Local Government Energy Audit Report

Brower Student Center

May 6, 2021

Prepared for:

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Disclaimer

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

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

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

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

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

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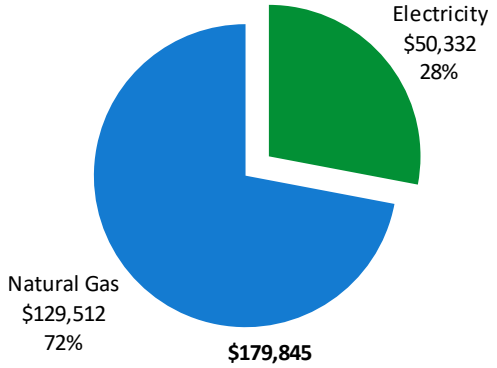
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Brower Student Center. 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: $179,845 Electricity: 1,766,749 kWh Natural Gas: 278,776 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.

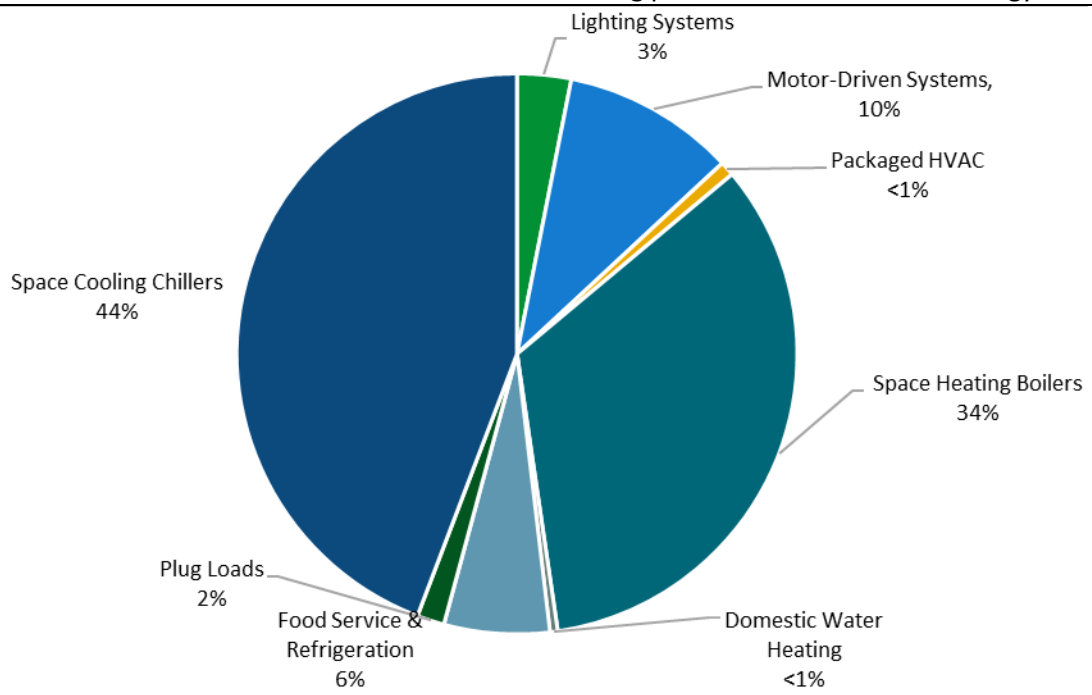


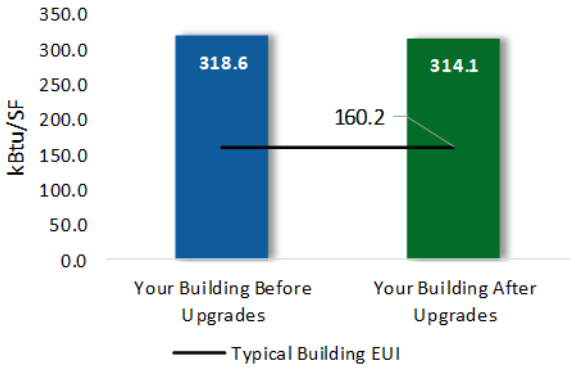
Figure 1 - Energy Use by System

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.

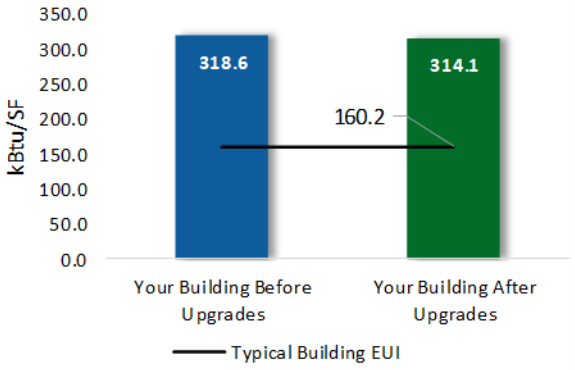
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$60,285
Potential Rebates & Incentives[1]	$10,690
Annual Cost Savings	$12,727
Annual Energy Savings	Electricity: 80,260 kWh Natural Gas: 1,999 Therms
Greenhouse Gas Emission Savings	52 Tons
Simple Payback	3.9 Years
Site Energy Savings (all utilities)	1%



Scenario 2: Cost Effective Package[2]

Installation Cost	$60,285
Potential Rebates & Incentives	$10,690
Annual Cost Savings	$12,727
Annual Energy Savings	Electricity: 80,260 kWh Natural Gas: 1,999 Therms
Greenhouse Gas Emission Savings	52 Tons
Simple Payback	3.9 Years
Site Energy Savings (all utilities)	1%



On-site Generation Potential

Photovoltaic	High
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			**31,199**	**2.5**	**-4**	**$4,566**	**$10,454**	**$1,930**	**$8,524**	**1.9**	**30,896**
ECM 1	Install LED Fixtures	Yes	11,844	0.0	0	$1,741	$4,436	$400	$4,036	2.3	11,926
ECM 2	Retrofit Fixtures with LED Lamps	Yes	19,356	2.5	-4	$2,825	$6,018	$1,530	$4,488	1.6	18,970
Lighting Control Measures			**6,690**	**0.6**	**-2**	**$976**	**$7,195**	**$6,760**	**$435**	**0.4**	**6,557**
ECM 3	Install High/Low Lighting Controls	Yes	6,690	0.6	-2	$976	$7,195	$6,760	$435	0.4	6,557
Variable Frequency Drive (VFD) Measures			**39,147**	**2.0**	**57**	**$6,021**	**$32,476**	**$1,900**	**$30,576**	**5.1**	**46,136**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	7,152	1.2	0	$1,051	$10,189	$250	$9,939	9.5	7,202
ECM 5	Install VFDs on Kitchen Hood Fan Motors	Yes	26,811	0.1	57	$4,208	$14,770	$1,250	$13,520	3.2	33,714
ECM 6	Install VFDs on Condensate Pumps	Yes	5,184	0.7	0	$762	$7,518	$400	$7,118	9.3	5,220
Food Service & Refrigeration Measures			**3,224**	**0.4**	**0**	**$474**	**$460**	**$100**	**$360**	**0.8**	**3,246**
ECM 7	Vending Machine Control	Yes	3,224	0.4	0	$474	$460	$100	$360	0.8	3,246
Custom Measures			**0**	**0.0**	**149**	**$690**	**$9,700**	**$0**	**$9,700**	**14.1**	**17,390**
ECM 8	Sub Metering	Yes	0	0.0	149	$690	$9,700	$0	$9,700	14.1	17,390
TOTALS (COST EFFECTIVE MEASURES)			**80,260**	**5.4**	**200**	**$12,727**	**$60,285**	**$10,690**	**$49,595**	**3.9**	**104,225**
TOTALS (ALL MEASURES)			**80,260**	**5.4**	**200**	**$12,727**	**$60,285**	**$10,690**	**$49,595**	**3.9**	**104,225**

* - 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
ECM 2	Retrofit Fixtures with LED Lamps	X		X
ECM 3	Install High/Low Lighting Controls	X		X
ECM 4	Install VFDs on Constant Volume (CV) Fans	X		X
ECM 5	Install VFDs on Kitchen Hood Fan Motors	X		X
ECM 6	Install VFDs on Condensate Pumps	X		X
ECM 7	Vending Machine Control	X		X
ECM 8	Sub Metering	X		

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 Brower Student Center. 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 6, 2020, TRC performed an energy audit at Brower Student Center located in Ewing, New Jersey. TRC met with Benedictus Paraan to review the facility operations and help focus our investigation on specific energy-using systems.

Brower Student Center is a three-story, 106,430 square foot building built in 2016. It is at the heart of the campus community offering services, activities, event planning assistance, and management for the convenience and enjoyment of students and guests. Spaces include administrative offices, multipurpose rooms, meeting rooms, game room, food court, traditions restaurant, box office, corner lounge, kitchens, refrigeration rooms, restrooms, storage, and mechanical spaces.

Lighting is provided mainly by LED fixtures. The facility uses steam and chilled water supplied from the Power House/Cogen building or Central Utilities Plant. This building is equipped with submeters for both incoming steam and electricity. There are seven air handling units (AHUs) equipped with hot water and chilled water coils that provide heating and cooling to spaces. There is a passenger elevator in the building.

Because this is a relatively new building with highly efficient systems, only limited potential energy savings was projected as a result of this audit.

Aerial View - Brower Student Center

2.2 Building Occupancy

The Brower Student Center operates on a 12-month schedule. The weekend and summer occupancies vary, and the entire facility is shut down at approximately 11:00 PM. During a typical day, the facility is occupied by approximately 2,199 students and 104 staff. It should be noted that the energy and economic analysis for this building is based on the use of the building during the utility billing period, and results will vary based on changes to building use patterns.

Building Name	Weekday/Weekend	Operating Schedule
Brower Student Center	Weekday	7:00 AM - 11:00 PM
	Weekend	Varies
	Summer	Varies

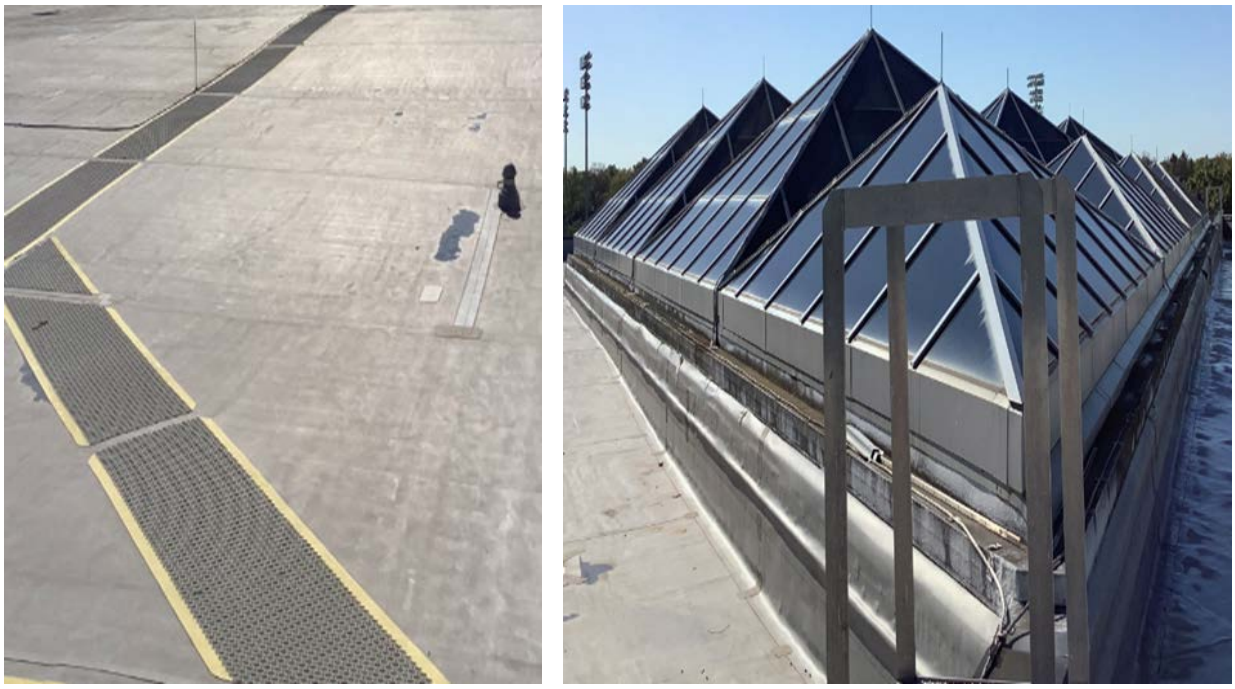
Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are made of concrete block over structural steel with brick veneer façade. The flat roof is supported with steel trusses and a metal deck and finished with a thermoplastic white membrane. A skylight covers the atrium. The roof is in good condition. Sections of the building are made of concrete block with glass panel facades.

The windows are double glazed and have aluminum frames with a fiberglass thermal break. The glass-to-frame seals are in good condition. The fixed window weather seals are in good condition, showing no signs of outside air infiltration. The entrance doors are fully glazed with aluminum frames. The exit doors are made of metal frames and are in good condition. Overall, the building envelope appears in good condition.

Building Walls



Flat Roof & Skylight

Entrance Doors

Exit Doors & Window

2.4 Lighting Systems

The primary interior lighting system uses LED fixtures that include downlight and linear recessed, downlight pendant and high bay lamps with various wattages.

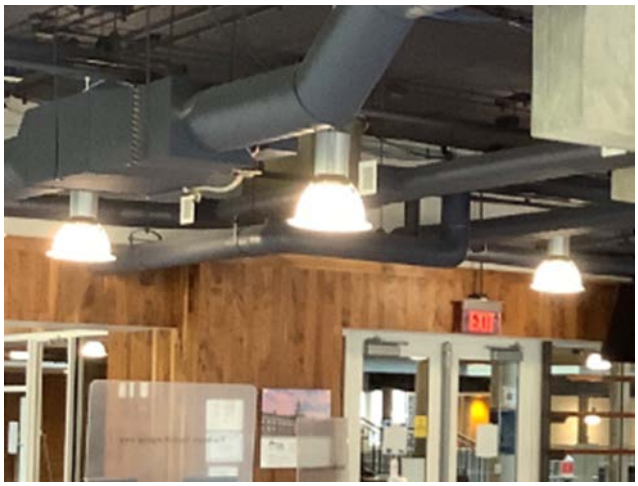
Additionally, there are some 32-Watt linear fluorescent T8 fixtures in spaces including electrical and mechanical rooms, basement and cooking areas corridors, room 004, IT, and storage rooms. Rooms 109, 110, 112 and 114 are lit with fluorescent fixtures containing U-bend tubes. All light fixtures are in good condition. Exit signs throughout the building are LED fixtures. All light fixtures are in good condition. Interior lighting levels were generally sufficient.

Lighting fixtures in small areas including offices, restrooms, IT rooms, custodial, storage room and mechanical, and electrical spaces are controlled by occupancy sensors that are either wall or ceiling mounted. The event rooms have specific lighting control system with dimming capability. The fixtures in the remaining the areas have a centralize controller.

Exterior fixtures include downlight recessed, spot luminaires, and wall mounted fixtures. There are eight 400-Watt roof mounted metal halide lamps that provide additional building perimeter illumination. Exterior fixtures are controlled by a timeclock and photocells.

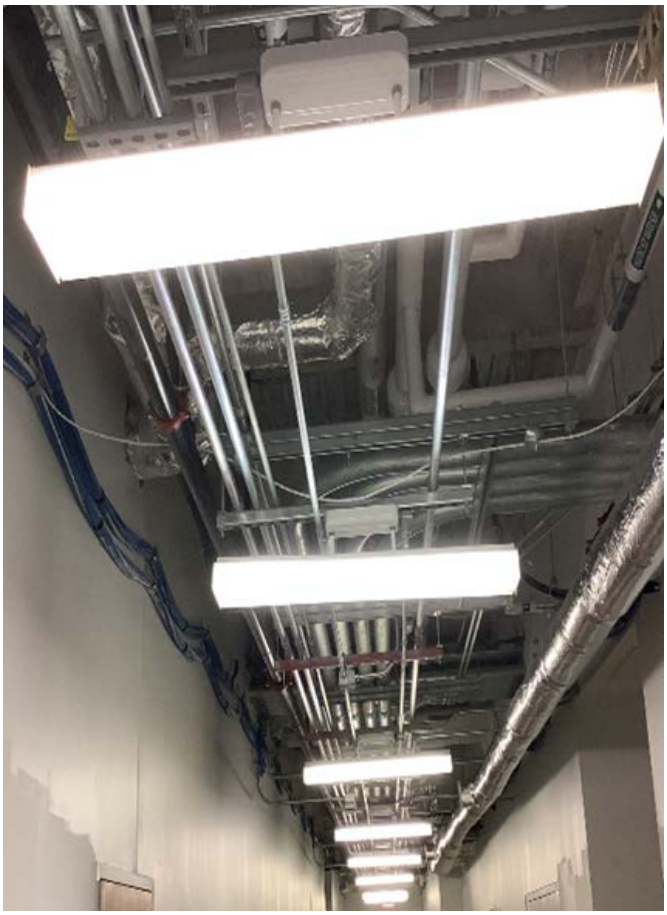
LED Fixture & Linear Fluorescent Troffer

LED Lamp & U-Bend T8 Fixture



LED High Bay & Exit Sign

Recessed LED Fixtures



LED Fixtures & Linear T8 Lamps

Timeclock & Occupancy Sensors

LED & Metal Halide Fixtures

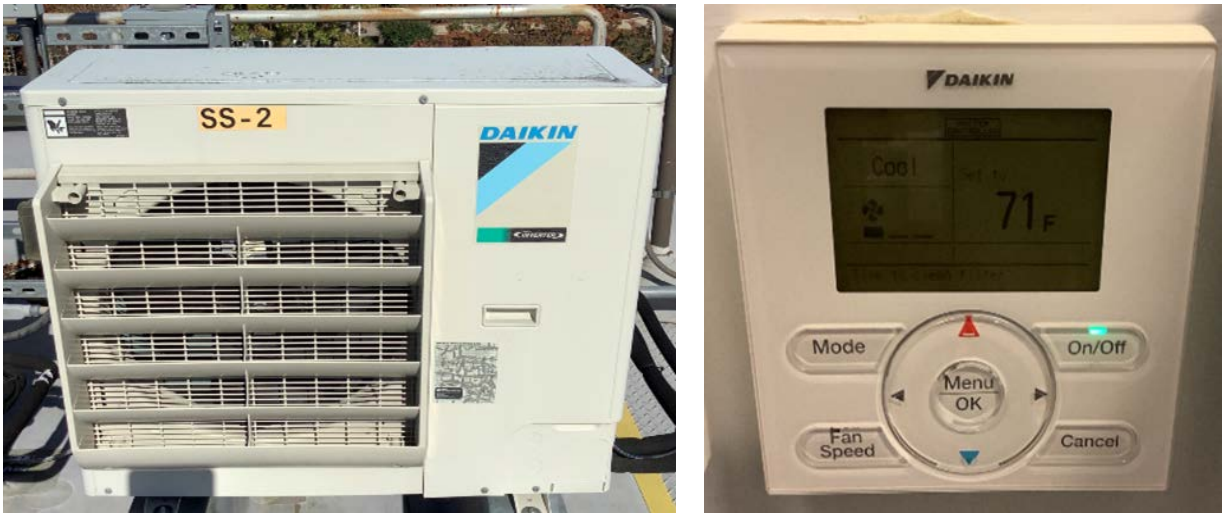
2.5 Air Handling Systems

Fan Coil Units

Building spaces including hallways and stairs are conditioned using fan coil units that are equipped with supply fan motors and digitally controlled fan coil valves. They provide heating and cooling. Hot water is generated from the central plant steam system via a heat exchanger while the chilled water is piped directly from the central chilled water plant.

Unitary Electric Heating, Ventilation, and Air Conditioning (HVAC) Equipment

The IT and telecommunication rooms are cooled with Daikin ductless split system air conditioning (AC) units. There are four units that use a direct expansion cooling system. Three units have 2-ton cooling capacity while one has a cooling capacity of 4 tons. The units are newer and in good condition. They are controlled via programmable thermostats.



Ductless Split System Condensing Unit & Programmable Thermostat

Ductless Split System Evaporator

Unitary Heating Equipment

The loading dock is heated using a five kW Qmark electric resistance heater that is controlled by a thermostat.

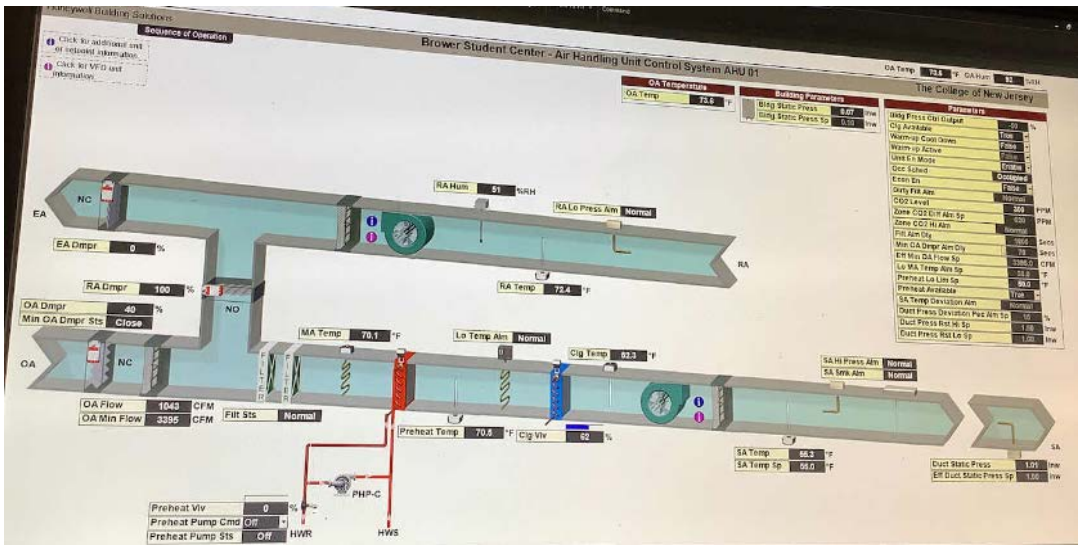
Electric Resistance Heater

AHUs

Much of the building is conditioned by seven AHUs physically located in three mechanical rooms. The AHUs are equipped with supply and return fans with motors that are controlled by variable speed drives. The supply fan motors vary in capacity between 15 and 50 horsepower (hp) while the return fan motors capacities vary from 7.5 hp to 15 hp. AHU-2 has no return fan motor. The AHUs contain hydronic preheat coils, chilled water coils for cooling, and hot water coils for heating. Most of the units have a heat recovery wheel that reclaim a portion of the energy wasted through exhaust during the heating and cooling processes. In the heating mode, as the wheel rotates into the incoming airstream, energy is released by the wheel to bring the heat and humidity in the incoming airstream closer to indoor conditions, reducing unit workload and energy consumed by the system.

Air distribution is provided to supply air registers by ducts concealed above the ceilings. Heated and cooled air is distributed through ducts to variable air volume terminals concealed above the ceilings. The AHUs are controlled by the facility energy management system (EMS).

AHU-2 & 7

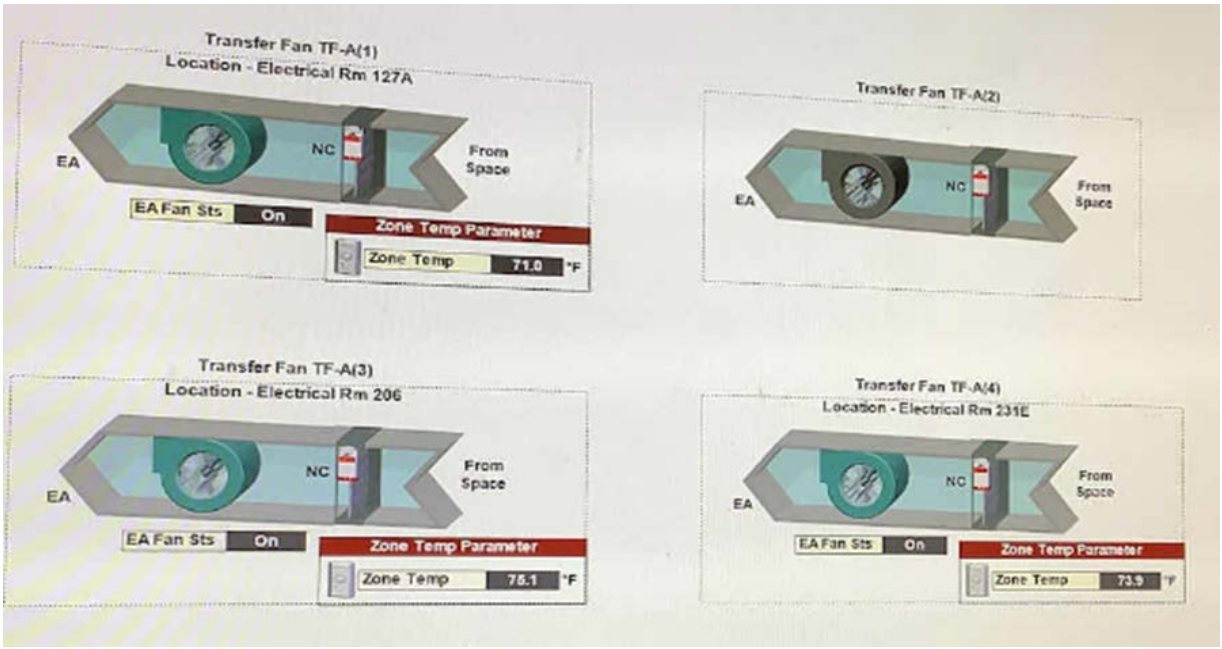


AHU-1 EMS Diagram View

General Building Exhaust Air System

There are several general exhaust fans that serve mechanical rooms, elevator room, restrooms, and the catering room, locker room and pump room. They vary in capacity from 0.3 hp to 2 hp. There are two 1.5 hp, one 3 hp and one 5 hp kitchen hood fans. Exhaust and kitchen hood fans are physically located on the roof and are not equipped with variable frequency drives. They are controlled via the building management system (EMS).

Exhaust Fans



Exhaust Fans - EMS Diagram View

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.

There two steam heat exchangers (HX-1 and 2). The hot water system is designed such that one heat exchanger will operate at a time during hot water system operation. Duty heat exchanger rotation is performed automatically. There are two pressure induced condensate pumps and two motorized 3 hp condensate pumps.

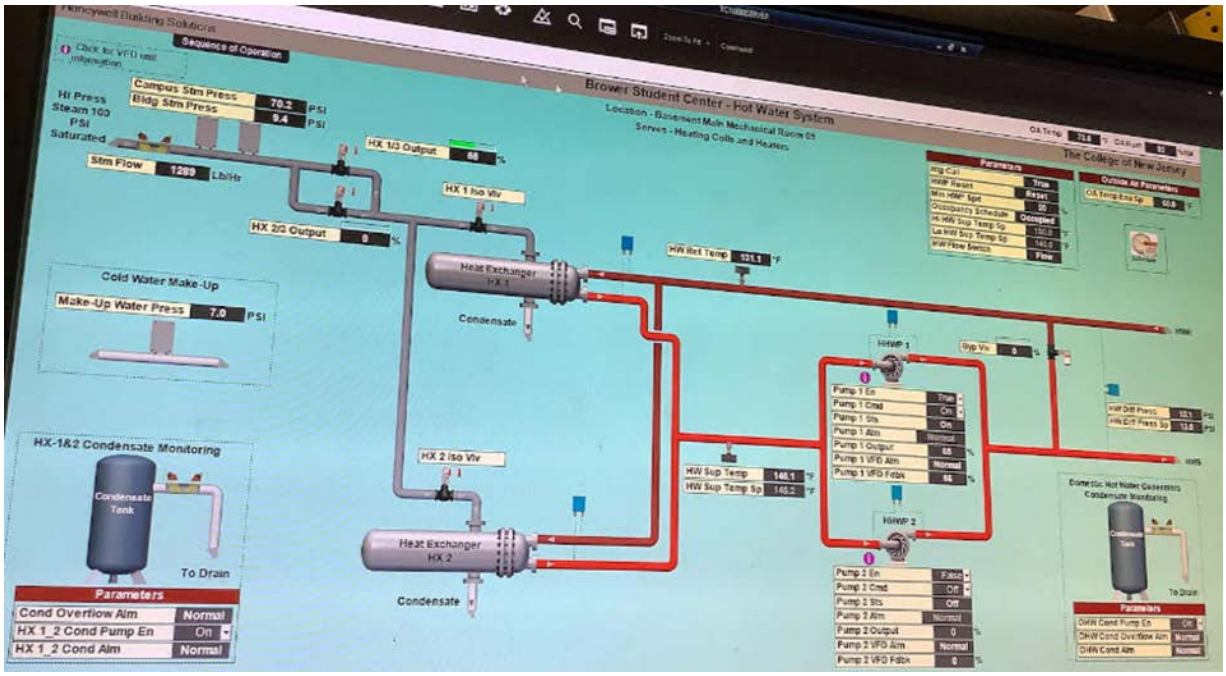
Space heating water is circulated to AHUs, fan coils, cabinet and hydronic unit heaters and baseboards using two 15 hp variable flow main loop pumps (HWP-1 and 2). Additionally, AHU-5, 6 and 7 have a 0.3 hp, 0.8 hp and 0.5 hp dedicated constant flow hot water pump respectively. The hot water distribution system is 2-pipe heating only. The hot water pumps operate on a lead/lag schedule. Pumps rotate position in schedule every week with changeover each Tuesday at 8:00 AM. Hot water supply temperature is reset between 120°F and 180°F in 2°F increments based on outside air temperature increments of 2°F between 70°F and 10°F respectively.

A flow transmitter and BTU meter are used to measure the building hot water energy usage.

Pressure Induced & 3 hp Condensate Pumps

Heat Exchangers

Main Hot Water Pumps & Variable Frequency Drives (VFDs)



Hot Water EMS Diagram View

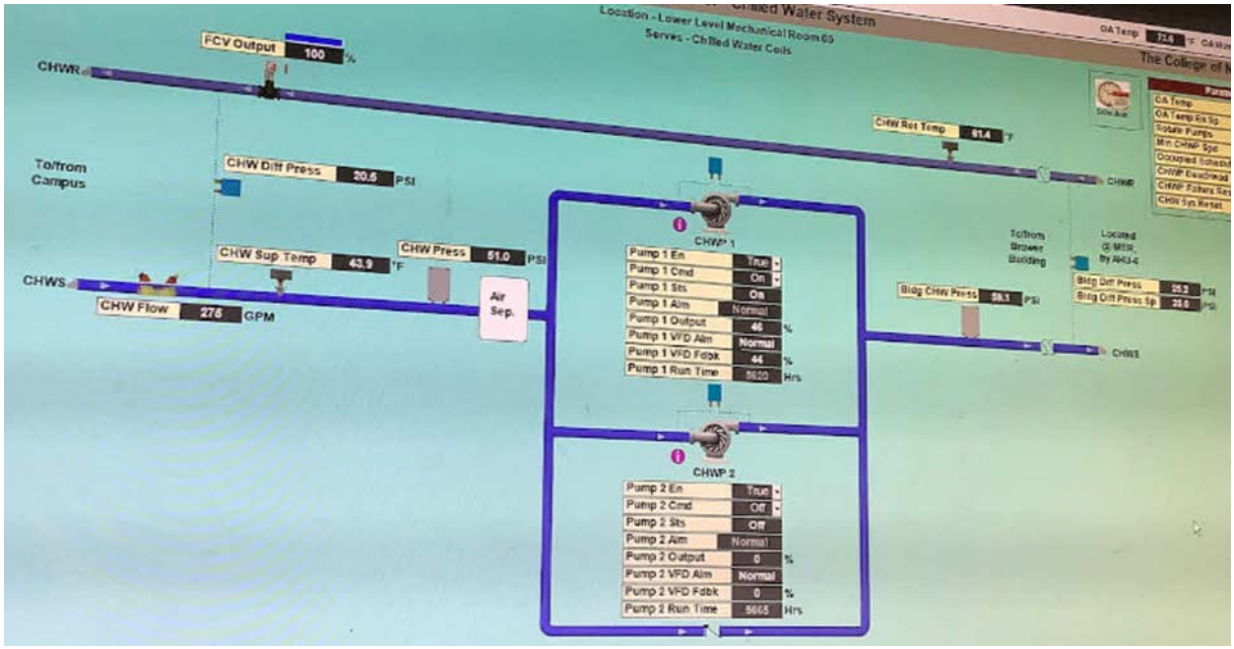
2.7 Chilled Water Systems

Chilled water is supplied by chillers located in the Power House/Cogen Building. Energy use associated with the steam engine and electric chillers used to produce chilled water was allocated to the individual buildings served by the chiller plant.

Chilled water is circulated to AHUs and fan coils using two 30 hp variable flow pumps (CHWP-1 and 2). They operate in a lead/lag scheme, with only one pump normally operating and one in standby. The chilled water system is designed to maintain the supply temperature at 47°F and the return leaving temperature at 57°F. The chilled water distribution system is two-pipe cooling only. Incoming chilled water is not metered for this building.

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

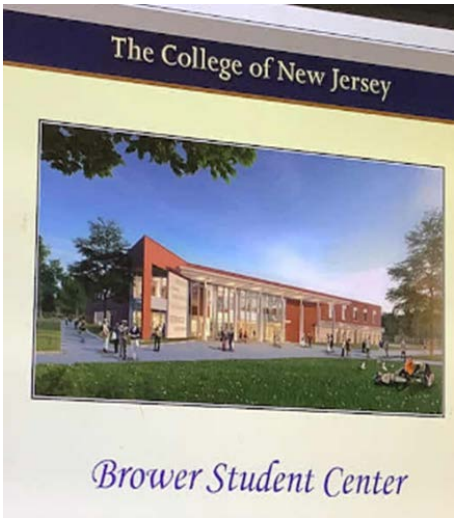
Chilled Water Pumps & VFDs

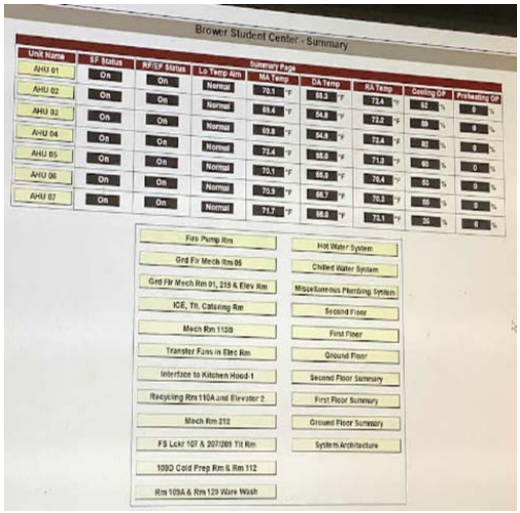


Chilled Water EMS Diagram View

2.8 Building Energy Management Systems (EMS)

A Honeywell EMS controls the HVAC equipment, the boilers, the chillers, the air handlers. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures, and chilled water loop temperatures. The EMS also controlled the exhaust fans, cabinet, and hydronic heaters.



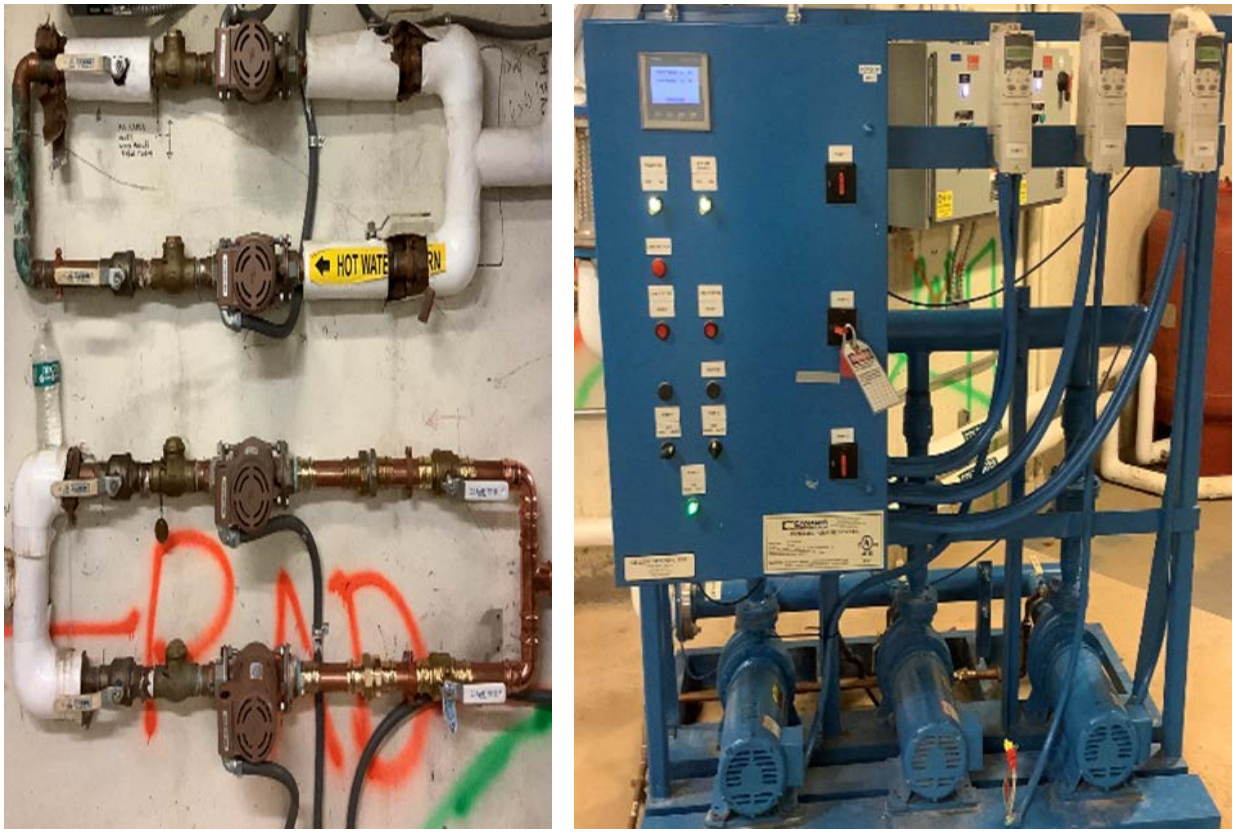


Building Systems Architecture

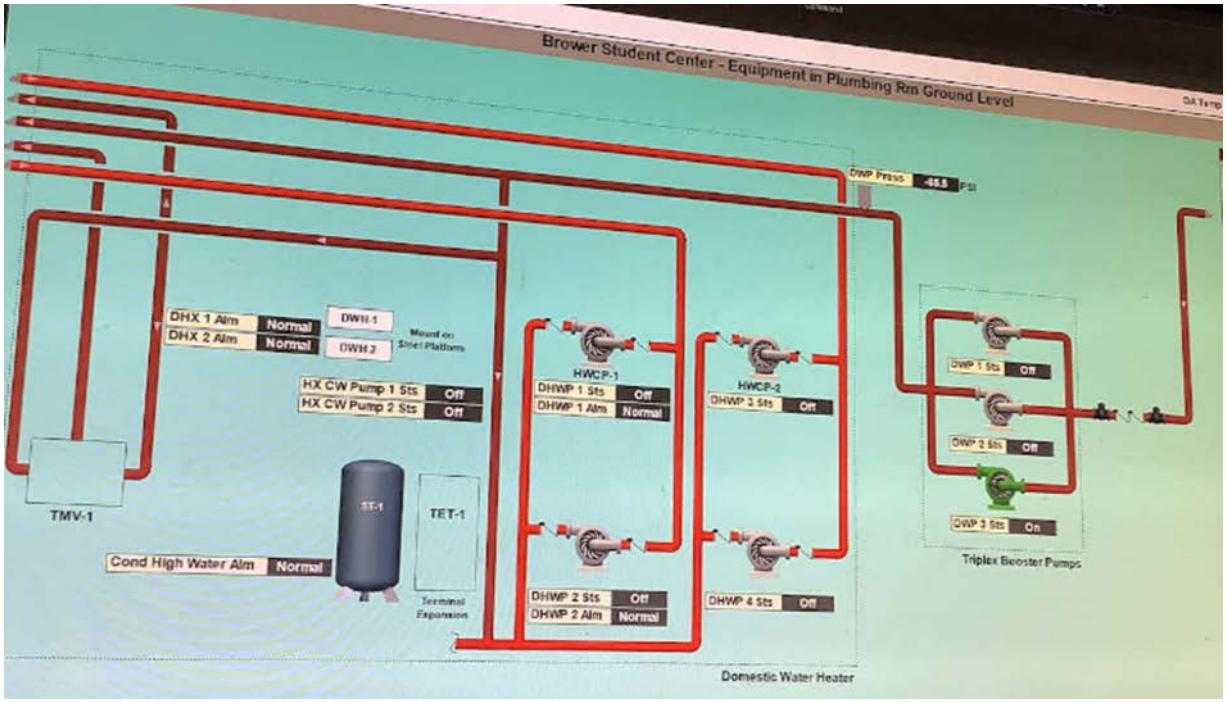
2.9 Domestic Hot Water

Hot water is produced by two P-K Compact semi-instantaneous indirect water heaters via heat exchangers using low pressure steam from the Power House/Cogeneration. Heated water is held in a separate storage tank. Four 0.5 hp constant flow pumps (DHWP-1, 2, 3 and 4) distribute water to end uses. The domestic hot water pipes are insulated, and the insulation is in good condition. Three 5 hp variable flow booster pumps (DWP-1, 2 and 3) are used to supply domestic cold water to the building.

Indirect Fired Semi-Instantaneous Water Heater & Storage Tank



0.5 hp Domestic Hot Water Pumps & 5 hp Booster Pumps



Domestic Hot Water EMS Diagram View

2.10 Food Service Equipment

The Brower Student Center houses a traditional restaurant and a food court that includes commercial kitchens. The kitchens have a mix of gas and electric equipment that is used to prepare food. Most cooking is done using convection gas-fired ovens, gas steamers, and griddles. There are four insulated food holding cabinets. Equipment is high efficiency and is in good condition.

There is an ENERGY STAR® low temperature rack type dishwasher made by Champion. It is in good condition.

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

Gas-Fired Convection Ovens

2.11 Refrigeration

The kitchens have several systems including stand-up solid door refrigerators and freezers, and it has three refrigerators chests. There are two self-contained ice machines made by Manitowoc. All equipment is high efficiency and in good condition.

The building has several walk-in coolers and freezers with three condensing units located on the exterior perimeter and one containing several compressors.

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

Stand-Up Refrigerator & Freezer

Outdoor Condensing Units

2.12 Plug Load and Vending Machines

There are approximately 40 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are also typical office loads such as copiers, projectors, small printers, microwaves, mini fridges, and various kitchen plug load.

There two refrigerated beverage vending machines and one non-refrigerated vending machine located in the main area. Vending machines are not equipped with occupancy-based controls.

Copier & Residential Style Refrigerator

Beverage Vending Machines

2.13 Water-Using Systems

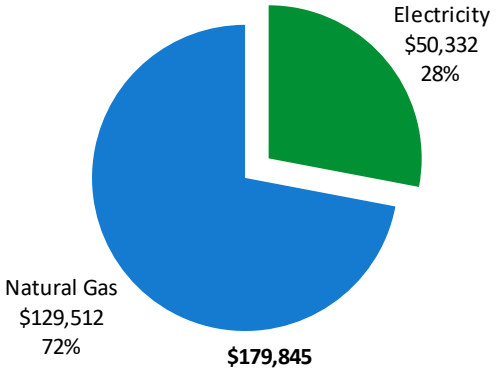
There are several restrooms with toilets, urinals, and sinks. The restrooms sinks have low-flow devices.

Typical Restroom Sinks

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	1,766,749 kWh	$50,332
Natural Gas	278,776 Therms	$129,512
Total		**$179,845**



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.

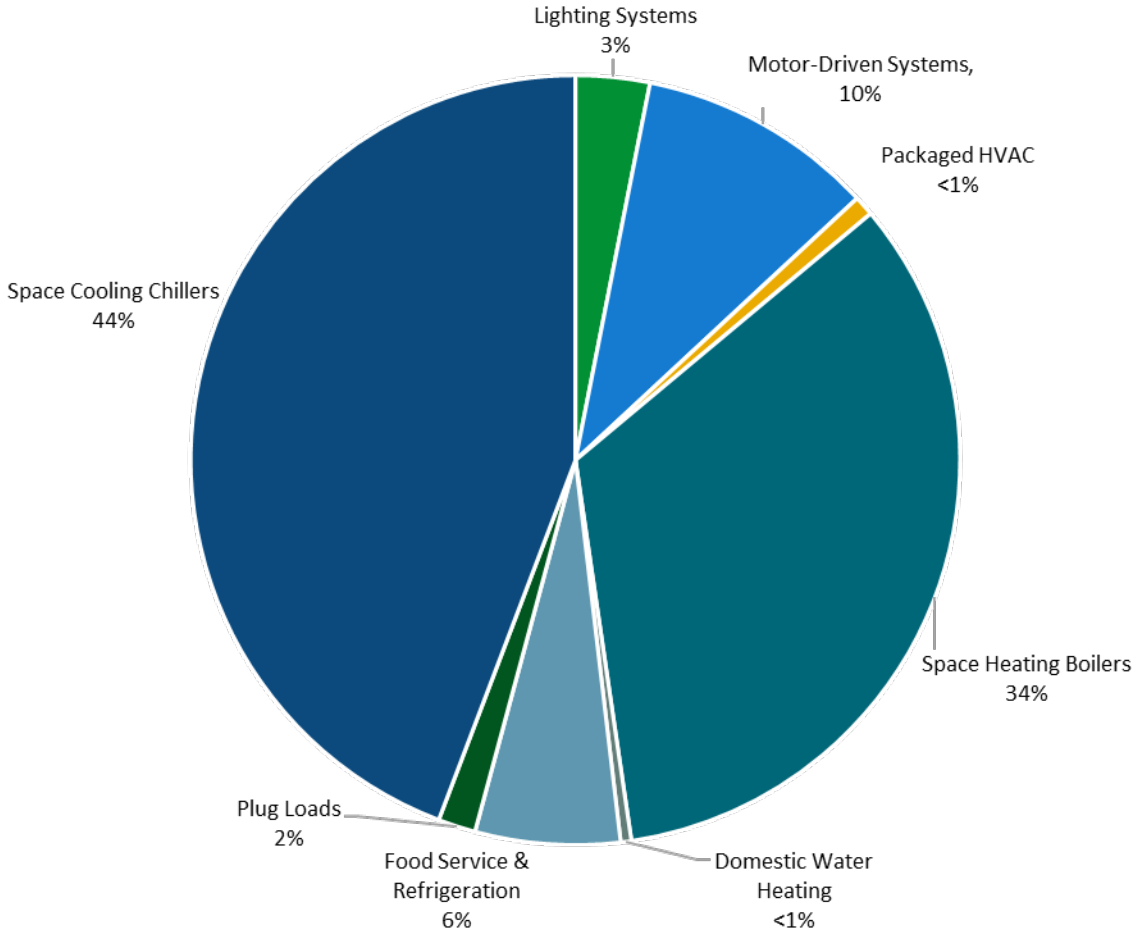
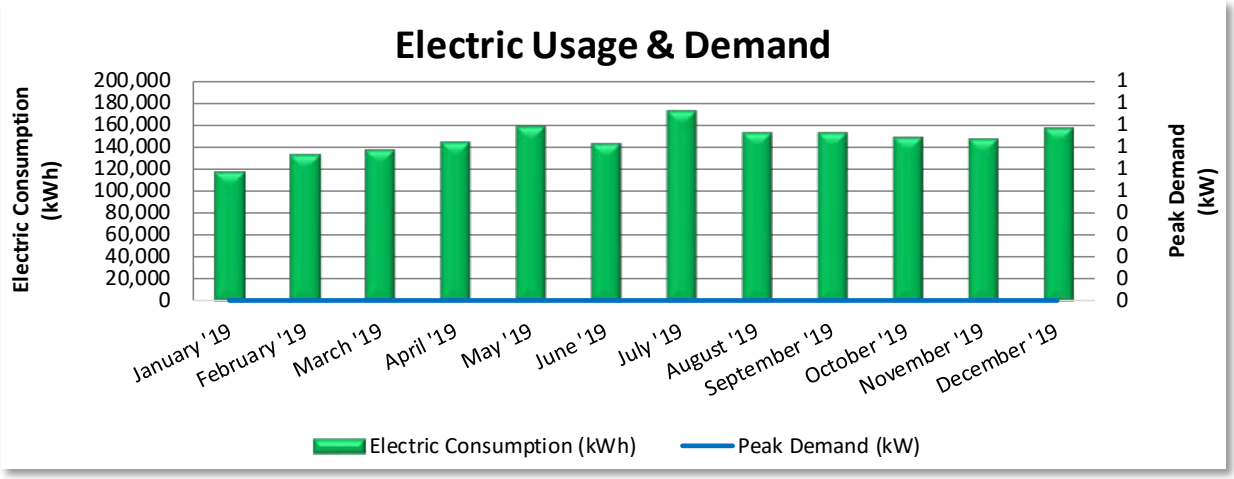


Figure 5 - Energy Balance

3.1 Electricity

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



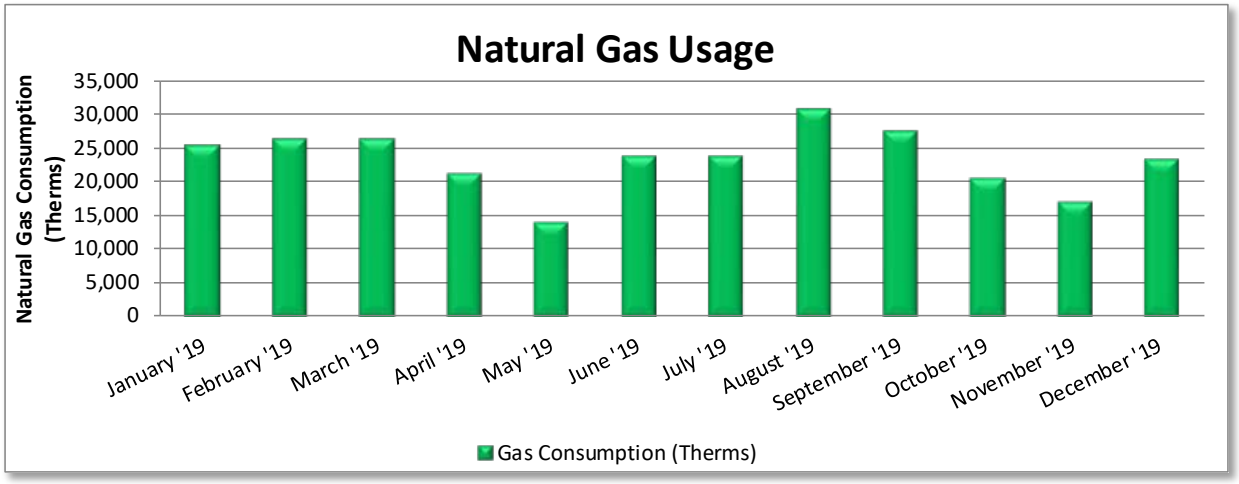
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
1/28/19	31	117,670	0	$0	$2,568	Yes
2/28/19	31	132,809	0	$0	$3,268	Yes
3/28/19	28	137,389	0	$0	$2,987	Yes
4/28/19	31	144,348	0	$0	$3,249	Yes
5/29/19	31	158,531	0	$0	$5,845	Yes
6/27/19	29	143,245	0	$0	$4,552	Yes
7/29/19	32	172,951	0	$0	$6,234	Yes
8/27/19	29	153,620	0	$0	$4,361	Yes
9/26/19	30	153,536	0	$0	$4,776	Yes
10/25/19	29	148,370	0	$0	$4,118	Yes
11/25/19	31	146,961	0	$0	$3,551	Yes
12/11/19	33	157,319	0	$0	$4,824	Yes
Totals	**365**	**1,766,749**	**0**	**$0**	**$50,332**	
Annual	**365**	**1,766,749**	**0**	**$0**	**$50,332**	

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. This building is equipped with an electrical submeter.
- 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?**
1/28/19	31	25,392	$10,384	Yes
2/28/19	31	26,223	$13,132	Yes
3/28/19	28	26,166	$12,147	Yes
4/28/19	31	21,059	$9,452	Yes
5/29/19	31	13,994	$6,672	Yes
6/27/19	29	23,691	$10,810	Yes
7/29/19	32	23,808	$9,946	Yes
8/27/19	29	30,637	$12,935	Yes
9/26/19	30	27,402	$11,187	Yes
10/25/19	29	20,316	$8,912	Yes
11/25/19	31	16,844	$7,659	Yes
12/11/19	33	23,243	$16,276	Yes
Totals	**365**	**278,776**	**$129,512**	
Annual	**365**	**278,776**	**$129,512**	

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 $0.465/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.

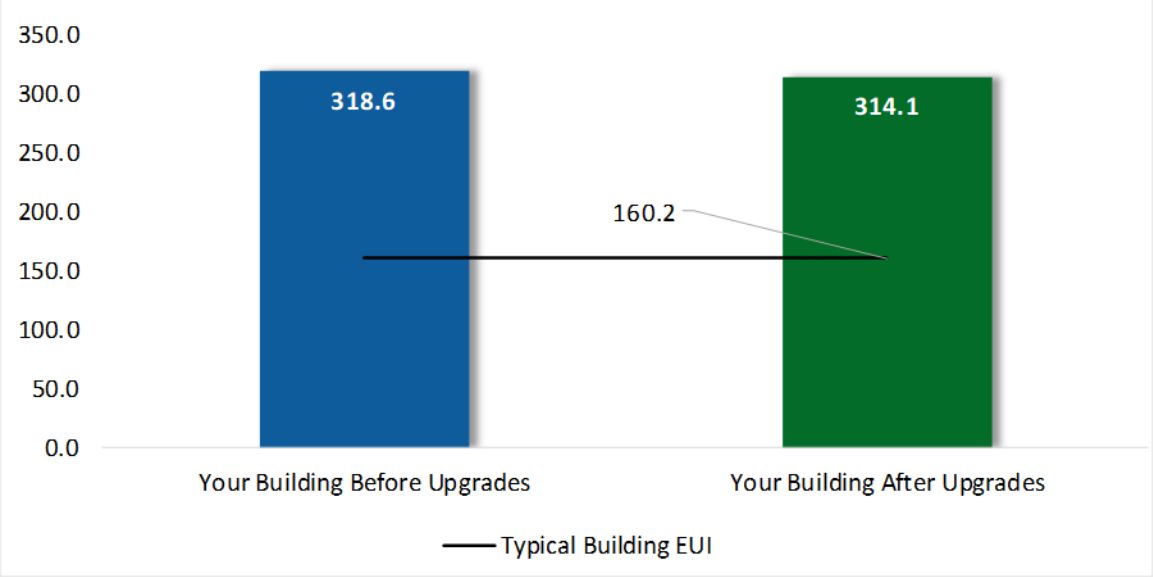


Figure 6 - Energy Use Intensity Comparison[3]

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			**31,199**	**2.5**	**-4**	**$4,566**	**$10,454**	**$1,930**	**$8,524**	**1.9**	**30,896**
ECM 1	Install LED Fixtures	Yes	11,844	0.0	0	$1,741	$4,436	$400	$4,036	2.3	11,926
ECM 2	Retrofit Fixtures with LED Lamps	Yes	19,356	2.5	-4	$2,825	$6,018	$1,530	$4,488	1.6	18,970
Lighting Control Measures			**6,690**	**0.6**	**-2**	**$976**	**$7,195**	**$6,760**	**$435**	**0.4**	**6,557**
ECM 3	Install High/Low Lighting Controls	Yes	6,690	0.6	-2	$976	$7,195	$6,760	$435	0.4	6,557
Variable Frequency Drive (VFD) Measures			**39,147**	**2.0**	**57**	**$6,021**	**$32,476**	**$1,900**	**$30,576**	**5.1**	**46,136**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	7,152	1.2	0	$1,051	$10,189	$250	$9,939	9.5	7,202
ECM 5	Install VFDs on Kitchen Hood Fan Motors	Yes	26,811	0.1	57	$4,208	$14,770	$1,250	$13,520	3.2	33,714
ECM 6	Install VFDs on Condensate Pumps	Yes	5,184	0.7	0	$762	$7,518	$400	$7,118	9.3	5,220
Food Service & Refrigeration Measures			**3,224**	**0.4**	**0**	**$474**	**$460**	**$100**	**$360**	**0.8**	**3,246**
ECM 7	Vending Machine Control	Yes	3,224	0.4	0	$474	$460	$100	$360	0.8	3,246
Custom Measures			**0**	**0.0**	**149**	**$690**	**$9,700**	**$0**	**$9,700**	**14.1**	**17,390**
ECM 8	Sub Metering	Yes	0	0.0	149	$690	$9,700	$0	$9,700	14.1	17,390
TOTALS (COST EFFECTIVE MEASURES)			**80,260**	**5.4**	**200**	**$12,727**	**$60,285**	**$10,690**	**$49,595**	**3.9**	**104,225**
TOTALS (ALL MEASURES)			**80,260**	**5.4**	**200**	**$12,727**	**$60,285**	**$10,690**	**$49,595**	**3.9**	**104,225**

* - 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		**31,199**	**2.5**	**-4**	**$4,566**	**$10,454**	**$1,930**	**$8,524**	**1.9**	**30,896**
ECM 1	Install LED Fixtures	11,844	0.0	0	$1,741	$4,436	$400	$4,036	2.3	11,926
ECM 2	Retrofit Fixtures with LED Lamps	19,356	2.5	-4	$2,825	$6,018	$1,530	$4,488	1.6	18,970
Lighting Control Measures		**6,690**	**0.6**	**-2**	**$976**	**$7,195**	**$6,760**	**$435**	**0.4**	**6,557**
ECM 3	Install High/Low Lighting Controls	6,690	0.6	-2	$976	$7,195	$6,760	$435	0.4	6,557
Variable Frequency Drive (VFD) Measures		**39,147**	**2.0**	**57**	**$6,021**	**$32,476**	**$1,900**	**$30,576**	**5.1**	**46,136**
ECM 4	Install VFDs on Constant Volume (CV) Fans	7,152	1.2	0	$1,051	$10,189	$250	$9,939	9.5	7,202
ECM 5	Install VFDs on Kitchen Hood Fan Motors	26,811	0.1	57	$4,208	$14,770	$1,250	$13,520	3.2	33,714
ECM 6	Install VFDs on Condensate Pumps	5,184	0.7	0	$762	$7,518	$400	$7,118	9.3	5,220
Food Service & Refrigeration Measures		**3,224**	**0.4**	**0**	**$474**	**$460**	**$100**	**$360**	**0.8**	**3,246**
ECM 7	Vending Machine Control	3,224	0.4	0	$474	$460	$100	$360	0.8	3,246
Custom Measures		**0**	**0.0**	**149**	**$690**	**$9,700**	**$0**	**$9,700**	**14.1**	**17,390**
ECM 8	Sub Metering	0	0.0	149	$690	$9,700	$0	$9,700	14.1	17,390
TOTALS		**80,260**	**5.4**	**200**	**$12,727**	**$60,285**	**$10,690**	**$49,595**	**3.9**	**104,225**

* - 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		**31,199**	**2.5**	**-4**	**$4,566**	**$10,454**	**$1,930**	**$8,524**	**1.9**	**30,896**
ECM 1	Install LED Fixtures	11,844	0.0	0	$1,741	$4,436	$400	$4,036	2.3	11,926
ECM 2	Retrofit Fixtures with LED Lamps	19,356	2.5	-4	$2,825	$6,018	$1,530	$4,488	1.6	18,970

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 400-Watt metal halide 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: roof mounted fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

Replace fluorescent T8 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: all areas with fluorescent fixtures with T8 tubes.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**6,690**	**0.6**	**-2**	**$976**	**$7,195**	**$6,760**	**$435**	**0.4**	**6,557**
ECM 3	Install High/Low Lighting Controls	6,690	0.6	-2	$976	$7,195	$6,760	$435	0.4	6,557

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 High/Low Lighting Controls

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

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

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

This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected building areas: hallways, stairs, and lobby.

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

4.3 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		**39,147**	**2.0**	**57**	**$6,021**	**$32,476**	**$1,900**	**$30,576**	**5.1**	**46,136**
ECM 4	Install VFDs on Constant Volume (CV) Fans	7,152	1.2	0	$1,051	$10,189	$250	$9,939	9.5	7,202
ECM 5	Install VFDs on Kitchen Hood Fan Motors	26,811	0.1	57	$4,208	$14,770	$1,250	$13,520	3.2	33,714
ECM 6	Install VFDs on Condensate Pumps	5,184	0.7	0	$762	$7,518	$400	$7,118	9.3	5,220

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 4: Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume exhaust fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume 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: 1 hp and 2 hp exhaust fan motors.

ECM 5: Install VFDs on Kitchen Hood Fan Motors

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

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

ECM 6: Install VFDs on Condensate Pumps

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

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

4.4 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		**3,224**	**0.4**	**0**	**$474**	**$460**	**$100**	**$360**	**0.8**	**3,246**
ECM 7	Vending Machine Control	3,224	0.4	0	$474	$460	$100	$360	0.8	3,246

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.

4.5 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		**0**	**0.0**	**149**	**$690**	**$9,700**	**$0**	**$9,700**	**14.1**	**17,390**
ECM 8	Sub Metering	0	0.0	149	$690	$9,700	$0	$9,700	14.1	17,390

ECM 8: 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 natural gas consumption of the sub metered buildings based on the premise of occupant behavioral changes. For this building the following submeter is proposed: water flow meter. This building is already equipped with electric submeter and steam flow meter. Meter costs for the evaluation are based on average building use across the campus: smart electric meter $2,400, steam flow meter $6,700, chilled water flow meter $9,700. The actual scope of work and implementation costs must be provided by a contractor in the future. This measure is recommended for implementation based on the initial energy and economic results but primarily for enhancing the potential for greater energy management activities.

5 ENERGY EFFICIENT BEST PRACTICES

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

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

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

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.

Economizer Maintenance

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

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

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.

Ductwork Maintenance

Duct maintenance has two primary goals: keep the ducts clean to avoid air quality problems and seal leaks to save energy. Check for cleanliness, obstructions that block airflow, water damage, and leaks. Ducts should be inspected at least every two years.

The biggest symptoms of clogged air ducts are differing temperatures throughout the building and areas with limited airflow from supply registers. If a particular air duct is clogged, then air flow will only be cut off to some rooms in the building - not all of them. The reduced airflow will make it more difficult for

those areas to reach the temperature setpoint which will cause the HVAC system to run longer to cool or heat that area properly. If you suspect clogged air ducts, ensure that all areas in front of supply registers are clear of items that may block or restrict air flow, and check for fire dampers or balancing dampers that have failed closed.

Duct leakage in commercial buildings can account for 5% to 25% of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Check ductwork for leakage. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

Distribution system losses are dependent on air system temperature, the size of the distribution system, and the level of insulation of the ductwork. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is missing or worn, the system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Steam Trap Repair and Replacement

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

Refrigeration Equipment Maintenance

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

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

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

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[6] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[7] 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.

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

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

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.

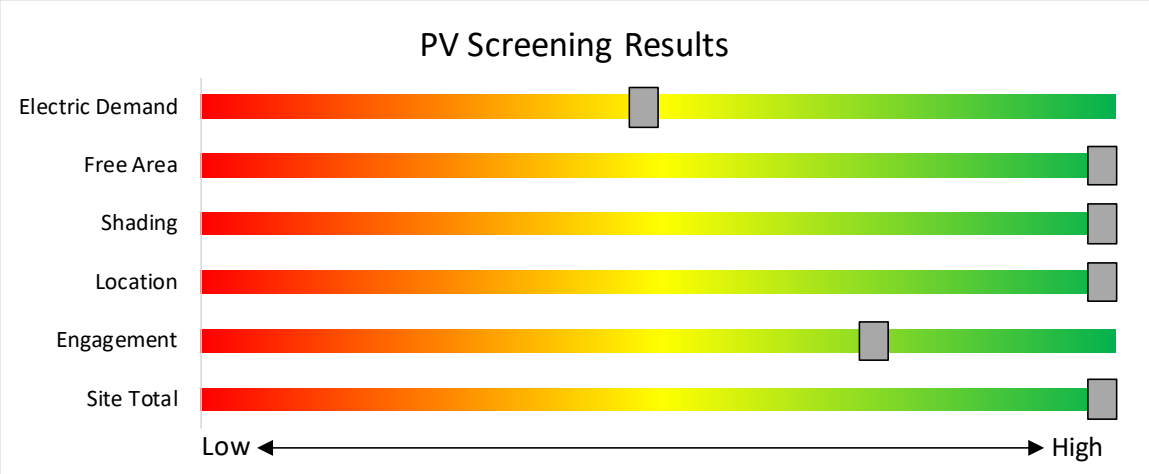
6.1 Solar Photovoltaic

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 high potential for installing a PV array.

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

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



Potential	High	
System Potential	404	kW DC STC
Electric Generation	481,314	kWh/yr
Displaced Cost	$70,750	/yr
Installed Cost	$1,050,400	

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 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.

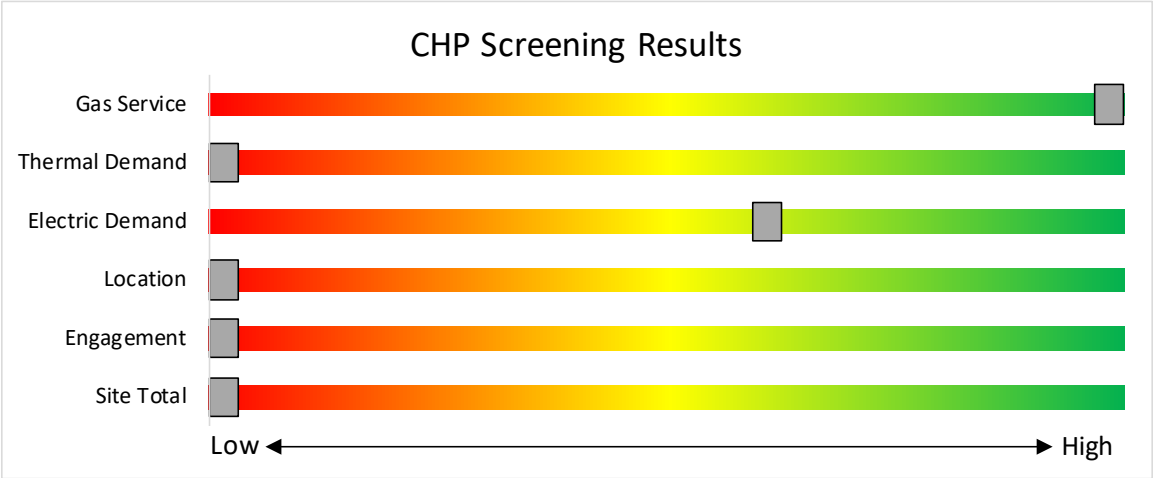


Figure 10 - Combined Heat and Power Screening

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 Intsall 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

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.

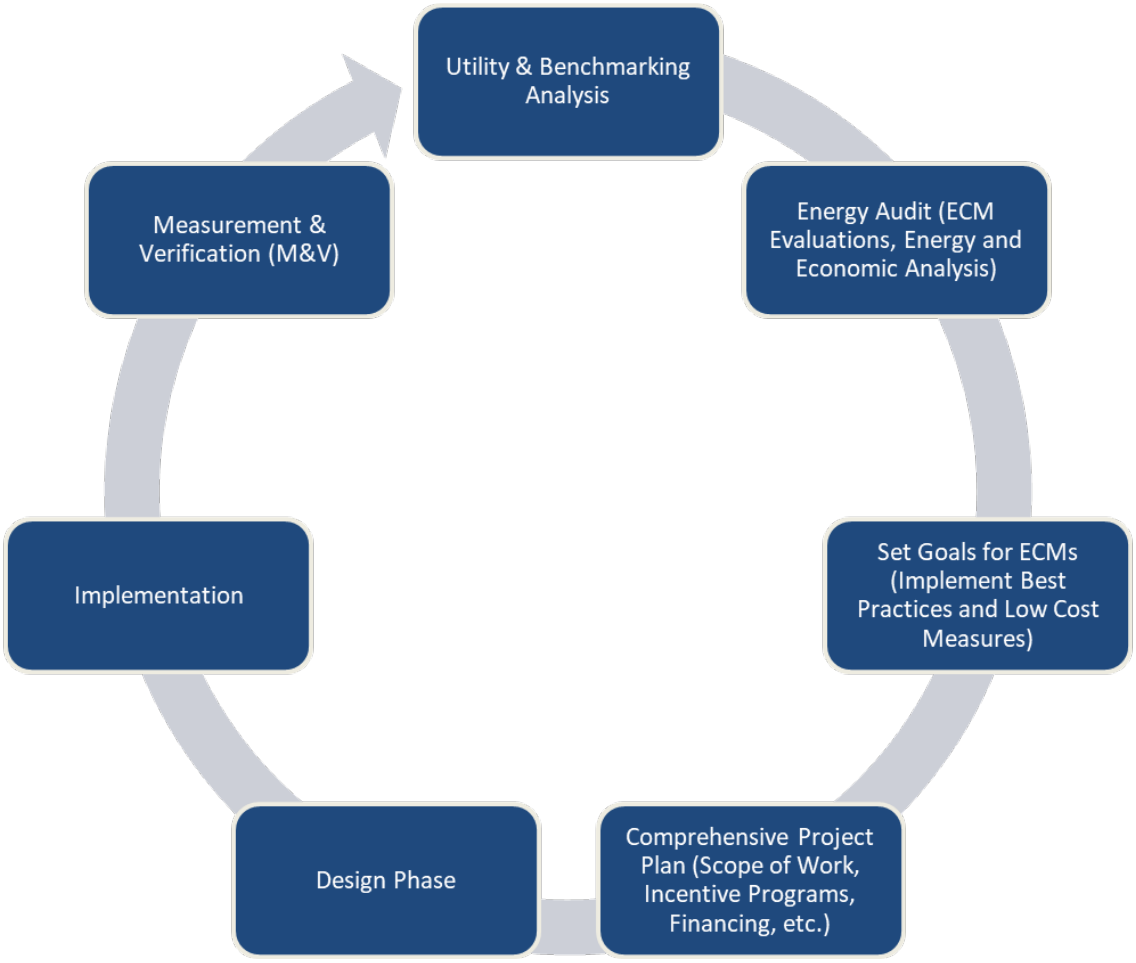


Figure 11 – Project Development Cycle

9.1 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[8].

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[9].

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

[9] 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
Entrance Exit 6	8	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	8	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
2nd Floor Study Area	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
2nd Floor Study Area	52	LED - Fixtures: Linear Strip	Other	S	38	5,950		None	No	52	LED - Fixtures: Linear Strip	Other	38	5,950	0.0	0	0	$0	$0	$0	0.0
2nd Floor Study Area	15	LED - Fixtures: Downlight Recessed	Other	S	18	5,950		None	No	15	LED - Fixtures: Downlight Recessed	Other	18	5,950	0.0	0	0	$0	$0	$0	0.0
Balcony	13	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	13	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Cooking Area	5	LED - Fixtures: 250W LED Fixtures	Other	S	250	5,950		None	No	5	LED - Fixtures: 250W LED Fixtures	Other	250	5,950	0.0	0	0	$0	$0	$0	0.0
Cooking Area	4	LED - Fixtures: Explosion-Proof (Kitchen Hood)	Other	S	10	5,950		None	No	4	LED - Fixtures: Explosion-Proof (Kitchen Hood)	Other	10	5,950	0.0	0	0	$0	$0	$0	0.0
Custodial	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	700	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	700	0.0	12	0	$2	$18	$5	7.4
Custodial	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.0	23	0	$3	$37	$10	7.9
Custodial	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	36	700		None	No	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	36	700	0.0	0	0	$0	$0	$0	0.0
Custodial	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.0	23	0	$3	$37	$10	7.9
Dining Area - Room 102B	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Area - Room 102B	11	LED - Fixtures: 2x2 Recessed LED Fixture	Other	S	40	5,950		None	No	11	LED - Fixtures: 2x2 Recessed LED Fixture	Other	40	5,950	0.0	0	0	$0	$0	$0	0.0
Dining Area 2 - Two Courts	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
Dining Area 2 - Two Courts	11	LED - Fixtures: 2x2 Recessed LED Fixture	Other	S	40	5,950		None	No	11	LED - Fixtures: 2x2 Recessed LED Fixture	Other	40	5,950	0.0	0	0	$0	$0	$0	0.0
Eating Area	4	LED - Fixtures: Downlight Recessed	Other	S	24	5,950		None	No	4	LED - Fixtures: Downlight Recessed	Other	24	5,950	0.0	0	0	$0	$0	$0	0.0
Electrical Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.0	23	0	$3	$37	$10	7.9
Electrical Room 002	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.1	185	0	$27	$292	$80	7.9
Exterior Front Recessed	9	LED - Fixtures: Downlight Recessed	Timeclock		24	4,380		None	No	9	LED - Fixtures: Downlight Recessed	Timeclock	24	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Front Column Mounted	6	LED - Fixtures: Architectural Flood/Spot Luminaire	Timeclock		24	4,380		None	No	6	LED - Fixtures: Architectural Flood/Spot Luminaire	Timeclock	24	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Recessed Exit 2	3	LED - Fixtures: Downlight Recessed	Timeclock		10	4,380		None	No	3	LED - Fixtures: Downlight Recessed	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Recessed Exit 3	3	LED - Fixtures: Downlight Recessed	Timeclock		10	4,380		None	No	3	LED - Fixtures: Downlight Recessed	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Recessed Exit 5	9	LED - Fixtures: Downlight Recessed	Timeclock		10	4,380		None	No	9	LED - Fixtures: Downlight Recessed	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Recessed Exit 6	8	LED - Fixtures: Downlight Recessed	Timeclock		10	4,380		None	No	8	LED - Fixtures: Downlight Recessed	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Recessed Exit 6	6	LED - Fixtures: Downlight Recessed	Timeclock		10	4,380		None	No	6	LED - Fixtures: Downlight Recessed	Timeclock	10	4,380	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
Exterior Recessed Exit 9	4	LED - Fixtures: Downlight Recessed	Timeclock		10	4,380		None	No	4	LED - Fixtures: Downlight Recessed	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		17	4,380		None	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	17	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		24	4,380		None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	24	4,380	0.0	0	0	$0	$0	$0	0.0
Fire Pump Room 001A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.0	46	0	$7	$73	$20	7.9
Food Court	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
Food Court	13	LED - Fixtures: Downlight Recessed	Other	S	18	5,950		None	No	13	LED - Fixtures: Downlight Recessed	Other	18	5,950	0.0	0	0	$0	$0	$0	0.0
Food Court	42	LED - Fixtures: High-Bay (Prismatic Reflector)	Other	S	160	5,950		None	No	42	LED - Fixtures: High-Bay (Prismatic Reflector)	Other	160	5,950	0.0	0	0	$0	$0	$0	0.0
Game Area	19	LED - Fixtures: Downlight Pendant	Other	S	85	5,950		None	No	19	LED - Fixtures: Downlight Pendant	Other	85	5,950	0.0	0	0	$0	$0	$0	0.0
Hallway - Basement	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
Hallway - Basement	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Other	S	62	5,950	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	4,106	0.1	1,749	0	$255	$481	$295	0.7
Hallway - Offices	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
Hallway - Offices	8	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	8	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Hallway - Restrooms	5	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	5	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Hallway- Cooking Areas	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
Hallway- Cooking Areas	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Other	S	62	5,950	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	4,106	0.2	1,999	0	$292	$517	$305	0.7
Hallway 2nd Floor	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
Hallway 2nd Floor	36	LED - Fixtures: Downlight Recessed	Other	S	16	5,950	4	None	Yes	36	LED - Fixtures: Downlight Recessed	High/Low Control	16	4,106	0.1	1,062	0	$155	$1,350	$1,260	0.6
Hallway by Exit 2	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
Hallway by Exit 2	30	LED - Fixtures: Downlight Recessed	Other	S	16	5,950	4	None	Yes	30	LED - Fixtures: Downlight Recessed	High/Low Control	16	4,106	0.1	885	0	$129	$1,125	$1,050	0.6
Handicap Access Hallway	6	LED - Fixtures: Downlight Recessed	Other	S	24	5,950		None	No	6	LED - Fixtures: Downlight Recessed	Other	24	5,950	0.0	0	0	$0	$0	$0	0.0
Handicap Access Lobby	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
Handicap Access Lobby	64	LED - Fixtures: Downlight Recessed	Other	S	16	5,950	4	None	Yes	64	LED - Fixtures: Downlight Recessed	High/Low Control	16	4,106	0.2	1,889	0	$276	$2,250	$2,240	0.0
Loading Dog	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Loading Dock	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Other	S	62	5,950	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	4,106	0.2	1,999	0	$292	$512	$115	1.4
Lobby Box Office	10	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	10	LED - Fixtures: Downlight Recessed	Other	16	5,950	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
Lobby Box Office	3	LED - Fixtures: Decorative Pendant	Other	S	28	5,950		None	No	3	LED - Fixtures: Decorative Pendant	Other	28	5,950	0.0	0	0	$0	$0	$0	0.0
Lobby Room 101	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
Lobby Room 101	23	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	23	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Lobby Room 101	3	LED - Fixtures: Downlight Recessed	Other	S	24	5,950		None	No	3	LED - Fixtures: Downlight Recessed	Other	24	5,950	0.0	0	0	$0	$0	$0	0.0
Main Entrance	6	LED - Fixtures: Downlight Recessed	Other	S	24	5,950		None	No	6	LED - Fixtures: Downlight Recessed	Other	24	5,950	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	9	LED - Fixtures: 2x2 Recessed LED Fixture	Occupancy Sensor	S	40	5,640		None	No	9	LED - Fixtures: 2x2 Recessed LED Fixture	Occupancy Sensor	40	5,640	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	8	LED - Fixtures: Explosion-Proof (Kitchen Hood)	Other	S	10	5,950		None	No	8	LED - Fixtures: Explosion-Proof (Kitchen Hood)	Other	10	5,950	0.0	0	0	$0	$0	$0	0.0
Main Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Main Lobby	11	LED - Fixtures: Downlight Recessed	Other	S	16	5,950	4	None	Yes	11	LED - Fixtures: Downlight Recessed	High/Low Control	16	4,106	0.0	325	0	$47	$225	$225	0.0
Mechanical Room 001	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical Room 001	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	3	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.3	370	0	$54	$584	$160	7.9
Open Study Area	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
Open Study Area	43	LED - Fixtures: Downlight Recessed	Other	S	28	5,950		None	No	43	LED - Fixtures: Downlight Recessed	Other	28	5,950	0.0	0	0	$0	$0	$0	0.0
Open Study Area	18	LED - Fixtures: Downlight Pendant	Other	S	85	5,950		None	No	18	LED - Fixtures: Downlight Pendant	Other	85	5,950	0.0	0	0	$0	$0	$0	0.0
Open Study Area	2	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	2	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Open Area - Above the Beams	88	LED - Fixtures: Decorative Pendant	Other	S	28	5,950		None	No	88	LED - Fixtures: Decorative Pendant	Other	28	5,950	0.0	0	0	$0	$0	$0	0.0
Pizza Area	6	Incandescent: (1) 250W A23 Screw-In Lamp (Heat Lamp)	Other	S	250	5,950		None	No	6	Incandescent: (1) 250W A23 Screw-In Lamp (Heat Lamp)	Other	250	5,950	0.0	0	0	$0	$0	$0	0.0
Pizza Area	9	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	24	5,640		None	No	9	LED - Fixtures: Downlight Recessed	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Reception Area	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
Reception Area	20	LED - Fixtures: Downlight Recessed	Other	S	24	5,950		None	No	20	LED - Fixtures: Downlight Recessed	Other	24	5,950	0.0	0	0	$0	$0	$0	0.0
Refrigeration Room	5	LED - Fixtures: Downlight Pendant	Occupancy Sensor	S	40	5,640		None	No	5	LED - Fixtures: Downlight Pendant	Occupancy Sensor	40	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - All Gender	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - All Gender	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Men	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Men	16	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	18	5,640		None	No	16	LED - Fixtures: Downlight Recessed	Occupancy Sensor	18	5,640	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
Restroom - Men	7	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	24	5,640		None	No	7	LED - Fixtures: Downlight Recessed	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Men	14	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	18	5,640		None	No	14	LED - Fixtures: Downlight Recessed	Occupancy Sensor	18	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Women	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Women	16	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	18	5,640		None	No	16	LED - Fixtures: Downlight Recessed	Occupancy Sensor	18	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Women	7	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	24	5,640		None	No	7	LED - Fixtures: Downlight Recessed	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Restroom - Women	14	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	18	5,640		None	No	14	LED - Fixtures: Downlight Recessed	Occupancy Sensor	18	5,640	0.0	0	0	$0	$0	$0	0.0
Roof	8	Metal Halide: (1) 400W Lamp	Timeclock		458	4,380	2	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	120	4,380	0.0	11,844	0	$1,741	$4,436	$400	2.3
Room 003	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.1	744	0	$109	$146	$40	1.0
Room 004	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	3	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.3	3,350	-1	$489	$657	$180	1.0
Room 005 Mechanical	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.1	185	0	$27	$292	$80	7.9
Room 006	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	186	0	$27	$37	$10	1.0
Room 1 - AV1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	372	0	$54	$73	$20	1.0
Room 1 - E2	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	18	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	18	5,640	0.0	0	0	$0	$0	$0	0.0
Room 1 - IT1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	372	0	$54	$73	$20	1.0
Room 1 - IT2	3	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	18	5,640		None	No	3	LED - Fixtures: Downlight Recessed	Occupancy Sensor	18	5,640	0.0	0	0	$0	$0	$0	0.0
Room 100E	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
Room 100E	6	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	6	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Room 100E	32	LED - Fixtures: Downlight Recessed	Other	S	38	5,950		None	No	32	LED - Fixtures: Downlight Recessed	Other	38	5,950	0.0	0	0	$0	$0	$0	0.0
Room 100W	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
Room 100W	2	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	2	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Room 100W	28	LED - Fixtures: Downlight Recessed	Other	S	38	5,950		None	No	28	LED - Fixtures: Downlight Recessed	Other	38	5,950	0.0	0	0	$0	$0	$0	0.0
Room 100W	4	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	4	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Room 102A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	186	0	$27	$37	$10	1.0
Room 102C	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	S	32	5,640	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	5,640	0.0	99	0	$14	$18	$5	0.9
Room 102E	2	LED - Fixtures: 2x2 Recessed LED Fixture	Occupancy Sensor	S	40	5,640		None	No	2	LED - Fixtures: 2x2 Recessed LED Fixture	Occupancy Sensor	40	5,640	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
Room 105A	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	18	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	18	5,640	0.0	0	0	$0	$0	$0	0.0
Room 105B	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 105E	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 105F	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 105G	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 105H	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 107D	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 107D	10	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	10	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 107F	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Other	S	62	5,950	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Other	29	5,950	0.0	196	0	$29	$37	$10	0.9
Room 108	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	2	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 109	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,640	0.0	327	0	$48	$145	$20	2.6
Room 110	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,640	0.0	327	0	$48	$145	$20	2.6
Room 112	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,640	0.1	981	0	$143	$435	$60	2.6
Room 114	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	5,640	0.0	327	0	$48	$145	$20	2.6
Room 116	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.1	931	0	$136	$183	$50	1.0
Room 1M1	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
Room 1M1	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.2	1,861	0	$272	$365	$100	1.0
Room 2 - E2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	372	0	$54	$73	$20	1.0
Room 2 - E3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	372	0	$54	$73	$20	1.0
Room 2-AV1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	558	0	$81	$110	$30	1.0
Room 2-IT1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	558	0	$81	$110	$30	1.0
Room 2-IT2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	5,640	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,640	0.0	372	0	$54	$73	$20	1.0
Room 2-M2 Mechanical	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Other	S	62	5,950	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Other	29	5,950	0.1	982	0	$143	$183	$50	0.9
Room 2-M3 Mechanical	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
Room 2-M3 Mechanical	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	700	2	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	700	0.2	323	0	$47	$511	$140	7.9

	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
Room 201	23	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	23	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 201A	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 201B	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 201C	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 201D	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 201E	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 201F	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 202	5	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	5	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 202A	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 202B	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 203	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 204	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 205	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 206	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 207	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 208	14	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	14	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 208A	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 208B	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 209	5	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	5	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 209A	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 209B	1	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	1	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 209C	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	4	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 210	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 211	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 212	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0

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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
Room 214	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	12	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 216	10	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	10	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220	14	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	14	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220A	1	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	1	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220B	3	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	3	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220C	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220D	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220E	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220F	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220G	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220H	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	2	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 220J	13	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	13	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 221	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 222	20	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	20	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 223	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	6	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 224	20	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	S	24	5,640		None	No	20	LED - Fixtures: Linear Recessed LED Fixtures	Occupancy Sensor	24	5,640	0.0	0	0	$0	$0	$0	0.0
Room 225A Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,050	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,050	0.0	104	0	$15	$110	$30	5.2
Room 225B Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,050	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,050	0.0	35	0	$5	$37	$10	5.2
Room 225C Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,050	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,050	0.0	35	0	$5	$37	$10	5.2
Room 225E	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
Room 225E	32	LED - Fixtures: Downlight Recessed	Other	S	38	5,950		None	No	32	LED - Fixtures: Downlight Recessed	Other	38	5,950	0.0	0	0	$0	$0	$0	0.0
Room 225E	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	0.0	0	0	$0	$0	$0	0.0
Room 225W	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
Room 225W	32	LED - Fixtures: Downlight Recessed	Other	S	38	5,950		None	No	32	LED - Fixtures: Downlight Recessed	Other	38	5,950	0.0	0	0	$0	$0	$0	0.0
Room 225W	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	S	16	5,640		None	No	4	LED - Fixtures: Downlight Recessed	Occupancy Sensor	16	5,640	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
Stairs	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	18	LED - Fixtures: Downlight Recessed	Other	S	16	5,950		None	No	18	LED - Fixtures: Downlight Recessed	Other	16	5,950	0.0	0	0	$0	$0	$0	0.0
Stairs Exit 10	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 Exit 10	11	LED - Fixtures: Downlight Recessed	Other	S	16	5,950	4	None	Yes	11	LED - Fixtures: Downlight Recessed	High/Low Control	16	4,106	0.0	325	0	$47	$450	$385	1.4
Stairs Exit 2	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs Exit 2	19	LED - Fixtures: Downlight Recessed	Other	S	16	5,950	4	None	Yes	19	LED - Fixtures: Downlight Recessed	High/Low Control	16	4,106	0.0	561	0	$82	$675	$665	0.1
Stairs Exit 3	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 Exit 3	14	LED - Fixtures: Downlight Recessed	Other	S	16	5,950	4	None	Yes	14	LED - Fixtures: Downlight Recessed	High/Low Control	16	4,106	0.0	413	0	$60	$450	$450	0.0
Tradition Area	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
Tradition Area	20	LED - Fixtures: Downlight Pendant	Other	S	85	5,950		None	No	20	LED - Fixtures: Downlight Pendant	Other	85	5,950	0.0	0	0	$0	$0	$0	0.0
Tradition Area	16	LED - Fixtures: Downlight Recessed	Other	S	18	5,950		None	No	16	LED - Fixtures: Downlight Recessed	Other	18	5,950	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 001	Chilled Water System	2	Chilled Water Pump	30.0	94.1%	Yes			W	2,352		No	94.1%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 001	Condensate Pump	2	Condensate Pump	3.0	82.5%	No			W	2,352	7	No	86.5%	Yes	2	0.7	5,184	0	$762	$7,518	$400	9.3
Mechanical Room 001	Domestic Hot Water Pump	4	DHW Circulation Pump	0.5	70.0%	No			W	8,760		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 001	Hot Water System	2	Heating Hot Water Pump	15.0	93.0%	Yes			W	2,882		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Room 1M1	Hot Water Pump - AHU-7	1	Heating Hot Water Pump	0.5	70.0%	No			W	2,882		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M3 Mechanical	Hot Water Pump - AHU-6	1	Heating Hot Water Pump	0.8	75.5%	No			W	2,882		No	75.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M3 Mechanical	Hot Water Pump - AHU-5	1	Heating Hot Water Pump	0.3	65.0%	No			W	2,882		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Loading Dock	Rollup Doors	2	Other	0.8	70.0%	No			W	2,882		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 001	Sewage System	2	Other	1.5	82.5%	No			W	2,882		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 1M1	AHU-7	1	Supply Fan	50.0	95.2%	Yes			W	5,824		No	95.2%	No		0.0	0	0	$0	$0	$0	0.0
Room 1M1	AHU-7	1	Return Fan	15.0	92.4%	Yes			W	5,824		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-1	1	Supply Fan	20.0	93.0%	Yes			W	5,824		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-1	1	Return Fan	7.5	89.5%	Yes			W	5,824		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-3	1	Supply Fan	20.0	93.0%	Yes			W	5,824		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-3	1	Return Fan	10.0	89.5%	Yes			W	5,824		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-4	1	Supply Fan	20.0	93.0%	Yes			W	5,824		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-4	1	Supply Fan	10.0	89.5%	Yes			W	5,824		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-5	1	Supply Fan	30.0	94.5%	Yes			W	5,824		No	94.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-5	1	Return Fan	15.0	92.4%	Yes			W	5,824		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Room 2-M2 Mechanical	AHU-6	1	Supply Fan	20.0	93.0%	Yes			W	5,824		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Room 2-M2 Mechanical	AHU-6	1	Return Fan	10.0	89.5%	Yes			W	5,824		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 005 Mechanical	AHU-2	1	Supply Fan	15.0	92.4%	Yes			W	5,824		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 001	Cold Water Supply System	3	Water Supply Pump	5.0	85.5%	Yes			W	2,920		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Room 108	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Entrance Exit 6	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hallway - Basement	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hallway 2nd Floor	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hallway by Exit 2	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Main Entrance	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Stairs Exit 10	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Stairs Exit 2	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Stairs Exit 3	Fan Coil	1	Fan Coil Unit	0.2	65.0%	No			W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Room 006	Fan Coil - FCU-3	1	Fan Coil Unit	2.0	82.5%	No			W	5,824		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-14,15 - Kitchen Hoods	2	Kitchen Hood Exhaust Fan	1.5	82.5%	No	Greenheck	SWD-212-15	W	5,250	6	No	86.5%	Yes	2	0.1	7,869	16	$1,229	$6,760	$150	5.4
Roof	EF-17 - Fire Pump Rm	1	Exhaust Fan	0.3	65.0%	No	Greenheck	G-103HP-4-X	W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-18 - Mechancial Rm 05	1	Exhaust Fan	0.8	70.0%	No	Greenheck	GB-161hp-7-X	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-19 - Mechancial Rm 001	1	Exhaust Fan	0.5	70.0%	No	Greenheck	G-103hp-VG-5	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-29,20 - Elevator Rm, Rm 215	2	Exhaust Fan	0.8	70.0%	No	Greenheck	G-095-VG-6-X	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-16,5 - Ice Machine Rm	2	Exhaust Fan	0.8	70.0%	No	Greenheck	GB-141HP-5-X	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-2 -Toilet Rm	1	Exhaust Fan	0.3	65.0%	No	Greenheck		W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	EF-23 - Catering Rm 112	1	Exhaust Fan	0.5	70.0%	No	Greenheck		W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-22 - Mechanical Rm 113B	1	Exhaust Fan	0.3	65.0%	No	Greenheck		W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-30,3 - Elevator Rm2, Rm 110A	2	Exhaust Fan	0.8	70.0%	No	Greenheck	G-095-VG-6-X	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-21,2 - Mechanical Rm212	2	Exhaust Fan	0.8	70.0%	No	Greenheck	GB-180-7-X	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-4 - Locker Rm	1	Exhaust Fan	0.8	70.0%	No	Greenheck	G-095-VG-6-X	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-5 -Toilet Rm	1	Exhaust Fan	0.5	70.0%	No	Greenheck	GB-141-5-X	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-6,7 - Rm 109D, Rm 112	2	Exhaust Fan	0.3	65.0%	No	Greenheck	G-098-VG-4-X	W	5,824		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-24,13 - Rm 119A, Rm 129	2	Exhaust Fan	0.5	70.0%	No	Greenheck	CUE-101HP-1/6-5-G	W	5,824		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	EF-8 - Kitchen	1	Kitchen Hood Exhaust Fan	5.0	89.5%	No	Greenheck	CUBE-300HP-50-G	W	5,250	6	No	89.5%	Yes	1	0.0	11,708	21	$1,818	$4,197	$900	1.8
Roof	EF-9 - Kitchen	1	Kitchen Hood Exhaust Fan	3.0	89.5%	No	Greenheck	CUBE-180HP-30-G	W	5,250	6	No	89.5%	Yes	1	0.0	7,234	21	$1,160	$3,812	$200	3.1
Roof	EF-10,12	2	Exhaust Fan	1.0	85.5%	No	Greenheck	CUBE-161XP-10-G	W	5,824	5	No	85.5%	Yes	2	0.6	3,576	0	$526	$6,566	$150	12.2
Roof	EF-1	1	Exhaust Fan	2.0	86.5%	No	Greenheck	SFB-20-50-GW-TH-X	W	5,824	5	No	86.5%	Yes	1	0.6	3,576	0	$526	$3,623	$100	6.7
Various Spaces	Hydronic Unit Heaters	5	Supply Fan	0.3	65.0%	No			W	4,200		No	65.0%	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
Loading Dock	Loading Dock	1	Electric Resistance Heat		17.06		1 COP	Qmark		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	SS-3 - Room 2-IT2	1	Ductless Mini-Split AC	2.00		18.10		Daikin	RZR24PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	SS-2 - Room 2-IT1	1	Ductless Mini-Split AC	2.00		18.10		Daikin	RZR24PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	SS-6 Room 2-AV1, 1-AV1	1	Ductless Mini-Split AC	4.00		13.80		Daikin	RZR42PVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	SS-7 Room 1-IT1, 1-IT2	1	Ductless Mini-Split AC	2.00		18.10		Daikin	RZR24PVJU	W		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Central Plant	Building Chilled Water	1	Water-Cooled Centrifugal Chiller	617.00	Central Plant	Proxy Chiller	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	5,617	Central Plant	Proxy Boiler	W		No						0.0	0	0	$0	$0	$0	0.0
Central Plant	Building Chilled Water	1	Other	7,404	Central Plant	Proxy Steam Chiller	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

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Hallway- Basement	1	Cooler (35F to 55F)	Master-Bilt	RST70C1E-TAS		No	No	No	0.0	0	0	$0	$0	$0	0.0
Refrigeration Room	1	Cooler (35F to 55F)	Bally	ZF06K4E-TFS		No	No	No	0.0	0	0	$0	$0	$0	0.0
Cooking Area	2	Medium Temp Freezer (0F to 30F)	Bally	ZS19KAE-TF5		No	No	No	0.0	0	0	$0	$0	$0	0.0
Hallway- Basement	1	Low Temp Freezer (-35F to -5F)	Bally	ZF15K4E-TF5		No	No	No	0.0	0	0	$0	$0	$0	0.0
Refrigeration Room	1	Low Temp Freezer (-35F to -5F)	Bally	ZF21K4E-TF5		No	No	No	0.0	0	0	$0	$0	$0	0.0
Cooking Area	1	Cooler (35F to 55F)	Bally	ZF13K4E-TF6		No	No	No	0.0	0	0	$0	$0	$0	0.0
Student Center	1	Low Temp Freezer (-35F to -5F)	Bohn	BHT014L6CF		No	No	No	0.0	0	0	$0	$0	$0	0.0
Student Center	1	Low Temp Freezer (-35F to -5F)	Bohn	BTH015X6CFM		No	No	No	0.0	0	0	$0	$0	$0	0.0

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Food Court	2	Refrigerator Chest	Harmony	HMO5136R	No		No	0.0	0	0	$0	$0	$0	0.0
Cooking Area	1	Freezer Chest	Continental		No		No	0.0	0	0	$0	$0	$0	0.0
Food Court	1	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Victory		No		No	0.0	0	0	$0	$0	$0	0.0
Pizza Area	2	Refrigerator Chest	Cold Well		No		No	0.0	0	0	$0	$0	$0	0.0
Food Court	1	Stand-Up Refrigerator, Glass Door (>50 cu. ft.)			No		No	0.0	0	0	$0	$0	$0	0.0
Food Court	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)			No		No	0.0	0	0	$0	$0	$0	0.0
Cooking Area	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Continental		No		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Continental		No		No	0.0	0	0	$0	$0	$0	0.0
Room 107D	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	TRUE	T-23-HC	No		No	0.0	0	0	$0	$0	$0	0.0
Room 107D	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	TRUE	T-23F-HC	No		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Custodial	1	Self-Contained Unit (≥175 lbs/day), Batch	Manitowoc	B570	Yes		No	0.0	0	0	$0	$0	$0	0.0
Dining Area	1	Self-Contained Unit (≥175 lbs/day), Batch	Manitowoc	B570	Yes		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Cooking Area	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Southbend		Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Southbend		Yes		No	0.0	0	0	$0	$0	$0	0.0
Pizza Area	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Southbend		Yes		No	0.0	0	0	$0	$0	$0	0.0
Cooking Area	1	Gas Convection Oven (Full Size)	Southbend	G-Series	Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Convection Oven (Full Size)	Alto-Shaam	CTC7-20G	Yes		No	0.0	0	0	$0	$0	$0	0.0
Pizza Area	1	Gas Convection Oven (Full Size)	Bloodgett	911P	Yes		No	0.0	0	0	$0	$0	$0	0.0
Cooking Area	1	Gas Griddle (4 Feet Width)	Southbend	P48C-GGGG	Yes		No	0.0	0	0	$0	$0	$0	0.0
Room 107D	1	Gas Fryer	Pitco		Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Fryer	Pitco		Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Griddle (4 Feet Width)	Southbend	P36N-CCC	Yes		No	0.0	0	0	$0	$0	$0	0.0
Room 107D	1	Gas Griddle (4 Feet Width)	Southbend	P48N-TTTT	Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Griddle (5 Feet Width)	Southbend	P48N-TTTT	Yes		No	0.0	0	0	$0	$0	$0	0.0
Room 107D	1	Gas Griddle (4 Feet Width)	Southbend	P36N-CCC	Yes		No	0.0	0	0	$0	$0	$0	0.0
Pizza Area	2	Insulated Food Holding Cabinet (1/2 Size)	CresCor		Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Insulated Food Holding Cabinet (Full Size)	CresCor	H137WSUA12D	Yes		No	0.0	0	0	$0	$0	$0	0.0
Cooking Area	1	Insulated Food Holding Cabinet (1/2 Size)	Metro C5		Yes		No	0.0	0	0	$0	$0	$0	0.0
Main Kitchen	1	Gas Steamer	Southbend		Yes		No	0.0	0	0	$0	$0	$0	0.0
Cooking Area/Main Kitchen	2	Gas Steamer	Cleveland	24CGA10	Yes		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Custodial	1	Single Tank Conveyor (Low Temp)	Champion	E-440DP	Electric	N/A	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

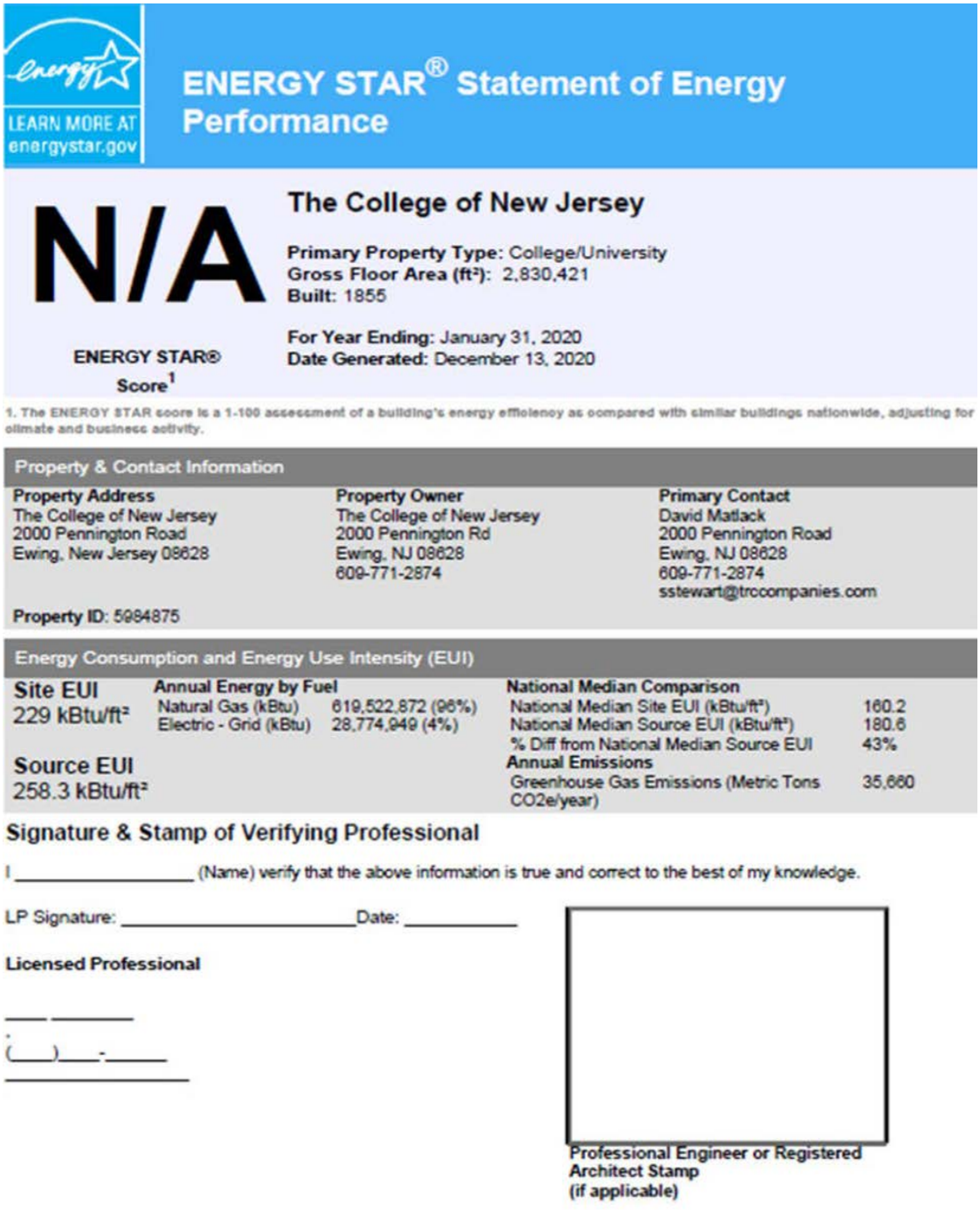
	Existing Conditions					
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**	**Manufacturer**	**Model**
Brower Student Center	1	Commercial Coffee Machine	1,600	No		
Brower Student Center	3	Coffee Machine	400	No		
Brower Student Center	40	Desktop Computer	120	Yes		
Brower Student Center	1	Undercounter Dishwasher	2,500	Yes		
Brower Student Center	4	Microwave	1,000	No		
Brower Student Center	1	Paper Shredder	146	No		
Brower Student Center	10	Printer (Medium/Small)	150	Yes		
Brower Student Center	4	Printer/Copier (Large)	600	Yes		
Brower Student Center	7	Projector	240	Yes		
Brower Student Center	2	Refrigerator (Large)	800	Yes		
Brower Student Center	3	Refrigerator (Mini)	250	Yes		
Brower Student Center	15	Television	220	Yes		
Brower Student Center	2	Toaster	400	No		
Brower Student Center	2	ATM Machines	175	No		
Brower Student Center	2	Water Cooler	192	Yes		
Brower Student Center	5	Server Closets	1,000	No		
Custodial	1	Food waste disposer	1,492	No		
Room 107D	1	Refrigeration Table	3,000	No		
Dining Area	1	Food Mixer	2,496	No		
Pizza Area	2	Automatic Press	3,100	No		
Cooking Area/Main Kitchen	3	Standing Heated Shelf Warmer	700	No		
Room 107D	1	Hot Food Table	2,400	No		
Main Kitchen	1	Countertop Oven	5,000	No		
Custodial	1	Electric Booster Pump (Dishwasher)	22,000	No		

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
Main Area	2	Refrigerated	8	Yes	0.4	3,224	0	$474	$460	$100	0.8
Main Area	1	Non-Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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



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ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

The College of New Jersey

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

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

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

Property & Contact Information

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

Property ID: 5984875

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
229 kBtu/ft²

Source EUI
258.3 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Natural Gas (kBtu)	619,522,872 (96%)	National Median Site EUI (kBtu/ft²)	160.2
Electric - Grid (kBtu)	28,774,949 (4%)	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.