Local Government Energy Audit Report

Eickhoff Hall

May 6, 2021

Prepared for:

The College of New Jersey

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Ewing, New Jersey 08628

Prepared by:

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Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

TRC reviewed the energy conservation measures and estimates of energy savings for technical accuracy. Actual, achieved energy savings depend on behavioral factors and other uncontrollable variables and, therefore, estimates of final energy savings are not guaranteed. TRC and the New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

TRC bases estimated material and labor costs primarily on RS Means cost manuals as well as on our experience at similar facilities. This approach is based on standard cost estimating manuals and is vendor neutral. Cost estimates include material and labor pricing associated with one for one equipment replacements. Cost estimates do not include demolition or removal of hazardous waste. The actual implementation costs for energy savings projects are anticipated to be significantly higher based on the specific conditions at your site(s). We strongly recommend that you work with your design engineer or contractor to develop actual project costs for your specific scope of work for the installation of high efficiency equipment. We encourage you to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on selected products and installers. TRC and NJBPU do not guarantee cost estimates and shall in no event be held liable should actual installed costs vary from these material and labor estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

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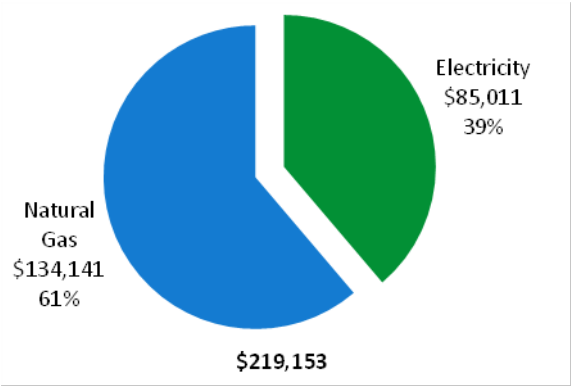
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Eickhoff Hall. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and to help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $219,153 Electricity: 2,984,035 kWh Natural Gas: 295,778 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

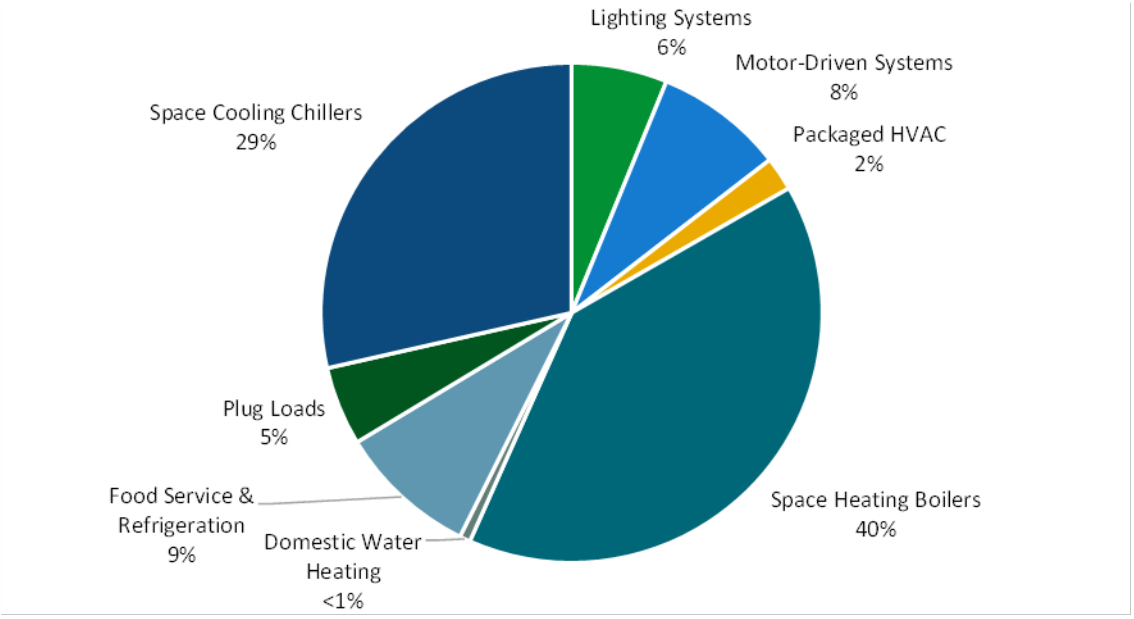


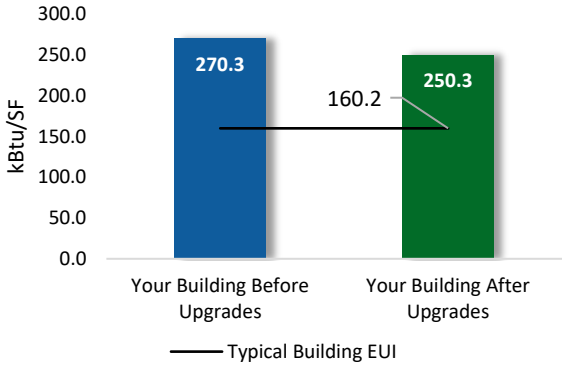
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

This energy audit considered a range of potential energy improvements in your building. Costs and savings will vary between improvements. Presented below are two potential scopes of work for your consideration.

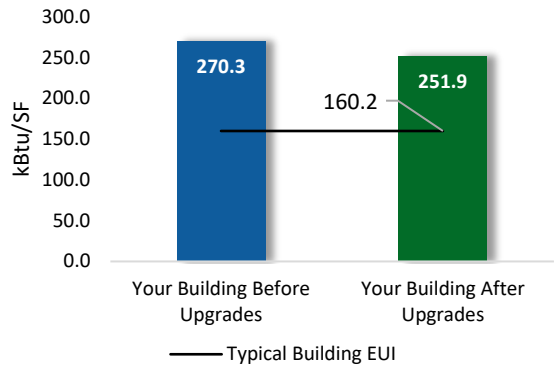
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$484,003
Potential Rebates & Incentives[1]	$38,780
Annual Cost Savings	$98,926
Annual Energy Savings	Electricity: 650,025 kWh Natural Gas: 7,269 Therms
Greenhouse Gas Emission Savings	370 Tons
Simple Payback	4.5 Years
Site Energy Savings (all utilities)	7%



Scenario 2: Cost Effective Package[2]

Installation Cost	$247,186
Potential Rebates & Incentives	$32,659
Annual Cost Savings	$94,053
Annual Energy Savings	Electricity: 621,493 kWh Natural Gas: 5,779 Therms
Greenhouse Gas Emission Savings	347 Tons
Simple Payback	2.3 Years
Site Energy Savings (all utilities)	7%



On-site Generation Potential

Photovoltaic	Medium
Combined Heat and Power	None

[1] Incentives are based on current SmartStart Prescriptive incentives. Other program incentives may apply.

[2] A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**321,428**	**23.7**	**-60**	**$47,016**	**$52,620**	**$6,347**	**$46,273**	**1.0**	**316,673**
ECM 1	Install LED Fixtures	Yes	3,458	0.0	0	$509	$2,399	$300	$2,099	4.1	3,483
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	13,847	1.1	-3	$2,024	$2,823	$290	$2,533	1.3	13,605
ECM 3	Retrofit Fixtures with LED Lamps	Yes	304,123	22.6	-57	$44,484	$47,398	$5,757	$41,641	0.9	299,586
Lighting Control Measures			**60,139**	**3.1**	**-7**	**$8,815**	**$26,291**	**$14,250**	**$12,041**	**1.4**	**59,710**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	23,772	1.9	-5	$3,475	$12,116	$1,475	$10,641	3.1	23,356
ECM 5	Install High/Low Lighting Controls	Yes	36,368	1.1	-2	$5,340	$14,175	$12,775	$1,400	0.3	36,354
Motor Upgrades			**5,577**	**0.6**	**0**	**$821**	**$10,972**	**$0**	**$10,972**	**13.4**	**5,616**
ECM 6	Premium Efficiency Motors	No	5,577	0.6	0	$821	$10,972	$0	$10,972	13.4	5,616
Variable Frequency Drive (VFD) Measures			**165,053**	**19.1**	**60**	**$24,553**	**$276,339**	**$11,900**	**$264,439**	**10.8**	**173,196**
ECM 7	Install VFD on Variable Air Volume (VAV) Fans	Yes	44,449	7.2	0	$6,539	$17,084	$2,350	$14,734	2.3	44,760
ECM 8	Install VFDs on Constant Volume (CV) Fans	Yes	35,583	6.1	0	$5,235	$28,300	$2,450	$25,850	4.9	35,832
ECM 9	Install VFDs on Heating Water Pumps	No	21,100	5.1	0	$3,104	$207,905	$3,750	$204,155	65.8	21,248
ECM 10	Install VFDs on Kitchen Hood Fan Motors	Yes	62,067	0.3	60	$9,402	$16,269	$3,200	$13,069	1.4	69,489
ECM 11	Install VFDs on Condensate Pumps	No	1,854	0.3	0	$273	$6,781	$150	$6,631	24.3	1,867
Unitary HVAC Measures			**7,603**	**1.7**	**0**	**$1,118**	**$11,695**	**$525**	**$11,170**	**10.0**	**7,656**
ECM 12	Install High Efficiency Air Conditioning Units	Yes	7,603	1.7	0	$1,118	$11,695	$525	$11,170	10.0	7,656
HVAC System Improvements			**0**	**0.0**	**5**	**$22**	**$43**	**$12**	**$31**	**1.4**	**557**
ECM 13	Install Pipe Insulation	Yes	0	0.0	5	$22	$43	$12	$31	1.4	557
Domestic Water Heating Upgrade			**0**	**0.0**	**149**	**$676**	**$11,159**	**$2,221**	**$8,938**	**13.2**	**17,440**
ECM 14	Install Low-Flow DHW Devices	No	0	0.0	149	$676	$11,159	$2,221	$8,938	13.2	17,440
Food Service & Refrigeration Measures			**36,198**	**3.2**	**0**	**$5,325**	**$38,573**	**$3,525**	**$35,048**	**6.6**	**36,451**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	5,819	0.6	0	$856	$7,583	$1,000	$6,583	7.7	5,860
ECM 16	Refrigeration Controls	Yes	10,182	0.2	0	$1,498	$14,830	$825	$14,005	9.3	10,253
ECM 17	Replace Refrigeration Equipment	Yes	17,094	2.0	0	$2,515	$15,241	$1,600	$13,641	5.4	17,213
ECM 18	Vending Machine Control	Yes	3,103	0.4	0	$456	$920	$100	$820	1.8	3,124
Custom Measures			**54,026**	**0.0**	**581**	**$10,581**	**$56,311**	**$0**	**$56,311**	**5.3**	**122,381**
ECM 19	Retro-Commissioning Study	Yes	24,186	0.0	313	$4,980	$37,511	$0	$37,511	7.5	61,056
ECM 20	Sub Metering	Yes	29,840	0.0	267	$5,601	$18,800	$0	$18,800	3.4	61,325
TOTALS (COST EFFECTIVE MEASURES)			**621,493**	**45.3**	**578**	**$94,053**	**$247,186**	**$32,659**	**$214,527**	**2.3**	**693,509**
TOTALS (ALL MEASURES)			**650,025**	**51.3**	**727**	**$98,926**	**$484,003**	**$38,780**	**$445,223**	**4.5**	**739,680**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 2 – Evaluated Energy Improvements

For more detail on each evaluated energy improvement and a break out of cost-effective improvements, see **Section 4: Energy Conservation Measures**.

1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decisions to make, such as:

- How will the project be funded and/or financed?
- Is it best to pursue individual ECMs, groups of ECMs, or use a comprehensive approach where all ECMs are installed together?
- Are there other facility improvements that should happen at the same time?

Pick Your Installation Approach

New Jersey's Clean Energy Programs give you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives before purchasing materials or starting installation.

The potential ECMs identified for this building likely qualify for multiple incentive and funding programs. Based on current program rules and requirements, your measures are likely to qualify for the following programs:

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	x		x
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x
ECM 3	Retrofit Fixtures with LED Lamps	x		x
ECM 4	Install Occupancy Sensor Lighting Controls	x		x
ECM 5	Install High/Low Lighting Controls	x		x
ECM 6	Premium Efficiency Motors			x
ECM 7	Install VFD on Variable Air Volume (VAV) Fans	x		x
ECM 8	Install VFDs on Constant Volume (CV) Fans	x		x
ECM 9	Install VFDs on Heating Water Pumps	x		x
ECM 10	Install VFDs on Kitchen Hood Fan Motors	x		x
ECM 11	Install VFDs on Condensate Pumps	x		x
ECM 12	Install High Efficiency Air Conditioning Units	x		x
ECM 13	Install Pipe Insulation	x		x
ECM 14	Install Low-Flow DHW Devices	x		x
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	x		x
ECM 16	Refrigeration Controls	x		x
ECM 17	Replace Refrigeration Equipment	x		x
ECM 18	Vending Machine Control	x		x
ECM 19	Retro-Commissioning Study			
ECM 20	Sub Metering			

Figure 3 – Funding Options

New Jersey's Clean Energy Programs At-A-Glance

	SmartStart Flexibility to install at your own pace	**Direct Install** Turnkey installation	**Pay for Performance** Whole building upgrades
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Incentives are paid out in three installments. The first installment is meant to help offset the costs of the initial engineering study. The subsequent incentives are paid based on the level of energy savings up to 50% of the total project cost. See Section 7.3 for all incentive details.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.

Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.

Individual Measures with SmartStart

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70 percent of the cost of selected measures. Direct Install contractors will assess and verify individual measure eligibility and, in most cases, they perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Whole Building Approach with Pay for Performance

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15 percent energy savings, where lighting cannot make up the majority of the savings.

More Options from Around the State

Financing and Planning Support with the Energy Savings Improvement Program (ESIP)

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the ESIP. Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

Resiliency with Return on Investment through Combined Heat & Power (CHP)

The CHP program provides incentives for combined heat and power (aka cogeneration) and waste heat to power projects. Combined heat and power systems generate power on-site and recover heat from the generation system to meet on-site thermal loads. Waste heat to power systems use waste heat to generate power. You will work with a qualified developer who will design a system that meets your building's heating and cooling needs.

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce electric demand during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Eickhoff Hall. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

2.1 Site Overview

On November 12, 2020, TRC performed an energy audit at The College of New Jersey's Eickhoff Hall located in Ewing, New Jersey. TRC met with Bryan Gibbons to review the facility operations and help focus our investigation on specific energy-using systems.

Eickhoff Hall is a three-story, 147,100 square foot building built in 1992. Spaces include a store, a dining hall, a commercial kitchen, residential dorm and apartment rooms, conference rooms, offices, medical exam rooms, small kitchenettes, laundry rooms, a loading dock, lounges, laboratories, test rooms, storage rooms, closets, rest rooms, vestibules, lobbies, hallways, corridors, stairwells, electrical rooms, and mechanical spaces. The information about the equipment in the Health Services office and residential apartments have been estimated based on similar rooms and building drawings due to lack of accessibility during the site visit.

Facility concerns include installing utility sub-meters, which is addressed in Section 4.

2.2 Building Occupancy

The facility is occupied from September through June. Typical weekday occupancy is 145 staff and 969 students.

The typically occupancy of this site is 24 hours per day, 7 days per week during the school year because it is a residence hall.

Building Name	Weekday/Weekend	Operating Schedule
Eickhoff Hall	Weekday	24/7
	Weekend	24/7
	Summer	Varies

Figure 4 - Building Occupancy Schedule

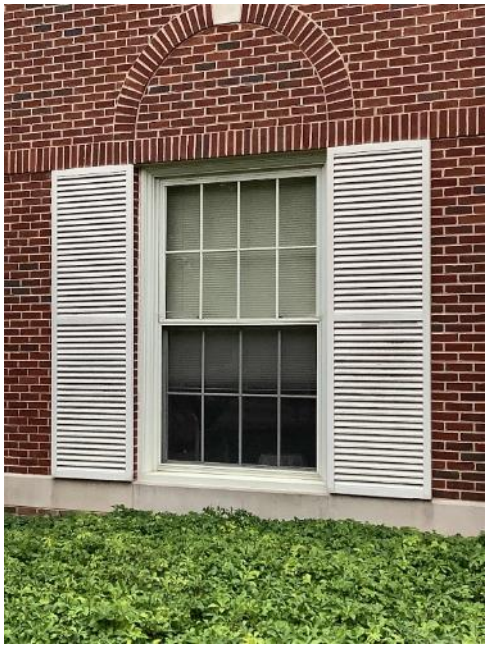
2.3 Building Envelope

Building walls are concrete masonry units over structural steel with a brick facade. Most of the roof is flat, insulated, and covered with grey single-ply membrane. Other sections of the roof are pitched and covered in copper standing steam or synthetic slate tile roofing. The overall roof is in fair condition.

Most of the windows are double-pane, clear, either operable or fixed, and have aluminum frames with insulating glass. Most windows have internal shading. The glass-to-frame seals are in fair condition. The operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have steel frames and are in fair condition with undamaged door seals.

Building Envelope

Roof Material



Exterior Window

Exterior Door

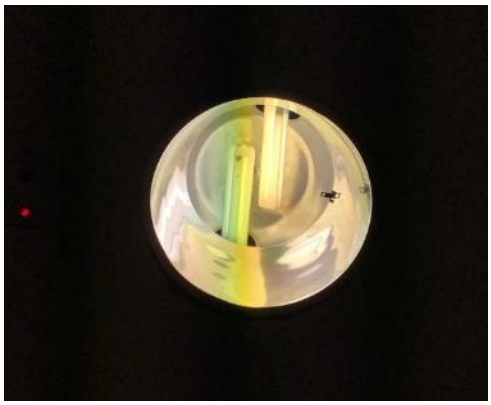
2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 40-Watt T12 fixtures and 85-W T12 high-output fixtures. Additionally, there are some compact fluorescent lamps , incandescent, halogen incandescent, LED general purpose lamps and fixtures, and T5 fluorescent lamps. Typically, T5 and T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 1- 2- 3- or 4-lamp, 2- 3- 4- or 8-foot long troffer, recessed, and surface mounted fixtures. Additionally, there are some other fixture types including: recessed can, cove mounted, panel, wall wash, pendent mounted, ceiling mounted, kitchen hood, wall mounted, track lighting, and 2-foot fixtures with U-bend tube lamps.

Most fixtures are in fair condition. Interior lighting levels were generally sufficient.

All exit signs are LED.



Recessed Can Fixture

Pendent Mounted Fixtures

Recessed Troffer Fixture

LED Wall Mounted Fixture

Lighting fixtures in hallways are controlled by a timeclock that operates those fixtures from 5:00 AM to 11:00 PM.

Most lighting fixtures are controlled manually with wall switches and the remainder by occupancy sensors. The dining room is equipped with a multiple load lighting control switching system.

Dining Hall Lighting Control

Exterior fixtures include wall packs, under canopy recessed fixtures, arm mounted fixtures, pole mounted fixtures, and pendent mounted fixtures, with high intensity discharge (HID), CFL, and LED lamps. Exterior fixtures are timeclock controlled. The pole mounted flood fixtures have LED lamps and are controlled through a central campus timeclock.

The parking garage fixtures incorporates recessed CFL lamps and LED wall packs. They operate continuously.

Wall Pack

Pendent Mounted Fixture

Pole Mounted Fixture

Arm Mounted Fixture

2.5 Air Handling Systems

Fan Coil Units and Radiant Units

Fan coil units are located above each of the four laundry rooms, each equipped with hot water coils, chilled water coils, and fractional hp supply fan motors. They are controlled by individual thermostats in each location. There are also four fan coil units located in the hallway and mechanical rooms equipped with hot water coils and a fractional hp supply fan motor. The loading dock hallway is also heated by a fan coil unit equipped with a fractional hp supply fan motor and an electric resistance heater estimated to have a heating capacity of about 17.06-MBh.

Throughout the building, the perimeter is heated using hot water baseboard radiant heaters. There are also variable air volume (VAV) boxes throughout the building in the ceilings equipped with hot water coils.

Additionally, radiant piping in the ceiling provides each residential dorm with heating and cooling via chilled water and hot water coils. The dorm rooms in the interior section of the building are cooled by the building chiller mounted on the roof while the dorm rooms on the perimeter of the building are served by the Power House/Cogen Building chillers.

Each of these systems is controlled by the energy management system (EMS).

Unit Ventilators and Cabinet Unit Heaters

Unit ventilators located in several residential dorm rooms and lounges are equipped with fractional hp supply fan motors, hot water coils, and chilled water coils.

The many cabinet unit heaters located in hallways and mechanical rooms throughout the building are equipped with fractional hp supply fan motors and hot water coils.

The heating, ventilation, and air conditioning (HVAC) system is partially pneumatically controlled while other equipment is subject to direct digital control though the EMS. A two motor, 3.0 hp air compressor located in the mechanical room serves the pneumatic system.

Unitary Electric HVAC Equipment

There is one split system air conditioning (AC) unit serving the dish room. This Trane unit has a cooling capacity of 5.0-tons with an estimated efficiency of 9.28 energy efficiency rating (EER), after de-rating. De-rating equipment's efficiency allows to more accurate represent the current efficiency of the unit based on its age and condition.

There are also three ductless mini-split system ACs serving various IT rooms throughout the building. Two of these units are Sanyo ductless mini-split ACs with a 0.75-ton cooling capacity and a 16.00 SEER cooling efficiency. There is also a 1.0-ton Sanyo ductless mini-split AC with a cooling capacity of 9.46 SEER, after de-rating.

Sanyo Ductless Mini-Split System ACs

Trane Split System AC

Heating Recovery Units

There are several heating recovery units (HRUs) located on the roof that condition various parts of the building. Each HRU is equipped with a VFD controlled supply fan motor, VFD controlled exhaust fan motor, chilled water coils, hot water coils, an outdoor air damper, and an enthalpy wheel. The chilled water to these units is supplied by the Power House/Cogen Building chillers. Each of these units serves a different section of the second and third floor dorm rooms, with the specific locations noted below:

Area Served	Unit Tag	Supply Fan Motor (HP)	Exhaust Fan Motor (HP)
West	HRU-3	1.5	1.0
North West	HRU-4	3.0	1.0
North West	HRU-5	1.5	1.0
North East	HRU-6	1.5	1.0
East	HRU-7	1.5	1.0
East	HRU-8	1.5	1.0
South East	HRU-9	3.0	1.0
South	HRU-10	1.5	1.0

Air Handling Units (AHUs)

Several areas of this building are conditioned by AHUs equipped with supply fan motors, hot water coils, chilled water coils, outdoor air dampers, and economizers. The chilled water to these units is supplied by the Power House/Co0gen Building chillers. Some of these units are also equipped with return fan motors. AHU-6A and AHU-6B are both interlocked with different kitchen exhaust fan motors, so when the exhaust fans operate, these units also run. The AHUs are controlled by the facility EMS. Additional information about each unit is provided below:

Area Served	Unit Tag	Supply Fan Motor (HP)	Return Fan Motor (HP)	VFD?
Health Services	AHU-1	10.0	1.5	Yes
Women's Study Offices & Health Center Exam Rooms	AHU-2	5.0	1.5*	Yes
Convenience Store & S/E Dining	AHU-3	10.0	1.5	No
North Offices	AHU-4	7.5	3.0	Yes
N/E Dining & Conference	AHU-5	10.0	1.5	No
Bakery	AHU-6A	3.0*	10.0 (KX-1)	No
Kitchen	AHU-6B	5.0*	15.0 (KX-2)	No
Dining Hall 169	AHU-7	5.0*	-	No
Dining Area	AHU-8	30.0	-	Yes
Dining Area	AHU-9	30.0	-	Yes

*Please note that the motors marked with an asterisk have been estimated due to lack of accessibility during the site visit.

AHU-2

AHU-4

AHU-5

AHU-1

2.6 Steam System

Steam is supplied by boilers and the cogeneration heat recovery system located in the Power House/Cogen Building. Steam is used in this building to produce space heating water and domestic hot water through steam heat exchangers. Space heating water is circulated to baseboard radiant heaters, cabinet unit heaters, fan coil units, VAV boxes, unit ventilators, air handling units, and heat recovery units by three constant speed 15.0 hp heating hot water pumps all on a lead/lag control scheme.

There are also two 1.5 hp hot water pumps used for the re-heat system and two fractional hp hot water pumps used for circulation. Domestic hot water is circulated throughout the building by six fractional hp, constant speed DHW circulation pumps. Additionally, there are two 1.5 hp constant speed condensate pumps. Energy use associated with producing steam was allocated to individual buildings served by the cogeneration system and boilers. Please see the Power House/Cogen building report for details regarding the steam system.

Heat Exchanger for Baseboard Perimeter Heating

Heat Exchanger for AHUs and HRUs

Heating Hot Water Pump

Condensate Pumps

2.7 Chilled Water Systems

Chilled water is partially supplied by chillers located in the Power House/Cogen Building. Energy use associated with the steam engine and electric chillers used to produce chilled water was allocated to the individual buildings served by the chiller plant. The chilled water produced by the Power House/Cogen Building serves the chilled water coils in the AHUs and HRUs; however, the interior dorm rooms chilled water is supplied by the rooftop chiller located at Eickhoff Hall.

The chiller located on the roof of this site is a Carrier variable speed, air-cooled scroll chiller with a cooling capacity of 30.0-tons. According to site personnel, this chiller runs for most of the year. Chilled water from this unit is circulated by a 3.0 hp constant speed chilled water pump.

Site staff indicated that since the chilled water system plant shifted from tertiary to secondary distribution, the three constant speed 25.0 hp building chilled water pumps linked to the main chilled water plant are not used. Chilled water is provided by the chilled water pumps located at the Power House/Cogen Building.

Please see the Power House/Cogen Building report for details regarding the chiller plant.

Eickhoff Air-Cooled Chiller

Chilled Water Pumps

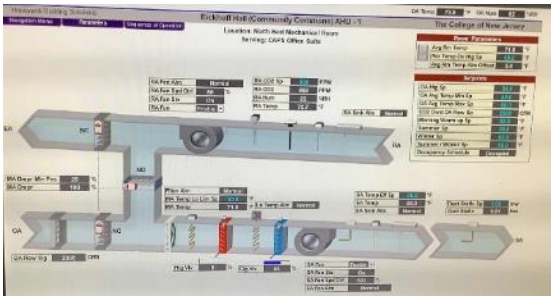
Chilled Water Pump

2.8 Building EMS

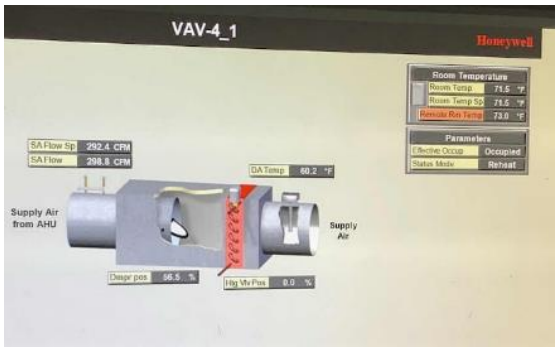
A Honeywell EMS controls the air handling units, the rooftop chiller, exhaust fans, heat recovery units, VAV boxes, kitchen hood fan motors, heating hot water loop, chilled water loop, radiant heaters, pumps, fan coil units, and domestic hot water system. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, return air temperatures, temperature setpoints, CO2 levels, humidity, supply fan motor operation status and speed, return fan motor operation status and speed, exhaust fan motor operation status and speed, outdoor air damper position, heating or cooling status, economizer operation status, hot water pump operation status, heating water loop temperatures, chilled water pump operation status, chilled water loop temperatures, domestic hot water pump operation status, and domestic hot water loop temperatures.

The site staff is pleased with the current EMS, but we are recommending that a retro-commissioning study to be performed, which is addressed in Section 4.

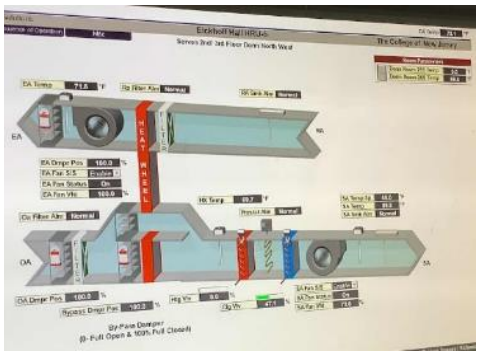
Eickhoff Hall Equipment EMS Display



AHU-1 EMS Display



VAV Box EMS Display



HRU-5 EMS Display

2.9 Domestic Hot Water

Hot water is produced by three heat exchangers using steam from the Power House/Cogen Building's space heating boilers.

At the time of the site visit, the domestic water heaters were set to supply hot water at approximately 134°F.

Six fractional hp circulation pumps distribute water to end uses. The circulation pumps operate continuously.

The domestic hot water pipes are partially insulated, and the insulation is in fair condition.

DHW Heat Exchanger

DHW Heat Exchanger

DHW Heat Exchanger

DHW Circulation Pumps

2.10 Food Service Equipment

The kitchen has a mix of gas and electric equipment that is used to prepare meals for students and staff. Most cooking is done using several electric convection ovens, gas-fired convection ovens, electric and gas-fired griddles, and gas-fired steamers. Bulk prepared foods are held in several electric holding cabinets. Most equipment is not high efficiency and is in fair condition.

There is also a large gas-fired pizza oven and a chicken rotisserie.

The dishwasher is an ENERGY STAR® high temperature, multi-tank conveyor type unit. There is an electric booster water heater rated at 18.0 kW.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Gas-Fired Griddle

Gas-Fired Convection Ovens

Gas-Fired Pizza Oven

Chicken Rotisserie

2.11 Refrigeration

The kitchen, dining areas, and C-store have several stand-up refrigerators with a mixture of solid and glass doors. There are also several stand-up freezers, some with solid and some with glass doors. Most equipment is standard efficiency and in fair condition.

The C-store and dining hall have several reach-in coolers estimated to range in cooling capacity from 0.12-tons to 0.27-tons. Each is estimated to have one evaporator fan.

There is one walk-in refrigerator located in the C-store with an estimated 1.77-ton compressor located in the mechanical room and a four-fan evaporator. The kitchen has four walk-in refrigerators. Two of these walk-ins (Walk-In #2 & #4) have estimated 0.92-ton compressors, and two-fan evaporators. The other two walk-ins have estimated 0.58-ton compressors located in the mechanical room. One of these has a single fan evaporator (Walk-In #3), while the other has a two-fan evaporator (Walk-In #1). None of these units have any known controls.

The kitchen has two walk-in medium temperature freezers (Walk-In #5 & #6). Walk-In #5 has an estimated 0.97-ton compressor located in the mechanical room and a four-fan evaporator. This walk-in has a manual heater control. Walk-In #6 has an estimated 2.33-ton compressor located in the mechanical room and a six-fan evaporator. This unit has no known controls.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high efficiency food service equipment.

Walk-In Refrigerator

C-Store Walk-In Refrigerator Evaporator

Walk-In Freezer

Walk-In Freezer Evaporator Fans

2.12 Plug Load and Vending Machines

You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as energy efficient best practices.

There are approximately 44 computer workstations throughout the facility. Plug loads throughout the building include general café, residential, and office equipment. There are typical loads such as dehumidifiers, electric space heaters, fans, microwaves, paper shredders, printers, mini fridges, speakers, TVs, toasters, toaster ovens, water coolers, and server closets.

There are also residential typical loads such as clothes washers, clothes dryers, undercounter dishwashers, and electric stovetops. There are also several medical equipment loads that were estimated. This equipment is located in the Health Services office, which we did not have access to during the site visit.

There are also commercial kitchen typical loads such as commercial coffee machines, hot drink machines, countertop freezers, milk shake mixers, hot dog warmers, warming tables, milk dispensers, undercounter refrigerators, fruit flavored water dispensers, refrigerated tables, bug lights, mixers, deli slicers, ice cream machines, pizza presses, soup warmers, soda dispensers, panini presses, food processors, hot plates, countertop ovens, dough presses, and a dish conveyor.

There are several residential style refrigerators throughout the building, some are used to store personal food and beverage items and some are used to store medial and laboratory items. These vary in condition and efficiency.

There are two refrigerated beverage vending machines and two non-refrigerated vending machines. Vending machines are/not equipped with occupancy-based controls.

Commercial Coffee Machine

Bug Light

Soda Dispenser

Clothes Dryers

2.13 Water-Using Systems

There are 10 restrooms, outside of the residential dorm rooms which each have their own rest room, with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher.

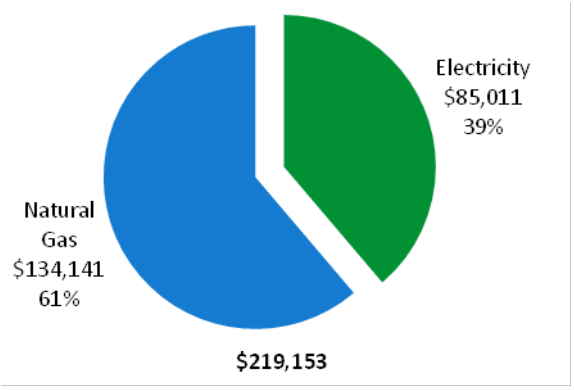
There are many restrooms with showers and showerheads are rated at 2.5 gpm.

Residential Dorm Room Showerhead

3 Energy Use and Costs

Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	2,984,035 kWh	$85,011
Natural Gas	295,778 Therms	$134,141
Total		**$219,153**



An energy balance identifies and quantifies energy use in your various building systems. This can highlight areas with the most potential for improvement. This energy balance was developed using calculated energy use for each of the end uses noted in the figure.

The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated energy use is then compared to the historical energy use and the initial inputs are revised, as necessary, to balance the calculated energy use to the historical energy use.

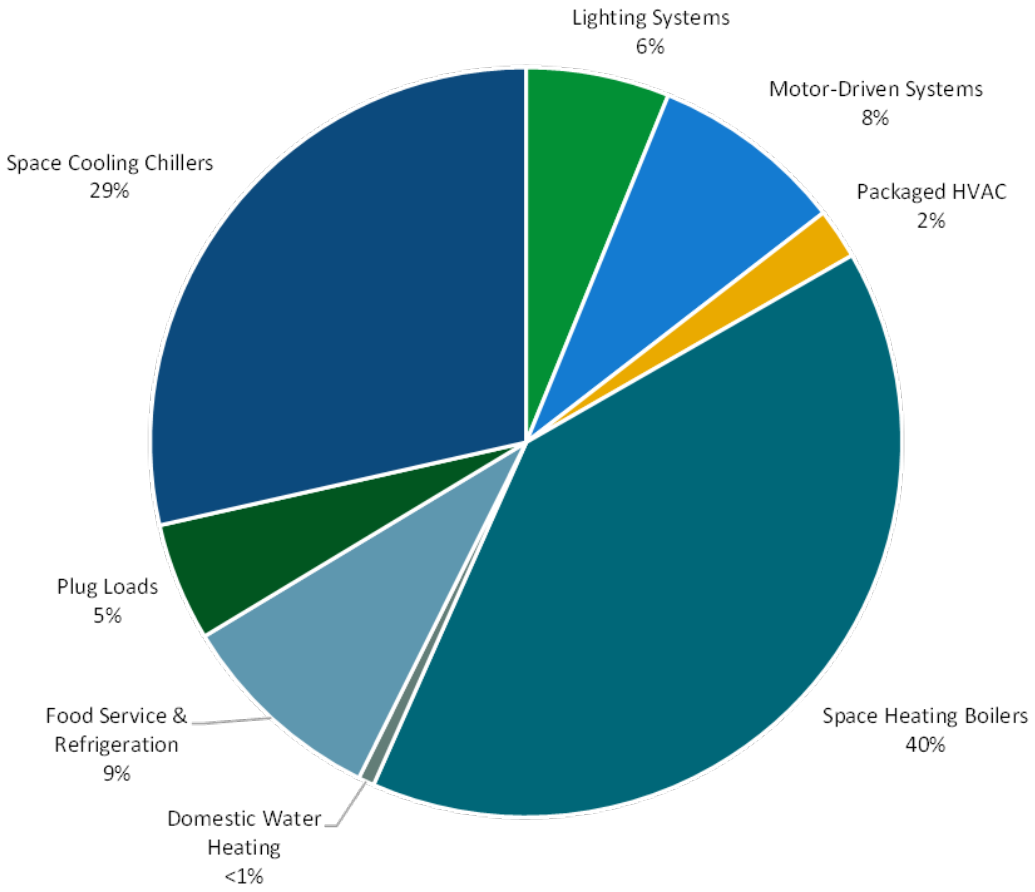
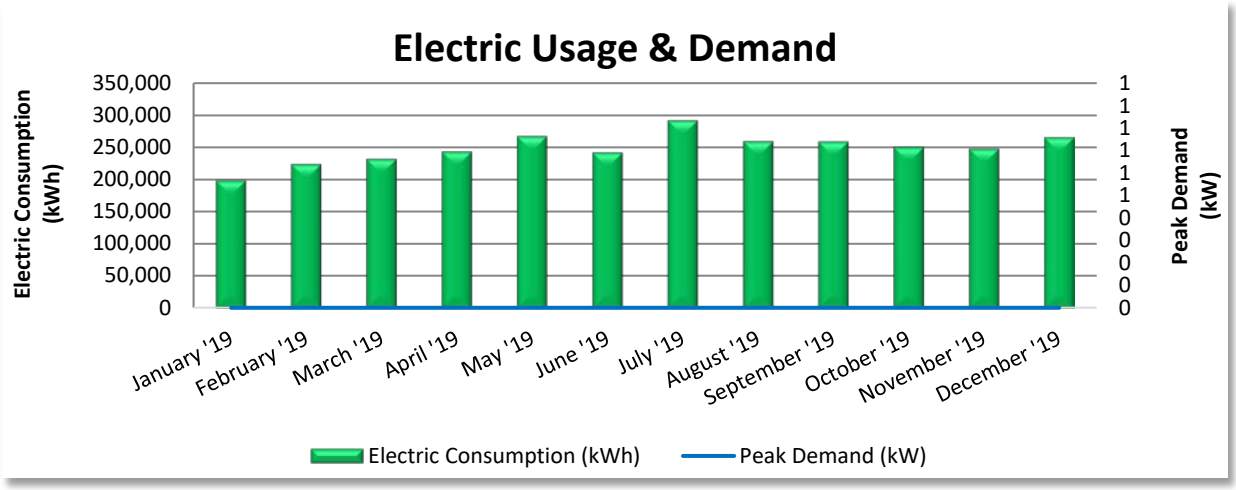


Figure 5 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class High Tension Service (HTS). Electricity for the building is supplemented by the cogeneration plant.



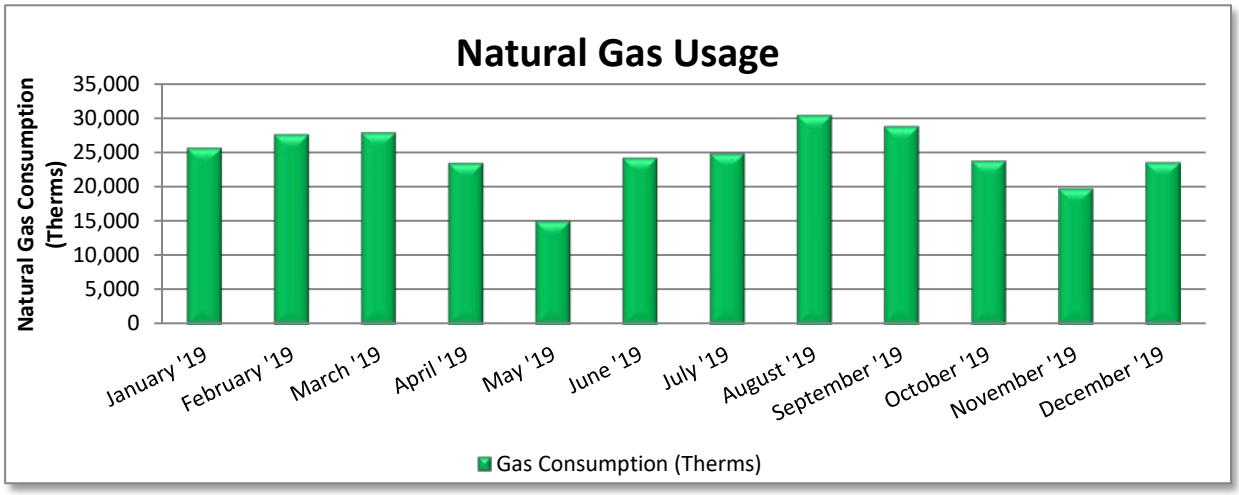
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
1/28/19	31	198,744	0	$0	$4,337	Yes
2/28/19	31	224,314	0	$0	$5,519	Yes
3/28/19	28	232,049	0	$0	$5,045	Yes
4/28/19	31	243,803	0	$0	$5,488	Yes
5/29/19	31	267,758	0	$0	$9,873	Yes
6/27/19	29	241,940	0	$0	$7,688	Yes
7/29/19	32	292,115	0	$0	$10,530	Yes
8/27/19	29	259,463	0	$0	$7,366	Yes
9/26/19	30	259,323	0	$0	$8,066	Yes
10/25/19	29	250,597	0	$0	$6,955	Yes
11/25/19	31	248,218	0	$0	$5,997	Yes
12/11/19	33	265,711	0	$0	$8,147	Yes
Totals	**365**	**2,984,035**	**0**	**$0**	**$85,011**	
Annual	**365**	**2,984,035**	**0**	**$0**	**$85,011**	

Notes:

- Electric data has been estimated based on a campus wide approach and utilization of sub metered data. Please refer to the Power House/Cogen Building report for details regarding utility baseline and campus building utility desegregation.
- The peak demand for this facility was unavailable because the building is served with electricity from the master meter.
- The average purchased electric cost over the past 12 months was $0.147/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.
- Effectively all of the electricity generated on-site is used on-site.

3.2 Natural Gas

The following charts provide the total estimated gas usage based on a percentage of the central plant gas use plus the usage associated with a dedicated gas meter that serves this building.

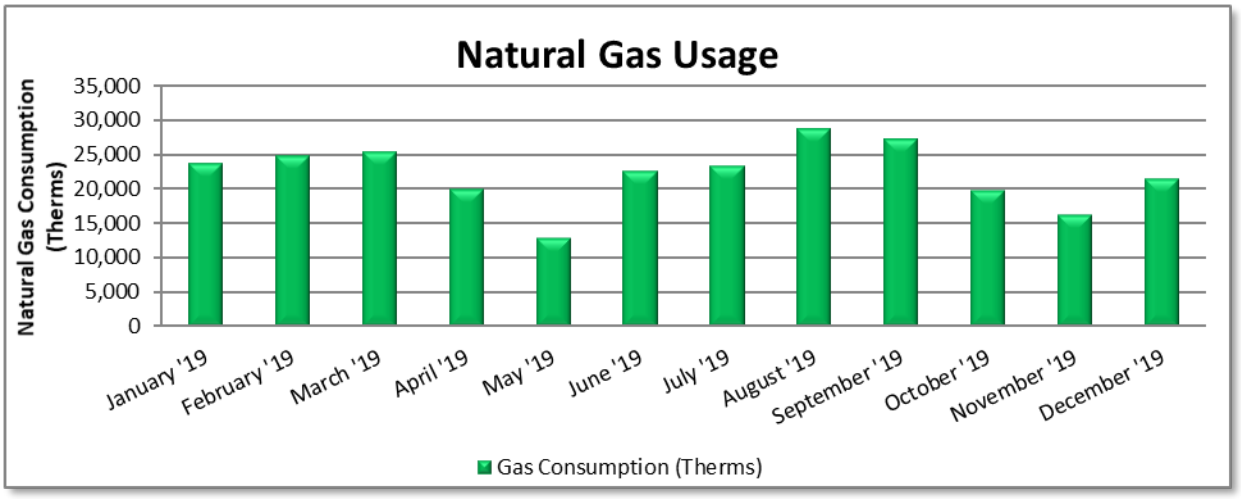


Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
1/31/19	31	25,722	$10,833	Yes
2/28/19	28	27,665	$14,218	Yes
3/31/19	31	27,939	$13,560	Yes
4/30/19	30	23,521	$10,560	Yes
5/31/19	31	15,093	$6,968	Yes
6/30/19	30	24,276	$10,833	Yes
7/31/19	31	24,941	$10,426	Yes
8/31/19	31	30,469	$12,294	Yes
9/30/19	30	28,858	$11,910	Yes
10/31/19	31	23,829	$11,056	Yes
11/30/19	30	19,848	$10,020	Yes
12/31/19	31	23,618	$11,462	Yes
Totals	**365**	**295,778**	**$134,141**	
Annual	**365**	**295,778**	**$134,141**	

- The average gas cost for the past 12 months is $0.454/therm, which is the blended rate used throughout the analysis.

CUP Natural Gas Usage

PSE&G delivers natural gas for the main boiler meter under rate class TSGNF. The following charts represent the central utility plant (CUP) natural gas usage, estimated based on a campus wide approach.



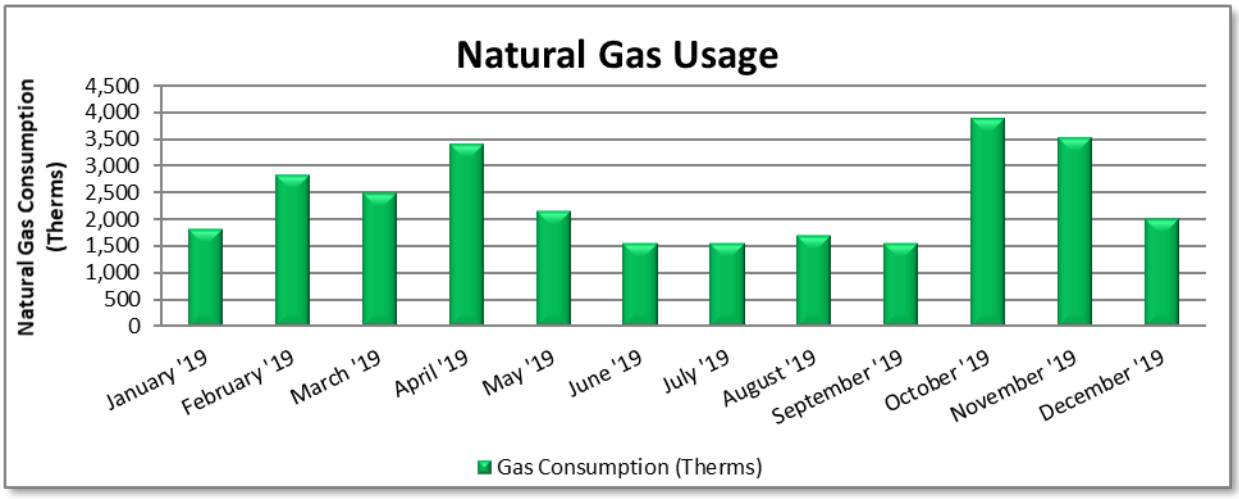
Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
1/31/19	31	23,880	$8,959	Yes
2/28/19	28	24,829	$11,815	Yes
3/31/19	31	25,440	$11,419	Yes
4/30/19	30	20,089	$8,410	Yes
5/31/19	31	12,925	$5,591	Yes
6/30/19	30	22,698	$9,791	Yes
7/31/19	31	23,377	$9,450	Yes
8/31/19	31	28,758	$11,262	Yes
9/30/19	30	27,278	$10,920	Yes
10/31/19	31	19,933	$8,512	Yes
11/30/19	30	16,319	$7,182	Yes
12/31/19	31	21,598	$9,712	Yes
Totals	**365**	**267,124**	**$113,023**	
Annual	**365**	**267,124**	**$113,023**	

Notes:

- Natural gas data has been estimated based on a campus wide approach. Please refer to the Power House/Cogen Building report for details regarding the utility baseline and campus building utility desegregation analysis.
- The average gas cost for the past 12 months for the CUP natural gas is $0.423/therm.

Eickhoff Hall Metered Natural Gas Usage

This is the dedicated natural gas usage from meter 3637360 serving Eickhoff Hall.



Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
1/31/19	31	1,842	$1,874	Yes
2/28/19	28	2,836	$2,403	Yes
3/31/19	31	2,499	$2,141	Yes
4/30/19	30	3,432	$2,150	Yes
5/31/19	31	2,168	$1,377	Yes
6/30/19	30	1,578	$1,042	Yes
7/31/19	31	1,564	$976	Yes
8/31/19	31	1,711	$1,032	Yes
9/30/19	30	1,580	$990	Yes
10/31/19	31	3,896	$2,544	Yes
11/30/19	30	3,529	$2,838	Yes
12/31/19	31	2,020	$1,750	Yes
Totals	**365**	**28,654**	**$21,118**	
Annual	**365**	**28,654**	**$21,118**	

Notes:

- The average gas cost for the past 12 months for the metered natural gas is $0.737/therm.

3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's (EPA) *Portfolio Manager®* software. Benchmarking compares your building's energy use to that of similar buildings across the country, while neutralizing variations due to location, occupancy, and operating hours. Some building types can be scored with a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average and a score of 100 is best.

This ENERGY STAR® benchmarking score provides a comprehensive snapshot of your building's energy performance. It assesses the building's physical assets, operations, and occupant behavior, which is compiled into a quick and easy-to-understand score.

Benchmarking Score	**N/A**

Due to its unique characteristics, this building type is not able to receive a benchmarking score. This report contains suggestions about how to improve building performance and reduce energy costs.

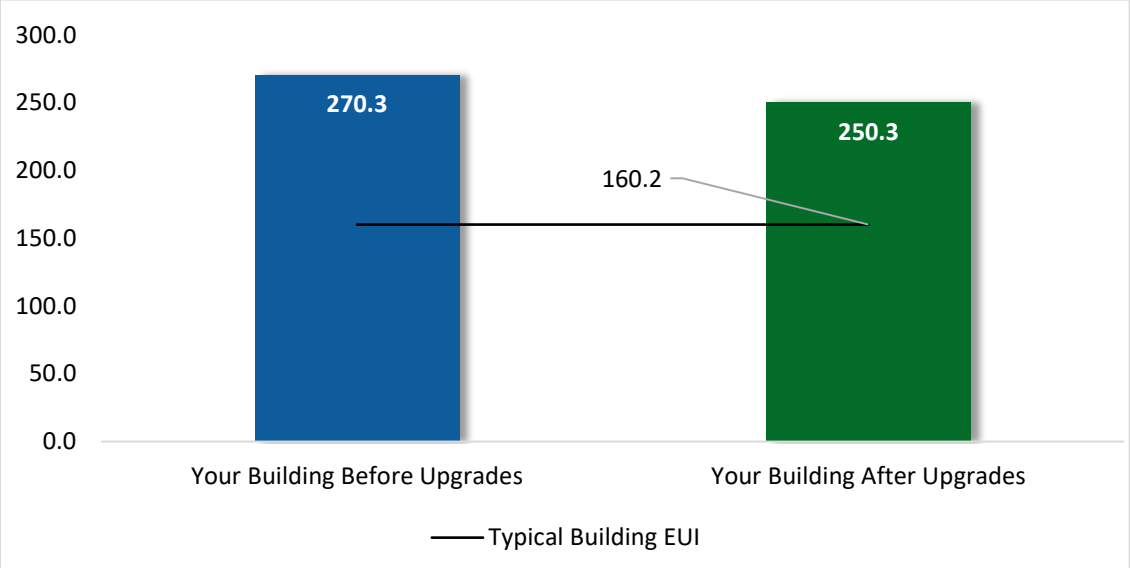


Figure 6 - Energy Use Intensity Comparison[3]

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. A number of factors can cause a building to vary from the "typical" energy usage. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and occupant behavior all contribute to a building's energy use and the benchmarking score.

Benchmarking is provided for The College of New Jersey's campus. Please refer to the Power House/Cogen report for additional details regarding the benchmarking approach within Portfolio Manager®.

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

Keeping track of your energy use on a monthly basis is one of the best ways to keep energy costs in check. Update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance.

We have created a Portfolio Manager® account for your facility and we have already entered the monthly utility data shown above for you. Account login information for your account will be sent via email.

Free online training is available to help you use ENERGY STAR® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[4].

[4] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify and evaluate potential energy efficiency improvements, provide information about the cost effectiveness of those improvements, and recognize potential financial incentives from NJBPU. Most energy conservation measures have received preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

Calculations of energy use and savings are based on the current version of the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances.

Operation and maintenance costs for the proposed new equipment will generally be lower than the current costs for the existing equipment—especially if the existing equipment is at or past its normal useful life. We have conservatively assumed there to be no impact on overall maintenance costs over the life of the equipment.

Financial incentives are based on the current NJCEP prescriptive SmartStart program. A higher level of investigation may be necessary to support any SmartStart Custom, Pay for Performance, or Direct Install incentive applications. Some measures and proposed upgrades may be eligible for higher incentives than those shown below through other NJCEP programs described in a following section of this report.

For a detailed list of the locations and recommended energy conservation measures for all inventoried equipment, see **Appendix A: Equipment Inventory & Recommendations.**

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**321,428**	**23.7**	**-60**	**$47,016**	**$52,620**	**$6,347**	**$46,273**	**1.0**	**316,673**
ECM 1	Install LED Fixtures	Yes	3,458	0.0	0	$509	$2,399	$300	$2,099	4.1	3,483
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	13,847	1.1	-3	$2,024	$2,823	$290	$2,533	1.3	13,605
ECM 3	Retrofit Fixtures with LED Lamps	Yes	304,123	22.6	-57	$44,484	$47,398	$5,757	$41,641	0.9	299,586
Lighting Control Measures			**60,139**	**3.1**	**-7**	**$8,815**	**$26,291**	**$14,250**	**$12,041**	**1.4**	**59,710**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	23,772	1.9	-5	$3,475	$12,116	$1,475	$10,641	3.1	23,356
ECM 5	Install High/Low Lighting Controls	Yes	36,368	1.1	-2	$5,340	$14,175	$12,775	$1,400	0.3	36,354
Motor Upgrades			**5,577**	**0.6**	**0**	**$821**	**$10,972**	**$0**	**$10,972**	**13.4**	**5,616**
ECM 6	Premium Efficiency Motors	No	5,577	0.6	0	$821	$10,972	$0	$10,972	13.4	5,616
Variable Frequency Drive (VFD) Measures			**165,053**	**19.1**	**60**	**$24,553**	**$276,339**	**$11,900**	**$264,439**	**10.8**	**173,196**
ECM 7	Install VFD on Variable Air Volume (VAV) Fans	Yes	44,449	7.2	0	$6,539	$17,084	$2,350	$14,734	2.3	44,760
ECM 8	Install VFDs on Constant Volume (CV) Fans	Yes	35,583	6.1	0	$5,235	$28,300	$2,450	$25,850	4.9	35,832
ECM 9	Install VFDs on Heating Water Pumps	No	21,100	5.1	0	$3,104	$207,905	$3,750	$204,155	65.8	21,248
ECM 10	Install VFDs on Kitchen Hood Fan Motors	Yes	62,067	0.3	60	$9,402	$16,269	$3,200	$13,069	1.4	69,489
ECM 11	Install VFDs on Condensate Pumps	No	1,854	0.3	0	$273	$6,781	$150	$6,631	24.3	1,867
Unitary HVAC Measures			**7,603**	**1.7**	**0**	**$1,118**	**$11,695**	**$525**	**$11,170**	**10.0**	**7,656**
ECM 12	Install High Efficiency Air Conditioning Units	Yes	7,603	1.7	0	$1,118	$11,695	$525	$11,170	10.0	7,656
HVAC System Improvements			**0**	**0.0**	**5**	**$22**	**$43**	**$12**	**$31**	**1.4**	**557**
ECM 13	Install Pipe Insulation	Yes	0	0.0	5	$22	$43	$12	$31	1.4	557
Domestic Water Heating Upgrade			**0**	**0.0**	**149**	**$676**	**$11,159**	**$2,221**	**$8,938**	**13.2**	**17,440**
ECM 14	Install Low-Flow DHW Devices	No	0	0.0	149	$676	$11,159	$2,221	$8,938	13.2	17,440
Food Service & Refrigeration Measures			**36,198**	**3.2**	**0**	**$5,325**	**$38,573**	**$3,525**	**$35,048**	**6.6**	**36,451**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	5,819	0.6	0	$856	$7,583	$1,000	$6,583	7.7	5,860
ECM 16	Refrigeration Controls	Yes	10,182	0.2	0	$1,498	$14,830	$825	$14,005	9.3	10,253
ECM 17	Replace Refrigeration Equipment	Yes	17,094	2.0	0	$2,515	$15,241	$1,600	$13,641	5.4	17,213
ECM 18	Vending Machine Control	Yes	3,103	0.4	0	$456	$920	$100	$820	1.8	3,124
Custom Measures			**54,026**	**0.0**	**581**	**$10,581**	**$56,311**	**$0**	**$56,311**	**5.3**	**122,381**
ECM 19	Retro-Commissioning Study	Yes	24,186	0.0	313	$4,980	$37,511	$0	$37,511	7.5	61,056
ECM 20	Sub Metering	Yes	29,840	0.0	267	$5,601	$18,800	$0	$18,800	3.4	61,325
TOTALS			**650,025**	**51.3**	**727**	**$98,926**	**$484,003**	**$38,780**	**$445,223**	**4.5**	**739,680**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**321,428**	**23.7**	**-60**	**$47,016**	**$52,620**	**$6,347**	**$46,273**	**1.0**	**316,673**
ECM 1	Install LED Fixtures	3,458	0.0	0	$509	$2,399	$300	$2,099	4.1	3,483
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	13,847	1.1	-3	$2,024	$2,823	$290	$2,533	1.3	13,605
ECM 3	Retrofit Fixtures with LED Lamps	304,123	22.6	-57	$44,484	$47,398	$5,757	$41,641	0.9	299,586
Lighting Control Measures		**60,139**	**3.1**	**-7**	**$8,815**	**$26,291**	**$14,250**	**$12,041**	**1.4**	**59,710**
ECM 4	Install Occupancy Sensor Lighting Controls	23,772	1.9	-5	$3,475	$12,116	$1,475	$10,641	3.1	23,356
ECM 5	Install High/Low Lighting Controls	36,368	1.1	-2	$5,340	$14,175	$12,775	$1,400	0.3	36,354
Variable Frequency Drive (VFD) Measures		**142,099**	**13.7**	**60**	**$21,176**	**$61,653**	**$8,000**	**$53,653**	**2.5**	**150,081**
ECM 7	Install VFD on Variable Air Volume (VAV) Fans	44,449	7.2	0	$6,539	$17,084	$2,350	$14,734	2.3	44,760
ECM 8	Install VFDs on Constant Volume (CV) Fans	35,583	6.1	0	$5,235	$28,300	$2,450	$25,850	4.9	35,832
ECM 10	Install VFDs on Kitchen Hood Fan Motors	62,067	0.3	60	$9,402	$16,269	$3,200	$13,069	1.4	69,489
Unitary HVAC Measures		**7,603**	**1.7**	**0**	**$1,118**	**$11,695**	**$525**	**$11,170**	**10.0**	**7,656**
ECM 12	Install High Efficiency Air Conditioning Units	7,603	1.7	0	$1,118	$11,695	$525	$11,170	10.0	7,656
HVAC System Improvements		**0**	**0.0**	**5**	**$22**	**$43**	**$12**	**$31**	**1.4**	**557**
ECM 13	Install Pipe Insulation	0	0.0	5	$22	$43	$12	$31	1.4	557
Food Service & Refrigeration Measures		**36,198**	**3.2**	**0**	**$5,325**	**$38,573**	**$3,525**	**$35,048**	**6.6**	**36,451**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	5,819	0.6	0	$856	$7,583	$1,000	$6,583	7.7	5,860
ECM 16	Refrigeration Controls	10,182	0.2	0	$1,498	$14,830	$825	$14,005	9.3	10,253
ECM 17	Replace Refrigeration Equipment	17,094	2.0	0	$2,515	$15,241	$1,600	$13,641	5.4	17,213
ECM 18	Vending Machine Control	3,103	0.4	0	$456	$920	$100	$820	1.8	3,124
Custom Measures		**54,026**	**0.0**	**581**	**$10,581**	**$56,311**	**$0**	**$56,311**	**5.3**	**122,381**
ECM 19	Retro-Commissioning Study	24,186	0.0	313	$4,980	$37,511	$0	$37,511	7.5	61,056
ECM 20	Sub Metering	29,840	0.0	267	$5,601	$18,800	$0	$18,800	3.4	61,325
TOTALS		**621,493**	**45.3**	**578**	**$94,053**	**$247,186**	**$32,659**	**$214,527**	**2.3**	**693,509**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**321,428**	**23.7**	**-60**	**$47,016**	**$52,620**	**$6,347**	**$46,273**	**1.0**	**316,673**
ECM 1	Install LED Fixtures	3,458	0.0	0	$509	$2,399	$300	$2,099	4.1	3,483
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	13,847	1.1	-3	$2,024	$2,823	$290	$2,533	1.3	13,605
ECM 3	Retrofit Fixtures with LED Lamps	304,123	22.6	-57	$44,484	$47,398	$5,757	$41,641	0.9	299,586

When considering lighting upgrades, we suggest using a comprehensive design approach that simultaneously upgrades lighting fixtures and controls to maximize energy savings and improve occupant lighting. Comprehensive design will also consider appropriate lighting levels for different space types to make sure that the right amount of light is delivered where needed. If conversion to LED light sources are proposed, we suggest converting all of a specific lighting type (e.g. linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

Replace existing fixtures containing HID lamps with new LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

In some cases, HID fixtures can be retrofit with screw-based LED lamps. Replacing an existing HID fixture with a new LED fixture will generally provide better overall lighting optics; however, replacing the HID lamp with a LED screw-in lamp is typically a less expensive retrofit. We recommend you work with your lighting contractor to determine which retrofit solution is best suited to your needs and will be compatible with the existing fixtures.

Maintenance savings may also be achieved since LED lamps last longer than other light sources and therefore do not need to be replaced as often.

Affected building areas: exterior high pressure sodium wall mounted fixtures.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures by removing the fluorescent tubes and ballasts and replacing them with LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures.

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology which use less power than other lighting technologies but provides equivalent lighting output. Maintenance savings may also be achieved since LED tubes last longer than fluorescent tubes and therefore do not need to be replaced as often.

Affected building areas: all areas with fluorescent fixtures with T12 tubes including C-store walk-in refrigerator, faculty dining area, and mechanical room.

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies.

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected building areas: C-store, C-store walk-in refrigerator, third floor corridor, dining hall, faculty dining hall, dish room, lobbies, lounges, hallways, residential dorms 247 and 264, stairwells, parking garage, exterior fixtures, and all areas with fluorescent fixtures with T8 tubes.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**60,139**	**3.1**	**-7**	**$8,815**	**$26,291**	**$14,250**	**$12,041**	**1.4**	**59,710**
ECM 4	Install Occupancy Sensor Lighting Controls	23,959	2.0	-5	$3,502	$12,341	$1,615	$10,726	3.1	23,540
ECM 5	Install High/Low Lighting Controls	36,181	1.1	-2	$5,313	$13,950	$12,635	$1,315	0.2	36,170

Lighting controls reduce energy use by turning off or lowering lighting fixture power levels when not in use. A comprehensive approach to lighting design should upgrade the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 4: Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend that lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

Occupancy sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Most occupancy sensor lighting controls allow users to manually turn fixtures on/off, as needed. Some controls can also provide dimming options.

Occupancy sensors can be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

This measure provides energy savings by reducing the lighting operating hours.

Affected building areas: C-store, conference rooms, faculty dining hall, dish room, laundry rooms, lounges, mail rooms, roof access room, offices, rest rooms, storage rooms, laboratories, and exam rooms.

ECM 5: Install High/Low Lighting Controls

Install occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons.

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety code requirements for egress. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. In parking lots and parking garages with significant ambient lighting, this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylight.

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be considered when selecting retrofit lamps and bulbs for the areas proposed for high/low control. This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected building areas: hallways, lobbies, and parking garage.

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage must be provided to ensure that lights turn on in each area as an occupant approaches.

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**5,577**	**0.6**	**0**	**$821**	**$10,972**	**$0**	**$10,972**	**13.4**	**5,616**
ECM 6	Premium Efficiency Motors	5,577	0.6	0	$821	$10,972	$0	$10,972	13.4	5,616

ECM 6: Premium Efficiency Motors

We evaluated replacing standard efficiency motors with IHP 2014 efficiency motors. This evaluation assumes that existing motors will be replaced with motors of equivalent size and type. In some cases, additional savings may be possible by downsizing motors to better meet the motor's current load requirements.

Affected motors (on next page):

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Elevator Room	Elevator Room	2	Exhaust Fan	0.5	Exhaust Fan Motor (EF-27)
Roof	Building Exhaust	1	Exhaust Fan	0.8	Exhaust Fan Motor (EF-24)
Roof	Building Exhaust	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-7)
Roof	Building Exhaust	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-32)
Roof	Building Exhaust	1	Exhaust Fan	0.3	Exhaust Fan Motor
Roof	Building Exhaust	1	Exhaust Fan	0.3	Exhaust Fan Motor
Roof	Building Exhaust	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-34)
Roof	Building Exhaust	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-33)
Roof	Cafeteria	1	Exhaust Fan	1.0	Exhaust Fan Motor
Roof	Rest Room	1	Exhaust Fan	0.5	Exhaust Fan Motor (EF-11)
Roof	Rest Room	1	Exhaust Fan	0.5	Exhaust Fan Motor (EF-12)
Roof	Fire System	1	Exhaust Fan	1.5	Exhaust Fan Motor (EF-17)
Roof	Hibachi Grill	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-18)
Roof	Cafeteria	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-25)
Roof	Cafeteria	1	Exhaust Fan	0.3	Exhaust Fan Motor
Roof	Crawl Space	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-35)
Roof	Crawl Space	1	Exhaust Fan	0.3	Exhaust Fan Motor (EF-36)
Roof	Bakery	1	Exhaust Fan	1.5	Exhaust Fan Motor (EF-8)
Roof	Dishwasher	1	Exhaust Fan	1.0	Exhaust Fan Motor (EF-9)
Mechanical Room 13	Building Exhaust	1	Exhaust Fan	1.5	Exhaust Fan Motor (EF-15)

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Mechanical Room 2	Mechanical Room 2	1	Exhaust Fan	1.0	Exhaust Fan Motor (EF-14)
Mechanical Room 13	Sewer	2	Other	0.8	Sewer Pumps

Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours. The base case motor energy consumption is estimated using the efficiencies found on nameplates or estimated based on the age of the motor and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the current New Jersey's Clean Energy Program Protocols to Measure Resource Savings.

4.4 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**165,053**	**19.1**	**60**	**$24,553**	**$276,339**	**$11,900**	**$264,439**	**10.8**	**173,196**
ECM 7	Install VFD on Variable Air Volume (VAV) Fans	44,449	7.2	0	$6,539	$17,084	$2,350	$14,734	2.3	44,760
ECM 8	Install VFDs on Constant Volume (CV) Fans	35,583	6.1	0	$5,235	$28,300	$2,450	$25,850	4.9	35,832
ECM 9	Install VFDs on Heating Water Pumps	21,100	5.1	0	$3,104	$207,905	$3,750	$204,155	65.8	21,248
ECM 10	Install VFDs on Kitchen Hood Fan Motors	62,067	0.3	60	$9,402	$16,269	$3,200	$13,069	1.4	69,489
ECM 11	Install VFDs on Condensate Pumps	1,854	0.3	0	$273	$6,781	$150	$6,631	24.3	1,867

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new inverter duty rated motor to conservatively account for the cost of an inverter duty rated motor.

ECM 7: Install VFD on VAV Fans

Replace existing air volume control devices on variable volume fans, such as inlet vanes and variable pitch fan blades, with VFDs. Inlet guide vanes and variable pitch fan blades are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device will be removed or permanently disabled, and the control signal will be redirected to the VFD to determine proper fan motor speed.

Energy savings result from using a more efficient control device to regulate the air flow provided by the fan. Additional maintenance savings may result from this measure. VFDs are solid state electronic devices, which generally requires less maintenance than mechanical air volume control devices.

Affected air handlers: AHU-3 & AHU-5.

ECM 8: Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a VAV system. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor, if the air handler has one.

Zone thermostats signal the VFD to adjust fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

VAV system controls should not raise the supply air temperature at the expense of the fan power. A common mistake is to reset the supply air temperature to achieve chiller energy savings, which can lead to additional air flow requirements. Supply air temperature should be kept low (e.g. 55°F) until the minimum fan speed (typically about 50%) is met. At this point, it is efficient to raise the supply air temperature as the load decreases, but not such that additional air flow and thus fan energy is required.

Energy savings result from reducing the fan speed (and power) when conditions allow for reduced air flow.

Affected air handlers: exhaust fan motors including 1.0 hp cafeteria exhaust fan motor, EF-8, EF-9, EF-13, EF-14 & EF-15 and supply fan motors including AHU-6A, AHU-6B & AHU-7.

ECM 9: Install VFDs on Heating Water Pumps

We evaluated installing variable frequency drives (VFD) to control heating water pumps. Two-way valves must serve the hot water coils and the hot water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the hot water distribution, they will need to be modified when this measure is implemented. As the hot water valves close, the differential pressure increases and the VFD modulates the pump speed to maintain a differential pressure setpoint.

Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

Affected pumps: (2) 1.5 hp re-heating hot water pumps & (3) 15.0 hp heating hot water pumps.

ECM 10: Install VFDs on Kitchen Hood Fan Motors

Install VFDs and sensors to control the kitchen hood fan motors. The air flow of the hood is varied based on two key inputs: temperature and smoke/cooking fumes. The VFD controls the amount of exhaust (and kitchen make-up air) based on temperature—the lower the temperature the lower the flow. If the optic sensor is triggered by smoke or cooking fumes, the speed of the fan ramps up to 100%.

Energy savings result from reducing the hood fan speed (and power) when conditions allow for reduced air flow.

ECM 11: Install VFDs on Condensate Pumps

We evaluated installing VFDs to control the condensate return pumps. The condensate pump flow will have to be controlled to work in conjunction with the boiler feed water pump. The VFD control feedback should be based on a pressure transducer located in the main steam header. Before implementing this measure co-ordinate with the pump and boiler manufacturer.

Energy savings result from reducing the pump motor speed (and power) at reduced condensate flow from the condensate receiver. The magnitude of energy savings is based on the estimated amount of time that the pumping system will operate at reduced load.

4.5 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**7,603**	**1.7**	**0**	**$1,118**	**$11,695**	**$525**	**$11,170**	**10.0**	**7,656**
ECM 12	Install High Efficiency Air Conditioning Units	7,603	1.7	0	$1,118	$11,695	$525	$11,170	10.0	7,656

Replacing the unitary HVAC units has a relatively long payback period and may not be justifiable based simply on energy considerations. However, most of the units are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high efficiency unit can be justified by the marginal savings from the improved efficiency. When the air conditioning units are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 12: Install High Efficiency Air Conditioning Units

Replace standard efficiency split system air conditioning units with high efficiency split system air conditioning units. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling and heating load and the estimated annual operating hours.

Affected units: (1) 5.0-ton split system AC serving the dish room & (1) 1.0-ton ductless mini-split system AC serving the IT room.

4.6 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**0**	**0.0**	**5**	**$22**	**$43**	**$12**	**$31**	**1.4**	**557**
ECM 13	Install Pipe Insulation	0	0.0	5	$22	$43	$12	$31	1.4	557

ECM 13: Install Pipe Insulation

Install insulation on domestic hot water system piping. Distribution system losses are dependent on system fluid temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Affected Systems: domestic hot water piping in mechanical room 13.

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**149**	**$676**	**$11,159**	**$2,221**	**$8,938**	**13.2**	**17,440**
ECM 14	Install Low-Flow DHW Devices	0	0.0	149	$676	$11,159	$2,221	$8,938	13.2	17,440

ECM 14: Install Low-Flow DHW Devices

We evaluated installing low-flow devices to reduce overall hot water demand. The following low flow devices are recommended to reduce hot water usage:

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Showerhead	2.0 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Additional cost savings may result from reduced water usage.

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**36,198**	**3.2**	**0**	**$5,325**	**$38,573**	**$3,525**	**$35,048**	**6.6**	**36,451**
ECM 15	Refrigerator/Freezer Case Electrically Commutated Motors	5,819	0.6	0	$856	$7,583	$1,000	$6,583	7.7	5,860
ECM 16	Refrigeration Controls	10,182	0.2	0	$1,498	$14,830	$825	$14,005	9.3	10,253
ECM 17	Replace Refrigeration Equipment	17,094	2.0	0	$2,515	$15,241	$1,600	$13,641	5.4	17,213
ECM 18	Vending Machine Control	3,103	0.4	0	$456	$920	$100	$820	1.8	3,124

ECM 15: Refrigerator/Freezer Case Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in refrigerators and freezers as well as reach-in refrigerators. Fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By using variable-speed technology, EC motors can optimize fan usage. Because these motors are brushless and use DC power, losses due to friction and phase shifting are eliminated.

Savings for this measure consider both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

Affected units: all walk-in refrigerators and freezers as well as all reach-in refrigerators.

ECM 16: Refrigeration Controls

Install additional controls to optimize the operation of walk-in coolers and freezers.

Defrost controllers can be used to override defrost of evaporator fans when the defrost operation is not necessary, which reduces annual energy consumption. This measure is applicable to existing evaporator fans with a traditional electric defrost mechanism.

Many walk-in coolers and freezers have evaporator fans that run continuously. The measure adds a control system feature to automatically shut off evaporator fans when not needed.

Energy savings for each of the control measures account for reduction in compressor and fan operating hours as well as reduction in the refrigeration heat load as appropriate.

Affected units: all walk-in refrigerators and freezers.

ECM 17: Replace Refrigeration Equipment

Replace existing commercial stand-up freezers with new ENERGY STAR® rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

Affected units: twp stand-up freezers in C-store.

ECM 18: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time, and they power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

4.9 Custom Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Custom Measures		**54,026**	**0.0**	**581**	**$10,581**	**$56,311**	**$0**	**$56,311**	**5.3**	**122,381**
ECM 19	Retro-Commissioning Study	24,186	0.0	313	$4,980	$37,511	$0	$37,511	7.5	61,056
ECM 20	Sub Metering	29,840	0.0	267	$5,601	$18,800	$0	$18,800	3.4	61,325

ECM 19: Retro-Commissioning Study

Due to the complexity of today's HVAC systems and controls a thorough analysis and rebalance of heating, ventilation, and cooling systems should periodically be conducted. There are indications that systems may be not be operating correctly or as efficiently as they could be. One important tool available to building operators to ensure proper system operation is retro-commissioning.

Retro-commissioning is a common practice recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to be implemented every few years. We recommend that you contact a reputable engineering firm that specializes in energy control systems and retro-commissioning. Ask them to propose a scope of work and an outline of the procedures and processes to be implemented, including a schedule and the roles of all responsible parties.

Once goals and responsibilities are established, the objective of the investigation process is to understand how the building is currently operating, identify the issues, and determine the most cost-effective way to improve performance. The retro-commissioning agent will review building documentation, interview building occupants, and inspect and test the equipment. Information is then compiled into a report and shared with facility staff, who will select which recommendations to implement after reviewing the findings.

The implementation phase puts the processes into place. Typical measures may include sensor calibration, equipment schedule changes, damper linkage repair and similar relatively low-cost adjustments -- although more expensive sophisticated programming and building control system upgrades may be warranted. Approved measures may be implemented by the agent, the building staff, or by subcontractors. Typically, a combination of these individuals makes up the retro-commissioning team.

After the approved measures are implemented, the team will verify that the changes are working as expected. Baseline and post-case measurements will allow building staff to monitor equipment and ensure that the benefits are maintained.

A high-level evaluation of potential savings and costs is provided for demonstration purposes only. It is a screening evaluation for the potential in HVAC Control Improvements. Based on industry standards and previous project experience, the potential energy savings may be up to 15% of existing HVAC energy use. The average cost of retro-commissioning studies and control improvements is $0.30 per square foot. Actual savings and costs will need to be outlined by the specific contractor engaged to perform the study. For the purposes of this report, we have conservatively estimated savings to be 2% of the total HVAC energy consumption baseline.

ECM 20: Sub Metering

Facility staff expressed interest in utility sub metering key buildings which are currently served by a master meter and the central plant. Utility submeters alone do not save energy, but they are a useful tool under the right circumstances. Utility sub-meters can provide facility staff with real-time energy use data for specific buildings, information that enhances the potential for greater energy management activities. Revenue grade submeters are a tool that allow owners to bill tenants or departments for the energy consumed in the spaces they occupy. Better resolution on building system performance can lead to occupant behavioral changes which often result in reduced energy use.

A high-level evaluation of potential savings and costs is provided for demonstration purposes only. Based on industry standards and case studies, the potential energy savings may be up to 5% of existing energy usage. For the purposes of this report, a conservative assumed savings of 1% was applied to building allocated electrical and natural gas consumption of the sub metered buildings based on the premise of occupant behavioral changes. For this building the following submeters are proposed: smart electric meter, steam flow meter, and chilled water flow meter. Meter costs for the evaluation are based on average building use across the campus: smart electric meter $2,400, steam flow meter $6,700, and chilled water flow meter $9,700. The actual scope of work and implementation costs must be provided by a contractor in the future. This measure is recommended for implementation based on the initial energy and economic results but primarily for enhancing the potential for greater energy management activities.

5 ENERGY EFFICIENT BEST PRACTICES

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs.

Operation and maintenance (O&M) plans enhance the operational efficiency of HVAC and other energy intensive systems and could save between 5 to 20 percent of the energy usage in your building without substantial capital investment. A successful plan includes your records of energy usage trends and costs, building equipment lists, current maintenance practices, planned capital upgrades, and incorporates your ideas for improved building operation. Your plan will address goals for energy-efficient operation, provide detail on how to reach the goals, and will outline procedures for measuring and reporting whether goals have been achieved.

You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[5] . Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Lighting Maintenance

Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

Lighting Controls

As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming that setpoints and sensitivity are configured properly. Adjust exterior lighting time clock controls seasonally as needed to match your lighting requirements.

[5] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager.

Motor Controls

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Whenever possible, use automatic devices such as twist timers or occupancy sensors to turn off motors when they are not needed.

Motor Maintenance

Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Economizer Maintenance

Economizers can significantly reduce cooling system load. A malfunctioning economizer can increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air. Common economizer malfunctions include broken outdoor thermostat or enthalpy control, or dampers that are stuck or improperly adjusted.

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position.

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save five to ten percent of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

AC System Evaporator/Condenser Coil Cleaning

Dirty evaporator and condenser coils restrict air flow and restrict heat transfer. This increases the loads on the evaporator and condenser fan and decreases overall cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

HVAC Filter Cleaning and Replacement

Air filters should be checked regularly (often monthly) and cleaned or replaced when appropriate. Air filters reduce indoor air pollution, increase occupant comfort, and help keep equipment operating efficiently. If the building has a building management system, consider installing a differential pressure switch across filters to send an alarm about premature fouling or overdue filter replacement. Over time, filters become less and less effective as particulate buildup increases. Dirty filters also restrict air flow through the air conditioning or heat pump system, which increases the load on the distribution fans.

Steam Trap Repair and Replacement

Steam traps are a crucial part of delivering heat from the boiler to the space heating units. Steam traps are automatic valves that remove condensate from the system. If the traps fail closed, condensate can build up in the steam supply side of the trap which reduces the flow in the steam lines and thermal capacity of the radiators. Or they may fail open, allowing steam into the condensate return lines resulting in wasted energy, water and hammering. Losses can be significantly reduced by testing and replacing equipment as they start to fail. Repair or replace traps that are blocked or allowing steam to pass. Inspect steam traps as part of a regular steam system maintenance plan.

Thermostatic Radiator Valve Installations

We recommend investigating the installation of thermostatic control valves for existing radiators. Traditionally radiators have manual valves that are used to control the flow through the radiator. Replacing these manual valves with thermostatic control valves allows for automatic modulation of the steam or hot water flow to maintain the temperature setting. The valve will incrementally close as space temperature increases. This will allow a maximum temperature to be set per area/room. Using thermostatic control valves will result in energy savings by reducing the overheating of spaces throughout the facility.

Water Heater Maintenance

The lower the supply water temperature that is used for hand washing sinks, the less energy is needed to heat the water. Reducing the temperature results in energy savings and the change is often unnoticeable to users. Be sure to review the domestic water temperature requirements for sterilizers and dishwashers as you investigate reducing the supply water temperature.

Also, preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional.
- For electric water heaters, look for signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank.
- For water heaters more than three years old, have a technician inspect the sacrificial anode annually.

Compressed Air System Maintenance

Compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan for compressed air systems should include:

- Inspection, cleaning, and replacement of inlet filter cartridges
- Cleaning of drain traps
- Daily inspection of lubricant levels to reduce unwanted friction
- Inspection of belt condition and tension

- Check for leaks and adjust loose connections
- Overall system cleaning

Contact a qualified technician for help with setting up periodic maintenance schedule.

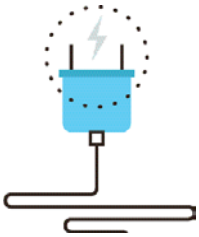
Refrigeration Equipment Maintenance

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between 5 and 10 percent on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[6]. Your local utility may offer incentives or rebates for this equipment.

Water Conservation

Installing dual flush or low-flow toilets and low-flow/waterless urinals are ways to reduce water use. The EPA WaterSense® ratings for urinals is 0.5 gallons per flush (gpf) and for flush valve toilets is 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

For more information regarding water conservation go to the EPA's WaterSense® website[7] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[8] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water

[6] For additional information refer to "Assessing and Reducing Plug and Process Loads in Office Buildings" http://www.nrel.gov/docs/fy13osti/54175.pdf, or "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

[7] https://www.epa.gov/watersense.

[8] https://www.epa.gov/watersense/watersense-work-0.

use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

If the facility has detached buildings with a master water meter for the entire campus, check for unnatural wet areas in the lawn or water seeping in the foundation at water pipe penetrations through the foundation. Periodically check overnight meter readings when the facility is unoccupied, and there is no other scheduled water usage.

Manage irrigation systems to use water more effectively outside the building. Adjust spray patterns so that water lands on intended lawns and plantings and not on pavement and walls. Consider installing an evapotranspiration irrigation controller that will prevent over-watering.

Procurement Strategies

Purchasing efficient products reduces energy costs without compromising quality. Consider modifying your procurement policies and language to require ENERGY STAR® or WaterSense® products where available.

6 On-site Generation

You don't have to look far in New Jersey to see one of the thousands of solar electric systems providing clean power to homes, businesses, schools, and government buildings. On-site generation includes both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) technologies that generate power to meet all or a portion of the facility's electric energy needs. Also referred to as distributed generation, these systems contribute to greenhouse gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, which results in improved electric grid reliability through better use of transmission and distribution systems.

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

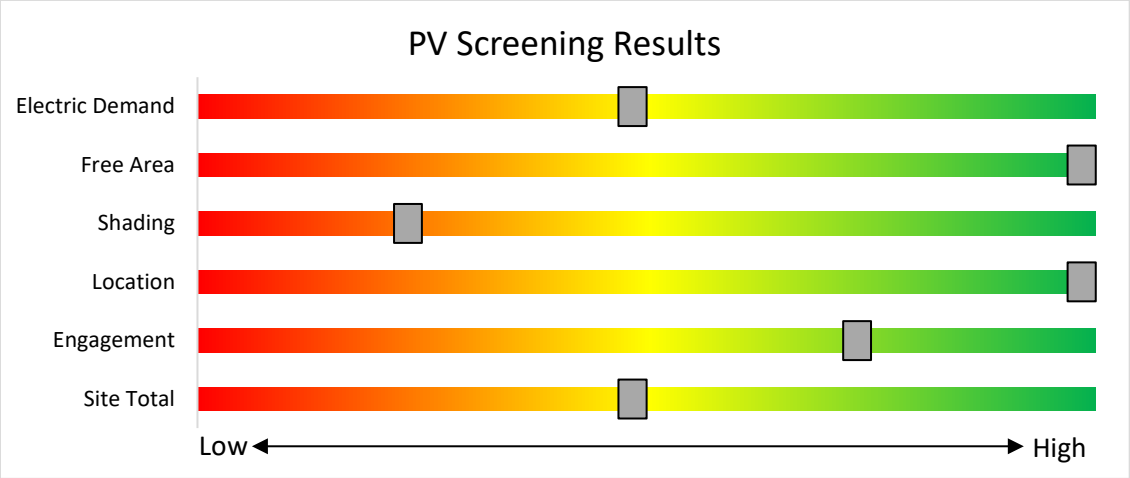
6.1 Solar Photovoltaic

Photovoltaic (PV) panels convert sunlight into electricity. Individual panels are combined into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is then connected to the building's electrical distribution system.

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has **medium** potential for installing a PV array.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the **medium** potential. A PV array located on the roof may be feasible. If you are interested in pursuing the installation of PV, we recommend conducting a full feasibility study.

The graphic below displays the results of the PV potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.



Potential	Medium	
System Potential	121	kW DC STC
Electric Generation	91,046	kWh/yr
Displaced Cost	$13,390	/yr
Installed Cost	$314,600	

Figure 9 - Photovoltaic Screening

Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installation.

Get more information about solar power in New Jersey or find a qualified solar installer who can help you decide if solar is right for your building:

Transition Incentive (TI) Program: https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

- **Basic Info on Solar PV in New Jersey**: www.njcleanenergy.com/whysolar.
- **New Jersey Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs.
- **Approved Solar Installers in the New Jersey Market**: www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1.

6.2 Combined Heat and Power

Combined heat and power (CHP) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for space cooling.

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has **no** potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility **does not** appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

The graphic below displays the results of the CHP potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.

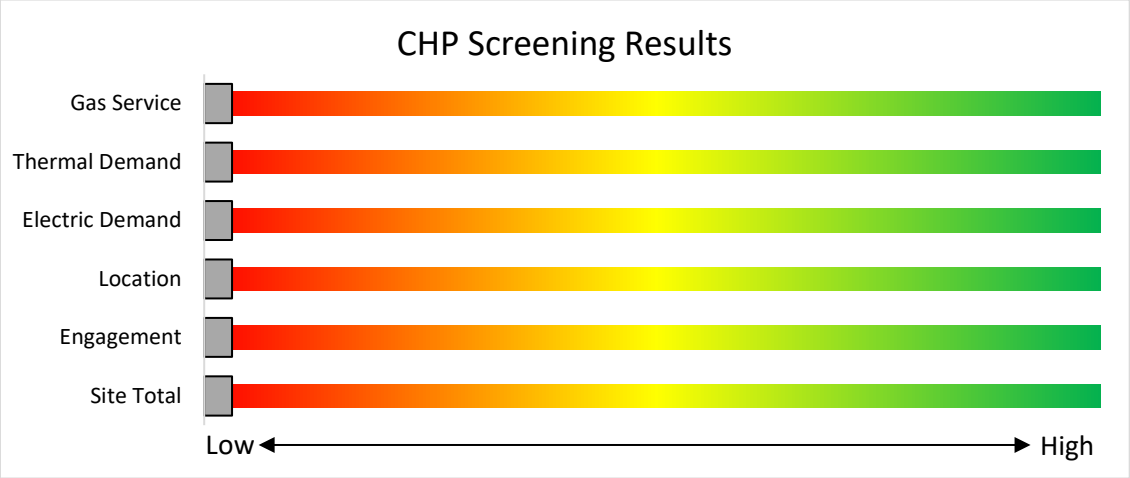


Figure 10 - Combined Heat and Power Screening

Find a qualified firm that specializes in commercial CHP cost assessment and installation: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? New Jersey's Clean Energy Programs can help. Pick the program that works best for you. Incentive programs that may apply to this facility are identified in the Executive Summary. This section provides an overview of currently available New Jersey's Clean Energy Programs.

	SmartStart *Flexibility to install at your own pace*	**Direct Install** *Turnkey installation*	**Pay for Performance** *Whole building upgrades*
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Incentives are paid out in three installments. The first installment is meant to help offset the costs of the initial engineering study. The subsequent incentives are paid based on the level of energy savings up to 50% of the total project cost. See Section 7.3 for all incentive details.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.
Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.			

7.1 SmartStart

SmartStart offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy efficient equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Incentives

The SmartStart Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type.

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are capped at 50% of the total installed incremental project cost, or a project cost buy down to a one-year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

Submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. You can work with your preferred contractor or use internal staff to install measures.

Visit www.njcleanenergy.com/SSB for a detailed program description, instructions for applying, and applications.

7.2 Direct Install

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives, and controls.

Based on the site building and utility data provided, the facility does not meet the requirements of the current Direct Install program.

Incentives

The program pays up to 70 percent of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program, which will pass on to you in the form of reduced material and implementation costs. This means up to 70 percent of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30 percent of the cost is paid to the contractor by the customer.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

7.3 Pay for Performance - Existing Buildings

Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures that results in at least 15 percent source energy savings, and lighting cannot make up the majority of the savings.

P4P is a generally a good option for medium-to-large sized facilities looking to implement as many measures as possible under a single project to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

For master metered campuses, such as The College of New Jersey, P4P eligibility is evaluated at the campus level. For the purposes of reporting P4P eligibility is being presented at all of the buildings. Final eligibility will be assessed once all of the reports are completed and will be addressed at the Exit Meeting. If the campus does not meet the 15% savings threshold based on measures identified during the LGEA Program process it is possible that additional measures could be identified at a later point in time, for example through further evaluation or the Energy Savings Improvement Program process.

Incentives

Incentives are based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

How to Participate

Contact one of the pre-approved consultants and contractors (“Partners”). Under direct contract to you, they will help further evaluate the measures identified in this report through development of the energy reduction plan), assist you in implementing selected measures, and verify actual savings one year after the installation. Your Partner will also help you apply for incentives.

Approval of the final scope of work is required by the program prior to installation. Installation can be done by the contractor of your choice (some P4P Partners are also contractors) or by internal staff, but the Partner remains involved throughout construction to ensure compliance with the program requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at www.njcleanenergy.com/P4P.

7.4 Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or waste heat to power (WHP) projects. Eligible CHP or WHP projects must achieve an annual system efficiency of at least 65% (lower heating value, or LHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

Incentives

Eligible Technologies	Size (Installed Rated Capacity)[1]	Incentive ($/kW)	% of Total Cost Cap per Project[3]	$ Cap per Project[3]
Powered by non-renewable or renewable fuel source[4]	≤500 kW	$2,000	30-40%[2]	$2 million
Gas Internal Combustion Engine	>500 kW - 1 MW	$1,000		
Gas Combustion Turbine	> 1 MW - 3 MW	$550	30%	$3 million
Microturbine Fuel Cells with Heat Recovery	>3 MW	$350		
Waste Heat to Power*	<1 MW	$1,000	30%	$2 million
	> 1MW	$500		$3 million

*Waste Heat to Power: Powered by non-renewable fuel source, heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine).

Check the NJCEP website for details on program availability, current incentive levels, and requirements.

How to Participate

You work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at www.njcleanenergy.com/CHP.

7.5 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive for the life of the contract.

ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

(1) Use an energy services company or "ESCO."

(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.

(3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the energy savings plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program descriptions and application can be found at www.njcleanenergy.com/ESIP.

ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you can use NJCEP incentive programs to help further reduce costs when developing the energy savings plan. Refer to the ESIP guidelines at the link above for further information and guidance on next steps.

7.6 Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installations. NJBPU calculates the value of a Transition Renewable Energy Certificate (TREC) by multiplying the base compensation rate ($152/MWh) by the project's assigned factor (i.e. $152 x 0.85 = $129.20/MWh). The TREC factors are defined based on the chart below:

Project Type	Factor
Subsection (t): landfill, brownfield, areas of historic fill	1.00
Grid supply (Subsection (r)) rooftop	1.00
Net metered non-residential rooftop and carport	1.00
Community solar	0.85
Grid supply (Subsection (r)) ground mount	0.60
Net metered residential ground mount	0.60
Net metered residential rooftop and carport	0.60
Net metered non-residential ground mount	0.60

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number, which enables it to generate New Jersey TRECs.

Eligible projects may generate TRECs for 15 years following the commencement of commercial operations (also referred to as the "Transition Incentive Qualification Life"). After 15 years, projects may be eligible for a New Jersey Class I REC.

TRECs will be used by the identified compliance entities to satisfy a compliance obligation tied to a new Transition Incentive Renewable Portfolio Standard ("TI-RPS"), which will exist in parallel with, and completely separate from, the existing Solar RPS for Legacy SRECs. The TI-RPS is a carve-out of the current Class I RPS requirement. The creation of TRECs is based upon metered generation supplied to PJM-EIS General Attribute Tracking System ("GATS") by the owners of eligible facilities or their agents. GATS would create one TREC for each MWh of energy produced from a qualified facility.

TRECs will be purchased monthly by a TREC Administrator who will allocate the TRECs to the Load Serving Entities (BGS Providers and Third-Party Suppliers) annually based on their market share of retail electricity sold during the relevant Energy Year.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan. The Transition Incentive Program online portal is now open to new applications effective May 1, 2020. There are instructions on "How and When to Transfer my SRP Registration to the Transition Incentive Program". If you are considering installing solar photovoltaics on your building, visit the following link for more information:

https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

8 PROJECT DEVELOPMENT

Energy conservation measures (ECMs) have been identified for your site and their energy and economic analyses are provided within this LGEA report. The next steps with project development are to set goals and create a comprehensive project plan. The graphic below provides an overview of the process flow for a typical energy efficiency or renewable energy project. We recommend implementing as many ECMs as possible prior to undertaking a feasibility study for a renewable project. The cyclical nature of this process flow demonstrates the ongoing work required to continually improve building energy efficiency over time. If your building(s) scope of work is relatively simple to implement or small in scope, the measurement and verification (M&V) step may not be required. It should be noted through a typical project cycle, there will be changes in costs based on specific scopes of work, contractor selections, design considerations, construction, etc. The estimated costs provided throughout this LGEA report demonstrate the unburdened turn-key material and labor cost only. There will be contingencies and additional costs at the time of implementation. We recommend comprehensive project planning includes the review of multiple bids for project work, incorporate potential operational & maintenance (O&M) cost savings and maximize your incentive potential.

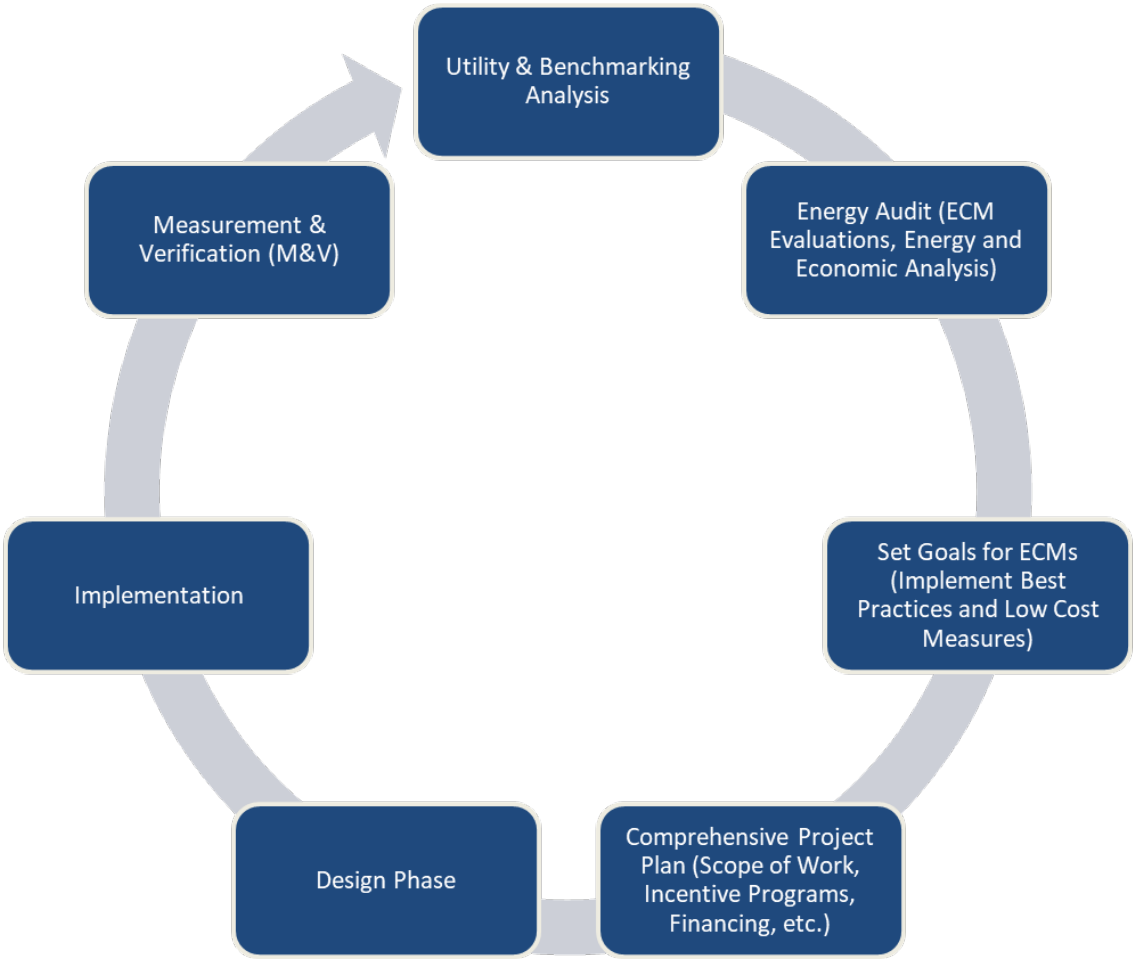


Figure 11 – Project Development Cycle

9 Energy Purchasing and Procurement Strategies

9.1 Retail Electric Supply Options

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[9].

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate monthly. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier typically depends on whether a customer prefers budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third-party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party natural gas suppliers is available at the NJBPU website[10].

[9] www.state.nj.us/bpu/commercial/shopping.html.

[10] www.state.nj.us/bpu/commercial/shopping.html.

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
C-Store	3	Compact Fluorescent: (2) 18W Biaxial Plug-In Lamps	Wall Switch	S	36	8,064	3, 4	Relamp	Yes	3	LED Lamps: (2) 13W Plug-In Lamps	Occupancy Sensor	25	5,564	0.0	495	0	$72	$75	$6	1.0
C-Store	9	Compact Fluorescent: (2) 18W Biaxial Plug-In Lamps	Wall Switch	S	36	8,064	3, 4	Relamp	Yes	9	LED Lamps: (2) 13W Plug-In Lamps	Occupancy Sensor	25	5,564	0.1	1,486	0	$217	$495	$53	2.0
C-Store	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	8,064	4	None	Yes	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	5,564	0.0	110	0	$16	$0	$0	0.0
C-Store Walk-In	7	Linear Fluorescent - T12HO: 8' T12HO (85W) - 1L	Wall Switch	S	85	8,064	2	Relamp & Reballast	No	7	LED - Linear Tubes: (1) 8' Lamp	Wall Switch	36	8,064	0.2	3,043	-1	$445	$591	$70	1.2
C-Store Walk-In	1	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	S	30	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' T5 (14.5W) Lamp	Wall Switch	15	8,064	0.0	133	0	$19	$33	$5	1.4
C-Store	18	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	18	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.3	3,396	-1	$496	$1,125	$178	1.9
C-Store Vestibule	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
C-Store Vestibule	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,064	0.0	257	0	$38	$72	$10	1.7
Conference Housing	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,564	0.1	1,740	0	$254	$632	$85	2.2
Corridor Third Floor	64	Compact Fluorescent: (2) 13W Biaxial Plug-In Lamps	Timeclock	S	26	6,048	3, 5	Relamp	Yes	64	LED Lamps: (2) 9W Plug-In Lamps	High/Low Control	18	4,173	0.6	5,723	-1	$837	$4,075	$2,368	2.0
Corridor Third Floor	15	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Timeclock	S	52	6,048	3, 5	Relamp	Yes	15	LED Lamps: (2) 18W Plug-In Lamps	High/Low Control	36	4,173	0.3	2,683	-1	$392	$1,050	$555	1.3
Corridor Third Floor	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Third Floor	17	LED - Linear Tubes: (2) 4' Lamps	Timeclock	S	29	6,048	5	None	Yes	17	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	4,173	0.1	1,017	0	$149	$675	$595	0.5
Corridor Third Floor	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Timeclock	S	33	6,048	3, 5	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	4,173	0.1	849	0	$124	$420	$246	1.4
Dining Area 1	2	Compact Fluorescent: (1) 42W A19 Screw-In Lamp	Wall Switch	S	42	8,064	3	Relamp	No	2	LED Lamps: (1) 29W Screw-In Lamp	Wall Switch	29	8,064	0.0	224	0	$33	$34	$2	1.0
Dining Area 1	9	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	Wall Switch	S	26	8,064	3	Relamp	No	9	LED Lamps: (1) 18W Plug-In Lamp	Wall Switch	18	8,064	0.1	623	0	$91	$113	$9	1.1
Dining Area 1	30	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	Wall Switch	S	26	8,064	3	Relamp	No	30	LED Lamps: (1) 18W Plug-In Lamp	Wall Switch	18	8,064	0.2	2,076	0	$303	$375	$30	1.1
Dining Area 1	21	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	Wall Switch	S	26	8,760	3	Relamp	No	21	LED Lamps: (1) 18W Plug-In Lamp	Wall Switch	18	8,760	0.1	1,578	0	$231	$263	$21	1.0
Dining Area 1	5	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	Wall Switch	S	26	8,064	3	Relamp	No	5	LED Lamps: (1) 18W Plug-In Lamp	Wall Switch	18	8,064	0.0	346	0	$51	$63	$5	1.1
Dining Area 1	5	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	8,064	3	Relamp	No	5	LED Lamps: (2) 18W Plug-In Lamps	Wall Switch	36	8,064	0.1	692	0	$101	$125	$10	1.1
Dining Area 1	10	Compact Fluorescent: (1) 42W Screw-In Lamp	Wall Switch	S	42	8,064	3	Relamp	No	10	LED Lamps: (1) 29W Screw-In Lamp	Wall Switch	29	8,064	0.1	1,118	0	$163	$172	$10	1.0
Dining Area 1	18	Compact Fluorescent: (2) 26W Quadruple Biaxial Plug-In Lamps	Wall Switch	S	52	8,064	3	Relamp	No	18	LED Lamps: (2) 18W Plug-In Lamps	Wall Switch	36	8,064	0.2	2,491	-1	$364	$450	$36	1.1
Dining Area 1	3	Compact Fluorescent: (1) 42W Spiral Plug-In Lamp	Wall Switch	S	42	8,064	3	Relamp	No	3	LED Lamps: (1) 29W Screw-In Lamp	Wall Switch	29	8,064	0.0	335	0	$49	$52	$3	1.0
Dining Area 1	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	18	Halogen Incandescent: (1) 250W Screw-in Lamps	Wall Switch	S	250	8,064		None	No	18	Halogen Incandescent: (1) 250W Screw-in Lamps	Wall Switch	250	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dining Area 1	204	Halogen Incandescent: (1) 39W E26 Screw-In Lamp	Wall Switch	S	39	8,064	3	Relamp	No	204	LED Lamps: (1) 6W Screw-In Lamp	Wall Switch	6	8,064	4.9	59,987	-13	$8,768	$4,321	$408	0.4
Dining Area 1	95	Halogen Incandescent: (1) 50W E26 Screw-In Lamp	Wall Switch	S	50	8,064	3	Relamp	No	95	LED Lamps: (1) 7.5W Screw-In Lamp	Wall Switch	8	8,064	2.9	35,814	-7	$5,235	$2,012	$190	0.3
Dining Area 1	35	Incandescent: (1) 5W Screw-in Lamps	Wall Switch	S	5	8,064	3	Relamp	No	35	LED Lamps: (1) 1W Screw-In Lamp	Wall Switch	1	8,064	0.1	1,319	0	$193	$813	$0	4.2
Dining Area 1	38	Halogen Incandescent: (1) 10W Plug-In Lamp	Wall Switch	S	10	8,064	3	Relamp	No	38	LED Lamps: (1) 1.5W Plug-In Pin Based Lamp	Wall Switch	2	8,064	0.2	2,865	-1	$419	$475	$38	1.0
Dining Area 1	14	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	8,064		None	No	14	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	8	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	8,064		None	No	8	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	4	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	S	9	8,064		None	No	4	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	9	8,064	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	8	LED - Fixtures: Flood Fixture	Breaker Panel		40	0		None	No	8	LED - Fixtures: Flood Fixture	Breaker Panel	40	0	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	8,064		None	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,064	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	91	Linear Fluorescent - T5: 2' T5 (14W) - 3L	Wall Switch	S	42	8,064	3	Relamp	No	91	LED - Linear Tubes: (3) 2' T5 (8W) Lamp	Wall Switch	24	8,064	1.2	14,530	-3	$2,124	$8,362	$0	3.9
Dining Area 1	24	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3	Relamp	No	24	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	8,064	0.3	3,406	-1	$498	$780	$144	1.3
Dining Area 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	585	0	$86	$73	$20	0.6
Dining Area 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	8,064	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,064	0.1	878	0	$128	$110	$30	0.6
Dining Area 2 Faculty	3	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	8,064	3, 4	Relamp	Yes	3	LED Lamps: (2) 18W Plug-In Lamps	Occupancy Sensor	36	5,564	0.1	715	0	$105	$75	$6	0.7
Dining Area 2 Faculty	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Area 2 Faculty	2	LED Lamps: (2) 7W A15 Screw-In Lamps	Wall Switch	S	14	8,064	4	None	Yes	2	LED Lamps: (2) 7W A15 Screw-In Lamps	Occupancy Sensor	14	5,564	0.0	77	0	$11	$0	$0	0.0
Dining Area 2 Faculty	20	U-Bend Fluorescent - T12: U T12 (40W) - 2L	Wall Switch	S	88	8,064	2, 4	Relamp & Reballast	Yes	20	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,564	0.9	11,572	-2	$1,692	$2,634	$270	1.4
Dining Area 2 Faculty	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.1	1,132	0	$165	$195	$36	1.0
Dining Area 2 Faculty	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,564	0.1	696	0	$102	$145	$20	1.2
Dish Room	3	Compact Fluorescent: (1) 42W Spiral Screw-In Lamp	Wall Switch	S	42	8,064	3, 4	Relamp	Yes	3	LED Lamps: (1) 29W Screw-In Lamp	Occupancy Sensor	29	5,564	0.0	578	0	$84	$52	$3	0.6
Dish Room	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dish Room	22	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064	4	None	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.1	1,754	0	$256	$540	$70	1.8
Dish Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,564	0.0	348	0	$51	$72	$10	1.2
Electrical Room 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Electrical Room 243	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Electrical Room 3	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Electrical Room 325	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Electrical Room 363	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Electrical Room 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Electrical Room 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	585	0	$86	$73	$20	0.6
Electrical Room 8	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Electrical Room 9	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Elevator 1	1	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	S	48	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 3' Lamps	Wall Switch	21	8,064	0.0	240	0	$35	$37	$10	0.8
Elevator 2	1	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	S	48	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 3' Lamps	Wall Switch	21	8,064	0.0	240	0	$35	$37	$10	0.8
Elevator P1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Elevator P2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Exterior Ground	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Timeclock		52	4,380	3	Relamp	No	1	LED Lamps: (2) 18W Plug-In Lamps	Timeclock	36	4,380	0.0	68	0	$10	$25	$2	2.3
Exterior Ground	1	Compact Fluorescent: (2) 18W Biaxial Plug-In Lamps	Timeclock		36	0	3	Relamp	No	1	LED Lamps: (2) 13W Plug-In Lamps	Timeclock	25	0	0.0	0	0	$0	$25	$2	0.0
Exterior Ground	6	Compact Fluorescent: (1) 30W Spiral Screw-In Lamp	Timeclock		30	4,380	3	Relamp	No	6	LED Lamps: (1) 21W Screw-In Lamp	Timeclock	21	4,380	0.0	237	0	$35	$103	$6	2.8
Exterior Ground	2	Compact Fluorescent: (1) 42W Spiral Screw-In Lamp	Timeclock		42	4,380	3	Relamp	No	2	LED Lamps: (1) 29W Screw-In Lamp	Timeclock	29	4,380	0.0	110	0	$16	$34	$2	2.0
Exterior Ground	4	High-Pressure Sodium: (1) 150W Lamp	Timeclock		188	4,380	1	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	56	4,380	0.0	2,306	0	$339	$1,599	$200	4.1
Walkway	46	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		30	3,276		None	No	46	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	30	3,276	0.0	0	0	$0	$0	$0	0.0
Exterior Roof	2	High-Pressure Sodium: (1) 150W Lamp	Timeclock		188	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	56	4,380	0.0	1,153	0	$170	$800	$100	4.1
Exterior Roof	5	LED - Fixtures: Wall Pack	Timeclock		50	4,380		None	No	5	LED - Fixtures: Wall Pack	Timeclock	50	4,380	0.0	0	0	$0	$0	$0	0.0
Janitorial 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Janitorial 104	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	8,064	0.0	142	0	$21	$33	$6	1.3
Janitorial 111	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	8,064	0.0	142	0	$21	$33	$6	1.3
Janitorial 2	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Janitorial 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Kitchen 202	1	LED Lamps: (1) 15W Lamp	Wall Switch	S	15	8,064		None	No	1	LED Lamps: (1) 15W Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen Lounge Third Floor	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,064	0.0	257	0	$38	$72	$10	1.7
Kitchen Main	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Kitchen Main Walk-Ins	17	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	8,064		None	No	17	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Kitchen Main	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.2	2,049	0	$300	$256	$70	0.6
Kitchen Main	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	27	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.6	7,904	-2	$1,155	$986	$270	0.6
Kitchen Main	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	8,064	3	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,064	0.1	1,317	0	$193	$164	$45	0.6
Kitchen Main	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,064	3	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,064	0.1	993	0	$145	$146	$40	0.7
Laundry 367	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064	4	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.0	399	0	$58	$270	$35	4.0
Laundry Room 221	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064	4	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.0	399	0	$58	$270	$35	4.0
Laundry Room 267	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064	4	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.0	319	0	$47	$270	$35	5.0
Loading Dock Hallway	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Loading Dock Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	8,064	3, 5	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	5,564	0.1	1,676	0	$245	$389	$150	1.0
Lobby Basment	12	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Timeclock	S	52	6,048	3, 5	Relamp	Yes	12	LED Lamps: (2) 18W Plug-In Lamps	High/Low Control	36	4,173	0.2	2,146	0	$314	$750	$444	1.0
Lobby Basment	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room Kitchen	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.1	1,117	0	$163	$380	$65	1.9
Lounge 202	25	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	8,064	3, 4	Relamp	Yes	25	LED Lamps: (2) 18W Plug-In Lamps	Occupancy Sensor	36	5,564	0.5	5,962	-1	$871	$1,165	$120	1.2
Lounge 202	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Lounge 302	25	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	8,064	3, 4	Relamp	Yes	25	LED Lamps: (2) 18W Plug-In Lamps	Occupancy Sensor	36	5,564	0.5	5,962	-1	$871	$1,165	$120	1.2
Lounge 302	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Lounge 342	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.1	745	0	$109	$189	$40	1.4
Lounge Third Floor	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Timeclock	S	62	6,048	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,173	0.1	1,117	0	$163	$416	$75	2.1
Lounge Third Floor 2	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Lounge Third Floor 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Timeclock	S	62	6,048	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,173	0.1	1,117	0	$163	$416	$75	2.1
Mail Room 117	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.0	377	0	$55	$181	$32	2.7
Main Hallway	58	Compact Fluorescent: (2) 18W Biaxial Plug-In Lamps	Timeclock	S	36	6,048	3, 5	Relamp	Yes	58	LED Lamps: (2) 13W Plug-In Lamp	High/Low Control	25	4,173	0.8	7,182	-2	$1,050	$3,700	$2,146	1.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Main Hallway	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Main Hallway	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Timeclock	S	33	6,048	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	4,173	0.0	283	0	$41	$65	$12	1.3
Main Lobby	6	Compact Fluorescent: (2) 18W Biaxial Plug-In Lamps	Wall Switch	S	36	8,064	3, 5	Relamp	Yes	6	LED Lamps: (2) 13W Plug-In Lamp	High/Low Control	25	5,564	0.1	991	0	$145	$375	$222	1.1
Main Lobby	18	Compact Fluorescent: (2) 18W Biaxial Plug-In Lamps	Wall Switch	S	36	8,064	3, 5	Relamp	Yes	18	LED Lamps: (2) 13W Plug-In Lamp	High/Low Control	25	5,564	0.2	2,972	-1	$434	$1,125	$666	1.1
Main Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 11	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 11	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.3	3,805	-1	$556	$475	$130	0.6
Mechanical 13	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 13	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.3	3,805	-1	$556	$475	$130	0.6
Mechanical 2	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.1	1,171	0	$171	$146	$40	0.6
Mechanical 5	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 5	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	26	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.6	7,611	-2	$1,112	$949	$260	0.6
Mechanical 8	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 8	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Mechanical Roof Access	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	8,064	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.1	1,206	0	$176	$254	$40	1.2
Office 114 Res Life	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office 114 Res Life	8	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.1	1,509	0	$221	$260	$48	1.0
Office 114 Res Life	10	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	10	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,564	0.3	3,480	-1	$509	$995	$135	1.7
Office 115	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.1	1,132	0	$165	$465	$71	2.4
Office 116	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.1	755	0	$110	$400	$59	3.1
Office 118	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.0	377	0	$55	$181	$32	2.7
Office 192	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office 192	15	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,064	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,564	0.2	2,830	-1	$414	$758	$125	1.5
Office Business Manager	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,564	0.1	1,044	0	$153	$487	$65	2.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office Director of Housing	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,564	0.1	1,044	0	$153	$487	$65	2.8
Office Kitchen	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.1	1,117	0	$163	$380	$65	1.9
Office Kitchen 181	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,564	0.1	1,490	0	$218	$416	$75	1.6
Residential 246	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 246	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 247	1	Incandescent: (2) 60W A19 Screw-In Lamps	Wall Switch	S	120	8,064	3	Relamp	No	1	LED Lamps: (2) 9W Screw-In Lamps	Wall Switch	18	8,064	0.1	905	0	$132	$34	$2	0.2
Residential 247	2	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	2	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 247	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 210	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 210	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 212	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 212	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 213	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 213	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 214	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 214	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 215	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 215	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 216	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 216	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 217	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 217	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 218	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 218	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 219	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0

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Residential 219	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 220	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 220	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 222	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 222	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 226	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 226	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	120	0	$18	$16	$3	0.8
Residential 226	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 228	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 228	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 228	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 229	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 229	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 229	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 230	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 230	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 230	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 231	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 231	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 231	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 232	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 232	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 232	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 233	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 233	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 233	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 234	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 234	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 234	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 235	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 235	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 235	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 236	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 236	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 236	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 237	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 237	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 237	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 238	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 238	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 238	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 239	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 239	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 239	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 240	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 240	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 240	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 245	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 245	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 249	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 249	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 250	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 250	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 251	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 251	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 252	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 252	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 253	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 253	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 254	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 254	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 255	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 255	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 256	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 256	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 256	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 257	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 257	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 257	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 258	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 258	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 258	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 259	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 259	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 259	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 260	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 260	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 260	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 261	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 261	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 261	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 262	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 262	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 262	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 264	1	Incandescent: (2) 60W A19 Screw-In Lamps	Wall Switch	S	120	8,064	3	Relamp	No	1	LED Lamps: (2) 9W Screw-In Lamps	Wall Switch	18	8,064	0.1	905	0	$132	$34	$2	0.2
Residential 264	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 264	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 264	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 264	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	120	0	$18	$16	$3	0.8
Residential 268	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 268	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 268	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	120	0	$18	$16	$3	0.8
Residential 269	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 269	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 269	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	120	0	$18	$16	$3	0.8
Residential 270	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 270	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 270	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	120	0	$18	$16	$3	0.8
Residential 271	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 271	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 271	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	120	0	$18	$16	$3	0.8
Residential 272	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 272	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 272	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 273	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 273	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 273	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 274	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 274	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 274	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 275	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 275	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 275	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 276	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 276	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 276	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 278	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 278	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 278	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 280	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED Lamps: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 280	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,064		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 280	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 308	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 308	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 308	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 310	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 310	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 310	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 312	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 312	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 312	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 313	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 313	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 313	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 314	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 314	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 314	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 315	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 315	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 315	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 316	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 316	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 316	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 317	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 317	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 317	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 318	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 318	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 318	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 319	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 319	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 319	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 320	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 320	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 320	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 322	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 322	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 322	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 326	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 326	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 326	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 327	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 327	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 327	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 328	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 328	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 328	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 329	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 329	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 329	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 330	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 330	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 330	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 331	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 331	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 331	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 332	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 332	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 332	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 333	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 333	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 333	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 334	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 334	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 334	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 335	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 335	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 335	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 336	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 336	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 336	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 337	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 337	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 337	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 338	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 338	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 338	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 339	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 339	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 339	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 340	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 340	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 340	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 342	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 342	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 342	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 345	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 345	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 346	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 346	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,064	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,064	0.0	293	0	$43	$37	$10	0.6
Residential 347	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 347	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 347	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 349	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 349	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 349	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 350	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 350	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 350	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 351	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 351	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 351	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 352	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 352	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 352	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 353	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 353	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 353	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 354	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 354	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 354	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 355	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 355	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 355	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 356	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 356	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 356	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 357	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 357	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 357	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 358	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 358	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 358	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 359	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 359	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 359	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 360	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0
Residential 360	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	8,064	3	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	8,064	0.0	240	0	$35	$33	$6	0.8
Residential 360	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,064	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	155	0	$23	$18	$5	0.6
Residential 361	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	S	10	8,064		None	No	1	LED - Fixtures: Indoor Wall Mounted Fixture	Wall Switch	10	8,064	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Residential 361	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,064		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,064	0.0	0	0	$0	$0	$0	0.0

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Laundry Rooms	Laundry Rooms	4	Supply Fan	0.1	65.0%	No			B	6,720		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	Convenience Store & S/E Dining (AHU-3)	1	Supply Fan	10.0	86.5%	No	Marathon Electric	WVF215TTDR7026HT	B	5,376	7	No	91.7%	Yes	1	3.1	19,161	0	$2,819	$5,152	$1,100	1.4
Mechanical Room 11	Convenience Store & S/E Dining (AHU-3)	1	Return Fan	1.5	80.0%	No	Marathon Electric	WVE145TTDR5326AA	B	5,376	7	No	86.5%	Yes	1	0.5	3,063	0	$451	$3,391	$75	7.4
Mechanical Room 11	Women's Study Offices & Health Center Exam Rooms (AHU-2)	1	Supply Fan	5.0	89.5%	Yes	Baldor	EM3218T-G	W	5,376		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	Women's Study Offices & Health Center Exam Rooms (AHU-2)	1	Return Fan	1.5	84.0%	Yes			W	5,376		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 5	North Offices (AHU-4)	1	Supply Fan	7.5	88.5%	Yes	Baldor	EM3311T	W	5,376		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 5	North Offices (AHU-4)	1	Return Fan	3.0	89.5%	Yes	Baldor	EM3211T	W	5,376		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 5	N/E Dining & Conference (AHU-5)	1	Supply Fan	10.0	86.5%	No	Marathon Electric	WVJ215TTDR7026HT	B	5,376	7	No	91.7%	Yes	1	3.1	19,161	0	$2,819	$5,152	$1,100	1.4
Mechanical Room 5	N/E Dining & Conference (AHU-5)	1	Return Fan	1.5	80.0%	No	Marathon Electric	WVE145TTDR5326AA	B	5,376	7	No	86.5%	Yes	1	0.5	3,063	0	$451	$3,391	$75	7.4
Mechanical Room 8	Health Services (AHU-1)	1	Supply Fan	5.0	84.0%	Yes			W	5,376		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 8	Health Services (AHU-1)	1	Return Fan	1.5	87.5%	Yes	Teco		W	5,376		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Hallway & Mechanical Rooms	Hallway & Mechanical Rooms	14	Supply Fan	0.1	65.0%	No			B	3,780		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lounges & Dorm Rooms	Lounges & Dorm Rooms	13	Supply Fan	0.1	65.0%	No			B	8,064		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hallway & Mechanical Rooms	Hallway & Mechanical Rooms	4	Fan Coil Unit	0.1	65.0%	No			B	3,780		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator Room	Elevator (P1)	1	Other	30.0	92.4%	No	Jenkins Elevator Company		B	1,008		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms South (HRU-10)	1	Supply Fan	1.5	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms South (HRU-10)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms West (HRU-3)	1	Supply Fan	1.5	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms West (HRU-3)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms North West (HRU-4)	1	Supply Fan	3.0	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions								Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	2nd & 3rd Floor Dorm Rooms North West (HRU-4)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms North West (HRU-5)	1	Supply Fan	1.5	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms North West (HRU-5)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms North East (HRU-6)	1	Supply Fan	1.5	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms North East (HRU-6)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms East (HRU-7)	1	Supply Fan	1.5	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms East (HRU-7)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms East (HRU-8)	1	Supply Fan	1.5	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms East (HRU-8)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms South East (HRU-9)	1	Supply Fan	3.0	84.0%	Yes	Xetex		W	8,064		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	2nd & 3rd Floor Dorm Rooms South East (HRU-9)	1	Exhaust Fan	1.0	82.5%	Yes	Xetex		W	8,064		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Dining Area (AHU-8)	1	Supply Fan	30.0	94.1%	Yes	McQuay		W	5,376		No	94.1%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Dining Area (AHU-9)	1	Supply Fan	30.0	94.1%	Yes	Baldor	EM2535T	W	5,376		No	94.1%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Pnuematic Controls	2	Air Compressor	3.0	86.5%	No	AO Smith	E226M	B	600		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	CUP Chilled Water System	1	Chilled Water Pump	25.0	89.5%	No	US Electrical Motors	E832A/T06T108 R104F	B	407		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	CUP Chilled Water System	1	Chilled Water Pump	25.0	89.5%	No	US Electrical Motors	E832A/T07T145 R007F	B	0		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	CUP Chilled Water System	1	Chilled Water Pump	25.0	89.5%	No	US Electrical Motors	E832A/T06T108 R104F	B	407		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Eickhoff Chilled Water System	1	Chilled Water Pump	3.0	82.5%	No	Baldor	VJMM3211T	W	275		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Heating Hot Water System	1	Condensate Pump	1.5	84.0%	No	Baldor	VM3154T	W	1,764	11	No	86.5%	Yes	1	0.2	927	0	$136	$3,391	$75	24.3
Mechanical Room 13	Heating Hot Water System	1	Condensate Pump	1.5	84.0%	No	Baldor	VM3154T	W	1,764	11	No	86.5%	Yes	1	0.2	927	0	$136	$3,391	$75	24.3

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Elevator Room	Elevator Room	2	Exhaust Fan	0.5	70.0%	No			B	8,064	6	Yes	78.2%	No		0.1	676	0	$99	$705	$0	7.1
Roof	Building Exhaust	1	Exhaust Fan	0.8	70.0%	No			B	8,064	6	Yes	81.1%	No		0.1	662	0	$97	$413	$0	4.2
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No			B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Crawl Space	1	Exhaust Fan	0.3	70.0%	No		5KCP39KG	B	8,064		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	WBT45	B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	WBT45	B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	WBT45	B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	WXQ82	B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Laundry Room	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	FMX15T	B	8,064		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	WXQ82	B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Cafeteria	1	Exhaust Fan	1.0	82.5%	No			B	8,064	6, 8	Yes	85.5%	Yes	1	0.3	1,961	0	$288	$3,010	$75	10.2
Roof	Parking Garage	1	Exhaust Fan	7.5	91.7%	Yes	McQuay	OAH018GVAM	W	8,064		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Rest Room	1	Exhaust Fan	0.5	70.0%	No			B	8,064	6	Yes	78.2%	No		0.0	338	0	$50	$352	$0	7.1
Roof	Rest Room	1	Exhaust Fan	0.5	70.0%	No			B	8,064	6	Yes	78.2%	No		0.0	338	0	$50	$352	$0	7.1
Roof	Fire System	1	Exhaust Fan	1.5	78.5%	No			B	8,064	6	Yes	86.5%	No		0.1	797	0	$117	$758	$0	6.5
Roof	Hibachi Grill	1	Exhaust Fan	0.3	65.0%	No	Greenheck	CUE-141-B	B	8,064	6	Yes	73.4%	No		0.0	265	0	$39	$384	$0	9.9
Roof	Parking Garage	1	Exhaust Fan	7.5	91.7%	Yes	McQuay	OAH018GVAM	W	8,064		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Fire System	1	Exhaust Fan	1.5	78.5%	No			B	500		No	78.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Fire System	1	Exhaust Fan	1.5	78.5%	No			B	500		No	78.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Fire System	1	Exhaust Fan	1.5	78.5%	No			B	500		No	78.5%	No		0.0	0	0	$0	$0	$0	0.0

Existing Conditions											Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Fire System	1	Exhaust Fan	1.5	78.5%	No	Baldor	M3T54	B	500		No	78.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Cafeteria	1	Exhaust Fan	0.3	65.0%	No			B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Cafeteria	1	Exhaust Fan	0.3	65.0%	No			B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Parking Garage	1	Exhaust Fan	7.5	91.7%	Yes	Baldor	EM3311T	W	8,064		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Crawl Space	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	WXQ82	B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Crawl Space	1	Exhaust Fan	0.3	65.0%	No	Penn Ventilation	WXQ82	B	8,064	6	Yes	69.5%	No		0.0	112	0	$17	$400	$0	24.2
Roof	Parking Garage	1	Exhaust Fan	7.5	91.7%	Yes	McQuay	OAH018GVAM	W	8,064		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Parking Garage	1	Exhaust Fan	7.5	91.7%	Yes	McQuay	OAH018GVAM	W	8,064		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Parking Garage	1	Exhaust Fan	7.5	91.7%	Yes	McQuay	OAH018GVAM	W	8,064		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Bakery	1	Exhaust Fan	1.5	84.0%	No			B	8,064	6, 8	Yes	86.5%	Yes	1	0.5	2,892	0	$425	$3,391	$75	7.8
Roof	Dishwasher	1	Exhaust Fan	1.0	82.5%	No			B	8,064	6, 8	Yes	85.5%	Yes	1	0.3	1,961	0	$288	$3,010	$75	10.2
Mechanical Room 13	Building Exhaust	1	Exhaust Fan	1.5	84.0%	No			B	8,064	6, 8	Yes	86.5%	Yes	1	0.5	2,892	0	$425	$3,391	$75	7.8
Mechanical Room 2	Mechanical Room 2	1	Exhaust Fan	1.0	82.5%	No			B	8,064	6, 8	Yes	85.5%	Yes	1	0.3	1,961	0	$288	$3,010	$75	10.2
Mechanical Room 8	Mechanical Room 8	1	Exhaust Fan	1.5	80.0%	No	Baldor		W	8,064	8	No	86.5%	Yes	1	0.5	3,254	0	$479	$3,391	$75	6.9
Mechanical Room 13	Heating Hot Water Reheat System	1	Heating Hot Water Pump	1.5	80.0%	No	Marathon Electric	WVL145TTDR5326AA	B	3,528	9	No	86.5%	Yes	1	0.2	2,101	0	$309	$9,016	$75	28.9
Mechanical Room 13	Heating Hot Water Reheat System	1	Heating Hot Water Pump	1.5	80.0%	No	Baldor	M31541	B	3,528	9	No	86.5%	Yes	1	0.2	2,101	0	$309	$9,016	$75	28.9
Mechanical Room 13	Heating Hot Water System - Heat Exchanger P1	1	Heating Hot Water Pump	15.0	91.0%	No	US Electrical Motors	E820A/T1013	B	1,176	9	No	93.0%	Yes	1	1.6	5,633	0	$829	$63,291	$1,200	74.9
Mechanical Room 13	Heating Hot Water System - Heat Exchanger P2	1	Heating Hot Water Pump	15.0	91.0%	No	US Electrical Motors		B	1,176	9	No	93.0%	Yes	1	1.6	5,633	0	$829	$63,291	$1,200	74.9
Mechanical Room 13	Heating Hot Water System - Heat Exchanger P3	1	Heating Hot Water Pump	15.0	91.0%	No			B	1,176	9	No	93.0%	Yes	1	1.6	5,633	0	$829	$63,291	$1,200	74.9
Mechanical Room 8	Heating Hot Water System	1	Heating Hot Water Pump	0.1	65.0%	No			B	3,528		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room 8	Heating Hot Water System	1	Heating Hot Water Pump	0.1	65.0%	No			B	3,528		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Kitchen Hood Bakery	1	Kitchen Hood Exhaust Fan	10.0	89.5%	No	Captive Aire		W	4,704	10	No	91.7%	Yes	1	0.1	20,797	20	$3,150	$5,152	$1,100	1.3
Roof	Kitchen Hood Kitchen	1	Kitchen Hood Exhaust Fan	15.0	91.0%	No	Captive Aire	B133CARM	W	4,704	10	No	93.0%	Yes	1	0.2	30,413	20	$4,565	$7,041	$1,200	1.3
Roof	Kitchen Hood Omelette Station	1	Kitchen Hood Exhaust Fan	5.0	87.5%	No	Captive Aire	US1300	W	4,704	10	No	89.5%	Yes	1	0.1	10,857	20	$1,687	$4,076	$900	1.9
Building	Bakery (AHU-6A)	1	Supply Fan	3.0	86.5%	No			B	4,704	8	No	89.5%	Yes	1	0.9	4,839	0	$712	$3,884	$200	5.2
Building	Kitchen (AHU-6B)	1	Supply Fan	5.0	87.5%	No			B	4,704	8	No	89.5%	Yes	1	1.5	7,822	0	$1,151	$4,076	$900	2.8
Elevator Room	Elevator (P2)	1	Other	30.0	92.4%	No	Jenkins Elevator Company		B	1,008		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Sewer	2	Other	0.8	70.0%	No	Goulds Pumps	WS0734BF	B	2,688	6	Yes	81.1%	No		0.1	441	0	$65	$1,073	$0	16.5
Mechanical Room 5	Storm Water	1	Other	1.0	82.5%	No			B	500		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 8	Gas Monitor	1	Other	0.1	65.0%	No	General Electric	5KH3MBA0419	B	6,132		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	Domestic Cold Water	1	Water Supply Pump	5.0	88.5%	Yes	Baldor	CEM3613T	W	2,920		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	Domestic Cold Water	1	Water Supply Pump	5.0	88.5%	Yes	Baldor	CEM3613T	W	2,920		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 11	Domestic Cold Water	1	Water Supply Pump	5.0	88.5%	Yes	Baldor	CEM3613T	W	2,920		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Domestic Hot Water System	1	DHW Circulation Pump	0.1	65.0%	No			B	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Domestic Hot Water System	1	DHW Circulation Pump	0.1	65.0%	No			B	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Domestic Hot Water System	1	DHW Circulation Pump	0.1	65.0%	No			B	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Domestic Hot Water System	1	DHW Circulation Pump	0.1	65.0%	No			B	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Domestic Hot Water System	1	DHW Circulation Pump	0.2	65.0%	No	B&G	PL-30B	B	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 13	Domestic Hot Water System	1	DHW Circulation Pump	0.1	65.0%	No	Grundfos		B	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Loading Dock Hallway	Loading Dock Hallway	1	Supply Fan	0.1	65.0%	No	Dimplex		B	3,780		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Building	Dining Hall 169 (AHU-7)	1	Supply Fan	5.0	87.5%	No			W	5,376	8	No	89.5%	Yes	1	1.5	8,940	0	$1,315	$4,076	$900	2.4

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Ground	Dish Room	1	Split-System	5.00		9.28		Trane	TTR060C100A1	B	12	Yes	1	Split-System	5.00		16.00		1.4	5,328	0	$784	$6,521	$525	7.6
Roof	IT Room	1	Ductless Mini-Split AC	0.75		16.00		Sanyo	CL0971	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	IT Room	1	Ductless Mini-Split AC	1.00		9.46		Sanyo	CL1251	B	12	Yes	1	Ductless Mini-Split AC	1.00		18.00		0.3	2,274	0	$335	$5,175	$0	15.5
Roof	Second Floor IT Room	1	Ductless Mini-Split AC	0.75		16.00		Sanyo	CL0971	W		No							0.0	0	0	$0	$0	$0	0.0
Loading Dock Hallway	Loading Dock Hallway	1	Electric Resistance Heat		17.06		1 COP	Dimplex		B		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Central Plant	Building Chilled Water (Indoor Units)	1	Water-Cooled Centrifugal Chiller	450.00	Central Plant	Proxy Chiller	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Chilled Water System (Outdoor Units)	1	Air-Cooled Scroll Chiller	30.00	Carrier	30RAP03065A01 F00	W		No							0.0	0	0	$0	$0	$0	0.0

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Central Plant	Building Space Heating	1	Forced Draft Steam Boiler	7,763	Central Plant	Proxy Boiler	W		No						0.0	0	0	$0	$0	$0	0.0
Central Plant	Building Chilled Water	1	Other	5,400	Central Plant	Proxy Steam Chiller	W		No						0.0	0	0	$0	$0	$0	0.0

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room 13	Domestic Hot Water System	13	6	2.00	0.0	0	5	$22	$43	$12	1.4

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Central Plant	Building	1	Indirect System	Central Plant	Proxy Boiler	W		No						0.0	0	0	$0	$0	$0	0.0
Dish Room	Dish Washer	1	Booster Water Heater	Champion	EUCCW8	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Rest Rooms	14	124	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	59	$267	$889	$496	1.5
Rest Rooms	14	115	Showerhead	2.50	1.50	0.0	0	90	$409	$10,270	$1,725	20.9

Reach-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions						Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Energy Efficient Doors?	Install Door Heater Control?	Install Aluminum Night Covers?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
C-Store	1	Cooler (35F to 55F)	Federal		15	Yes	No	No	No	No	0.0	177	0	$26	$303	$40	10.1
C-Store	1	Cooler (35F to 55F)	Structural Concepts	HOU4852R	15	Yes	No	No	No	No	0.0	177	0	$26	$303	$40	10.1
Dining Hall	1	Cooler (35F to 55F)	Structural Concepts	FSDG72R.T1	15	Yes	No	No	No	No	0.0	177	0	$26	$303	$40	10.1
Dining Hall	1	Cooler (35F to 55F)			15	Yes	No	No	No	No	0.0	177	0	$26	$303	$40	10.1

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
C-Store	1	Cooler (35F to 55F)	Russell	AA48-212	15, 16	Yes	Yes	Yes	0.2	2,594	0	$382	$3,406	$285	8.2
Cafeteria (Walk-In #1)	1	Cooler (35F to 55F)	Heat Craft	ADT070AK	15, 16	Yes	Yes	Yes	0.1	1,192	0	$175	$2,799	$205	14.8
Cafeteria (Walk-In #2)	1	Cooler (35F to 55F)	Trenton	TPLP211MAS1BR6	15, 16	Yes	Yes	Yes	0.1	1,309	0	$193	$2,799	$205	13.5
Cafeteria (Walk-In #3)	1	Cooler (35F to 55F)	Trenton	TPLP107MAS1BR6	15, 16	Yes	Yes	Yes	0.0	698	0	$103	$2,496	$165	22.7
Cafeteria (Walk-In #4)	1	Cooler (35F to 55F)	Trenton	TPLP211MAS1BR6	15, 16	Yes	Yes	Yes	0.1	1,309	0	$193	$2,799	$205	13.5
Cafeteria Small Freezer (Walk-In #5)	1	Medium Temp Freezer (0F to 30F)	Brown	B1P530065	15, 16	Yes	No	Yes	0.2	2,314	0	$340	$2,887	$235	7.8
Cafeteria Big Freezer (Walk-In #6)	1	Medium Temp Freezer (0F to 30F)	Russell	AE66-280	15, 16	Yes	Yes	Yes	0.2	5,877	0	$865	$4,012	$365	4.2

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
C-Store	1	Stand-Up Freezer, Glass Door (31 - 50 cu. ft.)	Hussmann	HGL-2-BS	No	17	Yes	0.5	4,654	0	$685	$4,836	$500	6.3
C-Store	1	Stand-Up Freezer, Glass Door (31 - 50 cu. ft.)	Kelvinator	T5CLGP-4	No	17	Yes	0.4	3,869	0	$569	$4,535	$500	7.1
Dining Hall	2	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	TRUE	T-23F	Yes		No	0.0	0	0	$0	$0	$0	0.0
C-Store	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	QBD	CD26-HC	Yes		No	0.0	0	0	$0	$0	$0	0.0
C-Store	1	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	QBD	PC8L-HC	Yes		No	0.0	0	0	$0	$0	$0	0.0
C-Store	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	QBD	CD26L1T5	Yes		No	0.0	0	0	$0	$0	$0	0.0
C-Store	1	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	IDW	GS-3-N234B	Yes		No	0.0	0	0	$0	$0	$0	0.0
C-Store	1	Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.)	TRUE	GDM-45-HC-LD	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	2	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Continental	DL1R-GD	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall Faculty	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	Traulsen	RIF3-32LUT	No	17	Yes	1.0	8,571	0	$1,261	$5,870	$600	4.2

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dining Hall Faculty	1	Ice Making Head (≥450 lbs/day), Continuous	Manitowoc	SD1002A	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Ice Making Head (≥450 lbs/day), Continuous	Hoshizaki		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall Faculty	1	Ice Making Head (≥450 lbs/day), Continuous	Scotsman		Yes		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Ice Making Head (≥450 lbs/day), Continuous	Hoshizaki		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Ice Making Head (≥450 lbs/day), Continuous	Manitowoc	RFS1200W	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Ice Making Head (≥450 lbs/day), Continuous	Manitowoc	D0906W-261	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dining Hall	1	Electric Convection Oven (Full Size)	Vulcan	VC4ED DEV	Yes		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	1	Electric Convection Oven (Full Size)	Blodgett		Yes		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	1	Gas Convection Oven (Full Size)			No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	1	Gas Convection Oven (Full Size)	Garland	Master 200	Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Convection Oven (Full Size)			No		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	3	Gas Convection Oven (Full Size)	Blodgett		Yes		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall Faculty	1	Gas Convection Oven (Half Size)	Blodgett		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall & Kitchen	3	Gas Large Vat Fryer	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	1	Electric Griddle (≤2 Feet Width)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	1	Gas Griddle (≤2 Feet Width)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	1	Gas Griddle (3 Feet Width)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	2	Gas Griddle (3 Feet Width)			No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	1	Electric Griddle (4 Feet Width)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	2	Gas Griddle (≥6 Feet Width)			No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall & Dining Hall Faculty & Main Kitchen	4	Insulated Food Holding Cabinet (Full Size)	Metro C5	Series 1	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	2	Electric Fryer	Anets	Anets Pasta Pro	No		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Rack Oven (Double)	Garland		No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall	2	Gas Steamer	Cleveland	Steam Craft Ultra 10	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Hall Faculty	1	Insulated Food Holding Cabinet (1/2 Size)	Alto Shaam		No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Dish Room	1	Multi-Tank Conveyor (High Temp)	Champiom	EUCCW8	Electric	Electric	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**	**Manufacturer**	**Model**
Laundry Rooms	13	Clothes Dryer	3,120		Alliance	LDEE5BGS153TW01
Laundry Rooms	13	Clothes Washer	1,176		Alliance	LWN432SP113TW04
C-Store	1	Commerical Coffee Machine	6,250			
Dining Hall	2	Commerical Coffee Machine	2,200			
Dining Hall	2	Hot Drink Machine	1,320		Nescafe	Alegria
Building	2	Dehumidifier	700			
Building	44	Computer	125			
Building	2	Undercounter Dishwasher	3,660			
Office 118	1	Electric Space Heater	3,000			
Residential Apartment	1	Ceiling Fan	75			
Offices	2	Portable Fan	150			
Building	7	Microwave	700			
Mail Room 117	3	Paper Shredder	150			
Offices	10	Small/Medium Printer	150			
Offices	3	Large Printer/Copier	300			
Building	2	Mini Fridge	260			
Dining Hall	6	Large Speaker	400			
Office	1	Small/Medium Speaker	250			
Building	21	TV	150			
Dining Hall	1	Toaster	800			
Dining Hall	3	Toaster Oven	1,400			
Office	1	Water Cooler	1,300			
C-Store	1	Hot Drink Machine	1,320			
C-Store	1	Countertop Freezer	1,236		Silver King	SKF-48G
C-Store	1	Milk Shake Mixer	260		F'real	
C-Store	1	Hot Dog Warmer	985		APW	
Dining Hall	14	Warming Table	1,200			
Dining Hall	6	Milk Dispenser	200			
Dining Hall	18	Undercounter Refrigerator	600		Continental	
Dining Hall	1	Fruit Flavored Water Dispenser	350			
Dining Hall	15	Refrigerated Table	445			
Dining Hall	1	Bug Light	84			
Dining Hall	1	Small Mixer	250			
Dining Hall	1	Medium Mixer	1,140		Hobart	
Dining Hall	1	Large Mixer	3,500		Hobart	

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Dining Hall	3	Deli Slicer	373			
Dining Hall	1	Ice Cream Machine	4,400		Taylor	338-33
Dining Hall	2	Pizza Press	1,450			
Dining Hall	4	Soup Warmer	400			
Dining Hall	5	Soda Dispenser	1,275			
Dining Hall	1	Panini Press	6,500		Sodir	
Dining Hall	1	Sandwich Press	1,800		Nemco	6600
Dining Hall	1	Food Processor	2,237		Robot Coupe	Blixer 6V
Dining Hall	3	Juice Dispenser	720			
Dining Hall	6	Bug Light	30			
Dining Hall	2	Hot Stone Plate	930		Hatco	
Dining Hall	5	Hot Plate	1,000			
Dining Hall	1	Electric Countertop Oven	1,650		Turbo Chef	Tornado
Dining Hall	1	Dough Press	1,100		Erika	
Dining Hall Faculty	2	Panini Press	1,750			
Dish Room	1	Dish Conveyor	1,500			
Kitchenettes	2	Electric Stove Top	3,000			
Kitchen	1	Large Mixer	1,491		Hobart	NH-600T
Dorm Room	1	Misc. Plug Loads	29,420			
Health Services Office	1	Residential Refrigerator	800			
Health Services Office	2	Coffee Machine	700			
Health Services Office	3	Misc. Medial Equipment	5,000			
Eickhoff Hall	3	Sever Closets	3,000			

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Hallway	2	Glass Fronted Refrigerated	18	Yes	0.3	2,418	0	$356	$460	$100	1.0
Hallway	2	Non-Refrigerated	18	Yes	0.1	685	0	$101	$460	$0	4.6

Miscellaneous Fuel Inventory

Location	Existing Conditions					
	Quantity	Equipment Description	Input Capacity per Unit (MBh)	ENERGY STAR Qualified?	Manufacturer	Model
Kitchen	1	Chicken Rotisserie	16.3	No	Alto-Shaam	AR-6G
Kitchen	5	Kettle	11.7	No	Cleveland	0
Kitchen	1	Tilt Skillet	7.6	No	Cleveland	0
Dining Hall	1	Pizza Oven	18.9	No	Wood Stone	0

Custom (High Level) Measure Analysis

Retro-Commissioning Study

Building Square Footage	125,035		Fuel Utility Rate	$4.535	MMBtu
Percent of Conditioned Area Impacted	100%		Blended Electric Utility Rate	$0.147	kWh

Existing Conditions						Proposed Conditions					Energy Impact & Financial Analysis						
Description	Area(s)/System(s) Served	Remaining Useful Life	Total HVAC Motor Usage kWh	Total HVAC Electric Usage kWh	Total HVAC Fuel Usage MMBtu	Description	% Savings HVAC Motor Usage kWh	% Savings HVAC Electric Usage kWh	% Savings HVAC Fuel Usage MMBtu	Estimated Cost per Sqft	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
HVAC Controls Not Currently Optimized	HVAC Equipment & Systems	3	958,343	250,952	15,672	Retro-Commissioning Study	2%	2%	2%	$0.30	0.00	24,186	313	$4,980	$37,511	$0	7.53

Utility Sub Metering

Existing Conditions					Proposed Conditions					Energy Impact & Financial Analysis						
Description	Existing Main Meter Annual kWh	Electric (kWh)	Steam (MMBtu)	Chilled Water (MMBtu)	Description	% Electric Savings	% Gas Savings	Number of Meters	Estimated Unit Cost	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Campus Wide Metering	No Current Metering	2,984,035	15,881	10,831	Electric Smart Sub Meter, Steam Flow and Chilled Water Meters	1%	1%	3	Varies	0.00	29,840	267	$5,601	$18,800	$0	3.36

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

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ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

The College of New Jersey

Primary Property Type: College/University
Gross Floor Area (ft²): 2,830,421
Built: 1855

For Year Ending: January 31, 2020
Date Generated: December 13, 2020

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
The College of New Jersey 2000 Pennington Road Ewing, New Jersey 08628	The College of New Jersey 2000 Pennington Rd Ewing, NJ 08628 609-771-2874	David Matlack 2000 Pennington Road Ewing, NJ 08628 609-771-2874 sstewart@trccompanies.com

Property ID: 5984875

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
229 kBtu/ft²

Source EUI
258.3 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	619,522,872 (96%)
Electric - Grid (kBtu)	28,774,949 (4%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	160.2
National Median Source EUI (kBtu/ft²)	180.6
% Diff from National Median Source EUI	43%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	35,660

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

LP Signature: _____ Date: _____

Licensed Professional

___ _____
,
(___)___-_____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

TERM	DEFINITION
Blended Rate	Used to calculate fiscal savings associated with measures. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is $22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour.
Btu	*British thermal unit*: a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
CHP	*Combined heat and power*. Also referred to as cogeneration.
COP	*Coefficient of performance*: a measure of efficiency in terms of useful energy delivered divided by total energy input.
Demand Response	Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives.
DCV	*Demand control ventilation*: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
US DOE	*United States Department of Energy*
EC Motor	*Electronically commutated motor*
ECM	*Energy conservation measure*
EER	*Energy efficiency ratio*: a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	*Energy Use Intensity:* measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance.
Energy Efficiency	Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service.
ENERGY STAR®	ENERGY STAR® is the government-backed symbol for energy efficiency. The ENERGY STAR® program is managed by the EPA.
EPA	*United States Environmental Protection Agency*
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
GHG	*Greenhouse gas* gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
gpf	*Gallons per flush*

gpm	*Gallon per minute*
HID	*High intensity discharge:* high-output lighting lamps such as high-pressure sodium, metal halide, and mercury vapor.
hp	*Horsepower*
HPS	*High-pressure sodium*: a type of HID lamp
HSPF	*Heating seasonal performance factor:* a measure of efficiency typically applied to heat pumps. Heating energy provided divided by seasonal energy input.
HVAC	*Heating, ventilating, and air conditioning*
IHP 2014	US DOE Integral Horsepower rule. The current ruling regarding required electric motor efficiency.
IPLV	*Integrated part load value:* a measure of the part load efficiency usually applied to chillers.
kBtu	One thousand British thermal units
kW	*Kilowatt*: equal to 1,000 Watts.
kWh	*Kilowatt-hour*: 1,000 Watts of power expended over one hour.
LED	*Light emitting diode*: a high-efficiency source of light with a long lamp life.
LGEA	*Local Government Energy Audit*
Load	The total power a building or system is using at any given time.
Measure	A single activity, or installation of a single type of equipment, that is implemented in a building system to reduce total energy consumption.
MH	*Metal halide*: a type of HID lamp
MBh	*Thousand Btu per hour*
MBtu	*One thousand British thermal units*
MMBtu	*One million British thermal units*
MV	*Mercury Vapor:* a type of HID lamp
NJBPU	*New Jersey Board of Public Utilities*
NJCEP	*New Jersey's Clean Energy Program:* NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment.
psig	Pounds per square inch gauge
Plug Load	Refers to the amount of power used in a space by products that are powered by means of an ordinary AC plug.
PV	*Photovoltaic:* refers to an electronic device capable of converting incident light directly into electricity (direct current).

SEER	*Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input.
SEP	*Statement of energy performance:* a summary document from the ENERGY STAR® Portfolio Manager®.
Simple Payback	The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings.
SREC	*Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array.
TREC	*Transition Incentive Renewable Energy Certificate:* a factorized renewable energy certificate you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of 1/8th of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use
VAV	*Variable air volume*
VFD	*Variable frequency drive*: a controller used to vary the speed of an electric motor.
WaterSense®	The symbol for water efficiency. The WaterSense® program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.