

New Jersey's Clean Energy Program

LGEA Exit Meeting for:

West Milford Township School District

Aimee Lalonde, TRC

June 14, 2018

Introductions



- *West Milford Township Schools*
 - Barbara Francisco – Business Administrator
 - Chris Kelly – Supervisor of Buildings & Grounds
- *NJ Clean Energy Program – TRC*
 - Aimee Lalonde – Auditor
 - Brian DeLuca – Program Manager
 - Elizabeth Ebinger – Account Manager
 - Mary-Anna Holden – BPU Commissioner
 - Maria Zazzera – Aide to BPU Commissioner Holden

Agenda



- Energy use & existing conditions
- Review of **E**nergy **C**onservation **M**easures (ECMs) identified
- Questions or concerns regarding the draft audit report
- Overview of NJCEP equipment incentives
- Next steps for West Milford Township School District

Process to Draft Report



- Application submitted to NJCEP
- Site Visit Performed
- Utility Analysis
- Baseline Condition
- Analysis
- Recommendations
- Report

Site Visit and Utility Analysis



Overview of Systems, Baseline & Existing Conditions:

- Building Envelope
- Lighting System
- HVAC and Mechanical Systems
- HVAC Controls

Utility Consumption:

- Electric Consumption and Costs
- Natural Gas Consumption and Costs
- Propane Consumption and Costs

Entities Visited/Analyzed

- West Milford High School
- Macopin Middle School
- Apshawa Elementary School
- Maple Road Elementary School
- Marshall Hill Elementary School
- Paradise Knoll School
- Upper Greenwood Lake Elementary School
- Westbrook Elementary School
- Administration Building
- Bus Garage

West Milford Summary



Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades	731,814	150.2	0.0	\$116,024	\$938,016	\$113,380	\$824,636	7.1	736,931
Lighting Control Measures	97,112	20.5	0.0	\$16,198	\$125,178	\$13,975	\$111,203	6.9	97,791
Motor Upgrades	7,259	2.1	0.0	\$1,073	\$13,166	\$0	\$13,166	12.3	7,310
Variable Frequency Drive (VFD) Measures	160,731	43.1	0.0	\$26,039	\$127,321	\$10,200	\$117,121	4.5	161,855
Electric Unitary HVAC Measures	20,643	12.0	0.0	\$4,380	\$94,884	\$4,331	\$90,553	20.7	20,787
Gas Heating (HVAC/Process) Replacement	0	0.0	916.6	\$8,158	\$275,223	\$30,849	\$244,374	30.0	107,323
HVAC System Improvements	571	0.0	17.1	\$408	\$713	\$0	\$713	1.7	2,843
Domestic Water Heating Upgrade	1,524	1.4	101.1	\$1,260	\$7,903	\$452	\$7,451	5.9	13,559
Food Service Equipment & Refrigeration Measures	73,109	16.1	0.0	\$11,033	\$100,061	\$6,925	\$93,136	8.4	73,620
Plug Load Equipment Control - Vending Machine	16,118	0.0	0.0	\$2,529	\$2,990	\$0	\$2,990	1.2	16,231
Custom Measures	93,252	0.0	1,997.9	\$33,861	\$422,785	\$0	\$422,785	12.5	347,776
TOTALS	1,202,133	245.3	3,032.8	\$220,963	\$2,108,240	\$180,112	\$1,928,128	8.7	1,586,027

All Buildings All Evaluated ECM Totals

West Milford Summary



Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades	629,704	137.3	0.0	\$100,387	\$553,037	\$82,600	\$470,437	4.7	634,106
Lighting Control Measures	96,593	20.4	0.0	\$16,118	\$123,592	\$13,920	\$109,672	6.8	97,268
Motor Upgrades	6,976	2.0	0.0	\$1,029	\$11,324	\$0	\$11,324	11.0	7,025
Variable Frequency Drive (VFD) Measures	160,731	43.1	0.0	\$26,039	\$127,321	\$10,200	\$117,121	4.5	161,855
Electric Unitary HVAC Measures	1,154	0.4	0.0	\$228	\$1,992	\$0	\$1,992	8.7	1,162
Gas Heating (HVAC/Process) Replacement	0	0.0	0.0	\$0	\$0	\$0	\$0	0.0	0
HVAC System Improvements	571	0.0	17.1	\$408	\$713	\$0	\$713	1.7	2,843
Domestic Water Heating Upgrade	1,524	1.4	72.7	\$1,011	\$3,511	\$300	\$3,211	3.2	10,223
Food Service Equipment & Refrigeration Measures	19,461	2.2	0.0	\$3,143	\$16,472	\$800	\$15,672	5.0	19,597
Plug Load Equipment Control - Vending Machine	16,118	0.0	0.0	\$2,529	\$2,990	\$0	\$2,990	1.2	16,231
Custom Measures	68,077	0.0	1,314.8	\$23,195	\$85,185	\$0	\$85,185	3.7	228,035
TOTALS	1,000,908	206.8	1,404.6	\$174,086	\$926,136	\$107,820	\$818,316	4.7	1,178,346

All Buildings High Priority ECM Totals

West Milford High School



Figure 1 – Previous 12 Month Utility Costs

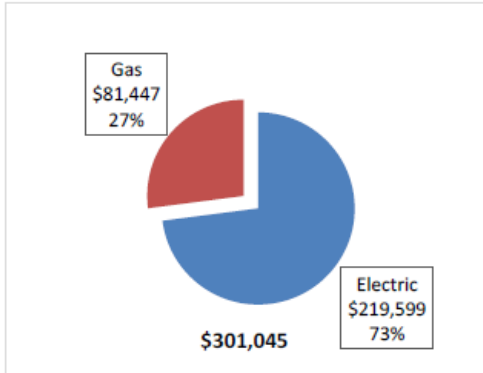


Figure 2a – Potential Post-Implementation Costs (All Evaluated Measures)

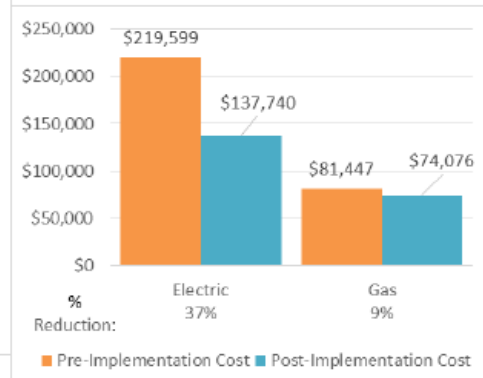
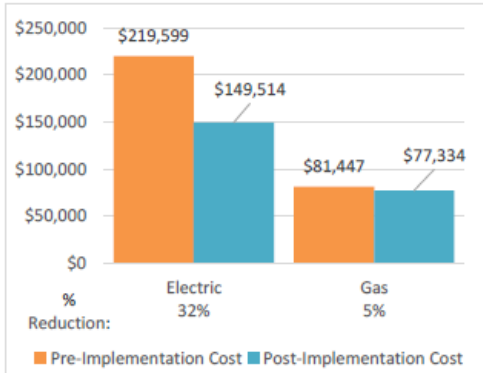


Figure 3b – Potential Post-Implementation Costs (High Priority Measures)



ENERGY STAR® Statement of Performance

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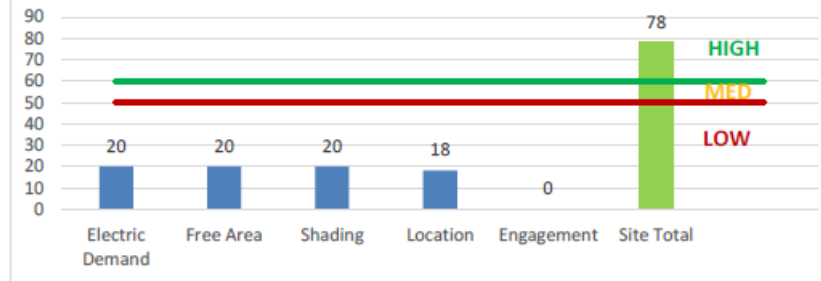
West Milford High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 220,000
Built: 1976

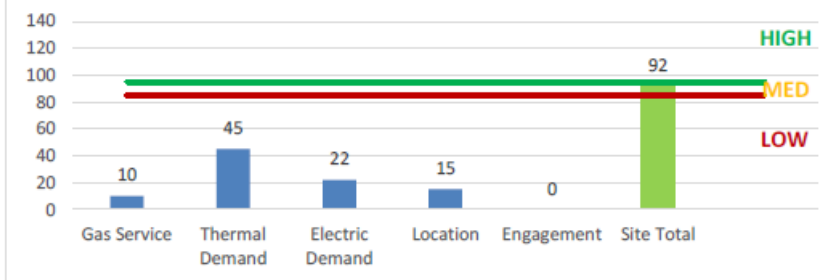
For Year Ending: January 31, 2018
Date Generated: April 25, 2018

ENERGY STAR® Score¹

PV Screening Results



CHP Screening Results



West Milford High School



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			302,327	45.9	0.0	\$44,463.90	\$223,342.60	\$30,475.00	\$192,867.60	4.3	304,441
ECM 1	Install LED Fixtures	Yes	44,717	2.3	0.0	\$6,576.64	\$80,131.04	\$6,150.00	\$73,981.04	11.2	45,030
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	328	0.0	0.0	\$48.27	\$202.00	\$0.00	\$202.00	4.2	331
ECM 3	Retrofit Fixtures with LED Lamps	Yes	257,282	43.6	0.0	\$37,838.99	\$143,009.57	\$24,325.00	\$118,684.57	3.1	259,081
Lighting Control Measures			33,021	4.9	0.0	\$4,856.42	\$27,124.00	\$2,220.00	\$24,904.00	5.1	33,252
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	23,123	3.5	0.0	\$3,400.79	\$17,324.00	\$2,220.00	\$15,104.00	4.4	23,285
ECM 5	Install High/Low Lighting Controls	Yes	9,897	1.5	0.0	\$1,455.63	\$9,800.00	\$0.00	\$9,800.00	6.7	9,967
Motor Upgrades			5,950	1.7	0.0	\$875.03	\$6,794.72	\$0.00	\$6,794.72	7.8	5,991
ECM 6	Premium Efficiency Motors	Yes	5,950	1.7	0.0	\$875.03	\$6,794.72	\$0.00	\$6,794.72	7.8	5,991
Variable Frequency Drive (VFD) Measures			95,251	24.5	0.0	\$14,008.72	\$66,179.15	\$7,400.00	\$58,779.15	4.2	95,917
ECM 7	Install VFDs on Constant Volume (CV) HVAC	Yes	32,604	11.2	0.0	\$4,795.16	\$26,206.80	\$3,200.00	\$23,006.80	4.8	32,832
ECM 8	Install VFDs on Chilled Water Pumps	Yes	28,051	7.2	0.0	\$4,125.47	\$16,944.10	\$3,600.00	\$13,344.10	3.2	28,247
ECM 9	Install VFDs on Hot Water Pumps	Yes	28,641	6.1	0.0	\$4,212.33	\$19,220.30	\$0.00	\$19,220.30	4.6	28,841
ECM 10	Install VFDs on Cooling Tower Fans	Yes	5,955	0.0	0.0	\$875.76	\$3,807.95	\$600.00	\$3,207.95	3.7	5,996
Electric Unitary HVAC Measures			1,365	0.7	0.0	\$200.79	\$2,992.44	\$184.00	\$2,808.44	14.0	1,375
	Install High Efficiency Electric AC	No	1,365	0.7	0.0	\$200.79	\$2,992.44	\$184.00	\$2,808.44	14.0	1,375
HVAC System Improvements			0	0.0	1.8	\$15.89	\$34.80	\$0.00	\$34.80	2.2	213
ECM 11	Install Pipe Insulation	Yes	0	0.0	1.8	\$15.89	\$34.80	\$0.00	\$34.80	2.2	213
Domestic Water Heating Upgrade			0	0.0	19.1	\$166.85	\$243.78	\$0.00	\$243.78	1.5	2,240
ECM 12	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	19.1	\$166.85	\$243.78	\$0.00	\$243.78	1.5	2,240
Food Service Equipment & Refrigeration Measures			53,648	13.9	0.0	\$7,890.11	\$83,588.63	\$6,125.00	\$77,463.63	9.8	54,023
	Food Service Equipment Replacement	No	52,286	13.7	0.0	\$7,689.77	\$80,256.23	\$6,050.00	\$74,206.23	9.6	52,651
	Replace Refrigeration Equipment	No	1,362	0.2	0.0	\$200.34	\$3,332.40	\$75.00	\$3,257.40	16.3	1,372
Plug Load Equipment Control - Vending Machine			9,671	0.0	0.0	\$1,422.34	\$1,840.00	\$0.00	\$1,840.00	1.3	9,739
ECM 13	Vending Machine Control	Yes	9,671	0.0	0.0	\$1,422.34	\$1,840.00	\$0.00	\$1,840.00	1.3	9,739
Custom Measures			55,356	0.0	824.2	\$15,328.98	\$243,866.00	\$0.00	\$243,866.00	15.9	152,248
ECM 14	Computer Power Management Software	Yes	30,283	0.0	0.0	\$4,453.73	\$8,950.00	\$0.00	\$8,950.00	2.0	30,494
ECM 15	Building Envelope Weatherization	Yes	30	0.0	450.6	\$3,934.08	\$14,916.00	\$0.00	\$14,916.00	3.8	52,792
	Expand the Energy Management System	No	25,044	0.0	373.6	\$6,941.18	\$220,000.00	\$0.00	\$220,000.00	31.7	68,961
TOTALS FOR HIGH PRIORITY MEASURES			476,531	76.9	471.6	\$74,196.96	\$349,425.06	\$40,095.00	\$309,330.06	4.2	535,079
TOTALS FOR ALL EVALUATED MEASURES			556,589	91.5	845.2	\$89,229.04	\$656,006.13	\$46,404.00	\$609,602.13	6.8	659,438

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Macopin Middle School



Figure 1 – Previous 12 Month Utility Costs

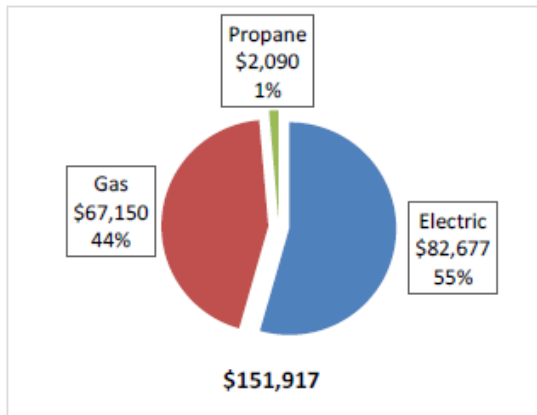


Figure 2a – Potential Post-Implementation Costs (All Measures)

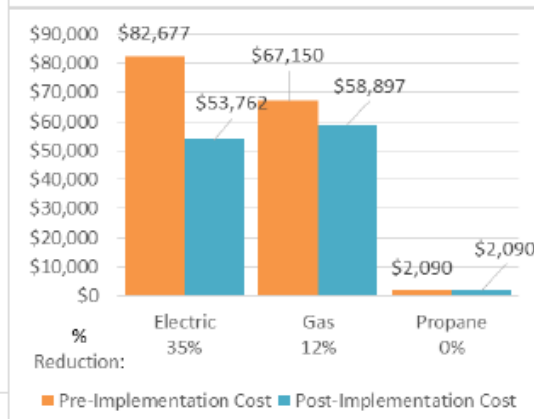


Figure 3b – Potential Post-Implementation Costs (High Priority Measures)

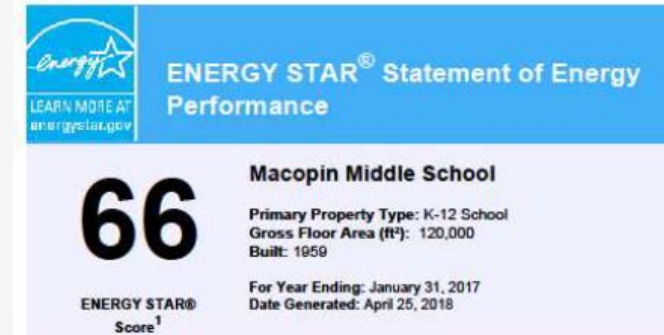
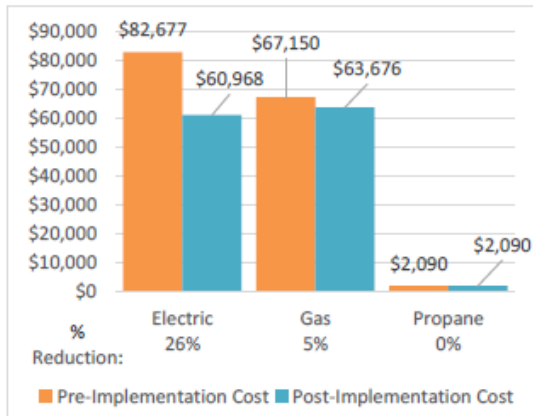
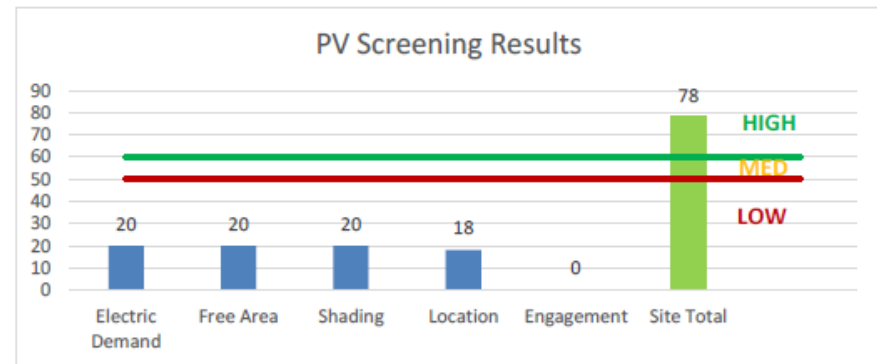


Figure 26 - Photovoltaic Screening



Macopin Middle School



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			152,840	38.4	0.0	\$23,126.14	\$256,720.86	\$27,815.00	\$228,905.86	9.9	153,909
	Install LED Fixtures	No	45,268	5.4	0.0	\$6,849.55	\$155,617.16	\$10,900.00	\$144,717.16	21.1	45,585
ECM 1	Retrofit Fixtures with LED Lamps	Yes	107,571	33.0	0.0	\$16,276.58	\$101,103.69	\$16,915.00	\$84,188.69	5.2	108,324
Lighting Control Measures			10,316	2.4	0.0	\$1,560.90	\$12,330.00	\$1,355.00	\$10,975.00	7.0	10,388
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	6,877	1.7	0.0	\$1,040.61	\$10,070.00	\$1,355.00	\$8,715.00	8.4	6,925
ECM 3	Adjust Timeclock for Exterior Lighting Control	Yes	961	0.3	0.0	\$145.39	\$60.00	\$0.00	\$60.00	0.4	968
ECM 4	Install High/Low Lighting Controls	Yes	2,478	0.5	0.0	\$374.90	\$2,200.00	\$0.00	\$2,200.00	5.9	2,495
Motor Upgrades			673	0.3	0.0	\$101.88	\$2,687.10	\$0.00	\$2,687.10	26.4	678
ECM 5	Premium Efficiency Motors	Yes	673	0.3	0.0	\$101.88	\$2,687.10	\$0.00	\$2,687.10	26.4	678
Variable Frequency Drive (VFD) Measures			12,000	2.5	0.0	\$1,815.74	\$7,615.90	\$0.00	\$7,615.90	4.2	12,084
ECM 6	Install VFDs on Hot Water Pumps	Yes	12,000	2.5	0.0	\$1,815.74	\$7,615.90	\$0.00	\$7,615.90	4.2	12,084
Electric Unitary HVAC Measures			2,357	1.7	0.0	\$356.61	\$12,432.14	\$276.00	\$12,156.14	34.1	2,373
	Install High Efficiency Electric AC	No	2,357	1.7	0.0	\$356.61	\$12,432.14	\$276.00	\$12,156.14	34.1	2,373
Gas Heating (HVAC/Process) Replacement			0	0.0	519.1	\$4,530.33	\$154,227.03	\$17,765.00	\$136,462.03	30.1	60,777
	Install High Efficiency Hot Water Boilers	No	0	0.0	519.1	\$4,530.33	\$154,227.03	\$17,765.00	\$136,462.03	30.1	60,777
Domestic Water Heating Upgrade			0	0.0	57.5	\$501.69	\$4,729.03	\$152.00	\$4,577.03	9.1	6,730
	Install High Efficiency Gas Water Heater	No	0	0.0	28.5	\$248.63	\$4,392.04	\$152.00	\$4,240.04	17.1	3,335
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	29.0	\$253.06	\$336.99	\$0.00	\$336.99	1.3	3,395
Food Service Equipment & Refrigeration Measures			1,007	0.1	0.0	\$152.32	\$2,116.40	\$0.00	\$2,116.40	13.9	1,014
ECM 8	Replace Refrigeration Equipment	Yes	1,007	0.1	0.0	\$152.32	\$2,116.40	\$0.00	\$2,116.40	13.9	1,014
Plug Load Equipment Control - Vending Machine			3,224	0.0	0.0	\$487.77	\$690.00	\$0.00	\$690.00	1.4	3,246
ECM 9	Vending Machine Control	Yes	3,224	0.0	0.0	\$487.77	\$690.00	\$0.00	\$690.00	1.4	3,246
Custom Measures			8,684	0.0	369.0	\$4,534.77	\$17,489.80	\$0.00	\$17,489.80	3.9	51,953
ECM 10	Computer Power Management Software	Yes	8,663	0.0	0.0	\$1,310.80	\$5,845.00	\$0.00	\$5,845.00	4.5	8,724
ECM 11	Building Envelope Weatherization	Yes	21	0.0	369.0	\$3,223.97	\$11,644.80	\$0.00	\$11,644.80	3.6	43,230
TOTALS FOR HIGH PRIORITY MEASURES			143,475	38.3	398.0	\$25,183.02	\$144,369.88	\$18,270.00	\$126,099.88	5.0	191,082
TOTALS FOR ALL EVALUATED MEASURES			191,101	45.3	945.6	\$37,168.14	\$471,038.26	\$47,363.00	\$423,675.26	11.4	303,152

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Apshawa Elementary



Figure 1 – Previous 12 Month Utility Costs

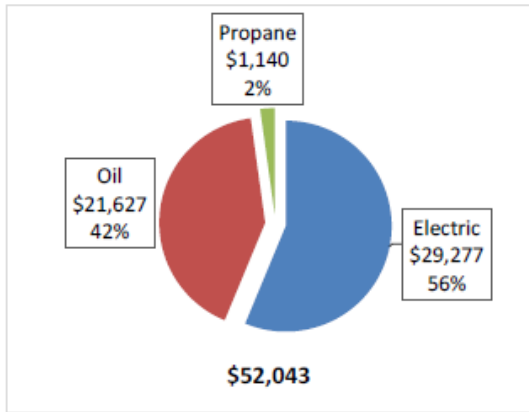


Figure 2a – Potential Post-Implementation Costs (All Measures)

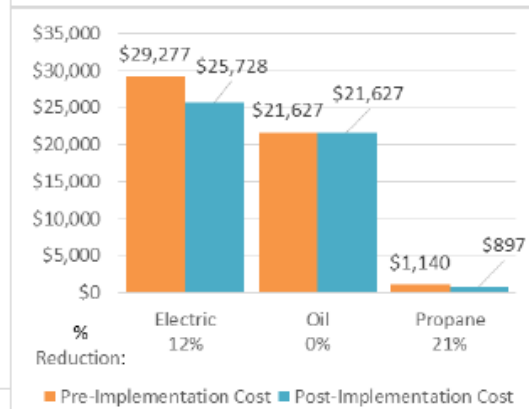
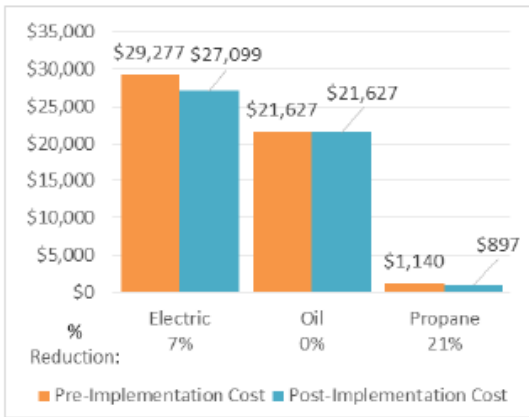


Figure 2b – Potential Post-Implementation Costs (High Priority Measures)



ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score¹

Apshawa Elementary School
Primary Property Type: K-12 School
Gross Floor Area (ft²): 41,500
Built: 1966
For Year Ending: February 28, 2017
Date Generated: April 24, 2018

Apshawa Elementary



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Propane Savings (MMBtu)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			9,591	1.7	0.0	0.0	\$1,427.68	\$40,752.37	\$3,045.00	\$37,707.37	26.4	9,658
	Install LED Fixtures	No	9,210	1.5	0.0	0.0	\$1,371.04	\$40,206.20	\$3,000.00	\$37,206.20	27.1	9,275
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	194	0.1	0.0	0.0	\$28.80	\$224.00	\$20.00	\$204.00	7.1	195
ECM 2	Retrofit Fixtures with LED Lamps	Yes	187	0.2	0.0	0.0	\$27.84	\$322.17	\$25.00	\$297.17	10.7	188
Lighting Control Measures			9,284	2.5	0.0	0.0	\$1,381.96	\$18,210.00	\$2,205.00	\$16,005.00	11.6	9,349
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	8,461	2.4	0.0	0.0	\$1,259.51	\$17,010.00	\$2,205.00	\$14,805.00	11.8	8,520
ECM 4	Install High/Low Lighting Controls	Yes	823	0.2	0.0	0.0	\$122.45	\$1,200.00	\$0.00	\$1,200.00	9.8	828
HVAC System Improvements			0	0.0	7.1	7.1	\$159.48	\$217.50	\$0.00	\$217.50	1.4	1,008
ECM 5	Install Pipe Insulation	Yes	0	0.0	7.1	7.1	\$159.48	\$217.50	\$0.00	\$217.50	1.4	1,008
Domestic Water Heating Upgrade			0	0.0	3.7	3.7	\$83.15	\$64.53	\$0.00	\$64.53	0.8	526
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	3.7	3.7	\$83.15	\$64.53	\$0.00	\$64.53	0.8	526
Custom Measures			4,970	0.0	0.0	0.0	\$739.77	\$3,550.00	\$0.00	\$3,550.00	4.8	5,004
ECM 7	Computer Power Management Software	Yes	4,970	0.0	0.0	0.0	\$739.77	\$3,550.00	\$0.00	\$3,550.00	4.8	5,004
TOTALS			23,844	4.3	10.8	10.8	\$3,792.05	\$62,794.40	\$5,250.00	\$57,544.40	15.2	25,545
TOTALS (High Priority)			14,634	2.8	10.8	10.8	\$2,421.01	\$22,588.20	\$2,250.00	\$20,338.20	8.4	16,270

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Maple Road Elementary



Figure 1 – Previous 12 Month Utility Costs

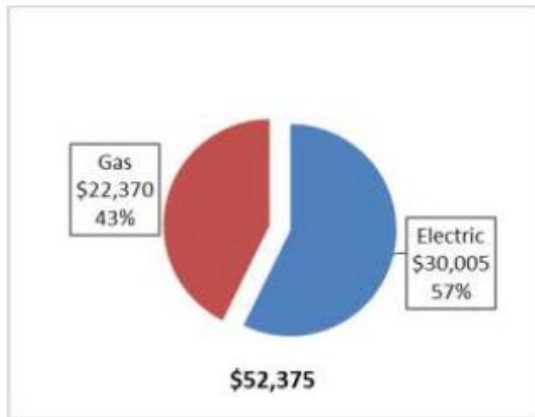


Figure 2a – Potential Post-Implementation Costs (All Measures)

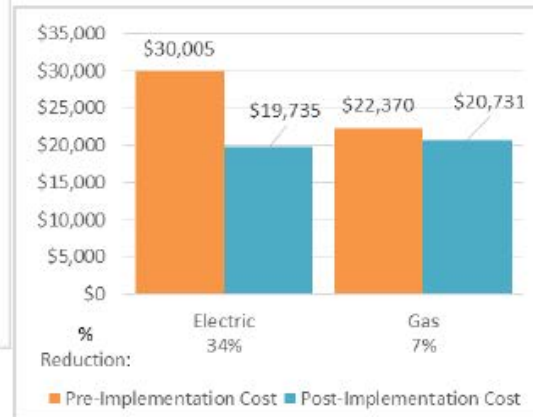
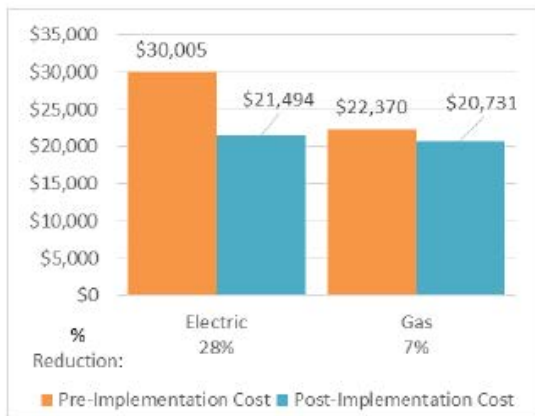


Figure 2b – Potential Post-Implementation Costs (High Priority Measures)



ENERGY STAR® Statement of Energy Performance

Maple Road Elementary School

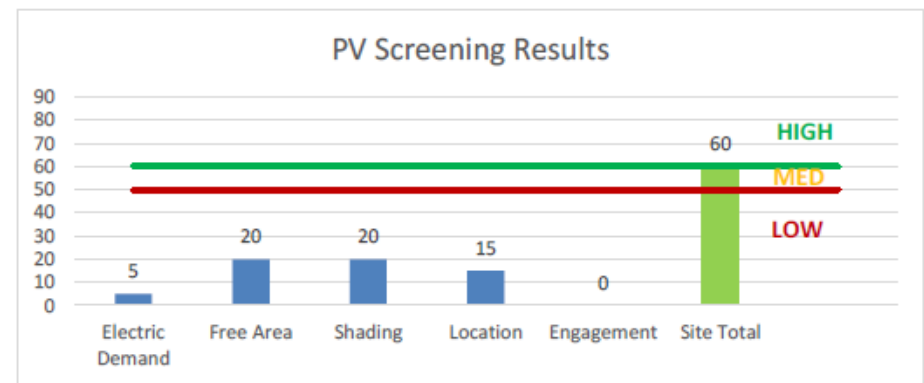
63

ENERGY STAR® Score¹

Primary Property Type: K-12 School
Gross Floor Area (ft²): 45,360
Built: 1968

For Year Ending: January 31, 2017
Date Generated: April 24, 2018

Figure 24 - Photovoltaic Screening



Maple Road Elementary



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			43,440	12.2	0.0	\$6,674.60	\$83,724.36	\$10,555.00	\$73,169.36	11.0	43,744
	Install LED Fixtures	No	11,161	0.5	0.0	\$1,714.92	\$44,023.57	\$4,105.00	\$39,918.57	23.3	11,239
ECM 1	Retrofit Fixtures with LED Lamps	Yes	32,279	11.7	0.0	\$4,959.67	\$39,700.79	\$6,450.00	\$33,250.79	6.7	32,505
Lighting Control Measures			6,911	1.9	0.0	\$1,061.85	\$11,166.00	\$1,140.00	\$10,026.00	9.4	6,959
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	5,872	1.7	0.0	\$902.27	\$8,556.00	\$1,140.00	\$7,416.00	8.2	5,913
ECM 3	Install Photocell Controls	Yes	131	0.0	0.0	\$20.19	\$180.00	\$0.00	\$180.00	8.9	132
ECM 4	Install High/Low Lighting Controls	Yes	907	0.3	0.0	\$139.39	\$2,430.00	\$0.00	\$2,430.00	17.4	914
Motor Upgrades			283	0.1	0.0	\$43.47	\$1,842.12	\$0.00	\$1,842.12	42.4	285
	Premium Efficiency Motors	No	283	0.1	0.0	\$43.47	\$1,842.12	\$0.00	\$1,842.12	42.4	285
Variable Frequency Drive (VFD) Measures			7,977	1.3	0.0	\$1,225.63	\$6,551.70	\$0.00	\$6,551.70	5.3	8,033
ECM 5	Install VFDs on Hot Water Pumps	Yes	7,977	1.3	0.0	\$1,225.63	\$6,551.70	\$0.00	\$6,551.70	5.3	8,033
Food Service Equipment & Refrigeration Measures			6,052	0.7	0.0	\$929.84	\$3,800.00	\$0.00	\$3,800.00	4.1	6,094
ECM 7	Replace Refrigeration Equipment	Yes	6,052	0.7	0.0	\$929.84	\$3,800.00	\$0.00	\$3,800.00	4.1	6,094
Custom Measures			2,176	0.0	169.2	\$1,882.98	\$10,700.00	\$0.00	\$10,700.00	5.7	22,002
ECM 8	Computer Power Management Software	Yes	2,167	0.0	0.0	\$332.95	\$3,700.00	\$0.00	\$3,700.00	11.1	2,182
ECM 9	Building Envelope Weatherization	Yes	9	0.0	169.2	\$1,550.03	\$7,000.00	\$0.00	\$7,000.00	4.5	19,820
TOTALS			66,838	16.1	179.1	\$11,908.95	\$117,956.26	\$11,695.00	\$106,261.26	8.9	88,276

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

TOTALS (High Priority)			55,394	15.5	179.1	\$10,150.56	\$72,090.57	\$7,590.00	\$64,500.57	6.4	76,752
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Marshall Hill Elementary



Figure 1 – Previous 12 Month Utility Costs

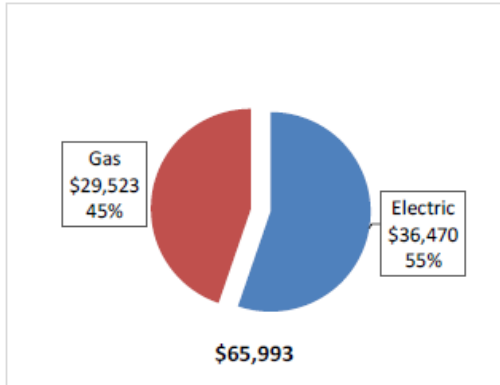


Figure 2a – Potential Post-Implementation Costs (All Measures)

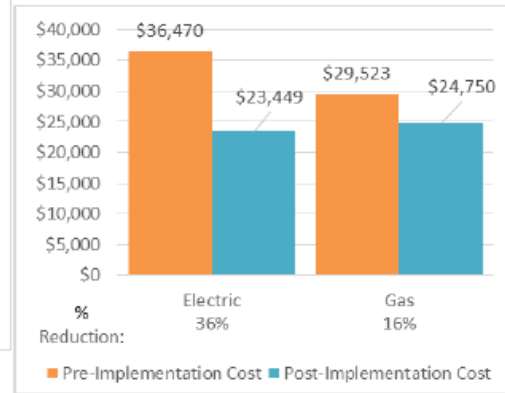
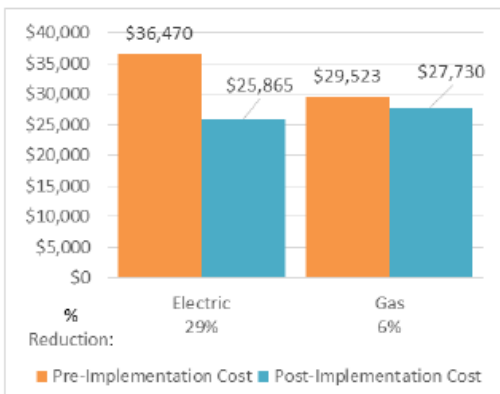


Figure 2b – Potential Post-Implementation Costs (High Priority Measures)



ENERGY STAR® Statement of Energy Performance

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Marshall Hill Elementary School

Primary Property Type: K-12 School
 Gross Floor Area (ft²): 41,725
 Built: 1959

For Year Ending: January 31, 2017
 Date Generated: April 23, 2018

ENERGY STAR® Score¹

Marshall Hill Elementary



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			62,311	15.8	0.0	\$9,226.02	\$90,646.82	\$9,730.00	\$80,916.82	8.8	62,747
	Install LED Fixtures	No	15,163	2.6	0.0	\$2,245.10	\$49,503.01	\$2,900.00	\$46,603.01	20.8	15,269
ECM 1	Retrofit Fixtures with LED Lamps	Yes	47,008	13.2	0.0	\$6,960.17	\$40,928.70	\$6,830.00	\$34,098.70	4.9	47,337
ECM 2	Install LED Exit Signs	Yes	140	0.0	0.0	\$20.75	\$215.11	\$0.00	\$215.11	10.4	141
Lighting Control Measures			3,852	0.3	0.0	\$570.28	\$1,586.00	\$55.00	\$1,531.00	2.7	3,879
	Install Occupancy Sensor Lighting Controls	No	117	0.0	0.0	\$17.36	\$386.00	\$55.00	\$331.00	19.1	118
ECM 3	Install High/Low Lighting Controls	Yes	3,734	0.2	0.0	\$552.92	\$1,200.00	\$0.00	\$1,200.00	2.2	3,760
Motor Upgrades			353	0.1	0.0	\$52.27	\$1,842.12	\$0.00	\$1,842.12	35.2	355
ECM 4	Premium Efficiency Motors	Yes	353	0.1	0.0	\$52.27	\$1,842.12	\$0.00	\$1,842.12	35.2	355
Variable Frequency Drive (VFD) Measures			9,953	1.3	0.0	\$1,473.65	\$6,551.70	\$0.00	\$6,551.70	4.4	10,022
ECM 5	Install VFDs on Hot Water Pumps	Yes	9,953	1.3	0.0	\$1,473.65	\$6,551.70	\$0.00	\$6,551.70	4.4	10,022
Electric Unitary HVAC Measures			1,036	0.4	0.0	\$153.34	\$4,717.96	\$0.00	\$4,717.96	30.8	1,043
	Install High Efficiency Electric AC	No	1,036	0.4	0.0	\$153.34	\$4,717.96	\$0.00	\$4,717.96	30.8	1,043
Gas Heating (HVAC/Process) Replacement			0	0.0	331.4	\$2,979.49	\$99,698.41	\$11,483.99	\$88,214.41	29.6	38,808
	Install High Efficiency Hot Water Boilers	No	0	0.0	331.4	\$2,979.49	\$99,698.41	\$11,483.99	\$88,214.41	29.6	38,808
Domestic Water Heating Upgrade			0	0.0	11.0	\$98.84	\$207.93	\$0.00	\$207.93	2.1	1,287
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	11.0	\$98.84	\$207.93	\$0.00	\$207.93	2.1	1,287
Food Service Equipment & Refrigeration Measures			4,655	0.5	0.0	\$689.26	\$4,944.00	\$200.00	\$4,744.00	6.9	4,688
ECM 7	Replace Refrigeration Equipment	Yes	4,655	0.5	0.0	\$689.26	\$4,944.00	\$200.00	\$4,744.00	6.9	4,688
Plug Load Equipment Control - Vending Machine			1,612	0.0	0.0	\$238.65	\$230.00	\$0.00	\$230.00	1.0	1,623
ECM 8	Vending Machine Control	Yes	1,612	0.0	0.0	\$238.65	\$230.00	\$0.00	\$230.00	1.0	1,623
Custom Measures			4,173	0.0	188.5	\$2,312.47	\$10,410.00	\$0.00	\$10,410.00	4.5	26,275
ECM 9	Computer Power Management Software	Yes	4,166	0.0	0.0	\$616.88	\$3,550.00	\$0.00	\$3,550.00	5.8	4,195
ECM 10	Building Envelope Weatherization	Yes	7	0.0	188.5	\$1,695.60	\$6,860.00	\$0.00	\$6,860.00	4.0	22,079
TOTALS			87,945	18.4	531.0	\$17,794.28	\$220,834.94	\$21,468.99	\$199,365.94	11.2	150,728

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

TOTALS (High Priority)			71,629	15.4	199.5	\$12,399.00	\$66,529.56	\$7,030.00	\$59,499.56	4.8	95,489
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Paradise Knoll School



Figure 1 – Previous 12 Month Utility Costs

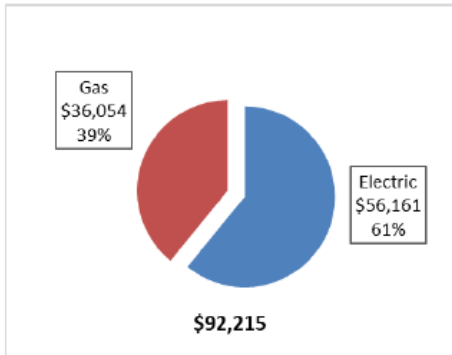


Figure 2a – Potential Post-Implementation Costs (All Measures)

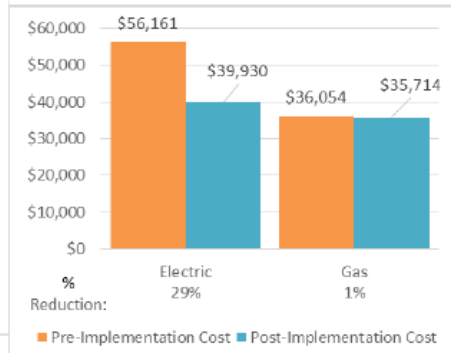


Figure 26 - Photovoltaic Screening

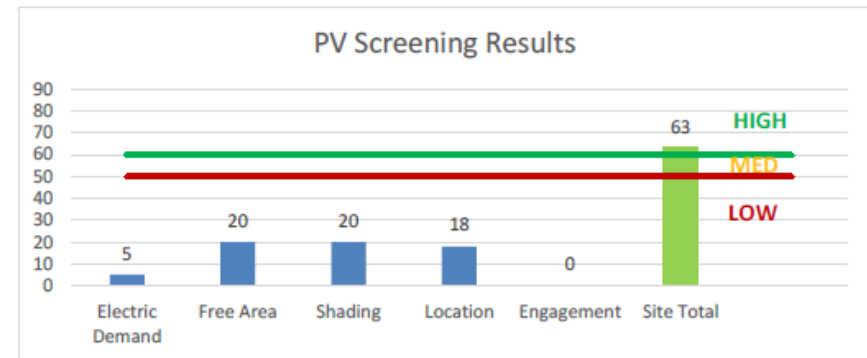
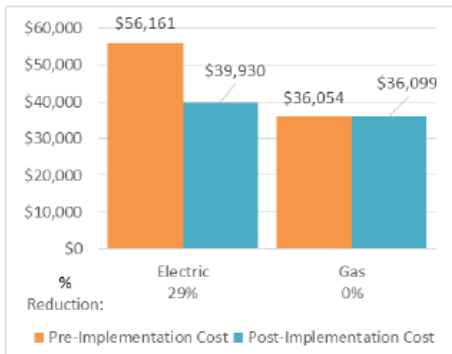


Figure 3b – Potential Post-Implementation Costs (High Priority Measures)



Installation of a Radon Mitigation System and Commission ERU

Measure Description

We recommend consulting with a qualified contractor to provide testing of the building for radon in accordance with the Environmental Protection Agency (EPA) guidelines for schools. Based on the outcome of the testing the district should consider installing a radon mitigation system. If the district decides it will be beneficial to continue using the ERU we recommend consulting a qualified HVAC contractor to commission the ERU. The focus of commissioning the ERU should be to determine the appropriate amount of outside the unit should supply and the operation of the furnace as these two components have a definite impact on the school's energy use. Due to the safety and air quality issues related to the operation of the ERU the estimate of potential savings and cost are outside the scope of this study. It is likely the radon testing and commissioning costs will be in the thousands of dollars. Continuous operation of a ventilation system that introduces high volumes of outside air and heats that air is very energy intensive. Reducing the amount of outside air and the subsequent heating to just the level required to maintain safe air quality will reduce the overall energy use of the ERU.

Paradise Knoll School



Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		47,664	9.6	0.0	\$9,423.30	\$53,310.33	\$8,260.00	\$45,050.33	4.8	47,997
ECM 1	Install LED Fixtures	7,878	0.7	0.0	\$1,557.45	\$25,558.21	\$3,400.00	\$22,158.21	14.2	7,933
ECM 2	Retrofit Fixtures with LED Lamps	39,786	8.9	0.0	\$7,865.85	\$27,752.12	\$4,860.00	\$22,892.12	2.9	40,064
Lighting Control Measures		11,913	2.5	0.0	\$2,355.31	\$13,516.00	\$1,730.00	\$11,786.00	5.0	11,997
ECM 3	Install Occupancy Sensor Lighting Controls	11,036	2.4	0.0	\$2,181.93	\$12,316.00	\$1,730.00	\$10,586.00	4.9	11,114
ECM 4	Install High/Low Lighting Controls	877	0.1	0.0	\$173.38	\$1,200.00	\$0.00	\$1,200.00	6.9	883
Variable Frequency Drive (VFD) Measures		10,091	1.3	0.0	\$1,995.00	\$11,473.01	\$0.00	\$11,473.01	5.8	10,161
ECM 5	Install VFDs on Hot Water Pumps	10,091	1.3	0.0	\$1,995.00	\$11,473.01	\$0.00	\$11,473.01	5.8	10,161
Electric Unitary HVAC Measures		1,154	0.4	0.0	\$228.06	\$1,991.52	\$0.00	\$1,991.52	8.7	1,162
ECM 6	Install High Efficiency Electric AC	1,154	0.4	0.0	\$228.06	\$1,991.52	\$0.00	\$1,991.52	8.7	1,162
Gas Heating (HVAC/Process) Replacement		0	0.0	40.2	\$385.41	\$11,102.09	\$1,200.00	\$9,902.09	25.7	4,711
	Install High Efficiency Furnaces	0	0.0	40.2	\$385.41	\$11,102.09	\$1,200.00	\$9,902.09	25.7	4,711
Domestic Water Heating Upgrade		1,524	1.4	-4.7	\$256.44	\$2,399.27	\$300.00	\$2,099.27	8.2	986
ECM 7	Install Tankless Water Heater	1,524	1.4	-5.2	\$251.50	\$2,392.10	\$300.00	\$2,092.10	8.3	926
ECM 8	Install Low-Flow Domestic Hot Water Devices	0	0.0	0.5	\$4.94	\$7.17	\$0.00	\$7.17	1.5	60
Food Service Equipment & Refrigeration Measures		3,845	0.4	0.0	\$760.22	\$3,462.00	\$600.00	\$2,862.00	3.8	3,872
ECM 9	Replace Refrigeration Equipment	3,845	0.4	0.0	\$760.22	\$3,462.00	\$600.00	\$2,862.00	3.8	3,872
Custom Measures		5,904	0.0	0.0	\$1,167.15	\$3,280.00	\$0.00	\$3,280.00	2.8	5,945
ECM 10	Computer Power Management Software	5,904	0.0	0.0	\$1,167.15	\$3,280.00	\$0.00	\$3,280.00	2.8	5,945
TOTALS		82,095	15.6	35.6	\$16,570.89	\$100,534.22	\$12,090.00	\$88,444.22	5.3	86,832

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

TOTALS (High Priority)		82,095	15.6	-4.7	\$16,185.48	\$89,432.13	\$10,890.00	\$78,542.13	4.9	82,120
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Upper Greenwood Lake Elementary



Figure 1 – Previous 12 Month Utility Costs

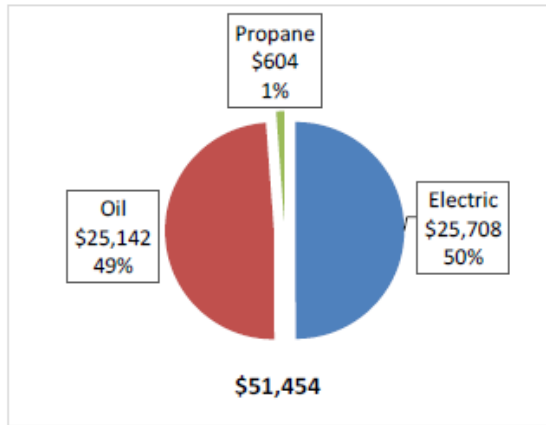


Figure 2a – Potential Post-Implementation Costs (All Measures)

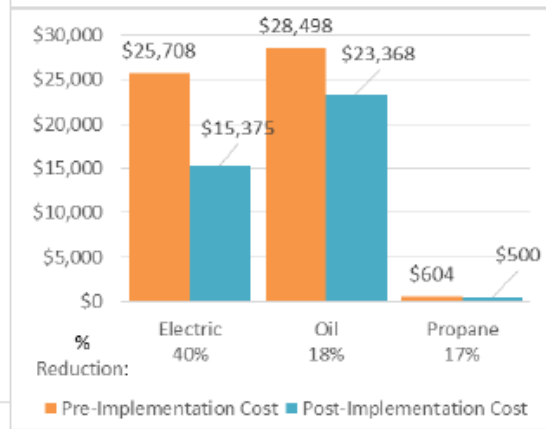
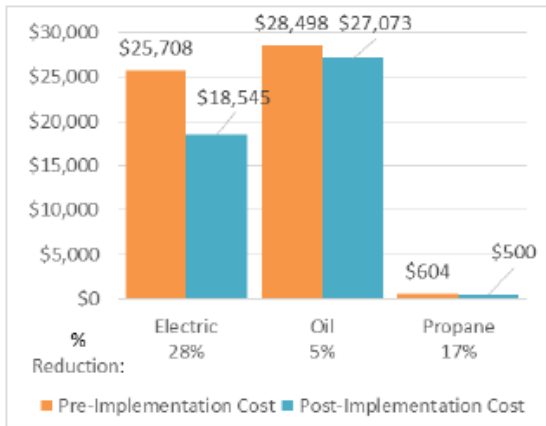


Figure 3b – Potential Post-Implementation Costs (High Priority Measures)



ENERGY STAR® Statement of Energy Performance

73

Upper Greenwood Lake Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 41,000
Built: 1966

For Year Ending: March 31, 2017
Date Generated: April 24, 2018

ENERGY STAR® Score¹

Upper Greenwood Lake Elementary



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			45,426	10.5	0.0	\$7,114.43	\$101,516.65	\$10,920.00	\$90,596.65	12.7	45,744
	Install LED Fixtures	No	19,711	2.7	0.0	\$3,087.09	\$76,397.09	\$6,725.00	\$69,672.09	22.6	19,849
ECM 1	Retrofit Fixtures with LED Lamps	Yes	25,715	7.9	0.0	\$4,027.33	\$25,119.56	\$4,195.00	\$20,924.56	5.2	25,895
Lighting Control Measures			8,631	2.5	0.0	\$1,351.76	\$23,196.00	\$2,960.00	\$20,236.00	15.0	8,691
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	8,230	2.4	0.0	\$1,288.87	\$21,996.00	\$2,960.00	\$19,036.00	14.8	8,287
	Install High/Low Lighting Controls	No	402	0.1	0.0	\$62.89	\$1,200.00	\$0.00	\$1,200.00	19.1	404
ECM 3	Install VFDs on Hot Water Pumps	Yes	5,090	1.3	0.0	\$797.19	\$6,551.70	\$0.00	\$6,551.70	8.2	5,126
HVAC System Improvements			0	0.0	3.6	\$50.95	\$108.75	\$0.00	\$108.75	2.1	504
ECM 4	Install Pipe Insulation	Yes	0	0.0	3.6	\$50.95	\$108.75	\$0.00	\$108.75	2.1	504
Domestic Water Heating Upgrade			0	0.0	3.7	\$53.13	\$64.53	\$0.00	\$64.53	1.2	526
ECM 5	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	3.7	\$53.13	\$64.53	\$0.00	\$64.53	1.2	526
Food Service Equipment & Refrigeration Measures			3,902	0.4	0.0	\$611.09	\$2,150.00	\$0.00	\$2,150.00	3.5	3,929
ECM 6	Replace Refrigeration Equipment	Yes	3,902	0.4	0.0	\$611.09	\$2,150.00	\$0.00	\$2,150.00	3.5	3,929
Custom Measures			2,931	0.0	428.6	\$5,588.57	\$126,644.00	\$0.00	\$126,644.00	22.7	73,080
ECM 7	Computer Power Management Software	Yes	2,797	0.0	0.0	\$438.05	\$3,580.00	\$0.00	\$3,580.00	8.2	2,817
ECM 8	Building Envelope Weatherization	Yes	3	0.0	119.1	\$1,425.39	\$5,464.00	\$0.00	\$5,464.00	3.8	19,484
	Window Replacements	No	131	0.0	309.6	\$3,725.12	\$117,600.00	\$0.00	\$117,600.00	31.6	50,780
TOTALS			65,980	14.8	435.9	\$15,567.11	\$260,231.63	\$13,880.00	\$246,351.63	15.8	137,601

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

TOTALS (High Priority)			45,737	12.0	126.3	\$8,692.00	\$65,034.54	\$7,155.00	\$57,879.54	6.7	66,567
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Westbrook Elementary



Figure 1 – Previous 12 Month Utility Costs

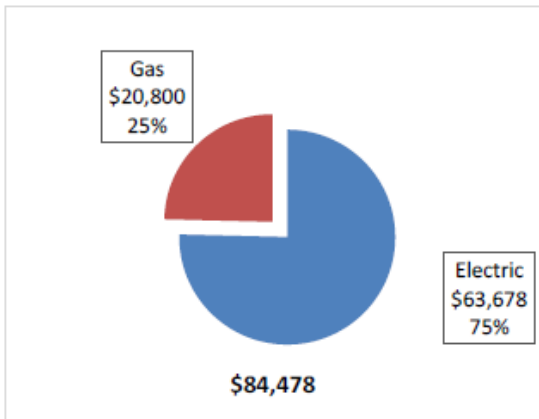
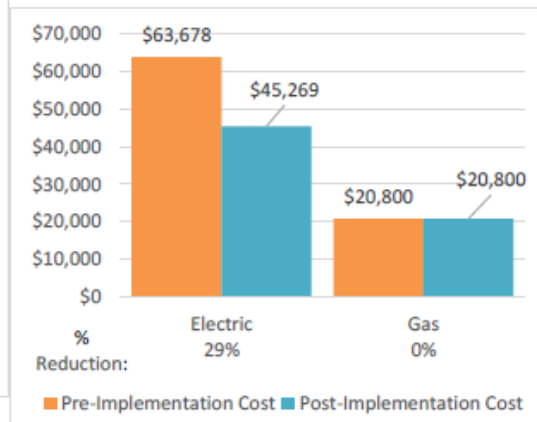


Figure 2a – Potential Post-Implementation Costs (All Measures)



ENERGY STAR® Statement of Energy Performance

74 **Westbrook Elementary School**

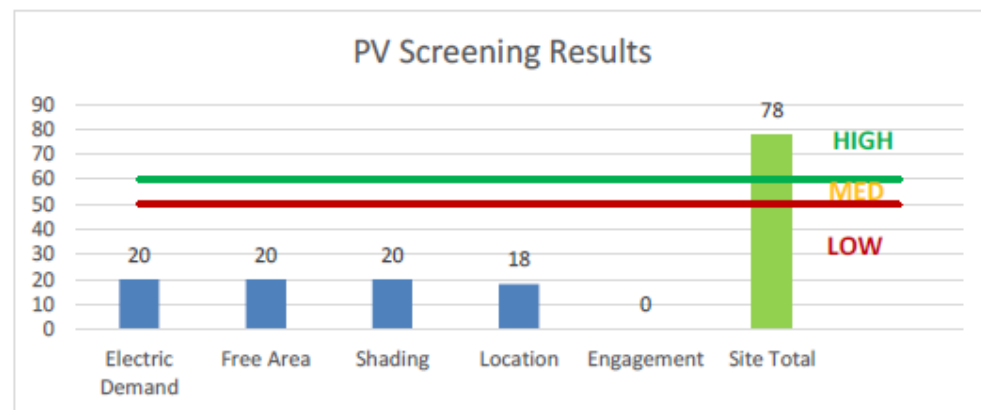
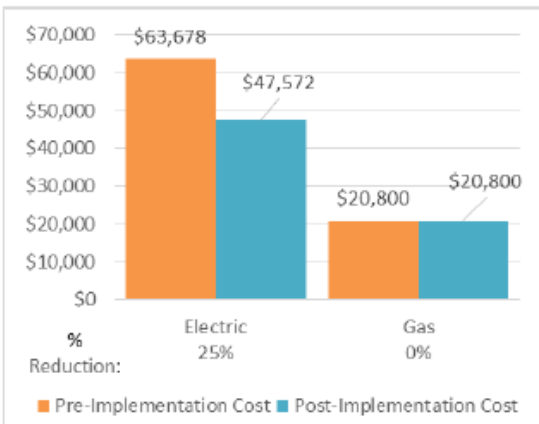
Primary Property Type: K-12 School
Gross Floor Area (ft²): 43,832
Built: 1973

For Year Ending: January 31, 2017
Date Generated: April 25, 2018

ENERGY STAR® Score¹

Figure 23 - Photovoltaic Screening

Figure 3b – Potential Post-Implementation Costs (High Priority Measures)



Westbrook Elementary



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			35,991	10.6	0.0	\$8,345.55	\$52,960.98	\$8,890.00	\$44,070.98	5.3	36,243
	Install LED Fixtures	No	1,596	0.2	0.0	\$370.08	\$19,232.22	\$3,150.00	\$16,082.22	43.5	1,607
ECM 1	Retrofit Fixtures with LED Lamps	Yes	34,395	10.3	0.0	\$7,975.48	\$33,728.76	\$5,740.00	\$27,988.76	3.5	34,635
Lighting Control Measures			10,477	2.7	0.0	\$2,429.49	\$13,976.00	\$1,855.00	\$12,121.00	5.0	10,551
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	10,259	2.6	0.0	\$2,378.78	\$13,376.00	\$1,855.00	\$11,521.00	4.8	10,330
ECM 3	Install High/Low Lighting Controls	Yes	219	0.1	0.0	\$50.71	\$600.00	\$0.00	\$600.00	11.8	220
Variable Frequency Drive (VFD) Measures			20,370	11.1	0.0	\$4,723.32	\$22,398.31	\$2,800.00	\$19,598.31	4.1	20,512
ECM 4	Install VFDs on Constant Volume (CV) HVAC	Yes	15,656	9.8	0.0	\$3,630.35	\$15,846.61	\$2,800.00	\$13,046.61	3.6	15,766
ECM 5	Install VFDs on Hot Water Pumps	Yes	4,714	1.3	0.0	\$1,092.97	\$6,551.70	\$0.00	\$6,551.70	6.0	4,747
Electric Unitary HVAC Measures			8,334	5.2	0.0	\$1,932.43	\$48,934.57	\$2,291.00	\$46,643.57	24.1	8,392
	Install High Efficiency Electric AC	No	8,334	5.2	0.0	\$1,932.43	\$48,934.57	\$2,291.00	\$46,643.57	24.1	8,392
Custom Measures			4,218	0.0	0.0	\$978.18	\$3,550.00	\$0.00	\$3,550.00	3.6	4,248
ECM 6	Computer Power Management Software	Yes	4,218	0.0	0.0	\$978.18	\$3,550.00	\$0.00	\$3,550.00	3.6	4,248
TOTALS			79,390	29.5	0.0	\$18,408.98	\$141,819.86	\$15,836.00	\$125,983.86	6.8	79,946

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

TOTALS (High Priority)			69,461	24.0	0.0	\$16,106.47	\$73,653.07	\$10,395.00	\$63,258.07	3.9	69,946
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Administrative Building



Figure 1 – Previous 12 Month Utility Costs

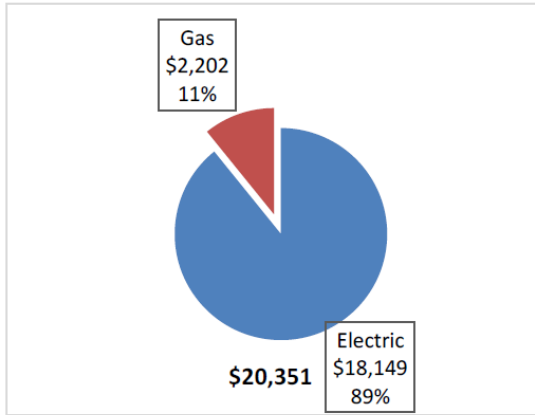


Figure 2a – Potential Post-Implementation Costs (All Measures)

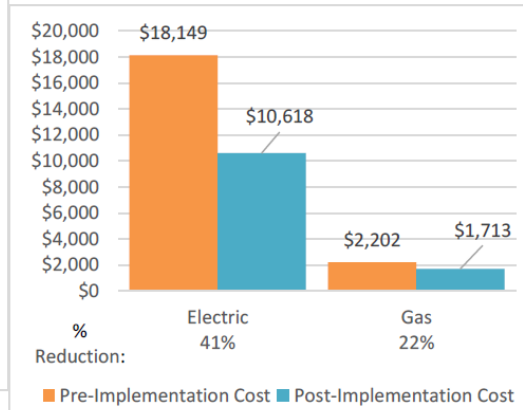
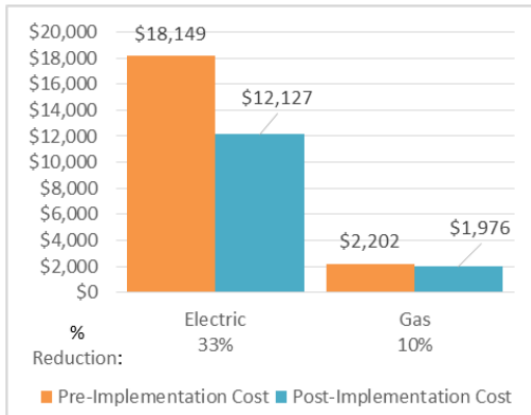


Figure 3b – Potential Post-Implementation Costs (High Priority Measures)



ENERGY STAR® Statement of Energy Performance

74

Administration Building

Primary Property Type: Office
Gross Floor Area (ft²): 8,000
Built: 1976

For Year Ending: January 31, 2017
Date Generated: February 25, 2018

ENERGY STAR® Score¹

Administrative Building



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			15,902	3.0	0.0	\$3,750.18	\$11,426.04	\$1,990.00	\$9,436.04	2.5	16,013
ECM 1	Install LED Fixtures	Yes	4,476	0.0	0.0	\$1,055.58	\$3,516.09	\$500.00	\$3,016.09	2.9	4,507
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	391	0.1	0.0	\$92.25	\$351.00	\$30.00	\$321.00	3.5	394
ECM 3	Retrofit Fixtures with LED Lamps	Yes	11,035	2.9	0.0	\$2,602.35	\$7,558.95	\$1,460.00	\$6,098.95	2.3	11,112
Lighting Control Measures			2,612	0.7	0.0	\$616.01	\$3,572.00	\$380.00	\$3,192.00	5.2	2,630
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	1,986	0.6	0.0	\$468.28	\$2,972.00	\$380.00	\$2,592.00	5.5	2,000
ECM 5	Install High/Low Lighting Controls	Yes	626	0.1	0.0	\$147.72	\$600.00	\$0.00	\$600.00	4.1	631
Electric Unitary HVAC Measures			6,398	3.5	0.0	\$1,508.87	\$23,815.43	\$1,580.00	\$22,235.43	14.7	6,443
	Install High Efficiency Electric AC	No	6,398	3.5	0.0	\$1,508.87	\$23,815.43	\$1,580.00	\$22,235.43	14.7	6,443
Gas Heating (HVAC/Process) Replacement			0	0.0	25.8	\$262.96	\$10,195.80	\$400.00	\$9,795.80	37.3	3,027
	Install High Efficiency Furnaces	No	0	0.0	25.8	\$262.96	\$10,195.80	\$400.00	\$9,795.80	37.3	3,027
HVAC System Improvements			571	0.0	3.5	\$170.22	\$329.87	\$0.00	\$329.87	1.9	985
ECM 6	Install Programmable Thermostats	Yes	571	0.0	3.5	\$170.22	\$329.87	\$0.00	\$329.87	1.9	985
Domestic Water Heating Upgrade			0	0.0	0.4	\$4.13	\$14.34	\$0.00	\$14.34	3.5	48
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	0.4	\$4.13	\$14.34	\$0.00	\$14.34	3.5	48
Plug Load Equipment Control - Vending Machine			1,612	0.0	0.0	\$380.12	\$230.00	\$0.00	\$230.00	0.6	1,623
ECM 8	Vending Machine Control	Yes	1,612	0.0	0.0	\$380.12	\$230.00	\$0.00	\$230.00	0.6	1,623
Custom Measures			4,840	0.0	18.3	\$1,327.94	\$3,295.00	\$0.00	\$3,295.00	2.5	7,021
ECM 9	Computer Power Management Software	Yes	3,746	0.0	0.0	\$883.53	\$2,995.00	\$0.00	\$2,995.00	3.4	3,773
ECM 10	Install Duct Insulation	Yes	1,093	0.0	18.3	\$444.40	\$300.00	\$0.00	\$300.00	0.7	3,248
TOTALS			31,935	7.3	48.1	\$8,020.42	\$52,878.48	\$4,350.00	\$48,528.48	6.1	37,789

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.
 ** - Simple Payback Period is based on net measure costs (i.e. after incentives).

TOTALS (High Priority)			25,537	3.8	22.2	\$6,248.59	\$18,867.25	\$2,370.00	\$16,497.25	2.6	28,319
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Bus Garage



Figure 1 – Previous 12 Month Utility Costs

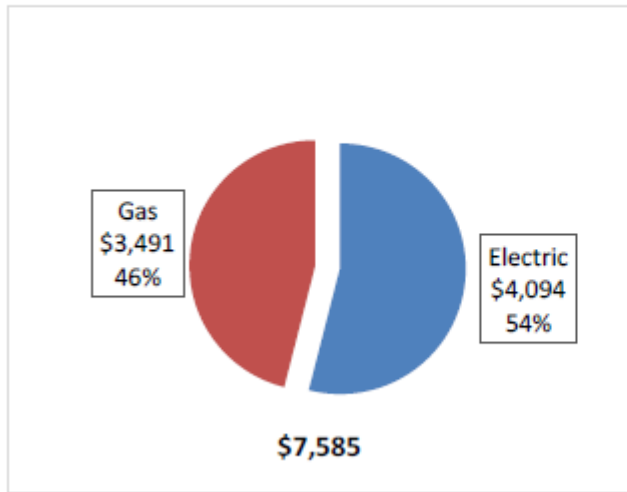
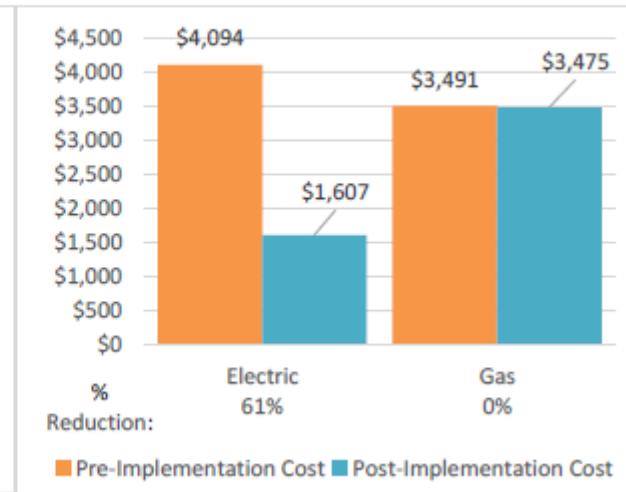


Figure 2 – Potential Post-Implementation Costs



ENERGY STAR® Statement of Energy Performance

N/A **Bus Garage No. 1**

Primary Property Type: Repair Services (Vehicle, Shoe, Locksmith, etc.)
 Gross Floor Area (ft²): 5,000
 Built: 2005

For Year Ending: January 31, 2017
 Date Generated: April 20, 2018

ENERGY STAR® Score¹

Bus Garage



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			16,321	2.4	0.0	\$2,472.59	\$23,614.92	\$1,700.00	\$21,914.92	8.9	16,435
ECM 1	Install LED Fixtures	Yes	14,381	1.6	0.0	\$2,178.65	\$22,269.42	\$1,470.00	\$20,799.42	9.5	14,481
ECM 2	Retrofit Fixtures with LED Lamps	Yes	1,940	0.8	0.0	\$293.94	\$1,345.50	\$230.00	\$1,115.50	3.8	1,954
Lighting Control Measures			95	0.1	0.0	\$14.39	\$502.00	\$75.00	\$427.00	29.7	96
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	95	0.1	0.0	\$14.39	\$502.00	\$75.00	\$427.00	29.7	96
HVAC System Improvements			0	0.0	1.1	\$11.29	\$21.75	\$0.00	\$21.75	1.9	133
ECM 4	Install Pipe Insulation	Yes	0	0.0	1.1	\$11.29	\$21.75	\$0.00	\$21.75	1.9	133
Domestic Water Heating Upgrade			0	0.0	0.5	\$4.83	\$7.17	\$0.00	\$7.17	1.5	57
ECM 5	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	0.5	\$4.83	\$7.17	\$0.00	\$7.17	1.5	57
TOTALS			16,416	2.5	1.6	\$2,503.10	\$24,145.84	\$1,775.00	\$22,370.84	8.9	16,721

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

West Milford Summary



	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**
All Evaluated ECMs	\$221,000	\$2,108,000	\$180,000	\$1,928,000	8.7
High Priority ECMs	\$174,000	\$926,000	\$108,000	\$818,000	4.7

West Milford

Total Project

Summary

(All Buildings

All Evaluated

ECMs)

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades	731,814	150.2	0.0	\$116,024.37	\$938,015.93	\$113,380.00	\$824,635.93	7.1	736,931
Install LED Fixtures	173,562	17.4	0.0	\$27,006.10	\$516,454.01	\$42,300.00	\$474,154.01	17.6	174,776
Retrofit Fluorescent Fixtures with LED Lamps and Drivers	913	0.2	0.0	\$169.32	\$777.00	\$50.00	\$727.00	4.3	919
Retrofit Fixtures with LED Lamps	557,199	132.5	0.0	\$88,828.20	\$420,569.81	\$71,030.00	\$349,539.81	3.9	561,095
Install LED Exit Signs	140	0.0	0.0	\$20.75	\$215.11	\$0.00	\$215.11	10.4	141
Lighting Control Measures	97,112	20.5	0.0	\$16,198.36	\$125,178.00	\$13,975.00	\$111,203.00	6.9	97,791
Install Occupancy Sensor Lighting Controls	76,057	17.3	0.0	\$12,952.79	\$104,508.00	\$13,975.00	\$90,533.00	7.0	76,588
Install Daylight Dimming Controls	1,092	0.3	0.0	\$165.58	\$240.00	\$0.00	\$240.00	1.4	1,100
Install High/Low Lighting Controls	19,963	3.0	0.0	\$3,079.99	\$20,430.00	\$0.00	\$20,430.00	6.6	20,102
Motor Upgrades	7,259	2.1	0.0	\$1,072.65	\$13,166.06	\$0.00	\$13,166.06	12.3	7,310
Premium Efficiency Motors	7,259	2.1	0.0	\$1,072.65	\$13,166.06	\$0.00	\$13,166.06	12.3	7,310
Variable Frequency Drive (VFD) Measures	160,731	43.1	0.0	\$26,039.25	\$127,321.47	\$10,200.00	\$117,121.47	4.5	161,855
Install VFDs on Constant Volume (CV) HVAC	48,260	21.0	0.0	\$8,425.51	\$42,053.41	\$6,000.00	\$36,053.41	4.3	48,598
Install VFDs on Chilled Water Pumps	28,051	7.2	0.0	\$4,125.47	\$16,944.10	\$3,600.00	\$13,344.10	3.2	28,247
Install VFDs on Hot Water Pumps	78,466	14.9	0.0	\$12,612.51	\$64,516.01	\$0.00	\$64,516.01	5.1	79,014
Install VFDs on Cooling Tower Fans	5,955	0.0	0.0	\$875.76	\$3,807.95	\$600.00	\$3,207.95	3.7	5,996
Electric Unitary HVAC Measures	20,643	12.0	0.0	\$4,380.10	\$94,884.06	\$4,331.00	\$90,553.06	20.7	20,787
Install High Efficiency Electric AC	20,643	12.0	0.0	\$4,380.10	\$94,884.06	\$4,331.00	\$90,553.06	20.7	20,787
Gas Heating (HVAC/Process) Replacement	0	0.0	916.6	\$8,158.19	\$275,223.33	\$30,848.99	\$244,374.34	30.0	107,323
Install High Efficiency Hot Water Boilers	0	0.0	850.5	\$7,509.82	\$253,925.44	\$29,248.99	\$224,676.45	29.9	99,585
Install High Efficiency Furnaces	0	0.0	66.1	\$648.37	\$21,297.89	\$1,600.00	\$19,697.89	30.4	7,738
HVAC System Improvements	571	0.0	17.1	\$407.83	\$712.67	\$0.00	\$712.67	1.7	2,843
Install Programmable Thermostats	571	0.0	3.5	\$170.22	\$329.87	\$0.00	\$329.87	1.9	985
Install Pipe Insulation	0	0.0	13.6	\$237.61	\$382.80	\$0.00	\$382.80	1.6	1,859
Domestic Water Heating Upgrade	1,524	1.4	101.1	\$1,259.64	\$7,902.66	\$452.00	\$7,450.66	5.9	13,559
Install High Efficiency Gas Water Heater	0	0.0	28.5	\$248.63	\$4,392.04	\$152.00	\$4,240.04	17.1	3,335
Install Tankless Water Heater	1,524	1.4	-5.2	\$251.50	\$2,392.10	\$300.00	\$2,092.10	8.3	926
Install Gas-Fired Booster Water Heater	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.0	0
Install Low-Flow Domestic Hot Water Devices	0	0.0	77.9	\$759.51	\$1,118.52	\$0.00	\$1,118.52	1.5	9,298
Food Service Equipment & Refrigeration Measures	73,109	16.1	0.0	\$11,032.84	\$100,061.03	\$6,925.00	\$93,136.03	8.4	73,620
Food Service Equipment Replacement	52,286	13.7	0.0	\$7,689.77	\$80,256.23	\$6,050.00	\$74,206.23	9.6	52,651
Replace Refrigeration Equipment	20,823	2.4	0.0	\$3,343.07	\$19,804.80	\$875.00	\$18,929.80	5.7	20,968
Plug Load Equipment Control - Vending Machine	16,118	0.0	0.0	\$2,528.88	\$2,990.00	\$0.00	\$2,990.00	1.2	16,231
Vending Machine Control	16,118	0.0	0.0	\$2,528.88	\$2,990.00	\$0.00	\$2,990.00	1.2	16,231
Custom Measures	93,252	0.0	1,997.9	\$33,860.81	\$422,784.80	\$0.00	\$422,784.80	12.5	347,776
Custom Measures	93,252	0.0	1,997.9	\$33,860.81	\$422,784.80	\$0.00	\$422,784.80	12.5	347,776
TOTALS	1,202,133	245.3	3,032.8	\$220,962.92	\$2,108,240.01	\$180,111.99	\$1,928,128.02	8.7	1,586,027

Energy Efficient Best Practices



- Reduce Air Leakage
- Close Doors and Windows
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Use Window Treatments/Coverings
- Clean and/or Replace HVAC filters
- Check and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Plug Load Controls
- Water Conservation

See individual reports for specific EE practices by building

Clean Energy Program Portfolio



ELIGIBLE SECTORS

Commercial, Industrial, Government, Non-Profit, Institutional and Multifamily

PROGRAMS

Equipment Rebates:

- SmartStart Retrofit
- SmartStart New Construction
- Direct Install
- Large Energy Users

Whole Buildings:

- Pay for Performance Existing Buildings
- Pay for Performance New Construction

Energy Generation:

- Combined Heat and Power (CHP)
- SREC Registration Program (SRP) for Solar Projects

* eligible programs are highlighted in yellow

SmartStart: Overview



- Two types of incentives for high efficiency equipment installation:
 - Prescriptive
 - Custom
- Includes New Construction, Rehab and Retrofit projects
- Project pre-approval required for certain equipment
- Incentives up to \$500,000 per electric account & \$500,000 per natural gas account
- Project Categories:
 - New Construction
 - Renovation
 - Remodeling
 - Equipment Replacement
- Specific incentives and individual applications for Lighting, HVAC, VFDs, Refrigeration, Controls and more!

Direct Install: Overview



- Turn-key retrofit program to replace outdated and inefficient equipment, including lighting, HVAC, refrigeration, etc.
- Open to Small to Mid-Sized Commercial and Industrial facilities with a peak electric demand ≤ 200 kW
- Provides incentives of up to 70% of the installed cost
- Incentives are paid directly to the contractor
 - Customer only pays remaining 30% of installed cost
 - \$125,000 project cap
 - \$250,000 per entity cap (up to \$500,000 if using ESIP)
- Participating contractors provide support and process all paperwork
- Fast turnaround time: Average length of time for job completion (4-6 months)

Direct Install:



Participating Contractor

Lime Energy

Tony McCoy

855-600-5463

njdi@lime-energy.com

Recommended NJCEP Incentives per Building



Entity Name	SmartStart (SS)	Direct Install (DI)	SREC Registration Program (SRP) for Solar Projects	Combined Heat and Power (CHP)
West Milford Board of Education Admin. Building	X	X		
Apshawa Elementary School	X	X		
Macopin Middle School *	X		X	
Maple Road Elementary School	X	X	X	
Marshall Hill Elementary School	X	X		
Paradise Knoll School	X	X	X	
Upper Greenwood Lake Elementary School	X	X		
Westbrook Elementary School	X	X	X	
West Milford High School **	X		X	X
Bus Garage	X	X		

* Macopin Middle School may qualify for DI once the demand is reduced. Only one month had a peak demand >200kW

** West Milford High School is the only building close to qualifying for P4P (Only if an ESCO identifies additional savings opportunities)

NOTE: All evaluated ECMs at All buildings within the School District may be combined into a comprehensive project under the ESIP

Energy Savings Improvement Program (ESIP)

- Provides alternative financing for energy savings projects at public institutions. Value of energy savings leveraged to pay for cost of EE projects over a 15 year contract. Does not count as debt/require voter approval.
- Requires an audit as 1st step (LGEA satisfies requirement)
- ESIP participation question on LGEA application
- Program administered directly by BPU

ESIP Process

New Jersey's Clean Energy Program Interaction

Initial Energy Audit completed
for entity building(s)

Local Government Energy Audit
(LGEA) may be used to meet
this requirement

Entity issues ESIP RFP (previously
approved by BPU) and selects ESCO
or DIY approach

Investment Grade Energy Audit completed
and Energy Savings Plan (ESP)
developed

P4P Energy Reduction Plan (ERP),
Direct Install, or SmartStart application
recommended submittal time frame

Third party review of ESP

Review and approval of ESP
by Board of Public Utilities (BPU)

Entity adopts ESP,
determines guarantee



FOR MORE INFORMATION

ESIP

Mike Thulen

ESIP Coordinator

Office: 609-777-3338

Cell: 732-330-2419

ESIP@bpu.nj.gov

Questions





FOR MORE INFORMATION

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Outreach Manager

732-855-6543

jfriedl@trcsolutions.com