



New Jersey Energy Efficiency Market Potential Assessment

Report Number 1401

Volume 3: Appendices

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MARKET PROFILES

Market profiles describe electricity use by sector, segment, end use and technology in the base year of the study (2010). The market profiles are given for average buildings and new vintages.

As explained in Chapter 2, a market profile includes the following elements:

- **Market size** is a representation of the number of customers in the segment. For the residential sector, it is number of households. In the commercial sector, it is floor space measured in square feet. For the industrial sector, it is number of employees.
- **Saturations** define the fraction of buildings with the specific technologies. (e.g., homes with electric space heating, commercial floor space with natural gas furnaces, etc).
- **UEC (unit energy consumption) or EUI (energy-use index)** describes the amount of energy consumed in the base year by a specific technology in buildings that have the technology. We use UECs expressed in kWh/household for the residential sector, and EUIs expressed in kWh/square foot or kWh/employee for the commercial and industrial sectors respectively. For natural gas technologies, kWh's are replaced by therms.
- **Intensity** for the residential sector represents the average energy use for the technology across all households in the base year. It is computed as the product of the saturation and the UEC and is defined as kWh/household for electricity and therms/household for natural gas. For the commercial and industrial sectors, intensity, computed as the product of the saturation and the EUI, represents the average use for the technology across all floor space or all employees in the base year.
- **Usage** is the annual energy use by a technology/end use in the segment. It is the product of the market size and intensity and is quantified in GWh for electricity and MMTherms for natural gas.

This appendix presents the following market profiles:

- Residential market profiles by segment (Table A-1 through Table A-12)
- Commercial market profiles by building type (Table A-13 through Table A-34)
- Industrial market profiles (Table A-35 through Table A-42)

Table A-1 Single Family Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Central AC	77.3%	2,595.6	2,006.2	3,376.4	87.3%	1,947.1	1,699.7	-25.0%
Cooling	Room AC	20.5%	1,266.0	259.2	436.2	10.5%	1,095.2	114.7	-13.5%
Cooling	Air-Source Heat Pump	0.8%	2,543.7	20.7	34.9	0.8%	1,654.1	13.5	-35.0%
Cooling	Geothermal Heat Pump	0.0%	1,696.6	-	-	0.0%	1,400.7	-	-17.4%
Heating	Electric Room Heat	3.4%	8,863.4	301.4	507.2	3.8%	6,864.5	260.7	-22.6%
Heating	Electric Furnace	0.5%	9,306.5	46.5	78.3	0.6%	7,207.7	40.3	-22.6%
Heating	Air-Source Heat Pump	0.8%	7,413.1	60.3	101.6	0.9%	4,678.6	42.5	-36.9%
Heating	Geothermal Heat Pump	0.0%	4,944.5	-	-	0.0%	3,257.2	-	-34.1%
Water Heating	Water Heater <=55 gal	11.6%	2,816.5	326.3	549.2	12.1%	2,420.4	294.1	-14.1%
Water Heating	Water Heater > 55 gal	1.3%	3,180.2	40.9	68.9	1.3%	2,733.0	36.9	-14.1%
Interior Lighting	Screw-in	100.0%	1,191.1	1,191.1	2,004.6	100.0%	1,418.1	1,418.1	19.1%
Interior Lighting	Linear Fluorescent	100.0%	153.4	153.4	258.2	100.0%	174.1	174.1	13.4%
Interior Lighting	Specialty	100.0%	620.5	620.5	1,044.2	100.0%	793.2	793.2	27.8%
Exterior Lighting	Screw-in	100.0%	273.3	273.3	460.0	100.0%	302.9	302.9	10.8%
Appliances	Clothes Washer	96.3%	111.5	107.4	180.8	99.2%	69.5	69.0	-37.6%
Appliances	Clothes Dryer	41.4%	837.6	346.6	583.4	42.6%	579.7	247.1	-30.8%
Appliances	Dishwasher	85.6%	424.1	362.9	610.8	88.1%	293.8	258.9	-30.7%
Appliances	Refrigerator	100.0%	798.0	798.0	1,343.0	100.0%	540.9	540.9	-32.2%
Appliances	Freezer	30.2%	625.3	188.6	317.4	31.1%	434.5	135.0	-30.5%
Appliances	Second Refrigerator	46.8%	929.5	434.9	732.0	48.2%	579.6	279.4	-37.6%
Appliances	Stove	26.3%	478.9	126.1	212.3	27.1%	478.9	129.8	0.0%
Appliances	Microwave	96.9%	136.5	132.2	222.5	99.8%	136.5	136.2	0.0%
Electronics	Personal Computers	90.6%	288.5	261.4	439.9	91.5%	296.3	271.1	2.7%
Electronics	Monitor	90.6%	57.4	52.0	87.5	91.5%	55.8	51.1	-2.7%
Electronics	Laptops	93.4%	118.7	110.8	186.4	94.3%	122.1	115.1	2.9%
Electronics	TVs	336.6%	164.5	553.6	931.6	340.0%	170.7	580.4	3.8%
Electronics	Printer/Fax/Copier	150.9%	42.2	63.7	107.2	152.4%	41.1	62.7	-2.5%
Electronics	Set-top Boxes/DVR	280.9%	112.4	315.7	531.4	283.7%	112.7	319.7	0.3%
Electronics	Devices and Gadgets	100.0%	105.0	105.0	176.7	101.0%	105.0	106.1	0.0%
Miscellaneous	Pool Pump	19.5%	1,500.0	292.5	492.3	19.5%	1,500.0	292.5	0.0%
Miscellaneous	Pool Heater	1.2%	4,981.0	61.0	102.7	1.2%	4,582.5	56.1	-8.0%
Miscellaneous	Hot Tub / Spa	8.6%	950.0	81.3	136.8	8.6%	950.0	81.3	0.0%
Miscellaneous	Well Pump	17.3%	561.0	97.1	163.4	17.3%	560.5	97.0	-0.1%
Miscellaneous	Furnace Fan	59.8%	446.4	266.8	449.1	59.8%	445.6	266.4	-0.2%
Miscellaneous	Miscellaneous	100.0%	605.3	605.3	1,018.6	100.0%	605.3	605.3	0.0%
Total				10,663	17,946			9,892	-7.2%

Table A-2 Single Family Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	59.3%	546.6	324.0	545.3	66.2%	417.0	276.1	-23.7%
Heating	Boiler	23.3%	823.8	192.1	323.3	26.0%	617.7	160.9	-25.0%
Heating	Other Heating	0.0%	430.0	-	-	0.0%	430.0	-	0.0%
Water Heating	Water Heater <=55 gal	73.8%	182.2	134.5	226.3	77.4%	157.9	122.2	-13.3%
Water Heating	Water Heater > 55 gal	7.3%	205.8	15.0	25.3	7.7%	178.3	13.6	-13.3%
Appliances	Clothes Dryer	55.8%	35.4	19.8	33.3	57.0%	18.3	10.4	-48.4%
Appliances	Stove	70.8%	59.7	42.3	71.2	72.9%	56.4	41.1	-5.6%
Miscellaneous	Pool Heater	8.8%	154.0	13.5	22.7	8.8%	154.0	13.5	0.0%
Miscellaneous	Hot Tub / Spa	15.6%	36.4	5.7	9.6	15.6%	36.4	5.7	0.0%
Miscellaneous	Miscellaneous	100.0%	17.2	17.2	29.0	100.0%	17.2	17.2	0.0%
Total				764	1,286			661	-13.5%

Table A-3 Single Family Limited Income Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Central AC	55.3%	2,054.9	1,136.1	657.9	65.3%	1,541.5	1,006.4	-25.0%
Cooling	Room AC	31.4%	1,002.3	314.8	182.3	21.4%	867.0	185.6	-13.5%
Cooling	Air-Source Heat Pump	0.8%	2,013.8	16.4	9.5	0.8%	1,309.5	10.7	-35.0%
Cooling	Geothermal Heat Pump	0.0%	1,343.2	-	-	0.0%	1,108.9	-	-17.4%
Heating	Electric Room Heat	3.6%	7,251.9	264.4	153.1	4.4%	5,616.4	245.9	-22.6%
Heating	Electric Furnace	0.5%	7,614.4	38.1	22.0	0.6%	5,897.2	35.4	-22.6%
Heating	Air-Source Heat Pump	0.8%	6,065.2	49.4	28.6	1.0%	3,827.9	37.4	-36.9%
Heating	Geothermal Heat Pump	0.0%	4,045.5	-	-	0.0%	2,665.0	-	-34.1%
Water Heating	Water Heater <=55 gal	3.3%	2,534.8	83.2	48.2	3.5%	2,178.3	76.2	-14.1%
Water Heating	Water Heater > 55 gal	0.4%	2,862.2	10.4	6.0	0.4%	2,459.7	9.6	-14.1%
Interior Lighting	Screw-in	100.0%	1,077.7	1,077.7	624.1	100.0%	1,261.4	1,261.4	17.1%
Interior Lighting	Linear Fluorescent	100.0%	138.8	138.8	80.4	100.0%	148.9	148.9	7.2%
Interior Lighting	Specialty	100.0%	561.4	561.4	325.1	100.0%	705.6	705.6	25.7%
Exterior Lighting	Screw-in	100.0%	260.3	260.3	150.7	100.0%	276.2	276.2	6.1%
Appliances	Clothes Washer	92.7%	106.2	98.4	57.0	95.5%	66.2	63.2	-37.6%
Appliances	Clothes Dryer	24.5%	797.7	195.3	113.1	25.2%	552.1	139.3	-30.8%
Appliances	Dishwasher	72.0%	403.9	290.8	168.4	74.2%	279.8	207.5	-30.7%
Appliances	Refrigerator	100.0%	760.0	760.0	440.1	100.0%	515.1	515.1	-32.2%
Appliances	Freezer	21.7%	595.5	129.3	74.9	22.4%	413.8	92.6	-30.5%
Appliances	Second Refrigerator	32.3%	885.3	285.8	165.5	33.3%	552.0	183.6	-37.6%
Appliances	Stove	17.9%	456.1	81.9	47.4	18.2%	456.1	82.8	0.0%
Appliances	Microwave	96.9%	130.0	125.9	72.9	99.8%	130.0	129.7	0.0%
Electronics	Personal Computers	78.9%	275.4	217.4	125.9	79.7%	282.8	225.4	2.7%
Electronics	Monitor	78.9%	54.8	43.3	25.0	79.7%	53.3	42.5	-2.7%
Electronics	Laptops	47.2%	113.0	53.4	30.9	47.7%	116.2	55.4	2.9%
Electronics	TVs	240.0%	156.6	376.0	217.7	242.4%	162.6	394.2	3.8%
Electronics	Printer/Fax/Copier	96.7%	40.2	38.9	22.5	97.7%	39.2	38.3	-2.5%
Electronics	Set-top Boxes/DVR	200.3%	107.1	214.4	124.2	202.3%	107.3	217.1	0.3%
Electronics	Devices and Gadgets	100.0%	100.0	100.0	57.9	101.0%	100.0	101.0	0.0%
Miscellaneous	Pool Pump	11.3%	1,500.0	169.8	98.3	11.3%	1,500.0	169.8	0.0%
Miscellaneous	Pool Heater	0.0%	4,981.0	-	-	0.0%	4,582.5	-	-8.0%
Miscellaneous	Hot Tub / Spa	0.0%	950.0	-	-	0.0%	950.0	-	0.0%
Miscellaneous	Well Pump	11.9%	561.0	66.9	38.7	11.9%	560.5	66.8	-0.1%
Miscellaneous	Furnace Fan	60.8%	392.9	238.9	138.4	60.8%	392.2	238.5	-0.2%
Miscellaneous	Miscellaneous	100.0%	402.8	402.8	233.2	100.0%	402.8	402.8	0.0%
Total				7,840	4,540			7,365	-6.1%

Table A-4 Single Family Limited Income Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	60.3%	451.3	272.2	157.6	72.4%	344.2	249.4	-23.7%
Heating	Boiler	16.0%	632.2	100.8	58.4	19.2%	474.0	90.8	-25.0%
Heating	Other Heating	0.0%	355.0	-	-	0.0%	355.0	-	0.0%
Water Heating	Water Heater <=55 gal	82.0%	150.1	123.1	71.3	87.5%	130.1	113.8	-13.3%
Water Heating	Water Heater > 55 gal	8.1%	169.4	13.7	8.0	8.7%	146.9	12.7	-13.3%
Appliances	Clothes Dryer	58.1%	35.4	20.6	11.9	59.3%	18.3	10.8	-48.4%
Appliances	Stove	80.9%	59.7	48.3	28.0	81.8%	56.4	46.1	-5.6%
Miscellaneous	Pool Heater	3.7%	154.0	5.6	3.3	3.7%	154.0	5.6	0.0%
Miscellaneous	Hot Tub / Spa	0.0%	36.4	-	-	0.0%	36.4	-	0.0%
Miscellaneous	Miscellaneous	100.0%	14.0	14.0	8.1	100.0%	14.0	14.0	0.0%
Total				598	346			543	-9.2%

Table A-5 Multi Family Renter Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Central AC	36.0%	1,992.0	717.0	358.5	46.0%	1,459.7	671.3	-26.7%
Cooling	Room AC	57.3%	1,285.8	736.9	368.5	47.3%	1,106.8	523.6	-13.9%
Cooling	Air-Source Heat Pump	0.0%	1,952.2	-	-	0.0%	1,282.8	-	-34.3%
Cooling	Geothermal Heat Pump	0.0%	1,302.1	-	-	0.0%	1,074.9	-	-17.4%
Heating	Electric Room Heat	1.0%	6,983.6	69.8	34.9	1.0%	5,194.0	53.7	-25.6%
Heating	Electric Furnace	7.2%	7,332.8	526.9	263.5	7.4%	5,453.7	405.2	-25.6%
Heating	Air-Source Heat Pump	0.0%	5,840.9	-	-	0.0%	3,821.6	-	-34.6%
Heating	Geothermal Heat Pump	0.0%	3,895.9	-	-	0.0%	2,566.4	-	-34.1%
Water Heating	Water Heater <=55 gal	13.9%	2,515.2	349.7	174.9	13.9%	2,153.8	299.4	-14.4%
Water Heating	Water Heater > 55 gal	0.0%	2,791.7	-	-	0.0%	2,390.5	-	-14.4%
Interior Lighting	Screw-in	100.0%	1,058.6	1,058.6	529.4	100.0%	1,255.8	1,255.8	18.6%
Interior Lighting	Linear Fluorescent	100.0%	121.8	121.8	60.9	100.0%	139.8	139.8	14.8%
Interior Lighting	Specialty	100.0%	551.4	551.4	275.8	100.0%	702.4	702.4	27.4%
Exterior Lighting	Screw-in	100.0%	237.8	237.8	118.9	100.0%	283.5	283.5	19.2%
Appliances	Clothes Washer	51.3%	106.2	54.5	27.2	52.8%	66.2	35.0	-37.6%
Appliances	Clothes Dryer	29.1%	797.7	231.9	116.0	29.9%	552.7	165.5	-30.7%
Appliances	Dishwasher	52.0%	403.9	209.8	104.9	53.5%	279.8	149.7	-30.7%
Appliances	Refrigerator	100.0%	760.0	760.0	380.1	100.0%	515.1	515.1	-32.2%
Appliances	Freezer	8.2%	595.5	48.9	24.4	8.5%	413.8	35.0	-30.5%
Appliances	Second Refrigerator	7.5%	885.3	66.1	33.0	7.7%	552.0	42.4	-37.6%
Appliances	Stove	17.5%	456.1	80.0	40.0	17.5%	456.1	80.0	0.0%
Appliances	Microwave	91.9%	130.0	119.4	59.7	94.7%	130.0	123.0	0.0%
Electronics	Personal Computers	71.3%	275.4	196.5	98.3	72.1%	282.8	203.8	2.7%
Electronics	Monitor	71.3%	54.8	39.1	19.6	72.1%	53.3	38.4	-2.7%
Electronics	Laptops	74.1%	113.0	83.7	41.9	74.8%	116.2	87.0	2.9%
Electronics	TVs	253.8%	156.6	397.5	198.8	256.3%	162.6	416.8	3.8%
Electronics	Printer/Fax/Copier	81.4%	40.2	32.7	16.4	82.2%	39.2	32.2	-2.5%
Electronics	Set-top Boxes/DVR	211.8%	107.1	226.7	113.4	213.9%	107.3	229.6	0.3%
Electronics	Devices and Gadgets	100.0%	100.0	100.0	50.0	101.0%	100.0	101.0	0.0%
Miscellaneous	Pool Pump	0.0%	1,500.0	-	-	0.0%	1,500.0	-	0.0%
Miscellaneous	Pool Heater	0.0%	4,981.0	-	-	0.0%	4,582.5	-	-8.0%
Miscellaneous	Hot Tub / Spa	0.0%	950.0	-	-	0.0%	950.0	-	0.0%
Miscellaneous	Well Pump	0.0%	556.0	-	-	0.0%	555.5	-	-0.1%
Miscellaneous	Furnace Fan	41.8%	383.2	160.3	80.1	41.8%	382.5	160.0	-0.2%
Miscellaneous	Miscellaneous	100.0%	392.7	392.7	196.4	100.0%	392.7	392.7	0.0%
Total				7,570	3,785			7,142	-5.7%

Table A-6 Multi Family Renter Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	34.6%	409.5	141.9	70.9	35.8%	298.9	107.0	-27.0%
Heating	Boiler	46.7%	613.4	286.3	143.2	48.3%	430.6	207.8	-29.8%
Heating	Other Heating	7.2%	410.8	29.6	14.8	7.5%	410.8	30.6	0.0%
Water Heating	Water Heater <=55 gal	86.1%	121.5	104.6	52.3	86.1%	106.1	91.4	-12.7%
Water Heating	Water Heater > 55 gal	0.0%	178.2	-	-	0.0%	155.7	-	-12.7%
Appliances	Clothes Dryer	18.8%	22.9	4.3	2.1	19.1%	11.8	2.3	-48.3%
Appliances	Stove	82.5%	38.4	31.7	15.8	82.5%	36.3	29.9	-5.6%
Miscellaneous	Pool Heater	0.0%	53.9	-	-	0.0%	53.9	-	0.0%
Miscellaneous	Hot Tub / Spa	0.0%	36.4	-	-	0.0%	36.4	-	0.0%
Miscellaneous	Miscellaneous	100.0%	15.1	15.1	7.6	100.0%	15.1	15.1	0.0%
Total				614	307			484	-21.1%

Table A-7 Multi Family Renter Limited Income Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Central AC	13.4%	1,707.4	229.6	98.7	23.4%	1,251.2	293.3	-26.7%
Cooling	Room AC	71.8%	1,102.1	790.8	340.1	61.8%	948.7	585.9	-13.9%
Cooling	Air-Source Heat Pump	0.0%	1,673.3	-	-	0.0%	1,099.5	-	-34.3%
Cooling	Geothermal Heat Pump	0.0%	1,116.1	-	-	0.0%	921.4	-	-17.4%
Heating	Electric Room Heat	1.0%	6,162.0	61.6	26.5	1.2%	4,583.0	54.3	-25.6%
Heating	Electric Furnace	0.5%	6,470.1	32.4	13.9	0.6%	4,812.1	28.5	-25.6%
Heating	Air-Source Heat Pump	0.0%	5,153.7	-	-	0.0%	3,372.0	-	-34.6%
Heating	Geothermal Heat Pump	0.0%	3,437.5	-	-	0.0%	2,264.5	-	-34.1%
Water Heating	Water Heater <=55 gal	33.5%	2,039.4	684.0	294.1	33.5%	1,746.3	585.7	-14.4%
Water Heating	Water Heater > 55 gal	0.0%	2,791.7	-	-	0.0%	2,390.5	-	-14.4%
Interior Lighting	Screw-in	100.0%	748.3	748.3	321.8	100.0%	887.7	887.7	18.6%
Interior Lighting	Linear Fluorescent	100.0%	86.1	86.1	37.0	100.0%	98.9	98.9	14.8%
Interior Lighting	Specialty	100.0%	389.8	389.8	167.6	100.0%	496.5	496.5	27.4%
Exterior Lighting	Screw-in	100.0%	232.1	232.1	99.8	100.0%	276.7	276.7	19.2%
Appliances	Clothes Washer	38.6%	106.2	41.0	17.6	39.8%	66.2	26.4	-37.6%
Appliances	Clothes Dryer	20.3%	797.7	162.0	69.7	20.9%	552.7	115.6	-30.7%
Appliances	Dishwasher	29.3%	403.9	118.3	50.9	30.2%	279.8	84.4	-30.7%
Appliances	Refrigerator	100.0%	760.0	760.0	326.8	100.0%	515.1	515.1	-32.2%
Appliances	Freezer	5.6%	595.5	33.4	14.4	5.8%	413.8	23.9	-30.5%
Appliances	Second Refrigerator	5.1%	885.3	45.2	19.4	5.3%	552.0	29.0	-37.6%
Appliances	Stove	28.5%	456.1	129.9	55.9	28.9%	456.1	132.0	0.0%
Appliances	Microwave	88.9%	130.0	115.5	49.7	91.6%	130.0	119.0	0.0%
Electronics	Personal Computers	20.6%	262.3	54.1	23.3	20.8%	269.3	56.2	2.7%
Electronics	Monitor	20.6%	52.2	10.8	4.6	20.8%	50.8	10.6	-2.7%
Electronics	Laptops	21.9%	107.4	23.5	10.1	22.1%	110.4	24.4	2.9%
Electronics	TVs	212.0%	148.8	315.5	135.7	214.1%	154.5	330.7	3.8%
Electronics	Printer/Fax/Copier	29.6%	38.2	11.3	4.9	29.9%	37.2	11.1	-2.5%
Electronics	Set-top Boxes/DVR	176.9%	101.7	179.9	77.4	178.7%	102.0	182.2	0.3%
Electronics	Devices and Gadgets	100.0%	95.0	95.0	40.8	101.0%	95.0	96.0	0.0%
Miscellaneous	Pool Pump	0.0%	1,500.0	-	-	0.0%	1,500.0	-	0.0%
Miscellaneous	Pool Heater	0.0%	4,981.0	-	-	0.0%	4,582.5	-	-8.0%
Miscellaneous	Hot Tub / Spa	0.0%	950.0	-	-	0.0%	950.0	-	0.0%
Miscellaneous	Well Pump	0.0%	556.0	-	-	0.0%	555.5	-	-0.1%
Miscellaneous	Furnace Fan	35.1%	239.5	84.2	36.2	35.1%	239.1	84.0	-0.2%
Miscellaneous	Miscellaneous	100.0%	296.3	296.3	127.4	100.0%	296.3	296.3	0.0%
Total				5,731	2,464			5,445	-5.0%

Table A-8 Multi Family Renter Limited Income Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	34.6%	353.9	122.6	52.7	41.0%	258.3	106.0	-27.0%
Heating	Boiler	48.3%	499.2	241.1	103.7	57.2%	350.5	200.5	-29.8%
Heating	Other Heating	0.0%	355.0	-	-	0.0%	355.0	-	0.0%
Water Heating	Water Heater <=55 gal	66.5%	108.0	71.8	30.9	66.5%	94.3	62.7	-12.7%
Water Heating	Water Heater > 55 gal	0.0%	158.4	-	-	0.0%	138.4	-	-12.7%
Appliances	Clothes Dryer	11.4%	22.9	2.6	1.1	11.6%	11.8	1.4	-48.3%
Appliances	Stove	69.9%	38.4	26.8	11.5	71.1%	36.3	25.8	-5.6%
Miscellaneous	Pool Heater	0.0%	53.9	-	-	0.0%	53.9	-	0.0%
Miscellaneous	Hot Tub / Spa	0.0%	36.4	-	-	0.0%	36.4	-	0.0%
Miscellaneous	Miscellaneous	100.0%	13.5	13.5	5.8	100.0%	13.5	13.5	0.0%
Total				478	206			410	-14.3%

Table A-9 Multi Family Owner Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Central AC	65.4%	1,739.1	1,137.1	252.7	75.4%	1,274.3	960.7	-26.7%
Cooling	Room AC	28.4%	1,122.5	319.1	70.9	18.4%	966.3	178.1	-13.9%
Cooling	Air-Source Heat Pump	0.0%	1,704.3	-	-	0.0%	1,119.9	-	-34.3%
Cooling	Geothermal Heat Pump	0.0%	1,136.8	-	-	0.0%	938.4	-	-17.4%
Heating	Electric Room Heat	1.0%	6,572.8	65.7	14.6	1.0%	4,888.5	48.9	-25.6%
Heating	Electric Furnace	4.5%	6,901.4	307.5	68.3	4.5%	5,132.9	228.7	-25.6%
Heating	Air-Source Heat Pump	0.0%	5,497.3	-	-	0.0%	3,596.8	-	-34.6%
Heating	Geothermal Heat Pump	0.0%	3,666.7	-	-	0.0%	2,415.5	-	-34.1%
Water Heating	Water Heater <=55 gal	13.9%	1,835.4	255.2	56.7	13.9%	1,571.7	218.5	-14.4%
Water Heating	Water Heater > 55 gal	0.0%	2,692.0	-	-	0.0%	2,305.2	-	-14.4%
Interior Lighting	Screw-in	100.0%	565.8	565.8	125.7	100.0%	745.8	745.8	31.8%
Interior Lighting	Linear Fluorescent	100.0%	65.1	65.1	14.5	100.0%	83.0	83.0	27.6%
Interior Lighting	Specialty	100.0%	294.7	294.7	65.5	100.0%	417.1	417.1	41.5%
Exterior Lighting	Screw-in	100.0%	175.5	175.5	39.0	100.0%	232.5	232.5	32.4%
Appliances	Clothes Washer	51.3%	106.2	54.5	12.1	52.8%	66.2	35.0	-37.6%
Appliances	Clothes Dryer	29.1%	797.7	231.9	51.5	29.9%	552.7	165.5	-30.7%
Appliances	Dishwasher	52.0%	403.9	209.8	46.6	53.5%	279.8	149.7	-30.7%
Appliances	Refrigerator	100.0%	760.0	760.0	168.9	100.0%	515.1	515.1	-32.2%
Appliances	Freezer	8.2%	595.5	48.9	10.9	8.5%	413.8	35.0	-30.5%
Appliances	Second Refrigerator	7.5%	885.3	66.1	14.7	7.7%	552.0	42.4	-37.6%
Appliances	Stove	5.8%	456.1	26.2	5.8	5.8%	456.1	26.2	0.0%
Appliances	Microwave	91.9%	130.0	119.4	26.5	94.7%	130.0	123.0	0.0%
Electronics	Personal Computers	67.0%	275.4	184.6	41.0	67.7%	282.8	191.5	2.7%
Electronics	Monitor	67.0%	54.8	36.7	8.2	67.7%	53.3	36.1	-2.7%
Electronics	Laptops	50.6%	113.0	57.1	12.7	51.1%	116.2	59.4	2.9%
Electronics	TVs	253.8%	156.6	397.5	88.3	256.3%	162.6	416.8	3.8%
Electronics	Printer/Fax/Copier	67.6%	40.2	27.2	6.0	68.3%	39.2	26.7	-2.5%
Electronics	Set-top Boxes/DVR	211.8%	107.1	226.7	50.4	213.9%	107.3	229.6	0.3%
Electronics	Devices and Gadgets	100.0%	100.0	100.0	22.2	101.0%	100.0	101.0	0.0%
Miscellaneous	Pool Pump	0.0%	1,500.0	-	-	0.0%	1,500.0	-	0.0%
Miscellaneous	Pool Heater	0.0%	4,981.0	-	-	0.0%	4,582.5	-	-8.0%
Miscellaneous	Hot Tub / Spa	0.0%	950.0	-	-	0.0%	950.0	-	0.0%
Miscellaneous	Well Pump	0.0%	556.0	-	-	0.0%	555.5	-	-0.1%
Miscellaneous	Furnace Fan	60.6%	239.5	145.2	32.3	60.6%	239.1	145.0	-0.2%
Miscellaneous	Miscellaneous	100.0%	334.1	334.1	74.2	100.0%	334.1	334.1	0.0%
Total				6,212	1,380			5,745	-7.5%

Table A-10 Multi Family Owner Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	56.2%	232.6	130.7	29.0	56.2%	169.7	95.4	-27.0%
Heating	Boiler	38.4%	399.4	153.2	34.0	38.4%	280.4	107.6	-29.8%
Heating	Other Heating	0.0%	233.3	-	-	0.0%	233.3	-	0.0%
Water Heating	Water Heater <=55 gal	86.1%	94.5	81.4	18.1	86.1%	82.5	71.1	-12.7%
Water Heating	Water Heater > 55 gal	0.0%	138.6	-	-	0.0%	121.1	-	-12.7%
Appliances	Clothes Dryer	18.8%	22.9	4.3	1.0	19.1%	11.8	2.3	-48.3%
Appliances	Stove	94.2%	38.4	36.2	8.0	94.2%	36.3	34.2	-5.6%
Miscellaneous	Pool Heater	0.0%	53.9	-	-	0.0%	53.9	-	0.0%
Miscellaneous	Hot Tub / Spa	0.0%	36.4	-	-	0.0%	36.4	-	0.0%
Miscellaneous	Miscellaneous	100.0%	9.6	9.6	2.1	100.0%	9.6	9.6	0.0%
Total				415	92			320	-22.9%

Table A-11 Multi Family Owner Limited Income Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Central AC	44.8%	1,106.7	495.3	20.1	54.8%	810.9	444.1	-26.7%
Cooling	Room AC	28.4%	775.5	220.5	8.9	18.4%	667.6	123.0	-13.9%
Cooling	Air-Source Heat Pump	0.0%	1,084.5	-	-	0.0%	712.7	-	-34.3%
Cooling	Geothermal Heat Pump	0.0%	723.4	-	-	0.0%	597.2	-	-17.4%
Heating	Electric Room Heat	1.0%	5,545.8	55.5	2.2	1.0%	4,124.7	41.2	-25.6%
Heating	Electric Furnace	0.5%	5,823.1	29.1	1.2	0.5%	4,330.9	21.7	-25.6%
Heating	Air-Source Heat Pump	0.0%	4,638.4	-	-	0.0%	3,034.8	-	-34.6%
Heating	Geothermal Heat Pump	0.0%	3,093.8	-	-	0.0%	2,038.1	-	-34.1%
Water Heating	Water Heater <=55 gal	33.5%	1,427.6	478.8	19.4	33.5%	1,222.4	410.0	-14.4%
Water Heating	Water Heater > 55 gal	0.0%	2,093.8	-	-	0.0%	1,792.9	-	-14.4%
Interior Lighting	Screw-in	100.0%	529.3	529.3	21.4	100.0%	662.8	662.8	25.2%
Interior Lighting	Linear Fluorescent	100.0%	60.9	60.9	2.5	100.0%	73.8	73.8	21.2%
Interior Lighting	Specialty	100.0%	275.7	275.7	11.2	100.0%	370.7	370.7	34.5%
Exterior Lighting	Screw-in	100.0%	164.2	164.2	6.6	100.0%	206.6	206.6	25.8%
Appliances	Clothes Washer	38.6%	100.9	39.0	1.6	39.8%	62.9	25.0	-37.6%
Appliances	Clothes Dryer	20.3%	757.8	153.9	6.2	20.9%	525.1	109.9	-30.7%
Appliances	Dishwasher	29.3%	383.7	112.4	4.5	30.2%	265.8	80.2	-30.7%
Appliances	Refrigerator	100.0%	722.0	722.0	29.2	100.0%	489.4	489.4	-32.2%
Appliances	Freezer	5.6%	565.7	31.8	1.3	5.8%	393.1	22.7	-30.5%
Appliances	Second Refrigerator	5.1%	841.0	43.0	1.7	5.3%	524.4	27.6	-37.6%
Appliances	Stove	28.5%	433.3	123.4	5.0	28.8%	433.3	125.0	0.0%
Appliances	Microwave	88.9%	123.5	109.7	4.4	91.6%	123.5	113.0	0.0%
Electronics	Personal Computers	44.8%	262.3	117.4	4.8	45.2%	269.3	121.8	2.7%
Electronics	Monitor	44.8%	52.2	23.4	0.9	45.2%	50.8	22.9	-2.7%
Electronics	Laptops	21.9%	107.4	23.5	1.0	22.1%	110.4	24.4	2.9%
Electronics	TVs	212.0%	148.8	315.5	12.8	214.1%	154.5	330.7	3.8%
Electronics	Printer/Fax/Copier	29.6%	38.2	11.3	0.5	29.9%	37.2	11.1	-2.5%
Electronics	Set-top Boxes/DVR	176.9%	101.7	179.9	7.3	178.7%	102.0	182.2	0.3%
Electronics	Devices and Gadgets	100.0%	95.0	95.0	3.8	101.0%	95.0	96.0	0.0%
Miscellaneous	Pool Pump	0.0%	1,500.0	-	-	0.0%	1,500.0	-	0.0%
Miscellaneous	Pool Heater	0.0%	4,981.0	-	-	0.0%	4,582.5	-	-8.0%
Miscellaneous	Hot Tub / Spa	0.0%	950.0	-	-	0.0%	950.0	-	0.0%
Miscellaneous	Well Pump	0.0%	556.0	-	-	0.0%	555.5	-	-0.1%
Miscellaneous	Furnace Fan	33.6%	215.5	72.5	2.9	33.6%	215.1	72.4	-0.2%
Miscellaneous	Miscellaneous	100.0%	245.7	245.7	9.9	100.0%	245.7	245.7	0.0%
Total				4,729	191			4,454	-5.8%

Table A-12 Multi Family Owner Limited Income Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	33.1%	227.5	75.4	3.1	33.1%	166.0	55.0	-27.0%
Heating	Boiler	65.4%	392.3	256.4	10.4	65.4%	275.4	180.0	-29.8%
Heating	Other Heating	0.0%	228.2	-	-	0.0%	228.2	-	0.0%
Water Heating	Water Heater <=55 gal	66.5%	94.5	62.8	2.5	66.5%	82.5	54.9	-12.7%
Water Heating	Water Heater > 55 gal	0.0%	138.6	-	-	0.0%	121.1	-	-12.7%
Appliances	Clothes Dryer	11.4%	22.9	2.6	0.1	11.6%	11.8	1.4	-48.3%
Appliances	Stove	70.2%	38.4	27.0	1.1	71.2%	36.3	25.8	-5.6%
Miscellaneous	Pool Heater	0.0%	53.9	-	-	0.0%	53.9	-	0.0%
Miscellaneous	Hot Tub / Spa	0.0%	36.4	-	-	0.0%	36.4	-	0.0%
Miscellaneous	Miscellaneous	100.0%	12.7	12.7	0.5	100.0%	12.7	12.7	0.0%
Total				437	18			330	-24.5%

Table A-13 Small Office Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	9.0%	4.04	0.36	139.7	10.2%	3.17	0.32	-21.5%
Cooling	Water-Cooled Chiller	4.3%	4.10	0.18	67.7	4.9%	3.36	0.16	-18.1%
Cooling	Roof top AC	33.4%	3.87	1.29	496.6	37.9%	3.04	1.15	-21.4%
Cooling	Air-Source Heat Pump	2.8%	3.49	0.10	37.0	3.1%	2.64	0.08	-24.4%
Cooling	Geothermal Heat Pump	0.7%	2.33	0.02	6.2	0.8%	1.96	0.02	-15.8%
Cooling	Other Cooling	8.5%	2.96	0.25	97.0	9.7%	2.71	0.26	-8.7%
Heating	Air-Source Heat Pump	2.8%	3.50	0.10	37.0	2.8%	2.92	0.08	-16.5%
Heating	Geothermal Heat Pump	0.7%	2.33	0.02	6.2	0.7%	1.83	0.01	-21.5%
Heating	Electric Room Heat	1.1%	4.28	0.05	17.9	1.1%	3.80	0.04	-11.3%
Heating	Electric Furnace	9.8%	4.49	0.44	168.7	9.8%	3.99	0.39	-11.3%
Ventilation	Ventilation	100.0%	0.81	0.81	312.3	100.0%	0.65	0.65	-19.7%
Water Heating	Water Heater	43.9%	0.61	0.27	103.7	43.9%	0.57	0.25	-7.0%
Interior Lighting	Screw-in	100.0%	1.26	1.26	483.7	100.0%	0.91	0.91	-27.4%
Interior Lighting	High-Bay Fixtures	100.0%	0.23	0.23	88.5	100.0%	0.13	0.13	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	2.00	2.00	769.4	100.0%	1.86	1.86	-7.2%
Exterior Lighting	Screw-in	100.0%	0.14	0.14	52.7	100.0%	0.08	0.08	-41.9%
Exterior Lighting	HID	100.0%	0.71	0.71	274.1	100.0%	0.49	0.49	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.06	0.06	22.0	140.0%	0.06	0.08	-3.3%
Refrigeration	Walk-in Refrigerator	4.7%	-	-	-	6.6%	-	-	0.0%
Refrigeration	Reach-in Refrigerator	4.7%	0.17	0.01	3.1	6.6%	0.08	0.01	-51.0%
Refrigeration	Glass Door Display	4.7%	-	-	-	6.6%	-	-	0.0%
Refrigeration	Open Display Case	4.7%	-	-	-	6.6%	-	-	0.0%
Refrigeration	Icemaker	4.7%	0.19	0.01	3.5	6.6%	0.17	0.01	-12.2%
Refrigeration	Vending Machine	4.7%	0.17	0.01	3.1	6.6%	0.12	0.01	-30.9%
Food Preparation	Oven	23.6%	0.24	0.06	21.4	33.0%	0.23	0.08	-1.1%
Food Preparation	Fryer	23.6%	-	-	-	33.0%	-	-	0.0%
Food Preparation	Dishwasher	23.6%	0.54	0.13	48.9	33.0%	0.41	0.14	-24.0%
Food Preparation	Hot Food Container	23.6%	-	-	-	33.0%	-	-	0.0%
Office Equipment	Desktop Computer	100.0%	0.96	0.96	367.1	140.0%	0.97	1.36	1.4%
Office Equipment	Laptop	100.0%	0.15	0.15	56.7	140.0%	0.15	0.21	1.4%
Office Equipment	Server	100.0%	0.68	0.68	260.4	140.0%	0.66	0.92	-2.6%
Office Equipment	Monitor	100.0%	0.18	0.18	68.0	140.0%	0.17	0.24	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.23	0.23	87.9	110.0%	0.22	0.24	-4.3%
Office Equipment	POS Terminal	20.5%	0.09	0.02	7.2	24.6%	0.08	0.02	-14.1%
Miscellaneous	Non-HVAC Motors	22.0%	0.20	0.04	16.5	30.8%	0.19	0.06	-5.0%
Miscellaneous	Pool Pump	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Miscellaneous	100.0%	0.90	0.90	345.4	100.0%	0.90	0.90	0.0%
Total				11.63	4,470			11.15	-4.2%

Table A-14 Small Office Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	14.8%	0.28	0.04	16.2	14.8%	0.24	0.04	-15.9%
Heating	Boiler	32.7%	1.04	0.34	130.7	32.7%	0.84	0.28	-19.0%
Heating	Other Heating	15.0%	0.28	0.04	16.4	15.0%	0.23	0.03	-18.4%
Water Heating	Water Heater	38.2%	0.21	0.08	31.1	38.2%	0.18	0.07	-13.1%
Food Preparation	Oven	1.7%	0.10	0.00	0.6	1.7%	0.09	0.00	-1.6%
Food Preparation	Fryer	1.7%	-	-	-	1.7%	-	-	0.0%
Food Preparation	Broiler	1.7%	-	-	-	1.7%	-	-	0.0%
Food Preparation	Griddle	1.7%	-	-	-	1.7%	-	-	0.0%
Food Preparation	Range	1.7%	-	-	-	1.7%	-	-	0.0%
Food Preparation	Steamer	1.7%	-	-	-	1.7%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	0.17	-	-	0.0%	0.16	-	-4.8%
Miscellaneous	Miscellaneous	2.3%	0.17	0.00	1.5	2.3%	0.17	0.00	0.0%
Total				0.51	196			0.42	-17.6%

Table A-15 Large Office Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	10.3%	3.92	0.40	175.3	11.7%	2.78	0.32	-29.2%
Cooling	Water-Cooled Chiller	3.2%	4.38	0.14	60.5	3.6%	3.19	0.12	-27.2%
Cooling	Roof top AC	33.9%	3.34	1.13	491.7	38.5%	2.47	0.95	-26.2%
Cooling	Air-Source Heat Pump	2.8%	3.02	0.08	36.6	3.2%	2.32	0.07	-23.3%
Cooling	Geothermal Heat Pump	0.7%	2.02	0.01	6.1	0.8%	1.72	0.01	-14.6%
Cooling	Other Cooling	8.7%	2.56	0.22	96.0	9.8%	2.34	0.23	-8.7%
Heating	Air-Source Heat Pump	2.8%	2.82	0.08	34.1	2.8%	2.37	0.07	-16.0%
Heating	Geothermal Heat Pump	0.7%	1.88	0.01	5.7	0.7%	1.48	0.01	-21.1%
Heating	Electric Room Heat	1.5%	3.56	0.05	22.7	1.5%	3.07	0.05	-13.6%
Heating	Electric Furnace	13.3%	3.74	0.50	214.7	13.3%	3.23	0.43	-13.6%
Ventilation	Ventilation	100.0%	1.94	1.94	840.5	100.0%	1.52	1.52	-21.5%
Water Heating	Water Heater	43.2%	0.67	0.29	126.0	43.2%	0.63	0.27	-6.9%
Interior Lighting	Screw-in	100.0%	1.16	1.16	504.3	100.0%	0.84	0.84	-27.7%
Interior Lighting	High-Bay Fixtures	100.0%	0.00	0.00	0.8	100.0%	0.00	0.00	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	2.61	2.61	1,129.2	100.0%	2.42	2.42	-7.2%
Exterior Lighting	Screw-in	100.0%	0.10	0.10	42.4	100.0%	0.06	0.06	-42.2%
Exterior Lighting	HID	100.0%	0.37	0.37	162.2	100.0%	0.26	0.26	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.02	0.02	8.1	140.0%	0.02	0.03	-3.3%
Refrigeration	Walk-in Refrigerator	35.9%	-	-	-	50.2%	-	-	0.0%
Refrigeration	Reach-in Refrigerator	35.9%	0.04	0.01	6.5	50.2%	0.02	0.01	-49.9%
Refrigeration	Glass Door Display	35.9%	0.17	0.06	27.1	50.2%	0.16	0.08	-10.3%
Refrigeration	Open Display Case	35.9%	0.08	0.03	12.2	50.2%	0.07	0.04	-9.0%
Refrigeration	Icemaker	35.9%	0.05	0.02	7.4	50.2%	0.04	0.02	-12.2%
Refrigeration	Vending Machine	35.9%	0.09	0.03	13.3	50.2%	0.06	0.03	-32.1%
Food Preparation	Oven	41.2%	0.09	0.04	16.2	57.7%	0.09	0.05	-1.1%
Food Preparation	Fryer	41.2%	0.13	0.06	24.1	57.7%	0.13	0.08	-0.6%
Food Preparation	Dishwasher	41.2%	0.21	0.09	37.0	57.7%	0.16	0.09	-24.0%
Food Preparation	Hot Food Container	41.2%	0.06	0.02	10.6	57.7%	0.04	0.02	-39.5%
Office Equipment	Desktop Computer	100.0%	2.33	2.33	1,008.1	140.0%	2.36	3.30	1.4%
Office Equipment	Laptop	100.0%	0.36	0.36	155.7	140.0%	0.36	0.51	1.4%
Office Equipment	Server	100.0%	0.28	0.28	119.2	140.0%	0.27	0.38	-2.6%
Office Equipment	Monitor	100.0%	0.43	0.43	186.8	140.0%	0.42	0.59	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.19	0.19	80.4	100.0%	0.18	0.18	-4.3%
Office Equipment	POS Terminal	12.7%	0.01	0.00	0.8	13.9%	0.01	0.00	-14.1%
Miscellaneous	Non-HVAC Motors	89.6%	0.12	0.11	47.7	125.4%	0.12	0.15	-5.0%
Miscellaneous	Pool Pump	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Miscellaneous	100.0%	0.79	0.79	344.2	100.0%	0.79	0.79	0.0%
Total				13.98	6,054			13.96	-0.1%

Table A-16 Large Office Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	15.8%	0.16	0.03	11.3	15.8%	0.14	0.02	-15.4%
Heating	Boiler	35.0%	0.60	0.21	91.0	35.0%	0.47	0.16	-21.6%
Heating	Other Heating	16.0%	0.16	0.03	11.4	16.0%	0.13	0.02	-19.3%
Water Heating	Water Heater	39.8%	0.17	0.07	29.2	39.8%	0.15	0.06	-13.8%
Food Preparation	Oven	18.6%	0.01	0.00	1.0	18.6%	0.01	0.00	-1.6%
Food Preparation	Fryer	18.6%	0.02	0.00	1.5	18.6%	0.02	0.00	-1.6%
Food Preparation	Broiler	18.6%	0.02	0.00	1.5	18.6%	0.02	0.00	0.0%
Food Preparation	Griddle	18.6%	0.02	0.00	1.5	18.6%	0.02	0.00	-0.6%
Food Preparation	Range	18.6%	0.02	0.00	1.5	18.6%	0.02	0.00	0.0%
Food Preparation	Steamer	18.6%	0.02	0.00	1.5	18.6%	0.02	0.00	-8.3%
Miscellaneous	Pool Heater	0.0%	0.04	-	-	0.0%	0.04	-	-5.0%
Miscellaneous	Miscellaneous	4.3%	0.04	0.00	0.8	4.3%	0.04	0.00	0.0%
Total				0.35	152			0.29	-18.3%

Table A-17 Restaurant Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	4.5%	8.50	0.38	20.0	4.7%	6.74	0.32	-20.8%
Cooling	Water-Cooled Chiller	4.0%	8.20	0.33	17.1	4.2%	6.84	0.29	-16.5%
Cooling	Roof top AC	35.8%	8.38	3.00	156.1	39.4%	5.89	2.32	-29.7%
Cooling	Air-Source Heat Pump	7.3%	7.58	0.55	28.7	8.0%	5.24	0.42	-30.9%
Cooling	Geothermal Heat Pump	1.8%	5.06	0.09	4.8	2.0%	3.86	0.08	-23.7%
Cooling	Other Cooling	14.8%	6.42	0.95	49.4	17.7%	5.87	1.04	-8.7%
Heating	Air-Source Heat Pump	7.3%	6.12	0.45	23.2	7.3%	5.02	0.37	-17.9%
Heating	Geothermal Heat Pump	1.8%	4.08	0.07	3.9	1.8%	3.39	0.06	-16.8%
Heating	Electric Room Heat	0.1%	10.12	0.01	0.7	0.1%	8.97	0.01	-11.4%
Heating	Electric Furnace	1.2%	10.63	0.13	6.8	1.2%	9.41	0.12	-11.4%
Ventilation	Ventilation	100.0%	2.65	2.65	137.9	100.0%	1.40	1.40	-47.1%
Water Heating	Water Heater	21.5%	9.45	2.03	105.6	21.5%	8.61	1.85	-8.9%
Interior Lighting	Screw-in	100.0%	5.63	5.63	292.4	100.0%	2.17	2.17	-61.4%
Interior Lighting	High-Bay Fixtures	100.0%	0.15	0.15	7.7	100.0%	0.08	0.08	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	1.25	1.25	65.2	100.0%	1.03	1.03	-17.8%
Exterior Lighting	Screw-in	100.0%	0.20	0.20	10.5	100.0%	0.13	0.13	-36.5%
Exterior Lighting	HID	100.0%	2.09	2.09	108.6	100.0%	1.42	1.42	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.01	0.01	0.4	140.0%	0.01	0.01	10.5%
Refrigeration	Walk-in Refrigerator	97.3%	4.29	4.17	216.9	136.2%	1.86	2.53	-56.6%
Refrigeration	Reach-in Refrigerator	97.3%	0.66	0.64	33.4	136.2%	0.32	0.44	-51.3%
Refrigeration	Glass Door Display	97.3%	2.77	2.69	140.0	136.2%	2.48	3.38	-10.3%
Refrigeration	Open Display Case	97.3%	1.25	1.22	63.2	136.2%	1.14	1.55	-9.0%
Refrigeration	Icemaker	97.3%	0.76	0.74	38.5	136.2%	0.67	0.91	-12.2%
Refrigeration	Vending Machine	97.3%	0.68	0.66	34.3	136.2%	0.37	0.50	-45.5%
Food Preparation	Oven	30.6%	4.68	1.43	74.4	42.9%	4.63	1.98	-1.1%
Food Preparation	Fryer	30.6%	6.97	2.13	110.8	42.9%	6.93	2.97	-0.6%
Food Preparation	Dishwasher	30.6%	5.36	1.64	85.2	42.9%	4.07	1.75	-24.0%
Food Preparation	Hot Food Container	30.6%	1.53	0.47	24.4	33.7%	0.93	0.31	-39.5%
Office Equipment	Desktop Computer	100.0%	0.22	0.22	11.3	110.0%	0.22	0.24	1.4%
Office Equipment	Laptop	100.0%	0.03	0.03	1.4	110.0%	0.03	0.03	1.4%
Office Equipment	Server	100.0%	0.31	0.31	16.0	110.0%	0.30	0.33	-2.6%
Office Equipment	Monitor	100.0%	0.04	0.04	2.1	110.0%	0.04	0.04	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.04	0.04	2.2	110.0%	0.04	0.04	-4.3%
Office Equipment	POS Terminal	100.0%	0.08	0.08	4.3	120.0%	0.07	0.09	-14.1%
Miscellaneous	Non-HVAC Motors	20.0%	0.92	0.18	9.5	28.0%	0.87	0.24	-5.0%
Miscellaneous	Pool Pump	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Miscellaneous	100.0%	1.23	1.23	63.7	100.0%	1.23	1.23	0.0%
Total				37.92	1,971			31.70	-16.4%

Table A-18 Restaurant Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	32.4%	0.27	0.09	4.5	32.4%	0.23	0.07	-15.7%
Heating	Boiler	8.9%	2.27	0.20	10.5	8.9%	1.74	0.16	-23.1%
Heating	Other Heating	33.0%	0.27	0.09	4.6	33.0%	0.22	0.07	-19.2%
Water Heating	Water Heater	66.1%	0.77	0.51	26.3	66.1%	0.66	0.44	-13.7%
Food Preparation	Oven	53.1%	0.23	0.12	6.4	53.1%	0.23	0.12	-1.6%
Food Preparation	Fryer	53.1%	0.36	0.19	10.0	53.1%	0.36	0.19	-1.6%
Food Preparation	Broiler	53.1%	0.36	0.19	10.0	53.1%	0.36	0.19	0.0%
Food Preparation	Griddle	53.1%	0.36	0.19	10.0	53.1%	0.36	0.19	-0.6%
Food Preparation	Range	53.1%	0.36	0.19	10.0	53.1%	0.36	0.19	0.0%
Food Preparation	Steamer	53.1%	0.36	0.19	10.0	53.1%	0.33	0.18	-8.3%
Miscellaneous	Pool Heater	0.0%	0.13	-	-	0.0%	0.13	-	-5.0%
Miscellaneous	Miscellaneous	5.8%	0.13	0.01	0.4	5.8%	0.13	0.01	0.0%
Total				1.97	103			1.80	-8.6%

Table A-19 Retail Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	0.0%	5.41	-	-	0.0%	4.27	-	-21.1%
Cooling	Water-Cooled Chiller	0.0%	5.21	-	-	0.0%	4.24	-	-18.5%
Cooling	Roof top AC	25.4%	5.73	1.46	802.7	26.7%	4.38	1.17	-23.6%
Cooling	Air-Source Heat Pump	10.0%	5.18	0.52	285.7	10.5%	3.78	0.40	-27.1%
Cooling	Geothermal Heat Pump	2.5%	3.46	0.09	47.6	2.6%	3.00	0.08	-13.3%
Cooling	Other Cooling	10.5%	4.39	0.46	253.7	10.5%	4.01	0.42	-8.7%
Heating	Air-Source Heat Pump	10.0%	7.04	0.70	387.9	10.0%	5.75	0.58	-18.2%
Heating	Geothermal Heat Pump	2.5%	4.69	0.12	64.7	2.5%	3.84	0.10	-18.2%
Heating	Electric Room Heat	0.0%	7.10	0.00	0.8	0.0%	6.48	0.00	-8.8%
Heating	Electric Furnace	0.2%	7.46	0.01	7.5	0.2%	6.80	0.01	-8.8%
Ventilation	Ventilation	100.0%	1.33	1.33	733.0	100.0%	1.09	1.09	-17.8%
Water Heating	Water Heater	43.0%	1.08	0.46	255.6	43.0%	0.97	0.42	-9.6%
Interior Lighting	Screw-in	100.0%	3.18	3.18	1,753.4	100.0%	1.59	1.59	-50.1%
Interior Lighting	High-Bay Fixtures	100.0%	0.33	0.33	181.1	100.0%	0.18	0.18	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	2.48	2.48	1,365.9	100.0%	2.21	2.21	-10.8%
Exterior Lighting	Screw-in	100.0%	0.50	0.50	276.9	100.0%	0.59	0.59	17.9%
Exterior Lighting	HID	100.0%	0.28	0.28	154.7	100.0%	0.19	0.19	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.01	0.01	2.9	110.0%	0.01	0.01	0.7%
Refrigeration	Walk-in Refrigerator	41.9%	0.79	0.33	181.7	46.1%	0.34	0.16	-56.7%
Refrigeration	Reach-in Refrigerator	41.9%	0.12	0.05	28.0	46.1%	0.06	0.03	-51.3%
Refrigeration	Glass Door Display	41.9%	0.51	0.21	117.3	46.1%	0.45	0.21	-10.3%
Refrigeration	Open Display Case	41.9%	0.23	0.10	53.0	46.1%	0.21	0.10	-9.0%
Refrigeration	Icemaker	41.9%	0.28	0.12	64.4	46.1%	0.24	0.11	-12.2%
Refrigeration	Vending Machine	41.9%	0.25	0.10	57.5	58.7%	0.17	0.10	-32.1%
Food Preparation	Oven	39.2%	0.15	0.06	32.5	54.8%	0.15	0.08	-1.1%
Food Preparation	Fryer	39.2%	0.22	0.09	48.5	54.8%	0.22	0.12	-0.6%
Food Preparation	Dishwasher	39.2%	0.35	0.14	74.5	54.8%	0.26	0.14	-24.0%
Food Preparation	Hot Food Container	39.2%	0.10	0.04	21.3	49.0%	0.06	0.03	-39.5%
Office Equipment	Desktop Computer	100.0%	0.15	0.15	83.2	125.0%	0.15	0.19	1.4%
Office Equipment	Laptop	100.0%	0.02	0.02	12.9	125.0%	0.02	0.03	1.4%
Office Equipment	Server	100.0%	0.21	0.21	118.1	125.0%	0.21	0.26	-2.6%
Office Equipment	Monitor	100.0%	0.03	0.03	15.4	125.0%	0.03	0.03	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.01	0.01	8.0	110.0%	0.01	0.02	-4.3%
Office Equipment	POS Terminal	100.0%	0.06	0.06	32.0	120.0%	0.05	0.06	-14.1%
Miscellaneous	Non-HVAC Motors	40.2%	0.08	0.03	18.3	48.2%	0.08	0.04	-5.0%
Miscellaneous	Pool Pump	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Miscellaneous	100.0%	0.81	0.81	444.5	100.0%	0.81	0.81	0.0%
Total				14.48	7,985			11.54	-20.3%

Table A-20 Retail Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	38.7%	0.43	0.17	91.7	38.7%	0.37	0.14	-13.6%
Heating	Boiler	4.5%	3.62	0.16	89.4	4.5%	2.85	0.13	-21.3%
Heating	Other Heating	25.7%	0.43	0.11	60.8	25.7%	0.35	0.09	-19.0%
Water Heating	Water Heater	31.5%	0.27	0.09	47.6	31.5%	0.24	0.07	-13.9%
Food Preparation	Oven	18.9%	0.03	0.01	2.9	18.9%	0.03	0.01	-1.6%
Food Preparation	Fryer	18.9%	0.04	0.01	4.5	18.9%	0.04	0.01	-1.6%
Food Preparation	Broiler	18.9%	0.04	0.01	4.5	18.9%	0.04	0.01	0.0%
Food Preparation	Griddle	18.9%	0.04	0.01	4.5	18.9%	0.04	0.01	-0.6%
Food Preparation	Range	18.9%	0.04	0.01	4.5	18.9%	0.04	0.01	0.0%
Food Preparation	Steamer	18.9%	0.04	0.01	4.5	18.9%	0.04	0.01	-8.3%
Miscellaneous	Pool Heater	0.0%	0.12	-	-	0.0%	0.11	-	-5.0%
Miscellaneous	Miscellaneous	4.8%	0.12	0.01	3.0	4.8%	0.12	0.01	0.0%
Total				0.58	318			0.49	-15.8%

Table A-21 Grocery Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	0.0%	7.42	-	-	0.0%	5.85	-	-21.1%
Cooling	Water-Cooled Chiller	0.0%	7.14	-	-	0.0%	5.82	-	-18.5%
Cooling	Roof top AC	43.3%	7.86	3.41	330.7	43.3%	5.89	2.55	-25.0%
Cooling	Air-Source Heat Pump	5.0%	7.10	0.35	34.3	5.0%	5.40	0.27	-23.9%
Cooling	Geothermal Heat Pump	1.2%	4.74	0.06	5.7	1.2%	3.69	0.05	-22.0%
Cooling	Other Cooling	17.0%	6.02	1.02	99.4	17.0%	5.50	0.94	-8.7%
Heating	Air-Source Heat Pump	5.0%	5.54	0.28	26.8	5.0%	4.53	0.23	-18.3%
Heating	Geothermal Heat Pump	1.2%	3.69	0.05	4.5	1.2%	2.94	0.04	-20.4%
Heating	Electric Room Heat	1.0%	6.21	0.06	6.0	1.0%	5.51	0.05	-11.2%
Heating	Electric Furnace	9.0%	6.52	0.58	56.7	9.0%	5.79	0.52	-11.2%
Ventilation	Ventilation	100.0%	2.16	2.16	209.2	100.0%	1.62	1.62	-25.0%
Water Heating	Water Heater	41.8%	2.27	0.95	92.0	41.8%	2.04	0.85	-10.1%
Interior Lighting	Screw-in	100.0%	2.83	2.83	274.9	100.0%	1.34	1.34	-52.6%
Interior Lighting	High-Bay Fixtures	100.0%	0.08	0.08	7.6	100.0%	0.04	0.04	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	5.34	5.34	518.6	100.0%	4.93	4.93	-7.8%
Exterior Lighting	Screw-in	100.0%	0.26	0.26	25.7	100.0%	0.14	0.14	-47.4%
Exterior Lighting	HID	100.0%	0.92	0.92	89.0	100.0%	0.63	0.63	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.04	0.04	3.6	140.0%	0.04	0.05	0.5%
Refrigeration	Walk-in Refrigerator	98.9%	6.62	6.55	635.4	138.5%	2.87	3.98	-56.6%
Refrigeration	Reach-in Refrigerator	98.9%	0.29	0.29	28.0	138.5%	0.14	0.20	-51.4%
Refrigeration	Glass Door Display	98.9%	12.21	12.08	1,171.9	138.5%	10.95	15.16	-10.3%
Refrigeration	Open Display Case	98.9%	5.51	5.45	529.0	138.5%	5.01	6.94	-9.0%
Refrigeration	Icemaker	98.9%	0.17	0.17	16.1	138.5%	0.15	0.20	-12.2%
Refrigeration	Vending Machine	98.9%	0.30	0.30	28.7	138.5%	0.16	0.23	-45.5%
Food Preparation	Oven	30.7%	0.63	0.19	18.6	43.0%	0.62	0.27	-1.1%
Food Preparation	Fryer	30.7%	0.93	0.29	27.8	43.0%	0.93	0.40	-0.6%
Food Preparation	Dishwasher	30.7%	1.43	0.44	42.7	43.0%	1.09	0.47	-24.0%
Food Preparation	Hot Food Container	30.7%	0.41	0.13	12.2	38.4%	0.25	0.10	-39.5%
Office Equipment	Desktop Computer	100.0%	0.14	0.14	14.0	125.0%	0.15	0.18	1.4%
Office Equipment	Laptop	100.0%	0.02	0.02	2.2	125.0%	0.02	0.03	1.4%
Office Equipment	Server	100.0%	0.10	0.10	9.9	125.0%	0.10	0.12	-2.6%
Office Equipment	Monitor	100.0%	0.03	0.03	2.6	125.0%	0.03	0.03	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.01	0.01	1.3	110.0%	0.01	0.01	-4.3%
Office Equipment	POS Terminal	100.0%	0.07	0.07	6.7	120.0%	0.06	0.07	-14.1%
Miscellaneous	Non-HVAC Motors	34.6%	0.11	0.04	3.8	41.6%	0.11	0.05	-5.0%
Miscellaneous	Pool Pump	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Miscellaneous	100.0%	0.88	0.88	85.3	100.0%	0.88	0.88	0.0%
Total				45.55	4,421			43.55	-4.4%

Table A-22 Grocery Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	39.8%	0.44	0.17	16.8	39.8%	0.37	0.15	-14.6%
Heating	Boiler	4.4%	3.67	0.16	15.7	4.4%	2.95	0.13	-19.5%
Heating	Other Heating	20.0%	0.44	0.09	8.5	20.0%	0.35	0.07	-19.2%
Water Heating	Water Heater	46.8%	0.31	0.14	13.9	46.8%	0.25	0.12	-17.0%
Food Preparation	Oven	26.7%	0.03	0.01	0.7	26.7%	0.02	0.01	-1.6%
Food Preparation	Fryer	26.7%	0.04	0.01	1.0	26.7%	0.04	0.01	-1.6%
Food Preparation	Broiler	26.7%	0.04	0.01	1.0	26.7%	0.04	0.01	0.0%
Food Preparation	Griddle	26.7%	0.04	0.01	1.0	26.7%	0.04	0.01	-0.6%
Food Preparation	Range	26.7%	0.04	0.01	1.0	26.7%	0.04	0.01	0.0%
Food Preparation	Steamer	26.7%	0.04	0.01	1.0	26.7%	0.04	0.01	-8.3%
Miscellaneous	Pool Heater	0.0%	0.04	-	-	0.0%	0.04	-	-8.0%
Miscellaneous	Miscellaneous	3.2%	0.04	0.00	0.1	3.2%	0.04	0.00	0.0%
Total				0.63	61			0.53	-15.9%

Table A-23 College Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	1.1%	5.12	0.06	12.3	1.1%	4.09	0.05	-20.1%
Cooling	Water-Cooled Chiller	5.5%	5.03	0.28	57.4	5.5%	4.02	0.22	-20.1%
Cooling	Roof top AC	19.3%	4.13	0.80	166.7	19.3%	3.28	0.63	-20.8%
Cooling	Air-Source Heat Pump	1.2%	3.74	0.04	9.3	1.2%	2.80	0.03	-25.1%
Cooling	Geothermal Heat Pump	0.3%	2.49	0.01	1.6	0.3%	2.09	0.01	-16.1%
Cooling	Other Cooling	20.6%	3.17	0.65	136.4	20.6%	2.90	0.60	-8.5%
Heating	Air-Source Heat Pump	1.2%	4.34	0.05	10.8	1.2%	3.68	0.04	-15.2%
Heating	Geothermal Heat Pump	0.3%	2.90	0.01	1.8	0.3%	2.36	0.01	-18.4%
Heating	Electric Room Heat	0.9%	7.73	0.07	14.3	0.9%	7.16	0.06	-7.3%
Heating	Electric Furnace	8.0%	8.11	0.65	134.8	8.0%	7.52	0.60	-7.3%
Ventilation	Ventilation	100.0%	1.21	1.21	251.6	100.0%	0.98	0.98	-18.5%
Water Heating	Water Heater	34.1%	1.65	0.56	117.1	34.1%	1.53	0.52	-6.9%
Interior Lighting	Screw-in	100.0%	1.27	1.27	264.9	100.0%	1.09	1.09	-14.3%
Interior Lighting	High-Bay Fixtures	100.0%	0.12	0.12	25.6	100.0%	0.07	0.07	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	2.10	2.10	438.4	100.0%	1.91	1.91	-9.2%
Exterior Lighting	Screw-in	100.0%	0.11	0.11	23.8	100.0%	0.05	0.05	-60.0%
Exterior Lighting	HID	100.0%	0.56	0.56	117.8	100.0%	0.38	0.38	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.00	0.00	0.2	110.0%	0.00	0.00	4.4%
Refrigeration	Walk-in Refrigerator	26.6%	0.16	0.04	8.9	29.3%	0.07	0.02	-56.7%
Refrigeration	Reach-in Refrigerator	26.6%	0.05	0.01	2.7	29.3%	0.02	0.01	-51.0%
Refrigeration	Glass Door Display	26.6%	0.10	0.03	5.7	29.3%	0.09	0.03	-10.3%
Refrigeration	Open Display Case	26.6%	0.05	0.01	2.6	29.3%	0.04	0.01	-9.0%
Refrigeration	Icemaker	26.6%	0.06	0.02	3.2	37.2%	0.05	0.02	-12.2%
Refrigeration	Vending Machine	26.6%	0.05	0.01	2.8	34.6%	0.04	0.01	-29.6%
Food Preparation	Oven	11.6%	0.22	0.03	5.3	15.1%	0.22	0.03	-1.1%
Food Preparation	Fryer	11.6%	0.33	0.04	7.9	15.1%	0.32	0.05	-0.6%
Food Preparation	Dishwasher	11.6%	0.50	0.06	12.2	15.1%	0.38	0.06	-24.0%
Food Preparation	Hot Food Container	11.6%	0.14	0.02	3.5	14.5%	0.09	0.01	-39.5%
Office Equipment	Desktop Computer	100.0%	0.51	0.51	106.5	125.0%	0.52	0.65	1.4%
Office Equipment	Laptop	100.0%	0.08	0.08	16.4	125.0%	0.08	0.10	1.4%
Office Equipment	Server	100.0%	0.24	0.24	50.3	125.0%	0.23	0.29	-2.6%
Office Equipment	Monitor	100.0%	0.09	0.09	19.7	125.0%	0.09	0.11	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.08	0.08	17.0	110.0%	0.08	0.09	-4.3%
Office Equipment	POS Terminal	20.8%	0.08	0.02	3.5	24.9%	0.07	0.02	-14.1%
Miscellaneous	Non-HVAC Motors	88.8%	0.03	0.02	4.8	106.6%	0.02	0.03	-5.0%
Miscellaneous	Pool Pump	4.9%	0.01	0.00	0.1	5.8%	0.01	0.00	0.0%
Miscellaneous	Pool Heater	1.2%	0.01	0.00	0.0	1.2%	0.01	0.00	0.0%
Miscellaneous	Miscellaneous	100.0%	0.62	0.62	129.6	100.0%	0.62	0.62	0.0%
Total				10.48	2,188			9.40	-10.3%

Table A-24 College Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	10.4%	0.17	0.02	3.7	10.4%	0.15	0.02	-14.6%
Heating	Boiler	53.3%	0.63	0.33	69.8	53.3%	0.49	0.26	-21.5%
Heating	Other Heating	8.3%	0.17	0.01	3.0	8.3%	0.14	0.01	-19.2%
Water Heating	Water Heater	53.0%	0.25	0.13	27.9	53.0%	0.22	0.12	-11.7%
Food Preparation	Oven	8.6%	0.02	0.00	0.3	8.6%	0.02	0.00	-1.6%
Food Preparation	Fryer	8.6%	0.03	0.00	0.5	8.6%	0.03	0.00	-1.6%
Food Preparation	Broiler	8.6%	0.03	0.00	0.5	8.6%	0.03	0.00	0.0%
Food Preparation	Griddle	8.6%	0.03	0.00	0.5	8.6%	0.03	0.00	-0.6%
Food Preparation	Range	8.6%	0.03	0.00	0.5	8.6%	0.03	0.00	0.0%
Food Preparation	Steamer	8.6%	0.03	0.00	0.5	8.6%	0.02	0.00	-8.3%
Miscellaneous	Pool Heater	1.2%	0.12	0.00	0.3	1.2%	0.12	0.00	-3.0%
Miscellaneous	Miscellaneous	7.2%	0.12	0.01	1.9	7.2%	0.12	0.01	0.0%
Total				0.52	109			0.43	-17.8%

Table A-25 School Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	2.4%	2.47	0.06	19.6	2.4%	1.97	0.05	-20.1%
Cooling	Water-Cooled Chiller	2.4%	2.42	0.06	19.2	2.4%	1.94	0.05	-20.1%
Cooling	Roof top AC	14.2%	1.99	0.28	92.2	14.2%	1.58	0.22	-20.8%
Cooling	Air-Source Heat Pump	0.9%	1.80	0.02	5.1	0.9%	1.35	0.01	-25.1%
Cooling	Geothermal Heat Pump	0.2%	1.20	0.00	0.9	0.2%	1.01	0.00	-16.1%
Cooling	Other Cooling	15.2%	1.53	0.23	75.4	15.2%	1.40	0.21	-8.5%
Heating	Air-Source Heat Pump	0.9%	2.40	0.02	6.8	0.9%	2.03	0.02	-15.2%
Heating	Geothermal Heat Pump	0.2%	1.60	0.00	1.1	0.2%	1.30	0.00	-18.4%
Heating	Electric Room Heat	0.3%	4.27	0.01	4.5	0.3%	3.96	0.01	-7.3%
Heating	Electric Furnace	2.9%	4.48	0.13	42.9	2.9%	4.15	0.12	-7.3%
Ventilation	Ventilation	100.0%	0.57	0.57	186.8	100.0%	0.47	0.47	-18.5%
Water Heating	Water Heater	24.4%	0.80	0.19	63.4	24.4%	0.74	0.18	-6.9%
Interior Lighting	Screw-in	100.0%	1.54	1.54	499.7	100.0%	1.32	1.32	-14.3%
Interior Lighting	High-Bay Fixtures	100.0%	0.25	0.25	81.8	100.0%	0.14	0.14	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	1.13	1.13	368.8	100.0%	1.03	1.03	-9.2%
Exterior Lighting	Screw-in	100.0%	0.06	0.06	20.8	100.0%	0.03	0.03	-60.0%
Exterior Lighting	HID	100.0%	0.42	0.42	135.2	100.0%	0.28	0.28	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.00	0.00	0.2	140.0%	0.00	0.00	4.4%
Refrigeration	Walk-in Refrigerator	65.7%	0.17	0.11	35.5	92.0%	0.07	0.07	-56.7%
Refrigeration	Reach-in Refrigerator	65.7%	0.05	0.03	10.9	92.0%	0.03	0.02	-51.0%
Refrigeration	Glass Door Display	65.7%	0.11	0.07	22.9	92.0%	0.10	0.09	-10.3%
Refrigeration	Open Display Case	65.7%	0.05	0.03	10.3	92.0%	0.04	0.04	-9.0%
Refrigeration	Icemaker	65.7%	0.06	0.04	12.6	92.0%	0.05	0.05	-12.2%
Refrigeration	Vending Machine	65.7%	0.05	0.03	11.2	78.8%	0.04	0.03	-29.6%
Food Preparation	Oven	28.1%	0.11	0.03	10.2	33.7%	0.11	0.04	-1.1%
Food Preparation	Fryer	28.1%	0.17	0.05	15.2	33.7%	0.17	0.06	-0.6%
Food Preparation	Dishwasher	28.1%	0.26	0.07	23.4	33.7%	0.19	0.07	-24.0%
Food Preparation	Hot Food Container	28.1%	0.07	0.02	6.7	39.3%	0.04	0.02	-39.5%
Office Equipment	Desktop Computer	100.0%	0.18	0.18	58.8	140.0%	0.18	0.26	1.4%
Office Equipment	Laptop	100.0%	0.02	0.02	6.1	140.0%	0.02	0.03	1.4%
Office Equipment	Server	100.0%	0.17	0.17	55.6	140.0%	0.17	0.23	-2.6%
Office Equipment	Monitor	100.0%	0.03	0.03	10.9	140.0%	0.03	0.05	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.06	0.06	18.8	110.0%	0.06	0.06	-4.3%
Office Equipment	POS Terminal	4.2%	0.02	0.00	0.3	5.1%	0.02	0.00	-14.1%
Miscellaneous	Non-HVAC Motors	43.7%	0.02	0.01	2.6	43.7%	0.02	0.01	-5.0%
Miscellaneous	Pool Pump	1.2%	0.00	0.00	0.0	1.2%	0.00	0.00	0.0%
Miscellaneous	Pool Heater	0.3%	0.00	0.00	0.0	0.3%	0.00	0.00	0.0%
Miscellaneous	Miscellaneous	100.0%	0.23	0.23	74.1	100.0%	0.23	0.23	0.0%
Total				6.18	2,011			5.47	-11.4%

Table A-26 School Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	10.1%	0.14	0.01	4.7	10.1%	0.12	0.01	-14.6%
Heating	Boiler	51.7%	0.52	0.27	87.6	51.7%	0.41	0.21	-21.5%
Heating	Other Heating	8.0%	0.14	0.01	3.7	8.0%	0.12	0.01	-19.2%
Water Heating	Water Heater	50.7%	0.21	0.11	35.0	50.7%	0.19	0.10	-11.7%
Food Preparation	Oven	40.8%	0.02	0.01	2.0	40.8%	0.02	0.01	-1.6%
Food Preparation	Fryer	40.8%	0.02	0.01	3.1	40.8%	0.02	0.01	-1.6%
Food Preparation	Broiler	40.8%	0.02	0.01	3.1	40.8%	0.02	0.01	0.0%
Food Preparation	Griddle	40.8%	0.02	0.01	3.1	40.8%	0.02	0.01	-0.6%
Food Preparation	Range	40.8%	0.02	0.01	3.1	40.8%	0.02	0.01	0.0%
Food Preparation	Steamer	40.8%	0.02	0.01	3.1	40.8%	0.02	0.01	-8.3%
Miscellaneous	Pool Heater	0.3%	0.04	0.00	0.0	0.3%	0.04	0.00	-3.0%
Miscellaneous	Miscellaneous	2.0%	0.04	0.00	0.3	2.0%	0.04	0.00	0.0%
Total				0.46	149			0.38	-16.5%

Table A-27 Health Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	15.1%	7.61	1.15	228.2	18.1%	6.19	1.12	-18.7%
Cooling	Water-Cooled Chiller	15.1%	8.11	1.23	243.0	18.1%	6.41	1.16	-20.9%
Cooling	Roof top AC	17.3%	7.18	1.24	246.0	20.7%	5.58	1.16	-22.2%
Cooling	Air-Source Heat Pump	8.8%	6.49	0.57	112.7	10.5%	4.98	0.52	-23.2%
Cooling	Geothermal Heat Pump	2.2%	4.33	0.09	18.8	2.6%	3.88	0.10	-10.4%
Cooling	Other Cooling	18.7%	5.50	1.03	203.7	21.7%	5.03	1.09	-8.5%
Heating	Air-Source Heat Pump	8.8%	9.19	0.81	159.6	8.8%	7.55	0.66	-17.8%
Heating	Geothermal Heat Pump	2.2%	6.13	0.13	26.6	2.2%	5.05	0.11	-17.6%
Heating	Electric Room Heat	0.2%	15.43	0.03	5.4	0.2%	13.86	0.02	-10.2%
Heating	Electric Furnace	1.6%	16.20	0.26	51.2	1.6%	14.55	0.23	-10.2%
Ventilation	Ventilation	100.0%	3.23	3.23	639.0	100.0%	2.52	2.52	-22.0%
Water Heating	Water Heater	10.4%	2.84	0.30	58.7	10.4%	2.61	0.27	-7.9%
Interior Lighting	Screw-in	100.0%	1.48	1.48	292.8	100.0%	1.29	1.29	-12.5%
Interior Lighting	High-Bay Fixtures	100.0%	0.04	0.04	7.2	100.0%	0.02	0.02	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	3.35	3.35	662.6	100.0%	3.11	3.11	-7.2%
Exterior Lighting	Screw-in	100.0%	0.03	0.03	6.6	100.0%	0.02	0.02	-52.9%
Exterior Lighting	HID	100.0%	0.43	0.43	84.6	100.0%	0.29	0.29	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.00	0.00	0.1	130.0%	0.00	0.00	5.1%
Refrigeration	Walk-in Refrigerator	87.6%	0.25	0.22	42.8	113.9%	0.11	0.12	-56.2%
Refrigeration	Reach-in Refrigerator	87.6%	0.04	0.03	6.6	113.9%	0.02	0.02	-56.6%
Refrigeration	Glass Door Display	87.6%	0.16	0.14	27.7	113.9%	0.14	0.16	-10.3%
Refrigeration	Open Display Case	87.6%	0.07	0.06	12.5	113.9%	0.07	0.07	-9.0%
Refrigeration	Icemaker	87.6%	0.09	0.08	15.2	113.9%	0.08	0.09	-12.2%
Refrigeration	Vending Machine	87.6%	0.08	0.07	13.5	109.5%	0.04	0.05	-45.5%
Food Preparation	Oven	32.1%	0.55	0.18	34.8	40.2%	0.54	0.22	-1.1%
Food Preparation	Fryer	32.1%	0.81	0.26	51.8	40.2%	0.81	0.33	-0.6%
Food Preparation	Dishwasher	32.1%	1.25	0.40	79.7	40.2%	0.95	0.38	-24.0%
Food Preparation	Hot Food Container	32.1%	0.36	0.12	22.8	45.0%	0.22	0.10	-39.5%
Office Equipment	Desktop Computer	100.0%	0.44	0.44	87.5	140.0%	0.45	0.63	1.4%
Office Equipment	Laptop	100.0%	0.07	0.07	13.5	140.0%	0.07	0.10	1.4%
Office Equipment	Server	100.0%	0.16	0.16	31.0	140.0%	0.15	0.21	-2.6%
Office Equipment	Monitor	100.0%	0.08	0.08	16.2	135.0%	0.08	0.11	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.11	0.11	20.9	110.0%	0.10	0.11	-4.3%
Office Equipment	POS Terminal	5.5%	0.11	0.01	1.2	6.1%	0.09	0.01	-14.1%
Miscellaneous	Non-HVAC Motors	74.1%	0.23	0.17	34.2	74.1%	0.22	0.16	-5.0%
Miscellaneous	Pool Pump	0.9%	0.01	0.00	0.0	0.9%	0.01	0.00	0.0%
Miscellaneous	Pool Heater	0.2%	0.02	0.00	0.0	0.2%	0.02	0.00	0.0%
Miscellaneous	Miscellaneous	100.0%	2.65	2.65	525.5	100.0%	2.65	2.65	0.0%
Total				20.63	4,084			19.22	-6.8%

Table A-28 Health Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	10.0%	0.56	0.06	11.1	10.0%	0.48	0.05	-14.1%
Heating	Boiler	49.5%	1.29	0.64	126.0	49.5%	0.98	0.48	-24.1%
Heating	Other Heating	6.1%	0.56	0.03	6.8	6.1%	0.46	0.03	-19.0%
Water Heating	Water Heater	65.2%	0.83	0.54	107.2	65.2%	0.67	0.43	-20.0%
Food Preparation	Oven	62.1%	0.05	0.03	5.5	62.1%	0.04	0.03	-1.6%
Food Preparation	Fryer	62.1%	0.07	0.04	8.6	62.1%	0.07	0.04	-1.6%
Food Preparation	Broiler	62.1%	0.07	0.04	8.5	62.1%	0.07	0.04	0.0%
Food Preparation	Griddle	62.1%	0.07	0.04	8.5	62.1%	0.07	0.04	-0.6%
Food Preparation	Range	62.1%	0.07	0.04	8.5	62.1%	0.07	0.04	0.0%
Food Preparation	Steamer	62.1%	0.07	0.04	8.5	62.1%	0.06	0.04	-8.3%
Miscellaneous	Pool Heater	0.2%	0.22	0.00	0.1	0.2%	0.20	0.00	-10.8%
Miscellaneous	Miscellaneous	5.2%	0.22	0.01	2.3	5.2%	0.22	0.01	0.0%
Total				1.52	302			1.24	-18.4%

Table A-29 Lodging Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	0.4%	1.76	0.01	0.7	0.5%	1.46	0.01	-16.7%
Cooling	Water-Cooled Chiller	7.2%	1.77	0.13	12.7	8.2%	1.39	0.11	-21.5%
Cooling	Roof top AC	44.4%	3.31	1.47	146.6	50.3%	2.42	1.22	-27.0%
Cooling	Air-Source Heat Pump	4.8%	3.20	0.15	15.2	5.4%	2.57	0.14	-19.6%
Cooling	Geothermal Heat Pump	1.2%	2.14	0.03	2.5	1.3%	1.70	0.02	-20.4%
Cooling	Other Cooling	14.0%	2.54	0.36	35.5	15.4%	2.32	0.36	-8.5%
Heating	Air-Source Heat Pump	4.8%	2.59	0.12	12.3	4.8%	2.05	0.10	-20.8%
Heating	Geothermal Heat Pump	1.2%	1.73	0.02	2.0	1.2%	1.40	0.02	-18.7%
Heating	Electric Room Heat	2.1%	3.37	0.07	7.0	2.1%	3.02	0.06	-10.2%
Heating	Electric Furnace	18.7%	3.53	0.66	66.0	18.7%	3.17	0.59	-10.2%
Ventilation	Ventilation	100.0%	1.08	1.08	107.2	100.0%	0.85	0.85	-20.6%
Water Heating	Water Heater	20.1%	3.65	0.74	73.3	20.1%	3.36	0.68	-7.9%
Interior Lighting	Screw-in	100.0%	3.46	3.46	345.0	100.0%	2.16	2.16	-37.7%
Interior Lighting	High-Bay Fixtures	100.0%	0.07	0.07	7.0	100.0%	0.04	0.04	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	0.44	0.44	43.9	100.0%	0.37	0.37	-16.8%
Exterior Lighting	Screw-in	100.0%	0.19	0.19	19.3	100.0%	0.10	0.10	-47.0%
Exterior Lighting	HID	100.0%	0.38	0.38	37.5	100.0%	0.26	0.26	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.00	0.00	0.1	120.0%	0.00	0.00	2.1%
Refrigeration	Walk-in Refrigerator	58.9%	0.35	0.21	20.8	70.7%	0.15	0.11	-56.7%
Refrigeration	Reach-in Refrigerator	58.9%	0.05	0.03	3.2	70.7%	0.02	0.02	-56.6%
Refrigeration	Glass Door Display	58.9%	0.23	0.13	13.4	70.7%	0.21	0.15	-10.3%
Refrigeration	Open Display Case	58.9%	0.10	0.06	6.1	70.7%	0.09	0.07	-9.0%
Refrigeration	Icemaker	58.9%	0.06	0.04	3.7	70.7%	0.06	0.04	-11.4%
Refrigeration	Vending Machine	58.9%	0.11	0.07	6.6	73.6%	0.06	0.04	-45.5%
Food Preparation	Oven	17.5%	0.25	0.04	4.4	21.8%	0.25	0.05	-1.1%
Food Preparation	Fryer	17.5%	0.38	0.07	6.6	21.8%	0.38	0.08	-0.6%
Food Preparation	Dishwasher	17.5%	0.58	0.10	10.1	21.8%	0.44	0.10	-24.0%
Food Preparation	Hot Food Container	17.5%	0.17	0.03	2.9	19.2%	0.10	0.02	-39.5%
Office Equipment	Desktop Computer	100.0%	0.06	0.06	5.8	110.0%	0.06	0.06	1.4%
Office Equipment	Laptop	100.0%	0.01	0.01	0.9	110.0%	0.01	0.01	1.4%
Office Equipment	Server	100.0%	0.04	0.04	4.1	110.0%	0.04	0.04	-2.6%
Office Equipment	Monitor	100.0%	0.01	0.01	1.1	110.0%	0.01	0.01	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.01	0.01	0.6	120.0%	0.01	0.01	-4.3%
Office Equipment	POS Terminal	100.0%	0.01	0.01	0.6	120.0%	0.00	0.01	-14.1%
Miscellaneous	Non-HVAC Motors	91.3%	0.02	0.02	1.7	91.3%	0.02	0.02	-5.0%
Miscellaneous	Pool Pump	39.5%	0.01	0.00	0.4	39.5%	0.01	0.00	0.0%
Miscellaneous	Pool Heater	9.9%	0.02	0.00	0.2	9.9%	0.02	0.00	0.0%
Miscellaneous	Miscellaneous	100.0%	0.86	0.86	85.8	100.0%	0.86	0.86	0.0%
Total				11.16	1,113			8.78	-21.4%

Table A-30 Lodging Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	7.6%	0.20	0.01	1.5	7.6%	0.16	0.01	-15.8%
Heating	Boiler	44.2%	0.40	0.18	17.7	44.2%	0.29	0.13	-26.7%
Heating	Other Heating	6.6%	0.40	0.03	2.6	6.6%	0.32	0.02	-19.3%
Water Heating	Water Heater	79.9%	0.44	0.35	35.1	79.9%	0.37	0.29	-16.7%
Food Preparation	Oven	40.3%	0.02	0.01	0.7	40.3%	0.02	0.01	-1.6%
Food Preparation	Fryer	40.3%	0.03	0.01	1.2	40.3%	0.03	0.01	-1.6%
Food Preparation	Broiler	40.3%	0.03	0.01	1.2	40.3%	0.03	0.01	0.0%
Food Preparation	Griddle	40.3%	0.03	0.01	1.2	40.3%	0.03	0.01	-0.6%
Food Preparation	Range	40.3%	0.03	0.01	1.2	40.3%	0.03	0.01	0.0%
Food Preparation	Steamer	40.3%	0.03	0.01	1.2	40.3%	0.03	0.01	-8.3%
Miscellaneous	Pool Heater	9.9%	0.06	0.01	0.6	9.9%	0.05	0.01	-7.7%
Miscellaneous	Miscellaneous	3.1%	0.06	0.00	0.2	3.1%	0.06	0.00	0.0%
Total				0.64	64			0.53	-17.9%

Table A-31 Warehouse Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	0.0%	3.46	-	-	0.0%	2.75	-	-20.4%
Cooling	Water-Cooled Chiller	0.0%	3.36	-	-	0.0%	2.95	-	-12.2%
Cooling	Roof top AC	10.7%	3.35	0.36	130.3	12.8%	2.68	0.34	-20.0%
Cooling	Air-Source Heat Pump	1.2%	3.02	0.03	12.7	1.4%	2.26	0.03	-25.2%
Cooling	Geothermal Heat Pump	0.3%	2.02	0.01	2.1	0.3%	1.61	0.01	-20.3%
Cooling	Other Cooling	3.1%	2.56	0.08	28.6	3.7%	2.35	0.09	-8.5%
Heating	Air-Source Heat Pump	1.2%	7.94	0.09	33.4	1.2%	6.51	0.07	-18.1%
Heating	Geothermal Heat Pump	0.3%	5.30	0.02	5.6	0.3%	4.31	0.01	-18.7%
Heating	Electric Room Heat	0.2%	9.48	0.02	6.0	0.2%	8.86	0.02	-6.6%
Heating	Electric Furnace	1.6%	9.95	0.16	56.6	1.6%	9.30	0.14	-6.6%
Ventilation	Ventilation	100.0%	0.32	0.32	116.7	100.0%	0.26	0.26	-19.8%
Water Heating	Water Heater	43.8%	0.30	0.13	47.7	43.8%	0.28	0.12	-7.9%
Interior Lighting	Screw-in	100.0%	0.56	0.56	204.8	100.0%	0.37	0.37	-33.4%
Interior Lighting	High-Bay Fixtures	100.0%	2.19	2.19	800.1	100.0%	1.19	1.19	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	0.50	0.50	182.2	100.0%	0.48	0.48	-3.5%
Exterior Lighting	Screw-in	100.0%	0.00	0.00	0.1	100.0%	0.00	0.00	-44.7%
Exterior Lighting	HID	100.0%	0.72	0.72	263.8	100.0%	0.49	0.49	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.00	0.00	1.2	120.0%	0.00	0.00	0.2%
Refrigeration	Walk-in Refrigerator	17.8%	-	-	-	21.3%	-	-	0.0%
Refrigeration	Reach-in Refrigerator	17.8%	-	-	-	21.3%	-	-	0.0%
Refrigeration	Glass Door Display	17.8%	-	-	-	21.3%	-	-	0.0%
Refrigeration	Open Display Case	17.8%	-	-	-	21.3%	-	-	0.0%
Refrigeration	Icemaker	17.8%	1.43	0.25	92.9	21.3%	1.26	0.27	-12.2%
Refrigeration	Vending Machine	17.8%	1.28	0.23	82.9	22.2%	0.87	0.19	-32.1%
Food Preparation	Oven	2.9%	0.26	0.01	2.8	3.7%	0.26	0.01	-1.1%
Food Preparation	Fryer	2.9%	-	-	-	3.7%	-	-	0.0%
Food Preparation	Dishwasher	2.9%	-	-	-	3.7%	-	-	0.0%
Food Preparation	Hot Food Container	2.9%	-	-	-	3.2%	-	-	0.0%
Office Equipment	Desktop Computer	100.0%	0.33	0.33	120.8	110.0%	0.34	0.37	1.4%
Office Equipment	Laptop	100.0%	0.04	0.04	14.9	120.0%	0.04	0.05	1.4%
Office Equipment	Server	100.0%	0.47	0.47	171.4	110.0%	0.46	0.50	-2.6%
Office Equipment	Monitor	100.0%	0.06	0.06	22.4	110.0%	0.06	0.07	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.03	0.03	11.6	125.0%	0.03	0.04	-4.3%
Office Equipment	POS Terminal	1.9%	0.06	0.00	0.4	2.3%	0.05	0.00	-14.1%
Miscellaneous	Non-HVAC Motors	49.9%	0.06	0.03	11.5	49.9%	0.06	0.03	-5.0%
Miscellaneous	Pool Pump	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	-	-	-	0.0%	-	-	0.0%
Miscellaneous	Miscellaneous	100.0%	0.59	0.59	216.5	100.0%	0.59	0.59	0.0%
Total				7.24	2,640			5.75	-20.5%

Table A-32 Warehouse Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	24.0%	0.50	0.12	43.4	24.0%	0.42	0.10	-15.4%
Heating	Boiler	5.5%	0.89	0.05	17.8	5.5%	0.70	0.04	-21.9%
Heating	Other Heating	18.4%	0.50	0.09	33.4	18.4%	0.40	0.07	-19.0%
Water Heating	Water Heater	25.0%	0.08	0.02	7.0	25.0%	0.07	0.02	-14.0%
Food Preparation	Oven	4.2%	0.03	0.00	0.5	4.2%	0.03	0.00	-1.6%
Food Preparation	Fryer	4.2%	-	-	-	4.2%	-	-	0.0%
Food Preparation	Broiler	4.2%	-	-	-	4.2%	-	-	0.0%
Food Preparation	Griddle	4.2%	-	-	-	4.2%	-	-	0.0%
Food Preparation	Range	4.2%	-	-	-	4.2%	-	-	0.0%
Food Preparation	Steamer	4.2%	-	-	-	4.2%	-	-	0.0%
Miscellaneous	Pool Heater	0.0%	0.03	-	-	0.0%	0.03	-	-5.1%
Miscellaneous	Miscellaneous	1.9%	0.03	0.00	0.2	1.9%	0.03	0.00	0.0%
Total				0.28	102			0.23	-17.5%

Table A-33 Miscellaneous Commercial Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Usage (GWh)	Saturation	UEC (kWh/sq ft)	Intensity (kWh/sq ft)	Compared to Average
Cooling	Air-Cooled Chiller	0.2%	2.64	0.01	2.5	0.3%	2.08	0.01	-21.2%
Cooling	Water-Cooled Chiller	4.1%	2.54	0.11	42.7	4.9%	2.07	0.10	-18.5%
Cooling	Roof top AC	20.7%	2.80	0.58	235.8	24.8%	2.16	0.54	-22.6%
Cooling	Air-Source Heat Pump	1.6%	2.53	0.04	15.9	1.9%	1.85	0.03	-26.9%
Cooling	Geothermal Heat Pump	0.4%	1.69	0.01	2.7	0.5%	1.31	0.01	-22.2%
Cooling	Other Cooling	19.7%	2.14	0.42	171.5	23.6%	1.96	0.46	-8.7%
Heating	Air-Source Heat Pump	1.6%	3.63	0.06	22.9	1.6%	3.22	0.05	-11.3%
Heating	Geothermal Heat Pump	0.4%	2.42	0.01	3.8	0.4%	2.04	0.01	-15.8%
Heating	Electric Room Heat	0.3%	3.67	0.01	5.1	0.3%	3.37	0.01	-8.2%
Heating	Electric Furnace	3.1%	3.85	0.12	48.6	3.1%	3.53	0.11	-8.2%
Ventilation	Ventilation	100.0%	0.56	0.56	226.0	100.0%	0.44	0.44	-20.6%
Water Heating	Water Heater	38.0%	1.06	0.40	163.9	38.0%	0.99	0.37	-6.9%
Interior Lighting	Screw-in	100.0%	0.89	0.89	364.2	100.0%	0.60	0.60	-32.5%
Interior Lighting	High-Bay Fixtures	100.0%	1.62	1.62	660.8	100.0%	0.88	0.88	-45.6%
Interior Lighting	Linear Fluorescent	100.0%	0.55	0.55	222.5	100.0%	0.50	0.50	-8.2%
Exterior Lighting	Screw-in	100.0%	0.24	0.24	97.7	100.0%	0.21	0.21	-14.5%
Exterior Lighting	HID	100.0%	0.51	0.51	205.8	100.0%	0.34	0.34	-31.8%
Exterior Lighting	Linear Fluorescent	100.0%	0.27	0.27	110.5	120.0%	0.30	0.36	11.1%
Refrigeration	Walk-in Refrigerator	25.5%	0.28	0.07	29.4	30.6%	0.12	0.04	-56.6%
Refrigeration	Reach-in Refrigerator	25.5%	0.04	0.01	4.5	30.6%	0.02	0.01	-51.4%
Refrigeration	Glass Door Display	25.5%	0.18	0.05	19.0	30.6%	0.16	0.05	-10.3%
Refrigeration	Open Display Case	25.5%	0.08	0.02	8.6	30.6%	0.08	0.02	-9.0%
Refrigeration	Icemaker	25.5%	0.05	0.01	5.2	30.6%	0.04	0.01	-12.2%
Refrigeration	Vending Machine	25.5%	0.09	0.02	9.3	28.0%	0.06	0.02	-29.6%
Food Preparation	Oven	12.3%	0.13	0.02	6.4	13.5%	0.13	0.02	-1.1%
Food Preparation	Fryer	12.3%	0.19	0.02	9.5	13.5%	0.19	0.03	-0.6%
Food Preparation	Dishwasher	12.3%	0.29	0.04	14.6	13.5%	0.22	0.03	-24.0%
Food Preparation	Hot Food Container	12.3%	0.08	0.01	4.2	13.5%	0.05	0.01	-39.5%
Office Equipment	Desktop Computer	100.0%	0.16	0.16	63.8	110.0%	0.16	0.17	1.4%
Office Equipment	Laptop	100.0%	0.02	0.02	9.9	120.0%	0.02	0.03	1.4%
Office Equipment	Server	100.0%	0.11	0.11	45.3	110.0%	0.11	0.12	-2.6%
Office Equipment	Monitor	100.0%	0.03	0.03	11.8	110.0%	0.03	0.03	-2.7%
Office Equipment	Printer/Copier/Fax	100.0%	0.03	0.03	12.2	125.0%	0.03	0.04	-4.3%
Office Equipment	POS Terminal	30.5%	0.06	0.02	7.5	36.6%	0.05	0.02	-14.1%
Miscellaneous	Non-HVAC Motors	59.9%	0.06	0.04	15.2	71.9%	0.06	0.04	-5.0%
Miscellaneous	Pool Pump	4.3%	0.00	0.00	0.0	5.1%	0.00	0.00	0.0%
Miscellaneous	Pool Heater	1.1%	0.00	0.00	0.0	1.1%	0.00	0.00	0.0%
Miscellaneous	Miscellaneous	100.0%	0.76	0.76	307.4	100.0%	0.76	0.76	0.0%
Total				7.83	3,187			6.48	-17.3%

Table A-34 *Miscellaneous Commercial Natural Gas Market Profile, 2010*

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm/sq ft)	Intensity (therm/sq ft)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/sq ft)	Compared to Average
Heating	Furnace	29.5%	0.22	0.07	26.6	29.5%	0.19	0.06	-13.5%
Heating	Boiler	23.4%	1.87	0.44	177.6	23.4%	1.42	0.33	-24.1%
Heating	Other Heating	16.0%	0.22	0.04	14.4	16.0%	0.18	0.03	-19.3%
Water Heating	Water Heater	39.5%	0.38	0.15	60.7	39.5%	0.31	0.12	-16.8%
Food Preparation	Oven	17.5%	0.02	0.00	1.5	17.5%	0.02	0.00	-1.6%
Food Preparation	Fryer	17.5%	0.03	0.01	2.4	17.5%	0.03	0.01	-1.6%
Food Preparation	Broiler	17.5%	0.03	0.01	2.4	17.5%	0.03	0.01	0.0%
Food Preparation	Griddle	17.5%	0.03	0.01	2.4	17.5%	0.03	0.01	-0.6%
Food Preparation	Range	17.5%	0.03	0.01	2.4	17.5%	0.03	0.01	0.0%
Food Preparation	Steamer	17.5%	0.03	0.01	2.4	17.5%	0.03	0.01	-8.3%
Miscellaneous	Pool Heater	1.1%	0.29	0.00	1.3	1.1%	0.27	0.00	-7.7%
Miscellaneous	Miscellaneous	14.7%	0.29	0.04	17.3	14.7%	0.29	0.04	0.0%
Total				0.76	311			0.62	-19.2%

Table A-35 Chemical and Pharmaceutical Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/empl)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/empl)	Compared to Average
Cooling	Air-Cooled Chiller	2.5%	7,356.0	183.9	16.3	2.5%	5,861.9	146.5	-20.3%
Cooling	Water-Cooled Chiller	2.5%	7,139.6	178.5	15.8	2.5%	6,257.1	156.4	-12.4%
Cooling	Roof top AC	5.6%	7,112.7	397.1	35.3	5.6%	5,684.0	317.3	-20.1%
Cooling	Air-Source Heat Pump	1.2%	6,430.0	74.1	6.6	1.2%	4,787.8	55.2	-25.5%
Cooling	Geothermal Heat Pump	0.3%	4,288.8	12.4	1.1	0.3%	3,419.8	9.9	-20.3%
Cooling	Other Cooling	3.1%	5,449.9	166.8	14.8	3.1%	4,970.3	152.1	-8.8%
Heating	Air-Source Heat Pump	1.2%	16,886.4	194.6	17.3	1.2%	13,849.4	159.6	-18.0%
Heating	Geothermal Heat Pump	0.3%	11,263.2	32.5	2.9	0.3%	9,171.2	26.4	-18.6%
Heating	Electric Room Heat	0.2%	20,157.8	34.9	3.1	0.2%	18,827.4	32.6	-6.6%
Heating	Electric Furnace	1.6%	21,165.7	329.6	29.3	1.6%	19,768.7	307.8	-6.6%
Ventilation	Ventilation	100.0%	679.9	679.9	60.4	100.0%	544.6	544.6	-19.9%
Interior Lighting	Screw-in	100.0%	240.1	240.1	21.3	100.0%	160.0	160.0	-33.4%
Interior Lighting	High-Bay Fixtures	100.0%	938.0	938.0	83.3	100.0%	471.0	471.0	-49.8%
Interior Lighting	Linear Fluorescent	100.0%	213.6	213.6	19.0	100.0%	206.1	206.1	-3.5%
Exterior Lighting	Screw-in	100.0%	0.1	0.1	0.0	100.0%	0.0	0.0	-44.7%
Exterior Lighting	HID	100.0%	130.3	130.3	11.6	100.0%	85.2	85.2	-34.6%
Exterior Lighting	Linear Fluorescent	100.0%	0.6	0.6	0.1	100.0%	0.6	0.6	0.2%
Motors	Pumps	100.0%	3,902.1	3,902.1	346.5	100.0%	3,862.3	3,862.3	-1.0%
Motors	Fans & Blowers	100.0%	1,083.9	1,083.9	96.3	100.0%	1,072.9	1,072.9	-1.0%
Motors	Compressed Air	100.0%	4,335.7	4,335.7	385.0	100.0%	4,291.5	4,291.5	-1.0%
Motors	Matl Handling	100.0%	1,083.9	1,083.9	96.3	100.0%	1,072.9	1,072.9	-1.0%
Motors	Matl Processing	100.0%	6,503.5	6,503.5	577.5	100.0%	6,437.1	6,437.1	-1.0%
Motors	Other Motors	100.0%	650.4	650.4	57.8	100.0%	643.7	643.7	-1.0%
Process	Process Heating	100.0%	3,243.7	3,243.7	288.0	100.0%	3,243.7	3,243.7	0.0%
Process	Process Cooling and Refrig	100.0%	2,737.0	2,737.0	243.0	100.0%	2,737.0	2,737.0	0.0%
Process	Electro-Chemical Processes	100.0%	3,250.5	3,250.5	288.6	100.0%	3,250.5	3,250.5	0.0%
Process	Other Process	100.0%	285.2	285.2	25.3	100.0%	285.2	285.2	0.0%
Miscellaneous	Miscellaneous	100.0%	985.5	985.5	87.5	100.0%	985.5	985.5	0.0%
Total				31,868	2,830			30,714	-3.6%

Table A-36 Chemical and Pharmaceutical Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/empl)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/empl)	Compared to Average
Heating	Furnace	24.0%	98.5	23.6	2.1	24.0%	83.4	20.0	-15.3%
Heating	Boiler	5.5%	177.0	9.7	0.9	5.5%	137.9	7.6	-22.1%
Heating	Other Heating	18.4%	98.5	18.2	1.6	18.4%	79.8	14.7	-19.0%
Process	Process Heating	100.0%	546.9	546.9	48.6	100.0%	546.9	546.9	0.0%
Process	Process Boiler	100.0%	1,290.6	1,290.6	114.6	100.0%	994.3	994.3	-23.0%
Process	Process Cooling	100.0%	9.1	9.1	0.8	100.0%	9.1	9.1	0.0%
Process	Other Process	100.0%	41.9	41.9	3.7	100.0%	41.9	41.9	0.0%
Miscellaneous	Miscellaneous	100.0%	90.9	90.9	8.1	100.0%	90.9	90.9	0.0%
Total				2,031	180			1,725	-15.0%

Table A-37 Paper Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/empl)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/empl)	Compared to Average
Cooling	Air-Cooled Chiller	2.5%	16,606.9	415.2	4.8	2.5%	13,233.9	330.8	-20.3%
Cooling	Water-Cooled Chiller	2.5%	16,118.4	403.0	4.6	2.5%	14,126.1	353.2	-12.4%
Cooling	Roof top AC	5.6%	16,057.8	896.4	10.3	5.6%	12,832.3	716.3	-20.1%
Cooling	Air-Source Heat Pump	1.2%	14,516.4	167.3	1.9	1.2%	10,808.9	124.6	-25.5%
Cooling	Geothermal Heat Pump	0.3%	9,682.5	27.9	0.3	0.3%	7,720.5	22.2	-20.3%
Cooling	Other Cooling	3.1%	12,303.7	376.6	4.3	3.1%	11,221.0	343.4	-8.8%
Heating	Air-Source Heat Pump	1.2%	38,123.0	439.4	5.1	1.2%	31,266.7	360.4	-18.0%
Heating	Geothermal Heat Pump	0.3%	25,428.0	73.3	0.8	0.3%	20,705.1	59.7	-18.6%
Heating	Electric Room Heat	0.2%	45,508.5	78.7	0.9	0.2%	42,504.9	73.5	-6.6%
Heating	Electric Furnace	1.6%	47,783.9	744.0	8.6	1.6%	44,630.2	694.9	-6.6%
Ventilation	Ventilation	100.0%	1,535.0	1,535.0	17.7	100.0%	1,229.6	1,229.6	-19.9%
Interior Lighting	Screw-in	100.0%	794.0	794.0	9.1	100.0%	529.1	529.1	-33.4%
Interior Lighting	High-Bay Fixtures	100.0%	3,102.1	3,102.1	35.7	100.0%	1,557.9	1,557.9	-49.8%
Interior Lighting	Linear Fluorescent	100.0%	706.6	706.6	8.1	100.0%	681.5	681.5	-3.5%
Exterior Lighting	Screw-in	100.0%	0.2	0.2	0.0	100.0%	0.1	0.1	-44.7%
Exterior Lighting	HID	100.0%	430.9	430.9	5.0	100.0%	281.7	281.7	-34.6%
Exterior Lighting	Linear Fluorescent	100.0%	1.9	1.9	0.0	100.0%	1.9	1.9	0.2%
Motors	Pumps	100.0%	20,620.4	20,620.4	237.1	100.0%	20,410.0	20,410.0	-1.0%
Motors	Fans & Blowers	100.0%	11,103.3	11,103.3	127.7	100.0%	10,989.9	10,989.9	-1.0%
Motors	Compressed Air	100.0%	5,551.7	5,551.7	63.8	100.0%	5,495.1	5,495.1	-1.0%
Motors	Matl Handling	100.0%	13,482.6	13,482.6	155.0	100.0%	13,345.0	13,345.0	-1.0%
Motors	Matl Processing	100.0%	13,482.6	13,482.6	155.0	100.0%	13,345.0	13,345.0	-1.0%
Motors	Other Motors	100.0%	8,724.0	8,724.0	100.3	100.0%	8,635.0	8,635.0	-1.0%
Process	Process Heating	100.0%	12,338.7	12,338.7	141.9	100.0%	12,338.7	12,338.7	0.0%
Process	Process Cooling and Refrig	100.0%	1,700.3	1,700.3	19.6	100.0%	1,700.3	1,700.3	0.0%
Process	Electro-Chemical Processes	100.0%	701.2	701.2	8.1	100.0%	701.2	701.2	0.0%
Process	Other Process	100.0%	1,075.2	1,075.2	12.4	100.0%	1,075.2	1,075.2	0.0%
Miscellaneous	Miscellaneous	100.0%	2,389.4	2,389.4	27.5	100.0%	2,389.4	2,389.4	0.0%
Total				101,362	1,166			97,786	-3.5%

Table A-38 Paper Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/empl)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/empl)	Compared to Average
Heating	Furnace	24.0%	473.2	113.5	1.3	24.0%	400.6	96.1	-15.3%
Heating	Boiler	5.5%	850.7	46.6	0.5	5.5%	662.6	36.3	-22.1%
Heating	Other Heating	18.4%	473.2	87.3	1.0	18.4%	383.3	70.7	-19.0%
Process	Process Heating	100.0%	1,627.9	1,627.9	18.7	100.0%	1,627.9	1,627.9	0.0%
Process	Process Boiler	100.0%	4,027.6	4,027.6	46.3	100.0%	3,103.1	3,103.1	-23.0%
Process	Process Cooling	100.0%	11.4	11.4	0.1	100.0%	11.4	11.4	0.0%
Process	Other Process	100.0%	32.3	32.3	0.4	100.0%	32.3	32.3	0.0%
Miscellaneous	Miscellaneous	100.0%	621.0	621.0	7.1	100.0%	621.0	621.0	0.0%
Total				6,567	76			5,599	-14.8%

Table A-39 Food Electric Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/empl)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/empl)	Compared to Average
Cooling	Air-Cooled Chiller	2.5%	7,693.8	192.3	5.8	2.5%	6,131.1	153.3	-20.3%
Cooling	Water-Cooled Chiller	2.5%	7,467.5	186.7	5.6	2.5%	6,544.4	163.6	-12.4%
Cooling	Roof top AC	5.6%	7,439.4	415.3	12.5	5.6%	5,945.0	331.9	-20.1%
Cooling	Air-Source Heat Pump	1.2%	6,725.3	77.5	2.3	1.2%	5,007.7	57.7	-25.5%
Cooling	Geothermal Heat Pump	0.3%	4,485.8	12.9	0.4	0.3%	3,576.8	10.3	-20.3%
Cooling	Other Cooling	3.1%	5,700.2	174.5	5.2	3.1%	5,198.6	159.1	-8.8%
Heating	Air-Source Heat Pump	1.2%	17,661.9	203.6	6.1	1.2%	14,485.5	167.0	-18.0%
Heating	Geothermal Heat Pump	0.3%	11,780.5	33.9	1.0	0.3%	9,592.4	27.6	-18.6%
Heating	Electric Room Heat	0.2%	21,083.6	36.5	1.1	0.2%	19,692.0	34.1	-6.6%
Heating	Electric Furnace	1.6%	22,137.7	344.7	10.3	1.6%	20,676.6	321.9	-6.6%
Ventilation	Ventilation	100.0%	711.2	711.2	21.3	100.0%	569.6	569.6	-19.9%
Interior Lighting	Screw-in	100.0%	337.2	337.2	10.1	100.0%	224.7	224.7	-33.4%
Interior Lighting	High-Bay Fixtures	100.0%	1,317.5	1,317.5	39.5	100.0%	661.6	661.6	-49.8%
Interior Lighting	Linear Fluorescent	100.0%	300.1	300.1	9.0	100.0%	289.4	289.4	-3.5%
Exterior Lighting	Screw-in	100.0%	0.1	0.1	0.0	100.0%	0.1	0.1	-44.7%
Exterior Lighting	HID	100.0%	183.0	183.0	5.5	100.0%	119.6	119.6	-34.6%
Exterior Lighting	Linear Fluorescent	100.0%	0.8	0.8	0.0	100.0%	0.8	0.8	0.2%
Motors	Pumps	100.0%	2,924.2	2,924.2	87.7	100.0%	2,894.3	2,894.3	-1.0%
Motors	Fans & Blowers	100.0%	2,103.2	2,103.2	63.1	100.0%	2,081.7	2,081.7	-1.0%
Motors	Compressed Air	100.0%	1,185.3	1,185.3	35.6	100.0%	1,173.2	1,173.2	-1.0%
Motors	Matl Handling	100.0%	1,792.0	1,792.0	53.8	100.0%	1,773.7	1,773.7	-1.0%
Motors	Matl Processing	100.0%	2,544.8	2,544.8	76.3	100.0%	2,518.8	2,518.8	-1.0%
Motors	Other Motors	100.0%	-	-	-	100.0%	-	-	0.0%
Process	Process Heating	100.0%	2,653.1	2,653.1	79.6	100.0%	2,653.1	2,653.1	0.0%
Process	Process Cooling and Refrig	100.0%	6,947.6	6,947.6	208.4	100.0%	6,947.6	6,947.6	0.0%
Process	Electro-Chemical Processes	100.0%	30.9	30.9	0.9	100.0%	30.9	30.9	0.0%
Process	Other Process	100.0%	169.0	169.0	5.1	100.0%	169.0	169.0	0.0%
Miscellaneous	Miscellaneous	100.0%	1,211.5	1,211.5	36.3	100.0%	1,211.5	1,211.5	0.0%
Total				26,089	783			24,746	-5.1%

Table A-40 Food Natural Gas Market Profile, 2010

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/empl)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/empl)	Compared to Average
Heating	Furnace	24.0%	226.3	54.3	1.6	24.0%	191.6	46.0	-15.3%
Heating	Boiler	5.5%	406.9	22.3	0.7	5.5%	316.9	17.4	-22.1%
Heating	Other Heating	18.4%	226.3	41.7	1.3	18.4%	183.3	33.8	-19.0%
Process	Process Heating	100.0%	685.7	685.7	20.6	100.0%	685.7	685.7	0.0%
Process	Process Boiler	100.0%	1,335.4	1,335.4	40.1	100.0%	1,028.8	1,028.8	-23.0%
Process	Process Cooling	100.0%	3.2	3.2	0.1	100.0%	3.2	3.2	0.0%
Process	Other Process	100.0%	16.6	16.6	0.5	100.0%	16.6	16.6	0.0%
Miscellaneous	Miscellaneous	100.0%	105.8	105.8	3.2	100.0%	105.8	105.8	0.0%
Total				2,265	68			1,937	-14.5%

Table A-41 *Miscellaneous Industrial Electric Market Profile, 2010*

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/empl)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/empl)	Compared to Average
Cooling	Air-Cooled Chiller	2.5%	24,535.9	613.4	77.8	2.5%	19,552.4	488.8	-20.3%
Cooling	Water-Cooled Chiller	2.5%	23,814.1	595.4	75.6	2.5%	20,870.5	521.8	-12.4%
Cooling	Roof top AC	5.6%	23,724.5	1,324.4	168.1	5.6%	18,959.0	1,058.3	-20.1%
Cooling	Air-Source Heat Pump	1.2%	21,447.3	247.2	31.4	1.2%	15,969.6	184.1	-25.5%
Cooling	Geothermal Heat Pump	0.3%	14,305.3	41.2	5.2	0.3%	11,406.7	32.9	-20.3%
Cooling	Other Cooling	3.1%	18,178.1	556.4	70.6	3.1%	16,578.4	507.4	-8.8%
Heating	Air-Source Heat Pump	1.2%	56,324.7	649.2	82.4	1.2%	46,194.9	532.5	-18.0%
Heating	Geothermal Heat Pump	0.3%	37,568.6	108.3	13.7	0.3%	30,590.6	88.2	-18.6%
Heating	Electric Room Heat	0.2%	67,236.4	116.3	14.8	0.2%	62,798.8	108.6	-6.6%
Heating	Electric Furnace	1.6%	70,598.2	1,099.2	139.5	1.6%	65,938.7	1,026.7	-6.6%
Ventilation	Ventilation	100.0%	2,267.9	2,267.9	287.8	100.0%	1,816.6	1,816.6	-19.9%
Interior Lighting	Screw-in	100.0%	833.2	833.2	105.7	100.0%	555.2	555.2	-33.4%
Interior Lighting	High-Bay Fixtures	100.0%	3,255.2	3,255.2	413.1	100.0%	1,634.8	1,634.8	-49.8%
Interior Lighting	Linear Fluorescent	100.0%	741.5	741.5	94.1	100.0%	715.1	715.1	-3.5%
Exterior Lighting	Screw-in	100.0%	0.2	0.2	0.0	100.0%	0.1	0.1	-44.7%
Exterior Lighting	HID	100.0%	452.1	452.1	57.4	100.0%	295.6	295.6	-34.6%
Exterior Lighting	Linear Fluorescent	100.0%	2.0	2.0	0.3	100.0%	2.0	2.0	0.2%
Motors	Pumps	100.0%	1,592.7	1,592.7	202.1	100.0%	1,576.5	1,576.5	-1.0%
Motors	Fans & Blowers	100.0%	1,912.8	1,912.8	242.7	100.0%	1,893.2	1,893.2	-1.0%
Motors	Compressed Air	100.0%	1,546.6	1,546.6	196.3	100.0%	1,530.9	1,530.9	-1.0%
Motors	Matl Handling	100.0%	659.0	659.0	83.6	100.0%	652.2	652.2	-1.0%
Motors	Matl Processing	100.0%	2,612.3	2,612.3	331.5	100.0%	2,585.6	2,585.6	-1.0%
Motors	Other Motors	100.0%	54.9	54.9	7.0	100.0%	54.3	54.3	-1.0%
Process	Process Heating	100.0%	3,913.6	3,913.6	496.6	100.0%	3,913.6	3,913.6	0.0%
Process	Process Cooling and Refrig	100.0%	1,680.3	1,680.3	213.2	100.0%	1,680.3	1,680.3	0.0%
Process	Electro-Chemical Processes	100.0%	150.1	150.1	19.0	100.0%	150.1	150.1	0.0%
Process	Other Process	100.0%	229.7	229.7	29.1	100.0%	229.7	229.7	0.0%
Miscellaneous	Miscellaneous	100.0%	1,513.8	1,513.8	192.1	100.0%	1,513.8	1,513.8	0.0%
Total				28,769	3,651			25,349	-11.9%

Table A-42 *Miscellaneous Industrial Natural Gas Market Profile, 2010*

Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/empl)	Usage (mmTherm)	Saturation	UEC (therm)	Intensity (therm/empl)	Compared to Average
Heating	Furnace	24.0%	1,484.7	356.0	45.2	24.0%	1,257.0	301.4	-15.3%
Heating	Boiler	5.5%	2,669.1	146.1	18.5	5.5%	2,079.0	113.8	-22.1%
Heating	Other Heating	18.4%	1,484.7	273.8	34.7	18.4%	1,202.5	221.8	-19.0%
Process	Process Heating	100.0%	249.7	249.7	31.7	100.0%	249.7	249.7	0.0%
Process	Process Boiler	100.0%	220.9	220.9	28.0	100.0%	170.2	170.2	-23.0%
Process	Process Cooling	100.0%	1.2	1.2	0.1	100.0%	1.2	1.2	0.0%
Process	Other Process	100.0%	34.0	34.0	4.3	100.0%	34.0	34.0	0.0%
Miscellaneous	Miscellaneous	100.0%	80.3	80.3	10.2	100.0%	80.3	80.3	0.0%
Total				1,362	173			1,172	-13.9%

RESIDENTIAL ENERGY EFFICIENCY EQUIPMENT AND MEASURE DATA

This appendix presents detailed information for all energy-efficiency measures (*equipment* and *non-equipment* measures per the LoadMAP taxonomy) that were evaluated as part of this study. Several sets of tables are provided.

Measure Descriptions

Table B-1 and Table B-2 provide brief descriptions for all equipment and non-equipment measures that were assessed for potential.

Equipment Measure Data

Table B-3 through Table B-26 list the detailed unit-level data for the equipment measures for each of the housing type segments — Single Family, Single Family Limited Income, Multi Family Renter, Multi Family Renter Limited Income, Multi Family Owner and Multi Family Owner Limited Income — and for existing and new construction, respectively. Savings are in annual kWh or therms per household, and incremental costs are in \$/household (\$/HH), unless noted otherwise. The BC ratio shown in the tables are for the first year of the potential analysis (2013), although the B/C ratio is calculated within LoadMAP for each year of the forecast. The B/C ratio in the tables is 1.00 if the measure represents the baseline technology, and zero if the technology is not available in 2013. The final data item in these tables is the levelized cost of conserved energy, which is defined as the cost of the measure divided by the cumulative amount of energy savings accrued over the measure's lifetime (\$/kWh or \$/therm).

Non-Equipment Measure Data

Table B-27 through Table B-38 list the detailed unit-level data for the non-equipment energy efficiency measures for each of the housing type segments and for existing and new construction, respectively. Because these measures can produce energy-use savings for multiple end-use loads (e.g., insulation affects heating and cooling energy use) savings are expressed as a net percentage of all the relevant, combined end-use loads. Base saturation indicates the percentage of homes in which the measure is already installed. Applicability is a factor that account for whether the measure is applicable to the building. Cost is expressed in \$/household. The detailed measure-level tables present the results of the benefit/cost (B/C) analysis for the first year of the analysis (2013) although the B/C ratio is calculated within LoadMAP for each year of the forecast. These tables also contain the levelized cost of conserved energy, which is defined as the cost of the measure divided by the cumulative amount of energy savings accrued over the measure's lifetime. Because these measures can effect multiple fuels, this metric is given in terms of \$/kBTU. To convert to \$/kWh, multiply these costs by 11.4. To convert to \$/therm, multiply by 100.

Table B-1 Residential Energy Efficiency Equipment Measure Descriptions

End Use	Technology	Measure Description
Cooling	Central AC	Central air conditioners consist of a refrigeration system using a direct expansion cycle. Equipment includes a compressor, an air-cooled condenser (located outdoors), an expansion valve, and an evaporator coil. A supply fan near the evaporator coil distributes supply air through air ducts to the building. Cooling efficiencies vary based on materials used, equipment size, condenser type, and system configuration. CACs may be unitary (all components housed in a factory-built assembly) or split system (an outdoor condenser section and an indoor evaporator section connected by refrigerant lines and with the compressor either indoors or outdoors). Energy efficiency is rated according to the size of the unit using the Seasonal Energy Efficiency Rating (SEER). Ductless systems with Variable Refrigerant Flow further improve the operating efficiency.
Cooling	Room AC	Room air conditioners are designed to cool a single room or space. They incorporate a complete air-cooled refrigeration and air-handling system in an individual package. Room air conditioners come in several forms, including window, split-type, and packaged terminal units. Energy efficiency is rated according to the size of the unit using the Energy Efficiency Rating (EER).
Cooling / Heating	Air-Source Heat Pump	A central heat pump consists of components similar to a CAC system, but is usually designed to function both as a heat pump and an air conditioner. It consists of a refrigeration system using a direct expansion (DX) cycle. Equipment includes a compressor, an air-cooled condenser (located outdoors), an expansion valve, and an evaporator coil (located in the supply air duct near the supply fan) and a reversing valve to change the DX cycle from cooling to heating when required. The cooling and heating efficiencies vary based on the materials used, equipment size, condenser type, and system configuration. Heat pumps may be unitary (all components housed in a factory-built assembly) or a split system (an outdoor condenser section and an indoor evaporator section connected by refrigerant lines, with either outdoors or indoors). A high-efficiency option for a ductless mini-split system is also analyzed.
Cooling / Heating	Geothermal Heat Pump	Geothermal heat pumps are similar to air-source heat pumps, but use the ground or groundwater instead of outside air to provide a heat source/sink. A geothermal heat pump system generally consists of three major subsystems or parts: a geothermal heat pump to move heat between the building and the fluid in the earth connection, an earth connection for transferring heat between the fluid and the earth, and a distribution subsystem for delivering heating or cooling to the building. The system may also have a desuperheater to supplement the building's water heater, or a full-demand water heater to meet all of the building's hot water needs.
Heating	Electric Furnace	Resistive heating elements are used to convert electricity directly to heat. The heat is then delivered by a supply fan and duct system to the regions that require heating.
Heating	Electric Room Heat	Resistive heating elements are used to convert electricity directly to heat. Conductive fins surrounding the element or another mechanism is used to deliver the heat directly to the surrounding room or area. These are typically either baseboard or wall-mounted units.
Heating	Furnace	Furnaces heat air and distribute the heated air through the building using ducts. Efficiency improvements can include: exhaust fan controls,

End Use	Technology	Measure Description
		<p>electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, smaller-diameter flue pipe, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.</p>
Heating	Boiler	<p>Boilers heat water, providing either hot water or steam to be distributed around the building for heating. Steam is distributed via pipes to steam radiators, and hot water can be distributed via baseboard radiators or radiant floor systems, or can heat air via a coil. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, smaller-diameter flue pipe, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.</p>
Water Heating	Water Heater	<p>For electric hot water heating, the most common type is a storage heater, which incorporates an electric heating element, storage tank, outer jacket, insulation, and controls in a single unit. Efficient units are characterized by a high recovery or thermal efficiency and low standby losses (the ratio of heat lost per hour to the content of the stored water). A further efficiency gain is available through a heat pump water heater (HPWH), which uses a vapor-compression thermodynamic cycle similar to that found in an air-conditioner or refrigerator to extract heat from an available source (e.g., air) and reject that heat to a higher temperature sink, in this case, the water in the water heater. Electric instantaneous water heaters are available, but are excluded from this study due to potentially high instantaneous demand concerns.</p> <p>For natural gas hot water heating, the most common type is a storage heater, which incorporates a burner, storage tank, outer jacket, insulation, and controls in a single unit. Efficient units are characterized by a high recovery or thermal efficiency and low standby losses (the ratio of heat lost per hour to the content of the stored water). A further efficiency gain is available in condensing units, which condense the water vapor produced in the combustion process and also use the heat from this condensation.</p>
Interior Lighting	Screw-in	<p>Infrared halogen lamps are designed to be a replacement for standard incandescent lamps. Also referred to as advanced incandescent lamps, these products meet the Energy Independence and Security Act (EISA) lighting standards and are phased in as the baseline technology screw-in lamp technology to reflect the timeline over which the EISA lighting standards take effect. Compact fluorescent lamps are designed to be a replacement for standard incandescent lamps and use about 25% of the energy used by standard incandescent lamps to produce the same lumen output. They can use either electronic or magnetic ballasts. Integral compact fluorescent lamps have the ballast integrated into the base of the lamp and have a standard screw-in base that permits installation into existing incandescent fixtures. Light-emitting diode (LED) lighting has seen recent penetration in specific applications such as traffic lights and exit signs. With the potential for extremely high efficiency, LEDs show promise to provide general-use lighting for interior spaces. Current models commercially available have efficacies comparable to CFLs. However, theoretical efficiencies are significantly higher. LED models under development are expected to provide improved efficacies.</p>

End Use	Technology	Measure Description
Interior Lighting	Linear Fluorescent	T8 fluorescent lamps are smaller in diameter than standard T12 lamps, resulting in greater light output per watt. T8 lamps also operate at a lower current and wattage, which increases the efficiency of the ballast but requires the lamps to be compatible with the ballast. Fluorescent lamp fixtures can include a reflector that increases the light output from the fixture, and thus make it possible to use a fewer number of lamps in each fixture. T5 lamps further increase efficiency by reducing the lamp diameter to 5/8". Light-emitting diode (LED) lighting has seen recent penetration in specific applications such as traffic lights and exit signs. With the potential for extremely high efficiency, LEDs show promise to provide general-use lighting for interior spaces. Current models commercially available have efficacies comparable to CFLs. However, theoretical efficiencies are significantly higher. LED models under development are expected to provide improved efficacies.
Interior Lighting	Specialty Lighting	Bulbs that the DOE does not consider conventional and are not covered by federal efficiency standards. These include: appliance bulbs, heavy-duty bulbs, dimmable bulbs, three-way bulbs, G shape (globe) lamps, candelabra base, and others.
Exterior Lighting	Screw-in	Infrared halogen lamps are designed to be a replacement for standard incandescent lamps. Also referred to as advanced incandescent lamps, these products meet the Energy Independence and Security Act (EISA) lighting standards and are phased in as the baseline technology screw-in lamp technology to reflect the timeline over which the EISA lighting standards take effect. Compact fluorescent lamps are designed to be a replacement for standard incandescent lamps and use about 25% of the energy used by standard incandescent lamps to produce the same lumen output. They can use either electronic or magnetic ballasts. Integral compact fluorescent lamps have the ballast integrated into the base of the lamp and have a standard screw-in base that permits installation into existing incandescent fixtures. Light-emitting diode (LED) lighting has seen recent penetration in specific applications such as traffic lights and exit signs. With the potential for extremely high efficiency, LEDs show promise to provide general-use lighting for interior spaces. Current models commercially available have efficacies comparable to CFLs. However, theoretical efficiencies are significantly higher. LED models under development are expected to provide improved efficacies.
Appliances	Refrigerator	Energy-efficient refrigerators/freezers incorporate features such as improved cabinet insulation, more efficient compressors and evaporator fans, defrost controls, mullion heaters, oversized condenser coils, and improved door seals. Further efficiency increases can be obtained by reducing the volume of refrigerated space, or adding multiple compartments to reduce losses from opening doors.
Appliances	Second Refrigerator	Energy-efficient refrigerators/freezers incorporate features such as improved cabinet insulation, more efficient compressors and evaporator fans, defrost controls, mullion heaters, oversized condenser coils, and improved door seals. Further efficiency increases can be obtained by reducing the volume of refrigerated space, or adding multiple compartments to reduce losses from opening doors.
Appliances	Freezer	Energy-efficient refrigerators/freezers incorporate features such as improved cabinet insulation, more efficient compressors and evaporator fans, defrost controls, mullion heaters, oversized condenser coils, and

End Use	Technology	Measure Description
		improved door seals. Further efficiency increases can be obtained by reducing the volume of refrigerated space, or adding multiple compartments to reduce losses from opening doors.
Appliances	Clothes Washer	High efficiency clothes washers use superior designs that require less water. Sensors match the hot water needs to the size and soil level of the load, preventing energy waste. Further energy and water savings can be achieved through advanced technologies such as inverter-drive or combination washer-dryer units. MEF is the official energy efficiency metric used to compare relative efficiencies of different clothes washers. MEF considers the energy used to run the washer, heat the water, and run the dryer. The higher the MEF, the more efficient the clothes washer.
Appliances	Clothes Dryer	An energy-efficient clothes dryer has a moisture-sensing device to terminate the drying cycle rather than using a timer, and an energy-efficient motor is used for spinning the dryer tub. Application of a heat pump cycle for extracting the moisture from clothes leads to additional energy savings.
Appliances	Dishwasher	High efficiency dishwashers save by using both improved technology for the primary wash cycle, and by using less hot water. Construction includes more effective washing action, energy-efficient motors, and other advanced technology such as sensors that determine the length of the wash cycle and the temperature of the water necessary to clean the dishes.
Appliances	Stove	These products have additional insulation in the oven compartment and tighter-fitting oven door gaskets and hinges to save energy. Conventional ovens must first heat up about 35 pounds of steel and a large amount of air before they heat up the food. Higher efficiency options include convection ovens, halogen burners, and induction burners.
Appliances	Microwave	Appliance that heats food with microwave radiation. No high efficiency option is modeled.
Electronics	Personal Computers	Improved power management can significantly reduce the annual energy consumption of PCs and monitors in both standby and normal operation. ENERGY STAR and Climate Savers labeled products provide increasing level of energy efficiency.
Electronics	Monitor	High efficiency electronics use efficient components and employ sleep/powersave modes.
Electronics	Laptops	High efficiency electronics use efficient components and employ sleep/powersave modes.
Electronics	Printer/Fax/Copier	High efficiency electronics use efficient components and employ sleep/powersave modes.
Electronics	TVs	In the average home, electronic products consumed significant energy, even when they are turn off, to maintain features like clocks, remote control, and channel/station memory. ENERGY STAR labeled consumer electronics can drastically reduce consumption during standby mode, in addition to saving energy through advanced power management during normal use.
Electronics	Devices and Gadgets	High efficiency electronics can use efficient components and employ sleep/powersave modes.

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Measure Description
Electronics	Set-top Boxes/DVR	High efficiency electronics can use efficient components and employ sleep/powersave modes.
Miscellaneous	Pool Heater	Efficient pool heaters can make use of heat pump technology to achieve significantly higher coefficients of performance in the COP=5.0 range. Gas pool heaters have a burner to heat water in a loop. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Miscellaneous	Pool Pump	High-efficiency motors and two-speed pumps provide improved energy efficiency for this load.
Miscellaneous	Furnace Fan	In homes heated by a furnace, there is still substantial energy use by the fan responsible for moving the hot air throughout the ductwork. Application of an Electronically Commutating Motor (ECM) ensures that motor speed matches the heating requirements of the system and saves energy when compared to a continuously operating standard motor.

Table B-2 Residential Energy Efficiency Non-Equipment Measure Descriptions

End Use	Measure	Description
HVAC (All)	Insulation - Ceiling	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation above ceilings can conserve energy by reducing the heat loss or gain into attics and/or through roofs. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene.
Cooling	Insulation - Ducting	Air distribution ducts can be insulated to reduce heating or cooling losses. Best results can be achieved by covering the entire surface area with insulation. Several types of ducts and duct insulation are available, including flexible duct, pre-insulated duct, duct board, duct wrap, tacked, or glued rigid insulation, and waterproof hard shell materials for exterior ducts. This analysis assumes that installing duct insulation can reduce the temperature drop/gain in ducts by 50%.
HVAC (All)	Insulation - Foundation	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing heat loss or gain from a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene. Foundation insulation is modeled for new construction / major retrofits only.
HVAC (All)	Insulation - Infiltration Control	Lowering the air infiltration rate by caulking small leaks and weather-stripping around window frames, doorframes, power outlets, plumbing, and wall corners can provide significant energy savings. Weather-stripping doors and windows will create a tight seal and further reduce air infiltration.
HVAC (All)	Insulation - Radiant Barrier	Radiant barriers are materials installed to reduce the heat gain in buildings. Radiant barriers are made from materials that are highly reflective and have low emissivity like aluminum. The closer the emissivity is to 0 the better they will perform. Radiant barriers can be placed above the insulation or on the roof rafters.
HVAC (All)	Insulation - Wall Cavity	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing heat loss or gain from a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene. Wall insulation is modeled for new construction / major retrofits only.
HVAC (All)	Insulation - Wall Sheathing	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing heat loss or gain from a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene. Wall sheathing is modeled for new construction / major retrofits only.
Cooling	Ducting - Repair and Sealing	Leakage in unsealed ducts varies considerably because of the differences in fabricating machinery used, the methods for assembly, installation workmanship, and age of the ductwork. Air leaks from the system to the outdoors result in a direct loss proportional to the amount of leakage and the difference in enthalpy between the outdoor air and the conditioned air. To seal ducts, a wide variety of sealing methods and products exist. Each has a relatively short shelf life, and no documented research has identified the aging characteristics of sealant applications.
HVAC (All)	Windows - High Efficiency/ENERGY STAR	High-efficiency windows, such as those labeled under the ENERGY STAR Program, are designed to reduce energy use and increase occupant comfort. High-efficiency windows reduce the amount of heat transfer through the

End Use	Measure	Description
		glazing surface. For example, some windows have a low-E coating, a thin film of metallic oxide coating on the glass surface that allows passage of short-wave solar energy through glass and prevents long-wave energy from escaping. Another example is double-pane glass that reduces conductive and convective heat transfer. Some double-pane windows are gas-filled (usually argon) to further increase the insulating properties of the window.
HVAC (All)	Windows - Install Reflective Film	Reflective films applied to the window interior help reduce solar gain into the space and thus lower cooling energy use.
HVAC (All)	Doors - Storm and Thermal	Like other components of the shell, doors are subject to several types of heat loss: conduction, infiltration, and radiant losses. Similar to a storm window, a storm door creates an insulating air space between the storm and primary doors. A tight fitting storm door can also help reduce air leakage or infiltration. Thermal doors have exceptional thermal insulation properties and also are provided with weather-stripping on the doorframe to reduce air leakage.
HVAC (All)	Roofs - High Reflectivity	The color and material of a building structure surface will determine the amount of solar radiation absorbed by that surface and subsequently transferred into a building. This is called solar absorptance. By using a living roof or a roofing material with a light color (and a lower solar absorptance), the roof will absorb less solar radiation and consequently reduce the cooling load. Living roofs also reduce stormwater runoff.
HVAC (All)	Attic Fan - Installation	Attic fans can reduce the need for AC by reducing heat transfer from the attic through the ceiling of the house. A well-ventilated attic can be several degrees cooler than a comparable, unventilated attic. An option for an attic fan equipped with a small solar photovoltaic generator is also modeled.
HVAC (All)	Attic Fan - Photovoltaic - Installation	Attic fans can reduce the need for AC by reducing heat transfer from the attic through the ceiling of the house. A well-ventilated attic can be several degrees cooler than a comparable, unventilated attic. An option for an attic fan equipped with a small solar photovoltaic generator is also modeled.
HVAC (All)	Whole-House Fan - Installation	Whole-house fans can reduce the need for AC on moderate-weather days or on cool evenings. The fan facilitates a quick air change throughout the entire house. Several windows must be open to achieve the best results. The fan is mounted on the top floor of the house, usually in a hallway ceiling.
HVAC (All)	Ceiling Fan - Installation	Ceiling fans can reduce the need for air conditioning. However, the house occupants must also select a ceiling fan with a high-efficiency motor and either shutoff the AC system or setup the thermostat temperature of the air conditioning system to realize the potential energy savings. Some ceiling fans also come with lamps. In this analysis, it is assumed that there are no lamps, and installing a ceiling fan will allow occupants to increase the thermostat cooling setpoint up by 2°F.
HVAC (All)	Thermostat - Clock/Programmable	A programmable thermostat can be added to most heating/cooling systems. They are typically used during winter to lower temperatures at night and in summer to increase temperatures during the afternoon. The energy savings from this type of thermostat are identical to those of a "setback" strategy with standard thermostats, but the convenience of a programmable thermostat makes it a much more attractive option. In this analysis, the baseline is assumed to have no thermostat setback.
HVAC (All)	Home Energy Management System	A centralized home energy management system can be used to control and schedule cooling, space heating, lighting, and possibly appliances as well. Some designs also allow the homeowner to remotely control loads via the Internet.
Cooling	Central AC - Early Replacement	CAC systems currently on the market are significantly more efficient than older units, due to technology improvement and stricter appliance standards. This measure incents homeowners to replace an aging but still working unit with a new, higher-efficiency one.
Cooling	Central AC - Maintenance and Tune-Up	An air conditioner's filters, coils, and fins require regular cleaning and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in

End Use	Measure	Description
		performance, requiring the AC unit to use more energy for the same cooling load.
Cooling / Heating	Central Heat Pump - Maintenance	A heat pump's filters, coils, and fins require regular cleaning and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance ensures a steady decline in performance while energy use steadily increases.
Cooling	Room AC - Removal of Second Unit	Homeowners may have a second room AC unit that is extremely inefficient. This measure incents homeowners to recycle the second unit and thus also eliminates associated electricity use.
Heating	Boiler - Hot Water Reset	Automatic control algorithm for boilers that varies the water temperature of the supply loop in an inverse relationship with the measured outside air temperature. If it is warmer outside, the hot water supply loop does not have to be as hot, thereby tailoring boiler heat output to the demand and saving energy.
Heating	Boiler - Pipe Insulation	Insulating hot water pipes decreases energy losses from piping that distributes hot water throughout the building. It also results in quicker delivery of hot water and may allow the lowering of the hot water set point, which saves energy. The most common insulation materials for this purpose are polyethylene and neoprene.
Heating	Boiler - Maintenance	A boiler's combustion controls, circulation loops, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
Heating	Furnace - Maintenance	A furnace's combustion controls, ventilation systems, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
Water Heating	Water Heater - Drainwater Heat Recovery	Drainwater Heat Recovery is a system in which drain water is used to preheat cold water entering the water heater. While these systems themselves are relatively inexpensive, upgrading an existing system could be unreasonable because of demolition costs. Thus they are modeled for new vintage only.
Water Heating	Water Heater - Faucet Aerators	Water faucet aerators are threaded screens that attach to existing faucets. They reduce the volume of water coming out of faucets while introducing air into the water stream. This measure provides energy saving by reducing hot water use, as well as water conservation for both hot and cold water.
Water Heating	Water Heater - Low-Flow Showerheads	Similar to faucet aerators, low-flow showerheads reduce the consumption of hot water, which in turn decreases water heating energy use.
Water Heating	Water Heater - Pipe Insulation	Insulating hot water pipes decreases energy losses from piping that distributes hot water throughout the building. It also results in quicker delivery of hot water and may allow the lowering of the hot water set point, which saves energy. The most common insulation materials for this purpose are polyethylene and neoprene.
Water Heating	Water Heater - Timer	These measures use either a programmable thermostat or a timer to adjust the water heater setpoint at times of low usage, typically when a home is unoccupied.
Water Heating	Water Heater - Desuperheater	A desuperheater can be added to an existing geothermal heat pump system (typically installed with the primary function of space heating and cooling) in order to draw off a portion of the geothermal heat for water heating purposes. The system can either supplement the building's water heater, or be a full-demand water heater that meets all of the building's hot water needs.
Water Heating	Water Heater - Solar System	Solar water heating systems can be used in residential buildings that have an appropriate near-south-facing roof or nearby unshaded grounds for installing a collector. Although system types vary, in general these systems use a solar

End Use	Measure	Description
		absorber surface within a solar collector or an actual storage tank. Either a heat-transfer fluid or the actual potable water flows through tubes attached to the absorber and transfers heat from it. (Systems with a separate heat-transfer-fluid loop include a heat exchanger that then heats the potable water.) The heated water is stored in a separate preheat tank or a conventional water heater tank. If additional heat is needed, it is provided by a conventional water-heating system.
Interior Lighting	Interior Lighting - Occupancy Sensors	Occupancy sensors turn lights off when a space is unoccupied. They are appropriate for areas with intermittent use, such as bathrooms or storage areas.
Exterior Lighting	Exterior Lighting - Photosensor Control	Photosensor controls turn exterior lighting on or off based on ambient lighting levels. Compared with manual operation, this can reduce the operation of exterior lighting during daylight hours.
Exterior Lighting	Exterior Lighting - Photovoltaic Installation	Solar photovoltaic generation may be used to power exterior lighting and thus eliminate all or part of the electrical energy use.
Exterior Lighting	Exterior Lighting - Timeclock Installation	Lighting timers turn exterior lighting on or off based on a preset schedule. Compared with manual operation, this can reduce the operation of exterior lighting during daylight hours.
Appliances	Refrigerator - Early Replacement	Refrigerators/freezers currently on the market are significantly more efficient than older units, due to technology improvement and stricter appliance standards. This measure incentivizes homeowners to replace an aging but still working unit with a new, higher-efficiency one.
Appliances	Refrigerator - Maintenance	This measure includes repairing and recharging refrigerant lines, cleaning condenser coils, and replacing the oil. This reduces energy consumption by improving the rate at which the system can compress and cool refrigerant as it moves through the system.
Appliances	Refrigerator - Remove Second Unit	Homeowners may have a second refrigerator or freezer that is not used to full capacity and that, because of its age, is extremely inefficient. This measure incentivizes homeowners to recycle the second unit and thus also eliminates associated electricity use.
Appliances	Freezer - Remove Second Unit	Homeowners may have a second refrigerator or freezer that is not used to full capacity and that, because of its age, is extremely inefficient. This measure incentivizes homeowners to recycle the second unit and thus also eliminates associated electricity use.
Appliances	Freezer - Early Replacement	Refrigerators/freezers currently on the market are significantly more efficient than older units, due to technology improvement and stricter appliance standards. This measure incentivizes homeowners to replace an aging but still working unit with a new, higher-efficiency one.
Appliances	Freezer - Maintenance	This measure includes repairing and recharging refrigerant lines, cleaning condenser coils, and replacing the oil. This reduces energy consumption by improving the rate at which the system can compress and cool refrigerant as it moves through the system.
Electronics	Electronics - Smart Power Strips	Representing a growing portion of home electricity consumption, plug-in electronics such as set-top boxes, DVD players, gaming systems, digital video recorders, and even battery chargers for mobile phones and laptop computers are often designed to supply a set voltage. When the units are not in use, this voltage could be dropped significantly (~1 W) and thereby generate a significant energy savings, assumed for this analysis to be between 4-5% on average. These savings are in excess of the measures already discussed for computers and televisions.
Miscellaneous	Pool Pump - Timer	A pool pump timer allows the pump to turn off automatically, eliminating the wasted energy associated with unnecessary pumping.
Miscellaneous	Pool Heater - Solar System	This measure replaces a conventional pool heater with a solar system.

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End Use	Measure	Description
HVAC (All)	ENERGY STAR Home Design	ENERGY STAR home design uses an integrated approach to the design of new buildings to account for the interaction of building systems. Designs may specify the building orientation, building shell, proper sizing of equipment and systems, and controls strategies with the goal of optimizing building energy efficiency and comfort. Options that may be evaluated and incorporated include passive solar strategies, increased thermal mass, natural ventilation, energy recovery ventilation, daylighting strategies, and shading strategies; but with specific requirements that adhere to the ENERGY STAR standard and measurement system. This measure is modeled for new vintage only.
Water Heating	Water Heater - Tank Blanket/Insulation	Insulation levels on hot water heaters can be increased by installing a fiberglass blanket on the outside of the tank. This increase in insulation reduces standby losses and thus saves energy. Water heater insulation is available either by the blanket or by square foot of fiberglass insulation with R-values ranging from 5 to 14.

Table B-3 Energy Efficiency Equipment Data, Electric—Single Family, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	205.51	\$126.16	15	1.03	\$0.06
Cooling	Central AC	SEER 15 (CEE Tier 2)	281.86	\$252.31	15	1.03	\$0.08
Cooling	Central AC	SEER 16 (CEE Tier 3)	346.16	\$378.47	15	1.02	\$0.10
Cooling	Central AC	Ductless Minisplit	400.69	\$2,223.53	15	0.74	\$0.51
Cooling	Central AC	SEER 21	797.51	\$2,144.68	15	0.82	\$0.25
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	113.19	\$89.66	10	1.02	\$0.10
Cooling	Room AC	EER 11.0	133.33	\$114.57	10	1.02	\$0.11
Cooling	Room AC	EER 11.5	180.62	\$139.47	10	1.03	\$0.10
Cooling	Room AC	EER 12.0	223.94	\$587.78	10	0.82	\$0.32
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	579.23	\$454.04	16	1.00	\$0.07
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	964.15	\$709.44	16	1.01	\$0.06
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,257.94	\$1,191.86	16	0.98	\$0.08
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1,471.73	\$3,575.59	16	0.79	\$0.21
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	636.12	\$437.41	16	1.00	\$0.06
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1,275.06	\$1,166.44	16	0.99	\$0.08
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	3,371.23	\$2,624.48	16	1.01	\$0.07
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	150.05	\$67.00	15	1.01	\$0.04
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,739.11	\$1,614.00	15	0.81	\$0.08
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	169.43	\$67.00	15	1.01	\$0.04
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,963.74	\$1,614.00	15	0.87	\$0.08
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	340.76	\$147.82	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	1,047.33	\$147.82	4	-	\$0.04
Interior Lighting	Screw-in	CFL	1,227.94	\$62.72	6	2.63	\$0.01
Interior Lighting	Screw-in	LED	1,306.09	\$1,769.56	15	0.55	\$0.12
Interior Lighting	Screw-in	LED (2020)	1,384.23	\$567.50	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	14.38	-\$4.59	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	43.09	\$36.70	10	0.76	\$0.10
Interior Lighting	Linear Fluorescent	LED (2011)	42.82	\$209.26	20	0.45	\$0.37
Interior Lighting	Linear Fluorescent	T5	43.70	\$62.94	10	0.66	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	167.79	\$545.49	20	-	\$0.25
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	177.51	\$231.01	4	-	\$0.35
Interior Lighting	Specialty	Infrared Halogen (2020)	545.57	\$231.01	4	-	\$0.11
Interior Lighting	Specialty	CFL	639.65	\$98.01	6	1.58	\$0.03
Interior Lighting	Specialty	LED	680.36	\$2,765.37	15	0.22	\$0.37
Interior Lighting	Specialty	LED (2020)	721.07	\$886.86	15	-	\$0.11
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	35.55	\$29.54	4	-	\$0.22
Exterior Lighting	Screw-in	Infrared Halogen (2020)	219.92	\$29.54	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	253.87	\$15.24	6	2.44	\$0.01
Exterior Lighting	Screw-in	LED	282.43	\$323.02	15	0.63	\$0.10
Exterior Lighting	Screw-in	LED (2020)	309.94	\$103.89	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	66.21	\$75.00	10	-	\$0.14
Appliances	Clothes Washer	AHAM (MEF 1.72)	66.21	\$75.00	10	-	\$0.14
Appliances	Clothes Washer	Energy Star (MEF 2.0)	75.48	\$115.00	10	0.89	\$0.19
Appliances	Clothes Washer	AHAM (MEF 2.0)	75.48	\$115.00	10	-	\$0.19

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End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	Compact (MEF 2.79)	91.60	\$225.00	10	0.78	\$0.30
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	29.19	\$100.00	13	0.89	\$0.35
Appliances	Clothes Dryer	Baseline (2015+)	30.65	\$75.00	13	-	\$0.25
Appliances	Clothes Dryer	High Efficiency (2015+)	68.63	\$175.00	13	-	\$0.26
Appliances	Clothes Dryer	HP (EF 4.52)	210.40	\$458.00	13	0.67	\$0.22
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	27.12	\$5.00	9	-	\$0.02
Appliances	Dishwasher	Energy Star (EF 0.73)	42.72	\$80.00	9	-	\$0.25
Appliances	Dishwasher	AHAM (EF 0.73)	42.72	\$80.00	9	1.00	\$0.25
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	144.01	\$255.00	9	0.86	\$0.24
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	48.69	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	68.88	\$425.00	13	0.71	\$0.62
Appliances	Refrigerator	AHAM (2014)	103.31	\$218.00	13	-	\$0.21
Appliances	Refrigerator	High Efficiency (2014)	133.00	\$695.00	13	-	\$0.53
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	51.83	\$50.00	11	0.96	\$0.11
Appliances	Freezer	High Efficiency	108.37	\$198.00	11	0.81	\$0.21
Appliances	Freezer	AHAM (2014)	109.55	\$198.00	11	-	\$0.21
Appliances	Freezer	High Efficiency (2014)	136.64	\$352.00	11	-	\$0.29
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	52.18	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	73.81	\$425.00	13	0.71	\$0.58
Appliances	Second Refrigerator	AHAM (2014)	110.71	\$218.00	13	-	\$0.20
Appliances	Second Refrigerator	High Efficiency (2014)	142.53	\$695.00	13	-	\$0.49
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.37	\$121.00	13	0.91	\$8.90
Appliances	Stove	Halogen Burner	4.53	\$580.00	13	0.67	\$12.94
Appliances	Stove	Induction	25.44	\$898.00	13	0.57	\$3.57
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	107.44	\$0.01	5	1.04	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	14.48	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	47.24	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	37.51	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	80.27	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	90.39	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.93	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	41.00	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	54.67	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	0.99	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	200.36	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	78.15	\$769.00	18	0.39	\$0.80
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-4 Energy Efficiency Equipment Data, Natural Gas—Single Family, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm /HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	5.74	\$135.10	20	0.99	\$1.79
Heating	Furnace	AFUE 90%	54.09	\$1,300.94	20	0.88	\$1.83
Heating	Furnace	AFUE 96%	87.59	\$2,001.44	20	0.83	\$1.74
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	2.86	\$598.57	21	1.00	\$15.45
Heating	Boiler	EF 0.85	30.78	\$1,795.72	21	0.94	\$4.31
Heating	Boiler	EF 0.95	120.25	\$5,985.73	21	0.76	\$3.68
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	10.34	\$56.67	15	1.00	\$0.50
Water Heating	Water Heater <=55 gal	EF 0.74	34.13	\$212.50	15	0.97	\$0.57
Water Heating	Water Heater <=55 gal	EF 0.76	37.75	\$240.83	15	0.96	\$0.58
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	52.75	\$1,164.17	15	0.64	\$2.02
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	11.68	\$56.67	15	1.00	\$0.44
Water Heating	Water Heater > 55 gal	EF 0.74	38.54	\$212.50	15	0.98	\$0.50
Water Heating	Water Heater > 55 gal	EF 0.76	42.63	\$240.83	15	0.98	\$0.52
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	59.56	\$1,164.17	15	0.66	\$1.79
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	1.02	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	3.75	\$130.00	13	0.81	\$3.50
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	2.84	\$115.00	13	0.85	\$4.09
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	7.43	\$103.37	15	0.98	\$1.27
Misc	Pool Heater	EF .90	21.99	\$1,791.56	15	0.71	\$7.45
Misc	Pool Heater	EF .95	28.93	\$2,071.10	15	0.68	\$6.54
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-5 Energy Efficiency Equipment Data, Electric—Single Family, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	162.90	\$108.15	15	1.03	\$0.06
Cooling	Central AC	SEER 15 (CEE Tier 2)	220.48	\$216.30	15	1.02	\$0.09
Cooling	Central AC	SEER 16 (CEE Tier 3)	269.25	\$324.44	15	1.01	\$0.11
Cooling	Central AC	Ductless Minisplit	310.23	\$1,906.11	15	0.73	\$0.56
Cooling	Central AC	SEER 21	330.78	\$1,838.52	15	0.74	\$0.51
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	106.21	\$89.66	10	1.01	\$0.10
Cooling	Room AC	EER 11.0	125.01	\$114.57	10	1.01	\$0.11
Cooling	Room AC	EER 11.5	169.43	\$139.47	10	1.03	\$0.10
Cooling	Room AC	EER 12.0	210.15	\$587.78	10	0.80	\$0.34
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	383.26	\$397.99	16	0.99	\$0.09
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	613.37	\$621.86	16	0.99	\$0.09
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	777.03	\$1,044.73	16	0.95	\$0.12
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	891.63	\$3,134.20	16	0.75	\$0.31
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	370.85	\$383.42	16	0.99	\$0.09
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	890.47	\$1,022.44	16	0.98	\$0.10
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2,553.23	\$2,300.50	16	0.99	\$0.08
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	147.32	\$67.00	15	1.01	\$0.04
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,707.49	\$1,614.00	15	0.81	\$0.09
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	166.35	\$67.00	15	1.01	\$0.04
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,928.04	\$1,614.00	15	0.86	\$0.08
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	387.14	\$167.94	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	1,189.88	\$167.94	4	-	\$0.04
Interior Lighting	Screw-in	CFL	1,395.07	\$71.25	6	2.63	\$0.01
Interior Lighting	Screw-in	LED	1,483.86	\$2,010.42	15	0.55	\$0.12
Interior Lighting	Screw-in	LED (2020)	1,572.65	\$644.75	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	16.34	-\$5.22	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	48.95	\$41.69	10	0.76	\$0.10
Interior Lighting	Linear Fluorescent	LED (2011)	48.64	\$237.74	20	0.45	\$0.37
Interior Lighting	Linear Fluorescent	T5	49.65	\$71.51	10	0.66	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	190.63	\$619.74	20	-	\$0.25
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	201.67	\$262.45	4	-	\$0.35
Interior Lighting	Specialty	Infrared Halogen (2020)	619.83	\$262.45	4	-	\$0.11
Interior Lighting	Specialty	CFL	726.71	\$111.35	6	1.58	\$0.03
Interior Lighting	Specialty	LED	772.96	\$3,141.77	15	0.22	\$0.37
Interior Lighting	Specialty	LED (2020)	819.21	\$1,007.58	15	-	\$0.11
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	40.38	\$33.56	4	-	\$0.22
Exterior Lighting	Screw-in	Infrared Halogen (2020)	249.85	\$33.56	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	288.42	\$17.32	6	2.44	\$0.01
Exterior Lighting	Screw-in	LED	320.87	\$366.99	15	0.63	\$0.10
Exterior Lighting	Screw-in	LED (2020)	352.12	\$118.03	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	66.21	\$75.00	10	-	\$0.14
Appliances	Clothes Washer	AHAM (MEF 1.72)	66.21	\$75.00	10	-	\$0.14
Appliances	Clothes Washer	Energy Star (MEF 2.0)	75.48	\$115.00	10	0.89	\$0.19
Appliances	Clothes Washer	AHAM (MEF 2.0)	75.48	\$115.00	10	-	\$0.19

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	Compact (MEF 2.79)	91.60	\$225.00	10	0.78	\$0.30
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	29.19	\$100.00	13	0.89	\$0.35
Appliances	Clothes Dryer	Baseline (2015+)	30.65	\$75.00	13	-	\$0.25
Appliances	Clothes Dryer	High Efficiency (2015+)	68.63	\$175.00	13	-	\$0.26
Appliances	Clothes Dryer	HP (EF 4.52)	210.40	\$458.00	13	0.67	\$0.22
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	27.12	\$5.00	9	-	\$0.02
Appliances	Dishwasher	Energy Star (EF 0.73)	42.72	\$80.00	9	-	\$0.25
Appliances	Dishwasher	AHAM (EF 0.73)	42.72	\$80.00	9	1.00	\$0.25
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	144.01	\$255.00	9	0.86	\$0.24
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	48.69	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	68.88	\$425.00	13	0.71	\$0.62
Appliances	Refrigerator	AHAM (2014)	103.31	\$218.00	13	-	\$0.21
Appliances	Refrigerator	High Efficiency (2014)	133.00	\$695.00	13	-	\$0.53
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	51.83	\$50.00	11	0.96	\$0.11
Appliances	Freezer	High Efficiency	108.37	\$198.00	11	0.81	\$0.21
Appliances	Freezer	AHAM (2014)	109.55	\$198.00	11	-	\$0.21
Appliances	Freezer	High Efficiency (2014)	136.64	\$352.00	11	-	\$0.29
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	52.18	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	73.81	\$425.00	13	0.71	\$0.58
Appliances	Second Refrigerator	AHAM (2014)	110.71	\$218.00	13	-	\$0.20
Appliances	Second Refrigerator	High Efficiency (2014)	142.53	\$695.00	13	-	\$0.49
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.37	\$121.00	13	0.91	\$8.90
Appliances	Stove	Halogen Burner	4.53	\$580.00	13	0.67	\$12.94
Appliances	Stove	Induction	25.44	\$898.00	13	0.57	\$3.57
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	107.44	\$0.01	5	1.04	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	14.48	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	47.24	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	37.51	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	80.27	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	90.39	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.93	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	41.00	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	54.67	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	0.99	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	200.36	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	78.15	\$769.00	18	0.39	\$0.80
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-6 Energy Efficiency Equipment Data, Natural Gas—Single Family, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/ HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	4.79	\$130.09	20	0.98	\$2.07
Heating	Furnace	AFUE 90%	42.60	\$1,252.71	20	0.86	\$2.24
Heating	Furnace	AFUE 96%	68.93	\$1,927.24	20	0.81	\$2.13
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	2.15	\$576.38	21	1.00	\$19.84
Heating	Boiler	EF 0.85	23.62	\$1,729.14	21	0.93	\$5.41
Heating	Boiler	EF 0.95	93.76	\$5,763.80	21	0.75	\$4.54
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	10.15	\$56.67	15	0.99	\$0.51
Water Heating	Water Heater <=55 gal	EF 0.74	33.48	\$212.50	15	0.97	\$0.58
Water Heating	Water Heater <=55 gal	EF 0.76	37.03	\$240.83	15	0.96	\$0.59
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	51.74	\$1,164.17	15	0.64	\$2.06
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	11.46	\$56.67	15	1.00	\$0.45
Water Heating	Water Heater > 55 gal	EF 0.74	37.80	\$212.50	15	0.98	\$0.51
Water Heating	Water Heater > 55 gal	EF 0.76	41.81	\$240.83	15	0.98	\$0.53
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	58.42	\$1,164.17	15	0.66	\$1.82
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	1.02	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	3.75	\$130.00	13	0.81	\$3.50
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	2.84	\$115.00	13	0.85	\$4.09
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	7.43	\$103.37	15	0.98	\$1.27
Misc	Pool Heater	EF .90	21.99	\$1,791.56	15	0.71	\$7.45
Misc	Pool Heater	EF .95	28.93	\$2,071.10	15	0.68	\$6.54
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-7 Energy Efficiency Equipment Data, Electric—Single Family Limited Income, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	162.70	\$99.87	15	1.03	\$0.06
Cooling	Central AC	SEER 15 (CEE Tier 2)	223.14	\$199.75	15	1.02	\$0.08
Cooling	Central AC	SEER 16 (CEE Tier 3)	274.04	\$299.62	15	1.01	\$0.10
Cooling	Central AC	Ductless Minisplit	317.22	\$1,760.29	15	0.73	\$0.51
Cooling	Central AC	SEER 21	631.36	\$1,697.87	15	0.80	\$0.25
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	89.61	\$70.98	10	0.98	\$0.10
Cooling	Room AC	EER 11.0	105.55	\$90.70	10	0.97	\$0.11
Cooling	Room AC	EER 11.5	142.99	\$110.42	10	0.98	\$0.10
Cooling	Room AC	EER 12.0	177.29	\$465.32	10	0.71	\$0.32
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	469.40	\$371.49	16	1.00	\$0.07
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	782.58	\$580.45	16	1.00	\$0.06
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,021.46	\$975.16	16	0.98	\$0.08
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1,195.12	\$2,925.48	16	0.78	\$0.21
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	518.19	\$357.88	16	1.00	\$0.06
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1,036.59	\$954.36	16	0.99	\$0.08
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2,736.30	\$2,147.30	16	1.00	\$0.07
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	135.04	\$67.00	15	1.01	\$0.05
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,565.20	\$1,614.00	15	0.77	\$0.09
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	152.48	\$67.00	15	1.01	\$0.04
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,767.37	\$1,614.00	15	0.82	\$0.08
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	319.42	\$152.20	4	-	\$0.13
Interior Lighting	Screw-in	Infrared Halogen (2020)	981.73	\$152.20	4	-	\$0.04
Interior Lighting	Screw-in	CFL	1,151.02	\$64.57	6	2.43	\$0.01
Interior Lighting	Screw-in	LED	1,224.28	\$1,821.89	15	0.47	\$0.14
Interior Lighting	Screw-in	LED (2020)	1,297.53	\$584.29	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	13.01	-\$4.56	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	38.98	\$36.47	10	0.72	\$0.12
Interior Lighting	Linear Fluorescent	LED (2011)	38.74	\$207.95	20	0.41	\$0.41
Interior Lighting	Linear Fluorescent	T5	39.54	\$62.55	10	0.62	\$0.19
Interior Lighting	Linear Fluorescent	LED (2020)	151.81	\$542.09	20	-	\$0.27
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	166.39	\$237.84	4	-	\$0.38
Interior Lighting	Specialty	Infrared Halogen (2020)	511.40	\$237.84	4	-	\$0.12
Interior Lighting	Specialty	CFL	599.59	\$100.91	6	1.41	\$0.03
Interior Lighting	Specialty	LED	637.74	\$2,847.15	15	0.18	\$0.41
Interior Lighting	Specialty	LED (2020)	675.90	\$913.09	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	34.29	\$29.83	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	212.16	\$29.83	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	244.91	\$15.39	6	2.29	\$0.01
Exterior Lighting	Screw-in	LED	272.47	\$326.24	15	0.55	\$0.11
Exterior Lighting	Screw-in	LED (2020)	299.01	\$104.93	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	102.56	\$0.01	5	1.04	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.82	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	44.99	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	35.72	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	76.45	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	86.09	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.31	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	39.05	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	52.06	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.89	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.01	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.94	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	200.36	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	68.77	\$769.00	18	0.38	\$0.91

Table B-8 Energy Efficiency Equipment Data, Natural Gas—Single Family Limited Income, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	4.74	\$111.53	20	0.99	\$1.79
Heating	Furnace	AFUE 90%	44.65	\$1,074.03	20	0.88	\$1.83
Heating	Furnace	AFUE 96%	72.31	\$1,652.35	20	0.83	\$1.74
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	2.20	\$459.37	21	1.00	\$15.45
Heating	Boiler	EF 0.85	23.62	\$1,378.11	21	0.94	\$4.31
Heating	Boiler	EF 0.95	92.28	\$4,593.70	21	0.76	\$3.68
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	8.52	\$56.67	15	0.99	\$0.61
Water Heating	Water Heater <=55 gal	EF 0.74	28.11	\$212.50	15	0.95	\$0.69
Water Heating	Water Heater <=55 gal	EF 0.76	31.09	\$240.83	15	0.94	\$0.71
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	43.44	\$1,164.17	15	0.61	\$2.45
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	9.62	\$56.67	15	0.99	\$0.54
Water Heating	Water Heater > 55 gal	EF 0.74	31.74	\$212.50	15	0.96	\$0.61
Water Heating	Water Heater > 55 gal	EF 0.76	35.10	\$240.83	15	0.96	\$0.63
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	49.05	\$1,164.17	15	0.63	\$2.17
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	1.02	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	3.75	\$130.00	13	0.81	\$3.50
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	2.84	\$115.00	13	0.85	\$4.09
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	7.43	\$103.37	15	0.98	\$1.27
Misc	Pool Heater	EF .90	21.99	\$1,791.56	15	0.71	\$7.45
Misc	Pool Heater	EF .95	28.93	\$2,071.10	15	0.68	\$6.54
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-9 Energy Efficiency Equipment Data, Electric—Single Family Limited Income, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	128.96	\$85.62	15	1.02	\$0.06
Cooling	Central AC	SEER 15 (CEE Tier 2)	174.55	\$171.23	15	1.01	\$0.09
Cooling	Central AC	SEER 16 (CEE Tier 3)	213.15	\$256.85	15	1.00	\$0.11
Cooling	Central AC	Ductless Minisplit	245.60	\$1,509.00	15	0.71	\$0.56
Cooling	Central AC	SEER 21	261.87	\$1,455.49	15	0.73	\$0.51
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	84.09	\$70.98	10	0.98	\$0.10
Cooling	Room AC	EER 11.0	98.96	\$90.70	10	0.97	\$0.11
Cooling	Room AC	EER 11.5	134.13	\$110.42	10	0.97	\$0.10
Cooling	Room AC	EER 12.0	166.37	\$465.32	10	0.69	\$0.34
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	309.93	\$325.63	16	0.99	\$0.09
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	496.81	\$508.80	16	0.98	\$0.09
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	629.55	\$854.78	16	0.95	\$0.12
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	722.31	\$2,564.34	16	0.74	\$0.31
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	301.50	\$313.70	16	0.99	\$0.09
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	722.50	\$836.54	16	0.98	\$0.10
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2,069.68	\$1,882.23	16	0.98	\$0.08
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	132.59	\$67.00	15	1.01	\$0.05
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,536.74	\$1,614.00	15	0.76	\$0.10
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	149.71	\$67.00	15	1.01	\$0.04
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,735.24	\$1,614.00	15	0.81	\$0.09
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	343.03	\$163.44	4	-	\$0.13
Interior Lighting	Screw-in	Infrared Halogen (2020)	1,054.29	\$163.44	4	-	\$0.04
Interior Lighting	Screw-in	CFL	1,236.10	\$69.34	6	2.43	\$0.01
Interior Lighting	Screw-in	LED	1,314.77	\$1,956.55	15	0.47	\$0.14
Interior Lighting	Screw-in	LED (2020)	1,393.44	\$627.47	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	13.97	-\$4.90	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	41.86	\$39.16	10	0.72	\$0.12
Interior Lighting	Linear Fluorescent	LED (2011)	41.60	\$223.32	20	0.41	\$0.41
Interior Lighting	Linear Fluorescent	T5	42.46	\$67.17	10	0.62	\$0.19
Interior Lighting	Linear Fluorescent	LED (2020)	163.04	\$582.16	20	-	\$0.27
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	178.69	\$255.42	4	-	\$0.38
Interior Lighting	Specialty	Infrared Halogen (2020)	549.19	\$255.42	4	-	\$0.12
Interior Lighting	Specialty	CFL	643.90	\$108.36	6	1.41	\$0.03
Interior Lighting	Specialty	LED	684.88	\$3,057.59	15	0.18	\$0.41
Interior Lighting	Specialty	LED (2020)	725.86	\$980.58	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	36.83	\$32.04	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	227.84	\$32.04	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	263.01	\$16.53	6	2.29	\$0.01
Exterior Lighting	Screw-in	LED	292.61	\$350.36	15	0.55	\$0.11
Exterior Lighting	Screw-in	LED (2020)	321.11	\$112.68	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	102.56	\$0.01	5	1.04	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.82	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	44.99	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	35.72	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	76.45	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	86.09	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.31	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	39.05	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	52.06	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.89	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.01	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.94	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	200.36	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	68.77	\$769.00	18	0.38	\$0.91

Table B-10 Energy Efficiency Equipment Data, Natural Gas—Single Family Limited Income, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	3.95	\$107.40	20	0.98	\$2.07
Heating	Furnace	AFUE 90%	35.17	\$1,034.21	20	0.86	\$2.24
Heating	Furnace	AFUE 96%	56.90	\$1,591.09	20	0.81	\$2.13
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.65	\$442.34	21	1.00	\$19.84
Heating	Boiler	EF 0.85	18.13	\$1,327.02	21	0.93	\$5.41
Heating	Boiler	EF 0.95	71.96	\$4,423.38	21	0.75	\$4.54
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	8.36	\$56.67	15	0.99	\$0.62
Water Heating	Water Heater <=55 gal	EF 0.74	27.57	\$212.50	15	0.95	\$0.70
Water Heating	Water Heater <=55 gal	EF 0.76	30.50	\$240.83	15	0.94	\$0.72
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	42.61	\$1,164.17	15	0.61	\$2.50
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	9.43	\$56.67	15	0.99	\$0.55
Water Heating	Water Heater > 55 gal	EF 0.74	31.13	\$212.50	15	0.96	\$0.62
Water Heating	Water Heater > 55 gal	EF 0.76	34.43	\$240.83	15	0.95	\$0.64
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	48.11	\$1,164.17	15	0.63	\$2.21
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	1.02	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	3.75	\$130.00	13	0.81	\$3.50
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	2.84	\$115.00	13	0.85	\$4.09
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	7.43	\$103.37	15	0.98	\$1.27
Misc	Pool Heater	EF .90	21.99	\$1,791.56	15	0.71	\$7.45
Misc	Pool Heater	EF .95	28.93	\$2,071.10	15	0.68	\$6.54
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-11 Energy Efficiency Equipment Data, Electric—Multi Family Renter, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	157.80	\$246.03	15	0.99	\$0.14
Cooling	Central AC	SEER 15 (CEE Tier 2)	309.46	\$492.06	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	436.90	\$738.09	15	0.97	\$0.15
Cooling	Central AC	Ductless Minisplit	545.51	\$4,336.26	15	0.60	\$0.73
Cooling	Central AC	SEER 21	804.74	\$4,182.49	15	0.64	\$0.48
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	114.77	\$220.98	10	0.94	\$0.24
Cooling	Room AC	EER 11.0	135.28	\$282.36	10	0.92	\$0.26
Cooling	Room AC	EER 11.5	183.30	\$343.75	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	227.30	\$1,448.64	10	0.59	\$0.78
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	485.45	\$1,696.41	16	0.91	\$0.31
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	888.74	\$2,650.64	16	0.88	\$0.26
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,202.09	\$4,453.08	16	0.81	\$0.32
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1,438.05	\$13,359.23	16	0.53	\$0.81
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	500.12	\$344.65	16	1.00	\$0.06
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1,001.44	\$919.06	16	0.99	\$0.08
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2,645.65	\$2,067.88	16	1.01	\$0.07
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	122.10	\$67.00	15	1.00	\$0.05
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,411.93	\$1,614.00	15	0.72	\$0.10
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	135.52	\$67.00	15	1.01	\$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,567.11	\$1,614.00	15	0.76	\$0.09
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	296.76	\$133.51	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	912.09	\$133.51	4	-	\$0.04
Interior Lighting	Screw-in	CFL	1,069.38	\$56.64	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	1,137.43	\$1,598.22	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	1,205.49	\$512.55	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	11.42	-\$3.78	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	34.20	\$30.21	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	33.99	\$172.26	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	34.69	\$51.81	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	133.19	\$449.04	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	154.59	\$208.64	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	475.12	\$208.64	4	-	\$0.12
Interior Lighting	Specialty	CFL	557.05	\$88.52	6	1.54	\$0.03
Interior Lighting	Specialty	LED	592.51	\$2,497.60	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	627.96	\$800.99	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	32.87	\$28.36	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	203.34	\$28.36	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	234.73	\$14.63	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	261.14	\$310.15	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	286.57	\$99.75	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	102.56	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.82	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	44.99	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	35.72	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	76.45	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	86.09	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.31	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	39.05	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	52.06	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	67.07	\$769.00	18	0.37	\$0.93
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-12 Energy Efficiency Equipment Data, Natural Gas—Multi Family Renter, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	4.29	\$178.38	20	0.98	\$3.16
Heating	Furnace	AFUE 90%	40.59	\$1,717.74	20	0.83	\$3.22
Heating	Furnace	AFUE 96%	65.40	\$2,642.68	20	0.77	\$3.07
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	2.13	\$794.13	21	1.00	\$27.53
Heating	Boiler	EF 0.85	22.91	\$2,382.39	21	0.92	\$7.68
Heating	Boiler	EF 0.95	89.53	\$7,941.29	21	0.72	\$6.56
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	7.14	\$56.67	15	0.98	\$0.73
Water Heating	Water Heater <=55 gal	EF 0.74	22.79	\$212.50	15	0.93	\$0.85
Water Heating	Water Heater <=55 gal	EF 0.76	25.16	\$240.83	15	0.92	\$0.87
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	35.30	\$1,164.17	15	0.58	\$3.01
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	10.47	\$56.67	15	1.00	\$0.49
Water Heating	Water Heater > 55 gal	EF 0.74	33.42	\$212.50	15	0.97	\$0.58
Water Heating	Water Heater > 55 gal	EF 0.76	36.91	\$240.83	15	0.96	\$0.60
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	51.77	\$1,164.17	15	0.64	\$2.06
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-13 Energy Efficiency Equipment Data, Electric—Multi Family Renter, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	127.52	\$210.72	15	0.99	\$0.15
Cooling	Central AC	SEER 15 (CEE Tier 2)	250.28	\$421.44	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	353.49	\$632.16	15	0.96	\$0.16
Cooling	Central AC	Ductless Minisplit	441.33	\$3,713.92	15	0.60	\$0.77
Cooling	Central AC	SEER 21	454.94	\$3,582.22	15	0.61	\$0.72
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	107.32	\$203.21	10	0.94	\$0.23
Cooling	Room AC	EER 11.0	126.45	\$259.66	10	0.92	\$0.25
Cooling	Room AC	EER 11.5	171.36	\$316.11	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	212.52	\$1,332.16	10	0.60	\$0.77
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	308.90	\$1,413.68	16	0.91	\$0.40
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	558.01	\$2,208.88	16	0.87	\$0.35
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	743.16	\$3,710.92	16	0.79	\$0.44
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	880.27	\$11,132.76	16	0.52	\$1.11
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	290.72	\$302.10	16	0.99	\$0.09
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	696.93	\$805.60	16	0.98	\$0.10
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,996.82	\$1,812.60	16	0.99	\$0.08
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	118.44	\$67.00	15	1.00	\$0.05
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,369.57	\$1,614.00	15	0.71	\$0.11
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	131.46	\$67.00	15	1.00	\$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,520.10	\$1,614.00	15	0.75	\$0.10
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	341.27	\$153.54	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	1,048.90	\$153.54	4	-	\$0.04
Interior Lighting	Screw-in	CFL	1,229.78	\$65.14	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	1,308.05	\$1,837.95	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	1,386.31	\$589.44	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	13.13	-\$4.35	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	39.33	\$34.74	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	39.08	\$198.10	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	39.89	\$59.58	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	153.17	\$516.40	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	177.78	\$239.94	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	546.39	\$239.94	4	-	\$0.12
Interior Lighting	Specialty	CFL	640.61	\$101.80	6	1.54	\$0.03
Interior Lighting	Specialty	LED	681.38	\$2,872.24	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	722.15	\$921.14	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	37.80	\$32.62	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	233.84	\$32.62	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	269.94	\$16.83	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	300.31	\$356.67	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	329.56	\$114.71	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	102.56	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.82	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	44.99	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	35.72	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	76.45	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	86.09	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.31	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	39.05	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	52.06	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	67.07	\$769.00	18	0.37	\$0.93
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-14 Energy Efficiency Equipment Data, Natural Gas—Multi Family Renter, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	3.25	\$147.24	20	0.98	\$3.44
Heating	Furnace	AFUE 90%	30.44	\$1,417.87	20	0.83	\$3.54
Heating	Furnace	AFUE 96%	49.12	\$2,181.34	20	0.76	\$3.38
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.59	\$655.50	21	1.00	\$30.46
Heating	Boiler	EF 0.85	17.50	\$1,966.51	21	0.92	\$8.31
Heating	Boiler	EF 0.95	69.46	\$6,555.04	21	0.71	\$6.97
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	7.00	\$56.67	15	0.98	\$0.74
Water Heating	Water Heater <=55 gal	EF 0.74	22.35	\$212.50	15	0.93	\$0.87
Water Heating	Water Heater <=55 gal	EF 0.76	24.69	\$240.83	15	0.92	\$0.89
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	34.63	\$1,164.17	15	0.58	\$3.07
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	10.27	\$56.67	15	1.00	\$0.50
Water Heating	Water Heater > 55 gal	EF 0.74	32.78	\$212.50	15	0.97	\$0.59
Water Heating	Water Heater > 55 gal	EF 0.76	36.20	\$240.83	15	0.96	\$0.61
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	50.79	\$1,164.17	15	0.63	\$2.10
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-15 Energy Efficiency Equipment Data, Electric—Multi Family Renter Limited Income, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	135.25	\$210.88	15	0.99	\$0.14
Cooling	Central AC	SEER 15 (CEE Tier 2)	265.25	\$421.76	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	374.49	\$632.65	15	0.97	\$0.15
Cooling	Central AC	Ductless Minisplit	467.58	\$3,716.79	15	0.60	\$0.73
Cooling	Central AC	SEER 21	689.78	\$3,584.99	15	0.64	\$0.48
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	98.37	\$189.41	10	0.94	\$0.24
Cooling	Room AC	EER 11.0	115.96	\$242.03	10	0.92	\$0.26
Cooling	Room AC	EER 11.5	157.12	\$294.64	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	194.83	\$1,241.69	10	0.59	\$0.78
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	424.87	\$1,496.83	16	0.91	\$0.31
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	777.38	\$2,338.80	16	0.88	\$0.26
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,051.07	\$3,929.19	16	0.80	\$0.33
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1,256.89	\$11,787.56	16	0.53	\$0.82
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	439.61	\$304.10	16	1.00	\$0.06
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	878.73	\$810.93	16	0.99	\$0.08
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2,318.20	\$1,824.60	16	1.00	\$0.07
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	99.00	\$67.00	15	0.99	\$0.06
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,144.81	\$1,614.00	15	0.64	\$0.13
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	135.52	\$67.00	15	1.01	\$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,567.11	\$1,614.00	15	0.76	\$0.09
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	209.78	\$94.38	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	644.75	\$94.38	4	-	\$0.04
Interior Lighting	Screw-in	CFL	755.94	\$40.04	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	804.05	\$1,129.77	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	852.16	\$362.32	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	8.07	-\$2.67	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	24.18	\$21.35	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	24.02	\$121.77	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	24.52	\$36.63	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	94.15	\$317.43	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	109.28	\$147.49	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	335.86	\$147.49	4	-	\$0.12
Interior Lighting	Specialty	CFL	393.78	\$62.57	6	1.54	\$0.03
Interior Lighting	Specialty	LED	418.84	\$1,765.54	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	443.90	\$566.22	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	32.08	\$27.69	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	198.50	\$27.69	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	229.14	\$14.28	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	254.92	\$302.76	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	279.75	\$97.37	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	97.67	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.16	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	42.75	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	33.93	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	72.63	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	81.78	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	11.70	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	37.10	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	49.46	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	41.92	\$769.00	18	0.30	\$1.49

Table B-16 Energy Efficiency Equipment Data, Natural Gas—Multi Family Renter Limited Income, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	3.70	\$154.16	20	0.98	\$3.16
Heating	Furnace	AFUE 90%	35.08	\$1,484.47	20	0.83	\$3.22
Heating	Furnace	AFUE 96%	56.52	\$2,283.80	20	0.77	\$3.07
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.73	\$646.38	21	1.00	\$27.53
Heating	Boiler	EF 0.85	18.65	\$1,939.15	21	0.92	\$7.68
Heating	Boiler	EF 0.95	72.87	\$6,463.84	21	0.72	\$6.56
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	6.34	\$56.67	15	0.98	\$0.82
Water Heating	Water Heater <=55 gal	EF 0.74	20.25	\$212.50	15	0.92	\$0.96
Water Heating	Water Heater <=55 gal	EF 0.76	22.37	\$240.83	15	0.91	\$0.98
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	31.38	\$1,164.17	15	0.56	\$3.39
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	9.30	\$56.67	15	0.99	\$0.56
Water Heating	Water Heater > 55 gal	EF 0.74	29.71	\$212.50	15	0.96	\$0.65
Water Heating	Water Heater > 55 gal	EF 0.76	32.81	\$240.83	15	0.95	\$0.67
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	46.02	\$1,164.17	15	0.62	\$2.31
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-17 Energy Efficiency Equipment Data, Electric—Multi Family Renter Limited Income, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	109.31	\$180.62	15	0.99	\$0.15
Cooling	Central AC	SEER 15 (CEE Tier 2)	214.53	\$361.23	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	302.99	\$541.85	15	0.96	\$0.16
Cooling	Central AC	Ductless Minisplit	378.28	\$3,183.36	15	0.60	\$0.77
Cooling	Central AC	SEER 21	389.95	\$3,070.48	15	0.61	\$0.72
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	91.99	\$174.18	10	0.94	\$0.23
Cooling	Room AC	EER 11.0	108.38	\$222.56	10	0.92	\$0.25
Cooling	Room AC	EER 11.5	146.88	\$270.95	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	182.16	\$1,141.85	10	0.60	\$0.77
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	269.84	\$1,247.37	16	0.91	\$0.40
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	487.03	\$1,949.01	16	0.87	\$0.35
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	648.21	\$3,274.34	16	0.79	\$0.44
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	767.32	\$9,823.02	16	0.52	\$1.12
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	255.11	\$266.56	16	0.99	\$0.09
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	610.51	\$710.82	16	0.98	\$0.10
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,747.80	\$1,599.35	16	0.98	\$0.08
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	96.03	\$67.00	15	0.99	\$0.06
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,110.46	\$1,614.00	15	0.63	\$0.13
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	131.46	\$67.00	15	1.00	\$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,520.10	\$1,614.00	15	0.75	\$0.10
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	241.25	\$108.53	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	741.46	\$108.53	4	-	\$0.04
Interior Lighting	Screw-in	CFL	869.33	\$46.05	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	924.66	\$1,299.24	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	979.98	\$416.67	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	9.28	-\$3.07	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	27.80	\$24.56	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	27.63	\$140.04	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	28.20	\$42.12	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	108.27	\$365.04	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	125.67	\$169.61	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	386.24	\$169.61	4	-	\$0.12
Interior Lighting	Specialty	CFL	452.85	\$71.96	6	1.54	\$0.03
Interior Lighting	Specialty	LED	481.67	\$2,030.38	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	510.49	\$651.15	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	36.90	\$31.84	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	228.27	\$31.84	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	263.51	\$16.43	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	293.16	\$348.18	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	321.71	\$111.98	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	97.67	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.16	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	42.75	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	33.93	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	72.63	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	81.78	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	11.70	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	37.10	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	49.46	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	41.92	\$769.00	18	0.30	\$1.49

Table B-18 Energy Efficiency Equipment Data, Natural Gas—Multi Family Renter Limited Income, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	2.81	\$127.25	20	0.98	\$3.44
Heating	Furnace	AFUE 90%	26.31	\$1,225.32	20	0.83	\$3.54
Heating	Furnace	AFUE 96%	42.45	\$1,885.11	20	0.76	\$3.38
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.29	\$533.55	21	1.00	\$30.46
Heating	Boiler	EF 0.85	14.24	\$1,600.65	21	0.92	\$8.31
Heating	Boiler	EF 0.95	56.54	\$5,335.50	21	0.71	\$6.97
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	6.22	\$56.67	15	0.98	\$0.83
Water Heating	Water Heater <=55 gal	EF 0.74	19.87	\$212.50	15	0.92	\$0.98
Water Heating	Water Heater <=55 gal	EF 0.76	21.94	\$240.83	15	0.91	\$1.00
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	30.78	\$1,164.17	15	0.56	\$3.46
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	9.13	\$56.67	15	0.99	\$0.57
Water Heating	Water Heater > 55 gal	EF 0.74	29.14	\$212.50	15	0.95	\$0.67
Water Heating	Water Heater > 55 gal	EF 0.76	32.18	\$240.83	15	0.95	\$0.68
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	45.14	\$1,164.17	15	0.62	\$2.36
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-19 Energy Efficiency Equipment Data, Electric—Multi Family Owner, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	137.76	\$214.79	15	0.99	\$0.14
Cooling	Central AC	SEER 15 (CEE Tier 2)	270.16	\$429.57	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	381.42	\$644.36	15	0.97	\$0.15
Cooling	Central AC	Ductless Minisplit	476.24	\$3,785.62	15	0.60	\$0.73
Cooling	Central AC	SEER 21	702.55	\$3,651.38	15	0.64	\$0.48
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	100.20	\$192.92	10	0.94	\$0.24
Cooling	Room AC	EER 11.0	118.10	\$246.51	10	0.92	\$0.26
Cooling	Room AC	EER 11.5	160.03	\$300.10	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	198.43	\$1,264.69	10	0.59	\$0.78
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	447.52	\$1,596.62	16	0.91	\$0.31
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	818.08	\$2,494.72	16	0.88	\$0.27
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,105.43	\$4,191.13	16	0.80	\$0.33
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1,321.07	\$12,573.40	16	0.53	\$0.83
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	466.17	\$324.37	16	1.00	\$0.06
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	929.30	\$864.99	16	0.99	\$0.08
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2,446.22	\$1,946.24	16	1.00	\$0.07
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	89.10	\$67.00	15	0.99	\$0.07
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	1,030.33	\$1,614.00	15	0.61	\$0.14
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	130.68	\$67.00	15	1.00	\$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,511.15	\$1,614.00	15	0.74	\$0.10
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	158.61	\$71.36	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	487.50	\$71.36	4	-	\$0.04
Interior Lighting	Screw-in	CFL	571.56	\$30.27	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	607.94	\$854.22	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	644.31	\$273.95	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	6.10	-\$2.02	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	18.28	\$16.15	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	18.16	\$92.07	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	18.54	\$27.69	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	71.19	\$240.01	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	82.62	\$111.52	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	253.94	\$111.52	4	-	\$0.12
Interior Lighting	Specialty	CFL	297.74	\$47.31	6	1.54	\$0.03
Interior Lighting	Specialty	LED	316.68	\$1,334.92	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	335.63	\$428.11	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	24.26	\$20.93	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	150.08	\$20.93	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	173.25	\$10.80	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	192.75	\$228.92	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	211.52	\$73.62	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	102.56	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.82	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	44.99	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	35.72	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	76.45	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	86.09	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.31	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	39.05	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	52.06	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	41.92	\$769.00	18	0.30	\$1.49
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-20 Energy Efficiency Equipment Data, Natural Gas—Multi Family Owner, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	2.43	\$101.30	20	0.98	\$3.16
Heating	Furnace	AFUE 90%	23.05	\$975.51	20	0.83	\$3.22
Heating	Furnace	AFUE 96%	37.14	\$1,500.78	20	0.77	\$3.07
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.39	\$517.11	21	1.00	\$27.53
Heating	Boiler	EF 0.85	14.92	\$1,551.32	21	0.92	\$7.68
Heating	Boiler	EF 0.95	58.30	\$5,171.07	21	0.72	\$6.56
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	5.55	\$56.67	15	0.98	\$0.93
Water Heating	Water Heater <=55 gal	EF 0.74	17.72	\$212.50	15	0.91	\$1.10
Water Heating	Water Heater <=55 gal	EF 0.76	19.57	\$240.83	15	0.89	\$1.12
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	27.45	\$1,164.17	15	0.55	\$3.88
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	8.14	\$56.67	15	0.99	\$0.64
Water Heating	Water Heater > 55 gal	EF 0.74	25.99	\$212.50	15	0.94	\$0.75
Water Heating	Water Heater > 55 gal	EF 0.76	28.71	\$240.83	15	0.93	\$0.77
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	40.27	\$1,164.17	15	0.60	\$2.64
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-21 Energy Efficiency Equipment Data, Electric—Multi Family Owner, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	111.33	\$183.96	15	0.99	\$0.15
Cooling	Central AC	SEER 15 (CEE Tier 2)	218.50	\$367.92	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	308.60	\$551.88	15	0.96	\$0.16
Cooling	Central AC	Ductless Minisplit	385.28	\$3,242.31	15	0.60	\$0.77
Cooling	Central AC	SEER 21	397.17	\$3,127.34	15	0.61	\$0.72
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	93.69	\$177.41	10	0.94	\$0.23
Cooling	Room AC	EER 11.0	110.39	\$226.69	10	0.92	\$0.25
Cooling	Room AC	EER 11.5	149.60	\$275.97	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	185.54	\$1,163.00	10	0.60	\$0.77
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	283.39	\$1,330.53	16	0.90	\$0.41
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	510.79	\$2,078.95	16	0.87	\$0.36
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	679.12	\$3,492.63	16	0.79	\$0.45
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	803.11	\$10,477.89	16	0.52	\$1.14
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	269.82	\$284.33	16	0.99	\$0.09
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	643.96	\$758.21	16	0.97	\$0.10
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,841.23	\$1,705.98	16	0.98	\$0.08
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	86.43	\$67.00	15	0.99	\$0.07
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	999.42	\$1,614.00	15	0.60	\$0.15
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	126.76	\$67.00	15	1.00	\$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,465.81	\$1,614.00	15	0.73	\$0.10
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	202.67	\$91.18	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	622.91	\$91.18	4	-	\$0.04
Interior Lighting	Screw-in	CFL	730.33	\$38.68	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	776.81	\$1,091.50	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	823.29	\$350.05	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	7.80	-\$2.58	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	23.36	\$20.63	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	23.21	\$117.65	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	23.69	\$35.39	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	90.96	\$306.67	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	105.58	\$142.49	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	324.48	\$142.49	4	-	\$0.12
Interior Lighting	Specialty	CFL	380.44	\$60.45	6	1.54	\$0.03
Interior Lighting	Specialty	LED	404.65	\$1,705.74	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	428.86	\$547.04	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	31.00	\$26.75	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	191.77	\$26.75	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	221.38	\$13.80	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	246.29	\$292.51	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	270.27	\$94.08	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	63.06	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	71.89	\$115.00	10	0.89	\$0.20
Appliances	Clothes Washer	AHAM (MEF 2.0)	71.89	\$115.00	10	-	\$0.20

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	Compact (MEF 2.79)	87.24	\$225.00	10	0.78	\$0.32
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	27.80	\$100.00	13	0.89	\$0.36
Appliances	Clothes Dryer	Baseline (2015+)	29.19	\$75.00	13	-	\$0.26
Appliances	Clothes Dryer	High Efficiency (2015+)	65.36	\$175.00	13	-	\$0.27
Appliances	Clothes Dryer	HP (EF 4.52)	200.38	\$458.00	13	0.66	\$0.23
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	25.83	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	40.69	\$80.00	9	-	\$0.26
Appliances	Dishwasher	AHAM (EF 0.73)	40.69	\$80.00	9	1.00	\$0.26
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	137.15	\$255.00	9	0.86	\$0.25
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	46.37	\$25.00	13	1.00	\$0.05
Appliances	Refrigerator	High Efficiency	65.60	\$425.00	13	0.70	\$0.65
Appliances	Refrigerator	AHAM (2014)	98.39	\$218.00	13	-	\$0.22
Appliances	Refrigerator	High Efficiency (2014)	126.67	\$695.00	13	-	\$0.55
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	49.36	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	103.21	\$198.00	11	0.80	\$0.22
Appliances	Freezer	AHAM (2014)	104.33	\$198.00	11	-	\$0.22
Appliances	Freezer	High Efficiency (2014)	130.14	\$352.00	11	-	\$0.31
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	49.69	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	70.29	\$425.00	13	0.71	\$0.61
Appliances	Second Refrigerator	AHAM (2014)	105.44	\$218.00	13	-	\$0.21
Appliances	Second Refrigerator	High Efficiency (2014)	135.74	\$695.00	13	-	\$0.52
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.31	\$121.00	13	0.91	\$9.35
Appliances	Stove	Halogen Burner	4.31	\$580.00	13	0.67	\$13.59
Appliances	Stove	Induction	24.23	\$898.00	13	0.57	\$3.75
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	102.56	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.82	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	44.99	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	35.72	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	76.45	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	86.09	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	12.31	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	39.05	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	52.06	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	41.92	\$769.00	18	0.30	\$1.49
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-22 Energy Efficiency Equipment Data, Natural Gas—Multi Family Owner, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/ HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	1.85	\$83.62	20	0.98	\$3.44
Heating	Furnace	AFUE 90%	17.29	\$805.21	20	0.83	\$3.54
Heating	Furnace	AFUE 96%	27.89	\$1,238.79	20	0.76	\$3.38
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.04	\$426.84	21	1.00	\$30.46
Heating	Boiler	EF 0.85	11.39	\$1,280.52	21	0.92	\$8.31
Heating	Boiler	EF 0.95	45.23	\$4,268.40	21	0.71	\$6.97
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	5.44	\$56.67	15	0.98	\$0.95
Water Heating	Water Heater <=55 gal	EF 0.74	17.38	\$212.50	15	0.91	\$1.12
Water Heating	Water Heater <=55 gal	EF 0.76	19.20	\$240.83	15	0.89	\$1.15
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	26.93	\$1,164.17	15	0.55	\$3.95
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	7.98	\$56.67	15	0.99	\$0.65
Water Heating	Water Heater > 55 gal	EF 0.74	25.50	\$212.50	15	0.94	\$0.76
Water Heating	Water Heater > 55 gal	EF 0.76	28.16	\$240.83	15	0.93	\$0.78
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	39.50	\$1,164.17	15	0.59	\$2.69
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-23 Energy Efficiency Equipment Data, Electric—Multi Family Owner Limited Income, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	87.66	\$136.68	15	0.99	\$0.14
Cooling	Central AC	SEER 15 (CEE Tier 2)	171.92	\$273.37	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	242.72	\$410.05	15	0.97	\$0.15
Cooling	Central AC	Ductless Minisplit	303.06	\$2,409.03	15	0.60	\$0.73
Cooling	Central AC	SEER 21	447.08	\$2,323.60	15	0.64	\$0.48
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	69.23	\$133.29	10	0.94	\$0.24
Cooling	Room AC	EER 11.0	81.60	\$170.31	10	0.92	\$0.26
Cooling	Room AC	EER 11.5	110.56	\$207.34	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	137.10	\$873.79	10	0.59	\$0.78
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	352.70	\$1,347.15	16	0.91	\$0.33
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	641.45	\$2,104.92	16	0.87	\$0.29
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	863.79	\$3,536.27	16	0.79	\$0.36
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1,028.63	\$10,608.80	16	0.52	\$0.90
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	381.32	\$273.69	16	1.00	\$0.06
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	748.96	\$729.84	16	0.98	\$0.09
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,947.63	\$1,642.14	16	0.98	\$0.07
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	69.30	\$67.00	15	0.98	\$0.09
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	801.37	\$1,614.00	15	0.54	\$0.18
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	101.64	\$67.00	15	0.99	\$0.06
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,175.34	\$1,614.00	15	0.65	\$0.13
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	148.38	\$66.75	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	456.04	\$66.75	4	-	\$0.04
Interior Lighting	Screw-in	CFL	534.69	\$28.32	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	568.72	\$799.11	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	602.75	\$256.28	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	5.71	-\$1.89	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	17.10	\$15.10	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	16.99	\$86.13	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	17.34	\$25.91	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	66.59	\$224.52	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	77.29	\$104.32	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	237.56	\$104.32	4	-	\$0.12
Interior Lighting	Specialty	CFL	278.53	\$44.26	6	1.54	\$0.03
Interior Lighting	Specialty	LED	296.25	\$1,248.80	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	313.98	\$400.49	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	22.69	\$19.58	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	140.40	\$19.58	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	162.07	\$10.10	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	180.31	\$214.15	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	197.87	\$68.87	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	59.91	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	59.91	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	68.29	\$115.00	10	0.88	\$0.21

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	AHAM (MEF 2.0)	68.29	\$115.00	10	-	\$0.21
Appliances	Clothes Washer	Compact (MEF 2.79)	82.88	\$225.00	10	0.78	\$0.33
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	26.41	\$100.00	13	0.89	\$0.38
Appliances	Clothes Dryer	Baseline (2015+)	27.73	\$75.00	13	-	\$0.27
Appliances	Clothes Dryer	High Efficiency (2015+)	62.09	\$175.00	13	-	\$0.28
Appliances	Clothes Dryer	HP (EF 4.52)	190.36	\$458.00	13	0.65	\$0.24
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	24.54	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	38.65	\$80.00	9	-	\$0.28
Appliances	Dishwasher	AHAM (EF 0.73)	38.65	\$80.00	9	1.00	\$0.28
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	130.30	\$255.00	9	0.85	\$0.26
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	44.05	\$25.00	13	1.00	\$0.06
Appliances	Refrigerator	High Efficiency	62.32	\$425.00	13	0.70	\$0.69
Appliances	Refrigerator	AHAM (2014)	93.47	\$218.00	13	-	\$0.24
Appliances	Refrigerator	High Efficiency (2014)	120.33	\$695.00	13	-	\$0.58
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	46.89	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	98.05	\$198.00	11	0.80	\$0.23
Appliances	Freezer	AHAM (2014)	99.12	\$198.00	11	-	\$0.23
Appliances	Freezer	High Efficiency (2014)	123.63	\$352.00	11	-	\$0.33
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	47.21	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	66.78	\$425.00	13	0.70	\$0.64
Appliances	Second Refrigerator	AHAM (2014)	100.17	\$218.00	13	-	\$0.22
Appliances	Second Refrigerator	High Efficiency (2014)	128.95	\$695.00	13	-	\$0.54
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.24	\$121.00	13	0.91	\$9.84
Appliances	Stove	Halogen Burner	4.10	\$580.00	13	0.67	\$14.30
Appliances	Stove	Induction	23.02	\$898.00	13	0.57	\$3.94
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	97.67	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.16	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	42.75	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	33.93	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	72.63	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	81.78	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	11.70	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	37.10	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	49.46	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	37.73	\$769.00	18	0.29	\$1.65

Table B-24 Energy Efficiency Equipment Data, Natural Gas—Multi Family Owner Limited Income, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	2.38	\$99.10	20	0.98	\$3.16
Heating	Furnace	AFUE 90%	22.55	\$954.30	20	0.83	\$3.22
Heating	Furnace	AFUE 96%	36.33	\$1,468.16	20	0.77	\$3.07
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.36	\$507.87	21	1.00	\$27.53
Heating	Boiler	EF 0.85	14.65	\$1,523.62	21	0.92	\$7.68
Heating	Boiler	EF 0.95	57.25	\$5,078.73	21	0.72	\$6.56
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	5.55	\$56.67	15	0.98	\$0.93
Water Heating	Water Heater <=55 gal	EF 0.74	17.72	\$212.50	15	0.91	\$1.10
Water Heating	Water Heater <=55 gal	EF 0.76	19.57	\$240.83	15	0.89	\$1.12
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	27.45	\$1,164.17	15	0.55	\$3.88
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	8.14	\$56.67	15	0.99	\$0.64
Water Heating	Water Heater > 55 gal	EF 0.74	25.99	\$212.50	15	0.94	\$0.75
Water Heating	Water Heater > 55 gal	EF 0.76	28.71	\$240.83	15	0.93	\$0.77
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	40.27	\$1,164.17	15	0.60	\$2.64
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-25 Energy Efficiency Equipment Data, Electric—Multi Family Owner Limited Income, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Central AC	SEER 13	-	\$0.00	15	1.00	\$0.00
Cooling	Central AC	SEER 14 (Energy Star)	70.85	\$117.07	15	0.99	\$0.15
Cooling	Central AC	SEER 15 (CEE Tier 2)	139.05	\$234.13	15	0.98	\$0.15
Cooling	Central AC	SEER 16 (CEE Tier 3)	196.38	\$351.20	15	0.96	\$0.16
Cooling	Central AC	Ductless Minisplit	245.18	\$2,063.29	15	0.60	\$0.77
Cooling	Central AC	SEER 21	252.74	\$1,990.12	15	0.61	\$0.72
Cooling	Room AC	EER 9.8	-	\$0.00	10	1.00	\$0.00
Cooling	Room AC	EER 10.8 (Energy Star)	64.73	\$122.57	10	0.94	\$0.23
Cooling	Room AC	EER 11.0	76.27	\$156.62	10	0.92	\$0.25
Cooling	Room AC	EER 11.5	103.36	\$190.67	10	0.91	\$0.23
Cooling	Room AC	EER 12.0	128.19	\$803.52	10	0.60	\$0.77
Cooling/Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	219.62	\$1,122.63	16	0.90	\$0.45
Cooling/Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	392.74	\$1,754.11	16	0.86	\$0.39
Cooling/Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	519.02	\$2,946.91	16	0.78	\$0.50
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	610.22	\$8,840.72	16	0.51	\$1.27
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.00
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	217.57	\$239.90	16	0.99	\$0.10
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	511.55	\$639.74	16	0.97	\$0.11
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,452.27	\$1,439.42	16	0.96	\$0.09
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.00
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.95	67.22	\$67.00	15	0.98	\$0.09
Water Heating	Water Heater <=55 gal	EF 2.3 (HP)	777.32	\$1,614.00	15	0.53	\$0.19
Water Heating	Water Heater > 55 gal	EF 0.9	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.95	98.59	\$67.00	15	0.99	\$0.06
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,140.08	\$1,614.00	15	0.64	\$0.13
Interior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Screw-in	Infrared Halogen	180.12	\$81.03	4	-	\$0.12
Interior Lighting	Screw-in	Infrared Halogen (2020)	553.59	\$81.03	4	-	\$0.04
Interior Lighting	Screw-in	CFL	649.05	\$34.38	6	2.60	\$0.01
Interior Lighting	Screw-in	LED	690.36	\$970.03	15	0.54	\$0.13
Interior Lighting	Screw-in	LED (2020)	731.67	\$311.09	15	-	\$0.04
Interior Lighting	Linear Fluorescent	T12	-	\$0.00	10	-	\$0.00
Interior Lighting	Linear Fluorescent	T8	6.93	-\$2.29	10	1.00	-\$0.04
Interior Lighting	Linear Fluorescent	Super T8	20.76	\$18.33	10	0.76	\$0.11
Interior Lighting	Linear Fluorescent	LED (2011)	20.63	\$104.55	20	0.44	\$0.39
Interior Lighting	Linear Fluorescent	T5	21.05	\$31.45	10	0.65	\$0.18
Interior Lighting	Linear Fluorescent	LED (2020)	80.84	\$272.54	20	-	\$0.26
Interior Lighting	Specialty	Incandescent	-	\$0.00	3	1.00	\$0.00
Interior Lighting	Specialty	Infrared Halogen	93.83	\$126.63	4	-	\$0.36
Interior Lighting	Specialty	Infrared Halogen (2020)	288.37	\$126.63	4	-	\$0.12
Interior Lighting	Specialty	CFL	338.10	\$53.73	6	1.54	\$0.03
Interior Lighting	Specialty	LED	359.62	\$1,515.90	15	0.21	\$0.39
Interior Lighting	Specialty	LED (2020)	381.14	\$486.16	15	-	\$0.12
Exterior Lighting	Screw-in	Incandescent	-	\$0.00	3	1.00	\$0.00
Exterior Lighting	Screw-in	Infrared Halogen	27.55	\$23.77	4	-	\$0.23
Exterior Lighting	Screw-in	Infrared Halogen (2020)	170.43	\$23.77	4	-	\$0.04
Exterior Lighting	Screw-in	CFL	196.74	\$12.26	6	2.40	\$0.01
Exterior Lighting	Screw-in	LED	218.88	\$259.95	15	0.61	\$0.11
Exterior Lighting	Screw-in	LED (2020)	240.19	\$83.61	15	-	\$0.03
Appliances	Clothes Washer	Standard (1.26)	-	\$0.00	10	1.00	\$0.00
Appliances	Clothes Washer	Energy Star (1.72)	59.91	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	AHAM (MEF 1.72)	59.91	\$75.00	10	-	\$0.15
Appliances	Clothes Washer	Energy Star (MEF 2.0)	68.29	\$115.00	10	0.88	\$0.21

Residential Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/HH /yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Appliances	Clothes Washer	AHAM (MEF 2.0)	68.29	\$115.00	10	-	\$0.21
Appliances	Clothes Washer	Compact (MEF 2.79)	82.88	\$225.00	10	0.78	\$0.33
Appliances	Clothes Dryer	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	High Efficiency	26.41	\$100.00	13	0.89	\$0.38
Appliances	Clothes Dryer	Baseline (2015+)	27.73	\$75.00	13	-	\$0.27
Appliances	Clothes Dryer	High Efficiency (2015+)	62.09	\$175.00	13	-	\$0.28
Appliances	Clothes Dryer	HP (EF 4.52)	190.36	\$458.00	13	0.65	\$0.24
Appliances	Dishwasher	Standard (EF 0.63)	-	\$0.00	9	-	\$0.00
Appliances	Dishwasher	Energy Star (EF 0.69)	24.54	\$5.00	9	-	\$0.03
Appliances	Dishwasher	Energy Star (EF 0.73)	38.65	\$80.00	9	-	\$0.28
Appliances	Dishwasher	AHAM (EF 0.73)	38.65	\$80.00	9	1.00	\$0.28
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	130.30	\$255.00	9	0.85	\$0.26
Appliances	Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Refrigerator	Energy Star	44.05	\$25.00	13	1.00	\$0.06
Appliances	Refrigerator	High Efficiency	62.32	\$425.00	13	0.70	\$0.69
Appliances	Refrigerator	AHAM (2014)	93.47	\$218.00	13	-	\$0.24
Appliances	Refrigerator	High Efficiency (2014)	120.33	\$695.00	13	-	\$0.58
Appliances	Freezer	Standard	-	\$0.00	11	1.00	\$0.00
Appliances	Freezer	Energy Star	46.89	\$50.00	11	0.96	\$0.12
Appliances	Freezer	High Efficiency	98.05	\$198.00	11	0.80	\$0.23
Appliances	Freezer	AHAM (2014)	99.12	\$198.00	11	-	\$0.23
Appliances	Freezer	High Efficiency (2014)	123.63	\$352.00	11	-	\$0.33
Appliances	Second Refrigerator	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Second Refrigerator	Energy Star	47.21	\$25.00	13	1.00	\$0.05
Appliances	Second Refrigerator	High Efficiency	66.78	\$425.00	13	0.70	\$0.64
Appliances	Second Refrigerator	AHAM (2014)	100.17	\$218.00	13	-	\$0.22
Appliances	Second Refrigerator	High Efficiency (2014)	128.95	\$695.00	13	-	\$0.54
Appliances	Stove	Baseline	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Convection	1.24	\$121.00	13	0.91	\$9.84
Appliances	Stove	Halogen Burner	4.10	\$580.00	13	0.67	\$14.30
Appliances	Stove	Induction	23.02	\$898.00	13	0.57	\$3.94
Appliances	Microwave	Standard	-	\$0.00	9	1.00	\$0.00
Electronics	Personal Computers	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Personal Computers	Energy Star	97.67	\$0.01	5	1.03	\$0.00
Electronics	Monitor	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Monitor	Energy Star	13.16	\$0.01	5	1.02	\$0.00
Electronics	Laptops	Standard	-	\$0.00	4	1.00	\$0.00
Electronics	Laptops	Energy Star	42.75	\$0.01	4	1.02	\$0.00
Electronics	TVs	Standard	-	\$0.00	11	1.00	\$0.00
Electronics	TVs	Energy Star (3.1)	33.93	\$0.01	11	-	\$0.00
Electronics	TVs	Energy Star (4.1)	72.63	\$0.02	11	-	\$0.00
Electronics	TVs	Energy Star (5.1)	81.78	\$0.03	11	1.07	\$0.00
Electronics	Printer / Fax / Copier	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Printer / Fax / Copier	Energy Star	11.70	\$0.01	5	1.02	\$0.00
Electronics	Set-top Boxes/DVR	Standard	-	\$0.00	5	1.00	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2009)	37.10	\$0.01	5	-	\$0.00
Electronics	Set-top Boxes/DVR	Energy Star (2011)	49.46	\$0.02	5	1.04	\$0.00
Electronics	Devices and Gadgets	Standard	-	\$0.00	5	1.00	\$0.00
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Pool Pump	High Efficiency	154.64	\$85.00	15	1.01	\$0.05
Misc	Pool Pump	Two-Speed	618.56	\$579.00	15	0.88	\$0.09
Misc	Pool Heater	Electric Resistance	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	Heat Pump (COP = 5.0)	3,984.80	\$2,550.00	15	1.00	\$0.06
Misc	Hot Tub / Spa	Standard	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	Efficient Pumps	146.15	\$300.00	15	0.94	\$0.19
Misc	Hot Tub / Spa	Improved Controls and Pumps	194.87	\$350.00	15	0.93	\$0.16
Misc	Well Pump	Baseline (40% EF)	-	\$0.00	10	1.00	\$0.00
Misc	Well Pump	High Efficiency (60% EF)	198.57	\$110.00	10	0.97	\$0.07
Misc	Furnace Fan	Standard	-	\$0.00	18	1.00	\$0.00
Misc	Furnace Fan	ECM	37.73	\$769.00	18	0.29	\$1.65

Table B-26 Energy Efficiency Equipment Data, Natural Gas—Multi Family Owner Limited Income, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost (\$/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	AFUE 80%	-	\$0.00	20	1.00	\$0.00
Heating	Furnace	AFUE 83%	1.81	\$81.80	20	0.98	\$3.44
Heating	Furnace	AFUE 90%	16.91	\$787.71	20	0.83	\$3.54
Heating	Furnace	AFUE 96%	27.29	\$1,211.86	20	0.76	\$3.38
Heating	Boiler	EF 0.81	-	\$0.00	21	-	\$0.00
Heating	Boiler	EF 0.82	1.02	\$419.22	21	1.00	\$30.46
Heating	Boiler	EF 0.85	11.19	\$1,257.65	21	0.92	\$8.31
Heating	Boiler	EF 0.95	44.42	\$4,192.17	21	0.71	\$6.97
Heating	Other Heating	Gas Fireplace	-	\$0.00	5	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater <=55 gal	EF 0.63	5.44	\$56.67	15	0.98	\$0.95
Water Heating	Water Heater <=55 gal	EF 0.74	17.38	\$212.50	15	0.91	\$1.12
Water Heating	Water Heater <=55 gal	EF 0.76	19.20	\$240.83	15	0.89	\$1.15
Water Heating	Water Heater <=55 gal	EF 0.86 (Condensing)	26.93	\$1,164.17	15	0.55	\$3.95
Water Heating	Water Heater > 55 gal	EF 0.59	-	\$0.00	15	1.00	\$0.00
Water Heating	Water Heater > 55 gal	EF 0.63	7.98	\$56.67	15	0.99	\$0.65
Water Heating	Water Heater > 55 gal	EF 0.74	25.50	\$212.50	15	0.94	\$0.76
Water Heating	Water Heater > 55 gal	EF 0.76	28.16	\$240.83	15	0.93	\$0.78
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	39.50	\$1,164.17	15	0.59	\$2.69
Appliances	Clothes Dryer	Standard	-	\$0.00	13	1.00	\$0.00
Appliances	Clothes Dryer	Standard (AHAM)	0.66	\$0.00	13	-	\$0.00
Appliances	Clothes Dryer	Efficient	2.42	\$130.00	13	0.79	\$5.43
Appliances	Stove	Standard (EF .399)	-	\$0.00	13	1.00	\$0.00
Appliances	Stove	Efficient (EF .42)	1.83	\$115.00	13	0.82	\$6.35
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Pool Heater	EF .82	2.60	\$103.37	15	0.98	\$3.63
Misc	Pool Heater	EF .90	7.70	\$1,791.56	15	0.67	\$21.28
Misc	Pool Heater	EF .95	10.13	\$2,071.10	15	0.64	\$18.70
Misc	Hot Tub / Spa	EF .78	-	\$0.00	15	1.00	\$0.00
Misc	Hot Tub / Spa	EF .82	1.76	\$103.37	15	0.97	\$5.38
Misc	Hot Tub / Spa	EF .90	5.20	\$1,791.56	15	0.66	\$31.51
Misc	Hot Tub / Spa	EF .95	6.84	\$2,071.10	15	0.63	\$27.68
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.00

Table B-27 Energy Efficiency Non-Equipment Data—Single Family, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	16.0%	72.0%	20	\$1,000.00	14,958.7	2.40	\$0.005
Insulation - Ducting	13.0%	75.0%	18	\$500.00	4,421.8	1.36	\$0.009
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	46.0%	90.0%	12	\$266.00	5,932.8	1.77	\$0.005
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	2,224.4	0.26	\$0.044
Insulation - Wall Cavity	16.0%	72.0%	20	\$1,000.00	9,223.8	1.48	\$0.008
Insulation - Wall Sheathing	0.0%	0.0%	20	\$1,000.00	2,823.6	0.41	\$0.027
Ducting - Repair and Sealing	16.0%	50.0%	18	\$500.00	14,152.2	4.22	\$0.003
Windows - High Efficiency/ENERGY STAR	47.0%	90.0%	25	\$7,500.00	5,016.5	0.15	\$0.100
Windows - Install Reflective Film	20.0%	45.0%	10	\$895.39	7,748.9	0.89	\$0.014
Doors - Storm and Thermal	38.0%	75.0%	12	\$320.00	1,485.8	0.38	\$0.023
Roofs - High Reflectivity	13.0%	17.4%	15	\$1,549.61	1,175.6	0.12	\$0.120
Attic Fan - Installation	5.0%	22.5%	18	\$141.00	75.7	0.10	\$0.151
Attic Fan - Photovoltaic - Installation	13.0%	45.0%	19	\$350.00	75.7	0.04	\$0.363
Whole-House Fan - Installation	1.0%	18.8%	18	\$250.00	1,836.6	1.38	\$0.011
Ceiling Fan - Installation	58.0%	75.0%	15	\$120.00	3,529.8	4.59	\$0.003
Thermostat - Clock/Programmable	54.0%	56.3%	12	\$73.33	10,554.5	12.28	\$0.001
Home Energy Management System	2.0%	37.5%	20	\$600.00	11,069.7	2.17	\$0.004
Central AC - Early Replacement	37.0%	100.0%	15	\$2,030.06	10,256.6	0.79	\$0.018
Central AC - Maintenance and Tune-Up	37.0%	100.0%	4	\$125.00	2,917.9	0.99	\$0.011
Central Heat Pump - Maintenance	3.0%	90.0%	4	\$125.00	5,281.6	1.64	\$0.006
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	7,214.0	5.34	\$0.002
Boiler - Hot Water Reset	13.5%	56.3%	12	\$370.00	11,774.7	2.47	\$0.003
Boiler - Pipe Insulation	16.0%	38.1%	13	\$360.00	88.9	0.02	\$0.409
Boiler - Maintenance	32.0%	100.0%	4	\$125.00	3,606.8	0.67	\$0.009
Furnace - Maintenance	32.0%	100.0%	4	\$125.00	2,393.2	0.44	\$0.014
Water Heater - Drainwater Heat Recovery	1.0%	50.0%	15	\$899.00	6,369.9	0.51	\$0.013
Water Heater - Faucet Aerators	25.0%	90.0%	9	\$12.70	1,601.3	5.28	\$0.001
Water Heater - Low-Flow Showerheads	45.0%	85.0%	10	\$37.95	3,758.6	4.63	\$0.001
Water Heater - Pipe Insulation	18.0%	38.1%	13	\$180.00	135.9	0.04	\$0.134
Water Heater - Timer	17.0%	40.0%	10	\$194.00	2,123.3	0.51	\$0.011
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	8,493.2	0.41	\$0.016
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	21,233.8	0.35	\$0.021
Water Heater - Tank Blanket/Insulation	19.0%	75.0%	13	\$24.00	1,099.1	2.78	\$0.002
Interior Lighting - Occupancy Sensors	18.0%	27.5%	15	\$750.00	4,478.8	0.34	\$0.015
Exterior Lighting - Photosensor Control	21.0%	45.0%	8	\$90.00	1,557.4	0.42	\$0.008
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	405.4	0.01	\$0.671
Exterior Lighting - Timerclock Installation	7.0%	45.0%	8	\$108.00	1,090.2	0.25	\$0.015
Refrigerator - Early Replacement	37.0%	100.0%	13	\$639.00	3,176.7	0.23	\$0.020
Refrigerator - Maintenance	37.0%	100.0%	4	\$50.00	984.4	0.30	\$0.014
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	10,593.4	2.54	\$0.002
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	7,126.1	1.79	\$0.002
Freezer - Early Replacement	37.0%	100.0%	11	\$441.60	2,999.4	0.26	\$0.017
Freezer - Maintenance	37.0%	100.0%	4	\$50.00	356.3	0.11	\$0.038
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	506.4	0.97	\$0.006
Pool Pump - Timer	4.0%	90.0%	15	\$160.00	1,506.4	0.76	\$0.010
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	36,083.1	0.57	\$0.010
ENERGY STAR Home Design	0.0%	0.0%	18	\$5,000.00	-	-	\$0.000
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.32	\$0.018

Table B-28 Energy Efficiency Non-Equipment Data—Single Family, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	9.0%	47.5%	20	\$1,000.00	8,161.1	1.39	\$0.009
Insulation - Ducting	2.0%	75.0%	18	\$250.00	3,493.6	2.23	\$0.006
Insulation - Foundation	20.0%	45.0%	20	\$1,000.00	3,981.8	0.64	\$0.019
Insulation - Infiltration Control	46.0%	90.0%	12	\$266.00	4,499.6	1.42	\$0.006
Insulation - Radiant Barrier	25.0%	90.0%	12	\$922.68	1,654.7	0.21	\$0.060
Insulation - Wall Cavity	9.0%	47.5%	20	\$1,000.00	6,924.3	1.17	\$0.011
Insulation - Wall Sheathing	9.0%	47.5%	20	\$1,000.00	2,118.9	0.32	\$0.036
Ducting - Repair and Sealing	50.0%	50.0%	18	\$500.00	7,358.5	2.34	\$0.006
Windows - High Efficiency/ENERGY STAR	85.0%	90.0%	25	\$2,200.00	2,827.1	0.30	\$0.052
Windows - Install Reflective Film	20.0%	45.0%	10	\$577.67	4,360.6	0.83	\$0.016
Doors - Storm and Thermal	13.0%	75.0%	12	\$180.00	1,349.9	0.64	\$0.014
Roofs - High Reflectivity	13.0%	90.0%	15	\$516.54	900.2	0.29	\$0.052
Attic Fan - Installation	5.0%	22.5%	18	\$41.00	56.3	0.28	\$0.059
Attic Fan - Photovoltaic - Installation	4.0%	11.3%	19	\$200.00	56.3	0.06	\$0.279
Whole-House Fan - Installation	1.0%	18.8%	18	\$250.00	1,497.6	1.21	\$0.014
Ceiling Fan - Installation	56.0%	75.0%	15	\$80.00	2,648.3	5.55	\$0.003
Thermostat - Clock/Programmable	67.1%	95.0%	12	\$73.33	6,793.9	8.32	\$0.001
Home Energy Management System	0.0%	67.5%	20	\$600.00	11,073.1	2.32	\$0.004
Central AC - Early Replacement	24.0%	100.0%	15	\$1,473.82	8,582.2	0.98	\$0.016
Central AC - Maintenance and Tune-Up	24.0%	100.0%	4	\$125.00	1,532.2	0.54	\$0.022
Central Heat Pump - Maintenance	1.0%	90.0%	4	\$125.00	2,635.2	0.88	\$0.013
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	6,240.6	4.79	\$0.003
Boiler - Hot Water Reset	16.8%	95.0%	12	\$370.00	8,817.6	1.92	\$0.004
Boiler - Pipe Insulation	7.0%	41.3%	13	\$100.00	460.9	0.41	\$0.022
Boiler - Maintenance	20.0%	100.0%	4	\$125.00	2,701.0	0.51	\$0.012
Furnace - Maintenance	20.0%	100.0%	4	\$125.00	1,827.7	0.34	\$0.018
Water Heater - Drainwater Heat Recovery	1.0%	90.0%	15	\$899.00	5,518.2	0.46	\$0.015
Water Heater - Faucet Aerators	16.0%	90.0%	9	\$7.12	1,358.2	8.22	\$0.001
Water Heater - Low-Flow Showerheads	28.0%	95.0%	10	\$48.00	3,165.1	3.18	\$0.002
Water Heater - Pipe Insulation	9.0%	41.3%	13	\$50.00	811.5	0.93	\$0.006
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,839.4	0.46	\$0.013
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	7,357.6	0.37	\$0.019
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	18,303.0	0.32	\$0.025
Water Heater - Tank Blanket/Insulation	8.0%	75.0%	13	\$24.00	990.7	2.64	\$0.002
Interior Lighting - Occupancy Sensors	18.0%	27.5%	15	\$500.00	5,502.9	0.82	\$0.008
Exterior Lighting - Photosensor Control	40.0%	45.0%	8	\$90.00	1,725.9	0.73	\$0.008
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	411.6	0.01	\$0.661
Exterior Lighting - Timeclock Installation	25.0%	45.0%	8	\$108.00	1,208.1	0.43	\$0.013
Refrigerator - Early Replacement	24.0%	100.0%	13	\$639.00	2,153.2	0.20	\$0.030
Refrigerator - Maintenance	24.0%	100.0%	4	\$50.00	638.5	0.24	\$0.021
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	6,605.8	2.04	\$0.002
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	4,951.5	1.52	\$0.003
Freezer - Early Replacement	24.0%	100.0%	11	\$441.60	2,084.1	0.23	\$0.024
Freezer - Maintenance	24.0%	100.0%	4	\$50.00	247.6	0.09	\$0.054
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	515.0	0.99	\$0.006
Pool Pump - Timer	90.0%	90.0%	15	\$160.00	1,406.9	0.71	\$0.010
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	33,812.5	0.56	\$0.011
ENERGY STAR Home Design	14.0%	75.0%	18	\$5,000.00	22,472.3	0.59	\$0.018
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.34	\$0.018

Table B-29 Energy Efficiency Non-Equipment Data—Single Family Limited Income, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	16.0%	72.0%	20	\$1,000.00	11,755.5	2.00	\$0.006
Insulation - Ducting	13.0%	75.0%	18	\$500.00	3,596.9	1.10	\$0.011
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	46.0%	90.0%	12	\$266.00	4,667.0	1.55	\$0.006
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	1,755.3	0.20	\$0.056
Insulation - Wall Cavity	16.0%	72.0%	20	\$1,000.00	7,256.5	1.23	\$0.010
Insulation - Wall Sheathing	0.0%	0.0%	20	\$1,000.00	2,213.0	0.36	\$0.034
Ducting - Repair and Sealing	16.0%	50.0%	18	\$500.00	11,559.3	3.52	\$0.004
Windows - High Efficiency/ENERGY STAR	47.0%	90.0%	25	\$7,500.00	3,948.0	0.12	\$0.128
Windows - Install Reflective Film	20.0%	45.0%	10	\$895.39	6,134.5	0.64	\$0.018
Doors - Storm and Thermal	38.0%	75.0%	12	\$320.00	1,164.8	0.33	\$0.029
Roofs - High Reflectivity	13.0%	17.4%	15	\$1,549.61	930.7	0.09	\$0.152
Attic Fan - Installation	5.0%	22.5%	18	\$141.00	59.9	0.07	\$0.191
Attic Fan - Photovoltaic - Installation	13.0%	45.0%	19	\$350.00	59.9	0.03	\$0.458
Whole-House Fan - Installation	1.0%	18.8%	18	\$250.00	1,454.0	1.00	\$0.014
Ceiling Fan - Installation	58.0%	75.0%	15	\$120.00	2,794.4	3.32	\$0.004
Thermostat - Clock/Programmable	54.0%	56.3%	12	\$73.33	8,280.9	10.46	\$0.001
Home Energy Management System	2.0%	37.5%	20	\$600.00	9,330.7	1.85	\$0.005
Central AC - Early Replacement	37.0%	100.0%	15	\$1,593.97	8,064.1	0.73	\$0.018
Central AC - Maintenance and Tune-Up	37.0%	100.0%	4	\$125.00	2,310.0	0.71	\$0.015
Central Heat Pump - Maintenance	3.0%	90.0%	4	\$125.00	4,216.9	1.19	\$0.008
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	5,711.1	2.53	\$0.003
Boiler - Hot Water Reset	13.5%	56.3%	12	\$370.00	9,157.9	2.24	\$0.004
Boiler - Pipe Insulation	16.0%	38.1%	13	\$360.00	69.1	0.02	\$0.526
Boiler - Maintenance	32.0%	100.0%	4	\$125.00	2,805.2	0.60	\$0.012
Furnace - Maintenance	32.0%	100.0%	4	\$125.00	2,002.3	0.43	\$0.017
Water Heater - Drainwater Heat Recovery	1.0%	50.0%	15	\$899.00	5,027.0	0.42	\$0.016
Water Heater - Faucet Aerators	25.0%	90.0%	9	\$12.70	1,265.6	4.32	\$0.001
Water Heater - Low-Flow Showerheads	45.0%	85.0%	10	\$37.95	2,969.7	3.79	\$0.002
Water Heater - Pipe Insulation	18.0%	38.1%	13	\$180.00	60.3	0.02	\$0.301
Water Heater - Timer	17.0%	40.0%	10	\$194.00	1,675.7	0.42	\$0.014
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	6,702.7	0.33	\$0.020
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	16,756.8	0.29	\$0.027
Water Heater - Tank Blanket/Insulation	19.0%	75.0%	13	\$24.00	741.8	1.96	\$0.003
Interior Lighting - Occupancy Sensors	18.0%	27.5%	15	\$750.00	4,052.2	0.29	\$0.017
Exterior Lighting - Photosensor Control	21.0%	45.0%	8	\$90.00	1,483.3	0.37	\$0.009
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	386.1	0.00	\$0.704
Exterior Lighting - Timeclock Installation	7.0%	45.0%	8	\$108.00	1,038.3	0.22	\$0.015
Refrigerator - Early Replacement	37.0%	100.0%	13	\$639.00	3,025.5	0.22	\$0.021
Refrigerator - Maintenance	37.0%	100.0%	4	\$50.00	937.5	0.29	\$0.014
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	10,089.0	2.42	\$0.002
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	6,786.7	1.70	\$0.002
Freezer - Early Replacement	37.0%	100.0%	11	\$441.60	2,856.5	0.25	\$0.018
Freezer - Maintenance	37.0%	100.0%	4	\$50.00	339.3	0.10	\$0.040
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	482.7	0.95	\$0.006
Pool Pump - Timer	4.0%	90.0%	15	\$160.00	1,506.4	0.78	\$0.010
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	36,083.1	0.62	\$0.010
ENERGY STAR Home Design	0.0%	0.0%	18	\$5,000.00	-	-	\$0.000
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.30	\$0.018

Table B-30 Energy Efficiency Non-Equipment Data— Single Family Limited Income, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	9.0%	47.5%	20	\$1,000.00	6,415.9	1.15	\$0.012
Insulation - Ducting	2.0%	75.0%	18	\$250.00	2,854.8	1.81	\$0.007
Insulation - Foundation	20.0%	45.0%	20	\$1,000.00	3,142.8	0.54	\$0.024
Insulation - Infiltration Control	46.0%	90.0%	12	\$266.00	3,532.8	1.24	\$0.008
Insulation - Radiant Barrier	25.0%	90.0%	12	\$922.68	1,304.9	0.16	\$0.076
Insulation - Wall Cavity	9.0%	47.5%	20	\$1,000.00	5,446.0	0.97	\$0.014
Insulation - Wall Sheathing	9.0%	47.5%	20	\$1,000.00	1,660.1	0.28	\$0.046
Ducting - Repair and Sealing	50.0%	50.0%	18	\$500.00	6,013.7	1.93	\$0.007
Windows - High Efficiency/ENERGY STAR	85.0%	90.0%	25	\$2,200.00	2,224.7	0.24	\$0.066
Windows - Install Reflective Film	20.0%	45.0%	10	\$577.67	3,452.1	0.60	\$0.021
Doors - Storm and Thermal	13.0%	75.0%	12	\$180.00	1,058.3	0.55	\$0.018
Roofs - High Reflectivity	13.0%	90.0%	15	\$516.54	712.7	0.21	\$0.066
Attic Fan - Installation	5.0%	22.5%	18	\$41.00	44.6	0.20	\$0.075
Attic Fan - Photovoltaic - Installation	4.0%	11.3%	19	\$200.00	44.6	0.04	\$0.352
Whole-House Fan - Installation	1.0%	18.8%	18	\$250.00	1,185.6	0.89	\$0.017
Ceiling Fan - Installation	56.0%	75.0%	15	\$80.00	2,096.5	4.05	\$0.003
Thermostat - Clock/Programmable	67.1%	95.0%	12	\$73.33	5,328.4	7.07	\$0.001
Home Energy Management System	0.0%	67.5%	20	\$600.00	9,322.9	1.74	\$0.005
Central AC - Early Replacement	24.0%	100.0%	15	\$1,351.19	7,208.1	0.82	\$0.017
Central AC - Maintenance and Tune-Up	24.0%	100.0%	4	\$125.00	1,213.0	0.39	\$0.028
Central Heat Pump - Maintenance	1.0%	90.0%	4	\$125.00	2,102.2	0.64	\$0.016
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	4,940.5	2.27	\$0.003
Boiler - Hot Water Reset	16.8%	95.0%	12	\$370.00	6,853.2	1.75	\$0.006
Boiler - Pipe Insulation	7.0%	41.3%	13	\$100.00	358.2	0.37	\$0.028
Boiler - Maintenance	20.0%	100.0%	4	\$125.00	2,099.3	0.46	\$0.016
Furnace - Maintenance	20.0%	100.0%	4	\$125.00	1,530.2	0.34	\$0.022
Water Heater - Drainwater Heat Recovery	1.0%	90.0%	15	\$899.00	4,362.4	0.39	\$0.019
Water Heater - Faucet Aerators	16.0%	90.0%	9	\$7.12	1,071.5	6.87	\$0.001
Water Heater - Low-Flow Showerheads	28.0%	95.0%	10	\$48.00	2,493.2	2.66	\$0.002
Water Heater - Pipe Insulation	9.0%	41.3%	13	\$50.00	361.3	0.45	\$0.014
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,454.1	0.38	\$0.016
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	5,816.5	0.31	\$0.024
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	14,457.6	0.27	\$0.032
Water Heater - Tank Blanket/Insulation	8.0%	75.0%	13	\$24.00	765.1	2.18	\$0.003
Interior Lighting - Occupancy Sensors	18.0%	27.5%	15	\$500.00	4,863.6	0.50	\$0.009
Exterior Lighting - Photosensor Control	40.0%	45.0%	8	\$90.00	1,573.9	0.45	\$0.008
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	375.4	0.01	\$0.724
Exterior Lighting - Timeclock Installation	25.0%	45.0%	8	\$108.00	1,101.7	0.26	\$0.014
Refrigerator - Early Replacement	24.0%	100.0%	13	\$639.00	2,050.6	0.19	\$0.031
Refrigerator - Maintenance	24.0%	100.0%	4	\$50.00	608.1	0.23	\$0.022
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	6,291.2	1.94	\$0.003
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	4,715.8	1.45	\$0.003
Freezer - Early Replacement	24.0%	100.0%	11	\$441.60	1,984.9	0.22	\$0.025
Freezer - Maintenance	24.0%	100.0%	4	\$50.00	235.8	0.09	\$0.057
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	490.9	1.10	\$0.006
Pool Pump - Timer	90.0%	90.0%	15	\$160.00	1,406.9	0.73	\$0.010
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	33,812.5	0.58	\$0.011
ENERGY STAR Home Design	14.0%	75.0%	18	\$5,000.00	18,181.2	0.48	\$0.022
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.33	\$0.018

Table B-31 Energy Efficiency Non-Equipment Data—Multi Family Renter, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	11.0%	33.8%	20	\$1,000.00	6,601.2	0.83	\$0.012
Insulation - Ducting	5.0%	75.0%	18	\$375.00	2,812.0	1.00	\$0.011
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	4,874.8	1.25	\$0.006
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	2,729.2	0.25	\$0.036
Insulation - Wall Cavity	11.0%	33.8%	20	\$1,000.00	7,010.1	0.92	\$0.011
Insulation - Wall Sheathing	0.0%	0.0%	20	\$1,000.00	4,828.3	0.56	\$0.016
Ducting - Repair and Sealing	8.0%	50.0%	18	\$500.00	5,130.7	1.42	\$0.008
Windows - High Efficiency/ENERGY STAR	68.0%	90.0%	25	\$2,500.00	2,918.8	0.22	\$0.058
Windows - Install Reflective Film	20.0%	45.0%	10	\$186.32	3,179.2	1.62	\$0.007
Doors - Storm and Thermal	17.0%	75.0%	12	\$320.00	1,134.8	0.24	\$0.030
Roofs - High Reflectivity	25.0%	28.8%	15	\$1,549.61	866.9	0.08	\$0.163
Attic Fan - Installation	2.0%	22.5%	18	\$141.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	2.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	1.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	43.0%	75.0%	15	\$120.00	2,389.6	2.86	\$0.005
Thermostat - Clock/Programmable	33.0%	67.5%	12	\$73.33	7,378.9	7.06	\$0.001
Home Energy Management System	2.0%	12.5%	20	\$600.00	9,873.7	1.73	\$0.005
Central AC - Early Replacement	27.0%	100.0%	15	\$3,905.70	8,476.0	0.31	\$0.042
Central AC - Maintenance and Tune-Up	27.0%	100.0%	4	\$100.00	2,240.0	0.87	\$0.012
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	4,123.3	1.61	\$0.007
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	7,326.7	4.43	\$0.002
Boiler - Hot Water Reset	8.3%	67.5%	12	\$370.00	8,520.3	1.44	\$0.005
Boiler - Pipe Insulation	9.0%	38.1%	13	\$360.00	130.1	0.02	\$0.280
Boiler - Maintenance	22.0%	100.0%	4	\$100.00	2,596.8	0.49	\$0.010
Furnace - Maintenance	22.0%	100.0%	4	\$100.00	1,733.8	0.33	\$0.015
Water Heater - Drainwater Heat Recovery	1.0%	50.0%	15	\$899.00	5,131.9	0.39	\$0.016
Water Heater - Faucet Aerators	12.0%	90.0%	9	\$12.70	1,535.8	4.63	\$0.001
Water Heater - Low-Flow Showerheads	27.0%	75.0%	10	\$37.95	1,580.7	1.79	\$0.003
Water Heater - Pipe Insulation	9.0%	38.1%	13	\$180.00	248.3	0.08	\$0.073
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,710.6	0.38	\$0.014
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	6,842.5	0.31	\$0.020
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	17,106.9	0.27	\$0.027
Water Heater - Tank Blanket/Insulation	11.0%	75.0%	13	\$24.00	1,483.7	3.58	\$0.002
Interior Lighting - Occupancy Sensors	5.0%	27.5%	15	\$256.00	3,947.3	0.85	\$0.006
Exterior Lighting - Photosensor Control	18.0%	45.0%	8	\$90.00	1,355.1	0.39	\$0.010
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	773.7	0.01	\$0.351
Exterior Lighting - Timerclock Installation	8.0%	45.0%	8	\$108.00	948.6	0.23	\$0.017
Refrigerator - Early Replacement	27.0%	100.0%	13	\$639.00	3,025.5	0.22	\$0.021
Refrigerator - Maintenance	27.0%	100.0%	4	\$50.00	937.5	0.30	\$0.014
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	10,089.0	2.62	\$0.002
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	6,786.7	1.70	\$0.002
Freezer - Early Replacement	27.0%	100.0%	11	\$441.60	2,856.5	0.25	\$0.018
Freezer - Maintenance	27.0%	100.0%	4	\$50.00	339.3	0.10	\$0.040
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	482.7	0.93	\$0.006
Pool Pump - Timer	0.0%	90.0%	15	\$16.00	1,506.4	7.66	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	31,078.1	0.53	\$0.012
ENERGY STAR Home Design	0.0%	0.0%	18	\$5,000.00	-	-	\$0.000
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.31	\$0.018

Table B-32 Energy Efficiency Non-Equipment Data— Multi Family Renter, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	13.0%	47.5%	20	\$1,000.00	3,246.3	0.41	\$0.023
Insulation - Ducting	13.0%	75.0%	18	\$200.00	2,295.0	1.47	\$0.007
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	3,598.4	0.92	\$0.008
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	1,801.8	0.18	\$0.055
Insulation - Wall Cavity	13.0%	47.5%	20	\$1,000.00	4,988.8	0.69	\$0.015
Insulation - Wall Sheathing	13.0%	47.5%	20	\$1,000.00	3,409.4	0.40	\$0.022
Ducting - Repair and Sealing	50.0%	50.0%	18	\$500.00	2,579.3	0.72	\$0.016
Windows - High Efficiency/ENERGY STAR	78.0%	90.0%	25	\$2,200.00	1,506.2	0.14	\$0.098
Windows - Install Reflective Film	20.0%	45.0%	10	\$218.97	1,707.1	0.80	\$0.016
Doors - Storm and Thermal	19.0%	75.0%	12	\$180.00	508.4	0.22	\$0.038
Roofs - High Reflectivity	32.0%	90.0%	15	\$516.54	386.0	0.12	\$0.122
Attic Fan - Installation	9.0%	22.5%	18	\$41.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	5.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	0.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	47.0%	75.0%	15	\$80.00	1,555.0	3.05	\$0.005
Thermostat - Clock/Programmable	83.4%	85.0%	12	\$73.33	4,424.2	4.43	\$0.002
Home Energy Management System	0.0%	67.5%	20	\$600.00	8,230.1	1.52	\$0.006
Central AC - Early Replacement	9.0%	100.0%	15	\$3,176.78	6,721.5	0.34	\$0.043
Central AC - Maintenance and Tune-Up	9.0%	100.0%	4	\$100.00	1,149.0	0.48	\$0.023
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	2,068.9	0.81	\$0.013
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	6,307.1	3.95	\$0.003
Boiler - Hot Water Reset	14.5%	85.0%	12	\$370.00	5,974.3	1.04	\$0.007
Boiler - Pipe Insulation	20.0%	41.3%	13	\$100.00	51.6	0.04	\$0.196
Boiler - Maintenance	14.0%	100.0%	4	\$100.00	1,820.9	0.35	\$0.015
Furnace - Maintenance	14.0%	100.0%	4	\$100.00	1,241.0	0.22	\$0.022
Water Heater - Drainwater Heat Recovery	1.0%	90.0%	15	\$899.00	4,460.7	0.35	\$0.018
Water Heater - Faucet Aerators	0.0%	90.0%	9	\$7.12	1,339.3	7.38	\$0.001
Water Heater - Low-Flow Showerheads	26.0%	75.0%	10	\$48.00	1,371.0	1.26	\$0.004
Water Heater - Pipe Insulation	13.0%	41.3%	13	\$50.00	120.8	0.15	\$0.042
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,486.9	0.34	\$0.016
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	5,947.6	0.28	\$0.023
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	14,798.8	0.24	\$0.031
Water Heater - Tank Blanket/Insulation	13.0%	75.0%	13	\$24.00	950.0	2.37	\$0.003
Interior Lighting - Occupancy Sensors	13.0%	27.5%	15	\$256.00	4,819.9	1.40	\$0.005
Exterior Lighting - Photosensor Control	31.0%	45.0%	8	\$90.00	1,615.3	0.68	\$0.008
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	1,091.2	0.02	\$0.249
Exterior Lighting - Timeclock Installation	22.0%	45.0%	8	\$108.00	1,130.7	0.40	\$0.014
Refrigerator - Early Replacement	9.0%	100.0%	13	\$639.00	2,050.6	0.19	\$0.031
Refrigerator - Maintenance	9.0%	100.0%	4	\$50.00	608.1	0.23	\$0.022
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	6,291.2	1.94	\$0.003
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	4,715.9	1.45	\$0.003
Freezer - Early Replacement	9.0%	100.0%	11	\$441.60	1,984.9	0.22	\$0.025
Freezer - Maintenance	9.0%	100.0%	4	\$50.00	235.8	0.09	\$0.057
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	490.9	0.98	\$0.006
Pool Pump - Timer	90.0%	90.0%	15	\$16.00	1,406.9	7.16	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	28,807.5	0.49	\$0.013
ENERGY STAR Home Design	14.0%	75.0%	18	\$5,000.00	17,130.4	0.40	\$0.024
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.33	\$0.018

Table B-33 Energy Efficiency Non-Equipment Data—Multi Family Renter Limited Income, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	11.0%	33.8%	20	\$1,000.00	5,331.1	0.88	\$0.014
Insulation - Ducting	5.0%	75.0%	18	\$375.00	2,096.6	0.90	\$0.015
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	3,894.7	1.31	\$0.007
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	2,269.9	0.24	\$0.044
Insulation - Wall Cavity	11.0%	33.8%	20	\$1,000.00	5,801.7	0.96	\$0.013
Insulation - Wall Sheathing	0.0%	0.0%	20	\$1,000.00	3,975.4	0.63	\$0.019
Ducting - Repair and Sealing	8.0%	50.0%	18	\$500.00	4,088.9	1.33	\$0.010
Windows - High Efficiency/ENERGY STAR	68.0%	90.0%	25	\$2,500.00	2,010.7	0.18	\$0.084
Windows - Install Reflective Film	20.0%	45.0%	10	\$186.32	2,725.0	1.39	\$0.008
Doors - Storm and Thermal	17.0%	75.0%	12	\$320.00	933.5	0.26	\$0.037
Roofs - High Reflectivity	25.0%	28.8%	15	\$1,549.61	743.0	0.07	\$0.191
Attic Fan - Installation	2.0%	22.5%	18	\$141.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	2.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	1.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	43.0%	75.0%	15	\$120.00	2,066.9	2.47	\$0.005
Thermostat - Clock/Programmable	33.0%	67.5%	12	\$73.33	6,143.0	7.60	\$0.001
Home Energy Management System	2.0%	12.5%	20	\$600.00	7,786.0	1.64	\$0.006
Central AC - Early Replacement	27.0%	100.0%	15	\$3,347.75	7,265.1	0.31	\$0.042
Central AC - Maintenance and Tune-Up	27.0%	100.0%	4	\$100.00	1,920.0	0.75	\$0.014
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	3,211.5	1.32	\$0.008
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	6,280.1	3.80	\$0.003
Boiler - Hot Water Reset	8.3%	67.5%	12	\$370.00	7,659.1	1.80	\$0.005
Boiler - Pipe Insulation	9.0%	38.1%	13	\$360.00	117.0	0.03	\$0.311
Boiler - Maintenance	22.0%	100.0%	4	\$100.00	2,334.4	0.61	\$0.011
Furnace - Maintenance	22.0%	100.0%	4	\$100.00	1,654.8	0.43	\$0.016
Water Heater - Drainwater Heat Recovery	1.0%	50.0%	15	\$899.00	5,425.8	0.41	\$0.015
Water Heater - Faucet Aerators	12.0%	90.0%	9	\$12.70	1,624.5	5.00	\$0.001
Water Heater - Low-Flow Showerheads	27.0%	75.0%	10	\$37.95	1,669.5	1.93	\$0.003
Water Heater - Pipe Insulation	9.0%	38.1%	13	\$180.00	456.2	0.15	\$0.040
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,808.6	0.41	\$0.013
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	7,234.4	0.33	\$0.019
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	18,087.5	0.28	\$0.025
Water Heater - Tank Blanket/Insulation	11.0%	75.0%	13	\$24.00	1,755.0	4.31	\$0.001
Interior Lighting - Occupancy Sensors	5.0%	27.5%	15	\$256.00	2,790.3	0.60	\$0.008
Exterior Lighting - Photosensor Control	18.0%	45.0%	8	\$90.00	1,322.8	0.38	\$0.010
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	755.3	0.01	\$0.360
Exterior Lighting - Timeclock Installation	8.0%	45.0%	8	\$108.00	926.0	0.22	\$0.017
Refrigerator - Early Replacement	27.0%	100.0%	13	\$639.00	3,025.5	0.22	\$0.021
Refrigerator - Maintenance	27.0%	100.0%	4	\$50.00	937.5	0.30	\$0.014
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	10,089.0	2.62	\$0.002
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	6,786.7	1.70	\$0.002
Freezer - Early Replacement	27.0%	100.0%	11	\$441.60	2,856.5	0.25	\$0.018
Freezer - Maintenance	27.0%	100.0%	4	\$50.00	339.3	0.10	\$0.040
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	459.0	0.88	\$0.006
Pool Pump - Timer	0.0%	90.0%	15	\$16.00	1,506.4	7.66	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	31,078.1	0.53	\$0.012
ENERGY STAR Home Design	0.0%	0.0%	18	\$5,000.00	-	-	\$0.000
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.31	\$0.018

Table B-34 Energy Efficiency Non-Equipment Data— Multi Family Renter Limited Income, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	13.0%	47.5%	20	\$1,000.00	2,580.0	0.44	\$0.029
Insulation - Ducting	13.0%	75.0%	18	\$200.00	1,566.3	1.18	\$0.010
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	2,873.6	0.99	\$0.010
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	1,500.7	0.17	\$0.066
Insulation - Wall Cavity	13.0%	47.5%	20	\$1,000.00	4,100.5	0.72	\$0.019
Insulation - Wall Sheathing	13.0%	47.5%	20	\$1,000.00	2,782.3	0.46	\$0.027
Ducting - Repair and Sealing	50.0%	50.0%	18	\$500.00	2,001.2	0.63	\$0.020
Windows - High Efficiency/ENERGY STAR	78.0%	90.0%	25	\$2,200.00	1,030.7	0.11	\$0.143
Windows - Install Reflective Film	20.0%	45.0%	10	\$218.97	1,463.2	0.68	\$0.018
Doors - Storm and Thermal	19.0%	75.0%	12	\$180.00	419.1	0.23	\$0.046
Roofs - High Reflectivity	32.0%	90.0%	15	\$516.54	330.9	0.10	\$0.143
Attic Fan - Installation	9.0%	22.5%	18	\$41.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	5.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	0.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	47.0%	75.0%	15	\$80.00	1,330.5	2.58	\$0.005
Thermostat - Clock/Programmable	83.4%	85.0%	12	\$73.33	3,627.8	4.68	\$0.002
Home Energy Management System	0.0%	67.5%	20	\$600.00	6,316.2	1.30	\$0.007
Central AC - Early Replacement	9.0%	100.0%	15	\$2,722.95	5,761.3	0.34	\$0.043
Central AC - Maintenance and Tune-Up	9.0%	100.0%	4	\$100.00	984.8	0.41	\$0.027
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	1,625.1	0.67	\$0.017
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	5,406.1	3.39	\$0.003
Boiler - Hot Water Reset	14.5%	85.0%	12	\$370.00	5,348.0	1.30	\$0.007
Boiler - Pipe Insulation	20.0%	41.3%	13	\$100.00	46.2	0.05	\$0.219
Boiler - Maintenance	14.0%	100.0%	4	\$100.00	1,630.0	0.43	\$0.016
Furnace - Maintenance	14.0%	100.0%	4	\$100.00	1,107.2	0.25	\$0.024
Water Heater - Drainwater Heat Recovery	1.0%	90.0%	15	\$899.00	4,691.6	0.37	\$0.018
Water Heater - Faucet Aerators	0.0%	90.0%	9	\$7.12	1,407.7	7.92	\$0.001
Water Heater - Low-Flow Showerheads	26.0%	75.0%	10	\$48.00	1,441.7	1.35	\$0.004
Water Heater - Pipe Insulation	13.0%	41.3%	13	\$50.00	221.3	0.27	\$0.023
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,563.9	0.36	\$0.015
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	6,255.5	0.30	\$0.022
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	15,588.7	0.25	\$0.029
Water Heater - Tank Blanket/Insulation	13.0%	75.0%	13	\$24.00	1,180.6	2.99	\$0.002
Interior Lighting - Occupancy Sensors	13.0%	27.5%	15	\$256.00	3,407.2	0.99	\$0.007
Exterior Lighting - Photosensor Control	31.0%	45.0%	8	\$90.00	1,576.8	0.67	\$0.008
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	1,065.2	0.02	\$0.255
Exterior Lighting - Timeclock Installation	22.0%	45.0%	8	\$108.00	1,103.8	0.39	\$0.014
Refrigerator - Early Replacement	9.0%	100.0%	13	\$639.00	2,050.6	0.19	\$0.031
Refrigerator - Maintenance	9.0%	100.0%	4	\$50.00	608.1	0.23	\$0.022
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	6,291.2	1.94	\$0.003
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	4,715.9	1.45	\$0.003
Freezer - Early Replacement	9.0%	100.0%	11	\$441.60	1,984.9	0.22	\$0.025
Freezer - Maintenance	9.0%	100.0%	4	\$50.00	235.8	0.09	\$0.057
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	466.8	0.94	\$0.006
Pool Pump - Timer	90.0%	90.0%	15	\$16.00	1,406.9	7.16	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	28,807.5	0.49	\$0.013
ENERGY STAR Home Design	14.0%	75.0%	18	\$5,000.00	13,554.2	0.38	\$0.030
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.33	\$0.018

Table B-35 Energy Efficiency Non-Equipment Data—Multi Family Owner, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	11.0%	33.8%	20	\$1,000.00	4,586.7	0.55	\$0.017
Insulation - Ducting	5.0%	75.0%	18	\$375.00	1,994.7	0.73	\$0.015
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	3,346.8	0.81	\$0.009
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	2,043.7	0.19	\$0.048
Insulation - Wall Cavity	11.0%	33.8%	20	\$1,000.00	4,955.5	0.62	\$0.015
Insulation - Wall Sheathing	0.0%	0.0%	20	\$1,000.00	3,211.2	0.33	\$0.024
Ducting - Repair and Sealing	8.0%	50.0%	18	\$500.00	3,710.6	1.06	\$0.011
Windows - High Efficiency/ENERGY STAR	68.0%	90.0%	25	\$2,500.00	1,710.4	0.13	\$0.098
Windows - Install Reflective Film	20.0%	45.0%	10	\$186.32	2,775.5	1.42	\$0.008
Doors - Storm and Thermal	17.0%	75.0%	12	\$320.00	779.6	0.16	\$0.044
Roofs - High Reflectivity	25.0%	28.8%	15	\$1,549.61	756.8	0.07	\$0.187
Attic Fan - Installation	2.0%	22.5%	18	\$141.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	2.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	1.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	43.0%	75.0%	15	\$120.00	2,102.9	2.53	\$0.005
Thermostat - Clock/Programmable	33.0%	67.5%	12	\$73.33	5,131.4	4.67	\$0.002
Home Energy Management System	2.0%	12.5%	20	\$600.00	6,368.0	1.13	\$0.007
Central AC - Early Replacement	27.0%	100.0%	15	\$3,409.74	7,399.7	0.31	\$0.042
Central AC - Maintenance and Tune-Up	27.0%	100.0%	4	\$100.00	1,955.5	0.76	\$0.014
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	3,485.6	1.39	\$0.008
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	6,396.4	3.87	\$0.003
Boiler - Hot Water Reset	8.3%	67.5%	12	\$370.00	5,664.1	0.84	\$0.007
Boiler - Pipe Insulation	9.0%	38.1%	13	\$360.00	86.5	0.01	\$0.421
Boiler - Maintenance	22.0%	100.0%	4	\$100.00	1,726.3	0.29	\$0.016
Furnace - Maintenance	22.0%	100.0%	4	\$100.00	1,005.2	0.17	\$0.027
Water Heater - Drainwater Heat Recovery	1.0%	50.0%	15	\$899.00	4,086.5	0.31	\$0.020
Water Heater - Faucet Aerators	12.0%	90.0%	9	\$12.70	1,223.0	3.69	\$0.001
Water Heater - Low-Flow Showerheads	27.0%	75.0%	10	\$37.95	1,258.6	1.43	\$0.004
Water Heater - Pipe Insulation	9.0%	38.1%	13	\$180.00	207.4	0.07	\$0.088
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,362.2	0.30	\$0.018
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	5,448.6	0.25	\$0.025
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	13,622.1	0.21	\$0.033
Water Heater - Tank Blanket/Insulation	11.0%	75.0%	13	\$24.00	1,190.7	2.88	\$0.002
Interior Lighting - Occupancy Sensors	5.0%	27.5%	15	\$256.00	2,109.8	0.46	\$0.011
Exterior Lighting - Photosensor Control	18.0%	45.0%	8	\$90.00	1,000.2	0.29	\$0.013
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	571.1	0.01	\$0.476
Exterior Lighting - Timerclock Installation	8.0%	45.0%	8	\$108.00	700.1	0.17	\$0.023
Refrigerator - Early Replacement	27.0%	100.0%	13	\$639.00	3,025.5	0.22	\$0.021
Refrigerator - Maintenance	27.0%	100.0%	4	\$50.00	937.5	0.30	\$0.014
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	10,089.0	2.62	\$0.002
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	6,786.7	1.70	\$0.002
Freezer - Early Replacement	27.0%	100.0%	11	\$441.60	2,856.5	0.25	\$0.018
Freezer - Maintenance	27.0%	100.0%	4	\$50.00	339.3	0.10	\$0.040
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	482.7	0.93	\$0.006
Pool Pump - Timer	0.0%	90.0%	15	\$16.00	1,506.4	7.66	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	31,078.1	0.53	\$0.012
ENERGY STAR Home Design	0.0%	0.0%	18	\$5,000.00	-	-	\$0.000
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.31	\$0.018

Table B-36 Energy Efficiency Non-Equipment Data— Multi Family Owner, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	13.0%	47.5%	20	\$1,000.00	2,222.4	0.26	\$0.034
Insulation - Ducting	13.0%	75.0%	18	\$200.00	1,608.7	1.08	\$0.010
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	2,437.4	0.58	\$0.012
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	1,367.6	0.14	\$0.072
Insulation - Wall Cavity	13.0%	47.5%	20	\$1,000.00	3,535.5	0.47	\$0.022
Insulation - Wall Sheathing	13.0%	47.5%	20	\$1,000.00	2,269.9	0.24	\$0.034
Ducting - Repair and Sealing	50.0%	50.0%	18	\$500.00	1,881.0	0.55	\$0.022
Windows - High Efficiency/ENERGY STAR	78.0%	90.0%	25	\$2,200.00	892.9	0.09	\$0.166
Windows - Install Reflective Film	20.0%	45.0%	10	\$218.97	1,490.3	0.70	\$0.018
Doors - Storm and Thermal	19.0%	75.0%	12	\$180.00	365.3	0.16	\$0.053
Roofs - High Reflectivity	32.0%	90.0%	15	\$516.54	337.0	0.10	\$0.140
Attic Fan - Installation	9.0%	22.5%	18	\$41.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	5.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	0.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	47.0%	75.0%	15	\$80.00	1,355.4	2.68	\$0.005
Thermostat - Clock/Programmable	83.4%	85.0%	12	\$73.33	3,087.0	2.97	\$0.003
Home Energy Management System	0.0%	67.5%	20	\$600.00	5,378.3	0.99	\$0.008
Central AC - Early Replacement	9.0%	100.0%	15	\$2,773.38	5,868.0	0.34	\$0.043
Central AC - Maintenance and Tune-Up	9.0%	100.0%	4	\$100.00	1,003.1	0.42	\$0.027
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	1,753.8	0.70	\$0.015
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	5,506.2	3.45	\$0.003
Boiler - Hot Water Reset	14.5%	85.0%	12	\$370.00	3,976.6	0.61	\$0.010
Boiler - Pipe Insulation	20.0%	41.3%	13	\$100.00	34.3	0.02	\$0.294
Boiler - Maintenance	14.0%	100.0%	4	\$100.00	1,212.0	0.21	\$0.022
Furnace - Maintenance	14.0%	100.0%	4	\$100.00	733.7	0.12	\$0.037
Water Heater - Drainwater Heat Recovery	1.0%	90.0%	15	\$899.00	3,550.8	0.28	\$0.023
Water Heater - Faucet Aerators	0.0%	90.0%	9	\$7.12	1,066.1	5.88	\$0.001
Water Heater - Low-Flow Showerheads	26.0%	75.0%	10	\$48.00	1,091.3	1.00	\$0.005
Water Heater - Pipe Insulation	13.0%	41.3%	13	\$50.00	100.9	0.12	\$0.050
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,183.6	0.27	\$0.020
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	4,734.4	0.22	\$0.029
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	11,781.3	0.19	\$0.039
Water Heater - Tank Blanket/Insulation	13.0%	75.0%	13	\$24.00	765.2	1.91	\$0.003
Interior Lighting - Occupancy Sensors	13.0%	27.5%	15	\$256.00	2,862.4	0.83	\$0.008
Exterior Lighting - Photosensor Control	31.0%	45.0%	8	\$90.00	1,324.7	0.56	\$0.010
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	894.9	0.02	\$0.304
Exterior Lighting - Timeclock Installation	22.0%	45.0%	8	\$108.00	927.3	0.33	\$0.017
Refrigerator - Early Replacement	9.0%	100.0%	13	\$639.00	2,050.6	0.19	\$0.031
Refrigerator - Maintenance	9.0%	100.0%	4	\$50.00	608.1	0.23	\$0.022
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	6,291.2	1.94	\$0.003
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	4,715.9	1.45	\$0.003
Freezer - Early Replacement	9.0%	100.0%	11	\$441.60	1,984.9	0.22	\$0.025
Freezer - Maintenance	9.0%	100.0%	4	\$50.00	235.8	0.09	\$0.057
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	490.9	0.98	\$0.006
Pool Pump - Timer	90.0%	90.0%	15	\$16.00	1,406.9	7.16	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	28,807.5	0.49	\$0.013
ENERGY STAR Home Design	14.0%	75.0%	18	\$5,000.00	11,707.4	0.27	\$0.035
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.33	\$0.018

Table B-37 Energy Efficiency Non-Equipment Data—Multi Family Owner Limited Income, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	11.0%	33.8%	20	\$1,000.00	3,950.3	0.46	\$0.019
Insulation - Ducting	5.0%	75.0%	18	\$375.00	1,353.8	0.48	\$0.022
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	2,903.7	0.68	\$0.010
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	1,616.3	0.14	\$0.061
Insulation - Wall Cavity	11.0%	33.8%	20	\$1,000.00	4,261.9	0.51	\$0.018
Insulation - Wall Sheathing	0.0%	0.0%	20	\$1,000.00	3,010.6	0.31	\$0.025
Ducting - Repair and Sealing	8.0%	50.0%	18	\$500.00	2,624.0	0.72	\$0.015
Windows - High Efficiency/ENERGY STAR	68.0%	90.0%	25	\$2,500.00	1,041.6	0.07	\$0.161
Windows - Install Reflective Film	20.0%	45.0%	10	\$186.32	1,766.2	0.90	\$0.013
Doors - Storm and Thermal	17.0%	75.0%	12	\$320.00	695.8	0.13	\$0.049
Roofs - High Reflectivity	25.0%	28.8%	15	\$1,549.61	481.6	0.04	\$0.294
Attic Fan - Installation	2.0%	22.5%	18	\$141.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	2.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	1.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	43.0%	75.0%	15	\$120.00	1,374.8	1.65	\$0.008
Thermostat - Clock/Programmable	33.0%	67.5%	12	\$73.33	4,551.2	3.94	\$0.002
Home Energy Management System	2.0%	12.5%	20	\$600.00	5,605.9	0.94	\$0.008
Central AC - Early Replacement	27.0%	100.0%	15	\$2,169.84	4,708.9	0.31	\$0.042
Central AC - Maintenance and Tune-Up	27.0%	100.0%	4	\$100.00	1,244.4	0.48	\$0.022
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	2,100.4	0.86	\$0.013
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	4,419.3	2.67	\$0.004
Boiler - Hot Water Reset	8.3%	67.5%	12	\$370.00	5,795.6	0.86	\$0.007
Boiler - Pipe Insulation	9.0%	38.1%	13	\$360.00	88.5	0.01	\$0.411
Boiler - Maintenance	22.0%	100.0%	4	\$100.00	1,766.4	0.30	\$0.015
Furnace - Maintenance	22.0%	100.0%	4	\$100.00	1,024.5	0.17	\$0.026
Water Heater - Drainwater Heat Recovery	1.0%	50.0%	15	\$899.00	4,342.9	0.33	\$0.019
Water Heater - Faucet Aerators	12.0%	90.0%	9	\$12.70	1,300.1	3.99	\$0.001
Water Heater - Low-Flow Showerheads	27.0%	75.0%	10	\$37.95	1,336.5	1.54	\$0.003
Water Heater - Pipe Insulation	9.0%	38.1%	13	\$180.00	338.4	0.11	\$0.054
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,447.6	0.33	\$0.016
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	5,790.5	0.26	\$0.024
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	14,477.3	0.23	\$0.032
Water Heater - Tank Blanket/Insulation	11.0%	75.0%	13	\$24.00	1,379.0	3.38	\$0.002
Interior Lighting - Occupancy Sensors	5.0%	27.5%	15	\$256.00	1,973.7	0.43	\$0.012
Exterior Lighting - Photosensor Control	18.0%	45.0%	8	\$90.00	935.7	0.27	\$0.014
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	534.2	0.01	\$0.509
Exterior Lighting - Timeclock Installation	8.0%	45.0%	8	\$108.00	655.0	0.16	\$0.024
Refrigerator - Early Replacement	27.0%	100.0%	13	\$639.00	2,874.2	0.21	\$0.022
Refrigerator - Maintenance	27.0%	100.0%	4	\$50.00	890.6	0.28	\$0.015
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	9,584.5	2.49	\$0.002
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	6,447.4	1.61	\$0.003
Freezer - Early Replacement	27.0%	100.0%	11	\$441.60	2,713.7	0.24	\$0.019
Freezer - Maintenance	27.0%	100.0%	4	\$50.00	322.4	0.10	\$0.042
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	459.0	0.88	\$0.006
Pool Pump - Timer	0.0%	90.0%	15	\$16.00	1,506.4	7.66	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	31,078.1	0.53	\$0.012
ENERGY STAR Home Design	0.0%	0.0%	18	\$5,000.00	-	-	\$0.000
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.30	\$0.018

Table B-38 Energy Efficiency Non-Equipment Data—Multi Family Owner Limited Income, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/install)	Energy Savings (kBtu)	BC Ratio (2013)	Levelized Cost of Energy
Insulation - Ceiling	13.0%	47.5%	20	\$1,000.00	1,936.3	0.22	\$0.039
Insulation - Ducting	13.0%	75.0%	18	\$200.00	1,061.3	0.70	\$0.015
Insulation - Foundation	0.0%	0.0%	20	\$1,000.00	-	-	\$0.000
Insulation - Infiltration Control	19.0%	90.0%	12	\$266.00	2,168.8	0.50	\$0.013
Insulation - Radiant Barrier	5.0%	90.0%	12	\$922.68	1,063.9	0.10	\$0.093
Insulation - Wall Cavity	13.0%	47.5%	20	\$1,000.00	3,021.8	0.38	\$0.025
Insulation - Wall Sheathing	13.0%	47.5%	20	\$1,000.00	2,118.3	0.23	\$0.036
Ducting - Repair and Sealing	50.0%	50.0%	18	\$500.00	1,335.9	0.38	\$0.030
Windows - High Efficiency/ENERGY STAR	78.0%	90.0%	25	\$2,200.00	532.0	0.05	\$0.278
Windows - Install Reflective Film	20.0%	45.0%	10	\$218.97	948.4	0.45	\$0.028
Doors - Storm and Thermal	19.0%	75.0%	12	\$180.00	306.5	0.12	\$0.063
Roofs - High Reflectivity	32.0%	90.0%	15	\$516.54	214.5	0.07	\$0.220
Attic Fan - Installation	9.0%	22.5%	18	\$41.00	-	-	\$0.000
Attic Fan - Photovoltaic - Installation	5.0%	11.3%	19	\$200.00	-	-	\$0.000
Whole-House Fan - Installation	0.0%	18.8%	18	\$125.00	-	-	\$0.000
Ceiling Fan - Installation	47.0%	75.0%	15	\$80.00	857.9	1.69	\$0.009
Thermostat - Clock/Programmable	83.4%	85.0%	12	\$73.33	2,695.8	2.46	\$0.003
Home Energy Management System	0.0%	67.5%	20	\$600.00	4,681.2	0.83	\$0.010
Central AC - Early Replacement	9.0%	100.0%	15	\$1,764.88	3,734.2	0.34	\$0.043
Central AC - Maintenance and Tune-Up	9.0%	100.0%	4	\$100.00	638.3	0.27	\$0.042
Central Heat Pump - Maintenance	0.0%	90.0%	4	\$100.00	1,062.0	0.44	\$0.025
Room AC - Removal of Second Unit	0.0%	37.5%	5	\$75.00	3,804.3	2.39	\$0.004
Boiler - Hot Water Reset	14.5%	85.0%	12	\$370.00	4,069.0	0.63	\$0.010
Boiler - Pipe Insulation	20.0%	41.3%	13	\$100.00	35.1	0.02	\$0.288
Boiler - Maintenance	14.0%	100.0%	4	\$100.00	1,240.2	0.21	\$0.022
Furnace - Maintenance	14.0%	100.0%	4	\$100.00	747.7	0.13	\$0.036
Water Heater - Drainwater Heat Recovery	1.0%	90.0%	15	\$899.00	3,758.6	0.30	\$0.022
Water Heater - Faucet Aerators	0.0%	90.0%	9	\$7.12	1,127.9	6.32	\$0.001
Water Heater - Low-Flow Showerheads	26.0%	75.0%	10	\$48.00	1,155.1	1.08	\$0.005
Water Heater - Pipe Insulation	13.0%	41.3%	13	\$50.00	164.2	0.20	\$0.031
Water Heater - Timer	5.0%	40.0%	10	\$194.00	1,252.9	0.29	\$0.019
Water Heater - Desuperheater	0.0%	75.0%	15	\$1,500.00	5,011.5	0.24	\$0.027
Water Heater - Solar System	0.0%	75.0%	20	\$6,000.00	12,485.3	0.20	\$0.037
Water Heater - Tank Blanket/Insulation	13.0%	75.0%	13	\$24.00	920.7	2.33	\$0.003
Interior Lighting - Occupancy Sensors	13.0%	27.5%	15	\$256.00	2,543.8	0.74	\$0.009
Exterior Lighting - Photosensor Control	31.0%	45.0%	8	\$90.00	1,177.3	0.50	\$0.011
Exterior Lighting - Photovoltaic Installation	10.0%	45.0%	15	\$2,975.00	795.3	0.02	\$0.342
Exterior Lighting - Timeclock Installation	22.0%	45.0%	8	\$108.00	824.1	0.29	\$0.019
Refrigerator - Early Replacement	9.0%	100.0%	13	\$639.00	1,948.1	0.18	\$0.033
Refrigerator - Maintenance	9.0%	100.0%	4	\$50.00	577.7	0.22	\$0.023
Refrigerator - Remove Second Unit	0.0%	37.5%	5	\$75.00	5,976.6	1.84	\$0.003
Freezer - Remove Second Unit	0.0%	25.0%	5	\$75.00	4,480.1	1.38	\$0.004
Freezer - Early Replacement	9.0%	100.0%	11	\$441.60	1,885.7	0.21	\$0.027
Freezer - Maintenance	9.0%	100.0%	4	\$50.00	224.0	0.08	\$0.060
Electronics - Smart Power Strips	5.0%	90.0%	8	\$20.00	466.8	0.94	\$0.006
Pool Pump - Timer	90.0%	90.0%	15	\$16.00	1,406.9	7.16	\$0.001
Pool Heater - Solar System	0.0%	75.0%	10	\$3,000.00	28,807.5	0.49	\$0.013
ENERGY STAR Home Design	14.0%	75.0%	18	\$5,000.00	9,965.6	0.22	\$0.041
Behavioral Feedback Tools	1.0%	75.0%	1	\$0.20	11.4	0.32	\$0.018

COMMERCIAL ENERGY EFFICIENCY EQUIPMENT AND MEASURE DATA

This appendix presents detailed information for all commercial energy-efficiency measures (*equipment* and *non-equipment* measures per the LoadMAP taxonomy) that were evaluated in this study.

Table C-1 and Table C-2 provide brief narrative descriptions for all equipment and non-equipment measures that were assessed for potential.

Table C-3 through Table C-46 list the detailed unit-level data (including economic screen results) for commercial equipment measures in existing and new buildings. The column headings and units are the same as described for the corresponding residential sector tables above.

Table C-47 through Table C-68 list the detailed unit-level data (including economic screen results) for commercial non-equipment measures in existing and new construction. The column headings and units are the same as described for the corresponding residential sector tables above.

Table C-1 Commercial Energy Efficiency Equipment Measure Descriptions

End Use	Technology	Measure Description
Cooling	Air-Cooled Chiller	A central chiller plant creates chilled water for distribution throughout the facility. Because of the wide variety of system types and sizes, savings and cost values for efficiency improvements represent an average over screw, reciprocating, and centrifugal technologies. Under this simplified approach, each central system is characterized by an aggregate efficiency value (inclusive of chiller, pumps, and motors), in kW/ton with a further efficiency upgrade through the application of variable refrigerant flow technology.
Cooling	Water-Cooled Chiller	A central chiller plant creates chilled water for distribution throughout the facility. Water source chillers include heat rejection via a condenser loop and cooling tower. Because of the wide variety of system types and sizes, savings and cost values for efficiency improvements represent an average over screw, reciprocating, and centrifugal technologies. Under this simplified approach, each central system is characterized by an aggregate efficiency value (inclusive of chiller, pumps, motors, and condenser loop equipment), in kW/ton with a further efficiency upgrade through the application of variable refrigerant flow technology.
Cooling	RTU	Packaged cooling systems, such as rooftop units (RTUs), are simple to install and maintain, and are commonly used in small and medium-sized commercial buildings. Applications range from a single supply system with air intake filters, supply fan, and cooling coil, or can become more complex with the addition of a return air duct, return air fan, and various controls to optimize performance. For packaged RTUs, varying Energy Efficiency Ratios (EER) are modeled, as well as a ductless mini-split system.
Cooling	PTAC	This measure includes efficiency upgrades to other small cooling systems in commercial buildings including room AC units, packaged terminal air conditioning (PTAC) units, and packaged terminal heat pumps (PTHP).
Cooling / Heating	Air-Source Heat Pump	For heat pumps, units with increasing EER and COP levels are evaluated, as well as a ductless mini-split system.
Cooling / Heating	Geothermal Heat Pump	For heat pumps, units with increasing EER and COP levels are evaluated.
Heating	Electric Furnace	Resistive heating elements are used to convert electricity directly to heat. The heat is then delivered by a supply fan and duct system to the regions that require heating.
Heating	Electric Room Heat	Resistive heating elements are used to convert electricity directly to heat. Conductive fins surrounding the element or another mechanism is used to deliver the heat directly to the surrounding room or area. These are typically either baseboard or wall-mounted units.
Heating	Furnace	Furnaces heat air and distribute the heated air through the building using ducts. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, smaller-diameter flue pipe, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Heating	Boiler	Boilers heat water, providing either hot water or steam to be distributed around the building for heating. Steam is distributed via pipes to steam radiators, and hot water can be distributed via baseboard radiators or radiant floor systems, or can heat air via a coil. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, smaller-diameter flue pipe, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Ventilation	Ventilation	A variable air volume ventilation system modulates the air flow rate as needed based on the interior conditions of the building to reduce fan load, improve

End Use	Technology	Measure Description
		dehumidification, and reduce energy usage.
Water Heating	Water Heater	Efficient electric water heaters are characterized by a high recovery or thermal efficiency (percentage of delivered electric energy which is transferred to the water) and low standby losses (the ratio of heat lost per hour to the content of the stored water). Included in the savings associated with high-efficiency electric water heaters are timers that allow temperature setpoints to change with hot water demand patterns. For example, the heating element could be shut off throughout the night, increasing the overall energy factor of the unit. In addition, tank and pipe insulation reduces standby losses and therefore reduces the demands on the water heater. This analysis considers conventional electric water heaters and heat pump water heaters. For natural gas hot water heating, the most common type is a storage heater, which incorporates a burner, storage tank, outer jacket, insulation, and controls in a single unit. Efficient units are characterized by a high recovery or thermal efficiency and low standby losses (the ratio of heat lost per hour to the content of the stored water). A further efficiency gain is available in condensing units, which condense the water vapor produced in the combustion process and also use the heat from this condensation.
Interior Lighting	Screw-in	This measure evaluates higher-efficiency alternatives for screw-in interior lamps including halogen, CFL, and LED.
Interior Lighting	High-Bay Fixtures	With the exception of screw-in lighting, commercial lighting efficiency changes typically require more than the simple purchase and installation of an alternative lamp. Restrictions regarding ballasts, fixtures, and circuitry limit the potential for direct substitution of one lamp type for another. Also, during the buildout for a leased office space, management could decide to replace all lamps, ballasts, and fixtures with different configurations. This type of decision-making is modeled on a stock turnover basis because of the time between opportunities for upgrades. For High-Bay fixtures, alternatives include mercury vapor, metal halides, T5 fluorescent high output, and high-pressure sodium.
Interior Lighting	Linear Fluorescent	With the exception of screw-in lighting, commercial lighting efficiency changes typically require more than the simple purchase and installation of an alternative lamp. Restrictions regarding ballasts, fixtures, and circuitry limit the potential for direct substitution of one lamp type for another. Also, during the buildout for a leased office space, management could decide to replace all lamps, ballasts, and fixtures with different configurations. This type of decision-making is modeled on a stock turnover basis because of the time between opportunities for upgrades. For linear fluorescent fixtures, alternatives include T12, T8, Super T8, T5, and LED.
Exterior Lighting	Screw-in	This measure evaluates higher-efficiency alternatives for screw-in interior lamps including halogen, CFL, and LED.
Exterior Lighting	HID	Alternatives modeled include metal halides, T8 and T5 high output, high pressure sodium, and LEDs
Exterior Lighting	Linear Fluorescent	For linear fluorescent fixtures, alternatives include T12, T8, Super T8, T5, and LED.
Refrigeration	Walk-in Refrigerator	These refrigerators can be designed to perform at higher efficiency through a combination of compressor equipment upgrades, default temperature settings, and defrost patterns. Standard refrigeration compressors typically operate at approximately 65% efficiency. High-efficiency models are available that can improve compressor efficiency by 15%. Analysis assumes unit with: 140 square feet, Cooling capacity of 26,230 BTU/hr.
Refrigeration	Reach-in Refrigerator	A significant amount of energy in the commercial sector can be attributed to "reach-in" units. These stand-alone appliances can range from a residential-style refrigerator/freezer unit in an office kitchen or the breakroom of a retail store, to the larger reach-in units in foodservice applications. As in the case of residential units, these refrigerators can be designed to perform at higher efficiency through a combination of compressor equipment upgrades, default temperature settings, and defrost patterns. Analysis assumes unit with: 48

End Use	Technology	Measure Description
		cubic feet, Cooling capacity of 3000 BTU/hr.
Refrigeration	Glass Door Display, Open Display Case	These refrigerators can be designed to perform at higher efficiency through a combination of compressor equipment upgrades, default temperature settings, and defrost patterns. Standard refrigeration compressors typically operate at approximately 65% efficiency. High-efficiency models are available that can improve compressor efficiency by 15%. Analysis assumes unit with: Cooling capacity of 20,000 BTU/hr
Refrigeration	Icemaker	By optimizing the timing of ice production and the type of output to the specific application, icemakers are assumed to deliver electricity savings.
Refrigeration	Vending Machine	High-efficiency vending machines incorporate more efficient compressors and lighting.
Food Preparation	Cooking Equipment, High Efficiency	This set of measures includes high-efficiency fryers, ovens, dishwashers, and hot food containers. Less common equipment, such as broilers and steamers, and assumed to be modeled with the other more common equipment types.
Office Equipment	Desktop Computer, Laptop, Monitors	ENERGY STAR labeled computers automatically power down to 15 watts or less when not in use and may actually last longer than conventional products because they spend a large portion of time in a low-power sleep mode. ENERGY STAR labeled computers also generate less heat than conventional models.
Office Equipment	Server	In addition to the "sleep" mode a reductions, servers have additional energy-saving opportunities through "virtualization" and other architecture solutions that involve optimal matching of computation tasks to hardware requirements
Office Equipment	Printer/Copier/Fax	ENERGY STAR labeled office equipment saves energy by powering down and "going to sleep" when not in use. ENERGY STAR labeled copiers are equipped with a feature that allows them to automatically turn off after a period of inactivity.
Office Equipment	POS Terminal	Point-of-sale terminals in retail and supermarket facilities are always on. Efficient models incorporate a high-efficiency power supply to reduce energy use.
Miscellaneous	Non-HVAC Motors	Includes motors for a variety of non-HVAC uses including vertical transportation. Premium efficiency motors can provide savings of 0.5% to 3% over standard motors. The savings results from the fact that energy efficient motors run cooler than their standard counterparts, resulting in an increase in the life of the motor insulation and bearing. In general, an efficient motor is a more reliable motor because there are fewer winding failures, longer periods between needed maintenance, and fewer forced outages. For example, using copper instead of aluminum in the windings, and increasing conductor cross-sectional area, lowers a motor's I ² R losses.
Miscellaneous	Pool Pump	High-efficiency motors and two-speed pumps provide improved energy efficiency for this load.
Miscellaneous	Pool Heater	Efficient pool heaters can make use of heat pump technology to achieve significantly higher coefficients of performance in the COP=5.0 range. Gas pool heaters have a burner to heat water in a loop. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.

Table C-2 Commercial Energy Efficiency Non-Equipment Measure Descriptions

End Use	Measure	Description
HVAC (All)	Insulation - Ceiling	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing the heat loss or gain of a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose; loose-fill (blown) fiberglass; and rigid polystyrene.
HVAC (All)	Insulation - Ducting	Air distribution ducts can be insulated to reduce heating or cooling losses. Best results can be achieved by covering the entire surface area with insulation. Insulation material inhibits the transfer of heat through the air-supply duct. Several types of ducts and duct insulation are available, including flexible duct, pre-insulated duct, duct board, duct wrap, tacked, or glued rigid insulation, and waterproof hard shell materials for exterior ducts.
HVAC (All)	Insulation - Radiant Barrier	Radiant barriers are materials installed to reduce the heat gain in buildings. Radiant barriers are made from materials that are highly reflective and have low emissivity like aluminum. The closer the emissivity is to 0 the better they will perform. Radiant barriers can be placed above the insulation or on the roof rafters.
HVAC (All)	Insulation - Wall Cavity	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing the heat loss or gain of a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose; loose-fill (blown) fiberglass; and rigid polystyrene.
HVAC (All)	HVAC - Duct Repair and Sealing	Leakage in unsealed ducts varies considerably because of the differences in fabricating machinery used, the methods for assembly, installation workmanship, and age of the ductwork. Air leaks from the system to the outdoors result in a direct loss proportional to the amount of leakage and the difference in enthalpy between the outdoor air and the conditioned air. To seal ducts, a wide variety of sealing methods and products exist. Each has a relatively short shelf life, and no documented research has identified the aging characteristics of sealant applications.
HVAC (All)	Doors - High Efficiency	Like other components of the shell, doors are subject to several types of heat loss: conduction, infiltration, and radiant losses. High efficiency doors have exceptional thermal insulation properties and tight-fitting, weather-stripping on the doorframe to reduce air leakage.
HVAC (All)	Windows - High Efficiency	High-efficiency windows, such as those labeled under the ENERGY STAR Program, are designed to reduce a building's energy bill while increasing comfort for the occupants at the same time. High-efficiency windows have reducing properties that reduce the amount of heat transfer through the glazing surface. For example, some windows have a low-E coating, which is a thin film of metallic oxide coating on the glass surface that allows passage of short-wave solar energy through glass and prevents long-wave energy from escaping. Another example is double-pane glass that reduces conductive and convective heat transfer. There are also double-pane glasses that are gas-filled (usually argon) to further increase the insulating properties of the window.
HVAC (All)	Windows - Install Reflective Film	Reflective films applied to the window interior help reduce solar gain into the space and thus lower cooling energy use.
HVAC (All)	Roof - High Reflectivity	The color and material of a building structure surface will determine the amount of solar radiation absorbed by that surface and subsequently transferred into a building. This is called solar absorptance. By using a living roof or a roofing material with a light color (and a lower solar absorptance), the roof will absorb less solar radiation and consequently reduce the cooling load. Living roofs also reduce stormwater runoff.
Cooling	Chiller - Condenser Water Temperature	Resetting the condenser water temperature to the lowest possible setting allows the cooling tower to generate cooler water whenever possible and

End Use	Measure	Description
	Reset	decreases the temperature lift between the condenser and the evaporator. This will generally increase chiller part-load efficiency, though it may require increased tower fan energy use.
Cooling	Chiller - Economizer	Economizers allow outside air (when it is cool and dry enough) to be brought into the building space to meet cooling loads instead of using mechanically cooled interior air. A dual enthalpy economizer consists of indoor and outdoor temperature and humidity sensors, dampers, motors, and motor controls. Economizers are most applicable to temperate climates and savings will be smaller in extremely hot or humid areas.
Cooling	Chiller - Thermal Energy Storage	This measure uses energy at off-peak times to create a chilled media, typically cool water or ice, then stores it in an insulated chamber until peak hours. During peak hours, it uses the cooling energy stored in the media by running the chiller loop through a heat exchanger in the thermal storage chamber, thereby reducing energy and peak demand from the grid.
Cooling	Chiller - VSD on Fans	Variable speed drives, which reduce chiller energy use under part load, are modeled for both air-cooled and water-cooled chillers.
Cooling	Chiller - Chilled Water Reset	Chilled water reset controls save energy by improving chiller performance through increasing the supply chilled water temperature, which allows increased suction pressure during low load periods. Raising the chilled water temperature also reduces chilled water piping losses. However, the primary savings from the chilled water reset measure results from chiller efficiency improvement. This is due partly to the smaller temperature difference between chilled water and ambient air, and partly due to the sensitivity of chiller performance to suction temperature.
Cooling	Chiller - Chilled Water Variable-Flow System	The part-load efficiency of chilled water loops can be improved substantially by varying the flow speed of the delivered water with the building demand for cooling.
Cooling	Chiller - High Efficiency Cooling Tower Fans	High-efficiency cooling fans utilize efficient components and variable frequency drives that improve fan performance by adjusting fan speed and rotation as conditions change.
Cooling	Chiller - Maintenance	Filters, coils, and fins require regular cleaning and maintenance for the heat pump or roof top unit to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases.
Water Heating	Chiller - Chiller Heat Recovery	Capturing the waste heat from the cooling tower of a chiller by means of a heat exchanger in order to meet water heating loads.
Cooling	RTU - Evaporative Precooler	Evaporative precooling can improve the performance of air conditioning systems, most commonly RTUs. These systems typically use indirect evaporative cooling as a first stage to pre-cool outside air. If the evaporative system cannot meet the full cooling load, the air stream is further cooled with conventional refrigerative air conditioning technology.
Cooling	RTU - Maintenance	Regular cleaning and maintenance enables a roof top unit to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
Heating	Gas Boiler - High Efficiency Hot Water Circulation	Efficiency improvements to the circulation system of a boiler's hot water loop.
Heating	Gas Boiler - Hot Water Reset	Automatic control algorithm for boilers that varies the water temperature of the supply loop in an inverse relationship with the measured outside air temperature. If it is warmer outside, the hot water supply loop does not have to be as hot, thereby tailoring boiler heat output to the demand and saving energy.
Heating	Gas Boiler -	Operating your boiler with an optimum amount of excess air will minimize heat

End Use	Measure	Description
	Combustion Controls (O2 Trim)	loss up the stack and improve combustion efficiency. When fuel composition is highly variable (such as refinery gas, hog fuel, or multi-fuel boilers), or where steam flows are highly variable, an online oxygen analyzer should be considered. The oxygen "trim" system provides feedback to the burner controls to automatically minimize excess combustion air and optimize the air-to-fuel ratio.
Heating	Gas Boiler - Condensate Return Lines	Hot condensate that comes out of the steam being delivered can be returned directly to the boiler, where it is then much easier to reheat than cold makeup water. Other benefits that will accrue from an efficient condensate return system are less make-up water, water related treatment costs, boiler blowdown, and disposal costs.
Heating	Gas Boiler - Condensing Economizer	A boiler economizer recovers heat from the boiler exhaust gas and is used to pre-heat the boiler feed water. Capturing this heat reduces overall fuel requirements for the boiler. A condensing economizer extracts additional heat from the exhaust gas by taking its water vapor all the way to a liquid water state.
Heating	Gas Boiler - Pipe Insulation	Insulating hot water pipes decreases the amount of energy lost during distribution of hot water throughout the building. Insulating pipes will result in quicker delivery of hot water and allows lowering the water heating set point. There are several different types of insulation, the most common being polyethylene and neoprene.
Heating	Gas Boiler - Steam Trap Maintenance	Steam transfers its latent heat to a process fluid in a heat exchanger. The steam is held in the heat exchanger by a steam trap until it condenses. Then the trap passes the condensate into the condensate return system. Heat loss through uninsulated or leaky lines and fittings in the steam traps can be significant, and is easily prevented with regular inspections, maintenance, and repair. General experience shows that most facilities, however, do not have such practices.
Heating	Gas Boiler - Maintenance	A boiler's combustion controls, circulation loops, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
Heating	Gas Furnace - Maintenance	A furnace's combustion controls, ventilation systems, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
Heating	Space Heating - Heat Recovery Ventilator	Heat recovery ventilation uses a counter-flow, air-to-air heat exchanger between inbound and outbound air flow to selectively transfer heat and reduce space heating loads.
Cooling / Heating	Heat Pump - Maintenance	Regular cleaning and maintenance enables a heat pump to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
Ventilation	Ventilation - ECM on VAV Boxes	ECM motors are well suited to the variable flow rates of VAV boxes. ECMs are a higher efficiency option for the air blowers and maintains efficiency better over a wide range of loads.
Ventilation	Ventilation - Variable Speed Control	Variable speed controls adjust ventilation fans for part-load conditions to reduce energy use.
Water Heating	Water Heater - Drainwater Heat Recovery	Drainwater Heat Recovery is a system in which drain water is used to preheat cold water entering the water heater. While these systems themselves are relatively inexpensive, upgrading an existing system could be unreasonable because of demolition costs. Thus they are modeled for new vintage only.
Water Heating	Water Heater - Faucet Aerators/Low	A faucet aerator or low flow nozzle spreads the stream from a faucet helping to reduce water usage. The amount of water passing through the aerator is

End Use	Measure	Description
	Flow Nozzles	measured in gallons per minute (GPM) and the lower the GPM the more water the aerator conserves.
Water Heating	Water Heater - High Efficiency Circulation Pump	A high efficiency circulation pump uses an electronically commutated motor (ECM) to improve motor efficiency over a larger range of partial loads. In addition, an ECM allows for improved low RPM performance with greater torque and smaller pump dimensions.
Water Heating	Water Heater - Desuperheater	A desuperheater can be added to an existing geothermal heat pump system (typically installed with the primary function of space heating and cooling) in order to draw off a portion of the geothermal heat for water heating purposes. The system can either supplement the building's water heater, or be a full-demand water heater that meets all of the building's hot water needs.
Water Heating	Water Heater - Solar System	Solar water heating systems can be used in residential buildings that have an appropriate near-south-facing roof or nearby unshaded grounds for installing a collector. Although system types vary, in general these systems use a solar absorber surface within a solar collector or an actual storage tank. Either a heat-transfer fluid or the actual potable water flows through tubes attached to the absorber and transfers heat from it. (Systems with a separate heat-transfer-fluid loop include a heat exchanger that then heats the potable water.) The heated water is stored in a separate preheat tank or a conventional water heater tank. If additional heat is needed, it is provided by a conventional water-heating system.
Water Heating	Water Heater - Install Timer	These measures use either a programmable thermostat or a timer to adjust the water heater setpoint at times of low usage, typically when a home is unoccupied.
Water Heating	Water Heater - Pipe Insulation	Insulating hot water pipes decreases the amount of energy lost during distribution of hot water throughout the building. Insulating pipes will result in quicker delivery of hot water and allows lowering the water heating set point. There are several different types of insulation, the most common being polyethylene and neoprene.
Water Heating	Water Heater - Tank Blanket/Insulation	Insulation levels on hot water heaters can be increased by installing a fiberglass blanket on the outside of the tank. This increase in insulation reduces standby losses and thus saves energy. Water heater insulation is available either by the blanket or by square foot of fiberglass insulation with R-values ranging from 5 to 14.
Water Heating	Water Heating - Booster Water Heater	Gas booster heaters are used to supply heat when the central water heater is too distant, e.g. to supply sanitizing water to a dishwashing machine.
Interior Lighting	Interior Lighting - Daylighting Controls	Daylighting controls use a photosensor to detect ambient light and adjust or turn off electric lights accordingly.
Interior Lighting	Interior Lighting - LED Exit Lighting	The lamps inside exit signs represent a significant energy end-use, since they usually operate 24 hours per day. Many old exit signs use incandescent lamps, which consume approximately 40 watts per sign. The incandescent lamps can be replaced with LED lamps that are specially designed for this specific purpose. In comparison, the LED lamps consume approximately 2-5 watts.
Interior Lighting	Interior Lighting - Occupancy Sensors	The installation of occupancy sensors allows lights to be turned off during periods when a space is unoccupied, virtually eliminating the wasted energy due to lights being left on. There are several types of occupancy sensors in the market.
Interior Lighting	Interior Lighting - Timeclocks and Timers	In many cases lighting remains on at night and during weekends. A simple timer can set a schedule for turning lights off to reduce operating hours.
Interior Lighting	Interior Lighting - Task Lighting	Individual work areas can use task lighting instead of brightly lighting the entire area. Significant energy savings can be realized by focusing light directly where it is needed and lowering the general lighting level. An example of task lighting is the common desk lamp. A 25W desk lamp can be installed in place of a typical lamp in a fixture.

End Use	Measure	Description
Interior Lighting	Interior Fluorescent - Bi-Level Fixture	Bi-level fixtures have the ability to reduce light output to a lower level, given a control strategy that is based on a timer, occupancy sensor, motion sensor, or manual switch.
Interior Lighting	Interior Fluorescent - Delamp and Install Reflectors	While sometimes included in lighting retrofit projects, delamping is often performed as a separate energy efficiency measure in which a lighting engineer analyzes the lighting provided by current systems compared to the requirements of building occupants. This often leads to the removal of unnecessary lamps corresponding to an overall reduction in energy usage. In addition, installing a reflector in each fixture can improve light distribution from the remaining lamps.
Exterior Lighting	Exterior Lighting - Bi-Level Fixture	Bi-level fixtures have the ability to reduce light output to a lower level, given a control strategy that is based on a timer, occupancy sensor, motion sensor, or manual switch.
Exterior Lighting	Exterior Lighting - Daylighting Controls	Daylighting controls use a photosensor to detect ambient light and adjust or turn off electric lights accordingly.
Exterior Lighting	Exterior Lighting - Photovoltaic Installation	Solar photovoltaic generation may be used to power exterior lighting and thus eliminate all or part of the electrical energy use.
Refrigeration	Refrigerator - Anti-Sweat Heater	Anti-sweat heaters are used in virtually all low-temperature display cases and many medium-temperature cases to control humidity and prevent the condensation of water vapor on the sides and doors and on the products contained in the cases. Typically, these heaters stay on all the time, even though they only need to be on about half the time. Anti-sweat heater controls can come in the form of humidity sensors or time clocks.
Refrigeration	Refrigerator - Decommissioning	Early retirement, removal, and recycling of older, little used refrigerators and freezers removes the energy use of these inefficient, aging units.
Refrigeration	Refrigerator - Demand Defrost	Units can be designed to perform at higher efficiency with a sensing and control system that runs defrost cycles based on demand/only when necessary.
Refrigeration	Refrigerator - Door Gasket Replacement	This measure involves replacing aging door gaskets that no longer adequately seal reach-in refrigerators or glass door display cases.
Refrigeration	Refrigerator - Evaporator Fan Controls	Evaporator fan motor controls allow for part load use or demand scheduling based on variable refrigeration load requirements, reducing energy consumption.
Refrigeration	Refrigerator - Floating Head Pressure	Floating head pressure control allows the pressure in the condenser to "float" with ambient temperatures. This method reduces refrigeration compression ratios, improves system efficiency and extends the compressor life. The greatest savings with a floating head pressure approach occurs when the ambient temperatures are low, such as in the winter season. Floating head pressure control is most practical for new installations. However, retrofits installation can be completed with some existing refrigeration systems. Installing floating head pressure control increases the capacity of the compressor when temperatures are low, which may lead to short cycling.
Refrigeration	Refrigerator - Strip Curtain	Strip curtains at the entrances to large walk-in coolers or freezers, such as those used in supermarkets, reduce air transfer between the refrigerated space and the surrounding space.
Refrigeration	Refrigerator - High Efficiency Compressor	Standard compressors typically operate at approximately 65% efficiency. High-efficiency models are available that can improve compressor efficiency by 15%.
Refrigeration	Refrigerator - Variable Speed Compressor	The part-load efficiency of drive systems can be improved by varying the speed of the motor drive. An additional benefit of variable-speed controls is the ability to start and stop the motor and process gradually, thus extending the life of the motor and associated machinery.
Refrigeration	Refrigerator - eCube	The eCube consists of a solid, waxy food simulant that is fitted around a thermostat sensor that would otherwise measure air temperature. The refrigeration controls therefore attempt to regulate the temperature of food,

End Use	Measure	Description
		which changes more slowly and gradually than air, thereby reducing the frequency of refrigeration cycles.
Refrigeration	Vending Machine - Controller	Cold beverage vending machines usually operate 24 hours a day regardless of whether the surrounding area is occupied or not. The result is that the vending machine consumes energy unnecessarily, because it will operate all night to keep the beverage cold even when there would be no customers until the next morning. A vending machine controller can reduce energy consumption without compromising the temperature of the vended product. The controller uses an infrared sensor to monitor the surrounding area's occupancy and will power down the vending machine when the area is unoccupied. It will also monitor the room's temperature and will re-power the machine at one to three hour intervals independent of occupancy to ensure that the product stays cold.
Refrigeration	Grocery - Display Case - LED Lighting	High-efficiency LED display case lighting not only reduces direct lighting energy use, but also reduce internal heat gains to the case from lights that must be removed by the refrigeration system.
Refrigeration	Grocery - Display Case Motion Sensors	Motion sensors reduce lighting load when area around display case is unoccupied to save energy on lighting.
Refrigeration	Grocery - ECMs for Display Cases	Replacement of shaded-pole evaporator fan motors with ECM motors in display cases allows for variable refrigeration loads to be handled. Reductions come from increased motor efficiency and the reduction of heating load.
Refrigeration	Grocery - Open Display Case - Night Covers	Night covers can be used on open refrigeration cases when a facility is closed or few customers are in the store.
Office Equipment	Office Equipment - ENERGY STAR Power Supplies	Power supplies with an efficient ac-dc or ac-ac conversion process can obtain the ENERGY STAR label. These devices can be used to power computers, phones, and other office equipment.
Office Equipment	Office Equipment - Plug Load Occupancy Sensors	Occupancy sensors can control power strips and thus turn off energy used by plug loads, such as task lights, when an office is unoccupied.
Office Equipment	Data Center - Server Virtualization	Servers have energy-saving opportunities through "virtualization" architecture solutions that involve optimal matching of computation tasks to hardware requirements. An example would be using software to run 3 "virtual machines" or computing tasks on 1 server CPU, rather than 3 computing tasks on 3 separate servers, each with their own cooling, fixed load, and energy overhead requirements.
Miscellaneous	Pool Heater - Solar	This measure replaces a conventional pool heater with a solar system.
Miscellaneous	Pool Pump - Timer	A pool pump timer allows the pump to turn off automatically, eliminating the wasted energy associated with unnecessary pumping.
HVAC (All)	Destratification Fans (HVLS)	High volume low-speed (HVLS) ceiling fans are large (8-ft. to 20-ft. in diameter). They will effectively mix and circulate air within a given space to equalize temperature between ceiling and floor levels.
Ventilation	Ventilation - CO2 Controlled	Also known as Demand Controlled Ventilation, this measure uses carbon dioxide (CO2) levels to indicate the level of occupancy in a space. Sensors monitor CO2 levels so that air handling controls can adjust the amount of outside air the system needs to intake. Ventilation rates are thereby controlled based on occupancy, rather than a fixed rate, thus saving HVAC energy use.
Miscellaneous	Non-HVAC Motors - Variable Speed Control	The part-load efficiency of motors can be improved by varying the speed of the motor drive. There are two major types of variable speed controls: mechanical and electronic. An additional benefit of variable-speed controls is the ability to start and stop the motor gradually, thus extending the life of the motor and associated machinery. This analysis assumes that electronic variable speed controls are installed.
HVAC (All)	Energy Management System	An energy management system (EMS) allows managers/owners to monitor and control the major energy-consuming systems within a commercial building. At the minimum, the EMS can be used to monitor and record energy consumption

End Use	Measure	Description
		of the different end-uses in a building, and can control operation schedules of the HVAC and lighting systems. The monitoring function helps building managers/owners to identify systems that are operating inefficiently so that actions can be taken to correct the problem. The EMS can also provide preventive maintenance scheduling that will reduce the cost of operations and maintenance in the long run. The control functionality of the EMS allows the building manager/owner to operate building systems from one central location. The operation schedules set via the EMS help to prevent building systems from operating during unwanted or unoccupied periods. This analysis assumes that this measure is limited to buildings with a central HVAC system.
HVAC (All)	Thermostat - Clock/Programmable	A programmable thermostat can be added to most heating/cooling systems. They are typically used during winter to lower temperatures at night and in summer to increase temperatures during the afternoon. There are two-setting models, and well as models that allow separate programming for each day of the week. The energy savings from this type of thermostat are identical to those of a "setback" strategy with standard thermostats, but the convenience of a programmable thermostat makes it a much more attractive option. In this analysis, the baseline is assumed to have no thermostat setback.
HVAC (All)	Lodging - Guest Room Controls	Hotel guestrooms can be fitted with occupancy controls that turn off energy-using equipment when the guest is not using the room. The occupancy controls comes in several forms, but this analysis assumes the simplest kind, which is a simple switch near the room's entry where the guest can deposit their room key or card. If the key or card is present, then lights, TV, and air conditioning can receive power and operate. When the guest leaves and takes the key, all equipment shuts off.
HVAC, Lighting	HVAC - Occupancy Sensors	Occupancy sensors turn off or adjust HVAC settings when a space is unoccupied.
HVAC, Lighting	Commissioning - HVAC, Lighting	For new construction and major renovations, commissioning ensures that building systems are properly designed, specified, and installed to meet the design intent and provide high-efficiency performance. Commissioning begins during the design process.
HVAC, Lighting	Retrocommissioning - HVAC, Lighting	In existing buildings, the retrocommissioning process identifies low-cost or no cost measures, including controls adjustments, to improve building performance and reduce operating costs. Retrocommissioning addresses HVAC, lighting, DHW, and other major building systems.
HVAC (All)	Advanced New Construction Designs	Advanced new construction designs use an integrated approach to the design of new buildings to account for the interaction of building systems. Designs may specify the building orientation, building shell, proper sizing of equipment and systems, and controls strategies with the goal of optimizing building energy efficiency and comfort. Options that may be evaluated and incorporated include passive solar strategies, increased thermal mass, natural ventilation, energy recovery ventilation, daylighting strategies, and shading strategies. This measure is modeled for new vintage only.
HVAC, Lighting	Custom Measures	Custom measures may be included in the analysis to serve as a "catch all" for measures for which costs and savings are not easily quantified and that could be part of a custom program. Typical costs and energy savings are assumed such that the measures pass the economic screen.

Table C-3 Energy Efficiency Equipment Data, Electric—Small Office, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.52	\$0.19	20	1.08	\$0.028
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.62	\$0.25	20	1.10	\$0.031
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.29	\$0.31	20	1.29	\$0.018
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.37	\$0.37	20	1.30	\$0.020
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.84	\$0.08	20	1.19	\$0.007
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.95	\$0.16	20	1.20	\$0.013
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.12	\$0.19	20	1.24	\$0.013
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.35	\$0.30	20	1.29	\$0.017
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.40	\$0.33	20	1.30	\$0.018
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.52	\$0.36	20	1.33	\$0.018
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.41	\$0.25	16	-	\$0.053
Cooling	Roof top AC	EER 11.2	0.82	\$0.47	16	1.00	\$0.051
Cooling	Roof top AC	EER 12.0	1.07	\$0.91	16	0.97	\$0.074
Cooling	Roof top AC	Ductless Minisplit	1.61	\$2.98	16	0.77	\$0.163
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.46	\$0.33	16	-	\$0.063
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.72	\$0.48	16	1.00	\$0.058
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.94	\$1.22	16	0.87	\$0.114
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.03	\$1.59	16	0.81	\$0.136
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.49	\$3.05	16	0.65	\$0.179
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.51	\$0.61	16	0.92	\$0.104
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.48	\$1.22	16	0.85	\$0.224
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.02	\$1.62	16	0.85	\$0.070
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.13	\$0.02	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.30	\$0.20	14	1.02	\$0.065
Cooling	Other Cooling	EER 11	0.35	\$0.21	14	1.04	\$0.059
Cooling	Other Cooling	EER 11.5	0.47	\$0.24	14	1.07	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.76	-\$0.04	10	1.27	-\$0.006
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.00	\$0.040
Water Heating	Water Heater	EF 2.0	0.31	\$0.01	15	1.96	\$0.002
Water Heating	Water Heater	EF 2.3	0.35	\$0.01	15	2.21	\$0.002
Water Heating	Water Heater	EF 2.4	0.36	\$0.01	15	2.28	\$0.002
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.84	\$0.04	3	-	\$0.017
Int. Lighting	Screw-in	70W HIR PAR-38	1.28	\$0.06	3	-	\$0.015
Int. Lighting	Screw-in	CFL	2.40	\$0.03	6	3.77	\$0.003
Int. Lighting	Screw-in	LED (2010)	2.60	\$0.87	20	2.08	\$0.025
Int. Lighting	Screw-in	LED (2020)	2.99	\$0.24	20	-	\$0.006
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.11	\$0.19	15	0.70	\$0.164

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.11	-\$0.01	10	2.03	-\$0.006
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.12	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.14	\$0.00	15	2.23	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.14	\$0.00	10	2.46	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	0.21	\$0.05	15	-	\$0.022
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.66	\$3.01	15	0.43	\$0.417
Int. Lighting	Linear Fluorescent	T8	0.69	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.95	\$0.02	10	1.50	\$0.003
Int. Lighting	Linear Fluorescent	T5	1.10	\$0.03	10	1.62	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	2.01	\$0.83	15	-	\$0.038
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.07	\$0.00	3	-	\$0.017
Ext. Lighting	Screw-in	70W HIR PAR-38	0.11	\$0.00	3	-	\$0.015
Ext. Lighting	Screw-in	CFL	0.21	\$0.00	6	3.57	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.23	\$0.08	20	1.75	\$0.025
Ext. Lighting	Screw-in	LED (2020)	0.26	\$0.02	20	-	\$0.006
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.40	\$0.60	15	0.68	\$0.136
Ext. Lighting	HID	T8	0.41	-\$0.02	10	1.99	-\$0.005
Ext. Lighting	HID	High Pressure Sodium	0.44	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.51	\$0.01	15	2.16	\$0.002
Ext. Lighting	HID	T5	0.53	-\$0.01	10	2.41	-\$0.002
Ext. Lighting	HID	LED (2020)	0.77	\$0.15	15	-	\$0.018
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.02	\$0.08	15	0.38	\$0.417
Ext. Lighting	Linear Fluorescent	T8	0.02	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.03	\$0.00	10	1.49	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.03	\$0.00	10	1.60	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.06	\$0.02	15	-	\$0.038
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.03	\$0.00	12	1.20	\$0.003
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.06	\$0.00	12	1.44	\$0.003
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.07	\$0.00	12	1.50	\$0.003
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.11	\$0.00	12	2.26	\$0.002
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	8400 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	4330 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	\$0.01	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.03	\$0.01	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.04	\$0.05	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.02	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.06	\$0.01	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.09	\$0.02	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.04	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.18	\$0.01	12	1.34	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	-	\$0.00	12	1.00	\$0.000
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.39	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.06	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.18	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.04	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.13	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.05	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.01	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-4 Energy Efficiency Equipment Data, Natural Gas—Small Office, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.05	20	1.02	\$0.259
Heating	Furnace	EF .83	0.02	\$0.13	20	1.00	\$0.416
Heating	Furnace	EF .90	0.04	\$0.21	20	1.02	\$0.382
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.05	\$0.06	25	1.00	\$0.083
Heating	Boiler	EF .82	0.08	\$0.22	25	1.01	\$0.181
Heating	Boiler	EF .85	0.15	\$0.46	25	1.04	\$0.205
Heating	Boiler	EF .96	0.20	\$1.87	25	0.91	\$0.619
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.97	15	0.58	\$5.765
Heating	Other Heating	AFUE .76	0.02	\$0.03	15	1.05	\$0.134
Heating	Other Heating	AFUE .77	0.02	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.03	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.01	\$0.334
Water Heating	Water Heater	EF 0.94	0.04	\$0.05	12	1.12	\$0.155
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.03	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	-	\$0.00	12	1.00	\$0.000
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.02	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.28	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.03	\$0.32	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-5 Energy Efficiency Equipment Data, Electric—Small Office, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.47	\$0.24	20	1.06	\$0.039
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.56	\$0.32	20	1.07	\$0.043
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.17	\$0.39	20	1.24	\$0.025
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.24	\$0.46	20	1.24	\$0.028
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.74	\$0.10	20	1.17	\$0.010
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.84	\$0.20	20	1.17	\$0.018
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.99	\$0.24	20	1.21	\$0.019
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.19	\$0.38	20	1.23	\$0.024
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.23	\$0.42	20	1.24	\$0.026
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.33	\$0.46	20	1.26	\$0.026
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.38	\$0.25	16	-	\$0.057
Cooling	Roof top AC	EER 11.2	0.76	\$0.48	16	1.00	\$0.055
Cooling	Roof top AC	EER 12.0	1.00	\$0.92	16	0.96	\$0.081
Cooling	Roof top AC	Ductless Minisplit	1.50	\$3.03	16	0.76	\$0.177
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.56	\$0.29	16	-	\$0.045
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.92	\$0.42	16	1.00	\$0.040
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.25	\$1.07	16	0.88	\$0.075
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.38	\$1.40	16	0.83	\$0.089
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	2.24	\$2.69	16	0.69	\$0.105
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.45	\$0.85	16	0.91	\$0.166
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.82	\$1.71	16	0.83	\$0.182
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.01	\$2.25	16	0.81	\$0.098
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.12	\$0.02	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.28	\$0.19	14	1.02	\$0.065
Cooling	Other Cooling	EER 11	0.34	\$0.21	14	1.04	\$0.059
Cooling	Other Cooling	EER 11.5	0.45	\$0.23	14	1.07	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.80	-\$0.06	10	1.19	-\$0.009
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.00	\$0.034
Water Heating	Water Heater	EF 2.0	0.30	\$0.00	15	1.97	\$0.001
Water Heating	Water Heater	EF 2.3	0.33	\$0.01	15	2.23	\$0.002
Water Heating	Water Heater	EF 2.4	0.34	\$0.01	15	2.31	\$0.002
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.84	\$0.04	3	-	\$0.017
Int. Lighting	Screw-in	70W HIR PAR-38	1.28	\$0.06	3	-	\$0.015
Int. Lighting	Screw-in	CFL	2.40	\$0.03	6	3.77	\$0.003
Int. Lighting	Screw-in	LED (2010)	2.60	\$0.87	20	2.08	\$0.025
Int. Lighting	Screw-in	LED (2020)	2.99	\$0.24	20	-	\$0.006
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.11	\$0.19	15	0.70	\$0.164

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.11	-\$0.01	10	2.03	-\$0.006
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.12	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.14	\$0.00	15	2.23	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.14	\$0.00	10	2.46	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	0.21	\$0.05	15	-	\$0.022
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.66	\$3.01	15	0.43	\$0.417
Int. Lighting	Linear Fluorescent	T8	0.69	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.95	\$0.02	10	1.50	\$0.003
Int. Lighting	Linear Fluorescent	T5	1.10	\$0.03	10	1.62	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	2.01	\$0.83	15	-	\$0.038
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.07	\$0.00	3	-	\$0.017
Ext. Lighting	Screw-in	70W HIR PAR-38	0.11	\$0.00	3	-	\$0.015
Ext. Lighting	Screw-in	CFL	0.21	\$0.00	6	3.57	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.23	\$0.08	20	1.75	\$0.025
Ext. Lighting	Screw-in	LED (2020)	0.26	\$0.02	20	-	\$0.006
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.40	\$0.60	15	0.68	\$0.136
Ext. Lighting	HID	T8	0.41	-\$0.02	10	1.99	-\$0.005
Ext. Lighting	HID	High Pressure Sodium	0.44	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.51	\$0.01	15	2.16	\$0.002
Ext. Lighting	HID	T5	0.53	-\$0.01	10	2.41	-\$0.002
Ext. Lighting	HID	LED (2020)	0.77	\$0.15	15	-	\$0.018
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.02	\$0.08	15	0.38	\$0.417
Ext. Lighting	Linear Fluorescent	T8	0.02	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.03	\$0.00	10	1.49	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.03	\$0.00	10	1.60	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.06	\$0.02	15	-	\$0.038
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.03	\$0.00	12	1.19	\$0.004
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.06	\$0.00	12	1.42	\$0.004
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.07	\$0.00	12	1.47	\$0.004
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.11	\$0.00	12	2.17	\$0.003
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	8400 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	4330 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	\$0.01	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.03	\$0.01	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.04	\$0.05	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.02	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.06	\$0.01	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.09	\$0.02	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.04	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.18	\$0.01	12	1.34	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	-	\$0.00	12	1.00	\$0.000
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.39	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.06	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.18	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.04	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.13	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.05	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.01	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-6 Energy Efficiency Equipment Data, Natural Gas—Small Office, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.04	20	1.02	\$0.263
Heating	Furnace	EF .83	0.02	\$0.12	20	1.00	\$0.422
Heating	Furnace	EF .90	0.04	\$0.20	20	1.01	\$0.385
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.04	\$0.06	25	1.00	\$0.094
Heating	Boiler	EF .82	0.07	\$0.23	25	1.01	\$0.205
Heating	Boiler	EF .85	0.14	\$0.48	25	1.03	\$0.232
Heating	Boiler	EF .96	0.19	\$1.93	25	0.88	\$0.702
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.03	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.02	\$0.04	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.02	\$0.06	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.03	\$0.13	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.01	\$0.334
Water Heating	Water Heater	EF 0.94	0.04	\$0.04	12	1.13	\$0.136
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.03	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	-	\$0.00	12	1.00	\$0.000
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.02	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.28	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.03	\$0.32	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-7 Energy Efficiency Equipment Data, Electric—Large Office, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.60	\$0.21	20	1.07	\$0.026
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.72	\$0.27	20	1.07	\$0.028
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.50	\$0.33	20	1.24	\$0.017
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.59	\$0.39	20	1.25	\$0.019
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.89	\$0.08	20	1.17	\$0.007
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.01	\$0.16	20	1.17	\$0.012
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.19	\$0.19	20	1.21	\$0.012
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.43	\$0.29	20	1.24	\$0.016
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.49	\$0.32	20	1.25	\$0.017
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.61	\$0.36	20	1.27	\$0.017
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.35	\$0.22	16	-	\$0.055
Cooling	Roof top AC	EER 11.2	0.71	\$0.43	16	1.00	\$0.053
Cooling	Roof top AC	EER 12.0	0.92	\$0.83	16	0.94	\$0.078
Cooling	Roof top AC	Ductless Minisplit	1.39	\$2.71	16	0.70	\$0.171
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.40	\$0.33	16	-	\$0.072
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.62	\$0.47	16	1.00	\$0.066
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.81	\$1.21	16	0.86	\$0.130
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	0.89	\$1.58	16	0.80	\$0.156
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.29	\$3.02	16	0.63	\$0.205
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.43	\$0.61	16	0.91	\$0.124
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.38	\$1.21	16	0.84	\$0.278
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.67	\$1.60	16	0.83	\$0.084
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.11	\$0.02	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.26	\$0.17	14	0.99	\$0.065
Cooling	Other Cooling	EER 11	0.30	\$0.18	14	1.00	\$0.059
Cooling	Other Cooling	EER 11.5	0.41	\$0.21	14	1.02	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	3.99	-\$0.35	10	1.18	-\$0.011
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.025
Water Heating	Water Heater	EF 2.0	0.34	\$0.00	15	2.00	\$0.001
Water Heating	Water Heater	EF 2.3	0.39	\$0.01	15	2.26	\$0.001
Water Heating	Water Heater	EF 2.4	0.40	\$0.01	15	2.35	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.77	\$0.03	3	-	\$0.014
Int. Lighting	Screw-in	70W HIR PAR-38	1.19	\$0.04	3	-	\$0.012
Int. Lighting	Screw-in	CFL	2.22	\$0.02	6	3.82	\$0.002
Int. Lighting	Screw-in	LED (2010)	2.40	\$0.64	20	2.28	\$0.020
Int. Lighting	Screw-in	LED (2020)	2.76	\$0.18	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.00	\$0.00	15	0.75	\$0.130

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.00	\$0.00	10	1.98	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.00	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.00	\$0.00	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.00	\$0.00	10	2.42	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.00	\$0.00	15	-	\$0.018
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.86	\$3.11	15	0.48	\$0.331
Int. Lighting	Linear Fluorescent	T8	0.89	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.24	\$0.02	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	1.44	\$0.03	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	2.62	\$0.86	15	-	\$0.030
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.05	\$0.00	3	-	\$0.014
Ext. Lighting	Screw-in	70W HIR PAR-38	0.08	\$0.00	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.15	\$0.00	6	3.68	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.16	\$0.04	20	2.03	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.19	\$0.01	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.21	\$0.25	15	0.76	\$0.108
Ext. Lighting	HID	T8	0.22	-\$0.01	10	1.94	-\$0.004
Ext. Lighting	HID	High Pressure Sodium	0.23	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.27	\$0.00	15	2.15	\$0.001
Ext. Lighting	HID	T5	0.28	\$0.00	10	2.38	-\$0.002
Ext. Lighting	HID	LED (2020)	0.41	\$0.06	15	-	\$0.015
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.01	\$0.02	15	0.44	\$0.331
Ext. Lighting	Linear Fluorescent	T8	0.01	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.01	\$0.00	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.01	\$0.00	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.02	\$0.01	15	-	\$0.030
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.08	\$0.023
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.00	12	1.16	\$0.024
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.00	12	1.18	\$0.024
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.00	12	1.47	\$0.015
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	\$0.02	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.07	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.09	\$0.02	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.03	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057

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End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.03	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.05	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.07	\$0.00	12	1.34	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.05	\$0.01	12	1.26	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.95	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.15	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.07	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.11	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.11	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.01	\$0.00	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-8 Energy Efficiency Equipment Data, Natural Gas—Large Office, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.03	20	1.01	\$0.328
Heating	Furnace	EF .83	0.01	\$0.09	20	0.99	\$0.525
Heating	Furnace	EF .90	0.02	\$0.16	20	0.99	\$0.482
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.03	\$0.04	25	1.00	\$0.083
Heating	Boiler	EF .82	0.05	\$0.14	25	1.01	\$0.181
Heating	Boiler	EF .85	0.10	\$0.30	25	1.04	\$0.205
Heating	Boiler	EF .96	0.13	\$1.19	25	0.91	\$0.619
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.28	15	0.75	\$2.916
Heating	Other Heating	AFUE .76	0.01	\$0.72	15	0.52	\$5.948
Heating	Other Heating	AFUE .77	0.01	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.02	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.01	12	1.02	\$0.215
Water Heating	Water Heater	EF 0.94	0.03	\$0.03	12	1.15	\$0.098
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.00	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.00	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.01	\$0.00	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.07	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.08	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-9 Energy Efficiency Equipment Data, Electric—Large Office, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.46	\$0.23	20	1.04	\$0.038
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.56	\$0.30	20	1.04	\$0.041
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.16	\$0.37	20	1.17	\$0.024
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.23	\$0.44	20	1.17	\$0.027
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.70	\$0.09	20	1.14	\$0.010
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.80	\$0.19	20	1.13	\$0.018
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.94	\$0.23	20	1.16	\$0.018
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.12	\$0.35	20	1.17	\$0.024
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.17	\$0.39	20	1.17	\$0.025
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.27	\$0.43	20	1.18	\$0.026
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.31	\$0.22	16	-	\$0.061
Cooling	Roof top AC	EER 11.2	0.62	\$0.42	16	1.00	\$0.059
Cooling	Roof top AC	EER 12.0	0.81	\$0.80	16	0.94	\$0.086
Cooling	Roof top AC	Ductless Minisplit	1.22	\$2.63	16	0.68	\$0.189
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.47	\$0.25	16	-	\$0.047
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.76	\$0.36	16	1.00	\$0.042
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.03	\$0.93	16	0.88	\$0.079
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.15	\$1.21	16	0.82	\$0.093
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.86	\$2.33	16	0.68	\$0.109
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.38	\$0.75	16	0.90	\$0.173
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.69	\$1.51	16	0.82	\$0.190
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.70	\$1.99	16	0.80	\$0.102
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.10	\$0.01	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.25	\$0.17	14	0.99	\$0.065
Cooling	Other Cooling	EER 11	0.29	\$0.18	14	1.00	\$0.059
Cooling	Other Cooling	EER 11.5	0.39	\$0.20	14	1.02	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	3.10	-\$0.38	10	1.14	-\$0.015
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.025
Water Heating	Water Heater	EF 2.0	0.33	\$0.00	15	2.00	\$0.001
Water Heating	Water Heater	EF 2.3	0.37	\$0.01	15	2.26	\$0.001
Water Heating	Water Heater	EF 2.4	0.38	\$0.01	15	2.35	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.77	\$0.03	3	-	\$0.014
Int. Lighting	Screw-in	70W HIR PAR-38	1.19	\$0.04	3	-	\$0.012
Int. Lighting	Screw-in	CFL	2.22	\$0.02	6	3.82	\$0.002
Int. Lighting	Screw-in	LED (2010)	2.40	\$0.64	20	2.28	\$0.020
Int. Lighting	Screw-in	LED (2020)	2.76	\$0.18	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.00	\$0.00	15	0.75	\$0.130

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.00	\$0.00	10	1.98	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.00	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.00	\$0.00	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.00	\$0.00	10	2.42	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.00	\$0.00	15	-	\$0.018
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.86	\$3.11	15	0.48	\$0.331
Int. Lighting	Linear Fluorescent	T8	0.89	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.24	\$0.02	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	1.44	\$0.03	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	2.62	\$0.86	15	-	\$0.030
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.05	\$0.00	3	-	\$0.014
Ext. Lighting	Screw-in	70W HIR PAR-38	0.08	\$0.00	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.15	\$0.00	6	3.68	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.16	\$0.04	20	2.03	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.19	\$0.01	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.21	\$0.25	15	0.76	\$0.108
Ext. Lighting	HID	T8	0.22	-\$0.01	10	1.94	-\$0.004
Ext. Lighting	HID	High Pressure Sodium	0.23	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.27	\$0.00	15	2.15	\$0.001
Ext. Lighting	HID	T5	0.28	\$0.00	10	2.38	-\$0.002
Ext. Lighting	HID	LED (2020)	0.41	\$0.06	15	-	\$0.015
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.01	\$0.02	15	0.44	\$0.331
Ext. Lighting	Linear Fluorescent	T8	0.01	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.01	\$0.00	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.01	\$0.00	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.02	\$0.01	15	-	\$0.030
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.05	\$0.032
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.00	12	1.09	\$0.034
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.01	12	1.10	\$0.033
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.01	12	1.32	\$0.021
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	\$0.02	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.07	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.09	\$0.02	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.03	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.03	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.05	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.07	\$0.00	12	1.34	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.05	\$0.01	12	1.26	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.95	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.15	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.07	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.11	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.11	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.01	\$0.00	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-10 Energy Efficiency Equipment Data, Natural Gas—Large Office, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.03	20	1.01	\$0.297
Heating	Furnace	EF .83	0.01	\$0.08	20	0.99	\$0.477
Heating	Furnace	EF .90	0.02	\$0.13	20	1.00	\$0.437
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.03	\$0.04	25	1.00	\$0.094
Heating	Boiler	EF .82	0.05	\$0.14	25	1.01	\$0.205
Heating	Boiler	EF .85	0.08	\$0.29	25	1.03	\$0.232
Heating	Boiler	EF .96	0.11	\$1.17	25	0.88	\$0.702
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.02	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.01	\$0.02	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.01	\$0.04	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.02	\$0.08	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.01	12	1.02	\$0.218
Water Heating	Water Heater	EF 0.94	0.03	\$0.03	12	1.15	\$0.099
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.00	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.00	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.01	\$0.00	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.07	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.08	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-11 Energy Efficiency Equipment Data, Electric—Restaurant, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	1.09	\$0.33	20	1.08	\$0.023
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1.30	\$0.43	20	1.10	\$0.025
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2.71	\$0.53	20	1.29	\$0.015
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.88	\$0.63	20	1.30	\$0.017
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.51	\$0.12	20	1.18	\$0.006
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.71	\$0.25	20	1.20	\$0.011
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	2.02	\$0.30	20	1.24	\$0.011
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2.42	\$0.47	20	1.28	\$0.015
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2.52	\$0.52	20	1.29	\$0.016
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.73	\$0.57	20	1.32	\$0.016
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.89	\$0.41	16	-	\$0.041
Cooling	Roof top AC	EER 11.2	1.77	\$0.79	16	1.00	\$0.039
Cooling	Roof top AC	EER 12.0	2.32	\$1.51	16	0.97	\$0.057
Cooling	Roof top AC	Ductless Minisplit	3.48	\$4.96	16	0.79	\$0.125
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	1.22	\$0.58	16	-	\$0.042
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.92	\$0.83	16	1.00	\$0.038
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	2.54	\$2.14	16	0.87	\$0.074
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	2.78	\$2.79	16	0.82	\$0.088
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	4.14	\$5.35	16	0.66	\$0.113
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.29	\$1.65	16	0.92	\$0.112
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.12	\$3.29	16	0.84	\$0.258
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	5.01	\$4.34	16	0.84	\$0.076
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.27	\$0.04	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.64	\$0.44	14	1.01	\$0.065
Cooling	Other Cooling	EER 11	0.76	\$0.46	14	1.02	\$0.059
Cooling	Other Cooling	EER 11.5	1.02	\$0.53	14	1.05	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	2.89	-\$0.10	10	1.36	-\$0.004
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.10	\$0.02	15	1.01	\$0.017
Water Heating	Water Heater	EF 2.0	4.82	\$0.04	15	2.02	\$0.001
Water Heating	Water Heater	EF 2.3	5.41	\$0.05	15	2.29	\$0.001
Water Heating	Water Heater	EF 2.4	5.57	\$0.06	15	2.38	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	2.00	\$0.06	3	-	\$0.011
Int. Lighting	Screw-in	70W HIR PAR-38	3.07	\$0.09	3	-	\$0.010
Int. Lighting	Screw-in	CFL	5.75	\$0.05	6	3.88	\$0.002
Int. Lighting	Screw-in	LED (2010)	6.22	\$1.34	20	2.52	\$0.016
Int. Lighting	Screw-in	LED (2020)	7.15	\$0.38	20	-	\$0.004
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.07	\$0.08	15	0.82	\$0.106
Int. Lighting	High-Bay Fixtures	T8	0.07	\$0.00	10	1.94	-\$0.004
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.08	\$0.00	6	1.86	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.09	\$0.00	15	2.19	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.09	\$0.00	10	2.39	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.13	\$0.02	15	-	\$0.014
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.37	\$1.09	15	0.54	\$0.270

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	T8	0.38	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.53	\$0.01	10	1.52	\$0.002
Int. Lighting	Linear Fluorescent	T5	0.62	\$0.01	10	1.64	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	1.13	\$0.30	15	-	\$0.025
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.12	\$0.00	3	-	\$0.011
Ext. Lighting	Screw-in	70W HIR PAR-38	0.18	\$0.01	3	-	\$0.010
Ext. Lighting	Screw-in	CFL	0.34	\$0.00	6	3.77	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.37	\$0.08	20	2.29	\$0.016
Ext. Lighting	Screw-in	LED (2020)	0.42	\$0.02	20	-	\$0.004
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	1.18	\$1.14	15	0.84	\$0.088
Ext. Lighting	HID	T8	1.21	-\$0.03	10	1.91	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	1.28	\$0.01	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	1.50	\$0.02	15	2.14	\$0.001
Ext. Lighting	HID	T5	1.54	-\$0.02	10	2.35	-\$0.001
Ext. Lighting	HID	LED (2020)	2.26	\$0.29	15	-	\$0.012
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.01	15	0.50	\$0.270
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.52	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.64	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.01	\$0.00	15	-	\$0.025
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.66	\$0.25	12	1.02	\$0.041
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.80	\$0.32	12	1.02	\$0.043
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.97	\$0.58	12	0.98	\$0.063
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.13	\$0.08	12	0.98	\$0.062
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.25	\$0.15	12	0.96	\$0.065
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.27	\$0.16	12	0.96	\$0.064
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.44	\$0.17	12	1.07	\$0.041
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.53	\$0.35	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	1.16	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	1.47	\$0.35	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.23	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.24	\$0.16	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.42	\$0.16	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.08	\$0.03	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.11	\$0.05	10	0.99	\$0.057
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.17	\$0.19	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.09	\$0.01	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.22	\$0.02	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.37	\$0.07	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.72	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.45	\$0.10	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	1.79	\$0.08	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	1.21	\$0.27	12	1.24	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.09	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.08	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.02	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.05	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAct 2015)	0.01	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.01	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.02	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.02	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.03	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-12 Energy Efficiency Equipment Data, Natural Gas—Restaurant, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.03	20	1.02	\$0.190
Heating	Furnace	EF .83	0.02	\$0.09	20	1.02	\$0.306
Heating	Furnace	EF .90	0.04	\$0.15	20	1.05	\$0.281
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.12	\$0.16	25	1.00	\$0.091
Heating	Boiler	EF .82	0.20	\$0.59	25	1.01	\$0.199
Heating	Boiler	EF .85	0.37	\$1.22	25	1.03	\$0.225
Heating	Boiler	EF .96	0.49	\$4.95	25	0.89	\$0.680
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.28	15	0.85	\$1.749
Heating	Other Heating	AFUE .76	0.02	\$0.72	15	0.65	\$3.663
Heating	Other Heating	AFUE .77	0.02	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.03	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.03	\$0.04	12	1.02	\$0.154
Water Heating	Water Heater	EF 0.94	0.14	\$0.09	12	1.18	\$0.068
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.07	\$0.01	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.11	\$0.01	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.04	\$0.02	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.08	\$0.02	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.21	\$0.08	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.22	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.02	\$0.25	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-13 Energy Efficiency Equipment Data, Electric— Restaurant, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.92	\$0.43	20	1.06	\$0.036
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1.10	\$0.56	20	1.06	\$0.039
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2.30	\$0.69	20	1.22	\$0.023
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.44	\$0.82	20	1.22	\$0.026
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.35	\$0.17	20	1.16	\$0.010
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.53	\$0.35	20	1.16	\$0.017
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.81	\$0.42	20	1.19	\$0.018
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2.17	\$0.65	20	1.21	\$0.023
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2.26	\$0.72	20	1.22	\$0.024
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.44	\$0.79	20	1.23	\$0.025
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.74	\$0.48	16	-	\$0.056
Cooling	Roof top AC	EER 11.2	1.48	\$0.91	16	1.00	\$0.054
Cooling	Roof top AC	EER 12.0	1.94	\$1.75	16	0.96	\$0.079
Cooling	Roof top AC	Ductless Minisplit	2.91	\$5.76	16	0.73	\$0.173
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	1.03	\$0.57	16	-	\$0.048
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.63	\$0.82	16	1.00	\$0.044
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	2.15	\$2.09	16	0.87	\$0.085
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	2.35	\$2.73	16	0.81	\$0.101
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	3.50	\$5.23	16	0.66	\$0.131
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.09	\$1.59	16	0.91	\$0.127
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.99	\$3.17	16	0.84	\$0.139
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	4.87	\$4.18	16	0.83	\$0.075
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.26	\$0.04	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.62	\$0.42	14	1.01	\$0.065
Cooling	Other Cooling	EER 11	0.73	\$0.45	14	1.02	\$0.059
Cooling	Other Cooling	EER 11.5	0.98	\$0.51	14	1.05	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	1.90	-\$0.15	10	1.19	-\$0.010
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.09	\$0.02	15	1.01	\$0.017
Water Heating	Water Heater	EF 2.0	4.48	\$0.03	15	2.02	\$0.001
Water Heating	Water Heater	EF 2.3	5.03	\$0.05	15	2.29	\$0.001
Water Heating	Water Heater	EF 2.4	5.18	\$0.05	15	2.38	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	2.00	\$0.06	3	-	\$0.011
Int. Lighting	Screw-in	70W HIR PAR-38	3.07	\$0.09	3	-	\$0.010
Int. Lighting	Screw-in	CFL	5.75	\$0.05	6	3.88	\$0.002
Int. Lighting	Screw-in	LED (2010)	6.22	\$1.34	20	2.52	\$0.016
Int. Lighting	Screw-in	LED (2020)	7.15	\$0.38	20	-	\$0.004
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.07	\$0.08	15	0.82	\$0.106

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.07	\$0.00	10	1.94	-\$0.004
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.08	\$0.00	6	1.86	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.09	\$0.00	15	2.19	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.09	\$0.00	10	2.39	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.13	\$0.02	15	-	\$0.014
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.37	\$1.09	15	0.54	\$0.270
Int. Lighting	Linear Fluorescent	T8	0.38	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.53	\$0.01	10	1.52	\$0.002
Int. Lighting	Linear Fluorescent	T5	0.62	\$0.01	10	1.64	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	1.13	\$0.30	15	-	\$0.025
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.12	\$0.00	3	-	\$0.011
Ext. Lighting	Screw-in	70W HIR PAR-38	0.18	\$0.01	3	-	\$0.010
Ext. Lighting	Screw-in	CFL	0.34	\$0.00	6	3.77	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.37	\$0.08	20	2.29	\$0.016
Ext. Lighting	Screw-in	LED (2020)	0.42	\$0.02	20	-	\$0.004
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	1.18	\$1.14	15	0.84	\$0.088
Ext. Lighting	HID	T8	1.21	-\$0.03	10	1.91	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	1.28	\$0.01	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	1.50	\$0.02	15	2.14	\$0.001
Ext. Lighting	HID	T5	1.54	-\$0.02	10	2.35	-\$0.001
Ext. Lighting	HID	LED (2020)	2.26	\$0.29	15	-	\$0.012
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.01	15	0.50	\$0.270
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.52	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.64	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.01	\$0.00	15	-	\$0.025
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.66	\$0.36	12	0.99	\$0.058
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.80	\$0.45	12	0.99	\$0.060
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.97	\$0.81	12	0.94	\$0.089
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.13	\$0.11	12	0.95	\$0.086
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.25	\$0.21	12	0.90	\$0.091
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.27	\$0.23	12	0.90	\$0.090
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.44	\$0.24	12	0.98	\$0.058
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.53	\$0.35	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	1.16	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	1.47	\$0.35	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.23	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.24	\$0.16	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.42	\$0.16	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.08	\$0.03	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.11	\$0.05	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.17	\$0.19	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.09	\$0.01	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.22	\$0.02	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.37	\$0.07	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.72	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.45	\$0.10	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	1.79	\$0.08	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	1.21	\$0.27	12	1.24	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.09	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.08	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.02	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.05	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.01	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.01	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.02	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.02	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.03	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-14 Energy Efficiency Equipment Data, Natural Gas— Restaurant, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.03	20	1.02	\$0.201
Heating	Furnace	EF .83	0.02	\$0.09	20	1.02	\$0.320
Heating	Furnace	EF .90	0.04	\$0.15	20	1.04	\$0.292
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.10	\$0.16	25	1.00	\$0.102
Heating	Boiler	EF .82	0.17	\$0.57	25	1.00	\$0.222
Heating	Boiler	EF .85	0.32	\$1.20	25	1.02	\$0.252
Heating	Boiler	EF .96	0.43	\$4.85	25	0.87	\$0.761
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.03	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.02	\$0.04	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.02	\$0.06	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.03	\$0.12	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.03	\$0.04	12	1.02	\$0.154
Water Heating	Water Heater	EF 0.94	0.13	\$0.08	12	1.18	\$0.068
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.07	\$0.01	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.11	\$0.01	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.04	\$0.02	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.08	\$0.02	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.21	\$0.08	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.22	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.02	\$0.25	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-15 Energy Efficiency Equipment Data, Electric—Retail, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.69	\$0.20	20	1.09	\$0.022
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.83	\$0.26	20	1.11	\$0.024
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.73	\$0.32	20	1.31	\$0.014
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.83	\$0.38	20	1.33	\$0.016
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.96	\$0.07	20	1.19	\$0.006
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.09	\$0.15	20	1.21	\$0.010
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.28	\$0.18	20	1.25	\$0.011
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.54	\$0.28	20	1.30	\$0.014
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.60	\$0.31	20	1.31	\$0.015
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.73	\$0.34	20	1.34	\$0.015
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.61	\$0.28	16	-	\$0.040
Cooling	Roof top AC	EER 11.2	1.21	\$0.54	16	1.00	\$0.039
Cooling	Roof top AC	EER 12.0	1.58	\$1.03	16	0.98	\$0.057
Cooling	Roof top AC	Ductless Minisplit	2.38	\$3.38	16	0.80	\$0.124
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.76	\$0.76	16	-	\$0.088
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.19	\$1.10	16	1.00	\$0.081
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.54	\$2.81	16	0.86	\$0.160
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.67	\$3.67	16	0.80	\$0.192
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	2.36	\$7.04	16	0.64	\$0.261
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.14	\$1.98	16	0.91	\$0.152
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.24	\$3.95	16	0.84	\$0.280
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	4.58	\$5.21	16	0.83	\$0.100
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.19	\$0.03	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.44	\$0.30	14	1.02	\$0.065
Cooling	Other Cooling	EER 11	0.52	\$0.32	14	1.03	\$0.059
Cooling	Other Cooling	EER 11.5	0.70	\$0.36	14	1.06	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	1.35	-\$0.11	10	1.19	-\$0.010
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.016
Water Heating	Water Heater	EF 2.0	0.55	\$0.00	15	2.02	\$0.001
Water Heating	Water Heater	EF 2.3	0.62	\$0.01	15	2.30	\$0.001
Water Heating	Water Heater	EF 2.4	0.64	\$0.01	15	2.39	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.45	\$0.06	3	-	\$0.015
Int. Lighting	Screw-in	70W HIR PAR-38	2.23	\$0.09	3	-	\$0.013
Int. Lighting	Screw-in	CFL	4.18	\$0.05	6	3.76	\$0.002
Int. Lighting	Screw-in	LED (2010)	4.52	\$1.32	20	2.11	\$0.022
Int. Lighting	Screw-in	LED (2020)	5.20	\$0.37	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.15	\$0.24	15	0.71	\$0.144

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.16	-\$0.01	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.17	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.20	\$0.00	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.20	\$0.00	10	2.44	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.29	\$0.06	15	-	\$0.019
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.81	\$3.23	15	0.45	\$0.366
Int. Lighting	Linear Fluorescent	T8	0.84	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.16	\$0.02	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	1.35	\$0.03	10	1.62	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	2.46	\$0.90	15	-	\$0.033
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.54	\$0.02	3	-	\$0.015
Ext. Lighting	Screw-in	70W HIR PAR-38	0.83	\$0.03	3	-	\$0.013
Ext. Lighting	Screw-in	CFL	1.56	\$0.02	6	3.64	\$0.002
Ext. Lighting	Screw-in	LED (2010)	1.69	\$0.49	20	1.91	\$0.022
Ext. Lighting	Screw-in	LED (2020)	1.94	\$0.14	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.16	\$0.21	15	0.72	\$0.119
Ext. Lighting	HID	T8	0.16	-\$0.01	10	1.96	-\$0.004
Ext. Lighting	HID	High Pressure Sodium	0.17	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.20	\$0.00	15	2.16	\$0.001
Ext. Lighting	HID	T5	0.21	\$0.00	10	2.39	-\$0.002
Ext. Lighting	HID	LED (2020)	0.30	\$0.05	15	-	\$0.016
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.01	15	0.41	\$0.366
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.50	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.61	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.01	\$0.00	15	-	\$0.033
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.12	\$0.02	12	1.09	\$0.018
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.15	\$0.03	12	1.11	\$0.019
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.18	\$0.05	12	1.10	\$0.027
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	\$0.01	12	1.07	\$0.027
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.05	\$0.01	12	1.13	\$0.028
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.05	\$0.01	12	1.14	\$0.028
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.08	\$0.01	12	1.40	\$0.018
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.10	\$0.06	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.21	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.27	\$0.06	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.04	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.04	\$0.03	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.08	\$0.03	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.03	\$0.01	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.04	\$0.02	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.06	\$0.07	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.03	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.08	\$0.01	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.14	\$0.02	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.02	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.12	\$0.01	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.08	\$0.02	12	1.24	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.06	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.06	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.01	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.03	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-16 Energy Efficiency Equipment Data, Natural Gas— Retail, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.02	\$0.10	20	1.01	\$0.357
Heating	Furnace	EF .83	0.04	\$0.26	20	0.98	\$0.575
Heating	Furnace	EF .90	0.06	\$0.45	20	0.97	\$0.531
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.18	\$0.24	25	1.00	\$0.091
Heating	Boiler	EF .82	0.30	\$0.89	25	1.01	\$0.199
Heating	Boiler	EF .85	0.56	\$1.86	25	1.03	\$0.225
Heating	Boiler	EF .96	0.74	\$7.53	25	0.89	\$0.680
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.50	15	0.83	\$1.955
Heating	Other Heating	AFUE .76	0.03	\$0.50	15	0.84	\$1.600
Heating	Other Heating	AFUE .77	0.03	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.05	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.01	12	1.02	\$0.143
Water Heating	Water Heater	EF 0.94	0.05	\$0.03	12	1.18	\$0.064
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.01	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.19	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.02	\$0.22	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-17 Energy Efficiency Equipment Data, Electric— Retail, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.58	\$0.24	20	1.07	\$0.031
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.70	\$0.31	20	1.08	\$0.033
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.46	\$0.38	20	1.26	\$0.020
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.54	\$0.45	20	1.27	\$0.022
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.84	\$0.10	20	1.17	\$0.009
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.95	\$0.19	20	1.17	\$0.015
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.12	\$0.23	20	1.21	\$0.016
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.35	\$0.36	20	1.24	\$0.020
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.40	\$0.40	20	1.25	\$0.022
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.52	\$0.44	20	1.27	\$0.022
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.55	\$0.21	16	-	\$0.034
Cooling	Roof top AC	EER 11.2	1.10	\$0.41	16	1.00	\$0.032
Cooling	Roof top AC	EER 12.0	1.44	\$0.78	16	0.99	\$0.047
Cooling	Roof top AC	Ductless Minisplit	2.16	\$2.56	16	0.83	\$0.104
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.77	\$0.24	16	-	\$0.027
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.26	\$0.34	16	1.00	\$0.024
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.72	\$0.88	16	0.93	\$0.045
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.92	\$1.15	16	0.89	\$0.052
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	3.18	\$2.20	16	0.81	\$0.060
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.03	\$0.94	16	0.94	\$0.080
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.88	\$1.88	16	0.88	\$0.087
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	4.59	\$2.48	16	0.91	\$0.047
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.18	\$0.03	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.42	\$0.29	14	1.02	\$0.065
Cooling	Other Cooling	EER 11	0.50	\$0.30	14	1.03	\$0.059
Cooling	Other Cooling	EER 11.5	0.67	\$0.35	14	1.06	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	1.14	-\$0.13	10	1.14	-\$0.014
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.024
Water Heating	Water Heater	EF 2.0	0.52	\$0.01	15	2.00	\$0.001
Water Heating	Water Heater	EF 2.3	0.59	\$0.01	15	2.26	\$0.001
Water Heating	Water Heater	EF 2.4	0.60	\$0.01	15	2.35	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.45	\$0.06	3	-	\$0.015
Int. Lighting	Screw-in	70W HIR PAR-38	2.23	\$0.09	3	-	\$0.013
Int. Lighting	Screw-in	CFL	4.18	\$0.05	6	3.76	\$0.002
Int. Lighting	Screw-in	LED (2010)	4.52	\$1.32	20	2.11	\$0.022
Int. Lighting	Screw-in	LED (2020)	5.20	\$0.37	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.15	\$0.24	15	0.71	\$0.144

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End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.16	-\$0.01	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.17	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.20	\$0.00	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.20	\$0.00	10	2.44	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.29	\$0.06	15	-	\$0.019
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.81	\$3.23	15	0.45	\$0.366
Int. Lighting	Linear Fluorescent	T8	0.84	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.16	\$0.02	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	1.35	\$0.03	10	1.62	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	2.46	\$0.90	15	-	\$0.033
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.54	\$0.02	3	-	\$0.015
Ext. Lighting	Screw-in	70W HIR PAR-38	0.83	\$0.03	3	-	\$0.013
Ext. Lighting	Screw-in	CFL	1.56	\$0.02	6	3.64	\$0.002
Ext. Lighting	Screw-in	LED (2010)	1.69	\$0.49	20	1.91	\$0.022
Ext. Lighting	Screw-in	LED (2020)	1.94	\$0.14	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.16	\$0.21	15	0.72	\$0.119
Ext. Lighting	HID	T8	0.16	-\$0.01	10	1.96	-\$0.004
Ext. Lighting	HID	High Pressure Sodium	0.17	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.20	\$0.00	15	2.16	\$0.001
Ext. Lighting	HID	T5	0.21	\$0.00	10	2.39	-\$0.002
Ext. Lighting	HID	LED (2020)	0.30	\$0.05	15	-	\$0.016
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.01	15	0.41	\$0.366
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.50	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.61	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.01	\$0.00	15	-	\$0.033
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.12	\$0.02	12	1.08	\$0.020
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.15	\$0.03	12	1.10	\$0.020
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.18	\$0.05	12	1.09	\$0.030
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	\$0.01	12	1.06	\$0.029
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.05	\$0.01	12	1.11	\$0.031
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.05	\$0.01	12	1.12	\$0.031
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.08	\$0.01	12	1.36	\$0.020
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.10	\$0.06	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.21	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.27	\$0.06	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.04	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.04	\$0.03	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.08	\$0.03	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.03	\$0.01	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.04	\$0.02	10	0.99	\$0.057

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End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.06	\$0.07	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.03	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.08	\$0.01	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.14	\$0.02	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.02	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.12	\$0.01	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.08	\$0.02	12	1.24	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.06	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.06	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.01	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.03	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-18 Energy Efficiency Equipment Data, Natural Gas— Retail, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.02	\$0.04	20	1.03	\$0.166
Heating	Furnace	EF .83	0.03	\$0.12	20	1.03	\$0.267
Heating	Furnace	EF .90	0.06	\$0.20	20	1.06	\$0.245
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.16	\$0.24	25	1.00	\$0.102
Heating	Boiler	EF .82	0.26	\$0.87	25	1.00	\$0.222
Heating	Boiler	EF .85	0.49	\$1.83	25	1.02	\$0.252
Heating	Boiler	EF .96	0.65	\$7.40	25	0.87	\$0.761
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.04	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.03	\$0.06	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.03	\$0.10	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.04	\$0.20	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.02	\$0.223
Water Heating	Water Heater	EF 0.94	0.05	\$0.04	12	1.15	\$0.096
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.01	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.19	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.02	\$0.22	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-19 Energy Efficiency Equipment Data, Electric—Grocery, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.95	\$0.27	20	1.12	\$0.022
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1.14	\$0.35	20	1.15	\$0.024
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2.37	\$0.43	20	1.41	\$0.014
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.51	\$0.51	20	1.44	\$0.016
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.32	\$0.10	20	1.22	\$0.006
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.49	\$0.20	20	1.25	\$0.010
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.76	\$0.24	20	1.31	\$0.011
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2.11	\$0.38	20	1.38	\$0.014
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2.20	\$0.42	20	1.40	\$0.015
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.37	\$0.46	20	1.45	\$0.015
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.83	\$1.35	16	-	\$0.142
Cooling	Roof top AC	EER 11.2	1.66	\$2.59	16	1.00	\$0.136
Cooling	Roof top AC	EER 12.0	2.17	\$4.98	16	0.96	\$0.201
Cooling	Roof top AC	Ductless Minisplit	3.26	\$16.34	16	0.73	\$0.438
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.87	\$2.09	16	-	\$0.211
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.37	\$3.01	16	1.00	\$0.193
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.83	\$7.72	16	0.82	\$0.369
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	2.01	\$10.07	16	0.75	\$0.440
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	2.98	\$19.30	16	0.56	\$0.567
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.69	\$7.69	16	0.89	\$0.397
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.55	\$15.38	16	0.80	\$0.866
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	6.64	\$20.28	16	0.76	\$0.267
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.25	\$0.04	14	1.04	\$0.014
Cooling	Other Cooling	EER 10.8	0.60	\$0.41	14	1.07	\$0.065
Cooling	Other Cooling	EER 11	0.71	\$0.43	14	1.09	\$0.059
Cooling	Other Cooling	EER 11.5	0.96	\$0.49	14	1.13	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	1.63	-\$0.83	10	1.06	-\$0.063
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.02	\$0.00	15	1.01	\$0.019
Water Heating	Water Heater	EF 2.0	1.21	\$0.01	15	2.01	\$0.001
Water Heating	Water Heater	EF 2.3	1.36	\$0.01	15	2.29	\$0.001
Water Heating	Water Heater	EF 2.4	1.40	\$0.02	15	2.38	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.27	\$0.04	3	-	\$0.010
Int. Lighting	Screw-in	70W HIR PAR-38	1.95	\$0.05	3	-	\$0.009
Int. Lighting	Screw-in	CFL	3.65	\$0.03	6	3.96	\$0.001
Int. Lighting	Screw-in	LED (2010)	3.95	\$0.77	20	2.77	\$0.015
Int. Lighting	Screw-in	LED (2020)	4.53	\$0.22	20	-	\$0.004
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.04	\$0.04	15	0.89	\$0.096

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.04	\$0.00	10	1.93	-\$0.003
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.04	\$0.00	6	1.87	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.05	\$0.00	15	2.20	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.05	\$0.00	10	2.39	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.07	\$0.01	15	-	\$0.013
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	1.77	\$4.71	15	0.59	\$0.244
Int. Lighting	Linear Fluorescent	T8	1.84	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	2.55	\$0.03	10	1.53	\$0.002
Int. Lighting	Linear Fluorescent	T5	2.96	\$0.05	10	1.65	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	5.39	\$1.31	15	-	\$0.022
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.13	\$0.00	3	-	\$0.010
Ext. Lighting	Screw-in	70W HIR PAR-38	0.20	\$0.01	3	-	\$0.009
Ext. Lighting	Screw-in	CFL	0.38	\$0.00	6	3.80	\$0.001
Ext. Lighting	Screw-in	LED (2010)	0.41	\$0.08	20	2.43	\$0.015
Ext. Lighting	Screw-in	LED (2020)	0.47	\$0.02	20	-	\$0.004
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.52	\$0.45	15	0.88	\$0.079
Ext. Lighting	HID	T8	0.53	-\$0.01	10	1.89	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	0.56	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.66	\$0.01	15	2.14	\$0.001
Ext. Lighting	HID	T5	0.68	-\$0.01	10	2.34	-\$0.001
Ext. Lighting	HID	LED (2020)	0.99	\$0.12	15	-	\$0.011
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.01	\$0.03	15	0.53	\$0.244
Ext. Lighting	Linear Fluorescent	T8	0.01	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.02	\$0.00	10	1.52	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.02	\$0.00	10	1.64	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.04	\$0.01	15	-	\$0.022
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	1.02	\$0.40	12	1.02	\$0.042
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	1.23	\$0.50	12	1.02	\$0.044
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	1.50	\$0.90	12	0.98	\$0.064
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.06	\$0.03	12	0.98	\$0.063
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.11	\$0.07	12	0.96	\$0.066
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.12	\$0.07	12	0.96	\$0.065
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.19	\$0.08	12	1.07	\$0.042
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	2.34	\$1.56	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	5.13	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	6.48	\$1.56	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	1.00	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	1.04	\$0.71	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	1.84	\$0.71	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	\$0.01	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.02	\$0.01	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.04	\$0.04	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.04	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.10	\$0.01	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.16	\$0.03	10	1.17	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.10	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.06	\$0.01	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.48	\$0.02	12	1.34	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.32	\$0.07	12	1.27	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.06	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.03	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.01	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.04	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-20 Energy Efficiency Equipment Data, Natural Gas— Grocery, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.02	\$0.39	20	0.95	\$1.438
Heating	Furnace	EF .83	0.04	\$1.07	20	0.87	\$2.286
Heating	Furnace	EF .90	0.06	\$1.80	20	0.80	\$2.109
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.19	\$0.26	25	1.00	\$0.091
Heating	Boiler	EF .82	0.32	\$0.95	25	1.01	\$0.199
Heating	Boiler	EF .85	0.59	\$1.98	25	1.03	\$0.225
Heating	Boiler	EF .96	0.79	\$8.01	25	0.89	\$0.680
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.28	15	0.92	\$1.095
Heating	Other Heating	AFUE .76	0.03	\$0.72	15	0.77	\$2.252
Heating	Other Heating	AFUE .77	0.03	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.05	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.02	\$0.167
Water Heating	Water Heater	EF 0.94	0.05	\$0.04	12	1.17	\$0.075
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.07	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.08	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-21 Energy Efficiency Equipment Data, Electric— Grocery, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.80	\$0.32	20	1.11	\$0.031
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.96	\$0.42	20	1.14	\$0.033
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2.00	\$0.52	20	1.38	\$0.020
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.12	\$0.62	20	1.40	\$0.022
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.15	\$0.13	20	1.21	\$0.009
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.31	\$0.27	20	1.23	\$0.015
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.54	\$0.32	20	1.28	\$0.016
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.85	\$0.50	20	1.35	\$0.020
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.93	\$0.55	20	1.36	\$0.022
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.08	\$0.60	20	1.40	\$0.022
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.74	\$1.60	16	-	\$0.190
Cooling	Roof top AC	EER 11.2	1.48	\$3.08	16	1.00	\$0.182
Cooling	Roof top AC	EER 12.0	1.94	\$5.92	16	0.94	\$0.267
Cooling	Roof top AC	Ductless Minisplit	2.91	\$19.43	16	0.69	\$0.584
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.76	\$2.39	16	-	\$0.276
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.19	\$3.43	16	1.00	\$0.253
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.72	\$8.81	16	0.81	\$0.448
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.94	\$11.50	16	0.75	\$0.519
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	3.33	\$22.02	16	0.56	\$0.579
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.68	\$9.26	16	0.89	\$0.484
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	3.06	\$18.52	16	0.79	\$0.530
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	7.48	\$24.43	16	0.75	\$0.286
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.24	\$0.03	14	1.04	\$0.014
Cooling	Other Cooling	EER 10.8	0.58	\$0.39	14	1.07	\$0.065
Cooling	Other Cooling	EER 11	0.68	\$0.42	14	1.09	\$0.059
Cooling	Other Cooling	EER 11.5	0.92	\$0.48	14	1.13	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.89	-\$1.16	10	1.04	-\$0.162
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.02	\$0.00	15	1.01	\$0.019
Water Heating	Water Heater	EF 2.0	1.16	\$0.01	15	2.01	\$0.001
Water Heating	Water Heater	EF 2.3	1.30	\$0.01	15	2.29	\$0.001
Water Heating	Water Heater	EF 2.4	1.34	\$0.01	15	2.38	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.27	\$0.04	3	-	\$0.010
Int. Lighting	Screw-in	70W HIR PAR-38	1.95	\$0.05	3	-	\$0.009
Int. Lighting	Screw-in	CFL	3.65	\$0.03	6	3.96	\$0.001
Int. Lighting	Screw-in	LED (2010)	3.95	\$0.77	20	2.77	\$0.015
Int. Lighting	Screw-in	LED (2020)	4.53	\$0.22	20	-	\$0.004
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.04	\$0.04	15	0.89	\$0.096

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.04	\$0.00	10	1.93	-\$0.003
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.04	\$0.00	6	1.87	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.05	\$0.00	15	2.20	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.05	\$0.00	10	2.39	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.07	\$0.01	15	-	\$0.013
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	1.77	\$4.71	15	0.59	\$0.244
Int. Lighting	Linear Fluorescent	T8	1.84	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	2.55	\$0.03	10	1.53	\$0.002
Int. Lighting	Linear Fluorescent	T5	2.96	\$0.05	10	1.65	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	5.39	\$1.31	15	-	\$0.022
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.13	\$0.00	3	-	\$0.010
Ext. Lighting	Screw-in	70W HIR PAR-38	0.20	\$0.01	3	-	\$0.009
Ext. Lighting	Screw-in	CFL	0.38	\$0.00	6	3.80	\$0.001
Ext. Lighting	Screw-in	LED (2010)	0.41	\$0.08	20	2.43	\$0.015
Ext. Lighting	Screw-in	LED (2020)	0.47	\$0.02	20	-	\$0.004
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.52	\$0.45	15	0.88	\$0.079
Ext. Lighting	HID	T8	0.53	-\$0.01	10	1.89	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	0.56	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.66	\$0.01	15	2.14	\$0.001
Ext. Lighting	HID	T5	0.68	-\$0.01	10	2.34	-\$0.001
Ext. Lighting	HID	LED (2020)	0.99	\$0.12	15	-	\$0.011
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.01	\$0.03	15	0.53	\$0.244
Ext. Lighting	Linear Fluorescent	T8	0.01	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.02	\$0.00	10	1.52	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.02	\$0.00	10	1.64	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.04	\$0.01	15	-	\$0.022
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	1.02	\$0.56	12	0.99	\$0.059
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	1.23	\$0.71	12	0.99	\$0.061
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	1.50	\$1.26	12	0.94	\$0.090
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.06	\$0.05	12	0.95	\$0.088
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.11	\$0.10	12	0.90	\$0.093
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.12	\$0.10	12	0.90	\$0.092
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.19	\$0.11	12	0.97	\$0.059
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	2.34	\$1.56	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	5.13	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	6.48	\$1.56	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	1.00	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	1.04	\$0.71	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	1.84	\$0.71	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	\$0.01	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.02	\$0.01	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.04	\$0.04	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.04	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.10	\$0.01	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.16	\$0.03	10	1.17	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.10	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.06	\$0.01	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.48	\$0.02	12	1.34	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.32	\$0.07	12	1.27	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.06	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.03	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.01	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.04	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-22 Energy Efficiency Equipment Data, Natural Gas— Grocery, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.02	\$0.52	20	0.94	\$1.997
Heating	Furnace	EF .83	0.03	\$1.41	20	0.84	\$3.163
Heating	Furnace	EF .90	0.06	\$2.38	20	0.77	\$2.902
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.17	\$0.26	25	1.00	\$0.102
Heating	Boiler	EF .82	0.29	\$0.97	25	1.00	\$0.222
Heating	Boiler	EF .85	0.54	\$2.02	25	1.02	\$0.252
Heating	Boiler	EF .96	0.72	\$8.18	25	0.87	\$0.761
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.04	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.03	\$0.06	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.03	\$0.10	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.05	\$0.20	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.02	\$0.167
Water Heating	Water Heater	EF 0.94	0.05	\$0.04	12	1.17	\$0.075
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.07	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.08	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-23 Energy Efficiency Equipment Data, Electric—College, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.78	\$0.52	20	1.04	\$0.050
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.94	\$0.68	20	1.04	\$0.055
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.96	\$0.83	20	1.18	\$0.032
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.08	\$0.99	20	1.17	\$0.036
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.02	\$0.17	20	1.15	\$0.013
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.15	\$0.34	20	1.14	\$0.023
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.36	\$0.41	20	1.17	\$0.023
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.63	\$0.64	20	1.18	\$0.030
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.70	\$0.71	20	1.18	\$0.032
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.83	\$0.77	20	1.20	\$0.032
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.44	\$0.48	16	-	\$0.095
Cooling	Roof top AC	EER 11.2	0.87	\$0.91	16	1.00	\$0.091
Cooling	Roof top AC	EER 12.0	1.14	\$1.76	16	0.93	\$0.134
Cooling	Roof top AC	Ductless Minisplit	1.72	\$5.76	16	0.66	\$0.294
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.73	\$0.26	16	-	\$0.031
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.15	\$0.37	16	1.00	\$0.028
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.52	\$0.95	16	0.90	\$0.055
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.66	\$1.24	16	0.86	\$0.065
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	2.47	\$2.37	16	0.72	\$0.084
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.02	\$1.11	16	0.93	\$0.095
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.12	\$2.22	16	0.87	\$0.174
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	4.12	\$2.92	16	0.89	\$0.062
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.13	\$0.05	14	1.02	\$0.038
Cooling	Other Cooling	EER 10.8	0.32	\$0.60	14	0.92	\$0.182
Cooling	Other Cooling	EER 11	0.37	\$0.63	14	0.92	\$0.163
Cooling	Other Cooling	EER 11.5	0.51	\$0.72	14	0.93	\$0.137
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	1.75	-\$0.38	10	1.09	-\$0.027
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.02	\$0.00	15	1.01	\$0.023
Water Heating	Water Heater	EF 2.0	0.84	\$0.01	15	2.00	\$0.001
Water Heating	Water Heater	EF 2.3	0.94	\$0.01	15	2.27	\$0.001
Water Heating	Water Heater	EF 2.4	0.97	\$0.01	15	2.36	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.00	\$0.03	3	-	\$0.009
Int. Lighting	Screw-in	70W HIR PAR-38	1.54	\$0.04	3	-	\$0.008
Int. Lighting	Screw-in	CFL	2.89	\$0.02	6	3.95	\$0.001
Int. Lighting	Screw-in	LED (2010)	3.13	\$0.56	20	2.82	\$0.014
Int. Lighting	Screw-in	LED (2020)	3.59	\$0.16	20	-	\$0.003
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.06	\$0.06	15	0.91	\$0.088

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.06	\$0.00	10	1.92	-\$0.003
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.06	\$0.00	6	1.86	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.07	\$0.00	15	2.19	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.07	\$0.00	10	2.37	-\$0.001
Int. Lighting	High-Bay Fixtures	LED (2020)	0.11	\$0.01	15	-	\$0.012
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.70	\$1.71	15	0.60	\$0.224
Int. Lighting	Linear Fluorescent	T8	0.72	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.00	\$0.01	10	1.53	\$0.001
Int. Lighting	Linear Fluorescent	T5	1.16	\$0.02	10	1.66	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	2.12	\$0.47	15	-	\$0.020
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.04	\$0.00	3	-	\$0.009
Ext. Lighting	Screw-in	70W HIR PAR-38	0.06	\$0.00	3	-	\$0.008
Ext. Lighting	Screw-in	CFL	0.12	\$0.00	6	3.83	\$0.001
Ext. Lighting	Screw-in	LED (2010)	0.13	\$0.02	20	2.54	\$0.014
Ext. Lighting	Screw-in	LED (2020)	0.15	\$0.01	20	-	\$0.003
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.32	\$0.26	15	0.91	\$0.073
Ext. Lighting	HID	T8	0.33	-\$0.01	10	1.88	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	0.35	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.41	\$0.00	15	2.13	\$0.001
Ext. Lighting	HID	T5	0.42	\$0.00	10	2.33	-\$0.001
Ext. Lighting	HID	LED (2020)	0.61	\$0.07	15	-	\$0.010
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.56	\$0.224
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.52	\$0.001
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.65	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.020
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.02	\$0.00	12	1.14	\$0.011
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.03	\$0.00	12	1.18	\$0.012
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.04	\$0.01	12	1.19	\$0.017
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.11	\$0.017
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.00	12	1.22	\$0.018
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.00	12	1.24	\$0.018
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.00	12	1.61	\$0.011
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.02	\$0.01	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.04	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.05	\$0.01	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.02	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.02	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.03	\$0.00	10	1.17	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.03	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.02	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.17	\$0.01	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.11	\$0.03	12	1.26	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.21	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.03	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.07	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.02	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.05	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.05	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.03	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.01	\$0.01	15	0.97	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-24 Energy Efficiency Equipment Data, Natural Gas— College, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.02	20	1.03	\$0.174
Heating	Furnace	EF .83	0.01	\$0.05	20	1.03	\$0.280
Heating	Furnace	EF .90	0.03	\$0.09	20	1.06	\$0.256
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.03	\$0.04	25	1.00	\$0.083
Heating	Boiler	EF .82	0.06	\$0.15	25	1.01	\$0.181
Heating	Boiler	EF .85	0.11	\$0.32	25	1.04	\$0.205
Heating	Boiler	EF .96	0.14	\$1.31	25	0.91	\$0.619
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.34	15	0.72	\$3.343
Heating	Other Heating	AFUE .76	0.01	\$0.66	15	0.55	\$5.253
Heating	Other Heating	AFUE .77	0.01	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.02	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.02	\$0.202
Water Heating	Water Heater	EF 0.94	0.05	\$0.04	12	1.16	\$0.091
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.21	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.02	\$0.24	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-25 Energy Efficiency Equipment Data, Electric— College, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.62	\$0.51	20	1.02	\$0.063
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.75	\$0.67	20	1.02	\$0.068
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.56	\$0.82	20	1.14	\$0.040
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.65	\$0.98	20	1.13	\$0.045
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.88	\$0.17	20	1.14	\$0.015
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.00	\$0.35	20	1.13	\$0.026
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.18	\$0.42	20	1.15	\$0.027
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.41	\$0.65	20	1.15	\$0.035
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.47	\$0.72	20	1.15	\$0.037
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.59	\$0.79	20	1.17	\$0.038
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.41	\$0.49	16	-	\$0.103
Cooling	Roof top AC	EER 11.2	0.82	\$0.93	16	1.00	\$0.099
Cooling	Roof top AC	EER 12.0	1.08	\$1.79	16	0.93	\$0.146
Cooling	Roof top AC	Ductless Minisplit	1.62	\$5.89	16	0.65	\$0.319
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.66	\$0.24	16	-	\$0.032
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.04	\$0.34	16	1.00	\$0.029
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.36	\$0.88	16	0.90	\$0.057
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.49	\$1.15	16	0.86	\$0.068
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	2.22	\$2.21	16	0.73	\$0.087
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.02	\$0.98	16	0.93	\$0.084
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.86	\$1.96	16	0.87	\$0.092
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	4.55	\$2.59	16	0.89	\$0.050
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.13	\$0.05	14	1.01	\$0.041
Cooling	Other Cooling	EER 10.8	0.30	\$0.62	14	0.91	\$0.195
Cooling	Other Cooling	EER 11	0.36	\$0.66	14	0.92	\$0.176
Cooling	Other Cooling	EER 11.5	0.49	\$0.75	14	0.92	\$0.147
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	2.01	-\$0.44	10	1.09	-\$0.027
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.02	\$0.00	15	1.01	\$0.023
Water Heating	Water Heater	EF 2.0	0.80	\$0.01	15	2.00	\$0.001
Water Heating	Water Heater	EF 2.3	0.90	\$0.01	15	2.27	\$0.001
Water Heating	Water Heater	EF 2.4	0.92	\$0.01	15	2.36	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.00	\$0.03	3	-	\$0.009
Int. Lighting	Screw-in	70W HIR PAR-38	1.54	\$0.04	3	-	\$0.008
Int. Lighting	Screw-in	CFL	2.89	\$0.02	6	3.95	\$0.001
Int. Lighting	Screw-in	LED (2010)	3.13	\$0.56	20	2.82	\$0.014
Int. Lighting	Screw-in	LED (2020)	3.59	\$0.16	20	-	\$0.003
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.06	\$0.06	15	0.91	\$0.088

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.06	\$0.00	10	1.92	-\$0.003
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.06	\$0.00	6	1.86	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.07	\$0.00	15	2.19	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.07	\$0.00	10	2.37	-\$0.001
Int. Lighting	High-Bay Fixtures	LED (2020)	0.11	\$0.01	15	-	\$0.012
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.70	\$1.71	15	0.60	\$0.224
Int. Lighting	Linear Fluorescent	T8	0.72	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.00	\$0.01	10	1.53	\$0.001
Int. Lighting	Linear Fluorescent	T5	1.16	\$0.02	10	1.66	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	2.12	\$0.47	15	-	\$0.020
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.04	\$0.00	3	-	\$0.009
Ext. Lighting	Screw-in	70W HIR PAR-38	0.06	\$0.00	3	-	\$0.008
Ext. Lighting	Screw-in	CFL	0.12	\$0.00	6	3.83	\$0.001
Ext. Lighting	Screw-in	LED (2010)	0.13	\$0.02	20	2.54	\$0.014
Ext. Lighting	Screw-in	LED (2020)	0.15	\$0.01	20	-	\$0.003
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.32	\$0.26	15	0.91	\$0.073
Ext. Lighting	HID	T8	0.33	-\$0.01	10	1.88	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	0.35	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.41	\$0.00	15	2.13	\$0.001
Ext. Lighting	HID	T5	0.42	\$0.00	10	2.33	-\$0.001
Ext. Lighting	HID	LED (2020)	0.61	\$0.07	15	-	\$0.010
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.56	\$0.224
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.52	\$0.001
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.65	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.020
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.02	\$0.00	12	1.13	\$0.012
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.03	\$0.00	12	1.16	\$0.013
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.04	\$0.01	12	1.17	\$0.019
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.10	\$0.019
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.00	12	1.20	\$0.020
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.00	12	1.22	\$0.019
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.00	12	1.57	\$0.012
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.02	\$0.01	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.04	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.05	\$0.01	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.02	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.02	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.03	\$0.00	10	1.17	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.03	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.02	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.17	\$0.01	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.11	\$0.03	12	1.26	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.21	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.03	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.07	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.02	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.05	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.05	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.03	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.01	\$0.01	15	0.97	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-26 Energy Efficiency Equipment Data, Natural Gas— College, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.02	20	1.03	\$0.171
Heating	Furnace	EF .83	0.01	\$0.05	20	1.03	\$0.275
Heating	Furnace	EF .90	0.02	\$0.08	20	1.06	\$0.252
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.03	\$0.04	25	1.00	\$0.094
Heating	Boiler	EF .82	0.05	\$0.16	25	1.01	\$0.205
Heating	Boiler	EF .85	0.09	\$0.33	25	1.03	\$0.232
Heating	Boiler	EF .96	0.13	\$1.32	25	0.88	\$0.702
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.02	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.01	\$0.02	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.01	\$0.04	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.02	\$0.08	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.02	\$0.202
Water Heating	Water Heater	EF 0.94	0.04	\$0.04	12	1.16	\$0.091
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.02	\$0.21	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.02	\$0.23	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-27 Energy Efficiency Equipment Data, Electric—School, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.38	\$0.25	20	1.06	\$0.050
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.45	\$0.33	20	1.06	\$0.055
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.94	\$0.40	20	1.22	\$0.032
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.00	\$0.48	20	1.22	\$0.036
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.49	\$0.08	20	1.16	\$0.013
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.56	\$0.16	20	1.16	\$0.023
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.65	\$0.20	20	1.20	\$0.023
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.79	\$0.31	20	1.22	\$0.030
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.82	\$0.34	20	1.22	\$0.032
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.88	\$0.37	20	1.24	\$0.032
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.21	\$0.23	16	-	\$0.095
Cooling	Roof top AC	EER 11.2	0.42	\$0.44	16	1.00	\$0.091
Cooling	Roof top AC	EER 12.0	0.55	\$0.85	16	0.94	\$0.134
Cooling	Roof top AC	Ductless Minisplit	0.83	\$2.78	16	0.70	\$0.294
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.37	\$0.14	16	-	\$0.033
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.59	\$0.20	16	1.00	\$0.030
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.77	\$0.52	16	0.90	\$0.059
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	0.85	\$0.68	16	0.86	\$0.071
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.26	\$1.31	16	0.72	\$0.091
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.54	\$0.61	16	0.93	\$0.100
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.62	\$1.22	16	0.87	\$0.174
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.17	\$1.61	16	0.89	\$0.065
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.06	\$0.03	14	1.02	\$0.038
Cooling	Other Cooling	EER 10.8	0.15	\$0.29	14	0.95	\$0.182
Cooling	Other Cooling	EER 11	0.18	\$0.31	14	0.95	\$0.163
Cooling	Other Cooling	EER 11.5	0.24	\$0.35	14	0.96	\$0.137
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.83	-\$0.18	10	1.09	-\$0.027
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.023
Water Heating	Water Heater	EF 2.0	0.41	\$0.00	15	2.00	\$0.001
Water Heating	Water Heater	EF 2.3	0.46	\$0.01	15	2.26	\$0.001
Water Heating	Water Heater	EF 2.4	0.47	\$0.01	15	2.35	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.21	\$0.08	3	-	\$0.022
Int. Lighting	Screw-in	70W HIR PAR-38	1.87	\$0.11	3	-	\$0.020
Int. Lighting	Screw-in	CFL	3.49	\$0.06	6	3.49	\$0.003
Int. Lighting	Screw-in	LED (2010)	3.78	\$1.63	20	1.54	\$0.033
Int. Lighting	Screw-in	LED (2020)	4.34	\$0.46	20	-	\$0.008
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.12	\$0.27	15	0.56	\$0.213

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.12	-\$0.01	10	2.11	-\$0.007
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.13	\$0.00	6	1.82	\$0.002
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.15	\$0.00	15	2.21	\$0.003
Int. Lighting	High-Bay Fixtures	T5	0.15	\$0.00	10	2.52	-\$0.004
Int. Lighting	High-Bay Fixtures	LED (2020)	0.23	\$0.07	15	-	\$0.029
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.38	\$2.22	15	0.33	\$0.540
Int. Lighting	Linear Fluorescent	T8	0.39	\$0.00	10	1.33	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.54	\$0.01	10	1.48	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.63	\$0.02	10	1.58	\$0.005
Int. Lighting	Linear Fluorescent	LED (2020)	1.14	\$0.62	15	-	\$0.049
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.02	\$0.00	3	-	\$0.022
Ext. Lighting	Screw-in	70W HIR PAR-38	0.04	\$0.00	3	-	\$0.020
Ext. Lighting	Screw-in	CFL	0.07	\$0.00	6	3.43	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.07	\$0.03	20	1.46	\$0.033
Ext. Lighting	Screw-in	LED (2020)	0.08	\$0.01	20	-	\$0.008
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.24	\$0.45	15	0.59	\$0.176
Ext. Lighting	HID	T8	0.24	-\$0.01	10	2.06	-\$0.006
Ext. Lighting	HID	High Pressure Sodium	0.26	\$0.00	6	1.82	\$0.002
Ext. Lighting	HID	Light Emitting Plasma	0.30	\$0.01	15	2.18	\$0.002
Ext. Lighting	HID	T5	0.31	-\$0.01	10	2.47	-\$0.003
Ext. Lighting	HID	LED (2020)	0.45	\$0.12	15	-	\$0.024
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.31	\$0.540
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.48	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.57	\$0.005
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.049
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.03	\$0.01	12	1.05	\$0.028
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.03	\$0.01	12	1.06	\$0.029
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.04	\$0.02	12	1.03	\$0.043
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.02	\$0.042
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.01	12	1.04	\$0.044
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.01	12	1.04	\$0.043
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.01	12	1.21	\$0.028
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.02	\$0.01	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.04	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.06	\$0.01	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.02	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.02	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.03	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.02	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.09	\$0.00	12	1.32	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.06	\$0.01	12	1.20	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.07	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.05	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.03	\$0.00	6	1.08	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.01	\$0.01	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.03	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.00	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.00	\$0.00	15	0.93	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-28 Energy Efficiency Equipment Data, Natural Gas— School, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.02	20	1.03	\$0.174
Heating	Furnace	EF .83	0.01	\$0.04	20	1.03	\$0.280
Heating	Furnace	EF .90	0.02	\$0.07	20	1.06	\$0.256
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.03	\$0.04	25	1.00	\$0.083
Heating	Boiler	EF .82	0.05	\$0.13	25	1.01	\$0.181
Heating	Boiler	EF .85	0.09	\$0.27	25	1.04	\$0.205
Heating	Boiler	EF .96	0.12	\$1.09	25	0.91	\$0.619
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.34	15	0.67	\$4.023
Heating	Other Heating	AFUE .76	0.01	\$0.66	15	0.50	\$6.322
Heating	Other Heating	AFUE .77	0.01	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.02	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.01	12	1.02	\$0.202
Water Heating	Water Heater	EF 0.94	0.04	\$0.03	12	1.16	\$0.091
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.00	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.01	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.07	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.08	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-29 Energy Efficiency Equipment Data, Electric— School, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.30	\$0.25	20	1.04	\$0.063
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.36	\$0.32	20	1.04	\$0.068
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.75	\$0.40	20	1.18	\$0.040
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.80	\$0.47	20	1.17	\$0.045
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.43	\$0.08	20	1.15	\$0.015
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.48	\$0.17	20	1.15	\$0.026
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.57	\$0.20	20	1.18	\$0.027
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.68	\$0.31	20	1.19	\$0.035
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.71	\$0.35	20	1.20	\$0.037
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.77	\$0.38	20	1.21	\$0.038
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.20	\$0.23	16	-	\$0.103
Cooling	Roof top AC	EER 11.2	0.40	\$0.45	16	1.00	\$0.099
Cooling	Roof top AC	EER 12.0	0.52	\$0.86	16	0.94	\$0.146
Cooling	Roof top AC	Ductless Minisplit	0.78	\$2.84	16	0.68	\$0.319
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.34	\$0.13	16	-	\$0.034
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.53	\$0.19	16	1.00	\$0.031
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.70	\$0.49	16	0.90	\$0.061
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	0.76	\$0.64	16	0.86	\$0.073
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.13	\$1.22	16	0.73	\$0.094
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.53	\$0.54	16	0.93	\$0.090
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.97	\$1.08	16	0.87	\$0.098
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.36	\$1.43	16	0.89	\$0.053
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.06	\$0.03	14	1.02	\$0.041
Cooling	Other Cooling	EER 10.8	0.15	\$0.30	14	0.94	\$0.195
Cooling	Other Cooling	EER 11	0.17	\$0.32	14	0.94	\$0.176
Cooling	Other Cooling	EER 11.5	0.23	\$0.36	14	0.95	\$0.147
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.96	-\$0.21	10	1.09	-\$0.027
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.023
Water Heating	Water Heater	EF 2.0	0.39	\$0.00	15	2.00	\$0.001
Water Heating	Water Heater	EF 2.3	0.43	\$0.01	15	2.26	\$0.001
Water Heating	Water Heater	EF 2.4	0.45	\$0.01	15	2.35	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.21	\$0.08	3	-	\$0.022
Int. Lighting	Screw-in	70W HIR PAR-38	1.87	\$0.11	3	-	\$0.020
Int. Lighting	Screw-in	CFL	3.49	\$0.06	6	3.49	\$0.003
Int. Lighting	Screw-in	LED (2010)	3.78	\$1.63	20	1.54	\$0.033
Int. Lighting	Screw-in	LED (2020)	4.34	\$0.46	20	-	\$0.008
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.12	\$0.27	15	0.56	\$0.213

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.12	-\$0.01	10	2.11	-\$0.007
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.13	\$0.00	6	1.82	\$0.002
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.15	\$0.00	15	2.21	\$0.003
Int. Lighting	High-Bay Fixtures	T5	0.15	\$0.00	10	2.52	-\$0.004
Int. Lighting	High-Bay Fixtures	LED (2020)	0.23	\$0.07	15	-	\$0.029
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.38	\$2.22	15	0.33	\$0.540
Int. Lighting	Linear Fluorescent	T8	0.39	\$0.00	10	1.33	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.54	\$0.01	10	1.48	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.63	\$0.02	10	1.58	\$0.005
Int. Lighting	Linear Fluorescent	LED (2020)	1.14	\$0.62	15	-	\$0.049
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.02	\$0.00	3	-	\$0.022
Ext. Lighting	Screw-in	70W HIR PAR-38	0.04	\$0.00	3	-	\$0.020
Ext. Lighting	Screw-in	CFL	0.07	\$0.00	6	3.43	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.07	\$0.03	20	1.46	\$0.033
Ext. Lighting	Screw-in	LED (2020)	0.08	\$0.01	20	-	\$0.008
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.24	\$0.45	15	0.59	\$0.176
Ext. Lighting	HID	T8	0.24	-\$0.01	10	2.06	-\$0.006
Ext. Lighting	HID	High Pressure Sodium	0.26	\$0.00	6	1.82	\$0.002
Ext. Lighting	HID	Light Emitting Plasma	0.30	\$0.01	15	2.18	\$0.002
Ext. Lighting	HID	T5	0.31	-\$0.01	10	2.47	-\$0.003
Ext. Lighting	HID	LED (2020)	0.45	\$0.12	15	-	\$0.024
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.31	\$0.540
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.48	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.57	\$0.005
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.049
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.03	\$0.01	12	1.02	\$0.039
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.03	\$0.01	12	1.02	\$0.041
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.04	\$0.02	12	0.99	\$0.060
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.01	12	0.99	\$0.058
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.01	12	0.97	\$0.062
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.01	12	0.97	\$0.061
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.01	12	1.09	\$0.039
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.02	\$0.01	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.04	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.06	\$0.01	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.02	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.02	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.03	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.02	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.09	\$0.00	12	1.32	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.06	\$0.01	12	1.20	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.07	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.05	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.03	\$0.00	6	1.08	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.01	\$0.01	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.03	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.00	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.00	\$0.00	15	0.93	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-30 Energy Efficiency Equipment Data, Natural Gas— School, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.01	20	1.03	\$0.171
Heating	Furnace	EF .83	0.01	\$0.04	20	1.03	\$0.275
Heating	Furnace	EF .90	0.02	\$0.07	20	1.06	\$0.252
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.03	\$0.04	25	1.00	\$0.094
Heating	Boiler	EF .82	0.04	\$0.13	25	1.01	\$0.205
Heating	Boiler	EF .85	0.08	\$0.27	25	1.03	\$0.232
Heating	Boiler	EF .96	0.11	\$1.10	25	0.88	\$0.702
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.01	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.01	\$0.02	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.01	\$0.03	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.01	\$0.07	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.01	12	1.02	\$0.202
Water Heating	Water Heater	EF 0.94	0.04	\$0.03	12	1.16	\$0.091
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.00	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.01	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.07	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.08	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-31 Energy Efficiency Equipment Data, Electric—Health, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	1.17	\$0.63	20	1.03	\$0.041
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1.40	\$0.82	20	1.03	\$0.045
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2.92	\$1.01	20	1.16	\$0.026
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	3.09	\$1.20	20	1.15	\$0.029
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.64	\$0.22	20	1.14	\$0.010
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.86	\$0.44	20	1.14	\$0.018
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	2.19	\$0.53	20	1.16	\$0.018
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2.63	\$0.82	20	1.17	\$0.024
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2.74	\$0.91	20	1.17	\$0.025
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.96	\$0.99	20	1.19	\$0.026
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.76	\$0.37	16	-	\$0.043
Cooling	Roof top AC	EER 11.2	1.52	\$0.72	16	1.00	\$0.042
Cooling	Roof top AC	EER 12.0	1.98	\$1.38	16	0.96	\$0.061
Cooling	Roof top AC	Ductless Minisplit	2.98	\$4.54	16	0.74	\$0.133
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	1.35	\$0.40	16	-	\$0.026
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	2.14	\$0.58	16	1.00	\$0.024
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	2.82	\$1.49	16	0.92	\$0.046
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	3.08	\$1.94	16	0.88	\$0.055
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	4.59	\$3.72	16	0.76	\$0.071
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.72	\$1.49	16	0.95	\$0.076
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.93	\$2.97	16	0.89	\$0.135
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	6.93	\$3.92	16	0.93	\$0.049
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.23	\$0.09	14	1.01	\$0.038
Cooling	Other Cooling	EER 10.8	0.55	\$1.04	14	0.89	\$0.182
Cooling	Other Cooling	EER 11	0.65	\$1.10	14	0.89	\$0.163
Cooling	Other Cooling	EER 11.5	0.88	\$1.25	14	0.89	\$0.137
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	3.98	-\$1.24	10	1.08	-\$0.038
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.03	\$0.00	15	1.01	\$0.012
Water Heating	Water Heater	EF 2.0	1.52	\$0.01	15	2.03	\$0.000
Water Heating	Water Heater	EF 2.3	1.71	\$0.01	15	2.31	\$0.001
Water Heating	Water Heater	EF 2.4	1.76	\$0.01	15	2.41	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.18	\$0.03	3	-	\$0.010
Int. Lighting	Screw-in	70W HIR PAR-38	1.82	\$0.05	3	-	\$0.009
Int. Lighting	Screw-in	CFL	3.40	\$0.03	6	3.89	\$0.002
Int. Lighting	Screw-in	LED (2010)	3.68	\$0.73	20	2.61	\$0.015
Int. Lighting	Screw-in	LED (2020)	4.23	\$0.21	20	-	\$0.004
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.02	\$0.02	15	0.85	\$0.098

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.02	\$0.00	10	1.93	-\$0.003
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.02	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.02	\$0.00	15	2.18	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.02	\$0.00	10	2.38	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.03	\$0.00	15	-	\$0.013
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	1.11	\$3.02	15	0.56	\$0.248
Int. Lighting	Linear Fluorescent	T8	1.16	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.61	\$0.02	10	1.52	\$0.002
Int. Lighting	Linear Fluorescent	T5	1.86	\$0.03	10	1.65	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	3.40	\$0.84	15	-	\$0.023
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.01	\$0.00	3	-	\$0.010
Ext. Lighting	Screw-in	70W HIR PAR-38	0.02	\$0.00	3	-	\$0.009
Ext. Lighting	Screw-in	CFL	0.04	\$0.00	6	3.80	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.04	\$0.01	20	2.41	\$0.015
Ext. Lighting	Screw-in	LED (2020)	0.05	\$0.00	20	-	\$0.004
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.24	\$0.21	15	0.87	\$0.081
Ext. Lighting	HID	T8	0.25	-\$0.01	10	1.89	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	0.26	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.31	\$0.00	15	2.14	\$0.001
Ext. Lighting	HID	T5	0.31	\$0.00	10	2.34	-\$0.001
Ext. Lighting	HID	LED (2020)	0.46	\$0.06	15	-	\$0.011
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.53	\$0.248
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.52	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.64	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.023
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.04	\$0.01	12	1.03	\$0.037
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.05	\$0.02	12	1.03	\$0.039
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.06	\$0.03	12	0.99	\$0.057
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.00	\$0.056
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.01	\$0.01	12	0.98	\$0.059
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.01	12	0.98	\$0.058
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.01	12	1.11	\$0.037
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	\$0.02	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.07	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.08	\$0.02	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.02	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.01	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	\$0.02	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.03	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.04	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.08	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.05	\$0.01	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.42	\$0.02	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.28	\$0.06	12	1.23	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.18	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.03	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.04	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.02	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.06	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.06	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.01	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.01	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.02	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.02	\$0.01	15	0.96	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-32 Energy Efficiency Equipment Data, Natural Gas— Health, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.03	\$0.05	20	1.03	\$0.151
Heating	Furnace	EF .83	0.05	\$0.14	20	1.03	\$0.242
Heating	Furnace	EF .90	0.08	\$0.24	20	1.07	\$0.222
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.06	\$0.05	25	1.00	\$0.052
Heating	Boiler	EF .82	0.11	\$0.18	25	1.02	\$0.113
Heating	Boiler	EF .85	0.20	\$0.38	25	1.06	\$0.128
Heating	Boiler	EF .96	0.26	\$1.52	25	0.99	\$0.386
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.03	\$0.50	15	0.87	\$1.504
Heating	Other Heating	AFUE .76	0.04	\$0.50	15	0.88	\$1.214
Heating	Other Heating	AFUE .77	0.04	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.06	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.03	\$0.06	12	1.02	\$0.224
Water Heating	Water Heater	EF 0.94	0.15	\$0.14	12	1.15	\$0.101
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.02	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.01	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.02	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.04	\$0.02	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.02	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.03	\$0.37	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.04	\$0.42	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-33 Energy Efficiency Equipment Data, Electric— Health, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	1.03	\$0.49	20	1.04	\$0.036
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1.24	\$0.64	20	1.05	\$0.039
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2.58	\$0.78	20	1.19	\$0.023
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.74	\$0.93	20	1.18	\$0.026
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.41	\$0.17	20	1.15	\$0.009
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.60	\$0.35	20	1.15	\$0.017
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.89	\$0.42	20	1.17	\$0.017
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2.26	\$0.65	20	1.19	\$0.022
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2.36	\$0.72	20	1.19	\$0.023
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.55	\$0.79	20	1.20	\$0.024
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.70	\$0.25	16	-	\$0.031
Cooling	Roof top AC	EER 11.2	1.40	\$0.48	16	1.00	\$0.030
Cooling	Roof top AC	EER 12.0	1.84	\$0.93	16	0.98	\$0.044
Cooling	Roof top AC	Ductless Minisplit	2.76	\$3.05	16	0.80	\$0.097
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.95	\$0.28	16	-	\$0.026
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.55	\$0.41	16	1.00	\$0.023
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	2.11	\$1.05	16	0.93	\$0.044
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	2.33	\$1.37	16	0.90	\$0.051
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	3.83	\$2.62	16	0.81	\$0.060
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.64	\$1.23	16	0.95	\$0.066
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	2.99	\$2.47	16	0.90	\$0.072
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	7.31	\$3.25	16	0.94	\$0.039
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.22	\$0.09	14	1.01	\$0.041
Cooling	Other Cooling	EER 10.8	0.53	\$1.08	14	0.88	\$0.195
Cooling	Other Cooling	EER 11	0.62	\$1.14	14	0.88	\$0.176
Cooling	Other Cooling	EER 11.5	0.84	\$1.30	14	0.88	\$0.147
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	3.99	-\$1.24	10	1.08	-\$0.038
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.03	\$0.00	15	1.01	\$0.012
Water Heating	Water Heater	EF 2.0	1.36	\$0.01	15	2.03	\$0.000
Water Heating	Water Heater	EF 2.3	1.53	\$0.01	15	2.31	\$0.001
Water Heating	Water Heater	EF 2.4	1.57	\$0.01	15	2.41	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.18	\$0.03	3	-	\$0.010
Int. Lighting	Screw-in	70W HIR PAR-38	1.82	\$0.05	3	-	\$0.009
Int. Lighting	Screw-in	CFL	3.40	\$0.03	6	3.89	\$0.002
Int. Lighting	Screw-in	LED (2010)	3.68	\$0.73	20	2.61	\$0.015
Int. Lighting	Screw-in	LED (2020)	4.23	\$0.21	20	-	\$0.004
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.02	\$0.02	15	0.85	\$0.098

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.02	\$0.00	10	1.93	-\$0.003
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.02	\$0.00	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.02	\$0.00	15	2.18	\$0.001
Int. Lighting	High-Bay Fixtures	T5	0.02	\$0.00	10	2.38	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	0.03	\$0.00	15	-	\$0.013
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	1.11	\$3.02	15	0.56	\$0.248
Int. Lighting	Linear Fluorescent	T8	1.16	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	1.61	\$0.02	10	1.52	\$0.002
Int. Lighting	Linear Fluorescent	T5	1.86	\$0.03	10	1.65	\$0.002
Int. Lighting	Linear Fluorescent	LED (2020)	3.40	\$0.84	15	-	\$0.023
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.01	\$0.00	3	-	\$0.010
Ext. Lighting	Screw-in	70W HIR PAR-38	0.02	\$0.00	3	-	\$0.009
Ext. Lighting	Screw-in	CFL	0.04	\$0.00	6	3.80	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.04	\$0.01	20	2.41	\$0.015
Ext. Lighting	Screw-in	LED (2020)	0.05	\$0.00	20	-	\$0.004
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.24	\$0.21	15	0.87	\$0.081
Ext. Lighting	HID	T8	0.25	-\$0.01	10	1.89	-\$0.003
Ext. Lighting	HID	High Pressure Sodium	0.26	\$0.00	6	1.84	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.31	\$0.00	15	2.14	\$0.001
Ext. Lighting	HID	T5	0.31	\$0.00	10	2.34	-\$0.001
Ext. Lighting	HID	LED (2020)	0.46	\$0.06	15	-	\$0.011
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.53	\$0.248
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.52	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.64	\$0.002
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.023
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.04	\$0.02	12	1.01	\$0.048
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.05	\$0.02	12	1.00	\$0.050
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.06	\$0.04	12	0.96	\$0.074
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.01	12	0.97	\$0.072
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.01	\$0.01	12	0.93	\$0.076
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.01	12	0.93	\$0.075
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.01	12	1.03	\$0.049
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	\$0.02	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.07	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.08	\$0.02	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.01	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.02	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.01	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	\$0.02	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.03	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.04	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.08	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.05	\$0.01	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.42	\$0.02	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.28	\$0.06	12	1.23	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.18	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.03	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.04	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.02	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.06	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.06	\$0.03	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.01	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.01	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.02	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.02	\$0.01	15	0.96	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-34 Energy Efficiency Equipment Data, Natural Gas— Health, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.03	\$0.08	20	1.02	\$0.222
Heating	Furnace	EF .83	0.04	\$0.20	20	1.01	\$0.355
Heating	Furnace	EF .90	0.08	\$0.34	20	1.03	\$0.326
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.06	\$0.09	25	1.00	\$0.108
Heating	Boiler	EF .82	0.09	\$0.32	25	1.00	\$0.234
Heating	Boiler	EF .85	0.17	\$0.68	25	1.02	\$0.265
Heating	Boiler	EF .96	0.23	\$2.73	25	0.86	\$0.800
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.03	\$0.06	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.03	\$0.08	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.04	\$0.13	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.06	\$0.26	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.03	\$0.04	12	1.02	\$0.140
Water Heating	Water Heater	EF 0.94	0.14	\$0.08	12	1.18	\$0.063
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.02	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.01	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.02	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.04	\$0.02	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.02	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.03	\$0.37	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.04	\$0.42	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-35 Energy Efficiency Equipment Data, Electric—Lodging, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.27	\$0.10	20	1.07	\$0.028
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.32	\$0.13	20	1.08	\$0.030
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.67	\$0.16	20	1.25	\$0.018
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.71	\$0.19	20	1.26	\$0.020
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.36	\$0.04	20	1.17	\$0.008
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.41	\$0.08	20	1.17	\$0.014
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.48	\$0.09	20	1.21	\$0.014
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.57	\$0.14	20	1.23	\$0.019
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.60	\$0.16	20	1.24	\$0.020
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.65	\$0.17	20	1.26	\$0.020
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.10	\$0.05	16	-	\$0.041
Cooling	Roof top AC	EER 11.2	0.20	\$0.09	16	1.00	\$0.040
Cooling	Roof top AC	EER 12.0	0.26	\$0.17	16	0.99	\$0.058
Cooling	Roof top AC	Ductless Minisplit	0.39	\$0.56	16	0.89	\$0.127
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.19	\$0.06	16	-	\$0.030
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.30	\$0.09	16	1.00	\$0.027
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.39	\$0.24	16	0.94	\$0.053
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	0.43	\$0.31	16	0.91	\$0.064
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	0.63	\$0.60	16	0.82	\$0.083
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.65	\$0.11	16	1.03	\$0.015
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.58	\$0.22	16	1.05	\$0.033
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.53	\$0.29	16	1.29	\$0.010
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.11	\$0.04	14	1.01	\$0.038
Cooling	Other Cooling	EER 10.8	0.25	\$0.48	14	0.90	\$0.182
Cooling	Other Cooling	EER 11	0.30	\$0.51	14	0.90	\$0.163
Cooling	Other Cooling	EER 11.5	0.40	\$0.58	14	0.90	\$0.137
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.86	-\$0.21	10	1.09	-\$0.030
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.04	\$0.01	15	1.00	\$0.035
Water Heating	Water Heater	EF 2.0	1.86	\$0.03	15	1.97	\$0.001
Water Heating	Water Heater	EF 2.3	2.09	\$0.04	15	2.21	\$0.002
Water Heating	Water Heater	EF 2.4	2.15	\$0.04	15	2.29	\$0.002
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.98	\$0.10	3	-	\$0.017
Int. Lighting	Screw-in	70W HIR PAR-38	3.04	\$0.13	3	-	\$0.015
Int. Lighting	Screw-in	CFL	5.69	\$0.08	6	3.66	\$0.003
Int. Lighting	Screw-in	LED (2010)	6.16	\$2.05	20	1.88	\$0.025
Int. Lighting	Screw-in	LED (2020)	7.07	\$0.58	20	-	\$0.006
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.03	\$0.06	15	0.65	\$0.164

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.03	\$0.00	10	2.03	-\$0.006
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.04	\$0.00	6	1.84	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.04	\$0.00	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.04	\$0.00	10	2.46	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	0.06	\$0.02	15	-	\$0.022
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.13	\$0.60	15	0.40	\$0.417
Int. Lighting	Linear Fluorescent	T8	0.14	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.19	\$0.00	10	1.50	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.22	\$0.01	10	1.61	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	0.40	\$0.17	15	-	\$0.038
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.09	\$0.00	3	-	\$0.017
Ext. Lighting	Screw-in	70W HIR PAR-38	0.14	\$0.01	3	-	\$0.015
Ext. Lighting	Screw-in	CFL	0.27	\$0.00	6	3.57	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.29	\$0.10	20	1.75	\$0.025
Ext. Lighting	Screw-in	LED (2020)	0.34	\$0.03	20	-	\$0.006
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.21	\$0.32	15	0.68	\$0.136
Ext. Lighting	HID	T8	0.22	-\$0.01	10	1.99	-\$0.005
Ext. Lighting	HID	High Pressure Sodium	0.23	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.27	\$0.00	15	2.16	\$0.002
Ext. Lighting	HID	T5	0.28	-\$0.01	10	2.41	-\$0.002
Ext. Lighting	HID	LED (2020)	0.41	\$0.08	15	-	\$0.018
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.38	\$0.417
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.49	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.60	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.038
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.05	\$0.01	12	1.06	\$0.025
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.07	\$0.02	12	1.07	\$0.026
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.08	\$0.03	12	1.05	\$0.038
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.04	\$0.037
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.01	12	1.06	\$0.040
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.01	12	1.07	\$0.039
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.04	\$0.01	12	1.25	\$0.025
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.04	\$0.03	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.10	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.12	\$0.03	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.02	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.02	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.03	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.02	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.04	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.06	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.04	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.02	\$0.01	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.19	\$0.01	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.13	\$0.03	12	1.23	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.02	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.00	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.01	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.00	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.00	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.00	\$0.00	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.02	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.02	\$0.01	15	0.96	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-36 Energy Efficiency Equipment Data, Natural Gas— Lodging, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.01	20	1.04	\$0.100
Heating	Furnace	EF .83	0.02	\$0.03	20	1.05	\$0.160
Heating	Furnace	EF .90	0.03	\$0.06	20	1.10	\$0.146
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.02	\$0.02	25	1.00	\$0.070
Heating	Boiler	EF .82	0.03	\$0.08	25	1.01	\$0.152
Heating	Boiler	EF .85	0.06	\$0.16	25	1.05	\$0.172
Heating	Boiler	EF .96	0.08	\$0.64	25	0.94	\$0.519
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.27	15	0.91	\$1.133
Heating	Other Heating	AFUE .76	0.03	\$0.73	15	0.74	\$2.494
Heating	Other Heating	AFUE .77	0.03	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.05	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.02	\$0.05	12	1.01	\$0.307
Water Heating	Water Heater	EF 0.94	0.08	\$0.10	12	1.13	\$0.138
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.10	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.11	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-37 Energy Efficiency Equipment Data, Electric— Lodging, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.25	\$0.09	20	1.07	\$0.028
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.30	\$0.12	20	1.08	\$0.030
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.62	\$0.14	20	1.26	\$0.018
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.65	\$0.17	20	1.26	\$0.020
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.31	\$0.03	20	1.17	\$0.008
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.35	\$0.06	20	1.17	\$0.014
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.41	\$0.08	20	1.21	\$0.014
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.49	\$0.12	20	1.23	\$0.019
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.51	\$0.13	20	1.24	\$0.020
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.55	\$0.14	20	1.26	\$0.020
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.09	\$0.04	16	-	\$0.038
Cooling	Roof top AC	EER 11.2	0.18	\$0.08	16	1.00	\$0.036
Cooling	Roof top AC	EER 12.0	0.24	\$0.14	16	0.99	\$0.054
Cooling	Roof top AC	Ductless Minisplit	0.36	\$0.47	16	0.90	\$0.117
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.18	\$0.09	16	-	\$0.046
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.28	\$0.13	16	1.00	\$0.042
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.37	\$0.34	16	0.91	\$0.082
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	0.40	\$0.45	16	0.88	\$0.097
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	0.59	\$0.86	16	0.75	\$0.128
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.57	\$0.12	16	1.01	\$0.018
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.04	\$0.24	16	1.02	\$0.020
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.54	\$0.32	16	1.20	\$0.011
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.10	\$0.04	14	1.01	\$0.041
Cooling	Other Cooling	EER 10.8	0.24	\$0.50	14	0.89	\$0.195
Cooling	Other Cooling	EER 11	0.29	\$0.53	14	0.89	\$0.176
Cooling	Other Cooling	EER 11.5	0.39	\$0.60	14	0.89	\$0.147
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.97	-\$0.24	10	1.09	-\$0.031
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.03	\$0.01	15	1.00	\$0.035
Water Heating	Water Heater	EF 2.0	1.75	\$0.03	15	1.97	\$0.001
Water Heating	Water Heater	EF 2.3	1.96	\$0.04	15	2.21	\$0.002
Water Heating	Water Heater	EF 2.4	2.02	\$0.04	15	2.29	\$0.002
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	1.98	\$0.10	3	-	\$0.017
Int. Lighting	Screw-in	70W HIR PAR-38	3.04	\$0.13	3	-	\$0.015
Int. Lighting	Screw-in	CFL	5.69	\$0.08	6	3.66	\$0.003
Int. Lighting	Screw-in	LED (2010)	6.16	\$2.05	20	1.88	\$0.025
Int. Lighting	Screw-in	LED (2020)	7.07	\$0.58	20	-	\$0.006
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	0.03	\$0.06	15	0.65	\$0.164

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	0.03	\$0.00	10	2.03	-\$0.006
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.04	\$0.00	6	1.84	\$0.001
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.04	\$0.00	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.04	\$0.00	10	2.46	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	0.06	\$0.02	15	-	\$0.022
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.13	\$0.60	15	0.40	\$0.417
Int. Lighting	Linear Fluorescent	T8	0.14	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.19	\$0.00	10	1.50	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.22	\$0.01	10	1.61	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	0.40	\$0.17	15	-	\$0.038
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.09	\$0.00	3	-	\$0.017
Ext. Lighting	Screw-in	70W HIR PAR-38	0.14	\$0.01	3	-	\$0.015
Ext. Lighting	Screw-in	CFL	0.27	\$0.00	6	3.57	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.29	\$0.10	20	1.75	\$0.025
Ext. Lighting	Screw-in	LED (2020)	0.34	\$0.03	20	-	\$0.006
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.21	\$0.32	15	0.68	\$0.136
Ext. Lighting	HID	T8	0.22	-\$0.01	10	1.99	-\$0.005
Ext. Lighting	HID	High Pressure Sodium	0.23	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.27	\$0.00	15	2.16	\$0.002
Ext. Lighting	HID	T5	0.28	-\$0.01	10	2.41	-\$0.002
Ext. Lighting	HID	LED (2020)	0.41	\$0.08	15	-	\$0.018
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.00	15	0.38	\$0.417
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.49	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.60	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.038
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.05	\$0.02	12	1.04	\$0.030
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.07	\$0.02	12	1.05	\$0.031
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.08	\$0.03	12	1.02	\$0.046
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.02	\$0.045
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.01	12	1.02	\$0.047
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.01	12	1.03	\$0.047
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.04	\$0.01	12	1.18	\$0.030
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.04	\$0.03	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.10	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.12	\$0.03	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.02	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.02	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.03	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.02	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.04	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.06	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.04	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.02	\$0.01	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.19	\$0.01	12	1.33	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.13	\$0.03	12	1.23	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.02	\$0.00	5	1.04	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.00	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.01	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.00	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.00	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.00	\$0.00	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.02	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.02	\$0.01	15	0.96	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-38 Energy Efficiency Equipment Data, Natural Gas— Lodging, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.01	20	1.04	\$0.079
Heating	Furnace	EF .83	0.01	\$0.02	20	1.06	\$0.127
Heating	Furnace	EF .90	0.03	\$0.04	20	1.12	\$0.116
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.02	\$0.02	25	1.00	\$0.081
Heating	Boiler	EF .82	0.03	\$0.08	25	1.01	\$0.176
Heating	Boiler	EF .85	0.05	\$0.16	25	1.04	\$0.199
Heating	Boiler	EF .96	0.07	\$0.64	25	0.91	\$0.601
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.04	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.02	\$0.06	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.03	\$0.09	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.04	\$0.18	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.02	\$0.04	12	1.01	\$0.307
Water Heating	Water Heater	EF 0.94	0.07	\$0.10	12	1.13	\$0.138
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.01	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.01	\$0.10	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.11	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-39 Energy Efficiency Equipment Data, Electric—Warehouse, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.49	\$0.19	20	1.12	\$0.030
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.59	\$0.25	20	1.15	\$0.032
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.23	\$0.31	20	1.40	\$0.019
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.30	\$0.36	20	1.42	\$0.021
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.62	\$0.07	20	1.22	\$0.008
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.70	\$0.13	20	1.24	\$0.014
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.83	\$0.16	20	1.30	\$0.015
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.99	\$0.25	20	1.37	\$0.019
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.03	\$0.27	20	1.39	\$0.020
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.12	\$0.30	20	1.43	\$0.020
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.35	\$0.21	16	-	\$0.053
Cooling	Roof top AC	EER 11.2	0.71	\$0.41	16	1.00	\$0.050
Cooling	Roof top AC	EER 12.0	0.93	\$0.78	16	1.02	\$0.074
Cooling	Roof top AC	Ductless Minisplit	1.39	\$2.57	16	0.95	\$0.162
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.52	\$0.44	16	-	\$0.074
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.83	\$0.64	16	1.00	\$0.068
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.09	\$1.64	16	0.89	\$0.132
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.19	\$2.14	16	0.85	\$0.157
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.76	\$4.10	16	0.71	\$0.204
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1.04	\$1.10	16	0.95	\$0.093
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.41	\$2.21	16	0.89	\$0.137
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	4.36	\$2.91	16	0.92	\$0.058
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.11	\$0.04	14	1.03	\$0.038
Cooling	Other Cooling	EER 10.8	0.26	\$0.48	14	1.02	\$0.182
Cooling	Other Cooling	EER 11	0.30	\$0.51	14	1.03	\$0.163
Cooling	Other Cooling	EER 11.5	0.41	\$0.58	14	1.06	\$0.137
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.30	-\$0.14	10	1.06	-\$0.056
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.00	\$0.00	15	1.01	\$0.017
Water Heating	Water Heater	EF 2.0	0.15	\$0.00	15	2.02	\$0.001
Water Heating	Water Heater	EF 2.3	0.17	\$0.00	15	2.30	\$0.001
Water Heating	Water Heater	EF 2.4	0.18	\$0.00	15	2.39	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.34	\$0.02	3	-	\$0.019
Int. Lighting	Screw-in	70W HIR PAR-38	0.53	\$0.03	3	-	\$0.017
Int. Lighting	Screw-in	CFL	0.99	\$0.02	6	3.69	\$0.003
Int. Lighting	Screw-in	LED (2010)	1.07	\$0.40	20	1.89	\$0.029
Int. Lighting	Screw-in	LED (2020)	1.23	\$0.11	20	-	\$0.007
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	1.03	\$2.08	15	0.65	\$0.185

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	1.05	-\$0.06	10	2.06	-\$0.007
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	1.11	\$0.01	6	1.85	\$0.002
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	1.30	\$0.03	15	2.23	\$0.002
Int. Lighting	High-Bay Fixtures	T5	1.34	-\$0.03	10	2.49	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	1.96	\$0.54	15	-	\$0.025
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.17	\$0.88	15	0.39	\$0.471
Int. Lighting	Linear Fluorescent	T8	0.18	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.25	\$0.01	10	1.50	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.29	\$0.01	10	1.60	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	0.52	\$0.24	15	-	\$0.043
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.00	\$0.00	3	-	\$0.019
Ext. Lighting	Screw-in	70W HIR PAR-38	0.00	\$0.00	3	-	\$0.017
Ext. Lighting	Screw-in	CFL	0.00	\$0.00	6	3.51	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.00	\$0.00	20	1.61	\$0.029
Ext. Lighting	Screw-in	LED (2020)	0.00	\$0.00	20	-	\$0.007
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.41	\$0.69	15	0.64	\$0.153
Ext. Lighting	HID	T8	0.42	-\$0.02	10	2.02	-\$0.005
Ext. Lighting	HID	High Pressure Sodium	0.44	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.52	\$0.01	15	2.17	\$0.002
Ext. Lighting	HID	T5	0.53	-\$0.01	10	2.44	-\$0.003
Ext. Lighting	HID	LED (2020)	0.78	\$0.18	15	-	\$0.021
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.01	15	0.35	\$0.471
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.49	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.59	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.043
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	8400 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	4330 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.15	\$0.07	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.21	\$0.10	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.31	\$0.36	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.16	\$0.02	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.41	\$0.04	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.70	\$0.12	10	1.17	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.04	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	-	\$0.00	12	1.00	\$0.000
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.14	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.02	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.13	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.02	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.02	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.04	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-40 Energy Efficiency Equipment Data, Natural Gas— Warehouse, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.02	\$0.06	20	1.02	\$0.207
Heating	Furnace	EF .83	0.04	\$0.17	20	1.02	\$0.331
Heating	Furnace	EF .90	0.07	\$0.29	20	1.04	\$0.303
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.04	\$0.04	25	1.00	\$0.065
Heating	Boiler	EF .82	0.07	\$0.15	25	1.01	\$0.140
Heating	Boiler	EF .85	0.14	\$0.32	25	1.05	\$0.159
Heating	Boiler	EF .96	0.18	\$1.31	25	0.95	\$0.480
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.03	\$0.50	15	0.85	\$1.702
Heating	Other Heating	AFUE .76	0.03	\$0.50	15	0.86	\$1.380
Heating	Other Heating	AFUE .77	0.04	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.06	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.00	\$0.00	12	1.03	\$0.134
Water Heating	Water Heater	EF 0.94	0.01	\$0.01	12	1.18	\$0.060
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	-	\$0.00	12	1.00	\$0.000
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.00	\$0.05	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.06	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-41 Energy Efficiency Equipment Data, Electric— Warehouse, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.43	\$0.22	20	1.11	\$0.039
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.51	\$0.28	20	1.13	\$0.042
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.07	\$0.35	20	1.37	\$0.025
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.13	\$0.41	20	1.39	\$0.028
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.59	\$0.08	20	1.21	\$0.011
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.66	\$0.16	20	1.23	\$0.019
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.78	\$0.20	20	1.28	\$0.019
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.94	\$0.30	20	1.34	\$0.025
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.98	\$0.34	20	1.36	\$0.026
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.06	\$0.37	20	1.40	\$0.027
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.34	\$0.19	16	-	\$0.050
Cooling	Roof top AC	EER 11.2	0.67	\$0.37	16	1.00	\$0.048
Cooling	Roof top AC	EER 12.0	0.88	\$0.71	16	1.02	\$0.070
Cooling	Roof top AC	Ductless Minisplit	1.32	\$2.32	16	0.96	\$0.154
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.71	\$0.45	16	-	\$0.056
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1.16	\$0.65	16	1.00	\$0.049
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	1.59	\$1.67	16	0.90	\$0.092
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	1.76	\$2.19	16	0.85	\$0.109
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	2.88	\$4.19	16	0.73	\$0.127
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.89	\$1.51	16	0.92	\$0.149
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	1.62	\$3.02	16	0.85	\$0.163
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	3.97	\$3.99	16	0.86	\$0.088
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.10	\$0.04	14	1.03	\$0.041
Cooling	Other Cooling	EER 10.8	0.25	\$0.50	14	1.01	\$0.195
Cooling	Other Cooling	EER 11	0.29	\$0.53	14	1.02	\$0.176
Cooling	Other Cooling	EER 11.5	0.39	\$0.61	14	1.05	\$0.147
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.34	-\$0.16	10	1.06	-\$0.059
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.00	\$0.00	15	1.01	\$0.017
Water Heating	Water Heater	EF 2.0	0.14	\$0.00	15	2.02	\$0.001
Water Heating	Water Heater	EF 2.3	0.16	\$0.00	15	2.30	\$0.001
Water Heating	Water Heater	EF 2.4	0.17	\$0.00	15	2.39	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.34	\$0.02	3	-	\$0.019
Int. Lighting	Screw-in	70W HIR PAR-38	0.53	\$0.03	3	-	\$0.017
Int. Lighting	Screw-in	CFL	0.99	\$0.02	6	3.69	\$0.003
Int. Lighting	Screw-in	LED (2010)	1.07	\$0.40	20	1.89	\$0.029
Int. Lighting	Screw-in	LED (2020)	1.23	\$0.11	20	-	\$0.007
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	1.03	\$2.08	15	0.65	\$0.185

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	T8	1.05	-\$0.06	10	2.06	-\$0.007
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	1.11	\$0.01	6	1.85	\$0.002
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	1.30	\$0.03	15	2.23	\$0.002
Int. Lighting	High-Bay Fixtures	T5	1.34	-\$0.03	10	2.49	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	1.96	\$0.54	15	-	\$0.025
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.17	\$0.88	15	0.39	\$0.471
Int. Lighting	Linear Fluorescent	T8	0.18	\$0.00	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.25	\$0.01	10	1.50	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.29	\$0.01	10	1.60	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	0.52	\$0.24	15	-	\$0.043
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.00	\$0.00	3	-	\$0.019
Ext. Lighting	Screw-in	70W HIR PAR-38	0.00	\$0.00	3	-	\$0.017
Ext. Lighting	Screw-in	CFL	0.00	\$0.00	6	3.51	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.00	\$0.00	20	1.61	\$0.029
Ext. Lighting	Screw-in	LED (2020)	0.00	\$0.00	20	-	\$0.007
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.41	\$0.69	15	0.64	\$0.153
Ext. Lighting	HID	T8	0.42	-\$0.02	10	2.02	-\$0.005
Ext. Lighting	HID	High Pressure Sodium	0.44	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.52	\$0.01	15	2.17	\$0.002
Ext. Lighting	HID	T5	0.53	-\$0.01	10	2.44	-\$0.003
Ext. Lighting	HID	LED (2020)	0.78	\$0.18	15	-	\$0.021
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.00	\$0.01	15	0.35	\$0.471
Ext. Lighting	Linear Fluorescent	T8	0.00	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.00	\$0.00	10	1.49	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.00	\$0.00	10	1.59	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.00	\$0.00	15	-	\$0.043
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	8400 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	4330 kWh/yr	-	\$0.00	18	1.00	\$0.000
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.15	\$0.07	10	1.00	\$0.053
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.21	\$0.10	10	1.00	\$0.057

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.31	\$0.36	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.16	\$0.02	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.41	\$0.04	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.70	\$0.12	10	1.17	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.04	\$0.00	12	1.13	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	-	\$0.00	12	1.00	\$0.000
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.14	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.02	\$0.00	4	1.01	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.13	\$0.00	3	1.03	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.02	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.02	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.04	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency, Multi-Speed	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-42 Energy Efficiency Equipment Data, Natural Gas— Warehouse, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.02	\$0.06	20	1.02	\$0.212
Heating	Furnace	EF .83	0.04	\$0.17	20	1.02	\$0.340
Heating	Furnace	EF .90	0.07	\$0.29	20	1.04	\$0.312
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.04	\$0.03	25	1.00	\$0.057
Heating	Boiler	EF .82	0.07	\$0.12	25	1.02	\$0.123
Heating	Boiler	EF .85	0.12	\$0.25	25	1.06	\$0.140
Heating	Boiler	EF .96	0.16	\$1.01	25	0.97	\$0.422
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.02	\$0.05	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.03	\$0.07	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.04	\$0.11	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.05	\$0.23	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.00	\$0.00	12	1.03	\$0.134
Water Heating	Water Heater	EF 0.94	0.01	\$0.01	12	1.18	\$0.060
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	-	\$0.00	12	1.00	\$0.000
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.00	\$0.00	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.00	\$0.05	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.01	\$0.06	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-43 Energy Efficiency Equipment Data, Electric—Miscellaneous Commercial, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.37	\$0.11	20	1.10	\$0.022
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.45	\$0.14	20	1.12	\$0.024
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.94	\$0.17	20	1.33	\$0.014
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.99	\$0.20	20	1.35	\$0.016
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.47	\$0.04	20	1.20	\$0.006
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.53	\$0.07	20	1.21	\$0.010
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.62	\$0.09	20	1.26	\$0.011
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.75	\$0.14	20	1.31	\$0.014
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.78	\$0.15	20	1.33	\$0.015
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.84	\$0.16	20	1.36	\$0.015
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.30	\$0.11	16	-	\$0.033
Cooling	Roof top AC	EER 11.2	0.59	\$0.21	16	1.00	\$0.032
Cooling	Roof top AC	EER 12.0	0.77	\$0.41	16	1.00	\$0.046
Cooling	Roof top AC	Ductless Minisplit	1.16	\$1.34	16	0.87	\$0.101
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.35	\$0.84	16	-	\$0.211
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.55	\$1.21	16	1.00	\$0.193
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.72	\$3.09	16	0.83	\$0.377
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	0.78	\$4.04	16	0.77	\$0.451
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.14	\$7.73	16	0.59	\$0.591
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.58	\$2.07	16	0.90	\$0.315
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.64	\$4.13	16	0.81	\$0.566
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.32	\$5.45	16	0.78	\$0.206
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.09	\$0.01	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.21	\$0.15	14	1.03	\$0.065
Cooling	Other Cooling	EER 11	0.25	\$0.15	14	1.04	\$0.059
Cooling	Other Cooling	EER 11.5	0.34	\$0.18	14	1.07	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.47	-\$0.24	10	1.06	-\$0.063
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.017
Water Heating	Water Heater	EF 2.0	0.54	\$0.00	15	2.02	\$0.001
Water Heating	Water Heater	EF 2.3	0.61	\$0.01	15	2.30	\$0.001
Water Heating	Water Heater	EF 2.4	0.62	\$0.01	15	2.39	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.56	\$0.03	3	-	\$0.020
Int. Lighting	Screw-in	70W HIR PAR-38	0.85	\$0.04	3	-	\$0.018
Int. Lighting	Screw-in	CFL	1.60	\$0.03	6	3.62	\$0.003
Int. Lighting	Screw-in	LED (2010)	1.73	\$0.68	20	1.75	\$0.030
Int. Lighting	Screw-in	LED (2020)	1.99	\$0.19	20	-	\$0.007
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	LED (2010)	0.76	\$1.62	15	0.61	\$0.194
Int. Lighting	High-Bay Fixtures	T8	0.78	-\$0.04	10	2.08	-\$0.007
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.82	\$0.01	6	1.84	\$0.002
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.97	\$0.02	15	2.22	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.99	-\$0.03	10	2.49	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	1.45	\$0.42	15	-	\$0.026
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.18	\$0.96	15	0.37	\$0.493
Int. Lighting	Linear Fluorescent	T8	0.19	\$0.00	10	1.33	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.26	\$0.01	10	1.49	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.30	\$0.01	10	1.59	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	0.54	\$0.27	15	-	\$0.045
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.19	\$0.01	3	-	\$0.020
Ext. Lighting	Screw-in	70W HIR PAR-38	0.29	\$0.02	3	-	\$0.018
Ext. Lighting	Screw-in	CFL	0.54	\$0.01	6	3.48	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.59	\$0.23	20	1.56	\$0.030
Ext. Lighting	Screw-in	LED (2020)	0.68	\$0.07	20	-	\$0.007
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.29	\$0.50	15	0.62	\$0.161
Ext. Lighting	HID	T8	0.29	-\$0.01	10	2.03	-\$0.006
Ext. Lighting	HID	High Pressure Sodium	0.31	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.36	\$0.01	15	2.18	\$0.002
Ext. Lighting	HID	T5	0.37	-\$0.01	10	2.45	-\$0.003
Ext. Lighting	HID	LED (2020)	0.55	\$0.13	15	-	\$0.022
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.10	\$0.54	15	0.34	\$0.493
Ext. Lighting	Linear Fluorescent	T8	0.11	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.15	\$0.00	10	1.48	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.17	\$0.01	10	1.58	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.31	\$0.15	15	-	\$0.045
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.04	\$0.00	12	1.15	\$0.011
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.05	\$0.01	12	1.18	\$0.011
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.06	\$0.01	12	1.20	\$0.017
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.11	\$0.016
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.00	12	1.23	\$0.017
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.00	12	1.25	\$0.017
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.00	12	1.63	\$0.011
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.04	\$0.02	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.08	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.10	\$0.02	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.02	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.03	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.03	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.05	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.02	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.10	\$0.00	12	1.31	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.07	\$0.01	12	1.19	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.06	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.03	\$0.00	3	1.04	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.02	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.03	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.04	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.00	\$0.00	15	0.99	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-44 Energy Efficiency Equipment Data, Natural Gas— Miscellaneous Commercial, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
					(Years)		
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.16	20	0.96	\$1.130
Heating	Furnace	EF .83	0.02	\$0.42	20	0.89	\$1.815
Heating	Furnace	EF .90	0.03	\$0.71	20	0.83	\$1.654
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.09	\$0.13	25	1.00	\$0.091
Heating	Boiler	EF .82	0.16	\$0.46	25	1.01	\$0.199
Heating	Boiler	EF .85	0.29	\$0.96	25	1.03	\$0.225
Heating	Boiler	EF .96	0.38	\$3.88	25	0.89	\$0.680
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.28	15	0.81	\$2.150
Heating	Other Heating	AFUE .76	0.01	\$0.72	15	0.60	\$4.429
Heating	Other Heating	AFUE .77	0.02	\$0.00	15	1.09	\$0.000
Heating	Other Heating	AFUE .80	0.03	\$0.00	15	1.14	\$0.000
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.03	\$0.134
Water Heating	Water Heater	EF 0.94	0.07	\$0.04	12	1.18	\$0.060
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.03	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.04	\$0.48	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.05	\$0.55	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-45 Energy Efficiency Equipment Data, Electric— Miscellaneous Commercial, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.32	\$0.13	20	1.08	\$0.031
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.39	\$0.17	20	1.09	\$0.033
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.81	\$0.21	20	1.28	\$0.020
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.86	\$0.25	20	1.29	\$0.022
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.41	\$0.05	20	1.18	\$0.009
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.47	\$0.09	20	1.19	\$0.015
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.55	\$0.11	20	1.23	\$0.016
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.66	\$0.18	20	1.26	\$0.020
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.69	\$0.20	20	1.27	\$0.022
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.74	\$0.21	20	1.30	\$0.022
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	0.27	\$0.10	16	-	\$0.033
Cooling	Roof top AC	EER 11.2	0.54	\$0.20	16	1.00	\$0.032
Cooling	Roof top AC	EER 12.0	0.71	\$0.38	16	1.00	\$0.047
Cooling	Roof top AC	Ductless Minisplit	1.07	\$1.26	16	0.87	\$0.103
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	0.39	\$0.65	16	-	\$0.146
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	0.63	\$0.93	16	1.00	\$0.129
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	0.86	\$2.39	16	0.84	\$0.244
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	0.95	\$3.12	16	0.78	\$0.287
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	1.55	\$5.97	16	0.61	\$0.336
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.50	\$2.23	16	0.89	\$0.387
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.92	\$4.46	16	0.81	\$0.424
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	2.25	\$5.88	16	0.77	\$0.229
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	0.09	\$0.01	14	1.03	\$0.014
Cooling	Other Cooling	EER 10.8	0.21	\$0.14	14	1.03	\$0.065
Cooling	Other Cooling	EER 11	0.24	\$0.15	14	1.04	\$0.059
Cooling	Other Cooling	EER 11.5	0.33	\$0.17	14	1.07	\$0.049
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	0.24	-\$0.32	10	1.04	-\$0.162
Water Heating	Water Heater	EF .97	-	\$0.00	15	1.00	\$0.000
Water Heating	Water Heater	EF .98	0.01	\$0.00	15	1.01	\$0.017
Water Heating	Water Heater	EF 2.0	0.51	\$0.00	15	2.02	\$0.001
Water Heating	Water Heater	EF 2.3	0.58	\$0.01	15	2.30	\$0.001
Water Heating	Water Heater	EF 2.4	0.59	\$0.01	15	2.39	\$0.001
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	0.56	\$0.03	3	-	\$0.020
Int. Lighting	Screw-in	70W HIR PAR-38	0.85	\$0.04	3	-	\$0.018
Int. Lighting	Screw-in	CFL	1.60	\$0.03	6	3.62	\$0.003
Int. Lighting	Screw-in	LED (2010)	1.73	\$0.68	20	1.75	\$0.030
Int. Lighting	Screw-in	LED (2020)	1.99	\$0.19	20	-	\$0.007
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	High-Bay Fixtures	LED (2010)	0.76	\$1.62	15	0.61	\$0.194
Int. Lighting	High-Bay Fixtures	T8	0.78	-\$0.04	10	2.08	-\$0.007
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	0.82	\$0.01	6	1.84	\$0.002
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	0.97	\$0.02	15	2.22	\$0.002
Int. Lighting	High-Bay Fixtures	T5	0.99	-\$0.03	10	2.49	-\$0.003
Int. Lighting	High-Bay Fixtures	LED (2020)	1.45	\$0.42	15	-	\$0.026
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	0.18	\$0.96	15	0.37	\$0.493
Int. Lighting	Linear Fluorescent	T8	0.19	\$0.00	10	1.33	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	0.26	\$0.01	10	1.49	\$0.003
Int. Lighting	Linear Fluorescent	T5	0.30	\$0.01	10	1.59	\$0.004
Int. Lighting	Linear Fluorescent	LED (2020)	0.54	\$0.27	15	-	\$0.045
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.19	\$0.01	3	-	\$0.020
Ext. Lighting	Screw-in	70W HIR PAR-38	0.29	\$0.02	3	-	\$0.018
Ext. Lighting	Screw-in	CFL	0.54	\$0.01	6	3.48	\$0.003
Ext. Lighting	Screw-in	LED (2010)	0.59	\$0.23	20	1.56	\$0.030
Ext. Lighting	Screw-in	LED (2020)	0.68	\$0.07	20	-	\$0.007
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	0.29	\$0.50	15	0.62	\$0.161
Ext. Lighting	HID	T8	0.29	-\$0.01	10	2.03	-\$0.006
Ext. Lighting	HID	High Pressure Sodium	0.31	\$0.00	6	1.83	\$0.001
Ext. Lighting	HID	Light Emitting Plasma	0.36	\$0.01	15	2.18	\$0.002
Ext. Lighting	HID	T5	0.37	-\$0.01	10	2.45	-\$0.003
Ext. Lighting	HID	LED (2020)	0.55	\$0.13	15	-	\$0.022
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.10	\$0.54	15	0.34	\$0.493
Ext. Lighting	Linear Fluorescent	T8	0.11	\$0.00	10	1.33	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.15	\$0.00	10	1.48	\$0.003
Ext. Lighting	Linear Fluorescent	T5	0.17	\$0.01	10	1.58	\$0.004
Ext. Lighting	Linear Fluorescent	LED (2020)	0.31	\$0.15	15	-	\$0.045
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.04	\$0.01	12	1.13	\$0.013
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.05	\$0.01	12	1.16	\$0.014
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.06	\$0.01	12	1.16	\$0.020
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	\$0.00	12	1.00	\$0.000
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	\$0.00	12	1.10	\$0.019
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	\$0.00	12	1.19	\$0.021
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	\$0.00	12	1.21	\$0.020
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	\$0.00	12	1.54	\$0.013
Refrigeration	Glass Door Display	14480 kWh/yr	-	\$0.00	12	-	\$0.000
Refrigeration	Glass Door Display	11700 kWh/yr	0.04	\$0.02	12	-	\$0.071
Refrigeration	Glass Door Display	8400 kWh/yr	0.08	\$0.00	12	1.00	\$0.000
Refrigeration	Glass Door Display	6800 kWh/yr	0.10	\$0.02	12	0.89	\$0.026
Refrigeration	Open Display Case	6500 kWh/yr	-	\$0.00	18	-	\$0.000
Refrigeration	Open Display Case	5350 kWh/yr	0.01	\$0.00	18	1.00	\$0.000
Refrigeration	Open Display Case	5300 kWh/yr	0.02	\$0.01	18	-	\$0.055
Refrigeration	Open Display Case	4330 kWh/yr	0.03	\$0.01	18	0.97	\$0.031
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	\$0.00	10	1.00	\$0.000
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	\$0.00	10	1.00	\$0.053

Commercial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incremental Cost (\$/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	\$0.00	10	0.99	\$0.057
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	\$0.01	10	0.86	\$0.141
Refrigeration	Vending Machine	3400 kWh/year	-	\$0.00	10	1.00	\$0.000
Refrigeration	Vending Machine	3000 kWh/year	0.01	\$0.00	10	1.05	\$0.012
Refrigeration	Vending Machine	2400 kWh/year	0.03	\$0.00	10	1.12	\$0.012
Refrigeration	Vending Machine	1700 kWh/year	0.05	\$0.01	10	1.16	\$0.022
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.02	\$0.00	12	1.12	\$0.000
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.03	\$0.024
Food Prep	Dishwasher	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Dishwasher	Energy Star	0.10	\$0.00	12	1.31	\$0.005
Food Prep	Hot Food Container	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Hot Food Container	Energy Star	0.07	\$0.01	12	1.19	\$0.024
Office Equip	Desktop Computer	Standard	-	\$0.00	5	1.00	\$0.000
Office Equip	Desktop Computer	Energy Star	0.06	\$0.00	5	1.05	\$0.000
Office Equip	Laptop	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Laptop	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Server	Standard	-	\$0.00	3	1.00	\$0.000
Office Equip	Server	Energy Star	0.03	\$0.00	3	1.04	\$0.000
Office Equip	Monitor	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	Monitor	Energy Star	0.01	\$0.00	4	1.02	\$0.000
Office Equip	Printer/Copier/Fax	Standard	-	\$0.00	6	1.00	\$0.000
Office Equip	Printer/Copier/Fax	Energy Star	0.02	\$0.00	6	1.09	\$0.000
Office Equip	POS Terminal	Standard	-	\$0.00	4	1.00	\$0.000
Office Equip	POS Terminal	Energy Star	0.03	\$0.02	4	0.95	\$0.151
Misc	Non-HVAC Motors	Standard (EPAAct)	-	\$0.00	15	1.00	\$0.000
Misc	Non-HVAC Motors	Standard (EPAAct 2015)	0.00	\$0.00	15	-	\$0.000
Misc	Non-HVAC Motors	High Efficiency	0.00	\$0.00	15	1.01	\$0.010
Misc	Non-HVAC Motors	High Efficiency (2015)	0.00	\$0.00	15	-	\$0.007
Misc	Non-HVAC Motors	Premium (NEMA)	0.00	\$0.00	15	1.02	\$0.010
Misc	Non-HVAC Motors	Premium (NEMA 2015)	0.00	\$0.00	15	-	\$0.008
Misc	Pool Pump	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Pump	High Efficiency	0.00	\$0.00	15	1.04	\$0.030
Misc	Pool Pump	High Efficiency, Multi-Speed	0.00	\$0.00	15	1.04	\$0.051
Misc	Pool Heater	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	Heat Pump	0.00	\$0.00	15	0.99	\$0.058
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-46 Energy Efficiency Equipment Data, Natural Gas— Miscellaneous Commercial, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/sq ft/yr)	Incre- mental Cost (\$/sq ft)	Lifetime	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
					(Years)		
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	0.01	\$0.12	20	0.97	\$0.882
Heating	Furnace	EF .83	0.02	\$0.32	20	0.91	\$1.408
Heating	Furnace	EF .90	0.03	\$0.55	20	0.86	\$1.291
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	0.08	\$0.12	25	1.00	\$0.102
Heating	Boiler	EF .82	0.14	\$0.45	25	1.00	\$0.222
Heating	Boiler	EF .85	0.25	\$0.94	25	1.02	\$0.252
Heating	Boiler	EF .96	0.34	\$3.82	25	0.87	\$0.761
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	0.01	\$0.02	15	1.02	\$0.188
Heating	Other Heating	AFUE .76	0.01	\$0.03	15	1.03	\$0.218
Heating	Other Heating	AFUE .77	0.02	\$0.05	15	1.02	\$0.285
Heating	Other Heating	AFUE .80	0.02	\$0.10	15	1.00	\$0.404
Water Heating	Water Heater	EF 0.77	-	\$0.00	12	1.00	\$0.000
Water Heating	Water Heater	EF 0.80	0.01	\$0.02	12	1.03	\$0.134
Water Heating	Water Heater	EF 0.94	0.06	\$0.04	12	1.18	\$0.060
Food Prep	Oven	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Oven	Energy Star	0.01	\$0.00	12	1.19	\$0.018
Food Prep	Fryer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Fryer	Energy Star	0.01	\$0.00	12	1.37	\$0.011
Food Prep	Broiler	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Griddle	Energy Star	0.00	\$0.00	12	1.10	\$0.043
Food Prep	Range	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Range	High Efficiency	0.01	\$0.00	12	1.19	\$0.021
Food Prep	Steamer	Standard	-	\$0.00	12	1.00	\$0.000
Food Prep	Steamer	Energy Star	0.02	\$0.01	12	1.28	\$0.042
Misc	Pool Heater	EF .78	-	\$0.00	15	1.00	\$0.000
Misc	Pool Heater	EF .82	0.01	\$0.03	15	1.02	\$0.178
Misc	Pool Heater	EF .90	0.04	\$0.48	15	0.88	\$1.130
Misc	Pool Heater	EF .95	0.05	\$0.55	15	0.88	\$0.960
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table C-47 Energy Efficiency Non-Equipment Data—Small Office, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	8.034	2.93	\$0.002
Insulation - Ducting	14.7%	50.0%	20	\$0.41	7.959	1.83	\$0.004
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	4.812	1.69	\$0.004
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	4.501	1.13	\$0.006
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	7.821	1.36	\$0.004
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	66.5%	75.0%	20	\$0.44	20.365	4.06	\$0.002
Windows - Install Reflective Film	66.5%	75.0%	20	\$3.00	1.376	0.06	\$0.166
Roof - High Reflectivity	41.6%	95.0%	15	\$0.18	3.165	1.97	\$0.005
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	4.960	0.19	\$0.047
Air-Cooled Chiller - Economizer	4.1%	48.8%	15	\$0.15	12.437	10.16	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	15.152	2.05	\$0.006
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.022	1.12	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	1.580	0.15	\$0.067
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.029	0.06	\$0.171
Air-Cooled Chiller - Maintenance	48.6%	90.0%	4	\$0.08	6.597	2.72	\$0.003
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.277	0.16	\$0.032
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	5.033	0.19	\$0.046
Water-Cooled Chiller - Economizer	4.1%	48.8%	15	\$0.15	14.307	11.57	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	15.369	2.06	\$0.006
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.141	1.13	\$0.009
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	1.603	0.15	\$0.066
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.016	0.03	\$0.301
Water-Cooled Chiller - Maintenance	48.6%	90.0%	4	\$0.08	6.694	2.74	\$0.003
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.277	0.16	\$0.032
RTU - Evaporative Precooler	0.0%	17.0%	20	\$3.00	22.032	1.06	\$0.010
RTU - Maintenance	48.6%	90.0%	4	\$0.08	6.316	2.50	\$0.003
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.44	7.224	0.63	\$0.007
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	11.708	0.21	\$0.020
Gas Boiler - Combustion Controls (O2 Trim)	4.1%	48.8%	25	\$2.78	1.948	0.08	\$0.096
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	5.843	2.75	\$0.002
Gas Boiler - Condensing Economizer	4.1%	48.8%	25	\$6.85	6.492	0.10	\$0.071
Gas Boiler - Pipe Insulation	15.5%	50.0%	15	\$0.28	3.246	0.70	\$0.008
Gas Boiler - Steam Trap Maintenance	35.9%	90.0%	4	\$0.08	6.492	1.23	\$0.003
Gas Boiler - Maintenance	35.9%	90.0%	4	\$0.08	8.466	1.60	\$0.003
Gas Furnace - Maintenance	35.9%	90.0%	4	\$0.08	2.320	0.47	\$0.009
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.94	\$0.007
Heat Pump - Maintenance	3.7%	95.0%	4	\$0.03	12.012	12.62	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.18	0.364	0.16	\$0.040
Ventilation - Variable Speed Control	0.8%	81.0%	10	\$0.20	3.915	0.86	\$0.006
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.006	0.51	\$0.009
Water Heater - Faucet Aerators/Low Flow Nozzles	25.7%	90.0%	9	\$0.01	0.428	1.58	\$0.003
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	2.236	1.13	\$0.004
Water Heater - Solar System	0.0%	50.0%	20	\$0.83	5.588	0.60	\$0.011
Water Heater - Install Timer	15.5%	50.0%	15	\$0.28	2.236	0.52	\$0.011
Water Heater - Pipe Insulation	15.5%	50.0%	15	\$0.28	0.423	0.09	\$0.061
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	0.559	1.16	\$0.004
Water Heating - Booster Water Heater	15.5%	50.0%	20	\$0.19	0.894	0.43	\$0.016
Interior Lighting - Daylighting Controls	10.6%	50.0%	8	\$0.11	11.939	3.86	\$0.001
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.080	3.54	\$0.002
Interior Lighting - Occupancy Sensors	5.3%	56.3%	8	\$0.20	3.980	0.71	\$0.007
Interior Lighting - Timeclocks and Timers	4.9%	56.3%	8	\$0.20	1.990	0.35	\$0.015
Interior Lighting - Task Lighting	17.1%	75.0%	5	\$0.24	1.488	0.11	\$0.035
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	2.282	0.19	\$0.032
Interior Fluorescent - Delamp and Install Reflectors	15.1%	45.0%	11	\$0.50	1.939	0.22	\$0.029
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	1.035	0.14	\$0.028
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	5.174	6.91	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	3.104	0.06	\$0.065
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	-	-	\$0.000
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.35	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.096	0.03	\$0.183
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.077	0.02	\$0.192
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.019	0.01	\$0.459
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	0.134	0.02	\$0.228
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	-	-	\$0.000
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.134	0.03	\$0.198
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.134	0.03	\$0.198
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.383	16.09	\$0.000
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.295	0.04	\$0.113
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.234	75.59	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.20	2.597	0.48	\$0.011
Pool Heater - Solar	0.0%	33.8%	20	\$0.83	8.472	0.95	\$0.007
Pool Pump - Timer	2.0%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	0.0%	12	\$0.74	15.326	1.45	\$0.005
Ventilation - CO2 Controlled	1.0%	15.0%	10	\$0.04	2.316	2.42	\$0.002
Non-HVAC Motors - Variable Speed Control	1.6%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	6.1%	50.0%	14	\$0.35	17.850	4.17	\$0.002
Thermostat - Clock/Programmable	57.6%	62.6%	11	\$0.13	16.103	6.70	\$0.001
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	7.620	2.03	\$0.003
Retrocommissioning - HVAC	5.0%	24.0%	4	\$0.70	12.501	0.39	\$0.015
Retrocommissioning - Lighting	25.7%	30.7%	5	\$0.10	4.497	0.98	\$0.005
Custom Measures	0%	0%	-	\$0.00	-	-	\$0.000

Table C-48 Energy Efficiency Non-Equipment Data— Small Office, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	5.601	2.21	\$0.004
Insulation - Ducting	11.1%	50.0%	20	\$0.41	7.067	1.99	\$0.004
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	4.207	1.66	\$0.005
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	3.713	1.05	\$0.007
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	5.266	0.99	\$0.007
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	77.8%	82.8%	20	\$0.35	14.859	3.99	\$0.002
Windows - Install Reflective Film	77.8%	82.8%	20	\$3.00	1.105	0.05	\$0.206
Roof - High Reflectivity	41.3%	95.0%	15	\$0.09	1.958	2.70	\$0.004
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	3.026	0.13	\$0.076
Air-Cooled Chiller - Economizer	37.4%	48.8%	15	\$0.15	7.638	7.16	\$0.002
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	11.885	1.85	\$0.007
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	5.044	0.80	\$0.014
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	1.669	0.18	\$0.063
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.018	0.04	\$0.277
Air-Cooled Chiller - Maintenance	41.3%	90.0%	4	\$0.08	4.070	1.87	\$0.005
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.258	0.16	\$0.034
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	3.206	0.13	\$0.072
Water-Cooled Chiller - Economizer	37.4%	48.8%	15	\$0.15	10.476	8.90	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	12.551	1.77	\$0.007
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	5.343	0.77	\$0.013
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	1.768	0.17	\$0.060
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.019	0.04	\$0.262
Water-Cooled Chiller - Maintenance	41.3%	90.0%	4	\$0.08	4.311	1.83	\$0.005
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.258	0.16	\$0.034
RTU - Evaporative Precooler	0.0%	19.0%	20	\$3.00	17.320	0.94	\$0.013
RTU - Maintenance	41.3%	90.0%	4	\$0.08	3.903	1.64	\$0.006
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.44	2.589	0.24	\$0.021
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	7.323	0.14	\$0.032
Gas Boiler - Combustion Controls (O2 Trim)	37.4%	48.8%	25	\$2.44	1.578	0.08	\$0.104
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	4.734	2.37	\$0.002
Gas Boiler - Condensing Economizer	37.4%	48.8%	25	\$6.02	5.260	0.10	\$0.077
Gas Boiler - Pipe Insulation	50.0%	50.0%	15	\$0.28	1.773	0.41	\$0.014
Gas Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.08	5.260	1.05	\$0.004
Gas Boiler - Maintenance	31.7%	90.0%	4	\$0.08	6.858	1.37	\$0.003
Gas Furnace - Maintenance	31.7%	90.0%	4	\$0.08	1.952	0.40	\$0.011
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	1.6%	95.0%	4	\$0.03	6.887	7.52	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.18	2.276	1.12	\$0.006
Ventilation - Variable Speed Control	3.2%	81.0%	10	\$0.20	3.165	0.76	\$0.008
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	0.891	0.48	\$0.010
Water Heater - Faucet Aerators/Low Flow Nozzles	25.4%	90.0%	9	\$0.01	0.352	1.40	\$0.004
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	1.981	1.07	\$0.004
Water Heater - Solar System	0.0%	50.0%	20	\$0.73	4.992	0.66	\$0.011
Water Heater - Install Timer	50.0%	50.0%	15	\$0.28	1.981	0.49	\$0.013
Water Heater - Pipe Insulation	50.0%	50.0%	15	\$0.28	0.254	0.06	\$0.101
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	0.439	0.98	\$0.006
Water Heating - Booster Water Heater	50.0%	50.0%	20	\$0.16	0.792	0.47	\$0.016
Interior Lighting - Daylighting Controls	75.0%	75.0%	8	\$0.09	9.906	4.71	\$0.001
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.066	3.55	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.20	3.302	0.71	\$0.009
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.651	0.35	\$0.018
Interior Lighting - Task Lighting	14.3%	75.0%	5	\$0.24	1.081	0.11	\$0.049
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	2.118	0.19	\$0.035
Interior Fluorescent - Delamp and Install Reflectors	14.3%	45.0%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.708	0.12	\$0.042
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	3.541	6.19	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.125	0.05	\$0.095
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	-	-	\$0.000
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.68	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.047	0.02	\$0.373
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.038	0.01	\$0.391
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.009	0.01	\$0.935
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	0.066	0.01	\$0.466
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	-	-	\$0.000
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.066	0.02	\$0.403
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.066	0.02	\$0.403
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.188	7.19	\$0.001
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.204	0.03	\$0.163
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.231	76.45	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.20	2.562	0.49	\$0.011
Pool Heater - Solar	0.0%	33.8%	20	\$0.73	8.160	1.04	\$0.007
Pool Pump - Timer	33.8%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	0.0%	12	\$0.65	12.541	1.47	\$0.006
Ventilation - CO2 Controlled	11.5%	15.0%	10	\$0.04	1.860	2.12	\$0.003
Non-HVAC Motors - Variable Speed Control	1.6%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	6.4%	50.0%	14	\$0.35	13.129	3.36	\$0.003
Thermostat - Clock/Programmable	78.0%	78.0%	11	\$0.13	12.565	5.70	\$0.001
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	6.185	1.76	\$0.003
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	40.0%	75.0%	25	\$1.25	10.217	1.24	\$0.008
Commissioning - Lighting	30.0%	75.0%	25	\$0.20	3.656	2.48	\$0.004
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	49.022	3.66	\$0.003

Table C-49 Energy Efficiency Non-Equipment Data— Large Office, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	1.455	0.51	\$0.014
Insulation - Ducting	16.7%	50.0%	20	\$0.41	2.293	0.52	\$0.014
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	0.775	0.26	\$0.026
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	4.465	0.50	\$0.013
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	7.891	1.39	\$0.004
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	75.0%	80.0%	20	\$0.88	13.174	1.32	\$0.005
Windows - Install Reflective Film	75.0%	80.0%	20	\$3.00	1.416	0.05	\$0.161
Roof - High Reflectivity	41.7%	75.0%	15	\$0.08	0.731	0.68	\$0.010
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	4.895	0.57	\$0.010
Air-Cooled Chiller - Economizer	25.0%	48.8%	15	\$0.15	13.050	6.98	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	14.702	1.35	\$0.006
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.856	0.72	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.621	0.47	\$0.014
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.031	0.04	\$0.159
Air-Cooled Chiller - Maintenance	41.7%	90.0%	4	\$0.06	6.405	2.24	\$0.003
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.298	0.18	\$0.029
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	5.464	0.63	\$0.009
Water-Cooled Chiller - Economizer	25.0%	48.8%	15	\$0.15	16.181	8.50	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	16.412	1.48	\$0.005
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.770	0.80	\$0.008
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.809	0.52	\$0.012
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.017	0.02	\$0.290
Water-Cooled Chiller - Maintenance	41.7%	90.0%	4	\$0.06	7.150	2.48	\$0.002
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.298	0.18	\$0.029
RTU - Evaporative Precooler	0.0%	3.0%	20	\$3.00	19.056	0.62	\$0.012
RTU - Maintenance	41.7%	90.0%	4	\$0.06	5.462	1.84	\$0.003
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	4.890	1.48	\$0.003
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	8.596	0.74	\$0.006
Gas Boiler - Combustion Controls (O2 Trim)	25.0%	48.8%	25	\$0.20	1.203	0.67	\$0.011
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	3.608	1.74	\$0.002
Gas Boiler - Condensing Economizer	25.0%	48.8%	25	\$0.49	4.009	0.91	\$0.008
Gas Boiler - Pipe Insulation	33.3%	38.3%	15	\$0.28	2.265	0.50	\$0.011
Gas Boiler - Steam Trap Maintenance	25.0%	90.0%	4	\$0.06	4.009	1.03	\$0.004
Gas Boiler - Maintenance	25.0%	90.0%	4	\$0.06	5.230	1.35	\$0.003
Gas Furnace - Maintenance	25.0%	90.0%	4	\$0.06	1.434	0.39	\$0.011
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.94	\$0.007
Heat Pump - Maintenance	8.3%	95.0%	4	\$0.06	10.503	3.56	\$0.002
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	3.224	1.61	\$0.004
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.34	9.517	1.27	\$0.004
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	0.905	0.46	\$0.010
Water Heater - Faucet Aerators/Low Flow Nozzles	41.7%	90.0%	9	\$0.03	0.399	0.50	\$0.010
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	2.011	1.03	\$0.004
Water Heater - Solar System	0.0%	50.0%	20	\$0.06	5.025	7.52	\$0.001
Water Heater - Install Timer	33.3%	38.3%	15	\$0.28	2.011	0.47	\$0.013
Water Heater - Pipe Insulation	33.3%	38.3%	15	\$0.28	0.568	0.13	\$0.045
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.503	0.53	\$0.010
Water Heating - Booster Water Heater	33.3%	38.3%	20	\$0.01	0.804	5.42	\$0.001
Interior Lighting - Daylighting Controls	8.3%	12.5%	8	\$0.29	12.898	1.58	\$0.003
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.086	3.76	\$0.001
Interior Lighting - Occupancy Sensors	25.0%	56.3%	8	\$0.28	4.299	0.54	\$0.010
Interior Lighting - Timeclocks and Timers	8.3%	56.3%	8	\$0.20	2.150	0.37	\$0.014
Interior Lighting - Task Lighting	41.7%	75.0%	5	\$0.24	1.376	0.10	\$0.038
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.40	2.971	0.29	\$0.020
Interior Fluorescent - Delamp and Install Reflectors	33.3%	67.5%	11	\$0.50	2.523	0.27	\$0.023
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.560	0.07	\$0.053
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	2.799	3.65	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.679	0.03	\$0.120
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.099	0.03	\$0.176
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.40	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.024	0.01	\$0.738
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.098	0.03	\$0.149
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.005	0.00	\$1.853
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.033	0.01	\$0.923
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	-	-	\$0.000
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.033	0.01	\$0.799
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.033	0.01	\$0.799
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.095	2.17	\$0.002
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.146	0.02	\$0.227
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.369	117.19	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.28	4.095	0.53	\$0.010
Pool Heater - Solar	0.0%	33.8%	20	\$0.06	2.195	3.43	\$0.002
Pool Pump - Timer	8.3%	33.8%	10	\$0.13	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	0.0%	12	\$0.05	13.056	13.66	\$0.000
Ventilation - CO2 Controlled	1.0%	11.3%	10	\$0.04	2.764	2.98	\$0.002
Non-HVAC Motors - Variable Speed Control	8.3%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	8.3%	90.0%	14	\$0.35	17.406	3.27	\$0.002
Thermostat - Clock/Programmable	58.3%	63.3%	11	\$0.13	11.155	4.06	\$0.001
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	5.980	1.46	\$0.003
Retrocommissioning - HVAC	9.0%	36.0%	4	\$0.35	11.685	0.61	\$0.008
Retrocommissioning - Lighting	66.7%	71.7%	5	\$0.05	4.579	1.98	\$0.002
Custom Measures	0%	0%	-	\$0.00	-	-	\$0.000
Data Center - Server Virtualization	50.0%	75.0%	3	\$600.00	22,519.589	0.51	\$0.009

Table C-50 Energy Efficiency Non-Equipment Data— Large Office, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBTU/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	0.557	0.21	\$0.036
Insulation - Ducting	0.0%	50.0%	20	\$0.41	1.559	0.41	\$0.020
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	0.354	0.14	\$0.056
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	1.852	0.23	\$0.032
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	4.873	0.92	\$0.007
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	100.0%	100.0%	20	\$0.88	5.282	0.59	\$0.013
Windows - Install Reflective Film	100.0%	100.0%	20	\$3.00	1.019	0.04	\$0.224
Roof - High Reflectivity	50.0%	95.0%	15	\$0.05	0.407	0.66	\$0.011
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.654	0.34	\$0.018
Air-Cooled Chiller - Economizer	53.8%	55.0%	15	\$0.15	6.912	4.08	\$0.002
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	10.405	1.06	\$0.009
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.488	0.45	\$0.016
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.614	0.52	\$0.014
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.016	0.02	\$0.316
Air-Cooled Chiller - Maintenance	50.0%	90.0%	4	\$0.06	3.345	1.27	\$0.005
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.278	0.17	\$0.032
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	3.045	0.37	\$0.016
Water-Cooled Chiller - Economizer	53.8%	55.0%	15	\$0.15	9.421	5.23	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	11.907	1.14	\$0.007
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	5.149	0.49	\$0.014
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.851	0.56	\$0.012
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.018	0.02	\$0.276
Water-Cooled Chiller - Maintenance	50.0%	90.0%	4	\$0.06	3.838	1.38	\$0.004
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.278	0.17	\$0.032
RTU - Evaporative Precooler	0.0%	1.0%	20	\$3.00	14.058	0.52	\$0.016
RTU - Maintenance	50.0%	90.0%	4	\$0.06	2.973	1.06	\$0.005
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	1.881	0.63	\$0.009
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	6.321	0.59	\$0.008
Gas Boiler - Combustion Controls (O2 Trim)	53.8%	55.0%	25	\$0.18	0.943	0.65	\$0.013
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	2.828	1.48	\$0.003
Gas Boiler - Condensing Economizer	53.8%	55.0%	25	\$0.45	3.142	0.87	\$0.010
Gas Boiler - Pipe Insulation	100.0%	100.0%	15	\$0.28	0.999	0.25	\$0.026
Gas Boiler - Steam Trap Maintenance	50.0%	90.0%	4	\$0.06	3.142	0.88	\$0.005
Gas Boiler - Maintenance	50.0%	90.0%	4	\$0.06	4.100	1.14	\$0.004
Gas Furnace - Maintenance	50.0%	90.0%	4	\$0.06	1.213	0.33	\$0.013
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	6.196	2.19	\$0.003
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	2.325	1.23	\$0.006
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.34	7.701	1.08	\$0.005
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	0.800	0.44	\$0.011
Water Heater - Faucet Aerators/Low Flow Nozzles	50.0%	90.0%	9	\$0.03	0.357	0.48	\$0.011
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	1.779	0.97	\$0.005
Water Heater - Solar System	0.0%	50.0%	20	\$0.05	4.444	7.89	\$0.001
Water Heater - Install Timer	100.0%	100.0%	15	\$0.28	1.779	0.45	\$0.014
Water Heater - Pipe Insulation	100.0%	100.0%	15	\$0.28	0.299	0.08	\$0.086
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.394	0.44	\$0.012
Water Heating - Booster Water Heater	100.0%	100.0%	20	\$0.01	0.711	5.69	\$0.001
Interior Lighting - Daylighting Controls	18.8%	18.8%	8	\$0.19	11.151	2.38	\$0.003
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.074	3.79	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	3.717	0.60	\$0.010
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.858	0.38	\$0.016
Interior Lighting - Task Lighting	50.0%	75.0%	5	\$0.24	0.995	0.10	\$0.053
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.40	2.756	0.29	\$0.021
Interior Fluorescent - Delamp and Install Reflectors	100.0%	100.0%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.376	0.07	\$0.078
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	1.881	3.28	\$0.002
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.128	0.03	\$0.179
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.089	0.02	\$0.196
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.42	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.012	0.00	\$1.473
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.081	0.02	\$0.182
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.002	0.00	\$3.698
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.017	0.00	\$1.842
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	-	-	\$0.000
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.017	0.00	\$1.594
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.017	0.00	\$1.594
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.048	0.81	\$0.006
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.099	0.01	\$0.335
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.369	119.50	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.25	4.104	0.61	\$0.009
Pool Heater - Solar	0.0%	33.8%	20	\$0.05	2.085	3.58	\$0.002
Pool Pump - Timer	33.8%	33.8%	10	\$0.13	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	0.0%	12	\$0.05	9.910	12.32	\$0.001
Ventilation - CO2 Controlled	8.7%	11.3%	10	\$0.04	2.169	2.47	\$0.002
Non-HVAC Motors - Variable Speed Control	50.0%	55.0%	10	\$0.10	-	-	\$0.000
Energy Management System	50.0%	90.0%	14	\$0.35	12.274	2.55	\$0.003
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	2.995	1.15	\$0.005
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	4.647	1.22	\$0.004
Custom Measures	0%	0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	8.949	1.17	\$0.008
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	3.905	3.41	\$0.003
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	42.047	2.76	\$0.003
Data Center - Server Virtualization	50.0%	75.0%	3	\$600.00	22,519.589	0.53	\$0.009

Table C-51 Energy Efficiency Non-Equipment Data— Restaurant, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	8.718	3.21	\$0.002
Insulation - Ducting	10.7%	50.0%	20	\$0.41	8.518	1.95	\$0.004
Insulation - Radiant Barrier	4.0%	12.5%	20	\$0.26	4.420	1.52	\$0.004
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	7.599	1.96	\$0.003
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	6.322	1.17	\$0.005
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	53.6%	75.0%	20	\$0.44	25.871	5.14	\$0.001
Windows - Install Reflective Film	53.6%	75.0%	20	\$3.00	2.835	0.10	\$0.080
Roof - High Reflectivity	35.7%	95.0%	15	\$0.18	3.447	1.75	\$0.005
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	9.306	0.29	\$0.025
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	25.725	17.40	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	31.881	3.59	\$0.003
Air-Cooled Chiller - Chilled Water Reset	0.0%	75.0%	10	\$1.73	15.151	0.57	\$0.014
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.488	0.19	\$0.043
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.063	0.10	\$0.079
Air-Cooled Chiller - Maintenance	64.3%	90.0%	4	\$0.08	13.808	4.62	\$0.002
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	2.084	1.20	\$0.004
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	8.972	0.28	\$0.026
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	28.738	19.26	\$0.000
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	30.678	3.42	\$0.003
Water-Cooled Chiller - Chilled Water Reset	0.0%	75.0%	10	\$1.73	14.608	0.55	\$0.015
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.399	0.18	\$0.044
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.035	0.06	\$0.142
Water-Cooled Chiller - Maintenance	64.3%	90.0%	4	\$0.08	13.314	4.43	\$0.002
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	2.084	1.20	\$0.004
RTU - Evaporative Precooler	0.0%	13.0%	20	\$3.00	47.780	1.92	\$0.005
RTU - Maintenance	64.3%	90.0%	4	\$0.08	13.617	4.38	\$0.002
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.44	17.609	1.58	\$0.003
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	32.060	0.58	\$0.007
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$6.52	5.051	0.09	\$0.087
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	15.152	7.32	\$0.001
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$16.09	16.836	0.12	\$0.064
Gas Boiler - Pipe Insulation	10.7%	50.0%	15	\$0.28	9.512	2.12	\$0.003
Gas Boiler - Steam Trap Maintenance	39.3%	90.0%	4	\$0.08	16.836	3.26	\$0.001
Gas Boiler - Maintenance	39.3%	90.0%	4	\$0.08	21.776	4.21	\$0.001
Gas Furnace - Maintenance	39.3%	90.0%	4	\$0.08	2.588	0.52	\$0.008
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.90	\$0.007
Heat Pump - Maintenance	3.6%	95.0%	4	\$0.03	25.585	22.24	\$0.000
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	5.274	2.47	\$0.003
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.34	10.909	1.41	\$0.004
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	6.638	3.36	\$0.001
Water Heater - Faucet Aerators/Low Flow Nozzles	28.6%	90.0%	9	\$0.01	2.925	10.77	\$0.000
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	14.752	7.47	\$0.001
Water Heater - Solar System	0.0%	50.0%	20	\$1.96	36.735	1.67	\$0.004
Water Heater - Install Timer	10.7%	50.0%	15	\$0.28	14.752	3.40	\$0.002
Water Heater - Pipe Insulation	10.7%	50.0%	15	\$0.28	4.169	0.96	\$0.006
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	3.688	7.61	\$0.001
Water Heating - Booster Water Heater	10.7%	50.0%	20	\$0.43	5.901	1.20	\$0.006
Interior Lighting - Daylighting Controls	0.0%	50.0%	8	\$0.11	24.038	3.93	\$0.001
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.160	3.59	\$0.001
Interior Lighting - Occupancy Sensors	0.0%	56.3%	8	\$0.30	8.013	0.48	\$0.006
Interior Lighting - Timeclocks and Timers	3.6%	56.3%	8	\$0.20	4.006	0.36	\$0.007
Interior Lighting - Task Lighting	3.6%	75.0%	5	\$0.24	6.653	0.25	\$0.008
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	1.429	0.10	\$0.051
Interior Fluorescent - Delamp and Install Reflectors	7.1%	37.5%	11	\$0.50	1.214	0.12	\$0.047
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	2.620	0.35	\$0.011
Exterior Lighting - Daylighting Controls	19.0%	37.5%	8	\$0.02	13.100	17.75	\$0.000
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	7.860	0.15	\$0.026
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	1.578	0.44	\$0.011
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.25	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	2.444	0.63	\$0.007
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	3.519	0.89	\$0.004
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.489	0.22	\$0.018
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	3.422	0.51	\$0.009
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	1.956	2.20	\$0.002
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	3.422	0.58	\$0.008
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	3.422	0.58	\$0.008
Refrigerator - eCube	5.0%	75.0%	12	\$0.17	9.778	2.29	\$0.002
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	1.159	0.15	\$0.029
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.074	23.02	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.30	0.819	0.10	\$0.054
Pool Heater - Solar	0.0%	33.8%	20	\$1.96	6.579	0.32	\$0.023
Pool Pump - Timer	0.0%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	0.0%	12	\$1.74	34.314	1.19	\$0.005
Ventilation - CO2 Controlled	1.0%	15.0%	10	\$0.04	7.562	7.91	\$0.001
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	7.1%	50.0%	14	\$0.35	38.370	7.21	\$0.001
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	31.928	12.56	\$0.000
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	18.575	4.64	\$0.001
Retrocommissioning - HVAC	5.0%	24.0%	4	\$0.70	30.049	0.83	\$0.006
Retrocommissioning - Lighting	10.7%	15.7%	5	\$0.10	9.323	1.14	\$0.002
Custom Measures	0%	0%	-	\$0.00	-	-	\$0.000

Table C-52 Energy Efficiency Non-Equipment Data— Restaurant, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	6.668	2.63	\$0.003
Insulation - Ducting	0.0%	50.0%	20	\$0.41	7.333	1.88	\$0.004
Insulation - Radiant Barrier	4.0%	12.5%	20	\$0.26	4.481	1.78	\$0.004
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	6.731	1.88	\$0.004
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	3.384	0.68	\$0.010
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	0.0%	75.0%	20	\$0.35	20.378	5.62	\$0.001
Windows - Install Reflective Film	0.0%	75.0%	20	\$3.00	2.166	0.09	\$0.105
Roof - High Reflectivity	50.0%	95.0%	15	\$0.09	2.748	3.07	\$0.003
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	6.040	0.20	\$0.038
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	16.142	11.55	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	25.253	3.01	\$0.004
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$1.73	11.412	0.45	\$0.019
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.751	0.22	\$0.038
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.039	0.07	\$0.125
Air-Cooled Chiller - Maintenance	100.0%	100.0%	4	\$0.08	7.689	2.69	\$0.003
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	1.899	1.15	\$0.005
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	6.136	0.20	\$0.038
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	24.200	16.99	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	25.542	2.99	\$0.003
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$1.73	11.593	0.45	\$0.018
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.794	0.22	\$0.038
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.040	0.07	\$0.123
Water-Cooled Chiller - Maintenance	100.0%	100.0%	4	\$0.08	7.811	2.68	\$0.003
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	1.899	1.15	\$0.005
RTU - Evaporative Precooler	0.0%	13.0%	20	\$3.00	33.587	1.52	\$0.007
RTU - Maintenance	100.0%	100.0%	4	\$0.08	6.729	2.30	\$0.003
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.44	7.593	0.75	\$0.007
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	23.235	0.45	\$0.010
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$6.52	3.883	0.07	\$0.113
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	11.650	6.11	\$0.001
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$16.09	12.944	0.10	\$0.083
Gas Boiler - Pipe Insulation	50.0%	50.0%	15	\$0.28	7.313	1.80	\$0.003
Gas Boiler - Steam Trap Maintenance	0.0%	90.0%	4	\$0.08	12.944	2.71	\$0.002
Gas Boiler - Maintenance	0.0%	90.0%	4	\$0.08	16.742	3.51	\$0.001
Gas Furnace - Maintenance	0.0%	90.0%	4	\$0.08	2.181	0.45	\$0.010
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.03	12.428	11.09	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	2.368	1.16	\$0.006
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.34	5.510	0.74	\$0.008
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	5.829	3.16	\$0.002
Water Heater - Faucet Aerators/Low Flow Nozzles	0.0%	90.0%	9	\$0.01	2.569	10.20	\$0.001
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	12.954	7.03	\$0.001
Water Heater - Solar System	0.0%	50.0%	20	\$1.96	32.260	1.59	\$0.005
Water Heater - Install Timer	50.0%	50.0%	15	\$0.28	12.954	3.24	\$0.002
Water Heater - Pipe Insulation	50.0%	50.0%	15	\$0.28	3.661	0.91	\$0.007
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	2.846	6.35	\$0.001
Water Heating - Booster Water Heater	50.0%	50.0%	20	\$0.43	5.181	1.15	\$0.006
Interior Lighting - Daylighting Controls	75.0%	75.0%	8	\$0.09	11.236	4.78	\$0.001
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.075	3.60	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	3.745	0.57	\$0.010
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.873	0.36	\$0.016
Interior Lighting - Task Lighting	0.0%	75.0%	5	\$0.24	2.570	0.25	\$0.021
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	1.175	0.09	\$0.063
Interior Fluorescent - Delamp and Install Reflectors	0.0%	37.5%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	1.779	0.31	\$0.017
Exterior Lighting - Daylighting Controls	19.0%	37.5%	8	\$0.02	8.893	15.65	\$0.000
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	5.336	0.13	\$0.038
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	1.415	0.37	\$0.012
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.49	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	1.060	0.36	\$0.017
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	2.126	0.67	\$0.007
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.212	0.11	\$0.041
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	1.484	0.29	\$0.021
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.848	1.63	\$0.003
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	1.484	0.32	\$0.018
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	1.484	0.32	\$0.018
Refrigerator - eCube	5.0%	75.0%	12	\$0.24	4.239	0.89	\$0.006
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.632	0.09	\$0.053
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.072	23.20	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.25	0.797	0.12	\$0.046
Pool Heater - Solar	0.0%	33.8%	20	\$1.96	6.249	0.30	\$0.024
Pool Pump - Timer	33.8%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	0.0%	12	\$1.74	26.530	1.00	\$0.007
Ventilation - CO2 Controlled	11.5%	15.0%	10	\$0.04	4.002	4.32	\$0.001
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	50.0%	14	\$0.35	24.569	5.54	\$0.001
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	23.775	9.86	\$0.001
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	14.226	3.80	\$0.001
Custom Measures	0%	0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	40.0%	75.0%	25	\$1.25	22.761	2.52	\$0.004
Commissioning - Lighting	30.0%	75.0%	25	\$0.20	4.635	2.81	\$0.003
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	105.445	7.21	\$0.001

Table C-53 Energy Efficiency Non-Equipment Data— Retail, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	32.272	10.98	\$0.001
Insulation - Ducting	20.5%	50.0%	20	\$0.41	32.698	7.09	\$0.001
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	20.257	6.81	\$0.001
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	9.257	2.38	\$0.003
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	25.589	4.35	\$0.001
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	45.2%	75.0%	20	\$0.44	36.447	7.30	\$0.001
Windows - Install Reflective Film	45.2%	75.0%	20	\$3.00	3.641	0.12	\$0.063
Roof - High Reflectivity	57.5%	95.0%	15	\$0.18	1.981	1.07	\$0.008
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	5.919	0.20	\$0.039
Air-Cooled Chiller - Economizer	4.1%	48.8%	15	\$0.15	20.876	15.57	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	20.266	2.51	\$0.004
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.86	15.365	1.29	\$0.007
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	1.596	0.13	\$0.066
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.050	0.09	\$0.099
Air-Cooled Chiller - Maintenance	45.2%	90.0%	4	\$0.08	8.834	3.25	\$0.002
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.475	0.27	\$0.018
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	5.698	0.19	\$0.040
Water-Cooled Chiller - Economizer	4.1%	48.8%	15	\$0.15	15.544	11.59	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	19.476	2.42	\$0.005
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.86	14.792	1.24	\$0.007
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	1.537	0.13	\$0.069
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.027	0.05	\$0.182
Water-Cooled Chiller - Maintenance	45.2%	90.0%	4	\$0.08	8.505	3.13	\$0.003
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.475	0.27	\$0.018
RTU - Evaporative Precooler	0.0%	13.0%	20	\$3.00	32.655	1.40	\$0.007
RTU - Maintenance	45.2%	90.0%	4	\$0.08	9.360	3.24	\$0.002
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.44	28.099	2.50	\$0.002
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	54.178	0.97	\$0.004
Gas Boiler - Combustion Controls (O2 Trim)	4.1%	48.8%	25	\$0.81	7.468	1.03	\$0.007
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	22.405	10.76	\$0.000
Gas Boiler - Condensing Economizer	4.1%	48.8%	25	\$2.00	24.895	1.39	\$0.005
Gas Boiler - Pipe Insulation	9.6%	50.0%	15	\$0.28	14.068	3.11	\$0.002
Gas Boiler - Steam Trap Maintenance	38.4%	90.0%	4	\$0.08	24.895	4.79	\$0.001
Gas Boiler - Maintenance	38.4%	90.0%	4	\$0.08	32.802	6.31	\$0.001
Gas Furnace - Maintenance	38.4%	90.0%	4	\$0.08	3.899	0.79	\$0.006
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.89	\$0.007
Heat Pump - Maintenance	4.1%	95.0%	4	\$0.03	17.701	16.49	\$0.000
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	5.303	2.46	\$0.003
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	5.745	1.25	\$0.004
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.253	0.64	\$0.007
Water Heater - Faucet Aerators/Low Flow Nozzles	23.3%	90.0%	9	\$0.01	0.572	2.12	\$0.002
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	2.784	1.42	\$0.003
Water Heater - Solar System	0.0%	50.0%	20	\$0.24	6.950	2.55	\$0.003
Water Heater - Install Timer	9.6%	50.0%	15	\$0.28	2.784	0.65	\$0.009
Water Heater - Pipe Insulation	9.6%	50.0%	15	\$0.28	0.787	0.18	\$0.033
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	0.696	1.45	\$0.004
Water Heating - Booster Water Heater	9.6%	50.0%	20	\$0.05	1.114	1.84	\$0.004
Interior Lighting - Daylighting Controls	13.7%	50.0%	8	\$0.11	20.464	5.04	\$0.001
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.136	4.65	\$0.001
Interior Lighting - Occupancy Sensors	4.1%	56.3%	8	\$0.30	6.821	0.62	\$0.006
Interior Lighting - Timeclocks and Timers	4.1%	56.3%	8	\$0.20	3.411	0.46	\$0.009
Interior Lighting - Task Lighting	12.3%	75.0%	5	\$0.24	3.759	0.18	\$0.014
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	2.823	0.22	\$0.026
Interior Fluorescent - Delamp and Install Reflectors	9.6%	30.0%	11	\$0.50	2.398	0.26	\$0.024
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.898	0.15	\$0.033
Exterior Lighting - Daylighting Controls	17.0%	37.5%	8	\$0.02	4.491	7.57	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.695	0.06	\$0.075
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.289	0.08	\$0.061
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.27	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.448	0.12	\$0.039
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.645	0.16	\$0.023
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.090	0.04	\$0.098
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	0.627	0.09	\$0.049
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.358	0.40	\$0.008
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.627	0.11	\$0.042
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.627	0.11	\$0.042
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	1.791	5.41	\$0.001
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.425	0.05	\$0.078
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.050	15.34	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.30	0.557	0.07	\$0.079
Pool Heater - Solar	0.0%	33.8%	20	\$0.24	5.768	2.22	\$0.003
Pool Pump - Timer	0.0%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.22	37.147	9.94	\$0.001
Ventilation - CO2 Controlled	1.0%	15.0%	10	\$0.04	3.788	3.93	\$0.001
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	8.2%	75.0%	14	\$0.35	32.611	6.45	\$0.001
Thermostat - Clock/Programmable	43.8%	50.0%	11	\$0.13	52.327	18.67	\$0.000
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	23.810	5.75	\$0.001
Retrocommissioning - HVAC	5.0%	36.0%	4	\$0.70	33.169	0.87	\$0.006
Retrocommissioning - Lighting	31.5%	36.5%	5	\$0.10	7.270	1.26	\$0.003
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000

Table C-54 Energy Efficiency Non-Equipment Data— Retail, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	25.150	9.17	\$0.001
Insulation - Ducting	0.0%	50.0%	20	\$0.41	26.018	6.11	\$0.001
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	17.069	6.22	\$0.001
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	5.670	1.57	\$0.005
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	16.205	2.94	\$0.002
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	72.7%	75.0%	20	\$0.35	45.045	12.22	\$0.001
Windows - Install Reflective Film	72.7%	75.0%	20	\$3.00	2.720	0.10	\$0.084
Roof - High Reflectivity	63.6%	95.0%	15	\$0.09	1.331	1.57	\$0.006
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	3.827	0.13	\$0.060
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	10.783	8.04	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	15.983	1.98	\$0.006
Air-Cooled Chiller - Chilled Water Reset	10.0%	75.0%	10	\$0.86	9.073	0.76	\$0.012
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.245	0.19	\$0.047
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.031	0.06	\$0.159
Air-Cooled Chiller - Maintenance	45.4%	90.0%	4	\$0.08	5.325	1.96	\$0.004
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.430	0.26	\$0.020
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	3.804	0.13	\$0.061
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	6.055	4.52	\$0.002
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	15.804	1.96	\$0.006
Water-Cooled Chiller - Chilled Water Reset	10.0%	75.0%	10	\$0.86	9.018	0.76	\$0.012
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.231	0.19	\$0.047
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.031	0.06	\$0.160
Water-Cooled Chiller - Maintenance	45.4%	90.0%	4	\$0.08	5.293	1.95	\$0.004
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.430	0.26	\$0.020
RTU - Evaporative Precooler	0.0%	13.0%	20	\$3.00	24.950	1.21	\$0.009
RTU - Maintenance	45.4%	90.0%	4	\$0.08	5.464	2.01	\$0.004
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.44	5.838	0.56	\$0.009
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	28.291	0.54	\$0.008
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	5.878	0.89	\$0.009
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	17.635	9.10	\$0.000
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	19.594	1.20	\$0.007
Gas Boiler - Pipe Insulation	50.0%	50.0%	15	\$0.28	5.938	1.43	\$0.004
Gas Boiler - Steam Trap Maintenance	36.4%	90.0%	4	\$0.08	19.594	4.04	\$0.001
Gas Boiler - Maintenance	36.4%	90.0%	4	\$0.08	25.818	5.32	\$0.001
Gas Furnace - Maintenance	36.4%	90.0%	4	\$0.08	3.367	0.69	\$0.006
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.03	9.506	9.10	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	4.460	2.25	\$0.003
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	4.686	1.10	\$0.005
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.099	0.60	\$0.008
Water Heater - Faucet Aerators/Low Flow Nozzles	36.4%	90.0%	9	\$0.01	0.492	1.97	\$0.003
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	2.442	1.34	\$0.004
Water Heater - Solar System	0.0%	50.0%	20	\$0.24	6.106	2.42	\$0.003
Water Heater - Install Timer	50.0%	50.0%	15	\$0.28	2.442	0.61	\$0.010
Water Heater - Pipe Insulation	50.0%	50.0%	15	\$0.28	0.402	0.10	\$0.064
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	0.536	1.21	\$0.005
Water Heating - Booster Water Heater	50.0%	50.0%	20	\$0.05	0.977	1.74	\$0.004
Interior Lighting - Daylighting Controls	75.0%	75.0%	8	\$0.09	13.587	6.03	\$0.001
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.091	4.57	\$0.001
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	4.529	0.72	\$0.008
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	2.265	0.45	\$0.013
Interior Lighting - Task Lighting	18.2%	75.0%	5	\$0.24	1.875	0.19	\$0.028
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	2.518	0.21	\$0.029
Interior Fluorescent - Delamp and Install Reflectors	9.1%	30.0%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.899	0.15	\$0.033
Exterior Lighting - Daylighting Controls	17.0%	37.5%	8	\$0.02	4.496	7.46	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.698	0.06	\$0.075
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.259	0.07	\$0.068
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.52	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.194	0.07	\$0.090
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.389	0.12	\$0.038
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.039	0.02	\$0.226
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	0.272	0.05	\$0.113
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.155	0.30	\$0.019
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.272	0.06	\$0.098
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.272	0.06	\$0.098
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	0.776	2.67	\$0.002
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.288	0.04	\$0.115
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.049	15.65	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.25	0.543	0.08	\$0.068
Pool Heater - Solar	0.0%	33.8%	20	\$0.24	5.492	2.11	\$0.003
Pool Pump - Timer	33.8%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.22	29.148	8.32	\$0.001
Ventilation - CO2 Controlled	11.5%	15.0%	10	\$0.04	3.115	3.47	\$0.002
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	75.0%	14	\$0.35	22.948	5.05	\$0.001
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	53.507	20.37	\$0.000
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	18.592	4.72	\$0.001
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	40.0%	75.0%	25	\$1.25	26.144	2.78	\$0.003
Commissioning - Lighting	30.0%	75.0%	25	\$0.20	4.979	3.23	\$0.003
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	116.577	7.74	\$0.001

Table C-55 Energy Efficiency Non-Equipment Data— Grocery, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	51.134	23.27	\$0.000
Insulation - Ducting	33.3%	50.0%	20	\$0.41	46.047	10.81	\$0.001
Insulation - Radiant Barrier	0.0%	12.5%	20	\$0.26	24.324	9.88	\$0.001
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	9.396	2.65	\$0.003
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	14.184	3.62	\$0.002
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	33.3%	75.0%	20	\$0.44	23.265	5.18	\$0.001
Windows - Install Reflective Film	33.3%	75.0%	20	\$3.00	4.036	0.24	\$0.057
Roof - High Reflectivity	66.7%	95.0%	15	\$0.18	12.190	15.85	\$0.001
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	8.121	0.71	\$0.028
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	13.120	23.44	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	27.821	8.15	\$0.003
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.37	21.079	10.07	\$0.002
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.190	0.45	\$0.048
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.068	0.30	\$0.072
Air-Cooled Chiller - Maintenance	33.3%	90.0%	4	\$0.08	12.050	11.31	\$0.002
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.972	0.56	\$0.009
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	7.818	0.68	\$0.030
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	25.039	44.73	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	26.719	7.83	\$0.003
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.37	20.292	9.69	\$0.002
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	2.108	0.43	\$0.050
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.037	0.16	\$0.132
Water-Cooled Chiller - Maintenance	33.3%	90.0%	4	\$0.08	11.600	10.89	\$0.002
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.972	0.56	\$0.009
RTU - Evaporative Precooler	0.0%	18.0%	20	\$3.00	44.799	4.53	\$0.005
RTU - Maintenance	33.3%	90.0%	4	\$0.08	12.768	11.29	\$0.002
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.44	24.612	2.18	\$0.002
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	44.809	0.80	\$0.005
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.64	7.059	1.23	\$0.006
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	21.177	10.11	\$0.000
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$1.57	23.530	1.66	\$0.004
Gas Boiler - Pipe Insulation	22.2%	50.0%	15	\$0.28	13.338	2.92	\$0.002
Gas Boiler - Steam Trap Maintenance	22.2%	90.0%	4	\$0.08	23.530	4.50	\$0.001
Gas Boiler - Maintenance	22.2%	90.0%	4	\$0.08	30.435	5.83	\$0.001
Gas Furnace - Maintenance	22.2%	90.0%	4	\$0.08	3.617	0.73	\$0.006
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.93	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.03	23.998	55.72	\$0.000
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.18	0.620	0.27	\$0.024
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.34	11.236	1.42	\$0.004
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	2.261	1.15	\$0.004
Water Heater - Faucet Aerators/Low Flow Nozzles	22.2%	90.0%	9	\$0.01	1.006	3.70	\$0.001
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	5.024	2.56	\$0.002
Water Heater - Solar System	0.0%	50.0%	20	\$0.19	12.556	5.76	\$0.001
Water Heater - Install Timer	22.2%	50.0%	15	\$0.28	5.024	1.15	\$0.005
Water Heater - Pipe Insulation	22.2%	50.0%	15	\$0.28	1.423	0.33	\$0.018
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	1.256	2.59	\$0.002
Water Heating - Booster Water Heater	22.2%	50.0%	20	\$0.04	2.010	4.15	\$0.002
Interior Lighting - Daylighting Controls	22.2%	50.0%	8	\$0.11	28.223	8.41	\$0.001
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.188	7.73	\$0.001
Interior Lighting - Occupancy Sensors	0.0%	56.3%	8	\$0.30	9.408	1.03	\$0.005
Interior Lighting - Timeclocks and Timers	11.1%	56.3%	8	\$0.20	4.704	0.77	\$0.006
Interior Lighting - Task Lighting	0.0%	75.0%	5	\$0.24	3.348	0.17	\$0.016
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	6.090	0.49	\$0.012
Interior Fluorescent - Delamp and Install Reflectors	44.4%	49.4%	11	\$0.55	5.173	0.53	\$0.012
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	1.389	0.18	\$0.021
Exterior Lighting - Daylighting Controls	31.0%	37.5%	8	\$0.02	6.943	8.88	\$0.000
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	4.166	0.07	\$0.049
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	6.957	1.98	\$0.003
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.35	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	3.773	1.06	\$0.005
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	8.717	2.41	\$0.002
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.755	0.37	\$0.012
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	5.282	0.85	\$0.006
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	3.018	3.42	\$0.001
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	5.282	0.96	\$0.005
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	5.282	0.96	\$0.005
Refrigerator - eCube	5.0%	75.0%	12	\$0.17	15.091	3.80	\$0.001
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.511	0.07	\$0.065
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.039	12.15	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.30	0.431	0.05	\$0.102
Pool Heater - Solar	0.0%	33.8%	20	\$0.19	2.114	1.03	\$0.007
Pool Pump - Timer	0.0%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.17	39.853	23.44	\$0.000
Ventilation - CO2 Controlled	1.0%	15.0%	10	\$0.04	6.143	6.30	\$0.001
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	50.0%	14	\$0.35	39.900	14.41	\$0.001
Thermostat - Clock/Programmable	33.3%	50.0%	11	\$0.13	57.557	30.52	\$0.000
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	23.716	7.58	\$0.001
Retrocommissioning - HVAC	5.0%	24.0%	4	\$0.70	35.246	1.50	\$0.005
Retrocommissioning - Lighting	55.6%	60.6%	5	\$0.10	10.102	2.06	\$0.002
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Grocery - Display Case - LED Lighting	12.0%	56.0%	6	\$0.04	50.492	32.06	\$0.000
Grocery - Display Case Motion Sensors	12.0%	56.0%	8	\$2.00	40.393	0.65	\$0.007
Grocery - ECMs for Display Cases	12.0%	56.0%	15	\$0.11	59.090	31.12	\$0.000
Grocery - Open Display Case - Night Covers	5.0%	75.0%	8	\$0.05	3.769	2.72	\$0.002

Table C-56 Energy Efficiency Non-Equipment Data— Grocery, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	51.491	22.41	\$0.000
Insulation - Ducting	33.3%	50.0%	20	\$0.41	49.396	12.39	\$0.001
Insulation - Radiant Barrier	0.0%	12.5%	20	\$0.26	34.828	15.01	\$0.001
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.34	8.063	3.67	\$0.003
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	8.923	2.38	\$0.004
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	33.3%	75.0%	20	\$0.35	18.246	5.44	\$0.001
Windows - Install Reflective Film	33.3%	75.0%	20	\$3.00	3.090	0.19	\$0.074
Roof - High Reflectivity	66.7%	95.0%	15	\$0.09	7.513	21.46	\$0.001
Air-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	5.250	0.46	\$0.044
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	8.167	14.59	\$0.002
Air-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	21.949	6.43	\$0.004
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.37	12.447	5.94	\$0.004
Air-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	3.080	0.63	\$0.034
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.042	0.19	\$0.116
Air-Cooled Chiller - Maintenance	33.3%	90.0%	4	\$0.08	7.127	6.69	\$0.003
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.873	0.53	\$0.010
Water-Cooled Chiller - Condenser Water Temperature Reset	0.0%	0.0%	4	\$0.86	5.218	0.46	\$0.044
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	20.581	36.77	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.5%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	0.0%	0.0%	20	\$1.17	21.682	6.35	\$0.004
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.37	12.371	5.91	\$0.004
Water-Cooled Chiller - Chilled Water Variable-Flow System	0.0%	0.0%	10	\$0.86	3.061	0.63	\$0.035
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0.0%	0.0%	10	\$0.04	0.042	0.19	\$0.117
Water-Cooled Chiller - Maintenance	33.3%	90.0%	4	\$0.08	7.084	6.65	\$0.003
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.873	0.53	\$0.010
RTU - Evaporative Precooler	0.0%	14.0%	20	\$3.00	33.584	3.84	\$0.007
RTU - Maintenance	33.3%	90.0%	4	\$0.08	7.175	6.73	\$0.003
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.44	11.105	1.07	\$0.005
Gas Boiler - Hot Water Reset	0.0%	0.0%	4	\$0.86	33.985	0.65	\$0.007
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.64	5.680	1.09	\$0.008
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	17.039	8.78	\$0.001
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$1.57	18.933	1.47	\$0.006
Gas Boiler - Pipe Insulation	50.0%	50.0%	15	\$0.28	6.045	1.46	\$0.004
Gas Boiler - Steam Trap Maintenance	22.2%	90.0%	4	\$0.08	18.933	3.89	\$0.001
Gas Boiler - Maintenance	22.2%	90.0%	4	\$0.08	24.488	5.04	\$0.001
Gas Furnace - Maintenance	22.2%	90.0%	4	\$0.08	3.088	0.63	\$0.007
Space Heating - Heat Recovery Ventilator	44.5%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.03	13.956	33.79	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.18	0.040	0.02	\$0.375
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.34	8.545	1.19	\$0.005
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.943	1.08	\$0.005
Water Heater - Faucet Aerators/Low Flow Nozzles	22.2%	90.0%	9	\$0.01	0.866	3.52	\$0.002
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	4.318	2.41	\$0.002
Water Heater - Solar System	0.0%	50.0%	20	\$0.19	10.794	5.52	\$0.001
Water Heater - Install Timer	50.0%	50.0%	15	\$0.28	4.318	1.10	\$0.006
Water Heater - Pipe Insulation	50.0%	50.0%	15	\$0.28	0.738	0.19	\$0.035
Water Heater - Tank Blanket/Insulation	40.4%	50.0%	10	\$0.02	0.929	2.13	\$0.003
Water Heating - Booster Water Heater	50.0%	50.0%	20	\$0.04	1.727	3.97	\$0.002
Interior Lighting - Daylighting Controls	75.0%	75.0%	8	\$0.09	21.587	10.02	\$0.001
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.144	7.56	\$0.001
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	7.196	1.20	\$0.005
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	3.598	0.75	\$0.008
Interior Lighting - Task Lighting	0.0%	75.0%	5	\$0.24	1.589	0.16	\$0.033
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	5.616	0.48	\$0.013
Interior Fluorescent - Delamp and Install Reflectors	44.4%	49.4%	11	\$0.55	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.913	0.16	\$0.032
Exterior Lighting - Daylighting Controls	31.0%	37.5%	8	\$0.02	4.567	7.95	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.740	0.06	\$0.074
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	6.239	1.67	\$0.003
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.40	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	1.638	0.52	\$0.011
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	6.366	1.85	\$0.002
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.328	0.16	\$0.027
Refrigerator - Floating Head Pressure	17.9%	37.5%	16	\$0.35	2.293	0.41	\$0.013
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	1.311	2.53	\$0.002
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	2.293	0.47	\$0.012
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	2.293	0.47	\$0.012
Refrigerator - eCube	5.0%	75.0%	12	\$0.24	6.553	1.29	\$0.004
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.278	0.05	\$0.119
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.038	12.38	\$0.000
Office Equipment - Plug Load Occupancy Sensors	7.1%	56.3%	8	\$0.25	0.418	0.06	\$0.088
Pool Heater - Solar	0.0%	33.8%	20	\$0.19	1.945	0.95	\$0.007
Pool Pump - Timer	33.8%	33.8%	10	\$0.44	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.17	31.336	19.44	\$0.001
Ventilation - CO2 Controlled	11.5%	15.0%	10	\$0.04	4.608	5.18	\$0.001
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	50.0%	14	\$0.35	28.197	10.51	\$0.001
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	55.061	27.25	\$0.000
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	18.785	6.29	\$0.001
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	40.0%	75.0%	25	\$1.25	27.846	4.29	\$0.003
Commissioning - Lighting	30.0%	75.0%	25	\$0.20	7.652	5.11	\$0.002
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	128.712	11.97	\$0.001
Grocery - Display Case - LED Lighting	12.0%	56.0%	6	\$0.02	45.478	49.97	\$0.000
Grocery - Display Case Motion Sensors	0.0%	0.0%	8	\$2.00	36.382	0.53	\$0.008
Grocery - ECMs for Display Cases	12.0%	56.0%	15	\$0.11	53.222	26.95	\$0.000
Grocery - Open Display Case - Night Covers	5.0%	75.0%	8	\$0.05	3.428	2.40	\$0.002

Table C-57 Energy Efficiency Non-Equipment Data— College, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBTU/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	2.0%	12.5%	20	\$0.26	2.591	1.06	\$0.008
Insulation - Ducting	55.5%	60.5%	20	\$0.41	3.995	1.13	\$0.008
Insulation - Radiant Barrier	2.0%	12.5%	20	\$0.26	1.408	0.54	\$0.014
Insulation - Wall Cavity	2.0%	12.5%	20	\$0.09	0.772	0.76	\$0.009
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	7.632	1.45	\$0.005
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	44.5%	100.0%	20	\$2.10	2.004	0.09	\$0.080
Windows - Install Reflective Film	44.5%	100.0%	20	\$3.00	1.341	0.06	\$0.170
Roof - High Reflectivity	22.2%	95.0%	15	\$0.18	3.196	1.84	\$0.005
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.09	4.268	1.41	\$0.006
Air-Cooled Chiller - Economizer	11.1%	81.0%	15	\$0.15	2.482	1.81	\$0.006
Air-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	19.257	2.40	\$0.005
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.09	5.589	4.50	\$0.002
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	1.166	0.94	\$0.009
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.040	0.07	\$0.125
Air-Cooled Chiller - Maintenance	44.5%	90.0%	4	\$0.06	8.360	4.15	\$0.002
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.576	0.34	\$0.015
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.09	4.195	1.38	\$0.006
Water-Cooled Chiller - Economizer	11.1%	81.0%	15	\$0.15	2.322	1.67	\$0.006
Water-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	18.707	2.29	\$0.005
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.09	5.493	4.38	\$0.002
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	1.146	0.91	\$0.010
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.030	0.05	\$0.165
Water-Cooled Chiller - Maintenance	44.5%	90.0%	4	\$0.06	8.216	4.06	\$0.002
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.576	0.34	\$0.015
RTU - Evaporative Precooler	0.0%	5.4%	20	\$3.00	23.559	1.04	\$0.010
RTU - Maintenance	44.5%	90.0%	4	\$0.06	6.753	3.23	\$0.002
Gas Boiler - High Efficiency Hot Water Circulation	1.0%	33.8%	10	\$0.44	3.713	0.33	\$0.015
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.09	7.461	1.27	\$0.003
Gas Boiler - Combustion Controls (O2 Trim)	11.1%	81.0%	25	\$0.21	1.355	0.71	\$0.011
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	4.064	1.94	\$0.002
Gas Boiler - Condensing Economizer	11.1%	81.0%	25	\$0.52	4.516	0.96	\$0.008
Gas Boiler - Pipe Insulation	44.5%	49.5%	15	\$0.28	2.556	0.56	\$0.010
Gas Boiler - Steam Trap Maintenance	0.0%	90.0%	4	\$0.06	4.516	1.15	\$0.004
Gas Boiler - Maintenance	0.0%	90.0%	4	\$0.06	5.890	1.50	\$0.003
Gas Furnace - Maintenance	0.0%	90.0%	4	\$0.06	1.614	0.44	\$0.010
Space Heating - Heat Recovery Ventilator	73.4%	81.0%	15	\$1,150.00	16,080.536	0.94	\$0.007
Heat Pump - Maintenance	33.3%	95.0%	4	\$0.06	12.849	6.11	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	4.180	1.92	\$0.003
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	4.716	1.01	\$0.005
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.779	0.92	\$0.005
Water Heater - Faucet Aerators/Low Flow Nozzles	55.5%	90.0%	9	\$0.03	0.792	1.00	\$0.005
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	3.953	2.05	\$0.002
Water Heater - Solar System	0.0%	50.0%	20	\$0.06	9.883	14.26	\$0.000
Water Heater - Install Timer	44.5%	49.5%	15	\$0.28	3.953	0.94	\$0.006
Water Heater - Pipe Insulation	44.5%	49.5%	15	\$0.28	1.119	0.27	\$0.023
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.988	1.05	\$0.005
Water Heating - Booster Water Heater	44.5%	49.5%	20	\$0.01	1.581	10.27	\$0.001
Interior Lighting - Daylighting Controls	0.0%	10.0%	8	\$0.29	11.939	1.51	\$0.004
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.080	3.68	\$0.002
Interior Lighting - Occupancy Sensors	11.1%	56.3%	8	\$0.28	3.980	0.52	\$0.010
Interior Lighting - Timeclocks and Timers	0.0%	56.3%	8	\$0.20	1.990	0.37	\$0.015
Interior Lighting - Task Lighting	11.1%	75.0%	5	\$0.24	1.500	0.13	\$0.035
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	2.393	0.48	\$0.012
Interior Fluorescent - Delamp and Install Reflectors	55.5%	60.5%	11	\$0.50	2.033	0.22	\$0.028
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.774	0.10	\$0.038
Exterior Lighting - Daylighting Controls	6.0%	37.5%	8	\$0.02	3.870	4.89	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.322	0.04	\$0.087
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.059	0.02	\$0.297
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.27	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.091	0.02	\$0.192
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.143	0.04	\$0.103
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.018	0.01	\$0.481
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.128	0.02	\$0.239
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.073	0.08	\$0.040
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.128	0.02	\$0.207
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.128	0.02	\$0.207
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.366	5.70	\$0.001
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.087	0.01	\$0.383
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.112	35.38	\$0.000
Office Equipment - Plug Load Occupancy Sensors	41.7%	56.3%	8	\$0.28	1.239	0.16	\$0.033
Pool Heater - Solar	0.0%	33.8%	20	\$0.06	6.310	9.08	\$0.001
Pool Pump - Timer	11.1%	33.8%	10	\$0.44	0.045	0.01	\$1.215
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.06	15.437	19.24	\$0.000
Ventilation - CO2 Controlled	1.0%	7.5%	10	\$0.04	1.717	1.75	\$0.003
Non-HVAC Motors - Variable Speed Control	11.1%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	44.5%	90.0%	14	\$0.35	19.326	4.51	\$0.002
Thermostat - Clock/Programmable	44.5%	50.0%	11	\$0.13	11.510	5.58	\$0.001
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	6.611	1.84	\$0.003
Retrocommissioning - HVAC	5.0%	36.0%	4	\$0.25	12.361	1.09	\$0.005
Retrocommissioning - Lighting	66.7%	71.7%	5	\$0.05	4.367	1.96	\$0.003
Custom Measures	0%	0%	-	\$0.00	-	-	\$0.000

Table C-58 Energy Efficiency Non-Equipment Data— College, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	2.0%	12.5%	20	\$0.26	1.947	0.84	\$0.010
Insulation - Ducting	55.5%	60.5%	20	\$0.41	3.234	0.99	\$0.010
Insulation - Radiant Barrier	2.0%	12.5%	20	\$0.26	1.262	0.55	\$0.016
Insulation - Wall Cavity	2.0%	12.5%	20	\$0.09	0.937	1.18	\$0.007
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	5.090	1.04	\$0.007
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	44.5%	100.0%	20	\$1.69	1.627	0.10	\$0.079
Windows - Install Reflective Film	44.5%	100.0%	20	\$3.00	1.048	0.05	\$0.218
Roof - High Reflectivity	22.2%	95.0%	15	\$0.18	2.394	1.48	\$0.007
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.09	2.725	0.92	\$0.009
Air-Cooled Chiller - Economizer	63.5%	81.0%	15	\$0.15	1.584	1.19	\$0.009
Air-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	15.379	1.97	\$0.006
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.09	3.568	2.95	\$0.003
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	1.189	0.98	\$0.009
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.025	0.05	\$0.195
Air-Cooled Chiller - Maintenance	44.5%	90.0%	4	\$0.06	5.293	2.69	\$0.003
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.536	0.33	\$0.016
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.09	3.568	1.21	\$0.007
Water-Cooled Chiller - Economizer	63.5%	81.0%	15	\$0.15	1.568	1.18	\$0.009
Water-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	14.977	1.93	\$0.006
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.09	4.599	3.82	\$0.002
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	1.169	0.97	\$0.009
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.025	0.05	\$0.198
Water-Cooled Chiller - Maintenance	44.5%	90.0%	4	\$0.06	5.204	2.65	\$0.003
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.536	0.33	\$0.016
RTU - Evaporative Precooler	0.0%	3.2%	20	\$3.00	18.669	0.93	\$0.012
RTU - Maintenance	44.5%	90.0%	4	\$0.06	4.240	2.15	\$0.004
Gas Boiler - High Efficiency Hot Water Circulation	1.0%	33.8%	10	\$0.44	1.458	0.14	\$0.037
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.09	6.023	1.11	\$0.004
Gas Boiler - Combustion Controls (O2 Trim)	63.5%	81.0%	25	\$0.21	1.064	0.62	\$0.013
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	3.192	1.66	\$0.003
Gas Boiler - Condensing Economizer	63.5%	81.0%	25	\$0.52	3.546	0.84	\$0.010
Gas Boiler - Pipe Insulation	49.5%	49.5%	15	\$0.28	1.121	0.27	\$0.023
Gas Boiler - Steam Trap Maintenance	0.0%	90.0%	4	\$0.06	3.546	0.98	\$0.005
Gas Boiler - Maintenance	0.0%	90.0%	4	\$0.06	4.625	1.28	\$0.003
Gas Furnace - Maintenance	0.0%	90.0%	4	\$0.06	1.379	0.38	\$0.012
Space Heating - Heat Recovery Ventilator	73.4%	81.0%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	33.3%	95.0%	4	\$0.06	7.280	3.89	\$0.002
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	2.900	1.51	\$0.005
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	3.918	0.94	\$0.006
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.599	0.88	\$0.005
Water Heater - Faucet Aerators/Low Flow Nozzles	55.5%	90.0%	9	\$0.03	0.707	0.95	\$0.006
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	3.553	1.95	\$0.002
Water Heater - Solar System	0.0%	50.0%	20	\$0.06	8.881	13.63	\$0.001
Water Heater - Install Timer	49.5%	49.5%	15	\$0.28	3.553	0.90	\$0.007
Water Heater - Pipe Insulation	49.5%	49.5%	15	\$0.28	0.593	0.15	\$0.043
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.799	0.90	\$0.006
Water Heating - Booster Water Heater	49.5%	49.5%	20	\$0.01	1.421	9.82	\$0.001
Interior Lighting - Daylighting Controls	15.0%	15.0%	8	\$0.19	10.469	2.26	\$0.003
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.070	3.61	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	3.490	0.57	\$0.011
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.745	0.36	\$0.017
Interior Lighting - Task Lighting	11.1%	75.0%	5	\$0.24	1.286	0.13	\$0.041
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	2.174	0.46	\$0.014
Interior Fluorescent - Delamp and Install Reflectors	55.5%	60.5%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.491	0.09	\$0.060
Exterior Lighting - Daylighting Controls	6.0%	37.5%	8	\$0.02	2.457	4.30	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.474	0.03	\$0.137
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.053	0.01	\$0.331
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.56	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.040	0.01	\$0.442
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.085	0.03	\$0.173
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.008	0.00	\$1.109
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.055	0.01	\$0.552
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.032	0.06	\$0.093
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.055	0.01	\$0.478
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.055	0.01	\$0.478
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.158	2.89	\$0.002
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.061	0.01	\$0.544
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.110	35.67	\$0.000
Office Equipment - Plug Load Occupancy Sensors	41.7%	56.3%	8	\$0.25	1.221	0.18	\$0.030
Pool Heater - Solar	0.0%	33.8%	20	\$0.06	6.123	8.92	\$0.001
Pool Pump - Timer	33.8%	33.8%	10	\$0.44	0.045	0.01	\$1.215
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.06	12.403	16.58	\$0.000
Ventilation - CO2 Controlled	5.9%	7.5%	10	\$0.04	1.399	1.60	\$0.004
Non-HVAC Motors - Variable Speed Control	11.1%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	44.5%	90.0%	14	\$0.35	14.079	3.49	\$0.002
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	9.028	4.69	\$0.002
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	5.313	1.58	\$0.004
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$0.80	9.957	1.89	\$0.005
Commissioning - Lighting	60.0%	75.0%	25	\$0.10	3.735	5.01	\$0.002
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	47.762	3.58	\$0.003

Table C-59 Energy Efficiency Non-Equipment Data— School, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	1.606	0.69	\$0.012
Insulation - Ducting	26.9%	50.0%	20	\$0.41	2.282	0.71	\$0.014
Insulation - Radiant Barrier	2.0%	12.5%	20	\$0.26	0.904	0.36	\$0.022
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	0.535	0.06	\$0.111
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	4.637	0.90	\$0.007
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	73.1%	75.0%	20	\$0.88	1.329	0.14	\$0.050
Windows - Install Reflective Film	73.1%	75.0%	20	\$3.00	0.609	0.03	\$0.375
Roof - High Reflectivity	50.0%	75.0%	15	\$0.08	1.540	2.48	\$0.005
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	2.057	0.44	\$0.023
Air-Cooled Chiller - Economizer	3.9%	48.8%	15	\$0.15	1.196	1.09	\$0.011
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	9.283	1.44	\$0.010
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.09	2.694	2.74	\$0.004
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.562	0.29	\$0.039
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.019	0.04	\$0.258
Air-Cooled Chiller - Maintenance	73.1%	90.0%	4	\$0.06	4.029	2.56	\$0.004
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.200	0.11	\$0.044
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	2.022	0.43	\$0.024
Water-Cooled Chiller - Economizer	3.9%	48.8%	15	\$0.15	1.210	1.09	\$0.011
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	9.017	1.37	\$0.010
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.09	2.648	2.66	\$0.004
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.553	0.28	\$0.040
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.014	0.03	\$0.342
Water-Cooled Chiller - Maintenance	73.1%	90.0%	4	\$0.06	3.960	2.50	\$0.004
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.200	0.11	\$0.044
RTU - Evaporative Precooler	0.0%	7.5%	20	\$3.00	11.355	0.62	\$0.020
RTU - Maintenance	73.1%	90.0%	4	\$0.06	3.255	1.99	\$0.005
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.989	0.89	\$0.005
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	6.007	0.51	\$0.008
Gas Boiler - Combustion Controls (O2 Trim)	3.9%	48.8%	25	\$0.21	1.091	0.57	\$0.013
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	3.272	1.56	\$0.003
Gas Boiler - Condensing Economizer	3.9%	48.8%	25	\$0.52	3.636	0.77	\$0.010
Gas Boiler - Pipe Insulation	15.4%	20.4%	15	\$0.28	2.057	0.45	\$0.012
Gas Boiler - Steam Trap Maintenance	34.6%	90.0%	4	\$0.06	3.636	0.93	\$0.004
Gas Boiler - Maintenance	34.6%	90.0%	4	\$0.06	4.742	1.21	\$0.003
Gas Furnace - Maintenance	34.6%	90.0%	4	\$0.06	1.300	0.35	\$0.012
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.94	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	6.034	3.70	\$0.003
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.19	2.290	0.96	\$0.007
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	2.246	0.48	\$0.011
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.168	0.58	\$0.008
Water Heater - Faucet Aerators/Low Flow Nozzles	30.8%	90.0%	9	\$0.03	0.520	0.63	\$0.008
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	2.596	1.29	\$0.003
Water Heater - Solar System	0.0%	50.0%	20	\$0.06	6.491	9.10	\$0.001
Water Heater - Install Timer	15.4%	20.4%	15	\$0.28	2.596	0.60	\$0.010
Water Heater - Pipe Insulation	15.4%	20.4%	15	\$0.28	0.735	0.17	\$0.035
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.649	0.66	\$0.008
Water Heating - Booster Water Heater	15.4%	20.4%	20	\$0.01	1.039	6.55	\$0.001
Interior Lighting - Daylighting Controls	11.5%	12.5%	8	\$0.29	9.987	1.12	\$0.004
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.067	2.68	\$0.002
Interior Lighting - Occupancy Sensors	15.4%	56.3%	8	\$0.28	3.329	0.38	\$0.012
Interior Lighting - Timeclocks and Timers	3.9%	56.3%	8	\$0.20	1.665	0.27	\$0.018
Interior Lighting - Task Lighting	3.9%	75.0%	5	\$0.24	1.816	0.14	\$0.029
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.40	1.292	0.12	\$0.046
Interior Fluorescent - Delamp and Install Reflectors	19.2%	56.3%	11	\$0.50	1.098	0.11	\$0.052
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.547	0.07	\$0.054
Exterior Lighting - Daylighting Controls	6.0%	37.5%	8	\$0.02	2.736	3.53	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.641	0.03	\$0.123
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.061	0.02	\$0.287
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.26	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.095	0.02	\$0.185
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.148	0.04	\$0.099
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.019	0.01	\$0.465
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.132	0.02	\$0.231
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.076	0.09	\$0.039
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.132	0.02	\$0.200
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.132	0.02	\$0.200
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	0.378	2.30	\$0.002
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.090	0.01	\$0.370
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.050	14.74	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.28	0.552	0.07	\$0.075
Pool Heater - Solar	0.0%	33.8%	20	\$0.06	2.128	3.06	\$0.002
Pool Pump - Timer	0.0%	33.8%	10	\$0.13	0.006	0.00	\$2.495
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.06	8.667	12.04	\$0.001
Ventilation - CO2 Controlled	1.0%	11.3%	10	\$0.04	0.818	0.83	\$0.006
Non-HVAC Motors - Variable Speed Control	3.9%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	19.2%	75.0%	14	\$0.35	11.106	2.78	\$0.003
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	6.562	3.50	\$0.002
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	4.195	1.20	\$0.005
Retrocommissioning - HVAC	9.0%	36.0%	4	\$0.25	7.141	0.69	\$0.009
Retrocommissioning - Lighting	30.8%	35.8%	5	\$0.05	3.603	1.42	\$0.003
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000

Table C-60 Energy Efficiency Non-Equipment Data— School, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	1.215	0.55	\$0.016
Insulation - Ducting	33.5%	50.0%	20	\$0.41	1.835	0.62	\$0.017
Insulation - Radiant Barrier	2.0%	12.5%	20	\$0.26	0.787	0.36	\$0.025
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	0.578	0.09	\$0.103
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	2.966	0.63	\$0.012
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	66.5%	75.0%	20	\$0.88	1.053	0.13	\$0.064
Windows - Install Reflective Film	66.5%	75.0%	20	\$3.00	0.460	0.02	\$0.496
Roof - High Reflectivity	33.5%	95.0%	15	\$0.05	1.154	3.20	\$0.004
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	1.313	0.28	\$0.037
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	0.764	0.72	\$0.018
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	7.413	1.18	\$0.012
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.09	1.720	1.79	\$0.006
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.573	0.30	\$0.039
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.012	0.03	\$0.405
Air-Cooled Chiller - Maintenance	66.5%	90.0%	4	\$0.06	2.551	1.66	\$0.006
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.186	0.10	\$0.047
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	1.720	0.37	\$0.028
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	0.836	0.79	\$0.016
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	7.219	1.15	\$0.012
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.09	2.217	2.32	\$0.005
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.564	0.29	\$0.039
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.012	0.03	\$0.412
Water-Cooled Chiller - Maintenance	66.5%	90.0%	4	\$0.06	2.509	1.63	\$0.006
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.186	0.10	\$0.047
RTU - Evaporative Precooler	0.0%	2.6%	20	\$3.00	8.998	0.56	\$0.025
RTU - Maintenance	66.5%	90.0%	4	\$0.06	2.044	1.33	\$0.008
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	1.174	0.39	\$0.014
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	4.849	0.45	\$0.010
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.21	0.856	0.50	\$0.017
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	2.569	1.33	\$0.003
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$0.52	2.855	0.68	\$0.012
Gas Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.903	0.22	\$0.028
Gas Boiler - Steam Trap Maintenance	33.5%	90.0%	4	\$0.06	2.855	0.79	\$0.006
Gas Boiler - Maintenance	33.5%	90.0%	4	\$0.06	3.724	1.03	\$0.004
Gas Furnace - Maintenance	33.5%	90.0%	4	\$0.06	1.110	0.30	\$0.015
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	3.403	2.35	\$0.005
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.19	1.866	0.88	\$0.008
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	1.866	0.45	\$0.013
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.042	0.55	\$0.008
Water Heater - Faucet Aerators/Low Flow Nozzles	33.5%	90.0%	9	\$0.03	0.460	0.59	\$0.009
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	2.315	1.22	\$0.004
Water Heater - Solar System	0.0%	50.0%	20	\$0.06	5.787	8.67	\$0.001
Water Heater - Install Timer	0.0%	0.0%	15	\$0.28	2.315	0.57	\$0.011
Water Heater - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.377	0.09	\$0.068
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.516	0.56	\$0.010
Water Heating - Booster Water Heater	0.0%	0.0%	20	\$0.01	0.926	6.24	\$0.001
Interior Lighting - Daylighting Controls	18.8%	18.8%	8	\$0.19	8.490	1.65	\$0.003
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.057	2.64	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	2.830	0.42	\$0.013
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.415	0.26	\$0.021
Interior Lighting - Task Lighting	0.0%	75.0%	5	\$0.24	1.557	0.14	\$0.034
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.40	1.173	0.11	\$0.050
Interior Fluorescent - Delamp and Install Reflectors	66.5%	71.5%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.353	0.06	\$0.083
Exterior Lighting - Daylighting Controls	6.0%	37.5%	8	\$0.02	1.764	3.10	\$0.002
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.058	0.02	\$0.191
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.055	0.02	\$0.320
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.55	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.041	0.01	\$0.427
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.088	0.03	\$0.167
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.008	0.00	\$1.072
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.057	0.01	\$0.534
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.033	0.06	\$0.090
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.057	0.01	\$0.462
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.057	0.01	\$0.462
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	0.164	0.91	\$0.006
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.063	0.01	\$0.526
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.049	14.87	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.25	0.543	0.08	\$0.068
Pool Heater - Solar	0.0%	33.8%	20	\$0.06	2.065	3.00	\$0.002
Pool Pump - Timer	33.8%	33.8%	10	\$0.13	0.006	0.00	\$2.495
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.06	6.907	10.34	\$0.001
Ventilation - CO2 Controlled	8.7%	11.3%	10	\$0.04	0.666	0.76	\$0.008
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	75.0%	14	\$0.35	8.187	2.17	\$0.004
Thermostat - Clock/Programmable	71.5%	71.5%	11	\$0.13	5.103	2.94	\$0.003
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	3.314	1.03	\$0.006
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	5.695	0.94	\$0.012
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	3.006	2.46	\$0.003
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	29.077	2.28	\$0.005

Table C-61 Energy Efficiency Non-Equipment Data— Health, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	2.0%	12.5%	20	\$0.26	3.884	1.39	\$0.005
Insulation - Ducting	9.8%	50.0%	20	\$0.41	5.773	1.38	\$0.005
Insulation - Radiant Barrier	5.0%	12.5%	20	\$0.26	2.049	0.71	\$0.010
Insulation - Wall Cavity	2.0%	12.5%	20	\$0.09	6.184	5.90	\$0.001
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	14.859	2.56	\$0.002
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	65.9%	100.0%	20	\$2.10	5.121	0.21	\$0.031
Windows - Install Reflective Film	65.9%	100.0%	20	\$3.00	2.261	0.07	\$0.101
Roof - High Reflectivity	39.0%	95.0%	15	\$0.18	2.404	1.04	\$0.007
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.09	6.883	1.65	\$0.004
Air-Cooled Chiller - Economizer	2.4%	81.0%	15	\$0.15	4.401	2.42	\$0.003
Air-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	28.636	2.71	\$0.003
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.30	10.592	1.90	\$0.003
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	2.390	1.43	\$0.005
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.053	0.07	\$0.092
Air-Cooled Chiller - Maintenance	48.8%	90.0%	4	\$0.06	12.436	4.48	\$0.001
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.304	0.18	\$0.029
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.09	7.330	1.74	\$0.003
Water-Cooled Chiller - Economizer	2.4%	81.0%	15	\$0.15	11.494	6.18	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	30.213	2.79	\$0.003
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.30	11.279	1.99	\$0.003
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	2.545	1.50	\$0.004
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.045	0.06	\$0.110
Water-Cooled Chiller - Maintenance	48.8%	90.0%	4	\$0.06	13.243	4.72	\$0.001
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.304	0.18	\$0.029
RTU - Evaporative Precooler	0.0%	2.0%	20	\$3.00	40.894	1.36	\$0.006
RTU - Maintenance	48.8%	90.0%	4	\$0.06	11.722	4.05	\$0.001
Gas Boiler - High Efficiency Hot Water Circulation	1.0%	33.8%	10	\$0.44	5.527	0.49	\$0.010
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.09	10.288	1.75	\$0.002
Gas Boiler - Combustion Controls (O2 Trim)	2.4%	81.0%	25	\$0.45	2.530	0.63	\$0.012
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	7.591	3.62	\$0.001
Gas Boiler - Condensing Economizer	2.4%	81.0%	25	\$1.10	8.434	0.84	\$0.009
Gas Boiler - Pipe Insulation	14.6%	19.6%	15	\$0.28	4.777	1.05	\$0.005
Gas Boiler - Steam Trap Maintenance	34.1%	90.0%	4	\$0.06	8.434	2.15	\$0.002
Gas Boiler - Maintenance	34.1%	90.0%	4	\$0.06	11.002	2.80	\$0.001
Gas Furnace - Maintenance	34.1%	90.0%	4	\$0.06	4.811	1.30	\$0.003
Space Heating - Heat Recovery Ventilator	73.4%	81.0%	15	\$1,150.00	16,080.536	0.89	\$0.007
Heat Pump - Maintenance	4.9%	95.0%	4	\$0.06	20.152	6.96	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	3.660	1.74	\$0.004
Ventilation - Variable Speed Control	2.4%	81.0%	10	\$0.34	12.851	1.64	\$0.003
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	5.178	2.35	\$0.002
Water Heater - Faucet Aerators/Low Flow Nozzles	19.5%	90.0%	9	\$0.03	2.301	2.53	\$0.002
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	11.507	5.22	\$0.001
Water Heater - Solar System	0.0%	50.0%	20	\$0.13	28.778	17.29	\$0.000
Water Heater - Install Timer	14.6%	19.6%	15	\$0.28	11.507	2.39	\$0.002
Water Heater - Pipe Insulation	14.6%	19.6%	15	\$0.28	3.258	0.68	\$0.008
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	2.877	2.66	\$0.002
Water Heating - Booster Water Heater	14.6%	19.6%	20	\$0.03	4.603	12.44	\$0.000
Interior Lighting - Daylighting Controls	14.6%	19.6%	8	\$0.29	16.622	2.03	\$0.003
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.111	4.94	\$0.001
Interior Lighting - Occupancy Sensors	4.9%	56.3%	8	\$0.28	5.541	0.70	\$0.007
Interior Lighting - Timeclocks and Timers	7.3%	56.3%	8	\$0.20	2.770	0.49	\$0.011
Interior Lighting - Task Lighting	9.8%	75.0%	5	\$0.24	1.748	0.14	\$0.030
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	3.814	0.72	\$0.008
Interior Fluorescent - Delamp and Install Reflectors	12.2%	25.0%	11	\$0.50	3.240	0.34	\$0.018
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.525	0.07	\$0.056
Exterior Lighting - Daylighting Controls	11.0%	37.5%	8	\$0.02	2.627	3.53	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.576	0.03	\$0.128
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.091	0.03	\$0.193
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.26	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.141	0.04	\$0.124
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.203	0.05	\$0.073
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.028	0.01	\$0.312
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.197	0.03	\$0.155
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.113	0.13	\$0.026
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.197	0.03	\$0.135
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.197	0.03	\$0.135
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	0.563	2.59	\$0.002
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.133	0.02	\$0.249
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.099	31.13	\$0.000
Office Equipment - Plug Load Occupancy Sensors	41.7%	56.3%	8	\$0.28	1.095	0.14	\$0.038
Pool Heater - Solar	0.0%	33.8%	20	\$0.13	11.241	7.22	\$0.001
Pool Pump - Timer	2.4%	33.8%	10	\$0.44	0.081	0.01	\$0.668
Destratification Fans (HVLS)	2.4%	33.0%	12	\$0.12	26.099	12.29	\$0.000
Ventilation - CO2 Controlled	1.0%	7.5%	10	\$0.04	4.598	4.74	\$0.001
Non-HVAC Motors - Variable Speed Control	2.4%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	90.0%	14	\$0.35	26.770	5.09	\$0.001
Thermostat - Clock/Programmable	63.4%	68.4%	11	\$0.13	20.452	8.05	\$0.001
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	12.547	3.05	\$0.002
Retrocommissioning - HVAC	5.0%	36.0%	4	\$0.25	23.112	1.67	\$0.003
Retrocommissioning - Lighting	12.2%	17.2%	5	\$0.05	5.803	2.56	\$0.002
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000

Table C-62 Energy Efficiency Non-Equipment Data— Health, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	2.0%	12.5%	20	\$0.26	4.225	1.55	\$0.005
Insulation - Ducting	9.1%	50.0%	20	\$0.41	6.006	1.47	\$0.005
Insulation - Radiant Barrier	5.0%	12.5%	20	\$0.26	2.743	1.00	\$0.007
Insulation - Wall Cavity	2.0%	12.5%	20	\$0.09	7.904	8.53	\$0.001
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	9.950	1.85	\$0.003
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	90.9%	100.0%	20	\$1.69	5.239	0.29	\$0.025
Windows - Install Reflective Film	90.9%	100.0%	20	\$3.00	1.787	0.06	\$0.128
Roof - High Reflectivity	45.5%	95.0%	15	\$0.18	1.929	0.89	\$0.009
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.09	4.553	1.11	\$0.005
Air-Cooled Chiller - Economizer	60.8%	81.0%	15	\$0.15	2.911	1.64	\$0.005
Air-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	23.275	2.25	\$0.004
Air-Cooled Chiller - Chilled Water Reset	50.0%	75.0%	10	\$0.30	7.327	1.34	\$0.005
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	2.163	1.32	\$0.005
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.035	0.05	\$0.140
Air-Cooled Chiller - Maintenance	72.7%	90.0%	4	\$0.06	8.015	2.94	\$0.002
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.280	0.16	\$0.031
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.09	6.175	1.51	\$0.004
Water-Cooled Chiller - Economizer	60.8%	81.0%	15	\$0.15	6.429	3.61	\$0.002
Water-Cooled Chiller - Thermal Energy Storage	73.4%	81.0%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	3.0%	75.0%	20	\$1.17	23.974	2.32	\$0.004
Water-Cooled Chiller - Chilled Water Reset	50.0%	75.0%	10	\$0.30	7.586	1.39	\$0.005
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.09	2.239	1.37	\$0.005
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25.0%	36.9%	10	\$0.04	0.036	0.05	\$0.135
Water-Cooled Chiller - Maintenance	72.7%	90.0%	4	\$0.06	8.298	3.04	\$0.002
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.280	0.16	\$0.031
RTU - Evaporative Precooler	0.0%	1.0%	20	\$3.00	31.806	1.20	\$0.007
RTU - Maintenance	72.7%	90.0%	4	\$0.06	7.225	2.65	\$0.002
Gas Boiler - High Efficiency Hot Water Circulation	1.0%	33.8%	10	\$0.44	2.664	0.26	\$0.020
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.09	7.182	1.33	\$0.003
Gas Boiler - Combustion Controls (O2 Trim)	60.8%	81.0%	25	\$0.28	1.921	0.85	\$0.010
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	5.762	3.00	\$0.002
Gas Boiler - Condensing Economizer	60.8%	81.0%	25	\$0.69	6.402	1.15	\$0.007
Gas Boiler - Pipe Insulation	14.1%	14.1%	15	\$0.28	2.033	0.50	\$0.013
Gas Boiler - Steam Trap Maintenance	34.1%	90.0%	4	\$0.06	6.402	1.77	\$0.003
Gas Boiler - Maintenance	34.1%	90.0%	4	\$0.06	8.350	2.31	\$0.002
Gas Furnace - Maintenance	36.4%	90.0%	4	\$0.06	4.131	1.13	\$0.004
Space Heating - Heat Recovery Ventilator	73.4%	81.0%	15	\$1,150.00	16,080.536	0.91	\$0.007
Heat Pump - Maintenance	9.1%	95.0%	4	\$0.06	13.319	4.35	\$0.001
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.17	2.428	1.30	\$0.006
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.34	10.420	1.48	\$0.004
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	4.180	2.17	\$0.002
Water Heater - Faucet Aerators/Low Flow Nozzles	27.3%	90.0%	9	\$0.03	1.864	2.36	\$0.002
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	9.288	4.82	\$0.001
Water Heater - Solar System	0.0%	50.0%	20	\$0.08	23.221	26.02	\$0.000
Water Heater - Install Timer	14.1%	14.1%	15	\$0.28	9.288	2.25	\$0.003
Water Heater - Pipe Insulation	14.1%	14.1%	15	\$0.28	1.491	0.36	\$0.017
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	1.877	2.01	\$0.003
Water Heating - Booster Water Heater	14.1%	14.1%	20	\$0.02	3.715	18.74	\$0.000
Interior Lighting - Daylighting Controls	32.3%	32.3%	8	\$0.19	15.113	3.05	\$0.002
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.101	4.88	\$0.001
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	5.038	0.77	\$0.007
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	2.519	0.48	\$0.012
Interior Lighting - Task Lighting	27.3%	75.0%	5	\$0.24	1.529	0.14	\$0.034
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	3.541	0.70	\$0.008
Interior Fluorescent - Delamp and Install Reflectors	18.2%	25.0%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.350	0.06	\$0.084
Exterior Lighting - Daylighting Controls	11.0%	37.5%	8	\$0.02	1.752	3.09	\$0.002
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.051	0.02	\$0.192
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.081	0.02	\$0.215
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.56	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.062	0.02	\$0.284
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.122	0.04	\$0.121
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.012	0.01	\$0.713
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.086	0.02	\$0.355
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.049	0.09	\$0.060
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.086	0.02	\$0.307
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.086	0.02	\$0.307
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	0.246	1.13	\$0.005
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.073	0.01	\$0.457
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.097	31.20	\$0.000
Office Equipment - Plug Load Occupancy Sensors	41.7%	56.3%	8	\$0.25	1.073	0.16	\$0.034
Pool Heater - Solar	0.0%	33.8%	20	\$0.08	10.039	11.14	\$0.001
Pool Pump - Timer	33.8%	33.8%	10	\$0.44	0.081	0.01	\$0.668
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.07	20.601	16.54	\$0.000
Ventilation - CO2 Controlled	5.9%	7.5%	10	\$0.04	3.588	4.12	\$0.001
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	90.0%	14	\$0.35	20.500	4.12	\$0.002
Thermostat - Clock/Programmable	86.8%	86.8%	11	\$0.13	15.710	6.57	\$0.001
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	9.849	2.55	\$0.002
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$0.80	18.224	2.95	\$0.003
Commissioning - Lighting	60.0%	75.0%	25	\$0.10	5.213	6.53	\$0.001
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	80.421	5.19	\$0.002

Table C-63 Energy Efficiency Non-Equipment Data— Lodging, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	0.923	0.34	\$0.021
Insulation - Ducting	4.8%	50.0%	20	\$0.41	2.113	0.54	\$0.015
Insulation - Radiant Barrier	5.0%	12.5%	20	\$0.26	0.447	0.16	\$0.044
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	0.687	0.08	\$0.086
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	5.110	0.91	\$0.007
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	61.9%	75.0%	20	\$0.88	1.166	0.12	\$0.057
Windows - Install Reflective Film	61.9%	75.0%	20	\$3.00	1.071	0.04	\$0.213
Roof - High Reflectivity	33.3%	75.0%	15	\$0.08	0.961	1.00	\$0.008
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	1.587	0.21	\$0.030
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	0.910	0.55	\$0.015
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	6.596	0.68	\$0.013
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.05	3.107	3.71	\$0.002
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.597	0.20	\$0.037
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.016	0.02	\$0.317
Air-Cooled Chiller - Maintenance	14.3%	90.0%	4	\$0.06	1.156	0.47	\$0.014
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.754	0.41	\$0.012
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	1.601	0.22	\$0.030
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	0.859	0.52	\$0.016
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	6.599	0.68	\$0.013
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.05	3.134	3.76	\$0.002
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.603	0.20	\$0.037
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.011	0.02	\$0.435
Water-Cooled Chiller - Maintenance	14.3%	90.0%	4	\$0.06	1.166	0.48	\$0.014
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.754	0.41	\$0.012
RTU - Evaporative Precooler	0.0%	8.0%	20	\$3.00	18.866	0.69	\$0.012
RTU - Maintenance	14.3%	90.0%	4	\$0.06	2.181	0.85	\$0.007
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	0.642	0.19	\$0.025
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.683	0.39	\$0.010
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.08	0.702	1.01	\$0.007
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	2.106	0.99	\$0.004
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$0.19	2.341	1.37	\$0.005
Gas Boiler - Pipe Insulation	23.8%	28.8%	15	\$0.28	1.325	0.28	\$0.019
Gas Boiler - Steam Trap Maintenance	14.3%	90.0%	4	\$0.06	2.341	0.59	\$0.007
Gas Boiler - Maintenance	14.3%	90.0%	4	\$0.06	3.053	0.77	\$0.005
Gas Furnace - Maintenance	14.3%	90.0%	4	\$0.06	1.486	0.40	\$0.011
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.94	\$0.007
Heat Pump - Maintenance	4.8%	95.0%	4	\$0.06	4.616	1.79	\$0.003
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.18	0.509	0.22	\$0.029
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	1.467	0.31	\$0.017
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	3.921	1.87	\$0.002
Water Heater - Faucet Aerators/Low Flow Nozzles	33.3%	90.0%	9	\$0.03	1.743	2.02	\$0.002
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	8.713	4.16	\$0.001
Water Heater - Solar System	0.0%	50.0%	20	\$0.02	21.784	81.69	\$0.000
Water Heater - Install Timer	23.8%	28.8%	15	\$0.28	8.713	1.90	\$0.003
Water Heater - Pipe Insulation	23.8%	28.8%	15	\$0.28	2.122	0.45	\$0.012
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	2.178	2.12	\$0.002
Water Heating - Booster Water Heater	23.8%	28.8%	20	\$0.01	3.485	58.81	\$0.000
Interior Lighting - Daylighting Controls	9.5%	12.5%	8	\$0.29	13.579	1.09	\$0.003
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.091	2.58	\$0.001
Interior Lighting - Occupancy Sensors	14.3%	56.3%	8	\$0.28	4.526	0.37	\$0.009
Interior Lighting - Timeclocks and Timers	4.8%	56.3%	8	\$0.20	2.263	0.26	\$0.013
Interior Lighting - Task Lighting	9.5%	75.0%	5	\$0.24	4.092	0.23	\$0.013
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	0.502	0.03	\$0.147
Interior Fluorescent - Delamp and Install Reflectors	0.0%	56.3%	11	\$0.50	0.426	0.04	\$0.134
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.650	0.08	\$0.045
Exterior Lighting - Daylighting Controls	20.0%	37.5%	8	\$0.02	3.251	3.88	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.951	0.03	\$0.104
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.130	0.04	\$0.134
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.25	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.202	0.05	\$0.087
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.291	0.07	\$0.051
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.040	0.02	\$0.217
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.283	0.04	\$0.108
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.162	0.18	\$0.018
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.283	0.05	\$0.094
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.283	0.05	\$0.094
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	0.809	3.80	\$0.001
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.192	0.02	\$0.173
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.013	4.20	\$0.001
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.28	0.148	0.02	\$0.277
Pool Heater - Solar	0.0%	47.8%	20	\$0.02	2.998	11.78	\$0.001
Pool Pump - Timer	42.8%	47.8%	10	\$0.13	0.065	0.02	\$0.245
Destratification Fans (HVLS)	0.0%	0.0%	12	\$0.02	9.716	29.36	\$0.000
Ventilation - CO2 Controlled	1.0%	15.0%	10	\$0.04	3.064	3.11	\$0.002
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	9.5%	90.0%	14	\$0.35	15.463	2.76	\$0.002
Thermostat - Clock/Programmable	52.4%	57.4%	11	\$0.13	7.446	3.15	\$0.002
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	4.268	1.10	\$0.005
Retrocommissioning - HVAC	9.0%	24.0%	4	\$0.35	8.207	0.46	\$0.011
Retrocommissioning - Lighting	42.8%	47.8%	5	\$0.05	4.851	1.41	\$0.002
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Lodging - Guest Room Controls	14.3%	56.3%	8	\$0.14	6.115	1.24	\$0.003

Table C-64 Energy Efficiency Non-Equipment Data— Lodging, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	1.431	0.53	\$0.014
Insulation - Ducting	0.0%	50.0%	20	\$0.41	2.362	0.62	\$0.013
Insulation - Radiant Barrier	5.0%	12.5%	20	\$0.26	0.974	0.36	\$0.020
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	0.558	0.07	\$0.106
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	3.194	0.61	\$0.011
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	74.9%	75.0%	20	\$0.88	0.621	0.07	\$0.108
Windows - Install Reflective Film	74.9%	75.0%	20	\$3.00	0.788	0.03	\$0.290
Roof - High Reflectivity	50.0%	95.0%	15	\$0.05	0.720	1.33	\$0.006
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	1.075	0.15	\$0.045
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	0.631	0.40	\$0.022
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	5.491	0.60	\$0.016
Air-Cooled Chiller - Chilled Water Reset	10.0%	75.0%	10	\$0.05	2.311	2.88	\$0.003
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.577	0.20	\$0.038
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.011	0.02	\$0.457
Air-Cooled Chiller - Maintenance	25.1%	90.0%	4	\$0.06	0.703	0.29	\$0.023
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.695	0.40	\$0.013
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	1.339	0.19	\$0.036
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	0.405	0.26	\$0.034
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	5.178	0.56	\$0.017
Water-Cooled Chiller - Chilled Water Reset	10.0%	75.0%	10	\$0.05	2.197	2.74	\$0.003
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.548	0.19	\$0.040
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.010	0.02	\$0.481
Water-Cooled Chiller - Maintenance	25.1%	90.0%	4	\$0.06	0.668	0.28	\$0.024
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.695	0.40	\$0.013
RTU - Evaporative Precooler	0.0%	8.0%	20	\$3.00	13.768	0.58	\$0.017
RTU - Maintenance	25.1%	90.0%	4	\$0.06	1.162	0.49	\$0.014
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.192	0.06	\$0.083
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.776	0.25	\$0.017
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.08	0.515	0.84	\$0.010
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.544	0.79	\$0.006
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$0.19	1.715	1.13	\$0.007
Gas Boiler - Pipe Insulation	30.1%	30.1%	15	\$0.28	0.545	0.13	\$0.047
Gas Boiler - Steam Trap Maintenance	25.1%	90.0%	4	\$0.06	1.715	0.47	\$0.009
Gas Boiler - Maintenance	25.1%	90.0%	4	\$0.06	2.237	0.61	\$0.007
Gas Furnace - Maintenance	25.1%	90.0%	4	\$0.06	1.252	0.34	\$0.013
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.94	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	2.993	1.08	\$0.005
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.18	3.180	1.55	\$0.005
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	1.079	0.26	\$0.023
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	3.333	1.76	\$0.003
Water Heater - Faucet Aerators/Low Flow Nozzles	0.0%	90.0%	9	\$0.03	1.481	1.91	\$0.003
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	7.407	3.91	\$0.001
Water Heater - Solar System	0.0%	50.0%	20	\$0.02	18.517	77.90	\$0.000
Water Heater - Install Timer	30.1%	30.1%	15	\$0.28	7.407	1.81	\$0.003
Water Heater - Pipe Insulation	30.1%	30.1%	15	\$0.28	1.051	0.26	\$0.024
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	1.577	1.71	\$0.003
Water Heating - Booster Water Heater	30.1%	30.1%	20	\$0.01	2.963	56.08	\$0.000
Interior Lighting - Daylighting Controls	18.8%	18.8%	8	\$0.19	8.751	1.65	\$0.003
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.058	2.62	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	2.917	0.42	\$0.013
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.459	0.26	\$0.020
Interior Lighting - Task Lighting	0.0%	75.0%	5	\$0.24	2.548	0.24	\$0.021
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	0.417	0.03	\$0.176
Interior Fluorescent - Delamp and Install Reflectors	0.0%	56.3%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.410	0.07	\$0.072
Exterior Lighting - Daylighting Controls	20.0%	37.5%	8	\$0.02	2.052	3.52	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.231	0.03	\$0.164
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.117	0.03	\$0.150
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.54	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.087	0.03	\$0.200
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.174	0.06	\$0.084
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.017	0.01	\$0.502
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.122	0.02	\$0.250
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.070	0.13	\$0.042
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.122	0.03	\$0.216
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.122	0.03	\$0.216
Refrigerator - eCube	5.0%	75.0%	12	\$0.01	0.350	1.77	\$0.003
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.104	0.02	\$0.318
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.013	4.24	\$0.001
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.25	0.147	0.02	\$0.251
Pool Heater - Solar	0.0%	55.0%	20	\$0.02	2.775	11.42	\$0.001
Pool Pump - Timer	55.0%	55.0%	10	\$0.13	0.065	0.02	\$0.245
Destratification Fans (HVLS)	0.0%	0.0%	12	\$0.02	7.317	23.95	\$0.000
Ventilation - CO2 Controlled	11.5%	15.0%	10	\$0.04	2.433	2.75	\$0.002
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	90.0%	14	\$0.35	10.617	2.27	\$0.003
Thermostat - Clock/Programmable	100.0%	100.0%	11	\$0.13	5.466	2.49	\$0.003
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	3.256	0.89	\$0.006
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	6.250	0.85	\$0.011
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	3.122	2.38	\$0.003
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	31.893	2.11	\$0.004
Lodging - Guest Room Controls	56.3%	56.3%	8	\$0.14	4.197	1.15	\$0.005

Table C-65 Energy Efficiency Non-Equipment Data— Warehouse, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBTU/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	13.259	7.56	\$0.001
Insulation - Ducting	15.3%	50.0%	20	\$0.41	11.233	3.06	\$0.003
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	7.393	3.35	\$0.003
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	8.181	1.15	\$0.007
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	3.027	1.21	\$0.011
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	46.9%	75.0%	20	\$1.33	2.844	0.35	\$0.036
Windows - Install Reflective Film	46.9%	75.0%	20	\$3.00	0.694	0.06	\$0.329
Roof - High Reflectivity	50.0%	75.0%	15	\$0.08	6.961	23.29	\$0.001
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.499	1.69	\$0.014
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	8.218	16.48	\$0.002
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.964	4.37	\$0.007
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.239	2.95	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.178	1.34	\$0.019
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.031	0.16	\$0.160
Air-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.651	8.21	\$0.003
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.134	0.08	\$0.065
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.396	1.64	\$0.014
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	9.668	19.39	\$0.001
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.558	4.24	\$0.007
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.996	2.87	\$0.009
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.143	1.30	\$0.019
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.019	0.10	\$0.259
Water-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.485	7.96	\$0.003
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.134	0.08	\$0.065
RTU - Evaporative Precooler	0.0%	6.0%	20	\$3.00	19.063	2.23	\$0.012
RTU - Maintenance	62.2%	90.0%	4	\$0.06	5.465	7.53	\$0.003
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	4.821	1.43	\$0.003
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	9.296	0.79	\$0.005
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	1.281	0.17	\$0.043
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	3.844	1.82	\$0.002
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	4.271	0.23	\$0.032
Gas Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	2.414	0.52	\$0.011
Gas Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	4.271	1.08	\$0.004
Gas Boiler - Maintenance	31.7%	90.0%	4	\$0.06	5.628	1.43	\$0.003
Gas Furnace - Maintenance	31.7%	90.0%	4	\$0.06	3.131	0.85	\$0.005
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.93	\$0.007
Heat Pump - Maintenance	3.1%	95.0%	4	\$0.06	10.057	14.12	\$0.002
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.13	1.276	0.75	\$0.008
Ventilation - Variable Speed Control	4.2%	81.0%	10	\$0.20	1.314	0.28	\$0.019
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	0.308	0.16	\$0.029
Water Heater - Faucet Aerators/Low Flow Nozzles	19.5%	90.0%	9	\$0.03	0.140	0.18	\$0.029
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	0.684	0.36	\$0.013
Water Heater - Solar System	0.0%	50.0%	20	\$0.24	1.708	0.63	\$0.011
Water Heater - Install Timer	6.1%	11.1%	15	\$0.28	0.684	0.16	\$0.037
Water Heater - Pipe Insulation	6.1%	11.1%	15	\$0.28	0.193	0.05	\$0.132
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.171	0.18	\$0.029
Water Heating - Booster Water Heater	6.1%	11.1%	20	\$0.05	0.274	0.46	\$0.015
Interior Lighting - Daylighting Controls	15.3%	20.3%	8	\$0.29	11.124	1.12	\$0.004
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.074	2.64	\$0.002
Interior Lighting - Occupancy Sensors	6.1%	56.3%	8	\$0.28	14.832	1.51	\$0.003
Interior Lighting - Timeclocks and Timers	3.1%	56.3%	8	\$0.20	1.854	0.27	\$0.016
Interior Lighting - Task Lighting	6.1%	75.0%	5	\$0.24	0.664	0.05	\$0.079
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.569	0.12	\$0.052
Interior Fluorescent - Delamp and Install Reflectors	18.3%	56.3%	11	\$0.50	0.484	0.06	\$0.118
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.828	0.12	\$0.036
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	4.141	5.76	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.484	0.05	\$0.081
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	-	-	\$0.000
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.43	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	-	-	\$0.000
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	-	-	\$0.000
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	-	-	\$0.000
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	-	-	\$0.000
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	-	-	\$0.000
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	-	-	\$0.000
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	-	-	\$0.000
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	-	1.00	\$0.000
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	2.183	0.28	\$0.015
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.102	33.10	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.28	1.138	0.15	\$0.036
Pool Heater - Solar	0.0%	33.8%	20	\$0.24	1.536	0.59	\$0.012
Pool Pump - Timer	0.0%	33.8%	10	\$0.13	-	-	\$0.000
Destratification Fans (HVLS)	4.2%	33.0%	12	\$0.22	17.372	14.13	\$0.001
Ventilation - CO2 Controlled	1.0%	7.5%	10	\$0.04	0.456	0.46	\$0.011
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	7.2%	75.0%	14	\$0.35	14.353	6.46	\$0.002
Thermostat - Clock/Programmable	31.7%	50.0%	11	\$0.13	7.974	5.60	\$0.002
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	5.177	2.36	\$0.004
Retrocommissioning - HVAC	9.0%	24.0%	4	\$0.35	8.715	1.14	\$0.011
Retrocommissioning - Lighting	25.6%	30.6%	5	\$0.05	4.122	1.52	\$0.003
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000

Table C-66 Energy Efficiency Non-Equipment Data— Warehouse, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	8.158	5.13	\$0.002
Insulation - Ducting	0.0%	50.0%	20	\$0.41	7.513	2.65	\$0.004
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	5.523	3.30	\$0.004
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	4.039	0.67	\$0.015
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	2.015	0.85	\$0.017
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	78.0%	100.0%	20	\$1.00	2.363	0.44	\$0.032
Windows - Install Reflective Film	78.0%	100.0%	20	\$3.00	0.523	0.05	\$0.436
Roof - High Reflectivity	55.9%	95.0%	15	\$0.05	5.337	31.45	\$0.001
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.524	1.22	\$0.019
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	5.060	10.15	\$0.003
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	10.318	3.48	\$0.009
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.670	1.67	\$0.015
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.359	1.54	\$0.016
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.020	0.10	\$0.252
Air-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.601	5.23	\$0.004
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.124	0.07	\$0.071
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.701	1.31	\$0.018
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	4.231	8.49	\$0.003
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	11.003	3.71	\$0.008
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.998	1.79	\$0.014
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.455	1.65	\$0.015
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.021	0.11	\$0.235
Water-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.854	5.60	\$0.004
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.124	0.07	\$0.071
RTU - Evaporative Precooler	0.0%	7.0%	20	\$3.00	15.256	2.01	\$0.015
RTU - Maintenance	62.8%	90.0%	4	\$0.06	3.500	5.08	\$0.005
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.993	0.32	\$0.016
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	4.814	0.44	\$0.010
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	1.000	0.15	\$0.055
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	3.001	1.55	\$0.003
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	3.334	0.20	\$0.040
Gas Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	1.010	0.24	\$0.025
Gas Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	3.334	0.91	\$0.005
Gas Boiler - Maintenance	44.1%	90.0%	4	\$0.06	4.393	1.21	\$0.004
Gas Furnace - Maintenance	44.1%	90.0%	4	\$0.06	2.648	0.72	\$0.006
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	5.650	8.07	\$0.003
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.13	1.022	0.66	\$0.010
Ventilation - Variable Speed Control	0.0%	81.0%	10	\$0.20	1.038	0.24	\$0.024
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	0.273	0.15	\$0.032
Water Heater - Faucet Aerators/Low Flow Nozzles	0.0%	90.0%	9	\$0.03	0.122	0.16	\$0.033
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	0.607	0.34	\$0.014
Water Heater - Solar System	0.0%	50.0%	20	\$0.24	1.517	0.60	\$0.012
Water Heater - Install Timer	0.0%	0.0%	15	\$0.28	0.607	0.15	\$0.042
Water Heater - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.101	0.03	\$0.253
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.135	0.15	\$0.037
Water Heating - Booster Water Heater	0.0%	0.0%	20	\$0.05	0.243	0.43	\$0.017
Interior Lighting - Daylighting Controls	42.2%	42.2%	8	\$0.19	7.001	1.54	\$0.004
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.047	2.45	\$0.003
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	9.334	1.56	\$0.004
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.167	0.24	\$0.025
Interior Lighting - Task Lighting	0.0%	75.0%	5	\$0.24	0.442	0.05	\$0.119
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.549	0.12	\$0.054
Interior Fluorescent - Delamp and Install Reflectors	18.7%	56.3%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.566	0.10	\$0.052
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	2.828	5.01	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.697	0.04	\$0.119
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	-	-	\$0.000
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.60	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	-	-	\$0.000
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	-	-	\$0.000
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	-	-	\$0.000
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	-	-	\$0.000
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	-	-	\$0.000
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	-	-	\$0.000
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	-	-	\$0.000
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	-	1.00	\$0.000
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	1.483	0.21	\$0.022
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.100	33.18	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.25	1.116	0.17	\$0.033
Pool Heater - Solar	0.0%	33.8%	20	\$0.24	1.462	0.56	\$0.013
Pool Pump - Timer	33.8%	33.8%	10	\$0.13	-	-	\$0.000
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.22	13.815	12.19	\$0.002
Ventilation - CO2 Controlled	5.9%	7.5%	10	\$0.04	0.365	0.40	\$0.014
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	0.0%	75.0%	14	\$0.35	9.595	4.75	\$0.003
Thermostat - Clock/Programmable	86.3%	86.3%	11	\$0.13	10.995	8.04	\$0.001
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	4.084	1.99	\$0.005
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	6.924	1.95	\$0.010
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	2.616	2.35	\$0.004
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	33.896	4.38	\$0.004

Table C-67 Energy Efficiency Non-Equipment Data— Miscellaneous Commercial, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	16.220	5.36	\$0.001
Insulation - Ducting	17.8%	50.0%	20	\$0.41	16.427	3.47	\$0.002
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	10.191	3.31	\$0.002
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	11.764	1.27	\$0.005
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	12.607	2.09	\$0.003
Doors - High Efficiency	0.0%	0.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	63.0%	75.0%	20	\$0.88	18.278	1.78	\$0.004
Windows - Install Reflective Film	63.0%	75.0%	20	\$3.00	1.806	0.06	\$0.126
Roof - High Reflectivity	36.3%	75.0%	15	\$0.08	0.958	1.35	\$0.008
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	2.888	0.53	\$0.017
Air-Cooled Chiller - Economizer	2.1%	48.8%	15	\$0.15	10.184	8.10	\$0.001
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	9.899	1.34	\$0.009
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.495	1.05	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.779	0.35	\$0.028
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.024	0.05	\$0.203
Air-Cooled Chiller - Maintenance	44.5%	90.0%	4	\$0.06	4.310	2.39	\$0.004
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.413	0.26	\$0.021
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	2.780	0.52	\$0.017
Water-Cooled Chiller - Economizer	2.1%	48.8%	15	\$0.15	8.874	7.12	\$0.002
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	9.501	1.30	\$0.009
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.216	1.02	\$0.010
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	0.750	0.34	\$0.030
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.013	0.03	\$0.372
Water-Cooled Chiller - Maintenance	44.5%	90.0%	4	\$0.06	4.149	2.32	\$0.004
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.413	0.26	\$0.021
RTU - Evaporative Precooler	0.0%	10.0%	20	\$3.00	15.930	0.79	\$0.014
RTU - Maintenance	44.5%	90.0%	4	\$0.06	4.566	2.48	\$0.004
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	14.280	4.17	\$0.001
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	23.145	1.93	\$0.002
Gas Boiler - Combustion Controls (O2 Trim)	2.1%	48.8%	25	\$0.81	3.850	0.51	\$0.014
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	11.551	5.40	\$0.001
Gas Boiler - Condensing Economizer	2.1%	48.8%	25	\$2.00	12.835	0.69	\$0.010
Gas Boiler - Pipe Insulation	24.0%	29.0%	15	\$0.28	7.253	1.55	\$0.004
Gas Boiler - Steam Trap Maintenance	24.7%	90.0%	4	\$0.06	12.835	3.21	\$0.001
Gas Boiler - Maintenance	24.7%	90.0%	4	\$0.06	16.736	4.19	\$0.001
Gas Furnace - Maintenance	24.7%	90.0%	4	\$0.06	1.989	0.54	\$0.008
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.93	\$0.007
Heat Pump - Maintenance	6.2%	95.0%	4	\$0.06	8.426	4.69	\$0.002
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.19	2.214	0.95	\$0.007
Ventilation - Variable Speed Control	1.4%	81.0%	10	\$0.20	2.399	0.52	\$0.010
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.755	0.87	\$0.005
Water Heater - Faucet Aerators/Low Flow Nozzles	27.4%	90.0%	9	\$0.03	0.807	0.97	\$0.005

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	3.900	1.94	\$0.002
Water Heater - Solar System	0.0%	50.0%	20	\$0.24	9.732	3.49	\$0.002
Water Heater - Install Timer	24.0%	29.0%	15	\$0.28	3.900	0.89	\$0.007
Water Heater - Pipe Insulation	24.0%	29.0%	15	\$0.28	1.102	0.25	\$0.023
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.975	0.99	\$0.005
Water Heating - Booster Water Heater	24.0%	29.0%	20	\$0.05	1.560	2.52	\$0.003
Interior Lighting - Daylighting Controls	7.5%	12.5%	8	\$0.29	10.480	1.00	\$0.004
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.070	2.38	\$0.002
Interior Lighting - Occupancy Sensors	6.8%	56.3%	8	\$0.28	3.493	0.34	\$0.012
Interior Lighting - Timeclocks and Timers	4.8%	56.3%	8	\$0.20	1.747	0.24	\$0.017
Interior Lighting - Task Lighting	17.8%	75.0%	5	\$0.24	1.058	0.07	\$0.050
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	0.623	0.05	\$0.118
Interior Fluorescent - Delamp and Install Reflectors	15.1%	67.5%	11	\$0.50	0.529	0.06	\$0.108
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	1.159	0.18	\$0.025
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	5.797	8.75	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	3.478	0.07	\$0.058
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.104	0.03	\$0.168
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.25	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.162	0.04	\$0.108
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.233	0.06	\$0.063
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.032	0.01	\$0.272
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.226	0.03	\$0.135
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.129	0.15	\$0.023
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.226	0.04	\$0.117
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.226	0.04	\$0.117
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.646	8.72	\$0.000
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.153	0.02	\$0.217
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.042	13.69	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.28	0.469	0.06	\$0.088
Pool Heater - Solar	0.0%	33.8%	20	\$0.24	14.480	5.22	\$0.001
Pool Pump - Timer	0.7%	33.8%	10	\$0.13	0.011	0.00	\$1.478
Destratification Fans (HVLS)	1.4%	33.0%	12	\$0.22	18.597	5.20	\$0.001
Ventilation - CO2 Controlled	1.0%	15.0%	10	\$0.04	1.582	1.62	\$0.003
Non-HVAC Motors - Variable Speed Control	0.7%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	9.6%	75.0%	14	\$0.35	16.567	3.47	\$0.002
Thermostat - Clock/Programmable	44.5%	50.0%	11	\$0.13	26.422	9.22	\$0.001
HVAC - Occupancy Sensors	14.3%	56.3%	8	\$0.14	11.930	2.85	\$0.002
Retrocommissioning - HVAC	9.0%	24.0%	4	\$0.70	16.467	0.44	\$0.011
Retrocommissioning - Lighting	34.2%	39.2%	5	\$0.10	4.073	0.72	\$0.005
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000

Table C-68 Energy Efficiency Non-Equipment Data— Miscellaneous Commercial, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	12.286	4.49	\$0.002
Insulation - Ducting	8.3%	50.0%	20	\$0.41	12.708	3.02	\$0.002
Insulation - Radiant Barrier	7.0%	12.5%	20	\$0.26	8.341	3.05	\$0.002
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	6.733	0.81	\$0.009
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	7.379	1.35	\$0.005
Doors - High Efficiency	100.0%	100.0%	0	\$0.00	-	3.00	\$0.000
Windows - High Efficiency	77.8%	82.8%	20	\$0.88	21.815	2.36	\$0.003
Windows - Install Reflective Film	77.8%	82.8%	20	\$3.00	1.277	0.05	\$0.179
Roof - High Reflectivity	33.3%	95.0%	15	\$0.05	0.649	1.59	\$0.007
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	1.864	0.36	\$0.026
Air-Cooled Chiller - Economizer	37.9%	48.8%	15	\$0.15	5.252	4.38	\$0.003
Air-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	7.795	1.11	\$0.011
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.419	0.65	\$0.016
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.093	0.51	\$0.020
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.015	0.03	\$0.327
Air-Cooled Chiller - Maintenance	36.1%	90.0%	4	\$0.06	2.627	1.50	\$0.006
Air-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.384	0.24	\$0.023
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	1.855	0.36	\$0.026
Water-Cooled Chiller - Economizer	37.9%	48.8%	15	\$0.15	6.461	5.45	\$0.002
Water-Cooled Chiller - Thermal Energy Storage	44.3%	48.8%	15	\$0.15	-	-	\$0.000
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	7.710	1.11	\$0.012
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.399	0.65	\$0.016
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.088	0.51	\$0.020
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.015	0.03	\$0.329
Water-Cooled Chiller - Maintenance	36.1%	90.0%	4	\$0.06	2.615	1.51	\$0.006
Water-Cooled Chiller - Chiller Heat Recovery	0.0%	50.0%	5	\$0.04	0.384	0.24	\$0.023
RTU - Evaporative Precooler	0.0%	7.0%	20	\$3.00	12.327	0.69	\$0.019
RTU - Maintenance	36.1%	90.0%	4	\$0.06	2.734	1.57	\$0.006
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	4.793	1.56	\$0.003
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	13.555	1.23	\$0.004
Gas Boiler - Combustion Controls (O2 Trim)	37.9%	48.8%	25	\$0.81	2.921	0.44	\$0.019
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	8.762	4.49	\$0.001
Gas Boiler - Condensing Economizer	37.9%	48.8%	25	\$2.00	9.735	0.59	\$0.014
Gas Boiler - Pipe Insulation	30.0%	30.0%	15	\$0.28	2.950	0.71	\$0.009
Gas Boiler - Steam Trap Maintenance	22.2%	90.0%	4	\$0.06	9.735	2.66	\$0.002
Gas Boiler - Maintenance	22.2%	90.0%	4	\$0.06	12.695	3.46	\$0.001
Gas Furnace - Maintenance	22.2%	90.0%	4	\$0.06	1.721	0.47	\$0.009
Space Heating - Heat Recovery Ventilator	44.3%	48.8%	15	\$1,150.00	16,080.536	0.95	\$0.007
Heat Pump - Maintenance	8.3%	95.0%	4	\$0.06	4.530	2.56	\$0.004
Ventilation - ECM on VAV Boxes	0.0%	0.0%	18	\$0.19	1.759	0.84	\$0.009
Ventilation - Variable Speed Control	2.8%	81.0%	10	\$0.20	1.890	0.45	\$0.013
Water Heater - Drainwater Heat Recovery	0.0%	50.0%	5	\$0.04	1.501	0.82	\$0.006
Water Heater - Faucet Aerators/Low Flow Nozzles	30.6%	90.0%	9	\$0.03	0.672	0.89	\$0.006
Water Heater - High Efficiency Circulation Pump	0.0%	0.0%	0	\$0.00	-	2.00	\$0.000

Commercial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/sq ft)	Energy Savings (kBtu/sq ft)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Water Heater - Desuperheater	0.0%	50.0%	5	\$0.04	3.336	1.81	\$0.003
Water Heater - Solar System	0.0%	50.0%	20	\$0.24	8.340	3.31	\$0.002
Water Heater - Install Timer	30.0%	30.0%	15	\$0.28	3.336	0.84	\$0.008
Water Heater - Pipe Insulation	30.0%	30.0%	15	\$0.28	0.534	0.13	\$0.048
Water Heater - Tank Blanket/Insulation	0.0%	0.0%	10	\$0.04	0.715	0.80	\$0.007
Water Heating - Booster Water Heater	30.0%	30.0%	20	\$0.05	1.334	2.38	\$0.003
Interior Lighting - Daylighting Controls	18.8%	18.8%	8	\$0.19	6.797	1.40	\$0.004
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.045	2.25	\$0.003
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	2.266	0.36	\$0.016
Interior Lighting - Timeclocks and Timers	56.3%	56.3%	8	\$0.20	1.133	0.22	\$0.026
Interior Lighting - Task Lighting	16.7%	75.0%	5	\$0.24	0.714	0.07	\$0.074
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.50	0.572	0.05	\$0.129
Interior Fluorescent - Delamp and Install Reflectors	11.1%	67.5%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.971	0.17	\$0.030
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	4.853	8.38	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.912	0.07	\$0.069
Refrigerator - Anti-Sweat Heater	0.0%	75.0%	16	\$0.20	0.093	0.03	\$0.187
Refrigerator - Decommissioning	50.0%	51.7%	8	\$0.13	5.926	1.51	\$0.003
Refrigerator - Demand Defrost	0.0%	75.0%	16	\$0.20	0.070	0.02	\$0.250
Refrigerator - Door Gasket Replacement	5.0%	75.0%	8	\$0.10	0.141	0.05	\$0.105
Refrigerator - Evaporator Fan Controls	0.0%	7.5%	5	\$0.04	0.014	0.01	\$0.627
Refrigerator - Floating Head Pressure	38.0%	45.0%	16	\$0.35	0.098	0.02	\$0.312
Refrigerator - Strip Curtain	5.0%	56.3%	8	\$0.02	0.056	0.11	\$0.052
Refrigerator - High Efficiency Compressor	10.0%	37.5%	15	\$0.29	0.098	0.02	\$0.270
Refrigerator - Variable Speed Compressor	10.0%	37.5%	15	\$0.29	0.098	0.02	\$0.270
Refrigerator - eCube	5.0%	75.0%	12	\$0.00	0.280	4.01	\$0.001
Vending Machine - Controller	2.0%	10.0%	10	\$0.27	0.108	0.02	\$0.308
Office Equipment - ENERGY STAR Power Supplies	10.0%	95.0%	7	\$0.00	0.041	13.77	\$0.000
Office Equipment - Plug Load Occupancy Sensors	12.6%	56.3%	8	\$0.25	0.457	0.07	\$0.081
Pool Heater - Solar	0.0%	33.8%	20	\$0.24	13.396	5.08	\$0.001
Pool Pump - Timer	33.8%	33.8%	10	\$0.13	0.011	0.00	\$1.478
Destratification Fans (HVLS)	2.8%	33.0%	12	\$0.22	14.233	4.34	\$0.002
Ventilation - CO2 Controlled	11.5%	15.0%	10	\$0.04	1.256	1.42	\$0.004
Non-HVAC Motors - Variable Speed Control	0.0%	37.5%	10	\$0.10	-	-	\$0.000
Energy Management System	13.9%	75.0%	14	\$0.35	11.472	2.68	\$0.003
Thermostat - Clock/Programmable	50.0%	50.0%	11	\$0.13	25.862	10.00	\$0.001
HVAC - Occupancy Sensors	56.3%	56.3%	8	\$0.14	8.993	2.34	\$0.002
Custom Measures	0.0%	0.0%	-	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	12.597	1.74	\$0.005
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	2.751	2.33	\$0.004
Advanced New Construction Designs	5.0%	75.0%	25	\$2.00	58.002	3.97	\$0.002

INDUSTRIAL ENERGY EFFICIENCY EQUIPMENT AND MEASURE DATA

This appendix presents detailed information for industrial energy-efficiency measures (*equipment* and *other* measures per the LoadMAP taxonomy) that were evaluated in this study.

Table D-1 and Table D-2 provide brief narrative descriptions for the measures.¹

Table D-3 through Table D-18 list the detailed unit-level data (including economic screen results) for industrial energy-efficiency equipment measures in existing and new buildings. The column headings and units are the same as described for the corresponding residential sector tables above.

Table D-19 through Table D-26 list the detailed unit-level data (including economic screen results) for industrial energy-efficiency non-equipment measures in existing and new buildings. The column headings and units are the same as described for the corresponding residential sector tables above.

¹ Measure Description Sources: Global internal databases. Also, for several measures: Northwest Power & Conservation Council, 6th Plan, "Systems Whole Plant Optimization Overview"

Table D-1 Industrial Energy Efficiency Equipment Measure Descriptions

End Use	Technology	Measure Description
Cooling	Air-Cooled Chiller	A central chiller plant creates chilled water for distribution throughout the facility. Because of the wide variety of system types and sizes, savings and cost values for efficiency improvements represent an average over screw, reciprocating, and centrifugal technologies. Under this simplified approach, each central system is characterized by an aggregate efficiency value (inclusive of chiller, pumps, and motors), in kW/ton with a further efficiency upgrade through the application of variable refrigerant flow technology.
Cooling	Water-Cooled Chiller	A central chiller plant creates chilled water for distribution throughout the facility. Water source chillers include heat rejection via a condenser loop and cooling tower. Because of the wide variety of system types and sizes, savings and cost values for efficiency improvements represent an average over screw, reciprocating, and centrifugal technologies. Under this simplified approach, each central system is characterized by an aggregate efficiency value (inclusive of chiller, pumps, motors, and condenser loop equipment), in kW/ton with a further efficiency upgrade through the application of variable refrigerant flow technology.
Cooling	RTU	Packaged cooling systems, such as rooftop units (RTUs), are simple to install and maintain, and are commonly used in small and medium-sized commercial buildings. Applications range from a single supply system with air intake filters, supply fan, and cooling coil, or can become more complex with the addition of a return air duct, return air fan, and various controls to optimize performance. For packaged RTUs, varying Energy Efficiency Ratios (EER) are modeled, as well as a ductless mini-split system.
Cooling / Heating	Air-Source Heat Pump	For heat pumps, units with increasing EER and COP levels are evaluated, as well as a ductless mini-split system.
Cooling / Heating	Geothermal Heat Pump	For heat pumps, units with increasing EER and COP levels are evaluated.
Heating	Electric Furnace	Resistive heating elements are used to convert electricity directly to heat. The heat is then delivered by a supply fan and duct system to the regions that require heating.
Heating	Electric Room Heat	Resistive heating elements are used to convert electricity directly to heat. Conductive fins surrounding the element or another mechanism is used to deliver the heat directly to the surrounding room or area. These are typically either baseboard or wall-mounted units.
Heating	Furnace	Furnaces heat air and distribute the heated air through the building using ducts. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, smaller-diameter flue pipe, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Boiler	Boiler	Boilers heat water, providing either hot water or steam to be distributed around the building for heating. Steam is distributed via pipes to steam radiators, and hot water can be distributed via baseboard radiators or radiant floor systems, or can heat air via a coil. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, smaller-diameter flue pipe, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Ventilation	Ventilation	A variable air volume ventilation system modulates the air flow rate as needed based on the interior conditions of the building to reduce fan load, improve dehumidification, and reduce energy usage.
Interior Lighting	Screw-in	This measure evaluates higher-efficiency alternatives for screw-in interior lamps including halogen, CFL, and LED.

End Use	Technology	Measure Description
Interior Lighting	High-Bay Fixtures	With the exception of screw-in lighting, industrial lighting efficiency changes typically require more than the simple purchase and installation of an alternative lamp. Restrictions regarding ballasts, fixtures, and circuitry limit the potential for direct substitution of one lamp type for another. Also, during the buildout for a leased office space, management could decide to replace all lamps, ballasts, and fixtures with different configurations. This type of decision-making is modeled on a stock turnover basis because of the time between opportunities for upgrades. For High-Bay fixtures, alternatives include mercury vapor, metal halides, T5 fluorescent high output, and high-pressure sodium.
Interior Lighting	Linear Fluorescent	With the exception of screw-in lighting, industrial lighting efficiency changes typically require more than the simple purchase and installation of an alternative lamp. Restrictions regarding ballasts, fixtures, and circuitry limit the potential for direct substitution of one lamp type for another. Also, during the buildout for a leased office space, management could decide to replace all lamps, ballasts, and fixtures with different configurations. This type of decision-making is modeled on a stock turnover basis because of the time between opportunities for upgrades. For linear fluorescent fixtures, alternatives include T12, T8, Super T8, T5, and LED.
Exterior Lighting	Screw-in	This measure evaluates higher-efficiency alternatives for screw-in interior lamps including halogen, CFL, and LED.
Exterior Lighting	HID	Alternatives modeled include metal halides, T8 and T5 high output, high pressure sodium, and LEDs
Exterior Lighting	Linear Fluorescent	For linear fluorescent fixtures, alternatives include T12, T8, Super T8, T5, and LED.
Process	Process Electrochemical	Electrochemical processes deal with chemical reactions in solution driven by electricity applied at a cathode and anode.
Process	Process Other	This category is a "catch all" for the many unique process applications in the broader industrial sector.
Process	Process Cooling	Industrial process where cooling is applied
Process	Process Refrigeration	Industrial refrigeration process
Process	Process Heating	Industrial process where heating is applied
Process	Other Process	This category is a "catch all" for the many unique process applications in the broader industrial sector.
Motors	Pumps, Fans & Blowers, Compressed Air, Conveyors	Premium efficiency motors reduce the amount of lost energy going into heat rather than power. Since less heat is generated, less energy is needed to cool the motor with a fan. The initial cost of energy efficient motors is generally higher than for standard motors, however their life-cycle costs can make them far more economical because of savings they generate in operating expense. The fact that energy efficient motors run cooler than their standard counterparts also results in an increase in the life of the motor insulation and bearing. High efficiency units use copper instead of aluminum in the windings and increased conductor cross-sectional area to lower a motor's I ² R losses.
Miscellaneous	Miscellaneous	Improvement of miscellaneous electric uses.

Table D-2 Industrial Energy Efficiency Non-Equipment Measure Descriptions

End Use	Measure	Description
HVAC (All)	Insulation - Ceiling	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing the heat loss or gain of a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose; loose-fill (blown) fiberglass; and rigid polystyrene.
HVAC (All)	Insulation - Ducting	Air distribution ducts can be insulated to reduce heating or cooling losses. Best results can be achieved by covering the entire surface area with insulation. Insulation material inhibits the transfer of heat through the air-supply duct. Several types of ducts and duct insulation are available, including flexible duct, pre-insulated duct, duct board, duct wrap, tacked, or glued rigid insulation, and waterproof hard shell materials for exterior ducts.
HVAC (All)	Insulation - Wall Cavity	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing the heat loss or gain of a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose; loose-fill (blown) fiberglass; and rigid polystyrene.
HVAC (All)	HVAC - Duct Repair and Sealing	Leakage in unsealed ducts varies considerably because of the differences in fabricating machinery used, the methods for assembly, installation workmanship, and age of the ductwork. Air leaks from the system to the outdoors result in a direct loss proportional to the amount of leakage and the difference in enthalpy between the outdoor air and the conditioned air. To seal ducts, a wide variety of sealing methods and products exist. Each has a relatively short shelf life, and no documented research has identified the aging characteristics of sealant applications.
Air-Cooled Chiller	Chiller - Economizer	Economizers allow outside air (when it is cool and dry enough) to be brought into the building space to meet cooling loads instead of using mechanically cooled interior air. A dual enthalpy economizer consists of indoor and outdoor temperature and humidity sensors, dampers, motors, and motor controls. Economizers are most applicable to temperate climates and savings will be smaller in extremely hot or humid areas.
Air-Cooled Chiller	Chiller - Efficient Mechanical Layout	Improvements to layout and placement of chiller equipment, for example to enable unobstructed access to cooling tower airflow or minimize the length of refrigerant run between cooling tower and chiller head unit.
Air-Cooled Chiller	Chiller - Maintenance	Filters, coils, and fins require regular cleaning and maintenance for the heat pump or roof top unit to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases.
Air-Cooled Chiller	Chiller - Chilled Water Reset	Chilled water reset controls save energy by improving chiller performance through increasing the supply chilled water temperature, which allows increased suction pressure during low load periods. Raising the chilled water temperature also reduces chilled water piping losses. However, the primary savings from the chilled water reset measure results from chiller efficiency improvement. This is due partly to the smaller temperature difference between chilled water and ambient air, and partly due to the sensitivity of chiller performance to suction temperature.
Air-Cooled Chiller	Chiller - Chilled Water Variable-Flow System	The part-load efficiency of chilled water loops can be improved substantially by varying the flow speed of the delivered water with the building demand for cooling.
Air-Cooled Chiller	Chiller - Condenser Water Temperature Reset	Resetting the condenser water temperature to the lowest possible setting allows the cooling tower to generate cooler water whenever possible and decreases the temperature lift between the condenser and the evaporator. This will generally increase chiller part-load efficiency, though it may require increased tower fan energy use.

End Use	Measure	Description
Air-Cooled Chiller	Chiller - High Efficiency Cooling Tower Fans	High-efficiency cooling fans utilize efficient components and variable frequency drives that improve fan performance by adjusting fan speed and rotation as conditions change.
Air-Cooled Chiller	Chiller - VSD on Fans	Variable speed drives, which reduce chiller energy use under part load, are modeled for both air-cooled and water-cooled chillers.
Roof Top AC	RTU - Maintenance	Regular cleaning and maintenance enables a roof top unit to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
Cooling / Heating	Heat Pump - Maintenance	Regular cleaning and maintenance enables a heat pump to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
HVAC (All)	Roofs - High Reflectivity	The color and material of a building structure surface will determine the amount of solar radiation absorbed by that surface and subsequently transferred into a building. This is called solar absorptance. By using a living roof or a roofing material with a light color (and a lower solar absorptance), the roof will absorb less solar radiation and consequently reduce the cooling load. Living roofs also reduce stormwater runoff.
HVAC (All)	Energy Management System	An energy management system (EMS) allows managers/owners to monitor and control the major energy-consuming systems within a commercial building. At the minimum, the EMS can be used to monitor and record energy consumption of the different end-uses in a building, and can control operation schedules of the HVAC and lighting systems. The monitoring function helps building managers/owners to identify systems that are operating inefficiently so that actions can be taken to correct the problem. The EMS can also provide preventive maintenance scheduling that will reduce the cost of operations and maintenance in the long run. The control functionality of the EMS allows the building manager/owner to operate building systems from one central location. The operation schedules set via the EMS help to prevent building systems from operating during unwanted or unoccupied periods. This analysis assumes that this measure is limited to buildings with a central HVAC system.
HVAC (All)	Thermostat - Clock/Programmable	A programmable thermostat can be added to most heating/cooling systems. They are typically used during winter to lower temperatures at night and in summer to increase temperatures during the afternoon. There are two-setting models, and well as models that allow separate programming for each day of the week. The energy savings from this type of thermostat are identical to those of a "setback" strategy with standard thermostats, but the convenience of a programmable thermostat makes it a much more attractive option. In this analysis, the baseline is assumed to have no thermostat setback.
Interior Lighting	Interior Lighting - Occupancy Sensors	The installation of occupancy sensors allows lights to be turned off during periods when a space is unoccupied, virtually eliminating the wasted energy due to lights being left on. There are several types of occupancy sensors in the market.
Interior Lighting	Interior Lighting - Skylights	Addition of transparent windows/fixtures in the roof to allow daylight to enter and reduce the need for powered lighting.
Interior Lighting	Interior Lighting - Time Clocks and Timers	In many cases lighting remains on at night and during weekends. A simple timer can set a schedule for turning lights off to reduce operating hours.
Interior Lighting	Interior Lighting - LED Exit Lighting	The lamps inside exit signs represent a significant energy end-use, since they usually operate 24 hours per day. Many old exit signs use incandescent lamps, which consume approximately 40 watts per sign. The incandescent lamps can be replaced with LED lamps that are specially designed for this specific purpose. In comparison, the LED lamps consume approximately 2-5 watts.

End Use	Measure	Description
Interior Lighting	Interior Lighting - Daylighting Controls	Daylighting controls use a photosensor to detect ambient light and adjust or turn off electric lights accordingly.
Interior Lighting	Interior Screw-in - Task Lighting	Individual work areas can use task lighting instead of brightly lighting the entire area. Significant energy savings can be realized by focusing light directly where it is needed and lowering the general lighting level. An example of task lighting is the common desk lamp. A 25W desk lamp can be installed in place of a typical lamp in a fixture.
Interior Lighting	Interior Fluorescent - Bi-Level Fixture	Bi-level fixtures have the ability to reduce light output to a lower level, given a control strategy that is based on a timer, occupancy sensor, motion sensor, or manual switch.
Interior Lighting	Interior Fluorescent - Delamp and Install Reflectors	While sometimes included in lighting retrofit projects, delamping is often performed as a separate energy efficiency measure in which a lighting engineer analyzes the lighting provided by current systems compared to the requirements of building occupants. This often leads to the removal of unnecessary lamps corresponding to an overall reduction in energy usage. In addition, installing a reflector in each fixture can improve light distribution from the remaining lamps.
Exterior Lighting	Exterior Lighting - Bi-Level Fixture	Bi-level fixtures have the ability to reduce light output to a lower level, given a control strategy that is based on a timer, occupancy sensor, motion sensor, or manual switch.
Exterior Lighting	Exterior Lighting - Daylighting Controls	Daylighting controls use a photosensor to detect ambient light and adjust or turn off electric lights accordingly.
Exterior Lighting	Exterior Lighting - Photovoltaic Installation	Solar photovoltaic generation may be used to power exterior lighting and thus eliminate all or part of the electrical energy use.
Process	Process - Conductivity Controls	Automated control of conductivity levels in a process solution, for example by variably injecting CO ₂ into a stream of rinse water, can maintain an optimal solution that increases process effectiveness, decreases impurities, reduces scaling or corrosion, and minimizes required rinse time.
Process	Process - Controls on Fume Hoods	Improved fume hoods involve installing sensors and variable-speed controls to provide ventilation based on actual demand. When the relevant equipment or process is not active, the controls automatically decrease the fan speed accordingly.
Process	Process - Timers and Controls	Significant energy savings can frequently be attained from processes by adding a timer or altering their control algorithms.
Process Refrigeration	Refrigeration - Floating Head Pressure	Floating head pressure control allows the pressure in the condenser to "float" with ambient temperatures. This method reduces refrigeration compression ratios, improves system efficiency and extends the compressor life. The greatest savings with a floating head pressure approach occurs when the ambient temperatures are low, such as in the winter season. Floating head pressure control is most practical for new installations. However, retrofits installation can be completed with some existing refrigeration systems. Installing floating head pressure control increases the capacity of the compressor when temperatures are low, which may lead to short cycling.
Process Refrigeration	Refrigeration - System Controls	Refrigeration System Controls would include measures such as temperature sensors, flow/float controls, and pressure controls. These work to improve the refrigeration system by limiting demand and improving overall system efficiency.
Process Refrigeration	Refrigeration - System Maintenance	This measure includes repairing and recharging refrigerant lines, cleaning condenser coils, and replacing the oil. This reduces energy consumption by improving the rate at which the system can compress and cool refrigerant as it moves through the system.
Process Refrigeration	Refrigeration - System Optimization	Refrigeration system optimization is a thorough overhaul of the refrigeration system which involves the resizing, sequencing, and controlling of compressors in order to optimize load.

End Use	Measure	Description
Compressed Air	Compressed Air - Air Usage Reduction	This measure involves a process audit of the facility to determine if the actual application of compressed air can be reduced, reconfigured, consolidated, or otherwise optimized.
Compressed Air	Compressed Air - Compressor Replacement	This measure is the replacement of existing air compressor equipment with more efficient compressors and motors in order to improve energy efficiency.
Compressed Air	Compressed Air - System Controls	Compressed Air System Controls would include measures such as VSDs, centralized controls, and system performance monitoring. These measures work in tandem to reduce energy usage by lowering system demand.
Compressed Air	Compressed Air - System Maintenance	This measure includes repairing holes in air lines, replacing failed nozzles, and lubricating the compressors. This reduces energy consumption by improving compressor efficiency and reducing line loss as gas moves through the system.
Compressed Air	Compressed Air - System Optimization and Improvements	System optimization is a thorough overhaul of the compressed air system which involves the resizing, sequencing, and improving control over all compressors in a system in order to reduce energy consumption to a minimum. This measure may include those from Controls and Maintenance.
Pumps	Pumping System - Controls	Significant energy savings can frequently be attained from processes by adding a timer or altering their control algorithms.
Pumps	Pumping System - Maintenance	This measure includes clearing traps, repairing impellers, and repairing broken seals or valves. This reduces energy consumption by reducing losses incurred by moving fluids through the system.
Pumps	Pumping System - Optimization	Optimization integrates best practices of system analysis, equipment improvements, and operational improvements into a sustaining energy program. A facility that implements such a practice treats its energy program in a similar manner to safety or quality control programs: an individual or team is tasked with developing and enforcing standards, goals are set, regular reports are generated and reported to management, and all plant employees are engaged and held accountable.
Pumps	Pumps - Variable Speed Control	The part-load efficiency of drive systems can be improved by varying the speed of the motor drive. An additional benefit of variable-speed controls is the ability to start and stop the motor and process gradually, thus extending the life of the motor and associated machinery.
Pumps	Pump Equipment Upgrade	Improved design of flow, housing, control valves, impeller trimming, proper sizing, etc to increase productive output per energy input. Moreover, these improved systems could be assessed and managed in accordance with recognized standards such as ASME EA-2-2008.
Fans & Blowers	Fan Equipment Upgrade	Improved design of airflow, blades, housing, sizing, etc to increase productive output per energy input. Fans are widely used in industry for conveyance, drying and ventilation. For example, relatively inefficient centrifugal-radial fans, with efficiency as low as 22%, are commonly used in industry. These fans could be replaced with more efficient centrifugal backwardly inclined fans that increase overall fan efficiency by 20% to 30%. The savings potential for premium-efficiency fans is high, and the costs are relatively low. However, premium-efficiency fans are sometimes not chosen for industrial applications because of concerns about reliable operation in dirty environments.
Fans & Blowers	Fan System - Controls	Significant energy savings can frequently be attained from processes by adding a timer or altering their control algorithms.
Fans & Blowers	Fan System - Maintenance	This measure includes repairing holes in ducts, replacing clogged filters, and lubricating the motors. This reduces energy consumption by improving fan efficiency and reducing system loss as gas moves through the ductwork.
Fans & Blowers	Fan System - Optimization	Optimization integrates best practices of system analysis, equipment improvements, and operational improvements into a sustaining energy program. A facility that implements such a practice treats its energy program in a similar manner to safety or quality control programs: an individual or team is tasked with developing and enforcing standards, goals are set, regular

End Use	Measure	Description
		reports are generated and reported to management, and all plant employees are engaged and held accountable.
Fans & Blowers	Fans - Variable Speed Control	The part-load efficiency of drive systems can be improved by varying the speed of the motor drive. An additional benefit of variable-speed controls is the ability to start and stop the motor and process gradually, thus extending the life of the motor and associated machinery.
Motors	Motors - Magnetic Adjustable Speed Drives	To allow for adjustable speed operation, this technology uses magnetic induction to couple a drive to its load. Varying the magnetic slip within the coupling controls the speed of the output shaft. Magnetic drives perform best at the upper end of the speed range due to the energy consumed by the slip. Unlike traditional ASDs, magnetically coupled ASDs create no power distortion on the electrical system. However, magnetically coupled ASD efficiency is best when power needs are greatest. VFDs may show greater efficiency when the average load speed is below 90% of the motor speed, however this occurs when power demands are reduced.
Motors	Motors - Efficient Rewind	When a motor burns out or is in need of repair, the owner may elect to either replace the motor or have it rewound. A typical motor rewind costs less than a replacement motor, but at the cost of efficiency. An efficient rewind, however, attempts to improve the efficiency of the motor by reducing stator losses. If the manufacturer has left stator slots open, or not entirely filled, additional copper wire can be included to reduce resistance and increase efficiency.
Motors	Motors - Synchronous Belts	Synchronous belts offer higher efficiency compared with standard belts due to reduced slipping, as well as less maintenance and retensioning.
Motors	Motors - Variable Frequency Drive	The part-load efficiency of drive systems can be improved by varying the speed of the motor drive. An additional benefit of variable-speed controls is the ability to start and stop the motor and process gradually, thus extending the life of the motor and associated machinery.
HVAC, Lighting	Commissioning - HVAC, Lighting	For new construction and major renovations, commissioning ensures that building systems are properly designed, specified, and installed to meet the design intent and provide high-efficiency performance. Commissioning begins during the design process.
HVAC, Lighting	Retrocommissioning - HVAC, Lighting	In existing buildings, the retrocommissioning process identifies low-cost or no cost measures, including controls adjustments, to improve building performance and reduce operating costs. Retrocommissioning addresses HVAC, lighting, DHW, and other major building systems.
HVAC (All)	Destratification Fans (HVLS)	High volume low-speed (HVLS) ceiling fans are large (8-ft. to 20-ft. in diameter). They will effectively mix and circulate air within a given space to equalize temperature between ceiling and floor levels.
Ventilation	Ventilation - CO2 Controlled	Also known as Demand Controlled Ventilation, this measure uses carbon dioxide (CO2) levels to indicate the level of occupancy in a space. Sensors monitor CO2 levels so that air handling controls can adjust the amount of outside air the system needs to intake. Ventilation rates are thereby controlled based on occupancy, rather than a fixed rate, thus saving HVAC energy use.
Boiler / Process Boiler	Boiler - High Efficiency Hot Water Circulation	Efficiency improvements to the circulation system of a boiler's hot water loop.
Boiler / Process Boiler	Boilers - Hot Water Reset	Automatic control algorithm for boilers that varies the water temperature of the supply loop in a manner that is tailored to the heating demand of the process at hand.
Boiler / Process Boiler	Boiler - Combustion Controls (O2 Trim)	Operating your boiler with an optimum amount of excess air will minimize heat loss up the stack and improve combustion efficiency. When fuel composition is highly variable (such as refinery gas, hog fuel, or multi-fuel boilers), or where steam flows are highly variable, an online oxygen analyzer should be considered. The oxygen "trim" system provides feedback to the burner controls to automatically minimize excess combustion air and optimize the air-to-fuel ratio.

End Use	Measure	Description
Boiler / Process Boiler	Boiler - Condensate Return Lines	Hot condensate that comes out of the steam being delivered can be returned directly to the boiler, where it is then much easier to reheat than cold makeup water. Other benefits that will accrue from an efficient condensate return system are less make-up water, water related treatment costs, boiler blowdown, and disposal costs.
Boiler / Process Boiler	Boiler - Condensing Economizer	A boiler economizer recovers heat from the boiler exhaust gas and is used to pre-heat the boiler feed water. Capturing this heat reduces overall fuel requirements for the boiler. A condensing economizer extracts additional heat from the exhaust gas by taking its water vapor all the way to a liquid water state.
Boiler / Process Boiler	Boiler - Pipe Insulation	Insulating hot water pipes decreases the amount of energy lost during distribution of hot water throughout the building. Insulating pipes will result in quicker delivery of hot water and allows lowering the water heating set point. There are several different types of insulation, the most common being polyethylene and neoprene.
Boiler / Process Boiler	Boiler - Steam Trap Maintenance	Steam transfers its latent heat to a process fluid in a heat exchanger. The steam is held in the heat exchanger by a steam trap until it condenses. Then the trap passes the condensate into the condensate return system. Heat loss through uninsulated or leaky lines and fittings in the steam traps can be significant, and is easily prevented with regular inspections, maintenance, and repair. General experience shows that most facilities, however, do not have such practices.
Boiler / Process Boiler	Boiler - Maintenance	A boiler's combustion controls, circulation loops, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
Heating	Gas Furnace - Maintenance	A furnace's combustion controls, ventilation systems, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
All	Transformer - High Efficiency	All electric power passes through one or more transformers on its way to service equipment, lighting, and other loads. Currently available materials and designs can considerably reduce both load and no-load losses. The new NEMA TP-1 standard is used as the reference definition for energy -efficient products. Tier-1 represents TP-1 dry-type transformers while Tier-2 reflects a switch to liquid immersed TP-1 products. More efficient transformers with attractive payback periods are estimated to save 40 to 50 percent of the energy lost by a "typical" transformer, which translates into a one to three percent reduction in electric bills for commercial and industrial customers.
All	Custom Measures	Custom measures may be included in the analysis to serve as a "catch all" for measures for which costs and savings are not easily quantified and that could be part of a custom program. Typical costs and energy savings are assumed such that the measures pass the economic screen.

Table D-3 Energy Efficiency Equipment Data, Electric—Chemical and Pharmaceutical, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	1,043.28	\$406.89	20	1.10	\$0.030
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,251.93	\$528.95	20	1.12	\$0.032
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2,608.44	\$651.02	20	1.35	\$0.019
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2,764.93	\$773.08	20	1.37	\$0.021
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1,316.66	\$140.07	20	1.20	\$0.008
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1,492.63	\$280.14	20	1.22	\$0.014
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1,756.81	\$336.17	20	1.27	\$0.015
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2,108.52	\$522.92	20	1.33	\$0.019
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2,196.73	\$578.95	20	1.34	\$0.020
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2,372.92	\$634.98	20	1.38	\$0.020
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	751.13	\$451.49	16	-	\$0.053
Cooling	Roof top AC	EER 11.2	1,505.21	\$868.26	16	1.00	\$0.050
Cooling	Roof top AC	EER 12.0	1,966.75	\$1,667.06	16	1.00	\$0.074
Cooling	Roof top AC	Ductless Minisplit	2,952.57	\$5,470.03	16	0.86	\$0.162
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	1,115.29	\$945.86	16	-	\$0.074
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1,762.48	\$1,359.67	16	1.00	\$0.068
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	2,320.55	\$3,487.86	16	0.89	\$0.132
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	2,535.17	\$4,551.95	16	0.85	\$0.157
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	3,746.92	\$8,719.65	16	0.71	\$0.204
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	2,269.95	\$2,346.03	16	0.94	\$0.090
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	4,141.66	\$4,692.07	16	0.89	\$0.099
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	10,131.13	\$6,188.38	16	0.92	\$0.053
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	230.53	\$342.59	14	1.00	\$0.142
Cooling	Other Cooling	EER 10.8	544.37	\$3,896.92	14	0.84	\$0.686
Cooling	Other Cooling	EER 11	641.37	\$4,124.51	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	869.05	\$4,693.51	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	642.71	-\$292.56	10	1.06	-\$0.056
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	147.01	\$5.55	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	225.86	\$7.63	3	-	\$0.012
Int. Lighting	Screw-in	CFL	422.82	\$4.42	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	457.77	\$117.42	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	525.83	\$33.13	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	399.83	\$607.82	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	407.02	-\$16.17	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	433.09	\$2.89	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	477.61	\$171.46	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	506.83	\$9.40	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	519.49	-\$9.70	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	764.01	\$156.76	15	-	\$0.019

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	73.13	\$256.88	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	76.09	\$0.11	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	105.56	\$1.72	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	122.37	\$2.77	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	222.99	\$71.27	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.04	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.05	\$0.00	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.10	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.11	\$0.03	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.13	\$0.01	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	31.92	\$113.19	15	0.48	\$0.324
Ext. Lighting	HID	T8	33.23	-\$0.86	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	51.47	\$3.82	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	51.49	-\$0.05	6	1.68	\$0.000
Ext. Lighting	HID	T5	53.79	\$0.33	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	98.48	\$30.75	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.19	\$0.67	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.20	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.28	\$0.00	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.32	\$0.01	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.58	\$0.19	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	19.71	\$16.31	10	1.00	\$0.102
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	5.63	\$5.37	10	0.99	\$0.118
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	19.22	\$11.65	10	1.00	\$0.075
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	5.54	\$5.82	10	0.99	\$0.129
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	33.22	\$34.91	10	0.99	\$0.129
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	3.32	\$3.49	10	0.99	\$0.129
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-4 Energy Efficiency Equipment Data, Natural Gas—Chemical and Pharmaceutical, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	4.69	\$12.79	20	1.02	\$0.207
Heating	Furnace	EF .83	7.95	\$34.59	20	1.02	\$0.331
Heating	Furnace	EF .90	14.67	\$58.48	20	1.04	\$0.303
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	8.72	\$8.38	25	1.00	\$0.065
Heating	Boiler	EF .82	14.73	\$30.72	25	1.01	\$0.140
Heating	Boiler	EF .85	27.15	\$64.24	25	1.05	\$0.159
Heating	Boiler	EF .96	36.39	\$259.73	25	0.95	\$0.480
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	5.33	\$2.02	15	1.05	\$0.035
Heating	Other Heating	AFUE .76	6.58	\$2.89	15	1.06	\$0.040
Heating	Other Heating	AFUE .77	7.83	\$4.51	15	1.07	\$0.053
Heating	Other Heating	AFUE .80	11.28	\$9.19	15	1.10	\$0.074
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	63.53	\$61.07	25	1.00	\$0.065
Process	Process Boiler	EF .82	107.36	\$223.94	25	1.01	\$0.140
Process	Process Boiler	EF .85	197.89	\$468.23	25	1.05	\$0.159
Process	Process Boiler	EF .96	265.23	\$1,893.27	25	0.95	\$0.480
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-5 Energy Efficiency Equipment Data, Electric—Chemical and Pharmaceutical, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	910.65	\$463.94	20	1.09	\$0.039
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,092.81	\$603.12	20	1.11	\$0.042
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2,276.78	\$742.30	20	1.31	\$0.025
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2,413.36	\$881.48	20	1.32	\$0.028
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1,244.72	\$173.08	20	1.19	\$0.011
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1,411.02	\$346.16	20	1.20	\$0.019
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1,660.55	\$415.40	20	1.25	\$0.019
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1,992.58	\$646.17	20	1.29	\$0.025
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2,075.95	\$715.40	20	1.30	\$0.026
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2,242.70	\$784.64	20	1.33	\$0.027
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	713.75	\$407.25	16	-	\$0.050
Cooling	Roof top AC	EER 11.2	1,430.57	\$783.18	16	1.00	\$0.048
Cooling	Roof top AC	EER 12.0	1,869.19	\$1,503.70	16	1.00	\$0.070
Cooling	Roof top AC	Ductless Minisplit	2,806.09	\$4,934.02	16	0.87	\$0.154
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	1,498.86	\$966.46	16	-	\$0.056
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	2,462.29	\$1,389.28	16	1.00	\$0.049
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	3,367.71	\$3,563.81	16	0.90	\$0.093
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	3,740.19	\$4,651.08	16	0.85	\$0.109
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	6,124.89	\$8,909.53	16	0.73	\$0.127
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1,895.24	\$3,220.15	16	0.92	\$0.149
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	3,457.99	\$6,440.30	16	0.85	\$0.163
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	8,458.77	\$8,494.14	16	0.85	\$0.088
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	221.34	\$329.28	14	1.00	\$0.143
Cooling	Other Cooling	EER 10.8	522.53	\$3,745.57	14	0.84	\$0.687
Cooling	Other Cooling	EER 11	615.62	\$3,964.33	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	834.29	\$4,511.22	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	712.96	-\$341.59	10	1.06	-\$0.059
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	147.01	\$5.55	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	225.86	\$7.63	3	-	\$0.012
Int. Lighting	Screw-in	CFL	422.82	\$4.42	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	457.77	\$117.42	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	525.83	\$33.13	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	399.83	\$607.82	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	407.02	-\$16.17	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	433.09	\$2.89	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	477.61	\$171.46	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	506.83	\$9.40	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	519.49	-\$9.70	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	764.01	\$156.76	15	-	\$0.019

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	73.13	\$256.88	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	76.09	\$0.11	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	105.56	\$1.72	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	122.37	\$2.77	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	222.99	\$71.27	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.04	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.05	\$0.00	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.10	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.11	\$0.03	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.13	\$0.01	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	31.92	\$113.19	15	0.48	\$0.324
Ext. Lighting	HID	T8	33.23	-\$0.86	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	51.47	\$3.82	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	51.49	-\$0.05	6	1.68	\$0.000
Ext. Lighting	HID	T5	53.79	\$0.33	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	98.48	\$30.75	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.19	\$0.67	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.20	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.28	\$0.00	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.32	\$0.01	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.58	\$0.19	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	19.71	\$16.14	10	1.00	\$0.101
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	5.63	\$5.32	10	0.99	\$0.116
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	19.22	\$11.53	10	1.00	\$0.074
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	5.54	\$5.76	10	0.99	\$0.128
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	33.22	\$34.55	10	0.99	\$0.128
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	3.32	\$3.46	10	0.99	\$0.128
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-6 Energy Efficiency Equipment Data, Natural Gas—Chemical and Pharmaceutical, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	4.49	\$12.49	20	1.02	\$0.212
Heating	Furnace	EF .83	7.56	\$33.77	20	1.02	\$0.340
Heating	Furnace	EF .90	13.92	\$57.09	20	1.04	\$0.312
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	7.67	\$6.48	25	1.00	\$0.057
Heating	Boiler	EF .82	12.95	\$23.77	25	1.02	\$0.123
Heating	Boiler	EF .85	23.87	\$49.71	25	1.06	\$0.140
Heating	Boiler	EF .96	31.97	\$201.01	25	0.97	\$0.422
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	4.84	\$1.64	15	1.05	\$0.031
Heating	Other Heating	AFUE .76	5.98	\$2.34	15	1.06	\$0.036
Heating	Other Heating	AFUE .77	7.12	\$3.65	15	1.08	\$0.047
Heating	Other Heating	AFUE .80	10.26	\$7.44	15	1.11	\$0.066
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	55.91	\$47.26	25	1.00	\$0.057
Process	Process Boiler	EF .82	94.43	\$173.30	25	1.02	\$0.123
Process	Process Boiler	EF .85	174.02	\$362.36	25	1.06	\$0.140
Process	Process Boiler	EF .96	233.07	\$1,465.20	25	0.97	\$0.422
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-7 Energy Efficiency Equipment Data, Electric—Paper, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	2,355.32	\$918.59	20	1.10	\$0.030
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	2,826.38	\$1,194.17	20	1.12	\$0.032
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	5,888.85	\$1,469.75	20	1.35	\$0.019
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	6,242.15	\$1,745.33	20	1.37	\$0.021
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	2,972.52	\$316.22	20	1.20	\$0.008
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	3,369.79	\$632.44	20	1.22	\$0.014
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	3,966.19	\$758.93	20	1.27	\$0.015
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	4,760.23	\$1,180.56	20	1.33	\$0.019
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	4,959.37	\$1,307.05	20	1.34	\$0.020
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	5,357.14	\$1,433.54	20	1.38	\$0.020
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	1,695.76	\$1,019.30	16	-	\$0.053
Cooling	Roof top AC	EER 11.2	3,398.19	\$1,960.19	16	1.00	\$0.050
Cooling	Roof top AC	EER 12.0	4,440.18	\$3,763.57	16	1.00	\$0.074
Cooling	Roof top AC	Ductless Minisplit	6,665.76	\$12,349.22	16	0.86	\$0.162
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	2,517.89	\$2,135.39	16	-	\$0.074
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	3,979.00	\$3,069.62	16	1.00	\$0.068
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	5,238.90	\$7,874.25	16	0.89	\$0.132
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	5,723.44	\$10,276.56	16	0.85	\$0.157
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	8,459.11	\$19,685.61	16	0.71	\$0.204
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	5,124.67	\$5,296.44	16	0.94	\$0.090
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	9,350.27	\$10,592.89	16	0.89	\$0.099
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	22,872.21	\$13,970.99	16	0.92	\$0.053
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	520.44	\$773.43	14	1.00	\$0.142
Cooling	Other Cooling	EER 10.8	1,228.97	\$8,797.74	14	0.84	\$0.686
Cooling	Other Cooling	EER 11	1,447.97	\$9,311.57	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	1,961.97	\$10,596.14	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	1,451.00	-\$660.48	10	1.06	-\$0.056
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	486.21	\$18.36	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	746.99	\$25.25	3	-	\$0.012
Int. Lighting	Screw-in	CFL	1,398.41	\$14.62	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	1,514.01	\$388.36	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	1,739.10	\$109.57	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	1,322.40	\$2,010.27	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	1,346.16	-\$53.48	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	1,432.39	\$9.57	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	1,579.63	\$567.09	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	1,676.26	\$31.08	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	1,718.15	-\$32.09	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	2,526.87	\$518.47	15	-	\$0.019
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	LED (2010)	241.87	\$849.58	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	251.65	\$0.35	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	349.11	\$5.68	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	404.72	\$9.15	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	737.51	\$235.71	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.12	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.18	\$0.01	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.33	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.36	\$0.09	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.42	\$0.03	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	105.56	\$374.37	15	0.48	\$0.324
Ext. Lighting	HID	T8	109.90	-\$2.83	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	170.24	\$12.63	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	170.29	-\$0.15	6	1.68	\$0.000
Ext. Lighting	HID	T5	177.89	\$1.08	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	325.71	\$101.71	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.63	\$2.22	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.66	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.91	\$0.01	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	1.06	\$0.02	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	1.93	\$0.62	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	104.16	\$86.18	10	1.00	\$0.102
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	57.62	\$55.04	10	0.99	\$0.118
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	24.62	\$14.92	10	1.00	\$0.075
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	68.88	\$72.37	10	0.99	\$0.129
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	68.88	\$72.37	10	0.99	\$0.129
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	44.57	\$46.83	10	0.99	\$0.129
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-8 Energy Efficiency Equipment Data, Natural Gas— Paper, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/ empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	22.54	\$61.46	20	1.02	\$0.207
Heating	Furnace	EF .83	38.18	\$166.19	20	1.02	\$0.331
Heating	Furnace	EF .90	70.47	\$280.97	20	1.04	\$0.303
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	41.87	\$40.26	25	1.00	\$0.065
Heating	Boiler	EF .82	70.77	\$147.61	25	1.01	\$0.140
Heating	Boiler	EF .85	130.44	\$308.63	25	1.05	\$0.159
Heating	Boiler	EF .96	174.82	\$1,247.95	25	0.95	\$0.480
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	25.59	\$9.72	15	1.05	\$0.035
Heating	Other Heating	AFUE .76	31.62	\$13.88	15	1.06	\$0.040
Heating	Other Heating	AFUE .77	37.64	\$21.66	15	1.07	\$0.053
Heating	Other Heating	AFUE .80	54.20	\$44.15	15	1.10	\$0.074
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	198.26	\$190.60	25	1.00	\$0.065
Process	Process Boiler	EF .82	335.06	\$698.86	25	1.01	\$0.140
Process	Process Boiler	EF .85	617.58	\$1,461.26	25	1.05	\$0.159
Process	Process Boiler	EF .96	827.73	\$5,908.57	25	0.95	\$0.480
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-9 Energy Efficiency Equipment Data, Electric— Paper, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	2,055.90	\$1,047.39	20	1.09	\$0.039
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	2,467.15	\$1,361.61	20	1.11	\$0.042
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	5,140.09	\$1,675.82	20	1.31	\$0.025
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	5,448.44	\$1,990.04	20	1.32	\$0.028
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	2,810.09	\$390.75	20	1.19	\$0.011
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	3,185.55	\$781.50	20	1.20	\$0.019
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	3,748.89	\$937.81	20	1.25	\$0.019
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	4,498.47	\$1,458.81	20	1.29	\$0.025
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	4,686.70	\$1,615.11	20	1.30	\$0.026
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	5,063.15	\$1,771.41	20	1.33	\$0.027
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	1,611.37	\$919.42	16	-	\$0.050
Cooling	Roof top AC	EER 11.2	3,229.69	\$1,768.11	16	1.00	\$0.048
Cooling	Roof top AC	EER 12.0	4,219.91	\$3,394.78	16	1.00	\$0.070
Cooling	Roof top AC	Ductless Minisplit	6,335.07	\$11,139.12	16	0.87	\$0.154
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	3,383.85	\$2,181.89	16	-	\$0.056
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	5,558.91	\$3,136.47	16	1.00	\$0.049
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	7,603.01	\$8,045.72	16	0.90	\$0.093
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	8,443.92	\$10,500.35	16	0.85	\$0.109
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	13,827.65	\$20,114.30	16	0.73	\$0.127
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	4,278.73	\$7,269.87	16	0.92	\$0.149
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	7,806.81	\$14,539.73	16	0.85	\$0.163
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	19,096.65	\$19,176.50	16	0.85	\$0.088
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	499.71	\$743.39	14	1.00	\$0.143
Cooling	Other Cooling	EER 10.8	1,179.67	\$8,456.06	14	0.84	\$0.687
Cooling	Other Cooling	EER 11	1,389.84	\$8,949.93	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	1,883.50	\$10,184.61	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	1,609.58	-\$771.19	10	1.06	-\$0.059
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	486.21	\$18.36	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	746.99	\$25.25	3	-	\$0.012
Int. Lighting	Screw-in	CFL	1,398.41	\$14.62	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	1,514.01	\$388.36	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	1,739.10	\$109.57	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	1,322.40	\$2,010.27	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	1,346.16	-\$53.48	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	1,432.39	\$9.57	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	1,579.63	\$567.09	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	1,676.26	\$31.08	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	1,718.15	-\$32.09	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	2,526.87	\$518.47	15	-	\$0.019
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	LED (2010)	241.87	\$849.58	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	251.65	\$0.35	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	349.11	\$5.68	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	404.72	\$9.15	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	737.51	\$235.71	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.12	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.18	\$0.01	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.33	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.36	\$0.09	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.42	\$0.03	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	105.56	\$374.37	15	0.48	\$0.324
Ext. Lighting	HID	T8	109.90	-\$2.83	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	170.24	\$12.63	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	170.29	-\$0.15	6	1.68	\$0.000
Ext. Lighting	HID	T5	177.89	\$1.08	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	325.71	\$101.71	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.63	\$2.22	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.66	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.91	\$0.01	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	1.06	\$0.02	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	1.93	\$0.62	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	104.16	\$85.30	10	1.00	\$0.101
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	57.62	\$54.48	10	0.99	\$0.116
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	24.62	\$14.76	10	1.00	\$0.074
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	68.88	\$71.63	10	0.99	\$0.128
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	68.88	\$71.63	10	0.99	\$0.128
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	44.57	\$46.35	10	0.99	\$0.128
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-10 Energy Efficiency Equipment Data, Natural Gas— Paper, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/ empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	21.56	\$60.00	20	1.02	\$0.212
Heating	Furnace	EF .83	36.30	\$162.24	20	1.02	\$0.340
Heating	Furnace	EF .90	66.89	\$274.30	20	1.04	\$0.312
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	36.86	\$31.15	25	1.00	\$0.057
Heating	Boiler	EF .82	62.24	\$114.23	25	1.02	\$0.123
Heating	Boiler	EF .85	114.70	\$238.85	25	1.06	\$0.140
Heating	Boiler	EF .96	153.63	\$965.78	25	0.97	\$0.422
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	23.27	\$7.87	15	1.05	\$0.031
Heating	Other Heating	AFUE .76	28.74	\$11.24	15	1.06	\$0.036
Heating	Other Heating	AFUE .77	34.22	\$17.54	15	1.08	\$0.047
Heating	Other Heating	AFUE .80	49.27	\$35.76	15	1.11	\$0.066
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	174.50	\$147.50	25	1.00	\$0.057
Process	Process Boiler	EF .82	294.68	\$540.85	25	1.02	\$0.123
Process	Process Boiler	EF .85	543.07	\$1,130.86	25	1.06	\$0.140
Process	Process Boiler	EF .96	727.36	\$4,572.62	25	0.97	\$0.422
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-11 Energy Efficiency Equipment Data, Electric—Food, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	1,091.19	\$425.57	20	1.10	\$0.030
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,309.43	\$553.24	20	1.12	\$0.032
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2,728.24	\$680.92	20	1.35	\$0.019
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2,891.91	\$808.59	20	1.37	\$0.021
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1,377.13	\$146.50	20	1.20	\$0.008
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1,561.18	\$293.00	20	1.22	\$0.014
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1,837.49	\$351.61	20	1.27	\$0.015
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2,205.36	\$546.94	20	1.33	\$0.019
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2,297.62	\$605.54	20	1.34	\$0.020
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2,481.90	\$664.14	20	1.38	\$0.020
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	785.63	\$472.23	16	-	\$0.053
Cooling	Roof top AC	EER 11.2	1,574.34	\$908.13	16	1.00	\$0.050
Cooling	Roof top AC	EER 12.0	2,057.08	\$1,743.62	16	1.00	\$0.074
Cooling	Roof top AC	Ductless Minisplit	3,088.17	\$5,721.25	16	0.86	\$0.162
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	1,166.51	\$989.30	16	-	\$0.074
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	1,843.42	\$1,422.12	16	1.00	\$0.068
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	2,427.12	\$3,648.05	16	0.89	\$0.132
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	2,651.60	\$4,761.01	16	0.85	\$0.157
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	3,919.01	\$9,120.11	16	0.71	\$0.204
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	2,374.20	\$2,453.78	16	0.94	\$0.090
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	4,331.87	\$4,907.56	16	0.89	\$0.099
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	10,596.43	\$6,472.60	16	0.92	\$0.053
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	241.12	\$358.32	14	1.00	\$0.142
Cooling	Other Cooling	EER 10.8	569.37	\$4,075.89	14	0.84	\$0.686
Cooling	Other Cooling	EER 11	670.83	\$4,313.94	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	908.96	\$4,909.07	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	672.23	-\$305.99	10	1.06	-\$0.056
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	206.49	\$7.80	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	317.24	\$10.72	3	-	\$0.012
Int. Lighting	Screw-in	CFL	593.90	\$6.21	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	642.99	\$164.93	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	738.59	\$46.53	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	561.61	\$853.75	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	571.71	-\$22.71	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	608.33	\$4.06	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	670.86	\$240.84	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	711.90	\$13.20	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	729.69	-\$13.63	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	1,073.15	\$220.19	15	-	\$0.019
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	LED (2010)	102.72	\$360.81	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	106.87	\$0.15	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	148.27	\$2.41	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	171.88	\$3.89	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	313.22	\$100.10	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.05	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.08	\$0.00	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.14	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.15	\$0.04	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.18	\$0.01	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	44.83	\$158.99	15	0.48	\$0.324
Ext. Lighting	HID	T8	46.68	-\$1.20	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	72.30	\$5.36	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	72.32	-\$0.07	6	1.68	\$0.000
Ext. Lighting	HID	T5	75.55	\$0.46	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	138.33	\$43.20	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.27	\$0.94	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.28	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.39	\$0.01	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.45	\$0.01	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.82	\$0.26	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	14.77	\$12.22	10	1.00	\$0.102
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	10.91	\$10.43	10	0.99	\$0.118
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	5.26	\$3.18	10	1.00	\$0.075
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	9.15	\$9.62	10	0.99	\$0.129
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	13.00	\$13.66	10	0.99	\$0.129
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	-	\$0.00	10	1.00	\$0.000
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-12 Energy Efficiency Equipment Data, Natural Gas— Food, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/ empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	10.78	\$29.40	20	1.02	\$0.207
Heating	Furnace	EF .83	18.26	\$79.49	20	1.02	\$0.331
Heating	Furnace	EF .90	33.71	\$134.40	20	1.04	\$0.303
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	20.03	\$19.26	25	1.00	\$0.065
Heating	Boiler	EF .82	33.85	\$70.60	25	1.01	\$0.140
Heating	Boiler	EF .85	62.39	\$147.63	25	1.05	\$0.159
Heating	Boiler	EF .96	83.62	\$596.93	25	0.95	\$0.480
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	12.24	\$4.65	15	1.05	\$0.035
Heating	Other Heating	AFUE .76	15.12	\$6.64	15	1.06	\$0.040
Heating	Other Heating	AFUE .77	18.00	\$10.36	15	1.07	\$0.053
Heating	Other Heating	AFUE .80	25.93	\$21.12	15	1.10	\$0.074
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	65.73	\$63.19	25	1.00	\$0.065
Process	Process Boiler	EF .82	111.09	\$231.71	25	1.01	\$0.140
Process	Process Boiler	EF .85	204.76	\$484.48	25	1.05	\$0.159
Process	Process Boiler	EF .96	274.43	\$1,958.97	25	0.95	\$0.480
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-13 Energy Efficiency Equipment Data, Electric— Food, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	952.47	\$485.24	20	1.09	\$0.039
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,143.00	\$630.82	20	1.11	\$0.042
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2,381.34	\$776.39	20	1.31	\$0.025
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2,524.20	\$921.96	20	1.32	\$0.028
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1,301.88	\$181.03	20	1.19	\$0.011
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1,475.83	\$362.06	20	1.20	\$0.019
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1,736.82	\$434.47	20	1.25	\$0.019
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2,084.09	\$675.85	20	1.29	\$0.025
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2,171.29	\$748.26	20	1.30	\$0.026
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2,345.70	\$820.67	20	1.33	\$0.027
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	746.53	\$425.96	16	-	\$0.050
Cooling	Roof top AC	EER 11.2	1,496.28	\$819.15	16	1.00	\$0.048
Cooling	Roof top AC	EER 12.0	1,955.03	\$1,572.76	16	1.00	\$0.070
Cooling	Roof top AC	Ductless Minisplit	2,934.96	\$5,160.62	16	0.87	\$0.154
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	1,567.70	\$1,010.84	16	-	\$0.056
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	2,575.38	\$1,453.09	16	1.00	\$0.049
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	3,522.38	\$3,727.49	16	0.90	\$0.093
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	3,911.97	\$4,864.69	16	0.85	\$0.109
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	6,406.19	\$9,318.72	16	0.73	\$0.127
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	1,982.29	\$3,368.04	16	0.92	\$0.149
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	3,616.80	\$6,736.09	16	0.85	\$0.163
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	8,847.25	\$8,884.25	16	0.85	\$0.088
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	231.51	\$344.40	14	1.00	\$0.143
Cooling	Other Cooling	EER 10.8	546.53	\$3,917.59	14	0.84	\$0.687
Cooling	Other Cooling	EER 11	643.90	\$4,146.40	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	872.60	\$4,718.41	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	745.70	-\$357.28	10	1.06	-\$0.059
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	206.49	\$7.80	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	317.24	\$10.72	3	-	\$0.012
Int. Lighting	Screw-in	CFL	593.90	\$6.21	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	642.99	\$164.93	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	738.59	\$46.53	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	561.61	\$853.75	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	571.71	-\$22.71	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	608.33	\$4.06	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	670.86	\$240.84	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	711.90	\$13.20	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	729.69	-\$13.63	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	1,073.15	\$220.19	15	-	\$0.019
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	LED (2010)	102.72	\$360.81	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	106.87	\$0.15	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	148.27	\$2.41	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	171.88	\$3.89	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	313.22	\$100.10	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.05	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.08	\$0.00	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.14	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.15	\$0.04	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.18	\$0.01	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	44.83	\$158.99	15	0.48	\$0.324
Ext. Lighting	HID	T8	46.68	-\$1.20	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	72.30	\$5.36	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	72.32	-\$0.07	6	1.68	\$0.000
Ext. Lighting	HID	T5	75.55	\$0.46	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	138.33	\$43.20	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.27	\$0.94	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.28	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.39	\$0.01	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	0.45	\$0.01	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	0.82	\$0.26	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	14.77	\$12.10	10	1.00	\$0.101
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	10.91	\$10.32	10	0.99	\$0.116
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	5.26	\$3.15	10	1.00	\$0.074
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	9.15	\$9.52	10	0.99	\$0.128
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	13.00	\$13.52	10	0.99	\$0.128
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	-	\$0.00	10	1.00	\$0.000
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-14 Energy Efficiency Equipment Data, Natural Gas— Food, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/ empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	10.31	\$28.70	20	1.02	\$0.212
Heating	Furnace	EF .83	17.36	\$77.60	20	1.02	\$0.340
Heating	Furnace	EF .90	31.99	\$131.20	20	1.04	\$0.312
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	17.63	\$14.90	25	1.00	\$0.057
Heating	Boiler	EF .82	29.77	\$54.64	25	1.02	\$0.123
Heating	Boiler	EF .85	54.87	\$114.25	25	1.06	\$0.140
Heating	Boiler	EF .96	73.48	\$461.96	25	0.97	\$0.422
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	11.13	\$3.77	15	1.05	\$0.031
Heating	Other Heating	AFUE .76	13.75	\$5.38	15	1.06	\$0.036
Heating	Other Heating	AFUE .77	16.37	\$8.39	15	1.08	\$0.047
Heating	Other Heating	AFUE .80	23.57	\$17.10	15	1.11	\$0.066
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	57.85	\$48.90	25	1.00	\$0.057
Process	Process Boiler	EF .82	97.70	\$179.32	25	1.02	\$0.123
Process	Process Boiler	EF .85	180.05	\$374.93	25	1.06	\$0.140
Process	Process Boiler	EF .96	241.16	\$1,516.04	25	0.97	\$0.422
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-15 Energy Efficiency Equipment Data, Electric—Miscellaneous Industrial, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	3,479.85	\$1,357.17	20	1.10	\$0.030
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	4,175.82	\$1,764.32	20	1.12	\$0.032
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	8,700.46	\$2,171.47	20	1.35	\$0.019
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	9,222.44	\$2,578.62	20	1.37	\$0.021
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	4,391.74	\$467.20	20	1.20	\$0.008
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	4,978.69	\$934.40	20	1.22	\$0.014
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	5,859.84	\$1,121.28	20	1.27	\$0.015
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	7,032.99	\$1,744.22	20	1.33	\$0.019
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	7,327.20	\$1,931.10	20	1.34	\$0.020
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	7,914.88	\$2,117.98	20	1.38	\$0.020
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	2,505.40	\$1,505.96	16	-	\$0.053
Cooling	Roof top AC	EER 11.2	5,020.65	\$2,896.08	16	1.00	\$0.050
Cooling	Roof top AC	EER 12.0	6,560.12	\$5,560.48	16	1.00	\$0.074
Cooling	Roof top AC	Ductless Minisplit	9,848.31	\$18,245.31	16	0.86	\$0.162
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	3,720.05	\$3,154.92	16	-	\$0.074
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	5,878.76	\$4,535.20	16	1.00	\$0.068
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	7,740.19	\$11,633.77	16	0.89	\$0.132
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	8,456.08	\$15,183.06	16	0.85	\$0.157
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	12,497.88	\$29,084.44	16	0.71	\$0.204
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	7,571.42	\$7,825.21	16	0.94	\$0.090
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	13,814.53	\$15,650.42	16	0.89	\$0.099
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	33,792.46	\$20,641.39	16	0.92	\$0.053
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	768.93	\$1,142.70	14	1.00	\$0.142
Cooling	Other Cooling	EER 10.8	1,815.74	\$12,998.19	14	0.84	\$0.686
Cooling	Other Cooling	EER 11	2,139.30	\$13,757.34	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	2,898.71	\$15,655.23	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	2,143.77	-\$975.83	10	1.06	-\$0.056
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	510.20	\$19.26	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	783.85	\$26.49	3	-	\$0.012
Int. Lighting	Screw-in	CFL	1,467.40	\$15.34	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	1,588.70	\$407.52	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	1,824.90	\$114.98	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	1,387.64	\$2,109.46	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	1,412.58	-\$56.12	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	1,503.06	\$10.04	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	1,657.57	\$595.07	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	1,758.97	\$32.61	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	1,802.92	-\$33.67	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	2,651.54	\$544.05	15	-	\$0.019

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Int. Lighting	Linear Fluorescent	LED (2010)	253.80	\$891.50	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	264.06	\$0.36	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	366.34	\$5.96	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	424.69	\$9.60	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	773.90	\$247.34	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.12	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.19	\$0.01	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.35	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.38	\$0.10	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.44	\$0.03	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	110.77	\$392.85	15	0.48	\$0.324
Ext. Lighting	HID	T8	115.33	-\$2.97	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	178.64	\$13.25	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	178.70	-\$0.16	6	1.68	\$0.000
Ext. Lighting	HID	T5	186.67	\$1.13	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	341.78	\$106.73	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.66	\$2.33	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.69	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.96	\$0.02	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	1.11	\$0.03	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	2.02	\$0.65	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	8.05	\$6.66	10	1.00	\$0.102
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	9.93	\$9.48	10	0.99	\$0.118
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	6.86	\$4.16	10	1.00	\$0.075
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	3.37	\$3.54	10	0.99	\$0.129
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	13.35	\$14.02	10	0.99	\$0.129
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	0.28	\$0.29	10	0.99	\$0.129
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-16 Energy Efficiency Equipment Data, Natural Gas— Miscellaneous Industrial, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	70.73	\$192.85	20	1.02	\$0.207
Heating	Furnace	EF .83	119.80	\$521.43	20	1.02	\$0.331
Heating	Furnace	EF .90	221.12	\$881.59	20	1.04	\$0.303
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	131.39	\$126.31	25	1.00	\$0.065
Heating	Boiler	EF .82	222.04	\$463.13	25	1.01	\$0.140
Heating	Boiler	EF .85	409.27	\$968.37	25	1.05	\$0.159
Heating	Boiler	EF .96	548.54	\$3,915.59	25	0.95	\$0.480
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	80.31	\$30.49	15	1.05	\$0.035
Heating	Other Heating	AFUE .76	99.20	\$43.56	15	1.06	\$0.040
Heating	Other Heating	AFUE .77	118.10	\$67.96	15	1.07	\$0.053
Heating	Other Heating	AFUE .80	170.06	\$138.53	15	1.10	\$0.074
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	10.88	\$10.46	25	1.00	\$0.065
Process	Process Boiler	EF .82	18.38	\$38.34	25	1.01	\$0.140
Process	Process Boiler	EF .85	33.88	\$80.16	25	1.05	\$0.159
Process	Process Boiler	EF .96	45.40	\$324.11	25	0.95	\$0.480
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-17 Energy Efficiency Equipment Data, Electric— Miscellaneous Industrial, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	\$0.00	20	1.00	\$0.000
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	3,037.48	\$1,547.46	20	1.09	\$0.039
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	3,645.08	\$2,011.70	20	1.11	\$0.042
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	7,594.20	\$2,475.94	20	1.31	\$0.025
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	8,049.77	\$2,940.18	20	1.32	\$0.028
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	\$0.00	20	1.00	\$0.000
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	4,151.76	\$577.32	20	1.19	\$0.011
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	4,706.47	\$1,154.63	20	1.20	\$0.019
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	5,538.79	\$1,385.56	20	1.25	\$0.019
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	6,646.25	\$2,155.31	20	1.29	\$0.025
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	6,924.35	\$2,386.24	20	1.30	\$0.026
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	7,480.54	\$2,617.16	20	1.33	\$0.027
Cooling	Roof top AC	EER 9.2	-	\$0.00	16	-	\$0.000
Cooling	Roof top AC	EER 10.1	2,380.71	\$1,358.39	16	-	\$0.050
Cooling	Roof top AC	EER 11.2	4,771.69	\$2,612.29	16	1.00	\$0.048
Cooling	Roof top AC	EER 12.0	6,234.69	\$5,015.60	16	1.00	\$0.070
Cooling	Roof top AC	Ductless Minisplit	9,359.73	\$16,457.44	16	0.87	\$0.154
Cooling/Heating	Air-Source Heat Pump	EER 9.3, COP 3.1	-	\$0.00	16	-	\$0.000
Cooling/Heating	Air-Source Heat Pump	EER 10.3, COP 3.2	4,999.46	\$3,223.63	16	-	\$0.056
Cooling/Heating	Air-Source Heat Pump	EER 11.0, COP 3.3	8,212.99	\$4,633.96	16	1.00	\$0.049
Cooling/Heating	Air-Source Heat Pump	EER 11.7, COP 3.4	11,233.03	\$11,887.12	16	0.90	\$0.093
Cooling/Heating	Air-Source Heat Pump	EER 12.0, COP 3.4	12,475.44	\$15,513.70	16	0.85	\$0.109
Cooling/Heating	Air-Source Heat Pump	Ductless Minisplit	20,429.61	\$29,717.80	16	0.73	\$0.127
Cooling/Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	\$0.00	16	1.00	\$0.000
Cooling/Heating	Geothermal Heat Pump	EER 16, COP 3.5	6,321.60	\$10,740.83	16	0.92	\$0.149
Cooling/Heating	Geothermal Heat Pump	EER 18, COP 3.8	11,534.14	\$21,481.67	16	0.85	\$0.163
Cooling/Heating	Geothermal Heat Pump	EER 30, COP 5.0	28,214.28	\$28,332.25	16	0.85	\$0.088
Cooling	Other Cooling	EER 9.8	-	\$0.00	14	1.00	\$0.000
Cooling	Other Cooling	EER 10.2	738.30	\$1,098.32	14	1.00	\$0.143
Cooling	Other Cooling	EER 10.8	1,742.90	\$12,493.37	14	0.84	\$0.687
Cooling	Other Cooling	EER 11	2,053.42	\$13,223.04	14	0.83	\$0.617
Cooling	Other Cooling	EER 11.5	2,782.77	\$15,047.22	14	0.82	\$0.518
Heating	Electric Room Heat	Standard	-	\$0.00	20	1.00	\$0.000
Heating	Electric Furnace	Standard	-	\$0.00	20	1.00	\$0.000
Ventilation	Ventilation	Constant Volume	-	\$0.00	10	1.00	\$0.000
Ventilation	Ventilation	Variable Air Volume	2,378.07	-\$1,139.39	10	1.06	-\$0.059
Int. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Int. Lighting	Screw-in	90W Halogen PAR-38	510.20	\$19.26	3	-	\$0.013
Int. Lighting	Screw-in	70W HIR PAR-38	783.85	\$26.49	3	-	\$0.012
Int. Lighting	Screw-in	CFL	1,467.40	\$15.34	6	3.79	\$0.002
Int. Lighting	Screw-in	LED (2010)	1,588.70	\$407.52	20	2.24	\$0.020
Int. Lighting	Screw-in	LED (2020)	1,824.90	\$114.98	20	-	\$0.005
Int. Lighting	High-Bay Fixtures	Metal Halides	-	\$0.00	3	1.00	\$0.000
Int. Lighting	High-Bay Fixtures	LED (2010)	1,387.64	\$2,109.46	15	0.71	\$0.139
Int. Lighting	High-Bay Fixtures	T8	1,412.58	-\$56.12	10	2.00	-\$0.005
Int. Lighting	High-Bay Fixtures	High Pressure Sodium	1,503.06	\$10.04	6	1.85	\$0.001
Int. Lighting	High-Bay Fixtures	Induction	1,657.57	\$595.07	15	1.35	\$0.033
Int. Lighting	High-Bay Fixtures	Light Emitting Plasma	1,758.97	\$32.61	15	2.20	\$0.002
Int. Lighting	High-Bay Fixtures	T5	1,802.92	-\$33.67	10	2.43	-\$0.002
Int. Lighting	High-Bay Fixtures	LED (2020)	2,651.54	\$544.05	15	-	\$0.019
Int. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000

Industrial Energy Efficiency Equipment and Measure Data

End Use	Technology	Efficiency Definition	Savings (kWh/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/kWh)
Int. Lighting	Linear Fluorescent	LED (2010)	253.80	\$891.50	15	0.48	\$0.321
Int. Lighting	Linear Fluorescent	T8	264.06	\$0.36	10	1.34	\$0.000
Int. Lighting	Linear Fluorescent	Super T8	366.34	\$5.96	10	1.51	\$0.002
Int. Lighting	Linear Fluorescent	T5	424.69	\$9.60	10	1.63	\$0.003
Int. Lighting	Linear Fluorescent	LED (2020)	773.90	\$247.34	15	-	\$0.029
Ext. Lighting	Screw-in	Incandescent	-	\$0.00	2	1.00	\$0.000
Ext. Lighting	Screw-in	90W Halogen PAR-38	0.12	\$0.00	3	-	\$0.013
Ext. Lighting	Screw-in	70W HIR PAR-38	0.19	\$0.01	3	-	\$0.012
Ext. Lighting	Screw-in	CFL	0.35	\$0.00	6	3.69	\$0.002
Ext. Lighting	Screw-in	LED (2010)	0.38	\$0.10	20	2.06	\$0.020
Ext. Lighting	Screw-in	LED (2020)	0.44	\$0.03	20	-	\$0.005
Ext. Lighting	HID	Metal Halides	-	\$0.00	3	1.00	\$0.000
Ext. Lighting	HID	LED (2010)	110.77	\$392.85	15	0.48	\$0.324
Ext. Lighting	HID	T8	115.33	-\$2.97	10	1.44	-\$0.003
Ext. Lighting	HID	Light Emitting Plasma	178.64	\$13.25	15	1.56	\$0.007
Ext. Lighting	HID	High Pressure Sodium	178.70	-\$0.16	6	1.68	\$0.000
Ext. Lighting	HID	T5	186.67	\$1.13	10	1.74	\$0.001
Ext. Lighting	HID	LED (2020)	341.78	\$106.73	15	-	\$0.029
Ext. Lighting	Linear Fluorescent	T12	-	\$0.00	10	1.00	\$0.000
Ext. Lighting	Linear Fluorescent	LED (2010)	0.66	\$2.33	15	0.45	\$0.321
Ext. Lighting	Linear Fluorescent	T8	0.69	\$0.00	10	1.34	\$0.000
Ext. Lighting	Linear Fluorescent	Super T8	0.96	\$0.02	10	1.51	\$0.002
Ext. Lighting	Linear Fluorescent	T5	1.11	\$0.03	10	1.62	\$0.003
Ext. Lighting	Linear Fluorescent	LED (2020)	2.02	\$0.65	15	-	\$0.029
Motors	Pumps	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Pumps	High Efficiency	8.05	\$6.59	10	1.00	\$0.101
Motors	Fans & Blowers	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Fans & Blowers	High Efficiency	9.93	\$9.39	10	0.99	\$0.116
Motors	Compressed Air	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Compressed Air	High Efficiency	6.86	\$4.11	10	1.00	\$0.074
Motors	Matl Handling	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Handling	High Efficiency	3.37	\$3.50	10	0.99	\$0.128
Motors	Matl Processing	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Matl Processing	High Efficiency	13.35	\$13.88	10	0.99	\$0.128
Motors	Other Motors	Standard	-	\$0.00	10	1.00	\$0.000
Motors	Other Motors	High Efficiency	0.28	\$0.29	10	0.99	\$0.128
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Cooling and Refrig	Standard	-	\$0.00	15	1.00	\$0.000
Process	Electro-Chemical Processes	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Misc	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-18 Energy Efficiency Equipment Data, Natural Gas—Miscellaneous Industrial, New Vintage

End Use	Technology	Efficiency Definition	Savings (therm/empl/yr)	Incremental Cost (\$/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy (\$/therm)
Heating	Furnace	EF .76	-	\$0.00	20	1.00	\$0.000
Heating	Furnace	EF .80	67.65	\$188.27	20	1.02	\$0.212
Heating	Furnace	EF .83	113.91	\$509.04	20	1.02	\$0.340
Heating	Furnace	EF .90	209.86	\$860.65	20	1.04	\$0.312
Heating	Boiler	EF .76	-	\$0.00	25	-	\$0.000
Heating	Boiler	EF .80	115.64	\$97.75	25	1.00	\$0.057
Heating	Boiler	EF .82	195.29	\$358.42	25	1.02	\$0.123
Heating	Boiler	EF .85	359.89	\$749.42	25	1.06	\$0.140
Heating	Boiler	EF .96	482.02	\$3,030.26	25	0.97	\$0.422
Heating	Other Heating	AFUE .74	-	\$0.00	15	1.00	\$0.000
Heating	Other Heating	AFUE .75	73.00	\$24.70	15	1.05	\$0.031
Heating	Other Heating	AFUE .76	90.18	\$35.28	15	1.06	\$0.036
Heating	Other Heating	AFUE .77	107.36	\$55.04	15	1.08	\$0.047
Heating	Other Heating	AFUE .80	154.60	\$112.20	15	1.11	\$0.066
Process	Process Heating	Standard	-	\$0.00	15	1.00	\$0.000
Process	Process Boiler	EF .76	-	\$0.00	25	-	\$0.000
Process	Process Boiler	EF .80	9.57	\$8.09	25	1.00	\$0.057
Process	Process Boiler	EF .82	16.16	\$29.67	25	1.02	\$0.123
Process	Process Boiler	EF .85	29.79	\$62.03	25	1.06	\$0.140
Process	Process Boiler	EF .96	39.90	\$250.83	25	0.97	\$0.422
Process	Process Cooling	Standard	-	\$0.00	15	1.00	\$0.000
Process	Other Process	Standard	-	\$0.00	15	1.00	\$0.000
Miscellaneous	Miscellaneous	Standard	-	\$0.00	5	1.00	\$0.000

Table D-19 Energy Efficiency Non-Equipment Data— Chemical and Pharmaceutical, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	5.001	1.97	\$0.004
Insulation - Ducting	7.0%	12.5%	20	\$0.41	3.679	0.84	\$0.008
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	2.591	0.31	\$0.023
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	1.742	0.40	\$0.020
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	8.218	5.35	\$0.002
Air-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.239	0.94	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.178	0.43	\$0.019
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.499	0.52	\$0.014
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.031	0.05	\$0.160
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.964	1.44	\$0.007
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	9.668	6.42	\$0.001
Water-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.996	0.93	\$0.009
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.143	0.42	\$0.019
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.396	0.52	\$0.014
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.019	0.03	\$0.259
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.558	1.42	\$0.007
RTU - Maintenance	62.2%	90.0%	4	\$0.06	5.465	2.36	\$0.003
Heat Pump - Maintenance	3.1%	95.0%	4	\$0.06	9.885	4.70	\$0.002
Roofs - High Reflectivity	50.0%	75.0%	15	\$0.08	6.737	7.99	\$0.001
Energy Management System	7.2%	75.0%	14	\$0.35	12.740	2.52	\$0.003
Thermostat - Clock/Programmable	31.7%	50.0%	11	\$0.13	4.808	2.09	\$0.003
Interior Lighting - Occupancy Sensors	6.1%	56.3%	8	\$0.28	14.832	1.17	\$0.003
Interior Lighting - Skylights	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Lighting - Time Clocks and Timers	3.1%	56.3%	8	\$0.20	1.854	0.20	\$0.016
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.074	2.05	\$0.002
Interior Lighting - Daylighting Controls	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Screw-in - Task Lighting	6.1%	75.0%	5	\$0.24	0.664	0.04	\$0.079
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.569	0.12	\$0.052
Interior Fluorescent - Delamp and Install Reflectors	18.3%	56.3%	11	\$0.50	0.484	0.05	\$0.118
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.828	0.10	\$0.036
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	4.141	4.95	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.484	0.04	\$0.081
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.10	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.03	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.69	\$0.001
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	68.95	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.25	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.49	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.14	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.31	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.81	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.79	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.59	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.25	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.27	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.77	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	59.86	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.75	\$0.001
Motors - Efficient Rewind	14.9%	17.4%	10	\$0.35	11.397	1.36	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.21	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Retrocommissioning - HVAC	9.0%	24.0%	4	\$0.35	6.206	0.40	\$0.015
Retrocommissioning - Lighting	25.6%	30.6%	5	\$0.05	4.122	1.16	\$0.003
Destratification Fans (HVLS)	4.2%	33.0%	12	\$0.22	14.798	4.93	\$0.002
Ventilation - CO2 Controlled	1.0%	7.5%	10	\$0.04	0.456	0.48	\$0.011
Process Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Process Boilers - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Process Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Process Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Process Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Process Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Process Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Gas Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Gas Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Gas Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Furnace - Maintenance	31.7%	90.0%	4	\$0.06	1.499	0.40	\$0.011
Transformer - High Efficiency	8.6%	9.4%	10	\$0.11	11.192	4.37	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000

Table D-20 Energy Efficiency Non-Equipment Data— Chemical and Pharmaceutical, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBTU/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	3.132	1.40	\$0.006
Insulation - Ducting	7.0%	12.5%	20	\$0.41	2.720	0.74	\$0.011
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	1.313	0.18	\$0.045
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	1.097	0.29	\$0.032
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	5.060	3.77	\$0.003
Air-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.670	0.61	\$0.015
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.359	0.56	\$0.016
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.524	0.43	\$0.019
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.020	0.04	\$0.252
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	10.318	1.31	\$0.009
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	4.231	3.08	\$0.003
Water-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.854	1.90	\$0.004
Water-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.854	1.90	\$0.004
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.998	0.64	\$0.014
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.455	0.59	\$0.015
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.701	0.44	\$0.018
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.021	0.04	\$0.235
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	11.003	1.37	\$0.008
RTU - Maintenance	62.8%	90.0%	4	\$0.06	3.500	1.80	\$0.005
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	5.537	3.09	\$0.003
Roofs - High Reflectivity	55.9%	95.0%	15	\$0.05	5.193	11.64	\$0.001
Energy Management System	0.0%	75.0%	14	\$0.35	8.295	2.06	\$0.004
Thermostat - Clock/Programmable	86.3%	86.3%	11	\$0.13	6.606	3.19	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	9.334	1.32	\$0.004
Interior Lighting - Skylights	42.2%	42.2%	8	\$0.19	7.001	1.31	\$0.004
Interior Lighting - Time Clocks and Timers	56.3%	56.3%	8	\$0.20	1.167	0.21	\$0.025
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.047	2.09	\$0.003
Interior Lighting - Daylighting Controls	42.2%	42.2%	8	\$0.19	7.001	1.31	\$0.004
Interior Screw-in - Task Lighting	0.0%	75.0%	5	\$0.24	0.442	0.05	\$0.119
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.549	0.12	\$0.054
Interior Fluorescent - Delamp and Install Reflectors	18.7%	56.3%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.566	0.10	\$0.052
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	2.828	4.88	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.697	0.04	\$0.119
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.11	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.09	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.77	\$0.001
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	69.67	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.29	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.51	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.59	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.38	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.83	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.55	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.83	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.65	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.70	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.41	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.81	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	60.50	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.81	\$0.001
Motors - Efficient Rewind	14.9%	17.4%	10	\$0.35	11.397	1.37	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.23	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.55	\$0.000
De-stratification Fans (HVLS)	0.0%	33.0%	12	\$0.22	11.752	4.57	\$0.002
Ventilation - CO2 Controlled	5.9%	7.5%	10	\$0.04	0.365	0.44	\$0.014
Process Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Process Boilers - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Process Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Process Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Process Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Process Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Process Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Gas Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Gas Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Gas Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Furnace - Maintenance	44.1%	90.0%	4	\$0.06	1.269	0.35	\$0.013
Transformer - High Efficiency	8.6%	9.4%	10	\$0.11	11.192	4.50	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	4.913	0.80	\$0.014
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	2.616	2.04	\$0.004

Table D-21 Energy Efficiency Non-Equipment Data— Paper, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBTU/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	5.001	1.97	\$0.004
Insulation - Ducting	7.0%	12.5%	20	\$0.41	3.679	0.84	\$0.008
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	2.591	0.31	\$0.023
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	1.742	0.40	\$0.020
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	8.218	5.35	\$0.002
Air-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.239	0.94	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.178	0.43	\$0.019
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.499	0.52	\$0.014
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.031	0.05	\$0.160
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.964	1.44	\$0.007
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	9.668	6.42	\$0.001
Water-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.996	0.93	\$0.009
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.143	0.42	\$0.019
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.396	0.52	\$0.014
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.019	0.03	\$0.259
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.558	1.42	\$0.007
RTU - Maintenance	62.2%	90.0%	4	\$0.06	5.465	2.36	\$0.003
Heat Pump - Maintenance	3.1%	95.0%	4	\$0.06	9.885	4.70	\$0.002
Roofs - High Reflectivity	50.0%	75.0%	15	\$0.08	6.737	7.99	\$0.001
Energy Management System	7.2%	75.0%	14	\$0.35	12.740	2.52	\$0.003
Thermostat - Clock/Programmable	31.7%	50.0%	11	\$0.13	4.808	2.09	\$0.003
Interior Lighting - Occupancy Sensors	6.1%	56.3%	8	\$0.28	14.832	1.17	\$0.003
Interior Lighting - Skylights	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Lighting - Time Clocks and Timers	3.1%	56.3%	8	\$0.20	1.854	0.20	\$0.016
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.074	2.05	\$0.002
Interior Lighting - Daylighting Controls	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Screw-in - Task Lighting	6.1%	75.0%	5	\$0.24	0.664	0.04	\$0.079
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.569	0.12	\$0.052
Interior Fluorescent - Delamp and Install Reflectors	18.3%	56.3%	11	\$0.50	0.484	0.05	\$0.118
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.828	0.10	\$0.036
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	4.141	4.95	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.484	0.04	\$0.081
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.10	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.03	\$0.001
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.69	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	68.95	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.25	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.49	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.14	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.31	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.81	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.79	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.59	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.25	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.27	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.77	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	59.86	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.75	\$0.001
Motors - Efficient Rewind	14.9%	17.4%	10	\$0.35	11.397	1.36	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.21	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Retrocommissioning - HVAC	9.0%	24.0%	4	\$0.35	6.206	0.40	\$0.015
Retrocommissioning - Lighting	25.6%	30.6%	5	\$0.05	4.122	1.16	\$0.003
De-stratification Fans (HVLS)	4.2%	33.0%	12	\$0.22	14.798	4.93	\$0.002
Ventilation - CO2 Controlled	1.0%	7.5%	10	\$0.04	0.456	0.48	\$0.011
Process Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Process Boilers - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Process Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Process Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Process Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Process Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Process Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Gas Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Gas Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Gas Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Furnace - Maintenance	31.7%	90.0%	4	\$0.06	1.499	0.40	\$0.011
Transformer - High Efficiency	8.6%	9.4%	10	\$0.11	11.251	4.39	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000

Table D-22 Energy Efficiency Non-Equipment Data— Paper, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBTU/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	3.132	1.40	\$0.006
Insulation - Ducting	7.0%	12.5%	20	\$0.41	2.720	0.74	\$0.011
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	1.313	0.18	\$0.045
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	1.097	0.29	\$0.032
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	5.060	3.78	\$0.003
Air-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.670	0.61	\$0.015
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.359	0.56	\$0.016
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.524	0.43	\$0.019
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.020	0.04	\$0.252
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	10.318	1.31	\$0.009
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	4.231	3.08	\$0.003
Water-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.854	1.90	\$0.004
Water-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.854	1.90	\$0.004
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.998	0.63	\$0.014
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.455	0.58	\$0.015
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.701	0.44	\$0.018
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.021	0.04	\$0.235
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	11.003	1.36	\$0.008
RTU - Maintenance	62.8%	90.0%	4	\$0.06	3.500	1.80	\$0.005
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	5.537	3.09	\$0.003
Roofs - High Reflectivity	55.9%	95.0%	15	\$0.05	5.193	11.63	\$0.001
Energy Management System	0.0%	75.0%	14	\$0.35	8.295	2.06	\$0.004
Thermostat - Clock/Programmable	86.3%	86.3%	11	\$0.13	6.606	3.20	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	9.334	1.34	\$0.004
Interior Lighting - Skylights	42.2%	42.2%	8	\$0.19	7.001	1.32	\$0.004
Interior Lighting - Time Clocks and Timers	56.3%	56.3%	8	\$0.20	1.167	0.21	\$0.025
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.047	2.11	\$0.003
Interior Lighting - Daylighting Controls	42.2%	42.2%	8	\$0.19	7.001	1.32	\$0.004
Interior Screw-in - Task Lighting	0.0%	75.0%	5	\$0.24	0.442	0.05	\$0.119
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.549	0.12	\$0.054
Interior Fluorescent - Delamp and Install Reflectors	18.7%	56.3%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.566	0.10	\$0.052
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	2.828	4.88	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.697	0.04	\$0.119
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.11	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.08	\$0.001
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.76	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	69.58	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.27	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.51	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.50	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.35	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.83	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.50	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.82	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.64	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.61	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.35	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.80	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	60.42	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.80	\$0.001
Motors - Efficient Rewind	14.9%	17.4%	10	\$0.35	11.397	1.37	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.23	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.50	\$0.000
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.22	11.752	4.57	\$0.002
Ventilation - CO2 Controlled	5.9%	7.5%	10	\$0.04	0.365	0.45	\$0.014
Process Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Process Boilers - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Process Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Process Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Process Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Process Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Process Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Gas Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Gas Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Gas Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Furnace - Maintenance	44.1%	90.0%	4	\$0.06	1.269	0.35	\$0.013
Transformer - High Efficiency	8.6%	9.4%	10	\$0.11	11.251	4.52	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	4.913	0.80	\$0.014
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	2.616	2.04	\$0.004

Table D-23 Energy Efficiency Non-Equipment Data— Food, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBTU/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	5.001	1.97	\$0.004
Insulation - Ducting	7.0%	12.5%	20	\$0.41	3.679	0.84	\$0.008
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	2.591	0.31	\$0.023
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	1.742	0.40	\$0.020
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	8.218	5.35	\$0.002
Air-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.239	0.94	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.178	0.43	\$0.019
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.499	0.52	\$0.014
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.031	0.05	\$0.160
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.964	1.44	\$0.007
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	9.668	6.42	\$0.001
Water-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.996	0.93	\$0.009
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.143	0.42	\$0.019
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.396	0.52	\$0.014
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.019	0.03	\$0.259
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.558	1.42	\$0.007
RTU - Maintenance	62.2%	90.0%	4	\$0.06	5.465	2.36	\$0.003
Heat Pump - Maintenance	3.1%	95.0%	4	\$0.06	9.885	4.70	\$0.002
Roofs - High Reflectivity	50.0%	75.0%	15	\$0.08	6.737	7.99	\$0.001
Energy Management System	7.2%	75.0%	14	\$0.35	12.740	2.52	\$0.003
Thermostat - Clock/Programmable	31.7%	50.0%	11	\$0.13	4.808	2.09	\$0.003
Interior Lighting - Occupancy Sensors	6.1%	56.3%	8	\$0.28	14.832	1.17	\$0.003
Interior Lighting - Skylights	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Lighting - Time Clocks and Timers	3.1%	56.3%	8	\$0.20	1.854	0.20	\$0.016
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.074	2.05	\$0.002
Interior Lighting - Daylighting Controls	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Screw-in - Task Lighting	6.1%	75.0%	5	\$0.24	0.664	0.04	\$0.079
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.569	0.12	\$0.052
Interior Fluorescent - Delamp and Install Reflectors	18.3%	56.3%	11	\$0.50	0.484	0.05	\$0.118
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.828	0.10	\$0.036
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	4.141	4.95	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.484	0.04	\$0.081
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.10	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.03	\$0.001
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.69	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	68.95	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.25	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.49	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.14	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.31	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.81	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.79	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.59	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.25	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.27	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.77	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	59.86	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.75	\$0.001
Motors - Efficient Rewind	10.9%	12.1%	10	\$0.35	11.397	1.36	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.12	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Retrocommissioning - HVAC	9.0%	24.0%	4	\$0.35	6.206	0.40	\$0.015
Retrocommissioning - Lighting	25.6%	30.6%	5	\$0.05	4.122	1.16	\$0.003
De-stratification Fans (HVLS)	4.2%	33.0%	12	\$0.22	14.798	4.93	\$0.002
Ventilation - CO2 Controlled	1.0%	7.5%	10	\$0.04	0.456	0.48	\$0.011
Process Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Process Boilers - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Process Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Process Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Process Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Process Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Process Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Gas Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Gas Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Gas Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Furnace - Maintenance	31.7%	90.0%	4	\$0.06	1.499	0.40	\$0.011
Transformer - High Efficiency	8.6%	9.4%	10	\$0.13	11.135	3.57	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000

Table D-24 Energy Efficiency Non-Equipment Data— Food, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBTU/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	3.132	1.40	\$0.006
Insulation - Ducting	7.0%	12.5%	20	\$0.41	2.720	0.74	\$0.011
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	1.313	0.18	\$0.045
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	1.097	0.29	\$0.032
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	5.060	3.77	\$0.003
Air-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.670	0.61	\$0.015
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.359	0.56	\$0.016
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.524	0.43	\$0.019
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.020	0.04	\$0.252
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	10.318	1.31	\$0.009
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	4.231	3.09	\$0.003
Water-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.854	1.91	\$0.004
Water-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.854	1.91	\$0.004
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.998	0.64	\$0.014
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.455	0.59	\$0.015
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.701	0.45	\$0.018
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.021	0.04	\$0.235
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	11.003	1.37	\$0.008
RTU - Maintenance	62.8%	90.0%	4	\$0.06	3.500	1.80	\$0.005
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	5.537	3.09	\$0.003
Roofs - High Reflectivity	55.9%	95.0%	15	\$0.05	5.193	11.64	\$0.001
Energy Management System	0.0%	75.0%	14	\$0.35	8.295	2.06	\$0.004
Thermostat - Clock/Programmable	86.3%	86.3%	11	\$0.13	6.606	3.19	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	9.334	1.33	\$0.004
Interior Lighting - Skylights	42.2%	42.2%	8	\$0.19	7.001	1.31	\$0.004
Interior Lighting - Time Clocks and Timers	56.3%	56.3%	8	\$0.20	1.167	0.21	\$0.025
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.047	2.10	\$0.003
Interior Lighting - Daylighting Controls	42.2%	42.2%	8	\$0.19	7.001	1.31	\$0.004
Interior Screw-in - Task Lighting	0.0%	75.0%	5	\$0.24	0.442	0.05	\$0.119
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.549	0.12	\$0.054
Interior Fluorescent - Delamp and Install Reflectors	18.7%	56.3%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.566	0.10	\$0.052
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	2.828	4.88	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.697	0.04	\$0.119
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.11	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.09	\$0.001
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.77	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	69.64	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.28	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.51	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.57	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.37	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.83	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.53	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.83	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.65	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.68	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.39	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.81	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	60.46	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.81	\$0.001
Motors - Efficient Rewind	10.9%	12.1%	10	\$0.35	11.397	1.37	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.14	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.53	\$0.000
De-stratification Fans (HVLS)	0.0%	33.0%	12	\$0.22	11.752	4.57	\$0.002
Ventilation - CO2 Controlled	5.9%	7.5%	10	\$0.04	0.365	0.44	\$0.014
Process Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Process Boilers - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Process Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Process Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Process Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Process Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Process Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Gas Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Gas Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Gas Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Furnace - Maintenance	44.1%	90.0%	4	\$0.06	1.269	0.35	\$0.013
Transformer - High Efficiency	8.6%	9.4%	10	\$0.13	11.135	3.72	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	4.913	0.80	\$0.014
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	2.616	2.05	\$0.004

Table D-25 Energy Efficiency Non-Equipment Data— Miscellaneous Industrial, Existing Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBTU/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	5.001	1.97	\$0.004
Insulation - Ducting	7.0%	12.5%	20	\$0.41	3.679	0.84	\$0.008
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	2.591	0.31	\$0.023
HVAC - Duct Repair and Sealing	5.0%	25.0%	15	\$0.38	1.742	0.40	\$0.020
Air-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	8.218	5.35	\$0.002
Air-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.651	2.53	\$0.003
Air-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	8.239	0.94	\$0.009
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.178	0.43	\$0.019
Air-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.499	0.52	\$0.014
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.031	0.05	\$0.160
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.964	1.44	\$0.007
Water-Cooled Chiller - Economizer	0.0%	48.8%	15	\$0.15	9.668	6.42	\$0.001
Water-Cooled Chiller - Efficient Mechanical Layout	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Maintenance	62.2%	90.0%	4	\$0.06	5.485	2.50	\$0.003
Water-Cooled Chiller - Chilled Water Reset	5.0%	75.0%	10	\$0.57	7.996	0.93	\$0.009
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.143	0.42	\$0.019
Water-Cooled Chiller - Condenser Water Temperature Reset	30.0%	75.0%	4	\$0.18	3.396	0.52	\$0.014
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.019	0.03	\$0.259
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	12.558	1.42	\$0.007
RTU - Maintenance	62.2%	90.0%	4	\$0.06	5.465	2.36	\$0.003
Heat Pump - Maintenance	3.1%	95.0%	4	\$0.06	9.885	4.70	\$0.002
Roofs - High Reflectivity	50.0%	75.0%	15	\$0.08	6.737	7.99	\$0.001
Energy Management System	7.2%	75.0%	14	\$0.35	12.740	2.52	\$0.003
Thermostat - Clock/Programmable	31.7%	50.0%	11	\$0.13	4.808	2.09	\$0.003
Interior Lighting - Occupancy Sensors	6.1%	56.3%	8	\$0.28	14.832	1.17	\$0.003
Interior Lighting - Skylights	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Lighting - Time Clocks and Timers	3.1%	56.3%	8	\$0.20	1.854	0.20	\$0.016
Interior Lighting - LED Exit Lighting	50.0%	85.5%	10	\$0.00	0.074	2.05	\$0.002
Interior Lighting - Daylighting Controls	15.3%	20.3%	8	\$0.29	11.124	0.86	\$0.004
Interior Screw-in - Task Lighting	6.1%	75.0%	5	\$0.24	0.664	0.04	\$0.079
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.569	0.12	\$0.052
Interior Fluorescent - Delamp and Install Reflectors	18.3%	56.3%	11	\$0.50	0.484	0.05	\$0.118
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.828	0.10	\$0.036
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	4.141	4.95	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	2.484	0.04	\$0.081
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.10	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.03	\$0.001
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.69	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	68.95	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.25	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.49	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.14	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.31	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.81	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.79	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.59	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.25	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.27	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.77	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	59.86	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.75	\$0.001
Motors - Efficient Rewind	14.9%	17.4%	10	\$0.35	11.397	1.36	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.21	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.14	\$0.000
Retrocommissioning - HVAC	9.0%	24.0%	4	\$0.35	6.206	0.40	\$0.015
Retrocommissioning - Lighting	25.6%	30.6%	5	\$0.05	4.122	1.16	\$0.003
Destratification Fans (HVLS)	4.2%	33.0%	12	\$0.22	14.798	4.93	\$0.002
Ventilation - CO2 Controlled	1.0%	7.5%	10	\$0.04	0.456	0.48	\$0.011
Process Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Process Boilers - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Process Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Process Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Process Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Process Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Process Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Boiler - High Efficiency Hot Water Circulation	0.0%	33.8%	10	\$0.13	2.309	0.73	\$0.007
Gas Boiler - Hot Water Reset	30.0%	75.0%	4	\$0.18	4.452	0.41	\$0.011
Gas Boiler - Combustion Controls (O2 Trim)	0.0%	48.8%	25	\$0.81	0.614	0.09	\$0.089
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.841	0.94	\$0.005
Gas Boiler - Condensing Economizer	0.0%	48.8%	25	\$2.00	2.046	0.12	\$0.066
Gas Boiler - Pipe Insulation	6.1%	11.1%	15	\$0.28	1.156	0.27	\$0.022
Gas Boiler - Steam Trap Maintenance	31.7%	90.0%	4	\$0.06	2.046	0.56	\$0.008
Gas Boiler - Maintenance	31.7%	90.0%	4	\$0.06	2.696	0.74	\$0.006
Gas Furnace - Maintenance	31.7%	90.0%	4	\$0.06	1.499	0.40	\$0.011
Transformer - High Efficiency	8.6%	9.4%	10	\$0.11	10.640	3.91	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000

Table D-26 Energy Efficiency Non-Equipment Data— Miscellaneous Industrial, New Vintage

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBTU/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBTU)
Insulation - Ceiling	7.0%	12.5%	20	\$0.26	3.132	1.40	\$0.006
Insulation - Ducting	7.0%	12.5%	20	\$0.41	2.720	0.74	\$0.011
Insulation - Wall Cavity	7.0%	12.5%	20	\$0.78	1.313	0.18	\$0.045
HVAC - Duct Repair and Sealing	25.0%	25.0%	15	\$0.38	1.097	0.29	\$0.032
Air-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	5.060	3.77	\$0.003
Air-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.601	1.83	\$0.004
Air-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.670	0.61	\$0.015
Air-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.359	0.56	\$0.016
Air-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.524	0.43	\$0.019
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.020	0.04	\$0.252
Air-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	10.318	1.31	\$0.009
Water-Cooled Chiller - Economizer	36.6%	48.8%	15	\$0.15	4.231	3.09	\$0.003
Water-Cooled Chiller - Efficient Mechanical Layout	62.8%	90.0%	4	\$0.06	3.854	1.91	\$0.004
Water-Cooled Chiller - Maintenance	62.8%	90.0%	4	\$0.06	3.854	1.91	\$0.004
Water-Cooled Chiller - Chilled Water Reset	25.0%	75.0%	10	\$0.57	4.998	0.64	\$0.014
Water-Cooled Chiller - Chilled Water Variable-Flow System	30.0%	75.0%	10	\$0.18	1.455	0.59	\$0.015
Water-Cooled Chiller - Condenser Water Temperature Reset	60.0%	75.0%	4	\$0.18	2.701	0.45	\$0.018
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15.0%	41.3%	10	\$0.04	0.021	0.04	\$0.235
Water-Cooled Chiller - VSD on Fans	15.0%	66.2%	20	\$1.17	11.003	1.37	\$0.008
RTU - Maintenance	62.8%	90.0%	4	\$0.06	3.500	1.80	\$0.005
Heat Pump - Maintenance	0.0%	95.0%	4	\$0.06	5.537	3.09	\$0.003
Roofs - High Reflectivity	55.9%	95.0%	15	\$0.05	5.193	11.64	\$0.001
Energy Management System	0.0%	75.0%	14	\$0.35	8.295	2.06	\$0.004
Thermostat - Clock/Programmable	86.3%	86.3%	11	\$0.13	6.606	3.20	\$0.002
Interior Lighting - Occupancy Sensors	56.3%	56.3%	8	\$0.25	9.334	1.33	\$0.004
Interior Lighting - Skylights	42.2%	42.2%	8	\$0.19	7.001	1.31	\$0.004
Interior Lighting - Time Clocks and Timers	56.3%	56.3%	8	\$0.20	1.167	0.21	\$0.025
Interior Lighting - LED Exit Lighting	85.5%	85.5%	10	\$0.00	0.047	2.10	\$0.003
Interior Lighting - Daylighting Controls	42.2%	42.2%	8	\$0.19	7.001	1.31	\$0.004
Interior Screw-in - Task Lighting	0.0%	75.0%	5	\$0.24	0.442	0.05	\$0.119
Interior Fluorescent - Bi-Level Fixture	10.0%	22.5%	8	\$0.20	0.549	0.12	\$0.054
Interior Fluorescent - Delamp and Install Reflectors	18.7%	56.3%	11	\$0.50	-	-	\$0.000
Exterior Lighting - Bi-Level Fixture	10.0%	30.0%	8	\$0.20	0.566	0.10	\$0.052
Exterior Lighting - Daylighting Controls	18.0%	37.5%	8	\$0.02	2.828	4.88	\$0.001
Exterior Lighting - Photovoltaic Installation	0.0%	12.5%	5	\$0.92	1.697	0.04	\$0.119
Process - Conductivity Controls	20.0%	100.0%	5	\$0.53	11.397	0.44	\$0.010
Process - Controls on Fume Hoods	30.0%	100.0%	10	\$0.13	11.397	3.63	\$0.001
Process - Timers and Controls	40.0%	100.0%	5	\$0.42	22.793	1.11	\$0.004
Refrigeration - Floating Head Pressure	30.0%	90.0%	18	\$0.57	11.397	1.63	\$0.004
Refrigeration - System Controls	40.0%	56.0%	18	\$1.33	11.397	0.70	\$0.009
Refrigeration - System Maintenance	30.0%	72.0%	3	\$0.24	11.397	0.59	\$0.007
Refrigeration - System Optimization	40.0%	56.0%	15	\$0.15	11.397	5.07	\$0.001
Compressed Air - Air Usage Reduction	20.2%	25.9%	10	\$0.08	11.397	6.09	\$0.001
Compressed Air - Compressor Replacement	14.6%	17.1%	10	\$0.06	11.397	7.78	\$0.001

Industrial Energy Efficiency Equipment and Measure Data

Measure	Base Saturation	Applicability	Life-time (Years)	Incremental Cost (\$/empl)	Energy Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy (\$/kBtu)
Compressed Air - System Controls	5.0%	33.8%	15	\$0.01	11.397	69.66	\$0.000
Compressed Air - System Maintenance	5.0%	33.8%	3	\$0.03	11.397	4.29	\$0.001
Compressed Air - System Optimization and Improvements	24.8%	35.6%	10	\$0.20	11.397	2.51	\$0.002
Pumping System - Controls	22.8%	31.0%	10	\$0.01	11.397	43.60	\$0.000
Pumping System - Maintenance	5.0%	33.8%	3	\$0.02	11.397	6.37	\$0.001
Pumping System - Optimization	22.4%	30.0%	10	\$0.28	11.397	1.83	\$0.003
Pumps - Variable Speed Control	5.0%	33.8%	15	\$0.02	11.397	39.54	\$0.000
Pump Equipment Upgrade	24.0%	33.6%	10	\$0.13	11.397	3.83	\$0.001
Fan Equipment Upgrade	18.6%	23.2%	10	\$0.09	11.397	5.65	\$0.001
Fan System - Controls	20.9%	27.2%	10	\$0.01	11.397	43.71	\$0.000
Fan System - Maintenance	10.0%	37.5%	3	\$0.01	11.397	13.40	\$0.000
Fan System - Optimization	22.2%	29.6%	10	\$0.13	11.397	3.81	\$0.001
Fans - Variable Speed Control	10.0%	37.5%	15	\$0.01	11.397	60.49	\$0.000
Motors - Magnetic Adjustable Speed Drives	5.0%	15.0%	20	\$0.19	11.397	5.81	\$0.001
Motors - Efficient Rewind	14.9%	17.4%	10	\$0.35	11.397	1.37	\$0.004
Motors - Synchronous Belts	17.3%	21.0%	10	\$0.22	11.397	2.23	\$0.002
Motors - Variable Frequency Drive	5.0%	33.8%	15	\$0.02	11.397	39.54	\$0.000
Destratification Fans (HVLS)	0.0%	33.0%	12	\$0.22	11.752	4.57	\$0.002
Ventilation - CO2 Controlled	5.9%	7.5%	10	\$0.04	0.365	0.44	\$0.014
Process Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Process Boilers - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Process Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Process Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Process Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Process Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Process Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Process Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Boiler - High Efficiency Hot Water Circulation	5.0%	33.8%	10	\$0.13	0.476	0.16	\$0.034
Gas Boiler - Hot Water Reset	60.0%	75.0%	4	\$0.18	2.306	0.21	\$0.021
Gas Boiler - Combustion Controls (O2 Trim)	36.6%	48.8%	25	\$0.81	0.479	0.07	\$0.114
Gas Boiler - Condensate Return Lines	0.0%	50.0%	5	\$0.04	1.437	0.74	\$0.006
Gas Boiler - Condensing Economizer	36.6%	48.8%	25	\$2.00	1.597	0.10	\$0.084
Gas Boiler - Pipe Insulation	0.0%	0.0%	15	\$0.28	0.484	0.12	\$0.053
Gas Boiler - Steam Trap Maintenance	44.1%	90.0%	4	\$0.06	1.597	0.44	\$0.010
Gas Boiler - Maintenance	44.1%	90.0%	4	\$0.06	2.104	0.58	\$0.008
Gas Furnace - Maintenance	44.1%	90.0%	4	\$0.06	1.269	0.35	\$0.013
Transformer - High Efficiency	8.6%	9.4%	10	\$0.11	10.640	4.31	\$0.001
Custom Measures	0.0%	0.0%	0	\$0.00	-	-	\$0.000
Commissioning - HVAC	75.0%	75.0%	25	\$1.00	4.913	0.80	\$0.014
Commissioning - Lighting	60.0%	75.0%	25	\$0.15	2.616	2.04	\$0.004

MARKET ADOPTION FACTORS

To calculate achievable potential, we apply a set of market adoption factors to economic potential. These parameters are described below, followed by a discussion of how they are applied to calculate achievable potential. Finally, we present the three sets of factors at the end of this section.

Achievable High adoption rates.

These factors are applied to Economic potential to estimate the upper bound: Achievable High. These estimate customer adoption of economic measures when delivered through efficiency programs under ideal market, implementation, and customer preference conditions. Information channels are assumed to be established and efficient for marketing, educating consumers, and coordinating with trade allies and delivery partners. The Achievable High adoption rates are based on the ramp rates from the Northwest Power & Conservation Council's Sixth Plan as a starting point. The NWPCC has been running programs in the Pacific Northwest for many years, and the portfolio of programs reflects a similar profile of market maturity. The ramp rates are then adjusted with actual New Jersey program history and information from program evaluations. Achievable High potential establishes a maximum target for the EE savings that an administrator can hope to achieve through its EE programs and involves incentives that represent a substantial portion of the incremental cost combined with high administrative and marketing costs. These adoption rates increase over time, reflecting an increasing awareness and willingness to adopt energy-efficient measures.

Again, the Achievable High adoption rates are applied directly to economic potential to calculate the Achievable High potential estimates.

Achievable Low adoption rates.

These factors are applied to Achievable High potential to calculate Achievable Low potential, decrementing them by a range of 40% to 75% based on where measures lie in the time horizon of the study or whether they are already familiar inclusions in existing programs. They reflect expected program participation given significant barriers to customer acceptance, non-ideal implementation conditions, and limited program budgets. This represents a lower bound on achievable potential. Like the Achievable High rates, these rates increase over time.

To review, the Achievable Low adoption rates are applied directly to the Achievable High potential to calculate the Achievable Low potential estimates. Stated differently, both Low and High adoption rates are applied to Economic potential to calculate the Achievable Low estimates.

Estimates of Achievable Potential

Table E-1 through Table E-12 present the Achievable High factors (High) that represent how Economic potential is changed to reach Achievable High potential for residential equipment and non-equipment measures.

Table E-13 through Table E-24 present the product of Achievable High factors and Achievable Low factors (High x Low) to show how Economic potential is changed to reach Achievable Low potential for residential equipment and non-equipment measures.

Table E-25 through Table E-28 present the (High) and (High x Low) factors for commercial equipment and measures.

Table E-29 through Table E-32 present the same data for industrial equipment and measures.

Table E-1 Single Family Equipment Measures—(Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Room AC	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Heating	Electric	Electric Room Heat	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Electric Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Int. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Specialty	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Ext. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Washer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Dishwasher	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Freezer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Second Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Microwave	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Personal Computers	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Monitor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Laptops	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	TVs	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Printer/Fax/Copier	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Devices and Gadgets	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Electric	Pool Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Well Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Furnace Fan	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Furnace	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Boiler	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Natural Gas	Other Heating	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Natural Gas	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Natural Gas	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Natural Gas	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Table E-2 Single Family Non-Equipment Measures—(Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Ducting	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Foundation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Infiltration Control	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Insulation - Radiant Barrier	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Cavity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Sheathing	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ducting - Repair and Sealing	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - High Efficiency/ENERGY STAR	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - Install Reflective Film	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Doors - Storm and Thermal	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Roofs - High Reflectivity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Photovoltaic - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Whole-House Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ceiling Fan - Installation	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Thermostat - Clock/Programmable	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Home Energy Management System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central AC - Early Replacement	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Central AC - Maintenance and Tune-Up	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central Heat Pump - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Room AC - Removal of Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Hot Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Boiler - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Furnace - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Drainwater Heat Recovery	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Faucet Aerators	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Low-Flow Showerheads	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Timer	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Desuperheater	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Solar System	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Tank Blanket/Insulation	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Photosensor Control	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting - Photovoltaic Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Timeclock Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Refrigerator - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Freezer - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Electronics - Smart Power Strips	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Pool Pump - Timer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pool Heater - Solar System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
ENERGY STAR Home Design	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Behavioral Feedback Tools	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%

Table E-3 Single Family Limited Income Equipment Measures—(Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Room AC	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Heating	Electric	Electric Room Heat	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Electric Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Int. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Specialty	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Ext. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Washer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Dishwasher	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Freezer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Second Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Microwave	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Personal Computers	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Monitor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Laptops	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	TVs	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Printer/Fax/Copier	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Devices and Gadgets	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Electric	Pool Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Well Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Furnace Fan	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Furnace	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Boiler	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Natural Gas	Other Heating	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Natural Gas	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Natural Gas	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Natural Gas	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Table E-4 Single Family Limited Income Non-Equipment Measures—(Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Ducting	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Foundation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Infiltration Control	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Insulation - Radiant Barrier	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Cavity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Sheathing	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ducting - Repair and Sealing	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - High Efficiency/ENERGY STAR	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - Install Reflective Film	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Doors - Storm and Thermal	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Roofs - High Reflectivity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Photovoltaic - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Whole-House Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ceiling Fan - Installation	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Thermostat - Clock/Programmable	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Home Energy Management System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central AC - Early Replacement	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Central AC - Maintenance and Tune-Up	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central Heat Pump - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Room AC - Removal of Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Hot Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Boiler - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Furnace - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Drainwater Heat Recovery	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Faucet Aerators	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Low-Flow Showerheads	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Timer	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Desuperheater	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Solar System	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Tank Blanket/Insulation	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Photosensor Control	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting - Photovoltaic Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Timeclock Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Refrigerator - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Freezer - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Electronics - Smart Power Strips	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Pool Pump - Timer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pool Heater - Solar System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
ENERGY STAR Home Design	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Behavioral Feedback Tools	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%

Table E-5 Multi Family Renter Equipment Measures—(Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Cooling	Electric	Room AC	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Cooling	Electric	Air-Source Heat Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Heating	Electric	Electric Room Heat	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Electric	Electric Furnace	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Electric	Air-Source Heat Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Int. Lighting	Electric	Screw-in	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Int. Lighting	Electric	Specialty	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Ext. Lighting	Electric	Screw-in	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Appliances	Electric	Clothes Washer	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Clothes Dryer	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Dishwasher	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Refrigerator	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Freezer	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Appliances	Electric	Second Refrigerator	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Stove	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Appliances	Electric	Microwave	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Electronics	Electric	Personal Computers	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Monitor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Laptops	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	TVs	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Printer/Fax/Copier	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Devices and Gadgets	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Electric	Pool Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Pool Heater	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Hot Tub / Spa	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Well Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Furnace Fan	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Heating	Natural Gas	Furnace	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Heating	Natural Gas	Boiler	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Natural Gas	Other Heating	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Appliances	Natural Gas	Clothes Dryer	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Natural Gas	Stove	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Misc	Natural Gas	Pool Heater	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Natural Gas	Miscellaneous	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%

Table E-6 Multi Family Renter Non-Equipment Measures—(Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Ducting	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Foundation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Infiltration Control	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Insulation - Radiant Barrier	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Wall Cavity	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Wall Sheathing	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Ducting - Repair and Sealing	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Windows - High Efficiency/ENERGY STAR	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Windows - Install Reflective Film	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Doors - Storm and Thermal	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Roofs - High Reflectivity	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Attic Fan - Installation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Attic Fan - Photovoltaic - Installation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Whole-House Fan - Installation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Ceiling Fan - Installation	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Thermostat - Clock/Programmable	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Home Energy Management System	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Central AC - Early Replacement	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Central AC - Maintenance and Tune-Up	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Central Heat Pump - Maintenance	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Room AC - Removal of Second Unit	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Boiler - Hot Water Reset	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Boiler - Pipe Insulation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Boiler - Maintenance	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Furnace - Maintenance	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heater - Drainwater Heat Recovery	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heater - Faucet Aerators	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Water Heater - Low-Flow Showerheads	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Water Heater - Pipe Insulation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Water Heater - Timer	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Water Heater - Desuperheater	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heater - Solar System	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heater - Tank Blanket/Insulation	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Exterior Lighting - Photosensor Control	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Exterior Lighting - Photovoltaic Installation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Exterior Lighting - Timeclock Installation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Refrigerator - Early Replacement	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Refrigerator - Maintenance	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Refrigerator - Remove Second Unit	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Freezer - Remove Second Unit	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Freezer - Early Replacement	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Freezer - Maintenance	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Electronics - Smart Power Strips	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Pool Pump - Timer	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Pool Heater - Solar System	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
ENERGY STAR Home Design	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Behavioral Feedback Tools	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%

Table E-7 Multi Family Renter Limited Income Equipment Measures—(Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Cooling	Electric	Room AC	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Cooling	Electric	Air-Source Heat Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Heating	Electric	Electric Room Heat	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Electric	Electric Furnace	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Electric	Air-Source Heat Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Int. Lighting	Electric	Screw-in	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Int. Lighting	Electric	Specialty	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Ext. Lighting	Electric	Screw-in	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Appliances	Electric	Clothes Washer	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Clothes Dryer	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Dishwasher	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Refrigerator	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Freezer	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Appliances	Electric	Second Refrigerator	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Electric	Stove	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Appliances	Electric	Microwave	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Electronics	Electric	Personal Computers	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Monitor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Laptops	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	TVs	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Printer/Fax/Copier	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Devices and Gadgets	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Electric	Pool Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Pool Heater	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Hot Tub / Spa	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Well Pump	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Electric	Furnace Fan	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Heating	Natural Gas	Furnace	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Heating	Natural Gas	Boiler	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Heating	Natural Gas	Other Heating	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Appliances	Natural Gas	Clothes Dryer	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Appliances	Natural Gas	Stove	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Misc	Natural Gas	Pool Heater	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Misc	Natural Gas	Miscellaneous	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%

Table E-8 Multi Family Renter Limited Income Non-Equipment Measures—(Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Ducting	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Foundation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Infiltration Control	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Insulation - Radiant Barrier	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Wall Cavity	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Wall Sheathing	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Ducting - Repair and Sealing	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Windows - High Efficiency/ENERGY STAR	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Windows - Install Reflective Film	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Doors - Storm and Thermal	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Roofs - High Reflectivity	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Attic Fan - Installation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Attic Fan - Photovoltaic - Installation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Whole-House Fan - Installation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Ceiling Fan - Installation	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Thermostat - Clock/Programmable	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Home Energy Management System	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Central AC - Early Replacement	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Central AC - Maintenance and Tune-Up	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Central Heat Pump - Maintenance	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Room AC - Removal of Second Unit	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Boiler - Hot Water Reset	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Boiler - Pipe Insulation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Boiler - Maintenance	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Furnace - Maintenance	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Water Heater - Drainwater Heat Recovery	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heater - Faucet Aerators	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Water Heater - Low-Flow Showerheads	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Water Heater - Pipe Insulation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Water Heater - Timer	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Water Heater - Desuperheater	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heater - Solar System	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Water Heater - Tank Blanket/Insulation	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Exterior Lighting - Photosensor Control	0%	0%	18%	36%	54%	72%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Exterior Lighting - Photovoltaic Installation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Exterior Lighting - Timeclock Installation	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Refrigerator - Early Replacement	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%
Refrigerator - Maintenance	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Refrigerator - Remove Second Unit	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Freezer - Remove Second Unit	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Freezer - Early Replacement	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Freezer - Maintenance	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Electronics - Smart Power Strips	0%	0%	18%	36%	54%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
Pool Pump - Timer	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
Pool Heater - Solar System	0%	0%	9%	18%	27%	36%	45%	54%	59%	59%	59%	59%	59%	59%	59%
ENERGY STAR Home Design	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Behavioral Feedback Tools	0%	0%	9%	18%	27%	36%	45%	54%	63%	72%	77%	77%	77%	77%	77%

Table E-9 Multi Family Owner Equipment Measures—(Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Room AC	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Heating	Electric	Electric Room Heat	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Electric Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Int. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Specialty	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Ext. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Washer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Dishwasher	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Freezer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Second Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Microwave	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Personal Computers	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Monitor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Laptops	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	TVs	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Printer/Fax/Copier	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Devices and Gadgets	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Electric	Pool Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Well Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Furnace Fan	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Furnace	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Boiler	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Natural Gas	Other Heating	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Natural Gas	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Natural Gas	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Natural Gas	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Table E-10 Multi Family Owner Non-Equipment Measures—(Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Ducting	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Foundation	0%	0%	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	50%	54%	59%
Insulation - Infiltration Control	0%	0%	6%	12%	18%	24%	30%	36%	42%	48%	54%	59%	59%	59%	59%
Insulation - Radiant Barrier	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Cavity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Sheathing	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ducting - Repair and Sealing	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - High Efficiency/ENERGY STAR	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - Install Reflective Film	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Doors - Storm and Thermal	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Roofs - High Reflectivity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Photovoltaic - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Whole-House Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ceiling Fan - Installation	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Thermostat - Clock/Programmable	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Home Energy Management System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central AC - Early Replacement	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Central AC - Maintenance and Tune-Up	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central Heat Pump - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Room AC - Removal of Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Hot Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Boiler - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Furnace - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Drainwater Heat Recovery	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Faucet Aerators	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Low-Flow Showerheads	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Timer	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Desuperheater	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Solar System	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Tank Blanket/Insulation	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Photosensor Control	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting - Photovoltaic Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Timeclock Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Refrigerator - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Freezer - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Electronics - Smart Power Strips	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Pool Pump - Timer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pool Heater - Solar System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
ENERGY STAR Home Design	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Behavioral Feedback Tools	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%

Table E-11 Multi Family Owner Limited Income Equipment Measures—(Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Room AC	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Heating	Electric	Electric Room Heat	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Electric Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Int. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Int. Lighting	Electric	Specialty	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Ext. Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Washer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Dishwasher	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Freezer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Second Refrigerator	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Electric	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Electric	Microwave	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Personal Computers	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Monitor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Laptops	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	TVs	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Printer/Fax/Copier	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Electronics	Electric	Devices and Gadgets	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Electric	Pool Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Well Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Electric	Furnace Fan	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Furnace	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Boiler	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Natural Gas	Other Heating	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Appliances	Natural Gas	Clothes Dryer	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Appliances	Natural Gas	Stove	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Misc	Natural Gas	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Misc	Natural Gas	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Table E-12 Multi Family Owner Limited Income Non-Equipment Measures—(Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Ducting	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Foundation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Infiltration Control	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Insulation - Radiant Barrier	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Cavity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Sheathing	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ducting - Repair and Sealing	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - High Efficiency/ENERGY STAR	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - Install Reflective Film	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Doors - Storm and Thermal	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Roofs - High Reflectivity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Attic Fan - Photovoltaic - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Whole-House Fan - Installation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Ceiling Fan - Installation	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Thermostat - Clock/Programmable	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Home Energy Management System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central AC - Early Replacement	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Central AC - Maintenance and Tune-Up	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Central Heat Pump - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Room AC - Removal of Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Hot Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Boiler - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Furnace - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Drainwater Heat Recovery	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Faucet Aerators	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Low-Flow Showerheads	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Timer	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Desuperheater	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Solar System	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Tank Blanket/Insulation	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Photosensor Control	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting - Photovoltaic Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Timeclock Installation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Refrigerator - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Remove Second Unit	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Freezer - Early Replacement	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Freezer - Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Electronics - Smart Power Strips	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Pool Pump - Timer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pool Heater - Solar System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
ENERGY STAR Home Design	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Behavioral Feedback Tools	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%

Table E-13 Single Family Equipment Measures—(Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Room AC	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Cooling	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Cooling	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Heating	Electric	Electric Room Heat	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Electric Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Heating	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Int. Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Int. Lighting	Electric	Specialty	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Ext. Lighting	Electric	Screw-in	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Appliances	Electric	Clothes Washer	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Appliances	Electric	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Dishwasher	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Freezer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Second Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Microwave	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Electronics	Electric	Personal Computers	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Monitor	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Laptops	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	TVs	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Printer/Fax/Copier	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Devices and Gadgets	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Misc	Electric	Pool Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Well Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Furnace Fan	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Heating	Natural Gas	Furnace	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Heating	Natural Gas	Boiler	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Natural Gas	Other Heating	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Natural Gas	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Natural Gas	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Misc	Natural Gas	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Table E-14 Single Family Non-Equipment Measures—(Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Ducting	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Foundation	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Infiltration Control	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Insulation - Radiant Barrier	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Wall Cavity	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Wall Sheathing	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Ducting - Repair and Sealing	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Windows - High Efficiency/ENERGY STAR	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Windows - Install Reflective Film	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Doors - Storm and Thermal	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Roofs - High Reflectivity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Photovoltaic - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Whole-House Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Ceiling Fan - Installation	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Thermostat - Clock/Programmable	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Home Energy Management System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central AC - Early Replacement	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Central AC - Maintenance and Tune-Up	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central Heat Pump - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Room AC - Removal of Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Boiler - Hot Water Reset	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Boiler - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Boiler - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Furnace - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Drainwater Heat Recovery	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Faucet Aerators	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Low-Flow Showerheads	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Pipe Insulation	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Timer	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Desuperheater	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Solar System	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Tank Blanket/Insulation	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Photosensor Control	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Exterior Lighting - Photovoltaic Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Timeclock Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Refrigerator - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Freezer - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Electronics - Smart Power Strips	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Pool Pump - Timer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pool Heater - Solar System	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
ENERGY STAR Home Design	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Behavioral Feedback Tools	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%

Table E-15 Single Family Limited Income Equipment Measures—(Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Room AC	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Cooling	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Cooling	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Heating	Electric	Electric Room Heat	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Electric Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Heating	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Int. Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Int. Lighting	Electric	Specialty	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Ext. Lighting	Electric	Screw-in	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Appliances	Electric	Clothes Washer	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Appliances	Electric	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Dishwasher	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Freezer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Second Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Microwave	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Electronics	Electric	Personal Computers	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Monitor	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Laptops	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	TVs	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Printer/Fax/Copier	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Devices and Gadgets	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Misc	Electric	Pool Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Well Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Furnace Fan	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Heating	Natural Gas	Furnace	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Heating	Natural Gas	Boiler	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Natural Gas	Other Heating	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Natural Gas	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Natural Gas	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Misc	Natural Gas	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Table E-16 Single Family Limited Income Non-Equipment Measures—(Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Ducting	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Foundation	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Infiltration Control	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Insulation - Radiant Barrier	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Wall Cavity	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Wall Sheathing	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Ducting - Repair and Sealing	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Windows - High Efficiency/ENERGY STAR	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Windows - Install Reflective Film	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Doors - Storm and Thermal	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Roofs - High Reflectivity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Photovoltaic - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Whole-House Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Ceiling Fan - Installation	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Thermostat - Clock/Programmable	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Home Energy Management System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central AC - Early Replacement	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Central AC - Maintenance and Tune-Up	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central Heat Pump - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Room AC - Removal of Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Boiler - Hot Water Reset	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Boiler - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Boiler - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Furnace - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Drainwater Heat Recovery	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Faucet Aerators	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Low-Flow Showerheads	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Pipe Insulation	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Timer	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Desuperheater	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Solar System	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Tank Blanket/Insulation	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Photosensor Control	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Exterior Lighting - Photovoltaic Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Timeclock Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Refrigerator - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Freezer - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Electronics - Smart Power Strips	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Pool Pump - Timer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pool Heater - Solar System	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
ENERGY STAR Home Design	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Behavioral Feedback Tools	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%

Table E-17 Multi Family Renter Equipment Measures—(Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Cooling	Electric	Room AC	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Cooling	Electric	Air-Source Heat Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Cooling	Electric	Geothermal Heat Pump	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Heating	Electric	Electric Room Heat	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Heating	Electric	Electric Furnace	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Heating	Electric	Air-Source Heat Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Heating	Electric	Geothermal Heat Pump	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Int. Lighting	Electric	Screw-in	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Int. Lighting	Electric	Specialty	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Ext. Lighting	Electric	Screw-in	0%	0%	7%	15%	24%	33%	37%	38%	40%	41%	43%	44%	46%	47%	49%
Appliances	Electric	Clothes Washer	0%	0%	5%	9%	15%	20%	26%	32%	39%	46%	50%	52%	54%	55%	57%
Appliances	Electric	Clothes Dryer	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Dishwasher	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Refrigerator	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Freezer	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Appliances	Electric	Second Refrigerator	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Stove	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Appliances	Electric	Microwave	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Electronics	Electric	Personal Computers	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Monitor	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Laptops	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	TVs	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Printer/Fax/Copier	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Devices and Gadgets	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Misc	Electric	Pool Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Pool Heater	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Hot Tub / Spa	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Well Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Furnace Fan	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Heating	Natural Gas	Furnace	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Heating	Natural Gas	Boiler	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Heating	Natural Gas	Other Heating	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Appliances	Natural Gas	Clothes Dryer	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Natural Gas	Stove	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Misc	Natural Gas	Pool Heater	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Natural Gas	Miscellaneous	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%

Table E-18 Multi Family Renter Non-Equipment Measures—(Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Ducting	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Foundation	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Infiltration Control	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Insulation - Radiant Barrier	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Insulation - Wall Cavity	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Wall Sheathing	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Ducting - Repair and Sealing	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Windows - High Efficiency/ENERGY STAR	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Windows - Install Reflective Film	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Doors - Storm and Thermal	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Roofs - High Reflectivity	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Attic Fan - Installation	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Attic Fan - Photovoltaic - Installation	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Whole-House Fan - Installation	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Ceiling Fan - Installation	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Thermostat - Clock/Programmable	0%	0%	5%	9%	15%	20%	26%	32%	39%	46%	50%	52%	54%	55%	57%
Home Energy Management System	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Central AC - Early Replacement	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Central AC - Maintenance and Tune-Up	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Central Heat Pump - Maintenance	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Room AC - Removal of Second Unit	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Boiler - Hot Water Reset	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Boiler - Pipe Insulation	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Boiler - Maintenance	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Furnace - Maintenance	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Water Heater - Drainwater Heat Recovery	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heater - Faucet Aerators	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%
Water Heater - Low-Flow Showerheads	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%
Water Heater - Pipe Insulation	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Water Heater - Timer	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Water Heater - Desuperheater	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heater - Solar System	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heater - Tank Blanket/Insulation	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Exterior Lighting - Photosensor Control	0%	0%	7%	15%	24%	33%	37%	38%	40%	41%	43%	44%	46%	47%	49%
Exterior Lighting - Photovoltaic Installation	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Exterior Lighting - Timeclock Installation	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Refrigerator - Early Replacement	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Refrigerator - Maintenance	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Refrigerator - Remove Second Unit	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Freezer - Remove Second Unit	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Freezer - Early Replacement	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Freezer - Maintenance	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Electronics - Smart Power Strips	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Pool Pump - Timer	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Pool Heater - Solar System	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
ENERGY STAR Home Design	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Behavioral Feedback Tools	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%

Table E-19 Multi Family Renter Limited Income Equipment Measures—(Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Cooling	Electric	Room AC	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Cooling	Electric	Air-Source Heat Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Cooling	Electric	Geothermal Heat Pump	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Heating	Electric	Electric Room Heat	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Heating	Electric	Electric Furnace	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Heating	Electric	Air-Source Heat Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Heating	Electric	Geothermal Heat Pump	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Int. Lighting	Electric	Screw-in	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Int. Lighting	Electric	Specialty	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Ext. Lighting	Electric	Screw-in	0%	0%	7%	15%	24%	33%	37%	38%	40%	41%	43%	44%	46%	47%	49%
Appliances	Electric	Clothes Washer	0%	0%	5%	9%	15%	20%	26%	32%	39%	46%	50%	52%	54%	55%	57%
Appliances	Electric	Clothes Dryer	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Dishwasher	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Refrigerator	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Freezer	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Appliances	Electric	Second Refrigerator	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Electric	Stove	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Appliances	Electric	Microwave	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Electronics	Electric	Personal Computers	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Monitor	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Laptops	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	TVs	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Printer/Fax/Copier	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Devices and Gadgets	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Misc	Electric	Pool Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Pool Heater	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Hot Tub / Spa	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Well Pump	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Electric	Furnace Fan	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Heating	Natural Gas	Furnace	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Heating	Natural Gas	Boiler	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Heating	Natural Gas	Other Heating	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Appliances	Natural Gas	Clothes Dryer	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Appliances	Natural Gas	Stove	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Misc	Natural Gas	Pool Heater	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Misc	Natural Gas	Miscellaneous	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%

Table E-20 Multi Family Renter Limited Income Non-Equipment Measures—(Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Ducting	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Foundation	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Infiltration Control	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Insulation - Radiant Barrier	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Insulation - Wall Cavity	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Wall Sheathing	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Ducting - Repair and Sealing	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Windows - High Efficiency/ENERGY STAR	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Windows - Install Reflective Film	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Doors - Storm and Thermal	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Roofs - High Reflectivity	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Attic Fan - Installation	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Attic Fan - Photovoltaic - Installation	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Whole-House Fan - Installation	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Ceiling Fan - Installation	0%	0%	2%	5%	8%	11%	14%	18%	22%	26%	30%	34%	35%	36%	37%
Thermostat - Clock/Programmable	0%	0%	5%	9%	15%	20%	26%	32%	39%	46%	50%	52%	54%	55%	57%
Home Energy Management System	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Central AC - Early Replacement	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Central AC - Maintenance and Tune-Up	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Central Heat Pump - Maintenance	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Room AC - Removal of Second Unit	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Boiler - Hot Water Reset	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Boiler - Pipe Insulation	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Boiler - Maintenance	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Furnace - Maintenance	0%	0%	5%	9%	15%	20%	26%	32%	36%	37%	39%	40%	41%	42%	43%
Water Heater - Drainwater Heat Recovery	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heater - Faucet Aerators	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%
Water Heater - Low-Flow Showerheads	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%
Water Heater - Pipe Insulation	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Water Heater - Timer	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Water Heater - Desuperheater	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heater - Solar System	0%	0%	2%	4%	6%	8%	11%	14%	16%	19%	23%	26%	30%	33%	37%
Water Heater - Tank Blanket/Insulation	0%	0%	9%	19%	29%	40%	44%	46%	47%	49%	50%	52%	54%	55%	57%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Exterior Lighting - Photosensor Control	0%	0%	7%	15%	24%	33%	37%	38%	40%	41%	43%	44%	46%	47%	49%
Exterior Lighting - Photovoltaic Installation	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Exterior Lighting - Timeclock Installation	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Refrigerator - Early Replacement	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%
Refrigerator - Maintenance	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Refrigerator - Remove Second Unit	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Freezer - Remove Second Unit	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Freezer - Early Replacement	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Freezer - Maintenance	0%	0%	7%	15%	24%	27%	28%	29%	30%	32%	33%	34%	35%	36%	37%
Electronics - Smart Power Strips	0%	0%	9%	19%	29%	33%	34%	35%	36%	37%	39%	40%	41%	42%	43%
Pool Pump - Timer	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
Pool Heater - Solar System	0%	0%	4%	8%	12%	17%	22%	27%	30%	32%	33%	34%	35%	36%	37%
ENERGY STAR Home Design	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Behavioral Feedback Tools	0%	0%	4%	8%	12%	17%	22%	27%	33%	39%	43%	44%	46%	47%	49%

Table E-21 Multi Family Owner Equipment Measures—(Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Room AC	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Cooling	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Cooling	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Heating	Electric	Electric Room Heat	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Electric Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Heating	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Int. Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Int. Lighting	Electric	Specialty	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Ext. Lighting	Electric	Screw-in	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Appliances	Electric	Clothes Washer	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Appliances	Electric	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Dishwasher	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Freezer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Second Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Microwave	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Electronics	Electric	Personal Computers	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Monitor	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Laptops	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	TVs	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Printer/Fax/Copier	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Devices and Gadgets	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Misc	Electric	Pool Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Well Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Furnace Fan	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Heating	Natural Gas	Furnace	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Heating	Natural Gas	Boiler	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Natural Gas	Other Heating	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Natural Gas	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Natural Gas	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Misc	Natural Gas	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Table E-22 Multi Family Owner Non-Equipment Measures—(Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Ducting	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Foundation	0%	0%	2%	5%	7%	10%	13%	16%	20%	23%	27%	31%	35%	39%	43%
Insulation - Infiltration Control	0%	0%	3%	6%	10%	13%	17%	22%	26%	31%	36%	40%	41%	42%	43%
Insulation - Radiant Barrier	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Wall Cavity	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Wall Sheathing	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Ducting - Repair and Sealing	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Windows - High Efficiency/ENERGY STAR	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Windows - Install Reflective Film	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Doors - Storm and Thermal	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Roofs - High Reflectivity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Photovoltaic - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Whole-House Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Ceiling Fan - Installation	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Thermostat - Clock/Programmable	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Home Energy Management System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central AC - Early Replacement	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Central AC - Maintenance and Tune-Up	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central Heat Pump - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Room AC - Removal of Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Boiler - Hot Water Reset	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Boiler - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Boiler - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Furnace - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Drainwater Heat Recovery	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Faucet Aerators	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Low-Flow Showerheads	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Pipe Insulation	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Timer	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Desuperheater	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Solar System	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Tank Blanket/Insulation	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Photosensor Control	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Exterior Lighting - Photovoltaic Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Timeclock Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Refrigerator - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Freezer - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Electronics - Smart Power Strips	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Pool Pump - Timer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pool Heater - Solar System	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
ENERGY STAR Home Design	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Behavioral Feedback Tools	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%

Table E-23 Multi Family Owner Limited Income Equipment Measures—(Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Central AC	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Room AC	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Cooling	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Cooling	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Heating	Electric	Electric Room Heat	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Electric Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Air-Source Heat Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Heating	Electric	Geothermal Heat Pump	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heating	Electric	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Electric	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Int. Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Int. Lighting	Electric	Linear Fluorescent	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Int. Lighting	Electric	Specialty	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Ext. Lighting	Electric	Screw-in	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Appliances	Electric	Clothes Washer	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Appliances	Electric	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Dishwasher	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Freezer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Second Refrigerator	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Electric	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Electric	Microwave	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Electronics	Electric	Personal Computers	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Monitor	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Laptops	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	TVs	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Printer/Fax/Copier	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Set-top Boxes/DVR	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Electronics	Electric	Devices and Gadgets	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Misc	Electric	Pool Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Well Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Electric	Furnace Fan	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Misc	Electric	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Heating	Natural Gas	Furnace	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Heating	Natural Gas	Boiler	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Natural Gas	Other Heating	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heating	Natural Gas	Water Heater <=55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heating	Natural Gas	Water Heater > 55 gal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Appliances	Natural Gas	Clothes Dryer	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Appliances	Natural Gas	Stove	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Misc	Natural Gas	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Hot Tub / Spa	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Misc	Natural Gas	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Table E-24 Multi Family Owner Limited Income Non-Equipment Measures—(Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Ducting	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Foundation	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Infiltration Control	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Insulation - Radiant Barrier	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Wall Cavity	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Insulation - Wall Sheathing	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Ducting - Repair and Sealing	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Windows - High Efficiency/ENERGY STAR	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Windows - Install Reflective Film	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Doors - Storm and Thermal	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Roofs - High Reflectivity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Attic Fan - Photovoltaic - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Whole-House Fan - Installation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Ceiling Fan - Installation	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Thermostat - Clock/Programmable	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Home Energy Management System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central AC - Early Replacement	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Central AC - Maintenance and Tune-Up	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Central Heat Pump - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Room AC - Removal of Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Boiler - Hot Water Reset	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Boiler - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Boiler - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Furnace - Maintenance	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Drainwater Heat Recovery	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Faucet Aerators	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Low-Flow Showerheads	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Water Heater - Pipe Insulation	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Water Heater - Timer	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Desuperheater	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Solar System	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Tank Blanket/Insulation	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Interior Lighting - Occupancy Sensors	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Photosensor Control	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Exterior Lighting - Photovoltaic Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Timeclock Installation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Refrigerator - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Remove Second Unit	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Freezer - Early Replacement	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Freezer - Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Electronics - Smart Power Strips	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Pool Pump - Timer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pool Heater - Solar System	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
ENERGY STAR Home Design	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Behavioral Feedback Tools	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%

Table E-25 Commercial Equipment Measures (Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Air-Cooled Chiller	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Water-Cooled Chiller	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Roof top AC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Cooling	Electric	Other Cooling	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Heating	Electric	Electric Room Heat	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Electric Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Ventilation	Electric	Ventilation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heating	Electric	Water Heater	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Interior Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Interior Lighting	Electric	High-Bay Fixtures	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Interior Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Exterior Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting	Electric	HID	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Refrigeration	Electric	Walk-in Refrigerator	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigeration	Electric	Reach-in Refrigerator	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigeration	Electric	Glass Door Display	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigeration	Electric	Open Display Case	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigeration	Electric	Icemaker	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigeration	Electric	Vending Machine	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Electric	Oven	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Electric	Fryer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Electric	Dishwasher	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Food Preparation	Electric	Hot Food Container	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Office Equipment	Electric	Desktop Computer	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Office Equipment	Electric	Laptop	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Office Equipment	Electric	Server	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Office Equipment	Electric	Monitor	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Office Equipment	Electric	Printer/Copier/Fax	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Office Equipment	Electric	POS Terminal	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Miscellaneous	Electric	Non-HVAC Motors	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Miscellaneous	Electric	Pool Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Miscellaneous	Electric	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Miscellaneous	Electric	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Natural Gas	Boiler	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Natural Gas	Other Heating	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heating	Natural Gas	Water Heater	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Natural Gas	Oven	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Natural Gas	Fryer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Natural Gas	Broiler	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Natural Gas	Griddle	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Natural Gas	Range	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Food Preparation	Natural Gas	Steamer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Miscellaneous	Natural Gas	Pool Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Miscellaneous	Natural Gas	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Table E-26 Commercial Non-Equipment Measures (Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Ducting	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Radiant Barrier	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Cavity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
HVAC - Duct Repair and Sealing	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Doors - High Efficiency	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - High Efficiency	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Windows - Install Reflective Film	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Roof - High Reflectivity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Air-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Economizer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Thermal Energy Storage	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Air-Cooled Chiller - VSD on Fans	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Chilled Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Chiller Heat Recovery	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Economizer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Thermal Energy Storage	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water-Cooled Chiller - VSD on Fans	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Chilled Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Chiller Heat Recovery	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
RTU - Evaporative Precooler	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
RTU - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - High Efficiency Hot Water Circulation	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Hot Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Combustion Controls (O2 Trim)	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Condensate Return Lines	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Gas Boiler - Condensing Economizer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gas Boiler - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Steam Trap Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Furnace - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Space Heating - Heat Recovery Ventilator	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Heat Pump - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Ventilation - ECM on VAV Boxes	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Ventilation - Variable Speed Control	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Drainwater Heat Recovery	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Faucet Aerators/Low Flow Nozzles	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Water Heater - High Efficiency Circulation Pump	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Desuperheater	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Solar System	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water Heater - Install Timer	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heater - Tank Blanket/Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water Heating - Booster Water Heater	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Interior Lighting - Daylighting Controls	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Interior Lighting - LED Exit Lighting	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Interior Lighting - Occupancy Sensors	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Interior Lighting - Timeclocks and Timers	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Interior Lighting - Task Lighting	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Interior Fluorescent - Bi-Level Fixture	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Interior Fluorescent - Delamp and Install Reflectors	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Bi-Level Fixture	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Daylighting Controls	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting - Photovoltaic Installation	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Refrigerator - Anti-Sweat Heater	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Decommissioning	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Demand Defrost	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Door Gasket Replacement	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Evaporator Fan Controls	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Floating Head Pressure	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Strip Curtain	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - High Efficiency Compressor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigerator - Variable Speed Compressor	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Market Adoption Factors

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Refrigerator - eCube	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Vending Machine - Controller	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Office Equipment - ENERGY STAR Power Supplies	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Office Equipment - Plug Load Occupancy Sensors	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Pool Heater - Solar	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Pool Pump - Timer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Destratification Fans (HVLS)	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Ventilation - CO2 Controlled	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Non-HVAC Motors - Variable Speed Control	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Energy Management System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Thermostat - Clock/Programmable	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
HVAC - Occupancy Sensors	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Retrocommissioning - HVAC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Retrocommissioning - Lighting	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Custom Measures	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Commissioning - HVAC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Commissioning - Lighting	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Advanced New Construction Designs	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Data Center - Server Virtualization	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Grocery - Display Case - LED Lighting	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Grocery - Display Case Motion Sensors	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Grocery - ECMs for Display Cases	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Grocery - Open Display Case - Night Covers	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Lodging - Guest Room Controls	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%

Table E-27 Commercial Equipment Measures (Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Air-Cooled Chiller	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Water-Cooled Chiller	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Roof top AC	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Air-Source Heat Pump	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Cooling	Electric	Geothermal Heat Pump	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Cooling	Electric	Other Cooling	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Air-Source Heat Pump	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Geothermal Heat Pump	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Heating	Electric	Electric Room Heat	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Electric Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Ventilation	Electric	Ventilation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heating	Electric	Water Heater	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Interior Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Interior Lighting	Electric	High-Bay Fixtures	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Interior Lighting	Electric	Linear Fluorescent	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Exterior Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Exterior Lighting	Electric	HID	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Exterior Lighting	Electric	Linear Fluorescent	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Refrigeration	Electric	Walk-in Refrigerator	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigeration	Electric	Reach-in Refrigerator	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigeration	Electric	Glass Door Display	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigeration	Electric	Open Display Case	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigeration	Electric	Icemaker	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigeration	Electric	Vending Machine	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Electric	Oven	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Electric	Fryer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Electric	Dishwasher	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Food Preparation	Electric	Hot Food Container	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Office Equipment	Electric	Desktop Computer	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Office Equipment	Electric	Laptop	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Office Equipment	Electric	Server	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Office Equipment	Electric	Monitor	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Office Equipment	Electric	Printer/Copier/Fax	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Office Equipment	Electric	POS Terminal	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Market Adoption Factors

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Miscellaneous	Electric	Non-HVAC Motors	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Miscellaneous	Electric	Pool Pump	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Miscellaneous	Electric	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Miscellaneous	Electric	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Heating	Natural Gas	Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Natural Gas	Boiler	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Natural Gas	Other Heating	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water Heating	Natural Gas	Water Heater	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Natural Gas	Oven	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Natural Gas	Fryer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Natural Gas	Broiler	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Natural Gas	Griddle	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Natural Gas	Range	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Food Preparation	Natural Gas	Steamer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Miscellaneous	Natural Gas	Pool Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Miscellaneous	Natural Gas	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Table E-28 Commercial Non-Equipment Measures (Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Ducting	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Radiant Barrier	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Wall Cavity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
HVAC - Duct Repair and Sealing	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Doors - High Efficiency	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Windows - High Efficiency	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Windows - Install Reflective Film	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Roof - High Reflectivity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Air-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Air-Cooled Chiller - Economizer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Air-Cooled Chiller - Thermal Energy Storage	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Air-Cooled Chiller - VSD on Fans	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - Chilled Water Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Air-Cooled Chiller - Chiller Heat Recovery	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water-Cooled Chiller - Economizer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water-Cooled Chiller - Thermal Energy Storage	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water-Cooled Chiller - VSD on Fans	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - Chilled Water Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water-Cooled Chiller - Chiller Heat Recovery	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
RTU - Evaporative Precooler	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
RTU - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - High Efficiency Hot Water Circulation	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Hot Water Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Gas Boiler - Combustion Controls (O2 Trim)	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Condensate Return Lines	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Gas Boiler - Condensing Economizer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Market Adoption Factors

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gas Boiler - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Steam Trap Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Furnace - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Space Heating - Heat Recovery Ventilator	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Heat Pump - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Ventilation - ECM on VAV Boxes	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Ventilation - Variable Speed Control	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Drainwater Heat Recovery	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Faucet Aerators/Low Flow Nozzles	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Water Heater - High Efficiency Circulation Pump	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Desuperheater	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water Heater - Solar System	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Water Heater - Install Timer	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Water Heater - Tank Blanket/Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Water Heating - Booster Water Heater	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Interior Lighting - Daylighting Controls	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Interior Lighting - LED Exit Lighting	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Interior Lighting - Occupancy Sensors	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Interior Lighting - Timeclocks and Timers	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Interior Lighting - Task Lighting	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Interior Fluorescent - Bi-Level Fixture	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Interior Fluorescent - Delamp and Install Reflectors	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Bi-Level Fixture	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Exterior Lighting - Daylighting Controls	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Exterior Lighting - Photovoltaic Installation	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Refrigerator - Anti-Sweat Heater	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Refrigerator - Decommissioning	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Refrigerator - Demand Defrost	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Refrigerator - Door Gasket Replacement	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Evaporator Fan Controls	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Refrigerator - Floating Head Pressure	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Strip Curtain	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - High Efficiency Compressor	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Refrigerator - Variable Speed Compressor	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Refrigerator - eCube	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Vending Machine - Controller	0%	0%	8%	17%	26%	37%	41%	43%	44%	46%	48%	49%	51%	53%	54%
Office Equipment - ENERGY STAR Power Supplies	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Office Equipment - Plug Load Occupancy Sensors	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Pool Heater - Solar	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Pool Pump - Timer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Destratification Fans (HVLS)	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Ventilation - CO2 Controlled	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Non-HVAC Motors - Variable Speed Control	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Energy Management System	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Thermostat - Clock/Programmable	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
HVAC - Occupancy Sensors	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Retrocommissioning - HVAC	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Retrocommissioning - Lighting	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Custom Measures	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Commissioning - HVAC	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Commissioning - Lighting	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Advanced New Construction Designs	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Data Center - Server Virtualization	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Grocery - Display Case - LED Lighting	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Grocery - Display Case Motion Sensors	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Grocery - ECMs for Display Cases	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Grocery - Open Display Case - Night Covers	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Lodging - Guest Room Controls	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%

Table E-29 Industrial Equipment Measures (Achievable High factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Air-Cooled Chiller	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Water-Cooled Chiller	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Roof top AC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Cooling	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Cooling	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Cooling	Electric	Other Cooling	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Air-Source Heat Pump	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Geothermal Heat Pump	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Heating	Electric	Electric Room Heat	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Electric	Electric Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Ventilation	Electric	Ventilation	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Interior Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Interior Lighting	Electric	High-Bay Fixtures	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Interior Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Exterior Lighting	Electric	Screw-in	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting	Electric	HID	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting	Electric	Linear Fluorescent	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Motors	Electric	Pumps	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Motors	Electric	Fans & Blowers	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Motors	Electric	Compressed Air	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Motors	Electric	Matl Handling	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Motors	Electric	Matl Processing	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Motors	Electric	Other Motors	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process	Electric	Process Heating	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process	Electric	Process Cooling and Refrig	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process	Electric	Electro-Chemical Processes	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process	Electric	Other Process	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Miscellaneous	Electric	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heating	Natural Gas	Furnace	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Heating	Natural Gas	Boiler	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Heating	Natural Gas	Other Heating	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Process	Natural Gas	Process Heating	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process	Natural Gas	Process Boiler	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process	Natural Gas	Process Cooling	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process	Natural Gas	Other Process	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Miscellaneous	Natural Gas	Miscellaneous	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Table E-30 Industrial Non-Equipment Measures (Achievable High factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Ducting	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Insulation - Wall Cavity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
HVAC - Duct Repair and Sealing	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Air-Cooled Chiller - Economizer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Efficient Mechanical Layout	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Air-Cooled Chiller - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Chilled Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Air-Cooled Chiller - VSD on Fans	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Economizer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Efficient Mechanical Layout	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Water-Cooled Chiller - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Chilled Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Water-Cooled Chiller - VSD on Fans	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
RTU - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Heat Pump - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Roofs - High Reflectivity	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Energy Management System	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Thermostat - Clock/Programmable	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Interior Lighting - Occupancy Sensors	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Interior Lighting - Skylights	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Interior Lighting - Time Clocks and Timers	0%	0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	85%	85%	85%	85%
Interior Lighting - LED Exit Lighting	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Interior Lighting - Daylighting Controls	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Interior Screw-in - Task Lighting	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Interior Fluorescent - Bi-Level Fixture	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Interior Fluorescent - Delamp and Install Reflectors	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Exterior Lighting - Bi-Level Fixture	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Exterior Lighting - Daylighting Controls	0%	0%	20%	40%	60%	80%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Exterior Lighting - Photovoltaic Installation	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Process - Conductivity Controls	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Process - Controls on Fume Hoods	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Process - Timers and Controls	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigeration - Floating Head Pressure	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigeration - System Controls	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigeration - System Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Refrigeration - System Optimization	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Compressed Air - Air Usage Reduction	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Compressed Air - Compressor Replacement	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Compressed Air - System Controls	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Compressed Air - System Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Compressed Air - System Optimization and Improvements	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pumping System - Controls	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pumping System - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pumping System - Optimization	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Pumps - Variable Speed Control	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Pump Equipment Upgrade	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Fan Equipment Upgrade	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Fan System - Controls	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Fan System - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Fan System - Optimization	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Fans - Variable Speed Control	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Motors - Magnetic Adjustable Speed Drives	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Motors - Efficient Rewind	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Motors - Synchronous Belts	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Motors - Variable Frequency Drive	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Retrocommissioning - HVAC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Retrocommissioning - Lighting	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Destratification Fans (HVLS)	0%	0%	7%	13%	20%	27%	33%	40%	47%	53%	60%	65%	65%	65%	65%
Ventilation - CO2 Controlled	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Process Boiler - High Efficiency Hot Water Circulation	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Process Boilers - Hot Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Process Boiler - Combustion Controls (O2 Trim)	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Process Boiler - Condensate Return Lines	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%

Market Adoption Factors

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Process Boiler - Condensing Economizer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Process Boiler - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Process Boiler - Steam Trap Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Process Boiler - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - High Efficiency Hot Water Circulation	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Hot Water Reset	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Combustion Controls (O2 Trim)	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Condensate Return Lines	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Gas Boiler - Condensing Economizer	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Pipe Insulation	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Steam Trap Maintenance	0%	0%	20%	40%	60%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Gas Boiler - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Gas Furnace - Maintenance	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Transformer - High Efficiency	0%	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Custom Measures	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Commissioning - HVAC	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%
Commissioning - Lighting	0%	0%	10%	20%	30%	40%	50%	60%	65%	65%	65%	65%	65%	65%	65%

Table E-31 Industrial Equipment Measures (Achievable High factor x Achievable Low factor)

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cooling	Electric	Air-Cooled Chiller	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Water-Cooled Chiller	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Roof top AC	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Cooling	Electric	Air-Source Heat Pump	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Cooling	Electric	Geothermal Heat Pump	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Cooling	Electric	Other Cooling	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Air-Source Heat Pump	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Geothermal Heat Pump	0%	0%	3%	5%	8%	11%	15%	18%	22%	26%	30%	34%	39%	43%	48%
Heating	Electric	Electric Room Heat	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Electric	Electric Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Ventilation	Electric	Ventilation	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Interior Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Interior Lighting	Electric	High-Bay Fixtures	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Interior Lighting	Electric	Linear Fluorescent	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Exterior Lighting	Electric	Screw-in	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Exterior Lighting	Electric	HID	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Exterior Lighting	Electric	Linear Fluorescent	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Motors	Electric	Pumps	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Motors	Electric	Fans & Blowers	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Motors	Electric	Compressed Air	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Motors	Electric	Matl Handling	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Motors	Electric	Matl Processing	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Motors	Electric	Other Motors	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Process	Electric	Process Heating	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Process	Electric	Process Cooling and Refrig	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Process	Electric	Electro-Chemical Processes	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Process	Electric	Other Process	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Miscellaneous	Electric	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Heating	Natural Gas	Furnace	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Heating	Natural Gas	Boiler	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%

End Use	Fuel	Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Heating	Natural Gas	Other Heating	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Process	Natural Gas	Process Heating	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Process	Natural Gas	Process Boiler	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Process	Natural Gas	Process Cooling	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Process	Natural Gas	Other Process	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Miscellaneous	Natural Gas	Miscellaneous	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

Table E-32 Industrial Non-Equipment Measures (Achievable High factor x Achievable Low factor)

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Insulation - Ceiling	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Ducting	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Insulation - Wall Cavity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
HVAC - Duct Repair and Sealing	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Air-Cooled Chiller - Economizer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Air-Cooled Chiller - Efficient Mechanical Layout	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Air-Cooled Chiller - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Air-Cooled Chiller - Chilled Water Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Air-Cooled Chiller - VSD on Fans	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - Economizer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water-Cooled Chiller - Efficient Mechanical Layout	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Water-Cooled Chiller - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Water-Cooled Chiller - Chilled Water Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Water-Cooled Chiller - VSD on Fans	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
RTU - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Heat Pump - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Roofs - High Reflectivity	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Energy Management System	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Thermostat - Clock/Programmable	0%	0%	4%	8%	13%	18%	24%	30%	36%	43%	48%	49%	51%	53%	54%
Interior Lighting - Occupancy Sensors	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Interior Lighting - Skylights	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Interior Lighting - Time Clocks and Timers	0%	0%	5%	10%	16%	22%	29%	36%	43%	51%	56%	58%	60%	61%	63%
Interior Lighting - LED Exit Lighting	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Interior Lighting - Daylighting Controls	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Interior Screw-in - Task Lighting	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Interior Fluorescent - Bi-Level Fixture	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Interior Fluorescent - Delamp and Install Reflectors	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Exterior Lighting - Bi-Level Fixture	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%

Market Adoption Factors

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Exterior Lighting - Daylighting Controls	0%	0%	10%	21%	32%	45%	49%	51%	53%	54%	56%	58%	60%	61%	63%
Exterior Lighting - Photovoltaic Installation	0%	0%	3%	7%	11%	15%	19%	24%	29%	34%	40%	44%	46%	47%	48%
Process - Conductivity Controls	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Process - Controls on Fume Hoods	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Process - Timers and Controls	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Refrigeration - Floating Head Pressure	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Refrigeration - System Controls	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Refrigeration - System Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Refrigeration - System Optimization	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Compressed Air - Air Usage Reduction	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Compressed Air - Compressor Replacement	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Compressed Air - System Controls	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Compressed Air - System Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Compressed Air - System Optimization and Improvements	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pumping System - Controls	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pumping System - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pumping System - Optimization	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Pumps - Variable Speed Control	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Pump Equipment Upgrade	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Fan Equipment Upgrade	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Fan System - Controls	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Fan System - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Fan System - Optimization	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Fans - Variable Speed Control	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Motors - Magnetic Adjustable Speed Drives	0%	0%	10%	21%	32%	36%	38%	39%	40%	42%	43%	44%	46%	47%	48%
Motors - Efficient Rewind	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Motors - Synchronous Belts	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Motors - Variable Frequency Drive	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Retrocommissioning - HVAC	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Retrocommissioning - Lighting	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Destratification Fans (HVLS)	0%	0%	3%	6%	9%	12%	16%	20%	24%	29%	34%	38%	39%	40%	42%
Ventilation - CO2 Controlled	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Process Boiler - High Efficiency Hot Water Circulation	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Process Boilers - Hot Water Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Process Boiler - Combustion Controls (O2 Trim)	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Process Boiler - Condensate Return Lines	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%

Measure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Process Boiler - Condensing Economizer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Process Boiler - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Process Boiler - Steam Trap Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Process Boiler - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - High Efficiency Hot Water Circulation	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Hot Water Reset	0%	0%	5%	10%	16%	22%	29%	36%	40%	42%	43%	44%	46%	47%	48%
Gas Boiler - Combustion Controls (O2 Trim)	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Condensate Return Lines	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Gas Boiler - Condensing Economizer	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Pipe Insulation	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Steam Trap Maintenance	0%	0%	8%	17%	26%	30%	31%	33%	34%	35%	36%	38%	39%	40%	42%
Gas Boiler - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Gas Furnace - Maintenance	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Transformer - High Efficiency	0%	0%	2%	4%	7%	9%	12%	15%	18%	22%	25%	29%	33%	37%	42%
Custom Measures	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Commissioning - HVAC	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%
Commissioning - Lighting	0%	0%	4%	8%	13%	18%	24%	30%	34%	35%	36%	38%	39%	40%	42%

ANNUAL SAVINGS

This section presents the estimates of annual savings. Selected years are shown in Chapter 6 and 7 of the report. Table F-1 and Table F-2 show the overall annual savings for electric energy and peak demand, respectively. Table F-3 shows the savings for Natural Gas. Table F-4 through Table F-12 show the annual savings for each sector.

Table F-1 Annual Electric Energy Savings, All Sectors

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	78,859	77,045	75,716	74,776	73,615	73,151	73,031	73,746	74,501	75,666	76,603	77,728	78,746	79,802	81,041
Cumulative Savings (GWh)															
Achievable Potential Low	-	-	-	446	1,125	1,718	2,255	3,098	4,017	4,930	6,200	7,396	8,427	9,583	10,945
Achievable Potential High	-	-	-	918	2,251	3,368	4,277	5,658	7,017	8,273	9,891	11,382	12,566	13,779	15,219
Economic Potential	-	-	-	3,418	6,255	8,316	9,369	10,886	12,282	13,738	15,536	17,385	18,919	20,332	21,932
Technical Potential	-	-	-	3,708	6,647	8,782	9,868	11,445	12,936	14,483	16,276	18,125	19,812	21,367	23,126
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.6%	1.5%	2.3%	3.1%	4.2%	5.4%	6.5%	8.1%	9.5%	10.7%	12.0%	13.5%
Achievable Potential High	0.0%	0.0%	0.0%	1.2%	3.1%	4.6%	5.9%	7.7%	9.4%	10.9%	12.9%	14.6%	16.0%	17.3%	18.8%
Economic Potential	0.0%	0.0%	0.0%	4.6%	8.5%	11.4%	12.8%	14.8%	16.5%	18.2%	20.3%	22.4%	24.0%	25.5%	27.1%
Technical Potential	0.0%	0.0%	0.0%	5.0%	9.0%	12.0%	13.5%	15.5%	17.4%	19.1%	21.2%	23.3%	25.2%	26.8%	28.5%
Incremental Savings (GWh)															
Achievable Potential Low	-	-	-	446	679	592	538	842	919	913	1,270	1,195	1,031	1,156	1,362
Achievable Potential High	-	-	-	918	1,333	1,117	910	1,380	1,359	1,257	1,617	1,491	1,184	1,213	1,440
Economic Potential	-	-	-	3,418	2,837	2,061	1,053	1,518	1,395	1,457	1,797	1,849	1,534	1,413	1,600
Technical Potential	-	-	-	3,708	2,939	2,135	1,086	1,577	1,491	1,548	1,793	1,848	1,688	1,555	1,759
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.6%	0.9%	0.8%	0.7%	1.1%	1.2%	1.2%	1.7%	1.5%	1.3%	1.4%	1.7%
Achievable Potential High	0.0%	0.0%	0.0%	1.2%	1.8%	1.5%	1.2%	1.9%	1.8%	1.7%	2.1%	1.9%	1.5%	1.5%	1.8%
Economic Potential	0.0%	0.0%	0.0%	4.6%	3.9%	2.8%	1.4%	2.1%	1.9%	1.9%	2.3%	2.4%	1.9%	1.8%	2.0%
Technical Potential	0.0%	0.0%	0.0%	5.0%	4.0%	2.9%	1.5%	2.1%	2.0%	2.0%	2.3%	2.4%	2.1%	1.9%	2.2%

Table F-2 Annual Electric Peak Demand Savings, All Sectors

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	18,048	17,684	17,543	17,407	17,319	17,322	17,373	17,517	17,669	17,899	18,108	18,356	18,589	18,841	19,108
Peak Demand Savings (MW)															
Achievable Potential Low	-	-	-	74	164	255	356	506	681	872	1,122	1,377	1,624	1,892	2,182
Achievable Potential High	-	-	-	153	329	499	674	926	1,198	1,477	1,816	2,153	2,458	2,769	3,094
Economic Potential	-	-	-	614	959	1,268	1,517	1,834	2,167	2,528	2,938	3,362	3,755	4,129	4,506
Technical Potential	-	-	-	840	1,330	1,799	2,220	2,717	3,237	3,790	4,392	5,029	5,671	6,299	6,932
Peak Demand Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.4%	0.9%	1.5%	2.0%	2.9%	3.9%	4.9%	6.2%	7.5%	8.7%	10.0%	11.4%
Achievable Potential High	0.0%	0.0%	0.0%	0.9%	1.9%	2.9%	3.9%	5.3%	6.8%	8.3%	10.0%	11.7%	13.2%	14.7%	16.2%
Economic Potential	0.0%	0.0%	0.0%	3.5%	5.5%	7.3%	8.7%	10.5%	12.3%	14.1%	16.2%	18.3%	20.2%	21.9%	23.6%
Technical Potential	0.0%	0.0%	0.0%	4.8%	7.7%	10.4%	12.8%	15.5%	18.3%	21.2%	24.3%	27.4%	30.5%	33.4%	36.3%
Peak Demand Incremental Savings (MW)															
Achievable Potential Low	-	-	-	74	91	91	101	151	175	192	249	256	246	268	290
Achievable Potential High	-	-	-	153	176	169	176	252	272	279	339	337	305	310	325
Economic Potential	-	-	-	614	345	308	249	317	333	362	410	423	394	374	377
Technical Potential	-	-	-	840	490	469	421	497	519	554	602	637	642	628	632
Peak Demand Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.4%	0.5%	0.5%	0.6%	0.9%	1.0%	1.1%	1.4%	1.4%	1.3%	1.4%	1.5%
Achievable Potential High	0.0%	0.0%	0.0%	0.9%	1.0%	1.0%	1.0%	1.4%	1.5%	1.6%	1.9%	1.8%	1.6%	1.6%	1.7%
Economic Potential	0.0%	0.0%	0.0%	3.5%	2.0%	1.8%	1.4%	1.8%	1.9%	2.0%	2.3%	2.3%	2.1%	2.0%	2.0%
Technical Potential	0.0%	0.0%	0.0%	4.8%	2.8%	2.7%	2.4%	2.8%	2.9%	3.1%	3.3%	3.5%	3.5%	3.3%	3.3%

Table F-3 Annual Natural Gas Savings, All Sectors

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	4,619	4,596	4,581	4,560	4,559	4,568	4,589	4,620	4,648	4,681	4,719	4,757	4,799	4,846	4,894
Cumulative Savings (million therms)															
Achievable Potential Low	-	-	-	6	14	26	42	65	94	128	167	211	256	306	358
Achievable Potential High	-	-	-	13	30	54	84	125	172	223	281	340	398	460	521
Economic Potential	-	-	-	70	112	160	208	266	332	402	475	549	619	692	761
Technical Potential	-	-	-	202	341	486	649	829	1,014	1,201	1,387	1,574	1,745	1,914	2,077
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.1%	0.3%	0.6%	0.9%	1.4%	2.0%	2.7%	3.5%	4.4%	5.3%	6.3%	7.3%
Achievable Potential High	0.0%	0.0%	0.0%	0.3%	0.7%	1.2%	1.8%	2.7%	3.7%	4.8%	5.9%	7.1%	8.3%	9.5%	10.7%
Economic Potential	0.0%	0.0%	0.0%	1.5%	2.5%	3.5%	4.5%	5.8%	7.1%	8.6%	10.1%	11.5%	12.9%	14.3%	15.5%
Technical Potential	0.0%	0.0%	0.0%	4.4%	7.5%	10.6%	14.1%	18.0%	21.8%	25.7%	29.4%	33.1%	36.4%	39.5%	42.4%
Incremental Savings (million therms)															
Achievable Potential Low	-	-	-	6	8	12	16	23	29	34	39	43	45	50	52
Achievable Potential High	-	-	-	13	17	24	30	41	47	52	57	59	58	62	62
Economic Potential	-	-	-	70	42	48	48	58	66	70	73	74	71	73	68
Technical Potential	-	-	-	202	139	145	164	180	185	187	186	187	170	169	164
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.1%	0.2%	0.3%	0.4%	0.5%	0.6%	0.7%	0.8%	0.9%	0.9%	1.0%	1.1%
Achievable Potential High	0.0%	0.0%	0.0%	0.3%	0.4%	0.5%	0.7%	0.9%	1.0%	1.1%	1.2%	1.2%	1.2%	1.3%	1.3%
Economic Potential	0.0%	0.0%	0.0%	1.5%	0.9%	1.1%	1.1%	1.3%	1.4%	1.5%	1.6%	1.5%	1.5%	1.5%	1.4%
Technical Potential	0.0%	0.0%	0.0%	4.4%	3.0%	3.2%	3.6%	3.9%	4.0%	4.0%	3.9%	3.9%	3.5%	3.5%	3.3%

Table F-4 Annual Electric Energy Savings, Residential

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	30,307	30,148	30,341	30,442	29,793	29,515	29,502	29,948	30,268	30,788	31,127	31,491	31,749	32,076	32,638
Cumulative Savings (GWh)															
Achievable Potential Low	-	-	-	173	493	751	926	1,248	1,571	1,865	2,159	2,409	2,513	2,638	2,919
Achievable Potential High	-	-	-	352	994	1,488	1,769	2,300	2,731	3,114	3,497	3,788	3,836	3,900	4,174
Economic Potential	-	-	-	1,329	2,935	3,987	4,234	4,751	5,006	5,408	5,893	6,317	6,492	6,715	7,135
Technical Potential	-	-	-	1,271	2,831	3,759	3,809	4,140	4,245	4,491	4,714	4,923	5,050	5,228	5,697
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.6%	1.7%	2.5%	3.1%	4.2%	5.2%	6.1%	6.9%	7.7%	7.9%	8.2%	8.9%
Achievable Potential High	0.0%	0.0%	0.0%	1.2%	3.3%	5.0%	6.0%	7.7%	9.0%	10.1%	11.2%	12.0%	12.1%	12.2%	12.8%
Economic Potential	0.0%	0.0%	0.0%	4.4%	9.9%	13.5%	14.4%	15.9%	16.5%	17.6%	18.9%	20.1%	20.4%	20.9%	21.9%
Technical Potential	0.0%	0.0%	0.0%	4.2%	9.5%	12.7%	12.9%	13.8%	14.0%	14.6%	15.1%	15.6%	15.9%	16.3%	17.5%
Incremental Savings (GWh)															
Achievable Potential Low	-	-	-	173	321	258	175	322	323	294	294	251	103	126	281
Achievable Potential High	-	-	-	352	642	494	282	531	431	383	383	291	48	64	274
Economic Potential	-	-	-	1,329	1,606	1,051	247	517	255	402	485	425	174	223	420
Technical Potential	-	-	-	1,271	1,560	928	50	331	105	246	223	209	127	178	469
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.6%	1.1%	0.9%	0.6%	1.1%	1.1%	1.0%	0.9%	0.8%	0.3%	0.4%	0.9%
Achievable Potential High	0.0%	0.0%	0.0%	1.2%	2.2%	1.7%	1.0%	1.8%	1.4%	1.2%	1.2%	0.9%	0.2%	0.2%	0.8%
Economic Potential	0.0%	0.0%	0.0%	4.4%	5.4%	3.6%	0.8%	1.7%	0.8%	1.3%	1.6%	1.3%	0.5%	0.7%	1.3%
Technical Potential	0.0%	0.0%	0.0%	4.2%	5.2%	3.1%	0.2%	1.1%	0.3%	0.8%	0.7%	0.7%	0.4%	0.6%	1.4%

Table F-5 Annual Electric Peak Demand Savings, Residential

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	8,617	8,521	8,555	8,599	8,595	8,627	8,699	8,804	8,910	9,048	9,169	9,298	9,427	9,572	9,737
Peak Demand Savings (MW)															
Achievable Potential Low	-	-	-	31	70	104	134	180	233	294	364	441	510	590	688
Achievable Potential High	-	-	-	60	135	197	245	320	398	485	584	687	772	867	984
Economic Potential	-	-	-	215	376	505	577	675	764	876	1,005	1,140	1,267	1,406	1,565
Technical Potential	-	-	-	361	622	846	1,022	1,231	1,441	1,683	1,946	2,243	2,553	2,880	3,263
Peak Demand Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.4%	0.8%	1.2%	1.5%	2.0%	2.6%	3.2%	4.0%	4.7%	5.4%	6.2%	7.1%
Achievable Potential High	0.0%	0.0%	0.0%	0.7%	1.6%	2.3%	2.8%	3.6%	4.5%	5.4%	6.4%	7.4%	8.2%	9.1%	10.1%
Economic Potential	0.0%	0.0%	0.0%	2.5%	4.4%	5.9%	6.6%	7.7%	8.6%	9.7%	11.0%	12.3%	13.4%	14.7%	16.1%
Technical Potential	0.0%	0.0%	0.0%	4.2%	7.2%	9.8%	11.8%	14.0%	16.2%	18.6%	21.2%	24.1%	27.1%	30.1%	33.5%
Peak Demand Incremental Savings (MW)															
Achievable Potential Low	-	-	-	31	39	34	30	46	53	61	70	77	69	80	99
Achievable Potential High	-	-	-	60	74	62	49	74	78	87	99	103	86	95	116
Economic Potential	-	-	-	215	161	129	72	97	89	112	128	136	127	138	159
Technical Potential	-	-	-	361	261	224	177	208	210	242	262	297	310	328	382
Peak Demand Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.4%	0.5%	0.4%	0.3%	0.5%	0.6%	0.7%	0.8%	0.8%	0.7%	0.8%	1.0%
Achievable Potential High	0.0%	0.0%	0.0%	0.7%	0.9%	0.7%	0.6%	0.8%	0.9%	1.0%	1.1%	1.1%	0.9%	1.0%	1.2%
Economic Potential	0.0%	0.0%	0.0%	2.5%	1.9%	1.5%	0.8%	1.1%	1.0%	1.2%	1.4%	1.5%	1.3%	1.4%	1.6%
Technical Potential	0.0%	0.0%	0.0%	4.2%	3.0%	2.6%	2.0%	2.4%	2.4%	2.7%	2.9%	3.2%	3.3%	3.4%	3.9%

Table F-6 Annual Natural Gas Savings, Residential

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	2,255	2,270	2,282	2,300	2,319	2,333	2,352	2,371	2,391	2,412	2,436	2,458	2,482	2,511	2,543
Cumulative Savings (million therms)															
Achievable Potential Low	-	-	-	1	2	5	7	10	15	23	32	43	55	68	83
Achievable Potential High	-	-	-	1	5	9	13	18	26	37	51	66	81	98	116
Economic Potential	-	-	-	2	13	24	28	36	48	63	81	101	121	141	162
Technical Potential	-	-	-	105	200	293	394	503	613	725	838	957	1,065	1,174	1,286
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.3%	0.4%	0.6%	0.9%	1.3%	1.8%	2.2%	2.7%	3.3%
Achievable Potential High	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.5%	0.8%	1.1%	1.5%	2.1%	2.7%	3.3%	3.9%	4.6%
Economic Potential	0.0%	0.0%	0.0%	0.1%	0.5%	1.0%	1.2%	1.5%	2.0%	2.6%	3.3%	4.1%	4.9%	5.6%	6.4%
Technical Potential	0.0%	0.0%	0.0%	4.6%	8.6%	12.6%	16.8%	21.2%	25.6%	30.1%	34.4%	38.9%	42.9%	46.8%	50.6%
Incremental Savings (million therms)															
Achievable Potential Low	-	-	-	1	2	3	2	3	5	7	9	11	12	13	15
Achievable Potential High	-	-	-	1	3	5	4	5	8	11	14	15	15	17	18
Economic Potential	-	-	-	2	11	11	4	7	12	15	18	20	19	20	21
Technical Potential	-	-	-	105	95	93	101	109	110	112	113	119	108	109	112
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	0.3%	0.4%	0.5%	0.5%	0.5%	0.6%
Achievable Potential High	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	0.2%	0.3%	0.4%	0.6%	0.6%	0.6%	0.7%	0.7%
Economic Potential	0.0%	0.0%	0.0%	0.1%	0.5%	0.5%	0.2%	0.3%	0.5%	0.6%	0.7%	0.8%	0.8%	0.8%	0.8%
Technical Potential	0.0%	0.0%	0.0%	4.6%	4.1%	4.0%	4.3%	4.6%	4.6%	4.6%	4.7%	4.8%	4.3%	4.4%	4.4%

Table F-7 Annual Electric Energy Savings, Commercial

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	40,123	38,281	37,354	36,511	35,964	35,699	35,797	36,094	36,576	37,175	37,731	38,325	38,957	39,645	40,451
Cumulative Savings (GWh)															
Achievable Potential Low	-	-	-	251	585	889	1,217	1,678	2,214	2,770	3,676	4,504	5,341	6,286	7,309
Achievable Potential High	-	-	-	519	1,164	1,729	2,296	3,048	3,881	4,662	5,802	6,846	7,868	8,921	10,034
Economic Potential	-	-	-	1,883	3,030	3,943	4,670	5,557	6,582	7,509	8,697	9,918	11,125	12,199	13,322
Technical Potential	-	-	-	2,215	3,500	4,598	5,541	6,656	7,912	9,070	10,500	11,924	13,323	14,577	15,808
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.7%	1.6%	2.5%	3.4%	4.6%	6.1%	7.5%	9.7%	11.8%	13.7%	15.9%	18.1%
Achievable Potential High	0.0%	0.0%	0.0%	1.4%	3.2%	4.8%	6.4%	8.4%	10.6%	12.5%	15.4%	17.9%	20.2%	22.5%	24.8%
Economic Potential	0.0%	0.0%	0.0%	5.2%	8.4%	11.0%	13.0%	15.4%	18.0%	20.2%	23.0%	25.9%	28.6%	30.8%	32.9%
Technical Potential	0.0%	0.0%	0.0%	6.1%	9.7%	12.9%	15.5%	18.4%	21.6%	24.4%	27.8%	31.1%	34.2%	36.8%	39.1%
Incremental Savings (GWh)															
Achievable Potential Low	-	-	-	251	334	304	328	461	536	556	906	828	837	945	1,023
Achievable Potential High	-	-	-	519	645	565	567	752	833	781	1,140	1,043	1,023	1,053	1,113
Economic Potential	-	-	-	1,883	1,146	914	727	886	1,025	928	1,187	1,222	1,207	1,074	1,122
Technical Potential	-	-	-	2,215	1,285	1,098	944	1,115	1,255	1,159	1,430	1,424	1,399	1,253	1,232
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.7%	0.9%	0.9%	0.9%	1.3%	1.5%	1.5%	2.4%	2.2%	2.1%	2.4%	2.5%
Achievable Potential High	0.0%	0.0%	0.0%	1.4%	1.8%	1.6%	1.6%	2.1%	2.3%	2.1%	3.0%	2.7%	2.6%	2.7%	2.8%
Economic Potential	0.0%	0.0%	0.0%	5.2%	3.2%	2.6%	2.0%	2.5%	2.8%	2.5%	3.1%	3.2%	3.1%	2.7%	2.8%
Technical Potential	0.0%	0.0%	0.0%	6.1%	3.6%	3.1%	2.6%	3.1%	3.4%	3.1%	3.8%	3.7%	3.6%	3.2%	3.0%

Table F-8 Annual Electric Peak Demand Savings, Commercial

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	7,879	7,585	7,460	7,325	7,244	7,201	7,218	7,264	7,332	7,424	7,514	7,611	7,708	7,816	7,948
Peak Demand Savings (MW)															
Achievable Potential Low	-	-	-	37	83	130	189	277	381	491	648	800	954	1,122	1,298
Achievable Potential High	-	-	-	80	169	259	366	515	680	842	1,052	1,249	1,442	1,634	1,829
Economic Potential	-	-	-	337	499	650	800	985	1,194	1,405	1,650	1,892	2,126	2,333	2,538
Technical Potential	-	-	-	402	601	804	1,012	1,255	1,522	1,785	2,081	2,366	2,659	2,928	3,164
Peak Demand Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.5%	1.1%	1.8%	2.6%	3.8%	5.2%	6.6%	8.6%	10.5%	12.4%	14.4%	16.3%
Achievable Potential High	0.0%	0.0%	0.0%	1.1%	2.3%	3.6%	5.1%	7.1%	9.3%	11.3%	14.0%	16.4%	18.7%	20.9%	23.0%
Economic Potential	0.0%	0.0%	0.0%	4.6%	6.9%	9.0%	11.1%	13.6%	16.3%	18.9%	22.0%	24.9%	27.6%	29.9%	31.9%
Technical Potential	0.0%	0.0%	0.0%	5.5%	8.3%	11.2%	14.0%	17.3%	20.8%	24.0%	27.7%	31.1%	34.5%	37.5%	39.8%
Peak Demand Incremental Savings (MW)															
Achievable Potential Low	-	-	-	37	45	47	59	88	103	111	157	151	155	167	177
Achievable Potential High	-	-	-	80	89	90	107	149	165	162	210	197	192	192	195
Economic Potential	-	-	-	337	162	151	150	185	210	210	245	242	233	208	205
Technical Potential	-	-	-	402	199	203	208	244	266	263	295	286	293	269	236
Peak Demand Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.5%	0.6%	0.7%	0.8%	1.2%	1.4%	1.5%	2.1%	2.0%	2.0%	2.1%	2.2%
Achievable Potential High	0.0%	0.0%	0.0%	1.1%	1.2%	1.2%	1.5%	2.1%	2.3%	2.2%	2.8%	2.6%	2.5%	2.5%	2.5%
Economic Potential	0.0%	0.0%	0.0%	4.6%	2.2%	2.1%	2.1%	2.5%	2.9%	2.8%	3.3%	3.2%	3.0%	2.7%	2.6%
Technical Potential	0.0%	0.0%	0.0%	5.5%	2.7%	2.8%	2.9%	3.4%	3.6%	3.5%	3.9%	3.8%	3.8%	3.4%	3.0%

Table F-9 Annual Natural Gas Savings, Commercial

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	1,867	1,821	1,794	1,771	1,753	1,748	1,756	1,768	1,782	1,797	1,814	1,832	1,852	1,874	1,899
Cumulative Savings (million therms)															
Achievable Potential Low	-	-	-	5	11	21	34	53	77	102	131	162	194	230	267
Achievable Potential High	-	-	-	12	25	43	69	103	142	181	223	266	307	350	393
Economic Potential	-	-	-	67	96	132	175	224	276	329	382	433	482	533	579
Technical Potential	-	-	-	87	126	171	226	288	352	417	479	539	595	650	699
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.3%	0.7%	1.2%	2.0%	3.0%	4.3%	5.7%	7.2%	8.9%	10.5%	12.3%	14.0%
Achievable Potential High	0.0%	0.0%	0.0%	0.7%	1.4%	2.5%	3.9%	5.8%	7.9%	10.1%	12.3%	14.5%	16.6%	18.7%	20.7%
Economic Potential	0.0%	0.0%	0.0%	3.8%	5.5%	7.5%	9.9%	12.7%	15.5%	18.3%	21.0%	23.6%	26.0%	28.4%	30.5%
Technical Potential	0.0%	0.0%	0.0%	4.9%	7.2%	9.8%	12.9%	16.3%	19.8%	23.2%	26.4%	29.4%	32.1%	34.7%	36.8%
Incremental Savings (million therms)															
Achievable Potential Low	-	-	-	5	6	9	14	19	23	26	29	31	32	36	37
Achievable Potential High	-	-	-	12	13	18	26	34	38	40	42	42	41	44	43
Economic Potential	-	-	-	67	30	35	43	49	52	53	53	51	49	51	46
Technical Potential	-	-	-	87	39	45	55	62	65	65	63	60	56	55	49
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.3%	0.4%	0.5%	0.8%	1.1%	1.3%	1.4%	1.6%	1.7%	1.7%	1.9%	1.9%
Achievable Potential High	0.0%	0.0%	0.0%	0.7%	0.7%	1.1%	1.5%	1.9%	2.2%	2.2%	2.3%	2.3%	2.2%	2.3%	2.2%
Economic Potential	0.0%	0.0%	0.0%	3.8%	1.7%	2.0%	2.4%	2.8%	2.9%	2.9%	2.9%	2.8%	2.7%	2.7%	2.4%
Technical Potential	0.0%	0.0%	0.0%	4.9%	2.2%	2.6%	3.1%	3.5%	3.6%	3.6%	3.5%	3.3%	3.0%	2.9%	2.6%

Table F-10 Annual Electric Energy Savings, Industrial

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	8,429	8,617	8,021	7,822	7,858	7,937	7,732	7,704	7,657	7,703	7,744	7,913	8,041	8,081	7,952
Cumulative Savings (GWh)															
Achievable Potential Low	-	-	-	22	47	78	113	171	232	296	365	483	573	659	716
Achievable Potential High	-	-	-	46	93	150	212	309	404	497	592	748	862	958	1,011
Economic Potential	-	-	-	205	290	386	464	579	694	821	947	1,150	1,302	1,418	1,475
Technical Potential	-	-	-	222	316	426	518	649	779	922	1,062	1,277	1,439	1,563	1,621
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.3%	0.6%	1.0%	1.5%	2.2%	3.0%	3.8%	4.7%	6.1%	7.1%	8.2%	9.0%
Achievable Potential High	0.0%	0.0%	0.0%	0.6%	1.2%	1.9%	2.7%	4.0%	5.3%	6.5%	7.6%	9.5%	10.7%	11.9%	12.7%
Economic Potential	0.0%	0.0%	0.0%	2.6%	3.7%	4.9%	6.0%	7.5%	9.1%	10.7%	12.2%	14.5%	16.2%	17.5%	18.6%
Technical Potential	0.0%	0.0%	0.0%	2.8%	4.0%	5.4%	6.7%	8.4%	10.2%	12.0%	13.7%	16.1%	17.9%	19.3%	20.4%
Incremental Savings (GWh)															
Achievable Potential Low	-	-	-	22	24	31	35	59	61	63	70	117	91	86	58
Achievable Potential High	-	-	-	46	47	57	61	98	95	93	95	157	114	96	53
Economic Potential	-	-	-	205	85	96	78	115	115	127	126	203	152	116	57
Technical Potential	-	-	-	222	94	110	92	131	130	143	140	215	162	124	59
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.3%	0.3%	0.4%	0.5%	0.8%	0.8%	0.8%	0.9%	1.5%	1.1%	1.1%	0.7%
Achievable Potential High	0.0%	0.0%	0.0%	0.6%	0.6%	0.7%	0.8%	1.3%	1.2%	1.2%	1.2%	2.0%	1.4%	1.2%	0.7%
Economic Potential	0.0%	0.0%	0.0%	2.6%	1.1%	1.2%	1.0%	1.5%	1.5%	1.6%	1.6%	2.6%	1.9%	1.4%	0.7%
Technical Potential	0.0%	0.0%	0.0%	2.8%	1.2%	1.4%	1.2%	1.7%	1.7%	1.9%	1.8%	2.7%	2.0%	1.5%	0.7%

Table F-11 Annual Electric Peak Demand Savings, Industrial

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	1,552	1,579	1,529	1,483	1,480	1,494	1,456	1,450	1,427	1,427	1,425	1,448	1,454	1,453	1,423
Peak Demand Savings (MW)															
Achievable Potential Low	-	-	-	6	12	21	33	49	67	87	109	137	159	181	196
Achievable Potential High	-	-	-	13	25	43	63	92	120	150	180	217	244	268	281
Economic Potential	-	-	-	62	85	114	140	175	208	247	283	329	363	390	403
Technical Potential	-	-	-	77	108	150	186	231	274	322	366	420	459	491	505
Peak Demand Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.4%	0.8%	1.4%	2.2%	3.4%	4.7%	6.1%	7.7%	9.5%	11.0%	12.4%	13.7%
Achievable Potential High	0.0%	0.0%	0.0%	0.8%	1.7%	2.9%	4.3%	6.3%	8.4%	10.5%	12.6%	15.0%	16.8%	18.4%	19.8%
Economic Potential	0.0%	0.0%	0.0%	4.2%	5.7%	7.6%	9.6%	12.0%	14.6%	17.3%	19.9%	22.7%	24.9%	26.8%	28.3%
Technical Potential	0.0%	0.0%	0.0%	5.2%	7.3%	10.0%	12.8%	15.9%	19.2%	22.6%	25.7%	29.0%	31.6%	33.8%	35.5%
Peak Demand Incremental Savings (MW)															
Achievable Potential Low	-	-	-	6	6	9	11	17	18	20	22	28	23	21	15
Achievable Potential High	-	-	-	13	13	18	20	29	28	30	30	37	27	23	14
Economic Potential	-	-	-	62	22	29	27	35	33	39	37	45	34	27	13
Technical Potential	-	-	-	77	31	41	36	45	43	48	44	54	39	32	14
Peak Demand Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.4%	0.4%	0.6%	0.8%	1.2%	1.2%	1.4%	1.5%	1.9%	1.5%	1.5%	1.1%
Achievable Potential High	0.0%	0.0%	0.0%	0.8%	0.9%	1.2%	1.4%	2.0%	2.0%	2.1%	2.1%	2.6%	1.9%	1.6%	1.0%
Economic Potential	0.0%	0.0%	0.0%	4.2%	1.5%	1.9%	1.8%	2.4%	2.3%	2.7%	2.6%	3.1%	2.3%	1.9%	0.9%
Technical Potential	0.0%	0.0%	0.0%	5.2%	2.1%	2.8%	2.5%	3.1%	3.0%	3.4%	3.1%	3.7%	2.7%	2.2%	1.0%

Table F-12 Annual Natural Gas Savings, Industrial

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Baseline Forecast	497	505	505	489	487	487	481	481	475	472	469	468	465	461	452
Cumulative Savings (million therms)															
Achievable Potential Low	-	-	-	0.1	0.3	0.6	1.0	1.6	2.2	3.0	4.0	5.0	6.0	7.1	8.2
Achievable Potential High	-	-	-	0.3	0.7	1.3	2.0	3.0	4.0	5.3	6.8	8.4	9.7	11.2	12.5
Economic Potential	-	-	-	1.9	2.7	4.1	5.4	7.1	8.5	10.1	12.3	14.4	16.3	18.2	19.9
Technical Potential	-	-	-	10.0	14.5	21.3	29.3	39.2	49.6	60.0	69.6	78.2	84.9	89.8	92.4
Cumulative Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.3%	0.5%	0.6%	0.8%	1.1%	1.3%	1.5%	1.8%
Achievable Potential High	0.0%	0.0%	0.0%	0.1%	0.1%	0.3%	0.4%	0.6%	0.9%	1.1%	1.4%	1.8%	2.1%	2.4%	2.8%
Economic Potential	0.0%	0.0%	0.0%	0.4%	0.5%	0.8%	1.1%	1.5%	1.8%	2.1%	2.6%	3.1%	3.5%	4.0%	4.4%
Technical Potential	0.0%	0.0%	0.0%	2.0%	3.0%	4.4%	6.1%	8.2%	10.4%	12.7%	14.8%	16.7%	18.3%	19.5%	20.5%
Incremental Savings (million therms)															
Achievable Potential Low	-	-	-	0.1	0.2	0.3	0.4	0.6	0.6	0.8	1.0	1.1	1.0	1.1	1.1
Achievable Potential High	-	-	-	0.3	0.3	0.6	0.7	1.0	1.1	1.2	1.5	1.6	1.4	1.4	1.3
Economic Potential	-	-	-	1.9	0.8	1.5	1.3	1.6	1.5	1.6	2.2	2.1	1.9	1.9	1.7
Technical Potential	-	-	-	10.0	4.5	6.8	8.0	9.9	10.3	10.4	9.6	8.6	6.7	4.9	2.7
Incremental Savings (% of Baseline)															
Achievable Potential Low	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Achievable Potential High	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Economic Potential	0.0%	0.0%	0.0%	0.4%	0.2%	0.3%	0.3%	0.3%	0.3%	0.3%	0.5%	0.4%	0.4%	0.4%	0.4%
Technical Potential	0.0%	0.0%	0.0%	2.0%	0.9%	1.4%	1.7%	2.1%	2.2%	2.2%	2.0%	1.8%	1.4%	1.1%	0.6%

AVOIDED COSTS

This section provides the forecasts for electric and natural gas avoided and retail costs in both nominal and real 2010 dollars.

Table G-1 Energy Cost Forecasts – Nominal Dollars

Sector:	All	All	All	Residential	Residential	Commercial	Commercial	Industrial	Industrial
Fuel:	Electric	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas
Value:	Avoided Capacity Cost	Avoided Energy Cost	Avoided Energy Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost
Unit:	\$ perKW-yr	\$ per MWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu
2010	66.97	50.30	4.47	0.16	14.10	0.14	9.81	0.12	9.38
2011	49.87	47.39	4.02	0.18	13.68	0.15	10.44	0.13	9.95
2012	49.11	50.67	3.70	0.18	13.85	0.14	10.66	0.13	9.36
2013	75.38	49.36	4.24	0.18	13.88	0.14	10.62	0.13	9.65
2014	70.93	49.64	4.41	0.19	13.77	0.14	10.60	0.13	10.00
2015	59.41	49.48	4.62	0.19	14.16	0.15	10.87	0.13	10.32
2016	60.64	49.92	4.67	0.19	14.39	0.15	10.99	0.14	10.37
2017	61.62	52.92	4.79	0.20	14.67	0.15	11.15	0.14	10.51
2018	63.10	55.67	4.93	0.20	15.06	0.15	11.44	0.14	10.80
2019	64.32	54.51	5.16	0.20	15.50	0.15	11.76	0.14	11.15
2020	65.55	59.78	5.39	0.20	15.98	0.16	12.12	0.15	11.56
2021	66.78	62.79	5.77	0.21	16.59	0.16	12.61	0.15	12.12
2022	68.25	65.55	6.22	0.21	17.24	0.16	13.13	0.16	12.73
2023	69.48	68.99	6.58	0.22	17.82	0.17	13.57	0.17	13.24
2024	70.95	72.11	6.88	0.22	18.32	0.17	13.94	0.17	13.64
2025	72.42	74.03	7.23	0.23	18.94	0.17	14.43	0.17	14.21
2026	73.90	75.49	7.56	0.23	19.54	0.17	14.88	0.18	14.74
2027	75.62	77.37	7.93	0.24	20.14	0.17	15.33	0.18	15.25
2028	77.33	79.97	8.22	0.25	20.74	0.18	15.76	0.18	15.74
2029	79.30	82.86	8.57	0.25	21.38	0.18	16.24	0.19	16.27
2030	81.02	84.83	8.95	0.26	22.11	0.19	16.79	0.20	16.91
2031	83.23	88.13	9.35	0.27	22.96	0.19	17.43	0.20	17.67
2032	85.44	90.37	9.81	0.27	23.81	0.20	18.09	0.21	18.42
2033	87.16	94.00	10.19	0.28	24.54	0.20	18.63	0.21	19.04

Sector:	All	All	All	Residential	Residential	Commercial	Commercial	Industrial	Industrial
Fuel:	Electric	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas
Value:	Avoided Capacity Cost	Avoided Energy Cost	Avoided Energy Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost
Unit:	\$ perKW-yr	\$ per MWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu
2034	89.12	99.44	10.94	0.29	25.60	0.21	19.48	0.22	20.08
2035	91.33	104.78	11.67	0.30	26.63	0.22	20.29	0.24	21.05
2036	92.47	107.90	12.12	0.31	27.32	0.22	20.89	0.24	21.74
2037	93.62	111.11	12.60	0.31	28.02	0.23	21.50	0.25	22.46
2038	94.79	114.42	13.09	0.32	28.74	0.23	22.14	0.26	23.20
2039	95.98	117.83	13.60	0.33	29.48	0.23	22.79	0.26	23.96
2040	97.17	121.34	14.13	0.34	30.24	0.24	23.46	0.27	24.75
2041	98.39	124.95	14.69	0.35	31.02	0.24	24.15	0.28	25.56
2042	99.62	128.67	15.26	0.36	31.82	0.25	24.87	0.29	26.40
2043	100.86	132.51	15.86	0.37	32.64	0.25	25.60	0.29	27.27
2044	102.12	136.45	16.48	0.37	33.48	0.26	26.36	0.30	28.16
2045	103.39	140.52	17.12	0.38	34.34	0.26	27.13	0.31	29.09
2046	104.68	144.70	17.79	0.39	35.23	0.27	27.93	0.32	30.05
2047	105.99	149.01	18.49	0.40	36.14	0.27	28.76	0.33	31.03
2048	107.31	153.45	19.21	0.41	37.07	0.28	29.60	0.34	32.05
2049	108.65	158.02	19.96	0.43	38.02	0.28	30.48	0.35	33.11
2050	110.01	162.73	20.74	0.44	39.00	0.29	31.38	0.36	34.19

Table G-2 Energy Cost Forecasts – Real 2010 Dollars

Sector:	All	All	All	Residential	Residential	Commercial	Commercial	Industrial	Industrial
Fuel:	Electric	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas
Value:	Avoided Capacity Cost	Avoided Energy Cost	Avoided Energy Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost
Unit:	\$ perKW-yr	\$ per MWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu
2010	66.97	50.30	0.45	0.16	1.41	0.14	0.98	0.12	0.94
2011	48.77	46.34	0.39	0.18	1.34	0.15	1.02	0.13	0.97
2012	46.96	48.45	0.35	0.17	1.32	0.14	1.02	0.13	0.90
2013	70.45	46.13	0.40	0.17	1.30	0.13	0.99	0.12	0.90
2014	64.76	45.32	0.40	0.17	1.26	0.13	0.97	0.12	0.91
2015	52.97	44.12	0.41	0.17	1.26	0.13	0.97	0.12	0.92
2016	52.76	43.43	0.41	0.17	1.25	0.13	0.96	0.12	0.90
2017	52.30	44.91	0.41	0.17	1.24	0.13	0.95	0.12	0.89
2018	52.20	46.06	0.41	0.16	1.25	0.13	0.95	0.12	0.89
2019	51.85	43.94	0.42	0.16	1.25	0.12	0.95	0.11	0.90
2020	51.45	46.92	0.42	0.16	1.25	0.12	0.95	0.12	0.91
2021	51.00	47.96	0.44	0.16	1.27	0.12	0.96	0.12	0.93
2022	50.70	48.70	0.46	0.16	1.28	0.12	0.98	0.12	0.95
2023	50.17	49.82	0.48	0.16	1.29	0.12	0.98	0.12	0.96
2024	49.76	50.57	0.48	0.16	1.28	0.12	0.98	0.12	0.96
2025	49.31	50.40	0.49	0.16	1.29	0.12	0.98	0.12	0.97
2026	48.80	49.85	0.50	0.15	1.29	0.11	0.98	0.12	0.97
2027	48.41	49.53	0.51	0.15	1.29	0.11	0.98	0.12	0.98
2028	47.96	49.60	0.51	0.15	1.29	0.11	0.98	0.11	0.98
2029	47.61	49.75	0.51	0.15	1.28	0.11	0.98	0.11	0.98
2030	47.06	49.27	0.52	0.15	1.28	0.11	0.98	0.11	0.98
2031	46.73	49.49	0.53	0.15	1.29	0.11	0.98	0.11	0.99
2032	46.35	49.02	0.53	0.15	1.29	0.11	0.98	0.11	1.00
2033	45.64	49.22	0.53	0.15	1.28	0.11	0.98	0.11	1.00

Sector:	All	All	All	Residential	Residential	Commercial	Commercial	Industrial	Industrial
Fuel:	Electric	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas
Value:	Avoided Capacity Cost	Avoided Energy Cost	Avoided Energy Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost	Retail Cost
Unit:	\$ perKW-yr	\$ per MWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu	\$ per kWh	\$ per MMBTu
2034	45.02	50.23	0.55	0.15	1.29	0.11	0.98	0.11	1.01
2035	44.47	51.02	0.57	0.15	1.30	0.11	0.99	0.11	1.03
2036	43.75	51.05	0.57	0.14	1.29	0.11	0.99	0.11	1.03
2037	43.04	51.08	0.58	0.14	1.29	0.10	0.99	0.11	1.03
2038	42.34	51.11	0.58	0.14	1.28	0.10	0.99	0.11	1.04
2039	41.65	51.14	0.59	0.14	1.28	0.10	0.99	0.11	1.04
2040	40.98	51.17	0.60	0.14	1.28	0.10	0.99	0.11	1.04
2041	40.31	51.19	0.60	0.14	1.27	0.10	0.99	0.11	1.05
2042	39.66	51.22	0.61	0.14	1.27	0.10	0.99	0.11	1.05
2043	39.01	51.25	0.61	0.14	1.26	0.10	0.99	0.11	1.05
2044	38.38	51.28	0.62	0.14	1.26	0.10	0.99	0.11	1.06
2045	37.75	51.31	0.63	0.14	1.25	0.10	0.99	0.11	1.06
2046	37.14	51.34	0.63	0.14	1.25	0.09	0.99	0.11	1.07
2047	36.54	51.37	0.64	0.14	1.25	0.09	0.99	0.11	1.07
2048	35.94	51.40	0.64	0.14	1.24	0.09	0.99	0.11	1.07
2049	35.36	51.43	0.65	0.14	1.24	0.09	0.99	0.11	1.08
2050	34.79	51.46	0.66	0.14	1.23	0.09	0.99	0.11	1.08

About EnerNOC Utility Solutions Consulting

EnerNOC Utility Solutions Consulting is part of EnerNOC Utility Solutions group, which provides a comprehensive suite of demand-side management (DSM) services to utilities and grid operators worldwide. Hundreds of utilities have leveraged our technology, our people, and our proven processes to make their energy efficiency (EE) and demand response (DR) initiatives a success. Utilities trust EnerNOC to work with them at every stage of the DSM program lifecycle – assessing market potential, designing effective programs, implementing those programs, and measuring program results.

EnerNOC Utility Solutions delivers value to our utility clients through two separate practice areas – Program Implementation and EnerNOC Utility Solutions Consulting.

- Our Program Implementation team leverages EnerNOC’s deep “behind-the-meter expertise” and world-class technology platform to help utilities create and manage DR and EE programs that deliver reliable and cost-effective energy savings. We focus exclusively on the commercial and industrial (C&I) customer segments, with a track record of successful partnerships that spans more than a decade. Through a focus on high quality, measurable savings, EnerNOC has successfully delivered hundreds of thousands of MWh of energy efficiency for our utility clients, and we have thousands of MW of demand response capacity under management.
- The EnerNOC Utility Solutions Consulting team provides expertise and analysis to support a broad range of utility DSM activities, including: potential assessments; end-use forecasts; integrated resource planning; EE, DR, and smart grid pilot and program design and administration; load research; technology assessments and demonstrations; evaluation, measurement and verification; and regulatory support.

The EnerNOC Utility Solutions Consulting team has decades of combined experience in the utility DSM industry. The staff is comprised of professional electrical, mechanical, chemical, civil, industrial, and environmental engineers as well as economists, business planners, project managers, market researchers, load research professionals, and statisticians. Utilities view our experts as trusted advisors, and we work together collaboratively to make any DSM initiative a success.