Local Government Energy Audit Report

Norsworthy Hall

May 6, 2021

Prepared for:

The College of New Jersey
2000 Pennington Road
Ewing, New Jersey 08628

Prepared by:

TRC
900 Route 9 North
Woodbridge, New Jersey 07095

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.

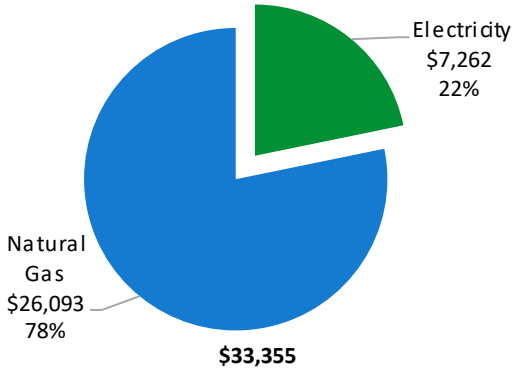
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Norsworthy 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: $33,355 Electricity: 254,912 kWh Natural Gas: 61,669 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.

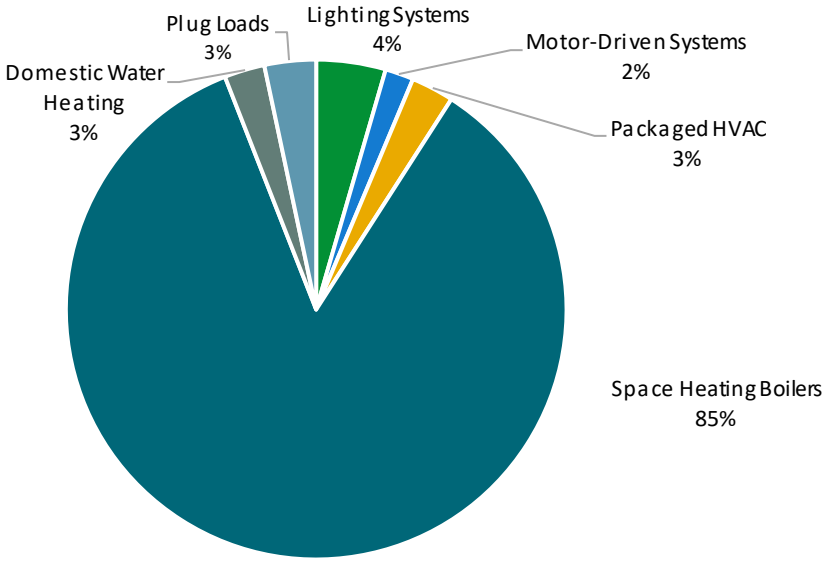


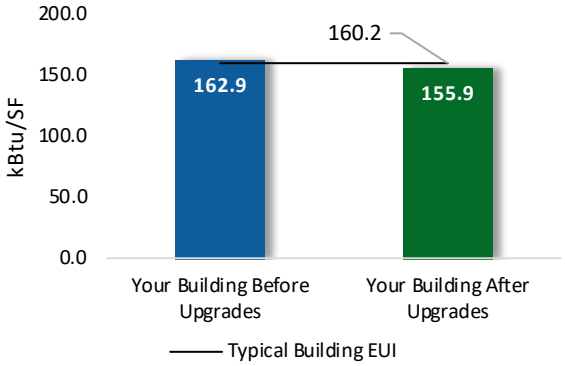
Figure 1 - Energy Use by System

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.

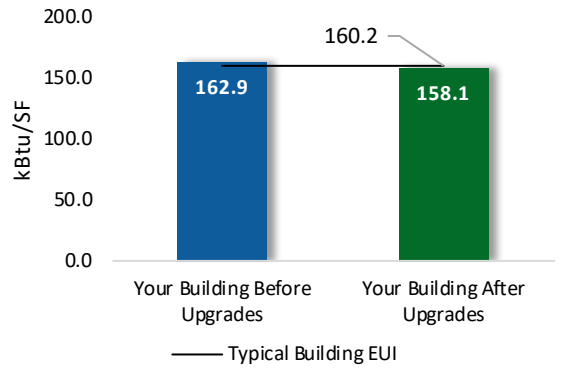
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$32,850
Potential Rebates & Incentives[1]	$1,182
Annual Cost Savings	$4,081
Annual Energy Savings	Electricity: 21,090 kWh Natural Gas: 2,310 Therms
Greenhouse Gas Emission Savings	24 Tons
Simple Payback	7.8 Years
Site Energy Savings (all utilities)	4%



Scenario 2: Cost Effective Package[2]

Installation Cost	$17,662
Potential Rebates & Incentives	$932
Annual Cost Savings	$2,986
Annual Energy Savings	Electricity: 13,651 kWh Natural Gas: 195 Therms
Greenhouse Gas Emission Savings	20 Tons
Simple Payback	5.6 Years
Site Energy Savings (all utilities)	4%



On-site Generation Potential

Photovoltaic	None
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			**7,620**	**0.0**	**0**	**$1,121**	**$2,817**	**$258**	**$2,559**	**2.3**	**7,672**
ECM 1	Install LED Fixtures	Yes	7,524	0.0	0	$1,107	$2,759	$250	$2,509	2.3	7,576
ECM 2	Retrofit Fixtures with LED Lamps	Yes	97	0.0	0	$14	$58	$8	$50	3.5	96
Lighting Control Measures			**1,241**	**0.1**	**0**	**$181**	**$1,890**	**$210**	**$1,680**	**9.3**	**1,216**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	1,241	0.1	0	$181	$1,890	$210	$1,680	9.3	1,216
Motor Upgrades			**765**	**0.1**	**0**	**$112**	**$2,797**	**$0**	**$2,797**	**24.9**	**770**
ECM 4	Premium Efficiency Motors	No	765	0.1	0	$112	$2,797	$0	$2,797	24.9	770
Variable Frequency Drive (VFD) Measures			**6,675**	**1.1**	**0**	**$982**	**$12,390**	**$250**	**$12,140**	**12.4**	**6,721**
ECM 5	Install VFDs on Constant Volume (CV) Fans	No	6,675	1.1	0	$982	$12,390	$250	$12,140	12.4	6,721
Domestic Water Heating Upgrade			**0**	**0.0**	**50**	**$211**	**$2,330**	**$464**	**$1,866**	**8.8**	**5,849**
ECM 6	Install Low-Flow DHW Devices	Yes	0	0.0	50	$211	$2,330	$464	$1,866	8.8	5,849
Food Service & Refrigeration Measures			**343**	**0.0**	**0**	**$50**	**$230**	**$0**	**$230**	**4.6**	**345**
ECM 7	Vending Machine Control	Yes	343	0.0	0	$50	$230	$0	$230	4.6	345
Custom Measures			**4,447**	**0.0**	**181**	**$1,422**	**$10,396**	**$0**	**$10,396**	**7.3**	**25,710**
ECM 8	Retro-Commissioning Study	Yes	1,898	0.0	120	$786	$1,296	$0	$1,296	1.6	15,923
ECM 9	Sub Metering	Yes	2,549	0.0	62	$636	$9,100	$0	$9,100	14.3	9,788
TOTALS (COST EFFECTIVE MEASURES)			**13,651**	**0.2**	**231**	**$2,986**	**$17,662**	**$932**	**$16,730**	**5.6**	**40,792**
TOTALS (ALL MEASURES)			**21,090**	**1.4**	**231**	**$4,081**	**$32,850**	**$1,182**	**$31,668**	**7.8**	**48,283**

* - 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 Fixtures with LED Lamps	x		x
ECM 3	Install Occupancy Sensor Lighting Controls	x		x
ECM 4	Premium Efficiency Motors			x
ECM 5	Install VFDs on Constant Volume (CV) Fans	x		x
ECM 6	Install Low-Flow DHW Devices	x		x
ECM 7	Vending Machine Control			x
ECM 8	Retro-Commissioning Study			
ECM 9	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 Norsworthy 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 October 21, 2020, TRC performed an energy audit at The College of New Jersey's Norsworthy Hall located in Ewing, New Jersey. TRC met with Kevin Myles to review the facility operations and help focus our investigation on specific energy-using systems.

Norsworthy Hall is a three-story, 43,200 square foot building built in 1936. Spaces include residential dorm rooms, offices, kitchenettes, lounges, rest rooms, hallways, corridors, stairwells, storage rooms, closets, janitorial closets, electrical rooms, and mechanical spaces.

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

2.2 Building Occupancy

The facility is occupied year-round. Typical weekday occupancy is 3 staff and 220 students.

This building is a residence hall, so it is occupied 24 hours per day, 7 days per week during the school year. Summer occupancy includes a summer camp and continuing maintenance activities.

Building Name	Weekday/Weekend	Operating Schedule
Norsworthy Hall	Weekday	24/7
	Weekend	24/7
	Summer	24/7

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are brick with some sections of poured concrete. The roof is pitched and covered with black asphalt-fiberglass composite shingles, and it is in fair condition.

Most of the windows are clear, operable, double pane, and have vinyl frames. Many of the 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 good condition with undamaged door seals.

Building Envelope

Roof Material

Exterior Windows

Exterior Door

2.4 Lighting Systems

The primary interior lighting system uses an estimated 20-Watt LED ceiling mounted fixture, primarily in the residence dorm rooms. There are also several 14.5-Watt LED linear tube fixtures and 2' by 2' LED panels rated at 60-Watts. Additionally, there are a several LED general purpose lamps and only a few linear T8 fluorescent lamps.

Fixture types include 1- or 2-lamp, 2- or 4-foot long troffer, recessed, and surface mounted fixtures. Additionally, there are also several ceiling mounted fixtures, recessed can fixtures, pendent mounted fixtures, wall mounted fixtures, cove mounted fixtures, wall sconce fixtures, and direct/indirect fixtures.

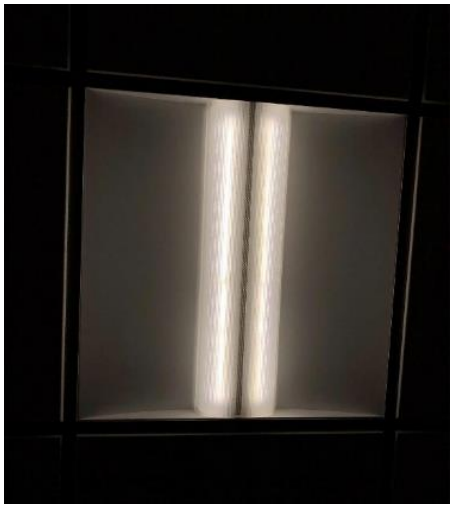
Most fixtures are in good condition. Interior lighting levels were generally sufficient.

All exit signs are LED.

Residential Dorm Ceiling Mounted Fixture

Rest Room Wall Mounted Fixture

Lobby Recessed Can Fixture



Lounge Direct/Indirect Fixture

Most lighting fixtures are controlled manually by wall switches and the remainder by occupancy sensors.

Ceiling Mounted Occupancy Sensor

Wall Switch

Exterior fixtures include wall packs, pole mounted fixtures, arm mounted fixtures, and under canopy fixtures with high intensity discharge (HID), CFL, and LED lamps.

The pole mounted flood fixtures have LED lamps and are controlled by a central campus timeclock.

Exterior light fixtures are controlled by a time clock or photocell, depending on the fixture.

LED Arm Mounted Fixture

LED Pole Mounted Fixture

LED Wall Pack

Metal Halide Arm Mounted Fixture

2.5 Air Handling Systems

Fan Coil Units

Fan coil units serving the mechanical rooms are equipped with fractional hp supply fan motors and hot water coils. Fan coil units serving the electrical room and the electrical generator room are equipped with fractional hp supply fan motors and electric resistance heating, each with an 11.26-MBh heating capacity.

Most spaces are heated through hot water baseboard radiant heating. Please see Section 2.6 for details on steam and hot water distribution.

Electric Resistance FCU

Hot Water FCU

Unitary Electric HVAC Equipment

There are several ductless mini-split system air conditioning units severing various areas. These units are controlled by individual programmable thermostats located in each area served. Please see the table below for more information about each unit:

Area Served	Unit Tag	Cooling Capacity (Tons)	Cooling Efficiency (SEER)
Handicap Room	CU-1	2.00	17.60
Handicap Room	CU-2	2.00	17.60
Student Lounge	CU-3	1.50	18.60
Student Lounge	CU-4	1.50	18.60
Student Lounge	CU-5	1.50	18.60
Laundry Room	CU-6	1.00	18.00
Student Lounge	CU-7	1.00	18.00
Student Lounge	CU-8	1.00	18.00
Laundry Room	CU-9	1.00	18.00

Ductless Mini-Split System AC Units

Ductless Mini-Split System AC Units

Lounge Evaporator Unit

Lounge Programmable Thermostat Control

Air Handling Units (AHUs)

There are two air handling units that provide heating and ventilation for lounge and hallway areas. Each unit is equipped with a 1.5 hp constant speed supply fan motor, hot water coils, and an outdoor air damper. Air in the corresponding zones is exhausted by dedicated exhaust fans as needed. These units are controlled through the building's energy management system (EMS).

H&V-2

H&V-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, fan coil units, and air handling units by two 5.0 hp, variable frequency drive (VFD) controlled hot water pumps in a lead/lag control scheme. There are also two fractional hp, constant speed hot water pumps that circulate hot water through the hot water coils in the air handling units. Additionally, there are two fractional hp, constant speed condensate pumps. Domestic hot water is circulated throughout the building by two fractional hp DHW circulation 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.

Heating Heat Exchanger

Hot Water Pumps

VFD Control

H&V-1 HW Circulation Pump

2.7 Domestic Hot Water

Hot water is produced by a heat exchanger using steam from the space heating boiler at the Power House/Cogen Building. Two fractional hp circulation pumps distribute water to end uses. The circulation pumps operate continuously. Two 5.0 hp, VFD controlled booster water pressure pumps circulate cold water to help maintain water pressure for the upper floors.

At the time of the site visit, the domestic water heaters were set at 110°F.

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

DHW Heat Exchanger

DHW Circulation Pump

Cold Water Pressure Pumps

VFD Controls

2.8 Plug Load and Vending Machines

The location is doing a great job managing their electrical plug loads. This report makes additional suggestions for ECMs in this area as well as energy efficient best practices.

There is approximately one computer workstation in the facility. Plug loads throughout the building include general residential dorm, café, and office equipment. There are typical loads such as dehumidifiers, fans, microwaves, printers, mini fridges, and TVs. There are also non-typical loads, such as: portable ACs, clothes washing machines, clothes dryers, electric ovens, and stovetops.

There are several residential style refrigerators throughout the building that are used to store personal food and beverages. These vary in condition and efficiency. There is one non-refrigerated vending machine not equipped with occupancy-based controls.

Clothes Dryer

Residential Refrigerator

Vending Machine

Electric Oven

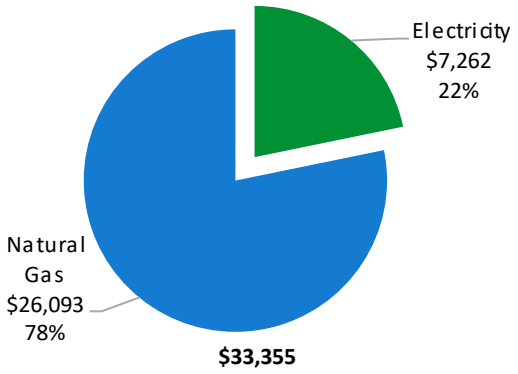
2.9 Water-Using Systems

There are 10 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. There are several restrooms with showers and showerheads that are estimated to be rated at 2.5 gpm.

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	254,912 kWh	$7,262
Natural Gas	61,669 Therms	$26,093
Total		**$33,355**



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.

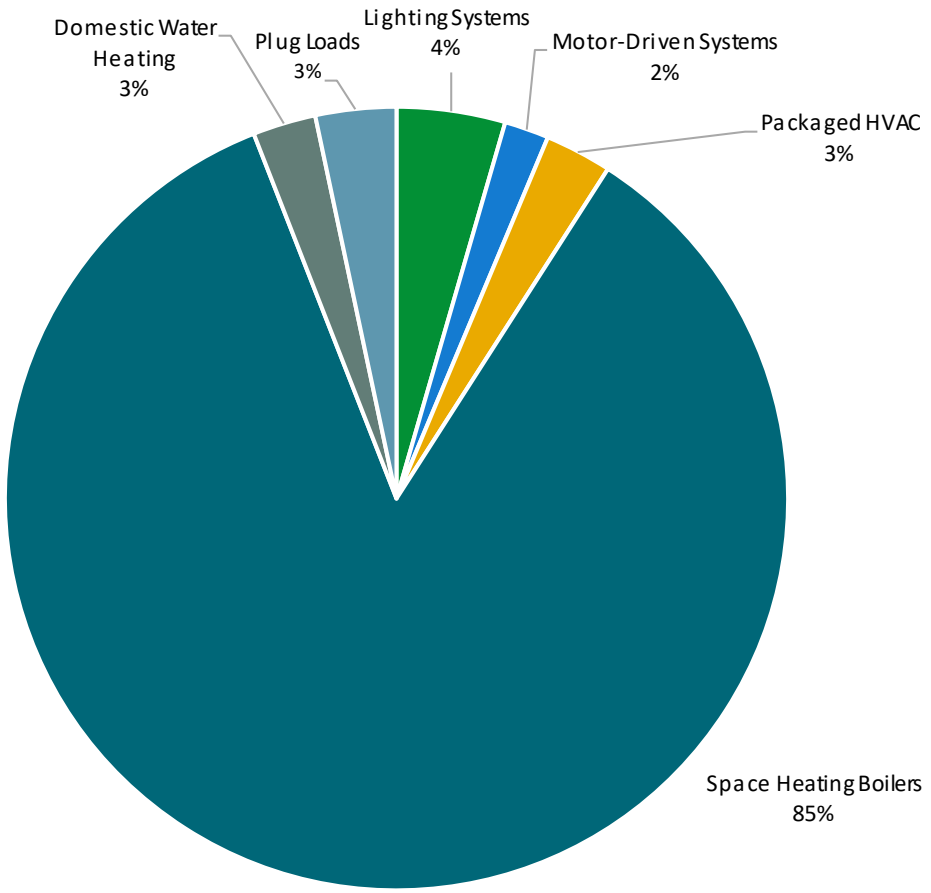
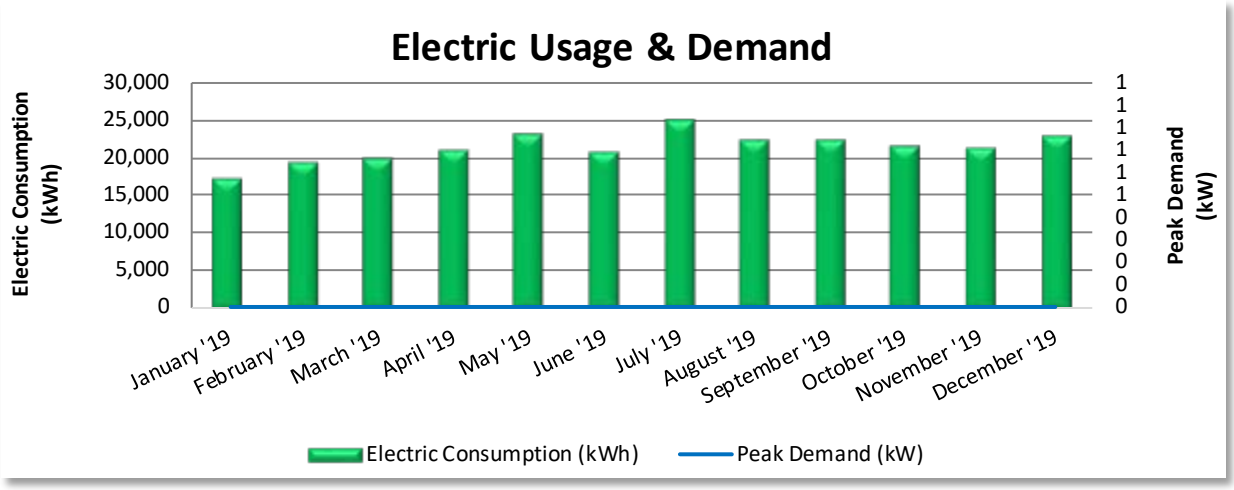


Figure 5 - Energy Balance

3.1 Electricity

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



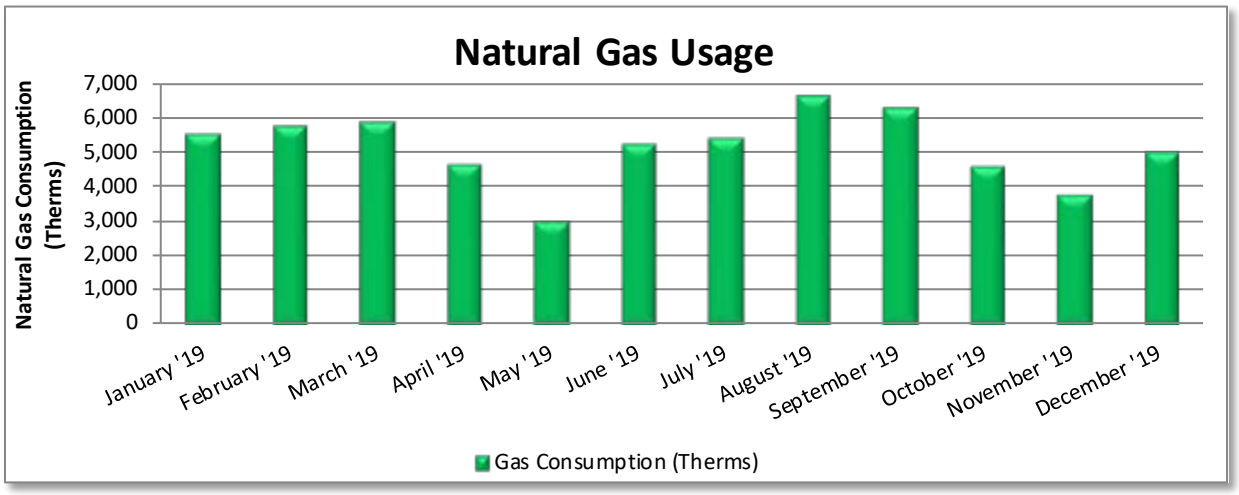
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
1/28/19	31	16,978	0	$0	$370	Yes
2/28/19	31	19,162	0	$0	$471	Yes
3/28/19	28	19,823	0	$0	$431	Yes
4/28/19	31	20,827	0	$0	$469	Yes
5/29/19	31	22,873	0	$0	$843	Yes
6/27/19	29	20,668	0	$0	$657	Yes
7/29/19	32	24,954	0	$0	$899	Yes
8/27/19	29	22,165	0	$0	$629	Yes
9/26/19	30	22,153	0	$0	$689	Yes
10/25/19	29	21,407	0	$0	$594	Yes
11/25/19	31	21,204	0	$0	$512	Yes
12/11/19	33	22,698	0	$0	$696	Yes
Totals	**365**	**254,912**	**0**	**$0**	**$7,262**	
Annual	**365**	**254,912**	**0**	**$0**	**$7,262**	

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

PSE&G delivers natural gas for the main boiler meter under rate class TSGNF.



Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
1/31/19	31	5,513	$2,068	Yes
2/28/19	28	5,732	$2,728	Yes
3/31/19	31	5,873	$2,636	Yes
4/30/19	30	4,638	$1,942	Yes
5/31/19	31	2,984	$1,291	Yes
6/30/19	30	5,240	$2,260	Yes
7/31/19	31	5,397	$2,182	Yes
8/31/19	31	6,639	$2,600	Yes
9/30/19	30	6,297	$2,521	Yes
10/31/19	31	4,602	$1,965	Yes
11/30/19	30	3,768	$1,658	Yes
12/31/19	31	4,986	$2,242	Yes
Totals	**365**	**61,669**	**$26,093**	
Annual	**365**	**61,669**	**$26,093**	

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 is $0.423/therm, which is the blended rate used throughout the analysis.

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.

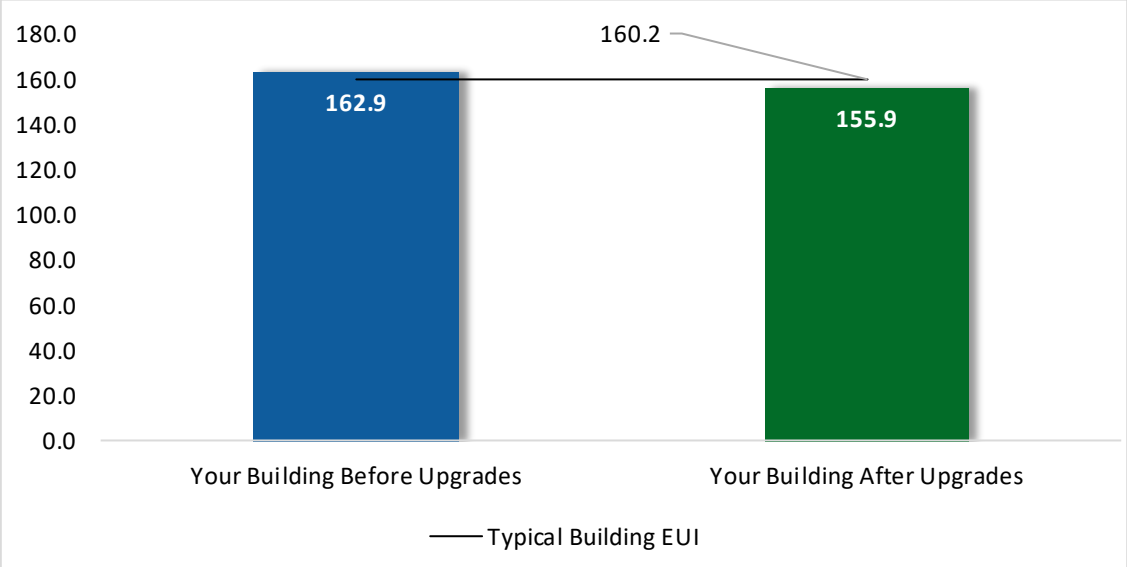


Figure 6 - Energy Use Intensity Comparison[3]

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			**7,620**	**0.0**	**0**	**$1,121**	**$2,817**	**$258**	**$2,559**	**2.3**	**7,672**
ECM 1	Install LED Fixtures	Yes	7,524	0.0	0	$1,107	$2,759	$250	$2,509	2.3	7,576
ECM 2	Retrofit Fixtures with LED Lamps	Yes	97	0.0	0	$14	$58	$8	$50	3.5	96
Lighting Control Measures			**1,241**	**0.1**	**0**	**$181**	**$1,890**	**$210**	**$1,680**	**9.3**	**1,216**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	1,241	0.1	0	$181	$1,890	$210	$1,680	9.3	1,216
Motor Upgrades			**765**	**0.1**	**0**	**$112**	**$2,797**	**$0**	**$2,797**	**24.9**	**770**
ECM 4	Premium Efficiency Motors	No	765	0.1	0	$112	$2,797	$0	$2,797	24.9	770
Variable Frequency Drive (VFD) Measures			**6,675**	**1.1**	**0**	**$982**	**$12,390**	**$250**	**$12,140**	**12.4**	**6,721**
ECM 5	Install VFDs on Constant Volume (CV) Fans	No	6,675	1.1	0	$982	$12,390	$250	$12,140	12.4	6,721
Domestic Water Heating Upgrade			**0**	**0.0**	**50**	**$211**	**$2,330**	**$464**	**$1,866**	**8.8**	**5,849**
ECM 6	Install Low-Flow DHW Devices	Yes	0	0.0	50	$211	$2,330	$464	$1,866	8.8	5,849
Food Service & Refrigeration Measures			**343**	**0.0**	**0**	**$50**	**$230**	**$0**	**$230**	**4.6**	**345**
ECM 7	Vending Machine Control	Yes	343	0.0	0	$50	$230	$0	$230	4.6	345
Custom Measures			**4,447**	**0.0**	**181**	**$1,422**	**$10,396**	**$0**	**$10,396**	**7.3**	**25,710**
ECM 8	Retro-Commissioning Study	Yes	1,898	0.0	120	$786	$1,296	$0	$1,296	1.6	15,923
ECM 9	Sub Metering	Yes	2,549	0.0	62	$636	$9,100	$0	$9,100	14.3	9,788
TOTALS			**21,090**	**1.4**	**231**	**$4,081**	**$32,850**	**$1,182**	**$31,668**	**7.8**	**48,283**

* - 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		**7,620**	**0.0**	**0**	**$1,121**	**$2,817**	**$258**	**$2,559**	**2.3**	**7,672**
ECM 1	Install LED Fixtures	7,524	0.0	0	$1,107	$2,759	$250	$2,509	2.3	7,576
ECM 2	Retrofit Fixtures with LED Lamps	97	0.0	0	$14	$58	$8	$50	3.5	96
Lighting Control Measures		**1,241**	**0.1**	**0**	**$181**	**$1,890**	**$210**	**$1,680**	**9.3**	**1,216**
ECM 3	Install Occupancy Sensor Lighting Controls	1,241	0.1	0	$181	$1,890	$210	$1,680	9.3	1,216
Domestic Water Heating Upgrade		**0**	**0.0**	**50**	**$211**	**$2,330**	**$464**	**$1,866**	**8.8**	**5,849**
ECM 6	Install Low-Flow DHW Devices	0	0.0	50	$211	$2,330	$464	$1,866	8.8	5,849
Food Service & Refrigeration Measures		**343**	**0.0**	**0**	**$50**	**$230**	**$0**	**$230**	**4.6**	**345**
ECM 7	Vending Machine Control	343	0.0	0	$50	$230	$0	$230	4.6	345
Custom Measures		**4,447**	**0.0**	**181**	**$1,422**	**$10,396**	**$0**	**$10,396**	**7.3**	**25,710**
ECM 8	Retro-Commissioning Study	1,898	0.0	120	$786	$1,296	$0	$1,296	1.6	15,923
ECM 9	Sub Metering	2,549	0.0	62	$636	$9,100	$0	$9,100	14.3	9,788
TOTALS		**13,651**	**0.2**	**231**	**$2,986**	**$17,662**	**$932**	**$16,730**	**5.6**	**40,792**

* - 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		**7,620**	**0.0**	**0**	**$1,121**	**$2,817**	**$258**	**$2,559**	**2.3**	**7,672**
ECM 1	Install LED Fixtures	7,524	0.0	0	$1,107	$2,759	$250	$2,509	2.3	7,576
ECM 2	Retrofit Fixtures with LED Lamps	97	0.0	0	$14	$58	$8	$50	3.5	96

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 metal halide fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

Replace fluorescent 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: rest room (linear fluorescent) and exterior (compact fluorescent) fixture.

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		**1,241**	**0.1**	**0**	**$181**	**$1,890**	**$210**	**$1,680**	**9.3**	**1,216**
ECM 3	Install Occupancy Sensor Lighting Controls	1,241	0.1	0	$181	$1,890	$210	$1,680	9.3	1,216

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 3: 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: lounges, office, rest rooms, and server room.

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		**765**	**0.1**	**0**	**$112**	**$2,797**	**$0**	**$2,797**	**24.9**	**770**
ECM 4	Premium Efficiency Motors	765	0.1	0	$112	$2,797	$0	$2,797	24.9	770

ECM 4: 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:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Roof	Building Exhaust	5	Exhaust Fan	0.3	Exhaust Fan Motor
Mechanical Room	Heating Hot Water System (H&V-1)	1	Heating Hot Water Pump	0.3	Heating Hot Water Pump (H&V-1)
Mechanical Room	Heating Hot Water System	1	Heating Hot Water Pump	0.3	Heating Hot Water Pump (H&V-2)

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 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		**6,675**	**1.1**	**0**	**$982**	**$12,390**	**$250**	**$12,140**	**12.4**	**6,721**
ECM 5	Install VFDs on Constant Volume (CV) Fans	6,675	1.1	0	$982	$12,390	$250	$12,140	12.4	6,721

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 5: Install VFDs on Constant Volume (CV) Fans

We evaluated installing VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume (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.

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

Affected air handlers: H&V-1 and H&V-2

4.5 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**	**50**	**$211**	**$2,330**	**$464**	**$1,866**	**8.8**	**5,849**
ECM 6	Install Low-Flow DHW Devices	0	0.0	50	$211	$2,330	$464	$1,866	8.8	5,849

ECM 6: Install Low-Flow DHW Devices

Install 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.

4.6 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		**343**	**0.0**	**0**	**$50**	**$230**	**$0**	**$230**	**4.6**	**345**
ECM 7	Vending Machine Control	343	0.0	0	$50	$230	$0	$230	4.6	345

ECM 7: 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.

4.7 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		**4,447**	**0.0**	**181**	**$1,422**	**$10,396**	**$0**	**$10,396**	**7.3**	**25,710**
ECM 8	Retro-Commissioning Study	1,898	0.0	120	$786	$1,296	$0	$1,296	1.6	15,923
ECM 9	Sub Metering	2,549	0.0	62	$636	$9,100	$0	$9,100	14.3	9,788

ECM 8: 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 selected 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 9: 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 and steam flow meter. Meter costs for the evaluation are based on average building use across the campus: smart electric meter $2,400 and steam flow meter $6,700. 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.

4.8 Measures for Future Consideration

There is an additional opportunity for improvement that The College of New Jersey may wish to consider. This potential upgrade typically requires further analysis, involves substantial capital investment and/or includes significant system reconfiguration. This measure is therefore beyond the scope of this energy audit. This measure is described here to support a whole building approach to energy efficiency and sustainability.

The College of New Jersey may wish to consider the Energy Savings Improvement Program (ESIP) or other whole building approach. With interest in implementing comprehensive, largescale and/or complex system wide projects, this measure may be pursued during development of a future energy savings plan. We recommend that you work with your energy service company (ESCO) and/or design team to:

- evaluate this measure further
- develop firm costs
- determine measure savings
- prepare detailed implementation plans.

Other modernization or capital improvement funds may be leveraged for these types of refurbishments. As you plan for capital upgrades, be sure to consider the energy impact of the building systems and controls being specified.

Upgrade to a Heat Pump System

An electric furnace or boiler has no flue loss through a chimney. The AFUE rating for an all-electric furnace or boiler is between 95% and 100%. The lower values are for units installed outdoors because they have greater jacket heat loss. However, despite their high efficiency, the higher cost of electricity in most parts of the country makes all-electric furnaces or boilers an uneconomic choice. If you are interested in electric heating, consider installing a heat pump system.

Electric resistance heat, including electric furnaces and baseboard heaters can be inexpensive to install but often expensive to run. Facilities with these systems can save substantial energy at a moderate cost by installing a heat pump when they replace a central air conditioner. Even in buildings without central air-conditioning, there are opportunities to save energy when an existing electric furnace needs to be replaced, as well as opportunities to install ductless electric heat pumps in buildings with baseboard electric heaters. Electric heat pumps have high coefficient of performance (COP) ratings and are substantially more efficient than traditional electric heating systems. Further investigation is required to determine whether installing a heat pump system is a cost-effective solution when replacing existing electrical heating systems.

This is recommended for the electrical generator room and electrical room that both have current electric resistance heating, but no cooling system in place.

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.

Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour (ACH) can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

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.

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

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.

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.

Thermostat Schedules and Temperature Resets

Use thermostat setback temperatures and schedules to reduce heating and cooling energy use during periods of low or no occupancy. Thermostats should be programmed for a setback of 5-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

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.

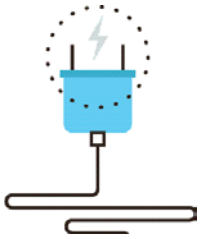
Optimize HVAC Equipment Schedules

Energy Management Systems (EMS) typically provide advanced controls for building HVAC systems, including chillers, boilers, air handling units, rooftop units and exhaust fans. The EMS monitors and reports operational status, schedules equipment 'start' and 'stop' times, locks out equipment operation based on outside air or space temperature, and often optimizes damper and valve operation based on complex algorithms. These EMS features, when in proper adjustment, can improve comfort for building occupants and save substantial energy.

Know your EMS scheduling capabilities. Regularly monitor HVAC equipment operating schedules and match them to building operating hours in order to eliminate unnecessary equipment operation and save

energy. Monitoring should be performed often at sites with frequently changing usage patterns – daily in some cases. We recommend using the 'Optimal Start' feature of the EMS, if available, to optimize the building warmup sequence. Most EMS scheduling programs provide for "Holiday" schedules which can be used during reduced use or shutdown periods. Finally, many systems are equipped with a one-time override function which can be used to provide additional space conditioning due to a one-time, special event. When available this override feature should be used rather than changing the base operating schedule.

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 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.

---

[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.

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 **no** potential for installing a PV array.

This facility **does not** appear to meet the minimum criteria for a cost-effective solar PV installation. To be cost-effective, a solar PV array needs certain minimum criteria, such as sufficient and sustained electric demand and sufficient flat or south-facing rooftop or other unshaded space on which to place the PV panels.

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.

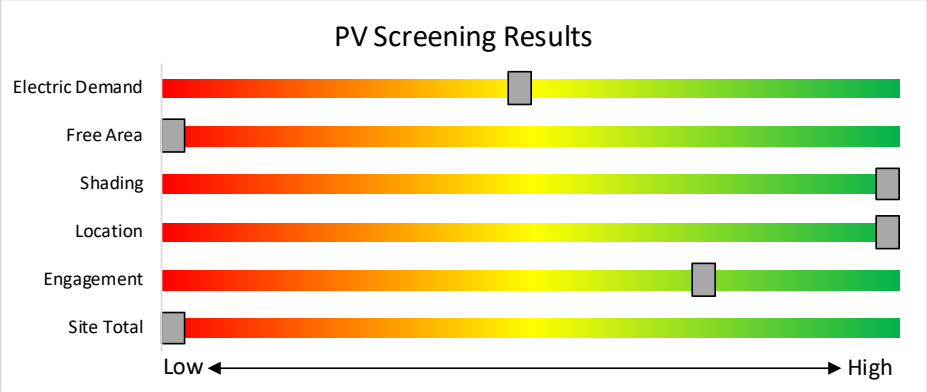


Figure 9 - Photovoltaic Screening

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.

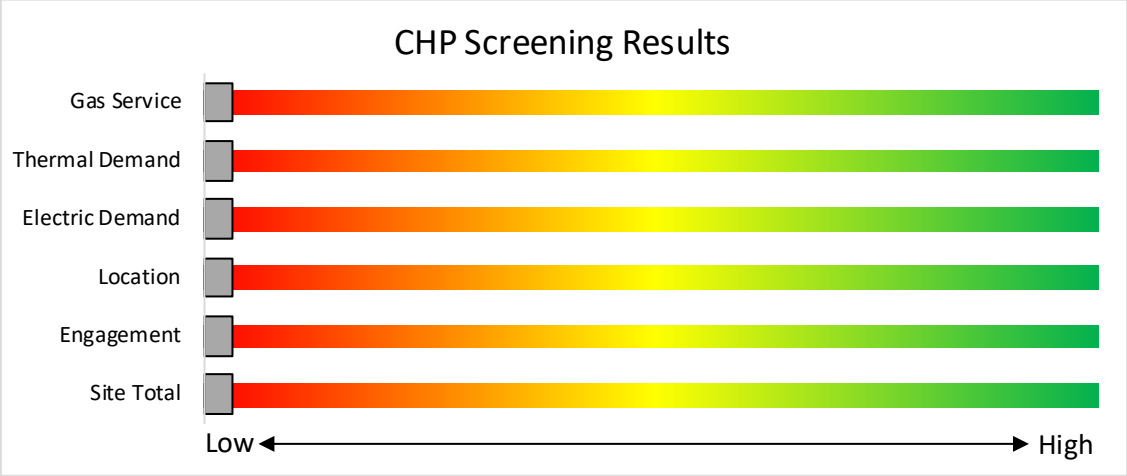


Figure 10 - Combined Heat and Power Screening

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.

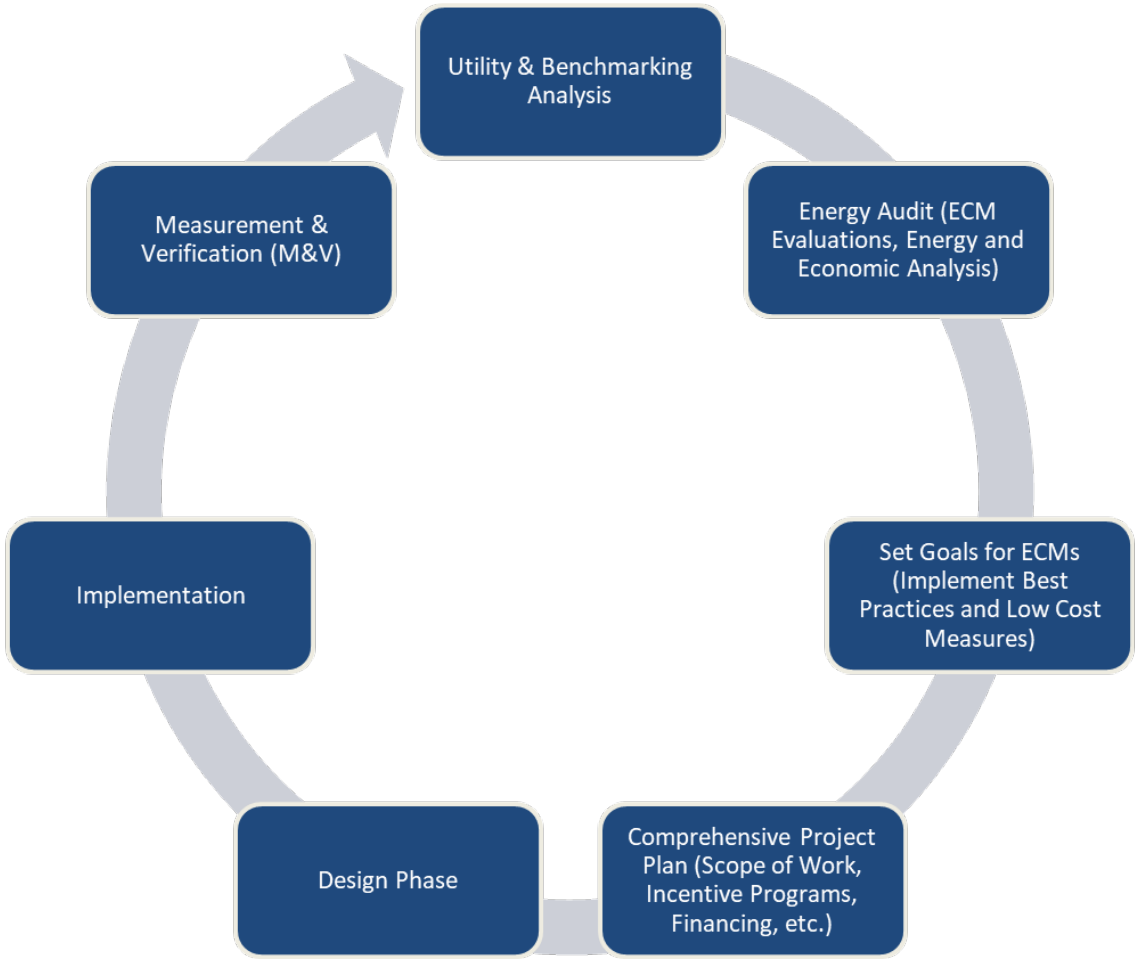


Figure 11 – Project Development Cycle

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
Basement Hallway	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
Basement Hallway	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	5,796		None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,796	0.0	0	0	$0	$0	$0	0.0
Electrical Room 1	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 1	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 10	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 10	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	300		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 11	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	300		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 2	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 3	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 329B	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 4	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 4	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 5	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 6	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room 8	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Electrical Room Generator	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level	1	Compact Fluorescent: (2) 18W Biaxial Plug-In Lamps	Photocell		36	4,380	2	Relamp	No	1	LED Lamps: (2) 13W Plug-In Lamps	Photocell	26	4,380	0.0	44	0	$6	$25	$2	3.6
Exterior Ground Level	1	LED Lamps: (1) 150W Corn Bulb Screw-In Lamp	Timeclock		150	4,732		None	No	1	LED Lamps: (1) 150W Corn Bulb Screw-In Lamp	Timeclock	150	4,732	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level	17	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock		30	4,732		None	No	17	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	30	4,732	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level	5	LED - Fixtures: Wall Pack	Timeclock		20	4,732		None	No	5	LED - Fixtures: Wall Pack	Timeclock	20	4,732	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level	1	LED - Fixtures: Wall Pack	Photocell		30	4,380		None	No	1	LED - Fixtures: Wall Pack	Photocell	30	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Ground Level	5	Metal Halide: (1) 400W Lamp	Timeclock		458	4,732	1	Fixture Replacement	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	140	4,732	0.0	7,524	0	$1,107	$2,759	$250	2.3
First Floor 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
First Floor Hallway	11	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	S	9	5,796		None	No	11	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	5,796	0.0	0	0	$0	$0	$0	0.0
First Floor Hallway	27	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	5,796		None	No	27	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	5,796	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
First Floor Hallway	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	5,796		None	No	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	5,796	0.0	0	0	$0	$0	$0	0.0
Janitorial 1	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	300		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	300	0.0	0	0	$0	$0	$0	0.0
Janitorial 1	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Janitorial 2	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Janitorial 236C	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	300	0.0	0	0	$0	$0	$0	0.0
Janitorial 4	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	300		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	300	0.0	0	0	$0	$0	$0	0.0
Janitorial 5	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	300		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	300	0.0	0	0	$0	$0	$0	0.0
Janitorial 6	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	15	300		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	15	300	0.0	0	0	$0	$0	$0	0.0
Kitchenette	4	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	5,796		None	No	4	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	5,796	0.0	0	0	$0	$0	$0	0.0
Lobby 1	5	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	S	9	5,796		None	No	5	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	5,796	0.0	0	0	$0	$0	$0	0.0
Lounge 4 & 5	3	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	S	9	5,796		None	No	3	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	5,796	0.0	0	0	$0	$0	$0	0.0
Lounge 4 & 5	16	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	5,796		None	No	16	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	5,796	0.0	0	0	$0	$0	$0	0.0
Lounge Community	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 Community	8	LED - Fixtures: Wall Sconce	Occupancy Sensor	S	20	5,796		None	No	8	LED - Fixtures: Wall Sconce	Occupancy Sensor	20	5,796	0.0	0	0	$0	$0	$0	0.0
Lounge Community	18	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	5,796		None	No	18	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	5,796	0.0	0	0	$0	$0	$0	0.0
Lounge Community	28	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	5,796		None	No	28	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	5,796	0.0	0	0	$0	$0	$0	0.0
Lounge Staff	4	LED - Fixtures: Ceiling Mount	Occupancy Sensor	S	20	5,796		None	No	4	LED - Fixtures: Ceiling Mount	Occupancy Sensor	20	5,796	0.0	0	0	$0	$0	$0	0.0
Lounge Study Room 18	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,400	3	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,796	0.0	151	0	$22	$270	$0	12.2
Mechanical 1	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	300		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	300	0.0	0	0	$0	$0	$0	0.0
Mechanical 14	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Mechanical 6	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Office 120	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	1,760	3	None	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,214	0.0	37	0	$5	$270	$35	43.3
Office Housing Repair	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	1,760		None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,760	0.0	0	0	$0	$0	$0	0.0
Residential 104	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 105	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	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 106	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 107	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 108	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 109	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 110	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 111	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 112	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 112	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 114	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 115	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 118A	2	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	2	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 122	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 123	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 124	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 125	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 126	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 127	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 128	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 129	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 130	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 131	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 132	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 133	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 134	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 135	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	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 201	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 202	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 203	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 204	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 205	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 206	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 207	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 208	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 209	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 210	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 211	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 212	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 213	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 214	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 215	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 216	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 217	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 218	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 219	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 220	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 221	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 222	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 223	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 224	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 225	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	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 226	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 227	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 228	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 229	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 230	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 231	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 232	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 233	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 234	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 235	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 301	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 302	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 303	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 304	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 305	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 306	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 307	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 308	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 309	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 310	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 311	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 312	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 313	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 314	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 315	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	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 316	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 317	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 318	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 319	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 320	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 321	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 322	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 323	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 324	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 325	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 326	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Residential 327	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	20	2,640		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	20	2,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 1	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 1	1	LED - Fixtures: Ceiling Mount	Occupancy Sensor	S	15	3,300		None	No	1	LED - Fixtures: Ceiling Mount	Occupancy Sensor	15	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 1	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	3,300		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 2	4	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	4	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 2	2	LED - Fixtures: Ceiling Mount	Occupancy Sensor	S	15	3,300		None	No	2	LED - Fixtures: Ceiling Mount	Occupancy Sensor	15	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 2	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	3,300		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 2	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	S	33	3,300	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,300	0.0	53	0	$8	$33	$6	3.4
Restroom - Male 1	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 1	2	LED - Fixtures: Ceiling Mount	Occupancy Sensor	S	15	3,300		None	No	2	LED - Fixtures: Ceiling Mount	Occupancy Sensor	15	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 1	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	3,300		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 2	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Male 2	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	3,300		None	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 1	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	S	20	3,300		None	No	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	20	3,300	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
Restroom - Unisex 1	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 104	1	LED - Fixtures: Bath Vanity	Wall Switch	S	20	3,300	3	None	Yes	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	20	2,277	0.0	20	0	$3	$0	$0	0.0
Restroom - Unisex 104	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Wall Switch	S	60	3,300	3	None	Yes	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	2,277	0.0	61	0	$9	$270	$35	26.2
Restroom - Unisex 18A	1	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	S	9	3,300	3	None	Yes	1	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	2,277	0.0	9	0	$1	$0	$0	0.0
Restroom - Unisex 18A	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Wall Switch	S	60	3,300	3	None	Yes	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	2,277	0.0	61	0	$9	$270	$35	26.2
Restroom - Unisex 18A	1	LED - Fixtures: Bath Vanity	Wall Switch	S	20	3,300	3	None	Yes	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	20	2,277	0.0	20	0	$3	$0	$0	0.0
Restroom - Unisex 2	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	S	20	3,300		None	No	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	20	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 2	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 2	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	1	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 2	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	S	20	3,300		None	No	1	LED - Fixtures: Bath Vanity	Occupancy Sensor	20	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 3	1	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	S	9	3,300		None	No	1	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 3	4	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	3,300		None	No	4	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 3	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	3,300		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,300	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 4	1	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	S	9	3,300	3	None	Yes	1	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	2,277	0.0	9	0	$1	$0	$0	0.0
Restroom - Unisex 4	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Wall Switch	S	60	3,300	3	None	Yes	5	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	2,277	0.0	307	0	$45	$270	$35	5.2
Restroom - Unisex 4	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,300	3	None	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,277	0.0	17	0	$3	$0	$0	0.0
Restroom - Unisex 4	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,300	3	None	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,277	0.0	15	0	$2	$0	$0	0.0
Second Floor Hallway	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Second Floor Hallway	12	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	S	9	5,796		None	No	12	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	5,796	0.0	0	0	$0	$0	$0	0.0
Second Floor Hallway	35	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	5,796		None	No	35	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	5,796	0.0	0	0	$0	$0	$0	0.0
Server Room 1	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300	3	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	207	0.0	11	0	$2	$270	$35	149.1
Stairs A	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
Stairs A	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	5,796		None	No	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	5,796	0.0	0	0	$0	$0	$0	0.0
Stairs B	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
Stairs B	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	5,796		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	5,796	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
Stairs C	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
Stairs C	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	5,796		None	No	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	5,796	0.0	0	0	$0	$0	$0	0.0
Storage 1	3	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	S	9	300		None	No	3	LED Lamps: (1) 9W A19 Screw-In Lamp	Wall Switch	9	300	0.0	0	0	$0	$0	$0	0.0
Storage 1	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	300		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	300	0.0	0	0	$0	$0	$0	0.0
Storage 10	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Storage 2	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	300		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	300	0.0	0	0	$0	$0	$0	0.0
Storage 2 & 3	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	300		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	0	0	$0	$0	$0	0.0
Storage 3	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	300		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	300	0.0	0	0	$0	$0	$0	0.0
Storage 5	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	300		None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	300	0.0	0	0	$0	$0	$0	0.0
Storage 9	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	300		None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	300	0.0	0	0	$0	$0	$0	0.0
Student Lounge	15	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	S	9	5,796		None	No	15	LED Lamps: (1) 9W A19 Screw-In Lamp	Occupancy Sensor	9	5,796	0.0	0	0	$0	$0	$0	0.0
Student Lounge	10	LED - Fixtures: Decorative: Other	Wall Switch	S	20	8,400	3	None	Yes	10	LED - Fixtures: Decorative: Other	Occupancy Sensor	20	5,796	0.0	521	0	$76	$270	$35	3.1
Student Lounge	26	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	5,796		None	No	26	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	5,796	0.0	0	0	$0	$0	$0	0.0
Third Floor Hallway	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Third Floor Hallway	25	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	S	60	5,796		None	No	25	LED - Fixtures: Ambient - 2' - Direct Fixture	Occupancy Sensor	60	5,796	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
Mechanical Room	Lounge (H&V-1)	1	Supply Fan	1.5	86.5%	No	Trane	BCHC072E2JOA1LD5D	W	5,600	5	No	86.5%	Yes	1	0.4	2,717	0	$400	$3,452	$75	8.4
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No			W	5,600	5	No	69.5%	Yes	1	0.1	621	0	$91	$2,743	$50	29.5
Mechanical Room	Hallway (H&V-2)	1	Supply Fan	1.5	86.5%	No	Trane	BCHC072E2JOA1LD5D	W	5,600	5	No	86.5%	Yes	1	0.4	2,717	0	$400	$3,452	$75	8.4
Roof	Building Exhaust	1	Exhaust Fan	0.3	65.0%	No			W	5,600	5	No	69.5%	Yes	1	0.1	621	0	$91	$2,743	$50	29.5
Electrical Generator Room	Electrical Generator Room	1	Supply Fan	0.0	65.0%	No	TPI	F2F5103CA1N	W	5,600		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Electrical Room	Electrical Room	1	Supply Fan	0.0	65.0%	No	TPI	F2F5103CA1N	W	5,600		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Rooms	Mechanical Rooms	4	Supply Fan	0.0	65.0%	No			W	5,600		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Building Exhaust	5	Exhaust Fan	0.3	65.0%	No			W	5,600	4	Yes	69.5%	No		0.1	390	0	$57	$1,998	$0	34.8
Mechanical Room	Heating Hot Water System	1	Condensate Pump	0.3	65.0%	No	Marathon	5KC39EN40077X	W	105		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Heating Hot Water System	1	Condensate Pump	0.3	65.0%	No	Marathon	5KC39EN40077X	W	105		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Heating Hot Water System (H&V-1)	1	Heating Hot Water Pump	0.3	55.0%	No	Baldor	KL1203	W	3,528	4	Yes	69.5%	No		0.0	187	0	$28	$400	$0	14.5
Mechanical Room	Heating Hot Water System	1	Heating Hot Water Pump	5.0	89.5%	Yes	Baldor	EM3218T	W	1,764		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Heating Hot Water System	1	Heating Hot Water Pump	5.0	89.5%	Yes	Baldor	EM3218T	W	1,764		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Heating Hot Water System	1	Heating Hot Water Pump	0.3	55.0%	No	Baldor	KL1203	W	3,528	4	Yes	69.5%	No		0.0	187	0	$28	$400	$0	14.5
Mechanical Room	Domestic Hot Water System	1	DHW Circulation Pump	0.2	65.0%	No	B&G	PL-30B	W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Domestic Hot Water System	1	DHW Circulation Pump	0.2	65.0%	No	B&G	PL-30B	W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Domestic Cold Water System	1	Water Supply Pump	5.0	88.5%	Yes			W	644		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Domestic Cold Water System	1	Water Supply Pump	5.0	88.5%	Yes			W	644		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0

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
Ground Level	Handicap Room (CU-1)	1	Ductless Mini-Split AC	2.00		17.60		Daikin	RZR24PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Handicap Room (CU-2)	1	Ductless Mini-Split AC	2.00		17.60		Daikin	RZR24PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Student Lounge (CU-3)	1	Ductless Mini-Split AC	1.50		18.60		Daikin	RZR18PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Student Lounge (CU-4)	1	Ductless Mini-Split AC	1.50		18.60		Daikin	RZR18PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Student Lounge (CU-5)	1	Ductless Mini-Split AC	1.50		18.60		Daikin	RZR18PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Laundry Room (CU-6)	1	Ductless Mini-Split AC	1.00		18.00		Daikin	RKN12KEVJU5	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Student Lounge (CU-7)	1	Ductless Mini-Split AC	1.00		18.00		Daikin	RKN12KEVJU5	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Student Lounge (CU-8)	1	Ductless Mini-Split AC	1.00		18.00		Daikin	RKN12KEVJU5	W		No							0.0	0	0	$0	$0	$0	0.0
Ground Level	Laundry Room (CU-9)	1	Ductless Mini-Split AC	1.00		18.00		Daikin	RKN12KEVJU2	W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Generator Room	Electrical Generator Room	1	Electric Resistance Heat		11.26		1 COP	TPI	F2F5103CA1N	W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room	Electrical Room	1	Electric Resistance Heat		11.26		1 COP	TPI	F2F5103CA1N	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	2,280	Central Plant	Proxy Boiler	W		No						0.0	0	0	$0	$0	$0	0.0

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

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 Room	6	26	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	12	$52	$186	$104	1.6
Rest Room	6	24	Showerhead	2.50	1.50	0.0	0	38	$159	$2,143	$360	11.2

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Residential 311	1	Portable AC	980		LG	LP0817WSR
Laundry Rooms	8	Clothes Dryer	5,000		Alliance	LDE30RGS153TW01
Laundry Rooms	8	Clothes Washer	1,800		Alliance	LWN432SP113TW04
Housing Repair Office	1	Dehumidifier	350			
Building	1	Computer	125			
Office 120	1	Ceiling Fan	75			
Housing Repair Office	1	Portable Fan	125			
Housing Repair Office	1	Microwave	800			
Kitchennete	1	Electric Oven	6,410		GE	JB630RF1SS
Student Lounge	1	Electric Stovetop	3,000			
Office 120	1	Small/Medium Printer	150			
Housing Repair Office	1	Mini Fridge	260			
Building	3	Residential Refrigerator	800			
Lounges	3	TV	150			
Dorm Rooms	1	Misc. Equipment	2,592			

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
Lobby	1	Non-Refrigerated	7	Yes	0.0	343	0	$50	$230	$0	4.6

Custom (High Level) Measure Analysis

Retro-Commissioning Study

Building Square Footage	4,320		
Percent of Conditioned Area Impacted	100%		
Fuel Utility Rate	$4.231	MMBtu	
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	37,918	56,995	5,983	Retro-Commissioning Study	2%	2%	2%	$0.30	0.00	1,898	120	$786	$1,296	$0	1.65

Utility Sub Metering

Existing Conditions					Proposed Conditions					Energy Impact & Financial Analysis						
Description	Central Utility Plant Steam & Chilled Water	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	254,912	6,167	-	Electric Smart Sub Meter and Steam Flow Meters	1%	1%	2	Varies	0.00	2,549	62	$636	$9,100	$0	14.31

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.

LEARN MORE AT energystar.gov

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@trocompanies.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.