



Local Government Energy Audit Report

Wesley Tisdale Elementary School

September 20, 2019

Prepared for:

Ramsey Board of Education
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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 Energy Services (TRC) reviewed the energy conservation measures and estimates of energy savings were reviewed 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 installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from 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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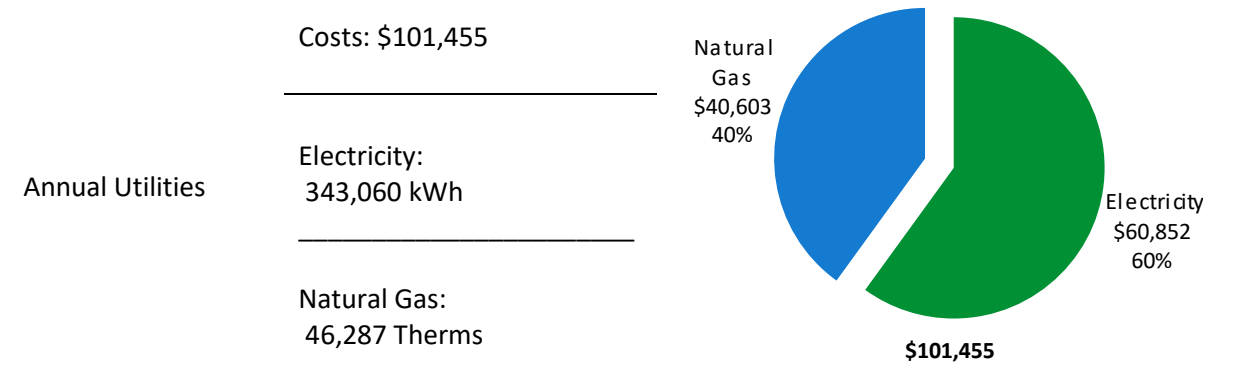
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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBP) has sponsored this Local Government Energy Audit (LGEA) report for Wesley Tisdale Elementary School. 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 Energy Services (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



ENERGY STAR® Benchmarking Score	77 (1-100 scale)	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance and lower your energy bills even more.
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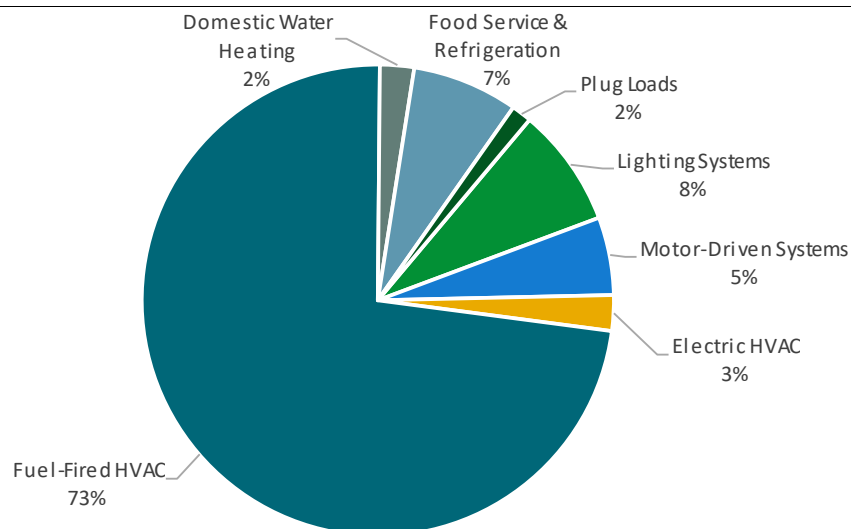


Figure 1 - Energy Use by System

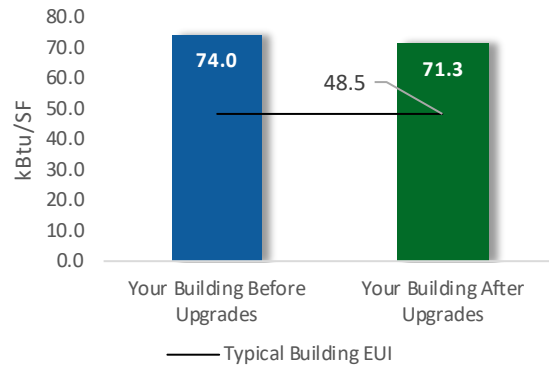
POTENTIAL IMPROVEMENTS



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.

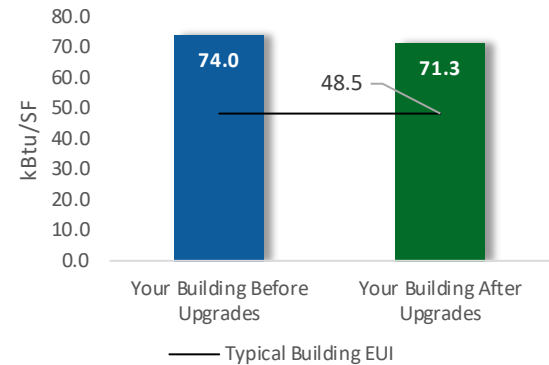
Scenario 1: Full Package (all evaluated measures)

Installation Cost	\$33,621
Potential Rebates & Incentives ¹	\$3,036
Annual Cost Savings	\$9,780
Annual Energy Savings	Electricity: 53,715 kWh Natural Gas: 287 Therms
Greenhouse Gas Emission Savings	29 Tons
Simple Payback	3.1 Years
Site Energy Savings (all utilities)	4%



Scenario 2: Cost Effective Package²

Installation Cost	\$33,621
Potential Rebates & Incentives	\$3,036
Annual Cost Savings	\$9,780
Annual Energy Savings	Electricity: 53,715 kWh Natural Gas: 287 Therms
Greenhouse Gas Emission Savings	29 Tons
Simple Payback	3.1 Years
Site Energy Savings (all utilities)	4%



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	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Energy Cost Savings (\$)	Lifetime Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		8,777	1.8	\$1,542	\$23,123	\$4,222	\$226	\$3,996	2.6	8,634
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	116	0.0	\$20	\$306	\$97	\$6	\$91	4.5	114
ECM 2	Retrofit Fixtures with LED Lamps	8,660	1.7	\$1,521	\$22,817	\$4,125	\$220	\$3,905	2.6	8,520
Lighting Control Measures		40,126	8.2	\$7,044	\$56,352	\$24,517	\$2,335	\$22,182	3.1	39,424
ECM 3	Install Occupancy Sensor Lighting Controls	32,808	6.7	\$5,759	\$46,074	\$18,442	\$2,335	\$16,107	2.8	32,234
ECM 4	Install High/Low Lighting Controls	7,318	1.5	\$1,285	\$10,277	\$6,075	\$0	\$6,075	4.7	7,190
Domestic Water Heating Upgrade		0	0.0	\$341	\$3,408	\$136	\$0	\$136	0.4	4,549
ECM 5	Install Low-Flow DHW Devices	0	0.0	\$341	\$3,408	\$136	\$0	\$136	0.4	4,549
Food Service & Refrigeration Measures		4,813	0.5	\$854	\$8,242	\$4,745	\$475	\$4,270	5.0	4,846
ECM 6	Replace Refrigeration Equipment	3,201	0.4	\$568	\$6,813	\$4,515	\$425	\$4,090	7.2	3,223
TOTALS (COST EFFECTIVE MEASURES)		53,715	10.5	\$9,780	\$91,125	\$33,621	\$3,036	\$30,585	3.1	57,454
TOTALS (ALL MEASURES)		53,715	10.5	\$9,780	\$91,125	\$33,621	\$3,036	\$30,585	3.1	57,454

* - 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	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X	X	
ECM 2	Retrofit Fixtures with LED Lamps	X	X	
ECM 3	Install Occupancy Sensor Lighting Controls	X	X	
ECM 4	Install High/Low Lighting Controls		X	
ECM 5	Install Low-Flow Domestic Hot Water Devices		X	
ECM 6	Replace Refrigeration Equipment	X	X	
ECM 7	Vending Machine Control	X	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.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
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% 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% 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 Wesley Tisdale Elementary School. 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 March 28, 2019, TRC performed an energy audit at Wesley Tisdale Elementary School located in Ramsey, New Jersey. TRC met with Greg M. Bohacik to review the facility operations and help focus our investigation on specific energy-using systems.

Wesley Tisdale Elementary School is a 1-story, 78,339 square foot building built in 1952. Spaces include: classrooms, gymnasium, cafeteria, corridors, a commercial kitchen, and basement mechanical space.

Over the last several years the facility has replaced all its existing T8 fluorescent fixtures with LED fixtures, however, T12 and T8 fluorescent fixtures still exists in some areas.

2.2 Building Occupancy

The facility is occupied from September through June. Typical weekday occupancy is totals 405 staff and students.

Summer occupancy includes continuing maintenance activities. On Saturday, there are only gym activities held.

Building Name	Weekday/Weekend	Operating Schedule
Wesley Tisdale Elementary School	Weekday	Operation: 6:00 AM - 10:00 PM; School: 8:00 AM - 3:00 PM
	Weekend	Saturday Gym Only: 9:00 AM - 6:00 PM; Sunday Closed

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

The exterior walls on the new side of the building are made of brick and concrete masonry units (CMUs), whereas on the older part of the building, walls are made from poured concrete with a decorative veneer and painted interior finish.

The flat roof section is supported with steel trusses and reinforced with a concrete deck, finished with an insulated layer, and a covering of TPO white membrane. The roof is five years old and in good condition.

Steel trusses support a pitched roof with a wooden deck covered with asphalt. The roof encloses semi-conditioned space with tapered insulation (e.g., space that is not intentionally heated but escaping heat from HVAC equipment causes the space to be conditioned). The thermal barrier is between this space and the conditioned space below.

Windows are double pane glazed with low-e glass and have aluminum frames with a thermal break. The glass-to-frame seals on the double pane windows are in good condition. The operable window weather seals are in good condition, showing no evidence of excessive wear. Exterior doors are FRP (fiber-reinforced plastic) aluminum frames with single pane glass and are in good condition with undamaged door seals.



Walls



Windows



Pitched Roof



Courtyard

2.4 Lighting Systems

The primary interior lighting system uses LED linear tubes and ambient fixtures. There are also several 32-Watt linear fluorescent T8 lamps and 40-Watt T12 fixtures. Additionally, there are some compact fluorescent lamps (CFL), incandescent, and LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use less efficient magnetic ballasts.

Fixture types include 3 and 4-lamp, 2 and 4-foot long troffer and recessed mounted fixtures and 2-foot fixtures with linear tube lamps.

The gymnasium fixtures have high bay 180-Watt LED lamps and are controlled by wall switches.

The cafeteria has recessed 4' long LED linear tubes and are also controlled by wall switches.

All exit signs are LED units.

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



Gym Lighting



Media Center Lighting



Hallway Lighting



1 Cafeteria Lighting

Exterior lighting includes wall packs, recessed canopy, wall sconces, flush mounted wall fixtures, flood lights, decorative, emergency lights, and wall mounted fixtures with LED lamps. The pole mounted roadway fixtures also have LED lamps.

In general, exterior light fixtures are controlled by a BMS located in the superintendent's office.



LED Area fixture



Flushed mounted wall fixture



LED Sign Board



Canopy lighting

2.5 Air Handling Systems

Unit Ventilators

The unit ventilators that supply heating to the “old section” classrooms are equipped with 1/12 hp supply fan motors. There are four-unit ventilators in the media center, which are equipped with 1/4 hp supply fan motors. Control is provided by a pneumatic thermostat. This system is original to the building and appears to be in fair operating condition.

Packaged Units

The cafeteria, media center, gym, classrooms, and library offices are conditioned by packaged air conditioning and split system heat pump units controlled by the EMS. These units have heating capacities ranging from 7.17 MBh to 32 MBh and cooling capacities that range from 1-ton to 7.5-tons. They range in efficiency between 9 and 10 EER.

Two Trane air handling units with 0.5 hp and 1.5 hp supply fan motors serves gym storage areas.

A total of 11 exhaust fans are located on the roof with fan motors ranging in size from 0.1 hp to 1 hp. There is a Trane make up air unit in the kitchen with 2 hp supply fan motor.

Refer to Appendix A for detailed information about each unit.

Air Conditioners

The main office, conference room, and break room use window air conditioning (AC) units. These vary in capacity between 0.83 and 1.25-tons. The units are in good condition. They range in efficiency between 9.7 and 10.80 EER. They are ENERGY STAR® labeled.

The HVAC system uses pneumatic controls. Two 1.5 hp air compressors located in the boiler room serve the pneumatic system. No air leaks were observed during the inspection.



Unit Ventilator



Split system AC



Window AC



Condensing Units on roof

2.6 Heating Hot Water Systems

Two 2,399 MBh Well-McClain steam boilers serve the older part of the building's heating loads. The burners are non-modulating with a nominal efficiency of 83%. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. Installed in 2011, they are in good condition. Each boiler has a 1.0 hp combustion air fan. There is a service contract in place for the boilers.

The boiler feed water system has three 0.5 hp feed water pumps along with two 1.5 hp vacuum pumps.

Two Aerco 2,610 MBh condensing hot water boilers serve the new addition's heating load needs. The burners are fully-modulating with a nominal efficiency of 87%. The boilers are configured in an automated control scheme. Both boilers are required under high load conditions. Installed in 2013, they are in good condition and there is a service contract in place.

The hot water boilers serve a primary only distribution system with two VFD controlled 10 hp heating hot water pumps operating in lead/lag fashion. The boilers provide hot water to unit ventilators and air handling units throughout the building.

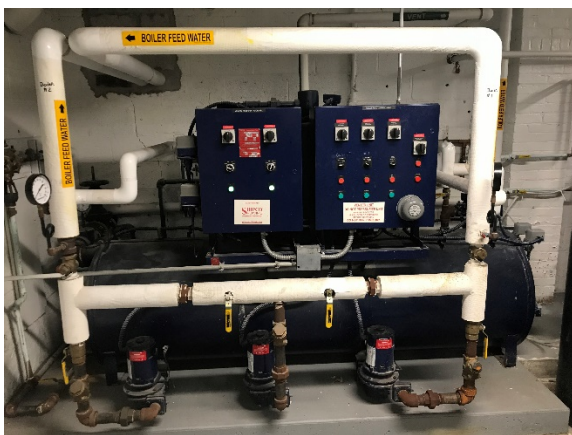
The hot water setpoint is typically 130°F when outside temperature is 55°F. The system is locked out at an outside temperature of 57°F.



Steam boilers



Hot water boilers



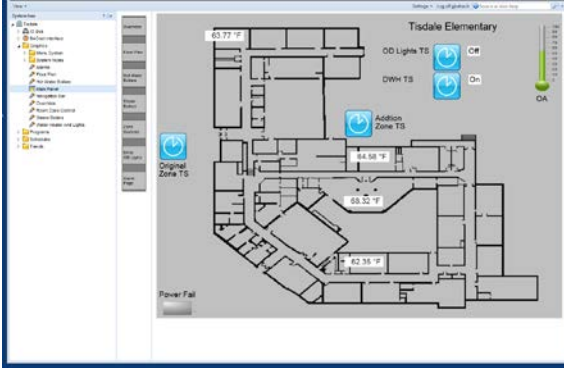
Boiler Feed water system



Heating hot water pumps

2.7 Building Energy Management Systems (EMS)

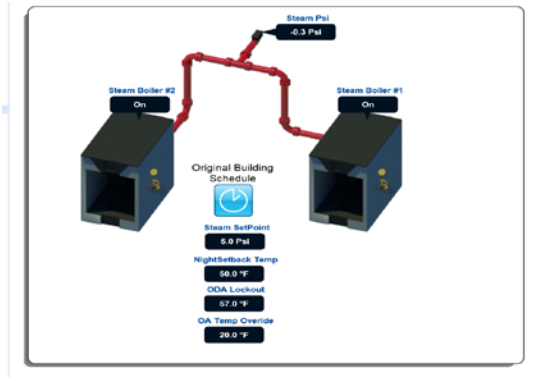
A PQ EMS controls the HVAC equipment, boilers, air handlers, package units, and exterior lighting. The EMS provides equipment scheduling control, monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures, and chilled water loop temperatures.



Floor plan



Hot water system



Steam system



DHW system

2.8 Domestic Hot Water

Hot water is produced with a 100-gallon Laars 199.9 MBh gas-fired storage water heaters with an 80% thermal efficiency.

Two 0.2 hp Bell & Gossett circulation pumps circulate water to end uses. The circulation pumps operate continuously. The domestic hot water pipes are insulated. The insulation is in good condition.



DHW Heater



DHW Circulation pump

2.9 Food Service Equipment

The kitchen has mixed gas and electric equipment that is used to prepare meals for students. Most cooking is done using a convection electric oven and two gas griddles. Bulk prepared foods are held in one full size electric holding cabinets. Equipment is high efficiency and 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 stove with oven



Electric convection oven



Steam serving table



Insulated food cabinet

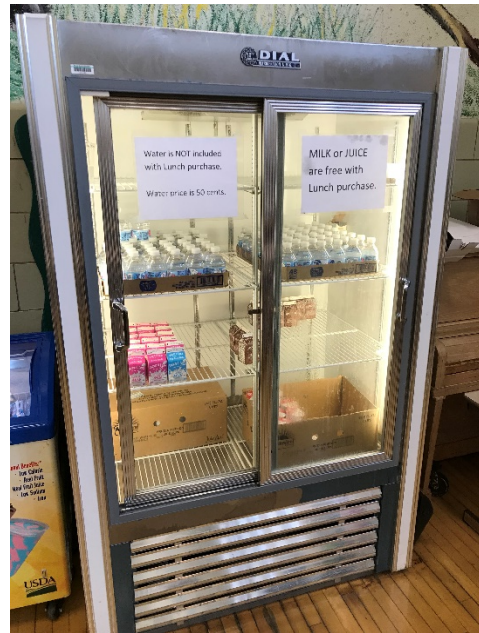
2.10 Refrigeration

The kitchen has six stand-up refrigerators with a mix of solid and glass doors. There is also an energy efficient chest type ice cream freezer. All equipment is high efficiency and in good condition.

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



Solid door refrigerator



Glass door refrigerator



Ice cream freezer

2.11 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 2% percent of total building energy use. This is lower than a typical building.

The staff seems to already be doing a great job managing the electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are approximately 66 computer work stations throughout the facility. Other plug loads throughout the building include general cafeteria and office equipment. There are classroom typical loads such as smart boards, projectors, and printers.

There are several residential style refrigerators throughout the building that are used to store staff lunches and cold beverages. These vary in condition and efficiency.

There is a refrigerated beverage vending machine, which is not equipped with occupancy-based controls.



Refrigerators



Vending Machine

2.12 Water-Using Systems

There are nine restrooms with toilets, urinals, and sinks. Faucet flow rates are at 1.5 gallons per minute (gpm) or higher. Toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1 gpf.



Urinals

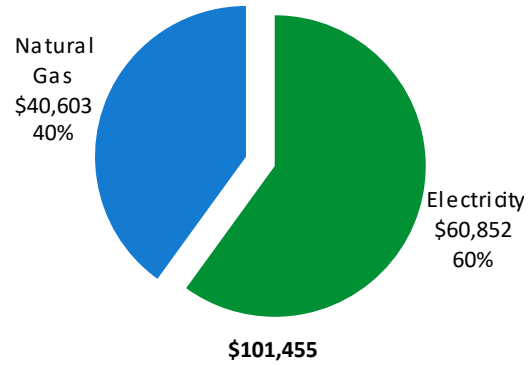


Lavatory faucets

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	343,060 kWh	\$60,852
Natural Gas	46,287 Therms	\$40,603
Total		\$101,455



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.

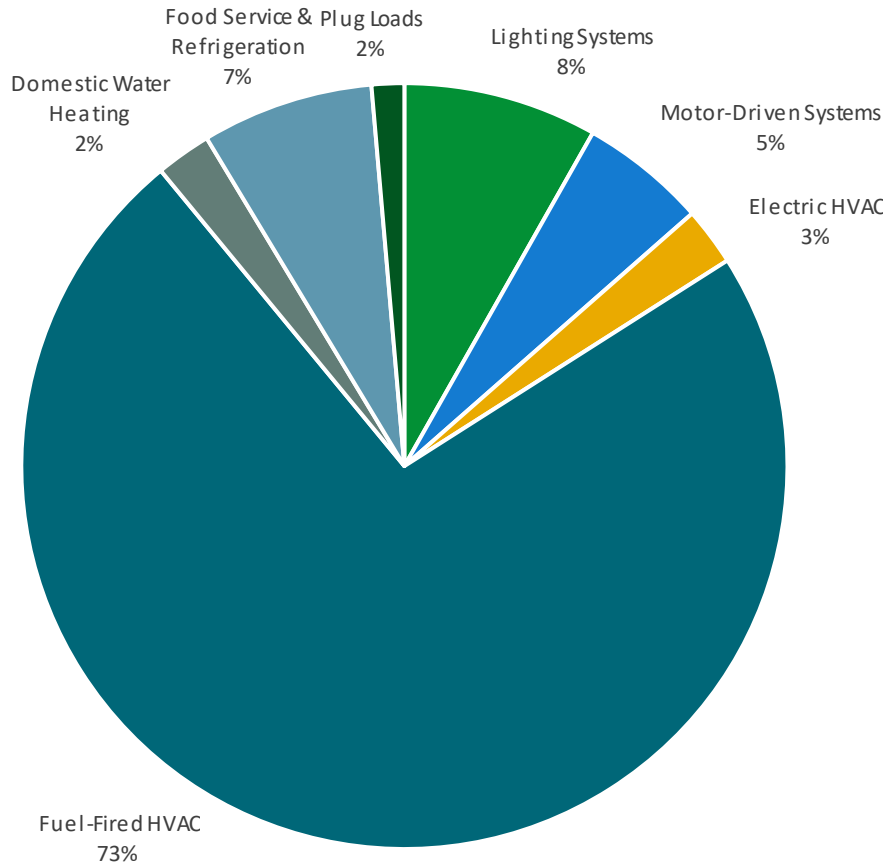
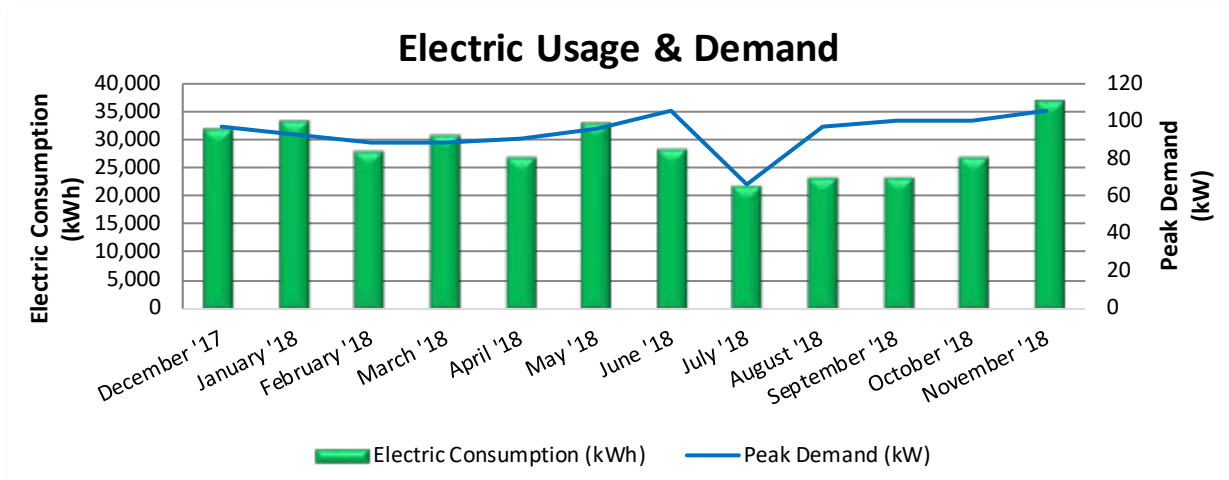


Figure 5 - Energy Balance

3.1 Electricity

Rockland Electric delivers electricity under rate class Monthly General Service Secondary, with electric production provided by Direct Energy, a third-party supplier.



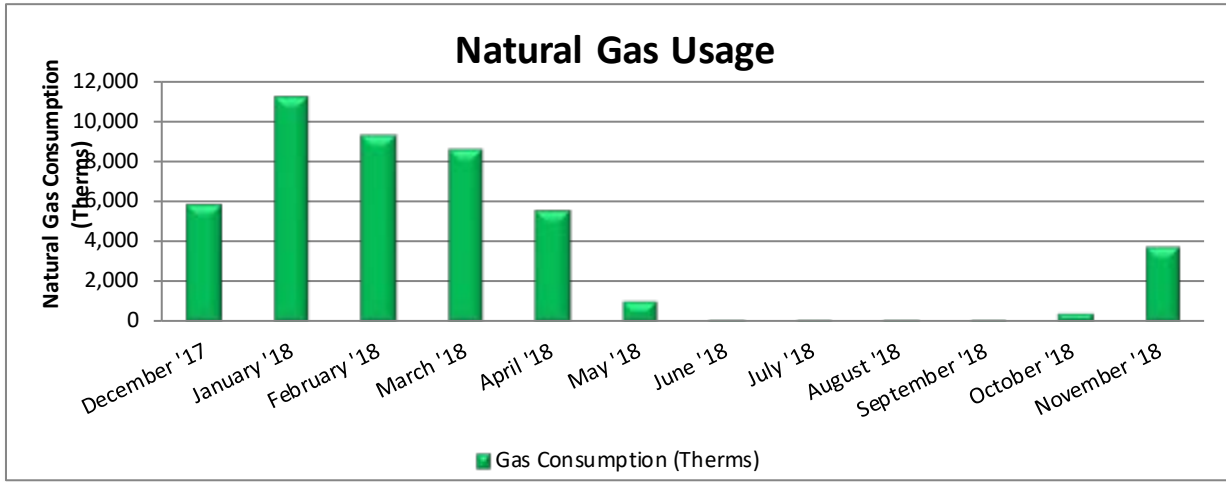
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/9/18	32	31,560	97	\$323	\$6,580
2/8/18	30	33,120	92	\$306	\$5,602
3/9/18	29	27,726	89	\$293	\$3,950
4/10/18	32	30,594	89	\$290	\$4,720
5/8/18	28	26,640	91	\$291	\$4,728
6/11/18	34	32,880	96	\$324	\$5,653
7/11/18	30	28,080	106	\$400	\$5,171
8/10/18	30	21,840	66	\$239	\$4,186
9/11/18	32	23,280	97	\$332	\$4,443
10/4/18	23	23,160	101	\$258	\$4,032
11/7/18	34	26,760	101	\$291	\$5,140
12/7/18	30	36,480	106	\$312	\$6,480
Totals	364	342,120	106	\$3,659	\$60,685
Annual	365	343,060	106	\$3,669	\$60,852

Notes:

- Peak demand of 106 kW occurred in November '18.
- The average electric cost over the past 12 months was \$0.177/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.

3.2 Natural Gas

PSE&G delivers natural gas under rate class General Service, with natural gas supply provided by General Direct Energy, a third-party supplier.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/19/17	32	5,885	\$5,113
1/20/18	32	11,196	\$9,693
2/21/18	32	9,294	\$8,336
3/23/18	30	8,588	\$7,826
4/20/18	28	5,569	\$3,515
5/21/18	31	1,081	\$769
6/21/18	31	115	\$177
7/20/18	29	88	\$161
8/21/18	32	89	\$161
9/19/18	29	92	\$163
10/18/18	29	426	\$368
11/16/18	29	3,738	\$4,210
Totals	364	46,160	\$40,492
Annual	365	46,287	\$40,603

Notes:

- The average gas cost for the past 12 months is \$0.877/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 county, 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.

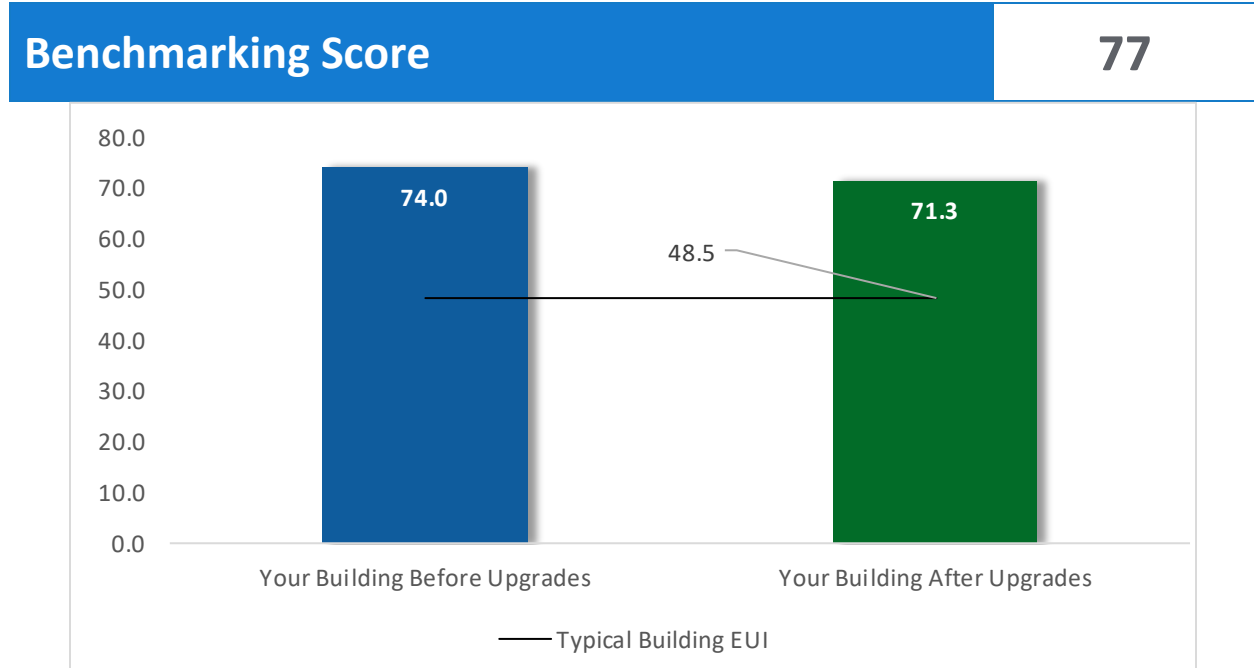


Figure 6 - Energy Use Intensity Comparison

Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

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 as 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.

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 website³.

³ <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 New Jersey Board of Public Utilities. 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	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		8,777	1.8	-2	\$1,542	\$4,222	\$226	\$3,996	2.6	8,634
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	116	0.0	0	\$20	\$97	\$6	\$91	4.5	114
ECM 2	Retrofit Fixtures with LED Lamps	8,660	1.7	-2	\$1,521	\$4,125	\$220	\$3,905	2.6	8,520
Lighting Control Measures		40,126	8.2	-8	\$7,044	\$24,517	\$2,335	\$22,182	3.1	39,424
ECM 3	Install Occupancy Sensor Lighting Controls	32,808	6.7	-7	\$5,759	\$18,442	\$2,335	\$16,107	2.8	32,234
ECM 4	Install High/Low Lighting Controls	7,318	1.5	-2	\$1,285	\$6,075	\$0	\$6,075	4.7	7,190
Domestic Water Heating Upgrade		0	0.0	39	\$341	\$136	\$0	\$136	0.4	4,549
ECM 5	Install Low-Flow DHW Devices	0	0.0	39	\$341	\$136	\$0	\$136	0.4	4,549
Food Service & Refrigeration Measures		4,813	0.5	0	\$854	\$4,745	\$475	\$4,270	5.0	4,846
ECM 6	Replace Refrigeration Equipment	3,201	0.4	0	\$568	\$4,515	\$425	\$4,090	7.2	3,223
ECM 7	Vending Machine Control	1,612	0.2	0	\$286	\$230	\$50	\$180	0.6	1,623
TOTALS		53,715	10.5	29	\$9,780	\$33,621	\$3,036	\$30,585	3.1	57,454

* - 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 Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
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ECM 7	Vending Machine Control	1,612	0.2	0	\$286	\$230	\$50	\$180	0.6	1,623
TOTALS		53,715	10.5	29	\$9,780	\$33,621	\$3,036	\$30,585	3.1	57,454

* - 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 Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		8,777	1.8	-2	\$1,542	\$4,222	\$226	\$3,996	2.6	8,634
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	116	0.0	0	\$20	\$97	\$6	\$91	4.5	114
ECM 2	Retrofit Fixtures with LED Lamps	8,660	1.7	-2	\$1,521	\$4,125	\$220	\$3,905	2.6	8,520

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: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected building areas: all areas with fluorescent fixtures with T12 tubes.

ECM 2: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: all areas with fluorescent fixtures with T5 or T8 tubes, compact fluorescent, and incandescent lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Control Measures		40,126	8.2	-8	\$7,044	\$24,517	\$2,335	\$22,182	3.1	39,424
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ECM 4	Install High/Low Lighting Controls	7,318	1.5	-2	\$1,285	\$6,075	\$0	\$6,075	4.7	7,190

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 controls together for maximum energy savings and improved lighting for occupants.

ECM 3: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected building areas: offices, conference rooms, classrooms, media center, restrooms, storage rooms, and gym.

ECM 4: 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 requirements. 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

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 occupants approach.

4.3 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		0	0.0	39	\$341	\$136	\$0	\$136	0.4	4,549
ECM 5	Install Low-Flow DHW Devices	0	0.0	39	\$341	\$136	\$0	\$136	0.4	4,549

ECM 5: Install Low-Flow DHW Devices

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

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm
Showerhead	2.0 gpm
Pre-rinse spray valve (kitchen)	1.28 gpm

Low-flow devices reduce the overall water flow from the fixture while still providing adequate pressure for washing. Pre-rinse spray valves (PRSVs) — often used in commercial and institutional kitchens — remove food waste from dishes prior to dishwashing.

Additional cost savings may result from reduced water usage.

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 Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		4,813	0.5	0	\$854	\$4,745	\$475	\$4,270	5.0	4,846
ECM 6	Replace Refrigeration Equipment	3,201	0.4	0	\$568	\$4,515	\$425	\$4,090	7.2	3,223
ECM 7	Vending Machine Control	1,612	0.2	0	\$286	\$230	\$50	\$180	0.6	1,623

ECM 6: Replace Refrigeration Equipment

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

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.

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. 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.⁴ 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.

Window Treatments/Coverings

Use high-reflectivity films or cover windows with shades or shutters to reduce solar heat gain and reduce the load on cooling and heating systems. Older, single pane windows and east or west-facing windows are especially prone to solar heat gain. In addition, use shades or shutters at night during cold weather to reduce heat loss.

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.

Motor Controls

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

⁴ <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>

Motor Maintenance

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

Thermostat Schedules and Temperature Resets



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

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.

Steam Trap Repair and Replacement

Steam traps are a crucial part of delivering heat from the boiler to the space heating units. Repair or replace traps that are blocked or allowing steam to pass. Inspect steam traps as part of a regular steam system maintenance plan.

Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the water side or fire side of the boiler.

Water Heater Maintenance

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

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

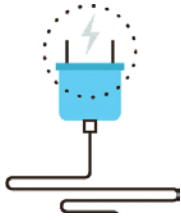
Compressed Air System Maintenance

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

- Inspection, cleaning, and replacement of inlet filter cartridges
- Cleaning of drain traps
- Daily inspection of lubricant levels to reduce unwanted friction
- Inspection of belt condition and tension
- Check for leaks and adjust loose connections
- Overall system cleaning

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

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips⁵. Your local utility may offer incentives or rebates for this equipment.

Computer Monitor Replacement

ENERGY STAR® labeled computer monitors can be up to 25% more efficient than standard monitors. ENERGY STAR® rated monitors have power consumption requirements for different operating modes such as on, idle, and sleep.

Computer Power Management Software

Many computers consume power during nights, weekends, and holidays. Screen savers are commonly confused as a power management strategy. This contributes to avoidable, excessive electrical energy consumption. There are innovative power management software packages available that are designed to deliver significant energy saving and provide ongoing tracking measurements. A central power management platform helps enforce energy savings policies as well as identify and eliminate underutilized devices

⁵ For additional information refer to “Assessing and Reducing Plug and Process Loads in Office Buildings” <http://www.nrel.gov/docs/fy13osti/54175.pdf>, or “Plug Load Best Practices Guide” <http://www.advancedbuildings.net/plug-load-best-practices-guide-offices>

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™ website⁶ 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.

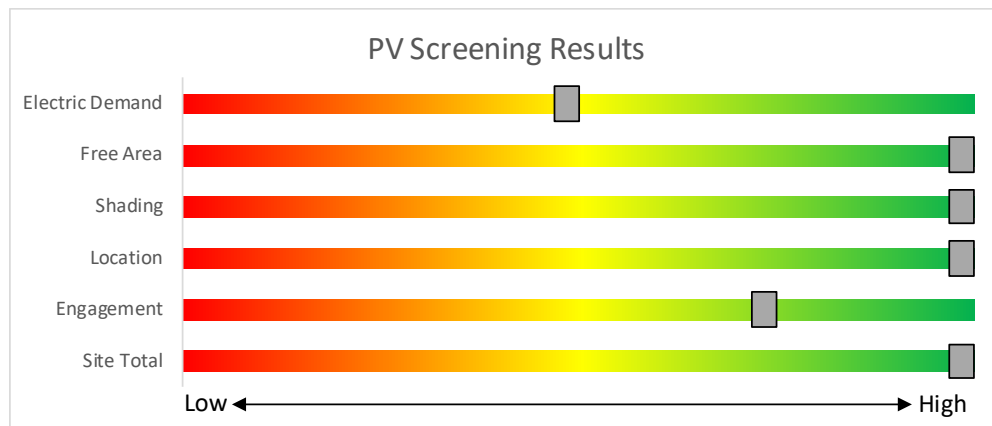
6.1 Solar Photovoltaic

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 on roof, 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	94	kW DC STC
Electric Generation	111,989	kWh/yr
Displaced Cost	\$19,860	/yr
Installed Cost	\$244,400	

Figure 9 - Photovoltaic Screening

Solar Renewable Energy Credit (SREC) Registration Program

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program before starting construction. Once your PV system is up and running, you periodically earn credits, which can then be sold on the open market for up to 15 years.

If you are considering installing solar photovoltaics on your building, visit www.njcleanenergy.com/srec for more information about the SREC Registration Program.

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:

- **Basic Info on Solar PV in NJ:** www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs:** www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ 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) generate electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

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

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

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

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

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

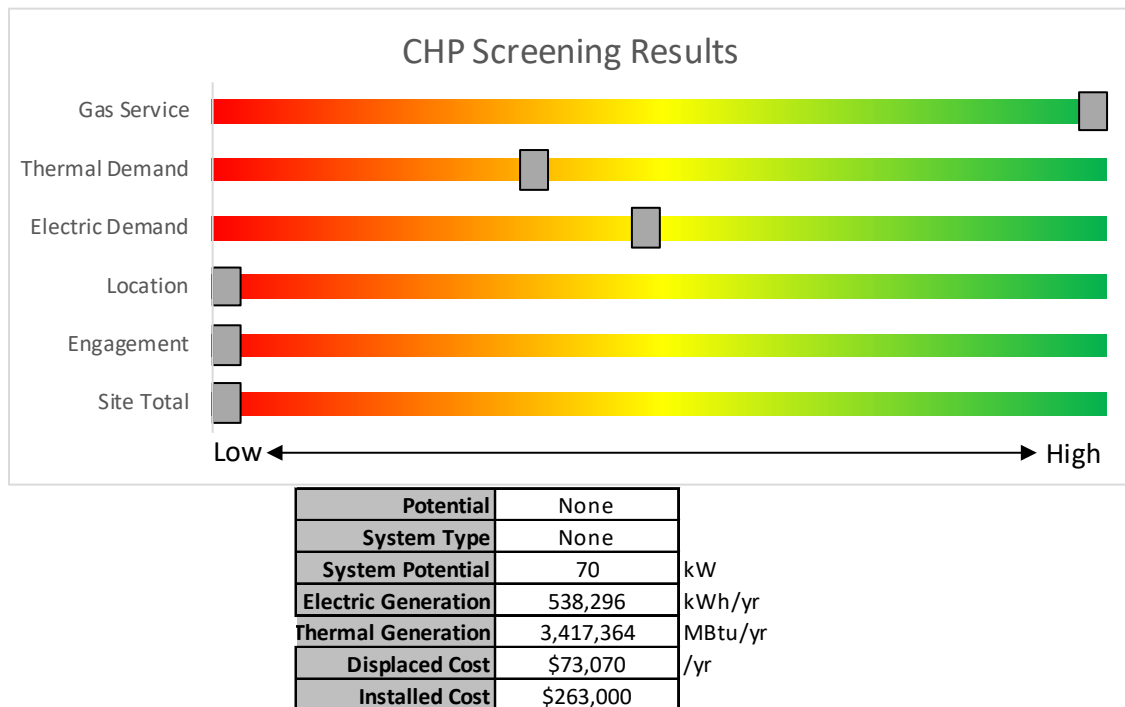


Figure 10 - Combined Heat and Power Screening

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

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building’s performance? 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 <i>Flexibility to install at your own pace</i>	Direct Install <i>Turnkey installation</i>	Pay for Performance <i>Whole building upgrades</i>
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.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
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.
<p>Take the next step by visiting www.njcleanenergy.com for program details, applications, and to contact a qualified contractor.</p>			

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 efficiency 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.

Incentives

The program pays up to 70% 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% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% 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% 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.

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 SREC Registration Program

The SREC Registration Program (SRP) 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 SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

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 SRECs. SREC's are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SREC's to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar Renewable Portfolio Standard. Purchasing SRECs can help them meet those requirements. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period fluctuates depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

8.1 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 website⁸.

8.2 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 website⁹.

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

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	2	LED Lamps: Bulb - 1L	Wall Switch	S	13	3,204		None	No	2	LED Lamps: Bulb - 1L	Wall Switch	13	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 1	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	507	0	\$89	\$270	\$35	2.6
Cafeteria	16	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.2	1,014	0	\$178	\$270	\$35	1.3
Cafeteria	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
Cafeteria Storage	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	253	0	\$44	\$116	\$0	2.6
Kitchen	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	95	0	\$17	\$116	\$0	7.0
Kitchen Closet	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen Closet 2	1	Incandescent: PAR38 Bulb	Wall Switch	S	150	3,204	2	Relamp	No	1	LED Lamps: Bulb	Wall Switch	23	3,204	0.1	449	0	\$79	\$30	\$1	0.4
1A Speech	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	143	0	\$25	\$116	\$20	3.8
1A Speech Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 2	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	380	0	\$67	\$270	\$35	3.5
2 Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Custodian Office	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	95	0	\$17	\$116	\$20	5.8
Boys Bathroom	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,204	3	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,211	0.0	63	0	\$11	\$270	\$35	21.1
Boys Closet	1	LED Lamps: Bulb - 1L	Wall Switch	S	13	3,204		None	No	1	LED Lamps: Bulb - 1L	Wall Switch	13	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 3	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	380	0	\$67	\$270	\$35	3.5
3 bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 4	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	380	0	\$67	\$270	\$35	3.5
Room 5	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	380	0	\$67	\$270	\$35	3.5
Room K-1	14	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.2	887	0	\$156	\$270	\$35	1.5
K-1 Closet	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
K-1 Bathroom	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Janitor Closet	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
2nd Grade Closet	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
IDF-1	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	95	0	\$17	\$116	\$0	7.0
Room K2	11	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	697	0	\$122	\$270	\$35	1.9
K2 Bathroom	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	3,204		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	3,204	0.0	0	0	\$0	\$0	\$0	0.0
K2 Closet	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 6	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
6 Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 7	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
7 Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 8	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
8 Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 9	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
9 Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 10	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
10 Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Old Wing Hall	1	LED Lamps: Bulb - 1L	Wall Switch	S	13	3,204		None	No	1	LED Lamps: Bulb - 1L	Wall Switch	13	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Old Wing Hall	39	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	4	None	Yes	39	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,211	0.5	2,471	-1	\$434	\$1,575	\$0	3.6
Old Wing Hall	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Old Wing Hall	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Old Wing Hall	1	Compact Fluorescent: Spiral Bulb	Wall Switch	S	18	3,204	2	Relamp	No	1	LED Lamps: Bulb	Wall Switch	13	3,204	0.0	19	0	\$3	\$17	\$1	4.9
Vestibule	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	95	0	\$17	\$116	\$0	7.0
Vestibule	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Room 27	16	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.2	760	0	\$133	\$270	\$35	1.8
27 Bathroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,204		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 27	7	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 3	Relamp	Yes	7	LED Lamps: Bulb - 2L	Occupancy Sensor	36	2,211	0.1	663	0	\$116	\$623	\$49	4.9
Room 27	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

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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 29	16	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.2	760	0	\$133	\$270	\$35	1.8
29 Bathroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,204		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 29	7	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 3	Relamp	Yes	7	LED Lamps: Bulb - 2L	Occupancy Sensor	36	2,211	0.1	663	0	\$116	\$623	\$49	4.9
Room 29	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
Room 28	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	380	0	\$67	\$270	\$35	3.5
28 Closet	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,204		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,204	0.0	0	0	\$0	\$0	\$0	0.0
28 Closet 2	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,204		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 30	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
Room 30	6	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 3	Relamp	Yes	6	LED Lamps: Bulb - 2L	Occupancy Sensor	36	2,211	0.1	568	0	\$100	\$573	\$47	5.3
Room 30	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
30 Bathroom	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204		None	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 31	15	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,204	3	None	Yes	15	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,211	0.1	279	0	\$49	\$270	\$35	4.8
Room 31	6	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 3	Relamp	Yes	6	LED Lamps: Bulb - 2L	Occupancy Sensor	36	2,211	0.1	568	0	\$100	\$573	\$47	5.3
Room 31	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
31 Bathroom	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204		None	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	3,204	0.0	0	0	\$0	\$0	\$0	0.0
New Wing Hall	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,204	4	None	Yes	3	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,211	0.0	56	0	\$10	\$225	\$0	23.0
New Wing Hall	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
New Wing Hall	12	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	3,204	4	None	Yes	12	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	40	2,211	0.1	524	0	\$92	\$450	\$0	4.9
New Wing Hall	1	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2	Relamp	No	1	LED Lamps: Bulb - 2L	Wall Switch	36	3,204	0.0	55	0	\$10	\$50	\$2	5.0
Light Storage	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204		None	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Girls Bathroom	3	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204	3	None	Yes	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,211	0.0	84	0	\$15	\$270	\$35	16.0
Girls Bathroom	1	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2	Relamp	No	1	LED Lamps: Bulb - 2L	Wall Switch	36	3,204	0.0	55	0	\$10	\$50	\$2	5.0
New Wing Hall	3	Compact Fluorescent: 4 Pin Bulb - 4L	Wall Switch	S	168	3,204	2, 4	Relamp	Yes	3	LED Lamps: Bulb - 4L	High/Low Control	118	2,211	0.2	918	0	\$161	\$528	\$12	3.2
Janitor Closet	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,204		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Boys Bathroom	3	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204	3	None	Yes	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,211	0.0	84	0	\$15	\$270	\$35	16.0

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boys Bathroom	1	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2	Relamp	No	1	LED Lamps: Bulb - 2L	Wall Switch	36	3,204	0.0	55	0	\$10	\$50	\$2	5.0
Library Office	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	285	0	\$50	\$270	\$35	4.7
Library Closet	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	95	0	\$17	\$116	\$0	7.0
Library	61	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,204	3	None	Yes	61	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,211	0.4	1,933	0	\$339	\$1,620	\$210	4.2
Library	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
Room 26	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	570	0	\$100	\$270	\$35	2.3
26 Bathroom	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,204		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,204	0.0	0	0	\$0	\$0	\$0	0.0
26 Under counter	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,204		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 25	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	570	0	\$100	\$270	\$35	2.3
25 Bathroom	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,204		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,204	0.0	0	0	\$0	\$0	\$0	0.0
25 Under counter	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,204		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 24	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	143	0	\$25	\$116	\$20	3.8
Display Case	2	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	S	25	3,204	1	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,204	0.0	116	0	\$20	\$97	\$6	4.5
Room 22	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 21 SGI	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	190	0	\$33	\$116	\$20	2.9
Room 21 SGI	2	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,211	0.0	56	0	\$10	\$116	\$0	11.9
21 Closet	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204		None	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Nurse	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,204	3	None	Yes	8	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,211	0.1	350	0	\$61	\$270	\$35	3.8
Nurse	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	3,204		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Nurse Bathroom	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,204		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	3,204	0.0	0	0	\$0	\$0	\$0	0.0
New Wing Hall	3	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	3,204	4	None	Yes	3	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	40	2,211	0.0	131	0	\$23	\$225	\$0	9.8
New Wing Hall	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,204	4	None	Yes	24	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,211	0.2	760	0	\$133	\$900	\$0	6.7
New Wing Hall	9	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2,4	Relamp	Yes	9	LED Lamps: Bulb - 2L	High/Low Control	36	2,211	0.2	853	0	\$150	\$904	\$18	5.9
New Wing Hall	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 12	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	570	0	\$100	\$270	\$35	2.3

		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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 11 Art	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	570	0	\$100	\$270	\$35	2.3
Girls Bathroom	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,204	3	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,211	0.0	95	0	\$17	\$270	\$35	14.1
Girls Closet	1	Incandescent: Bulb - 1L	Wall Switch	S	100	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	15	3,204	0.1	300	0	\$53	\$35	\$1	0.6
Conference Room	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.0	190	0	\$33	\$116	\$20	2.9
CR Bathroom	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Main Office	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	380	0	\$67	\$270	\$35	3.5
Copy Room	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	143	0	\$25	\$116	\$20	3.8
Closet	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Old Wing Hall	5	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	4	None	Yes	5	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,211	0.1	317	0	\$56	\$225	\$0	4.0
Old Wing Hall	6	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 4	Relamp	Yes	6	LED Lamps: Bulb - 2L	High/Low Control	36	2,211	0.1	568	0	\$100	\$528	\$12	5.2
Old Wing Hall	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
Room 20	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,204	3	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,211	0.0	131	0	\$23	\$116	\$20	4.2
20 Closet	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	3,204		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	3,204	0.0	0	0	\$0	\$0	\$0	0.0
20 Hall	3	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 4	Relamp	Yes	3	LED Lamps: Bulb - 2L	High/Low Control	36	2,211	0.1	284	0	\$50	\$376	\$6	7.4
Room 23A	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,204	3	None	Yes	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,211	0.0	175	0	\$31	\$116	\$20	3.1
23 Bathroom	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,204		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 23C	10	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,204	3	None	Yes	10	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,211	0.1	437	0	\$77	\$270	\$35	3.1
Room 23C	9	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 3	Relamp	Yes	9	LED Lamps: Bulb - 2L	Occupancy Sensor	36	2,211	0.2	853	0	\$150	\$724	\$53	4.5
Room 23C	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,204		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 23B	9	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,204	3	None	Yes	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,211	0.1	393	0	\$69	\$270	\$35	3.4
Room 23B	2	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,211	0.0	56	0	\$10	\$116	\$20	9.8
Room 23B	5	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 3	Relamp	Yes	5	LED Lamps: Bulb - 2L	Occupancy Sensor	36	2,211	0.1	474	0	\$83	\$522	\$45	5.7
Room 23B	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,204	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,211	0.2	888	0	\$156	\$489	\$95	2.5
23 Hallway	3	Compact Fluorescent: 4 Pin Bulb - 2L	Wall Switch	S	52	3,204	2, 4	Relamp	Yes	3	LED Lamps: Bulb - 2L	High/Low Control	36	2,211	0.1	284	0	\$50	\$376	\$6	7.4
23 Hallway	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

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 20 SGI	10	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	475	0	\$83	\$270	\$35	2.8
Gym	32	LED - Fixtures: High-Bay	Wall Switch	S	180	3,204	3	None	Yes	32	LED - Fixtures: High-Bay	Occupancy Sensor	180	2,211	1.3	6,293	-1	\$1,105	\$1,080	\$140	0.9
Gym Storage	2	LED Lamps: Bulb - 1L	Wall Switch	S	13	3,204	3	None	Yes	2	LED Lamps: Bulb - 1L	Occupancy Sensor	13	2,211	0.0	28	0	\$5	\$116	\$0	23.3
Storage	1	LED Lamps: Bulb - 1L	Wall Switch	S	13	3,204		None	No	1	LED Lamps: Bulb - 1L	Wall Switch	13	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Gym Office	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Gym	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
Gym Stage	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	253	0	\$44	\$270	\$35	5.3
Stage	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
Stage	1	LED Lamps: Bulb - 1L	Wall Switch	S	18	3,204		None	No	1	LED Lamps: Bulb - 1L	Wall Switch	18	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Faculty Room	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	285	0	\$50	\$270	\$35	4.7
FR Phone booth	1	Incandescent: Bulb - 1L	Wall Switch	S	60	3,204	2	Relamp	No	1	LED Lamps: Bulb - 1L	Wall Switch	9	3,204	0.0	180	0	\$32	\$17	\$1	0.5
Men Bathroom	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Men Bathroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,204		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Men Bathroom	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204		None	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Room 19 SGI	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.1	253	0	\$44	\$270	\$35	5.3
Room 13	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
Girls Bathroom	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.0	127	0	\$22	\$270	\$35	10.6
Boys Bathroom	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	3	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,211	0.0	127	0	\$22	\$270	\$35	10.6
Janitor Closet	1	LED Lamps: Bulb - 1L	Wall Switch	S	13	3,204		None	No	1	LED Lamps: Bulb - 1L	Wall Switch	13	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Old Wing Hall	29	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204	4	None	Yes	29	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,211	0.4	1,838	0	\$323	\$1,125	\$0	3.5
Women Bathroom	2	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	S	26	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,211	0.0	56	0	\$10	\$270	\$35	24.0
Women Bathroom	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	3,204		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,204	0.0	0	0	\$0	\$0	\$0	0.0
Old Wing Hall	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
Principal Office	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.0	95	0	\$17	\$116	\$20	5.8
Principal Bathroom	1	Incandescent: Bulb - 2L	Wall Switch	S	120	3,204	2	Relamp	No	1	LED Lamps: Bulb - 2L	Wall Switch	18	3,204	0.1	359	0	\$63	\$34	\$2	0.5

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 14	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
Room 15	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
Room 16	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
Room 17	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	665	0	\$117	\$270	\$35	2.0
Room 18	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,204	3	None	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,211	0.1	570	0	\$100	\$270	\$35	2.3
Old Wing Hall	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
Courtyard Wall Sconces	3	LED - Fixtures: Wall Sconces	Other		18	4,380		None	No	3	LED - Fixtures: Wall Sconces	Other	18	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Courtyard Wallpack	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other		44	4,380		None	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other	44	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Courtyard	1	Incandescent: Bulb - 1L	Other		60	4,380	2	Relamp	No	1	LED Lamps: Bulb - 1L	Other	9	4,380	0.0	223	0	\$40	\$17	\$1	0.4
Decorative Lighting	1	LED - Fixtures: Decorative: Other	Other		18	4,380		None	No	1	LED - Fixtures: Decorative: Other	Other	18	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Pole Lights	3	LED - Fixtures: Outdoor Pole/Arm Mounted Area/Roadway Fixture	Other		44	4,380		None	No	3	LED - Fixtures: Outdoor Pole/Arm Mounted Area/Roadway Fixture	Other	44	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Wallpack	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other		60	4,380		None	No	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other	60	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Canopy	1	Incandescent: Bulb - 1L	Other		60	4,380	2	Relamp	No	1	LED Lamps: Bulb - 1L	Other	9	4,380	0.0	223	0	\$40	\$17	\$1	0.4
Wallpack	1	LED - Fixtures: Outdoor Porch Wall Mount	Other		45	4,380		None	No	1	LED - Fixtures: Outdoor Porch Wall Mount	Other	45	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Wallpack	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other		57	4,380		None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other	57	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Wallflush	7	LED - Fixtures: Wall-Wash Lights	Other		13	4,380		None	No	7	LED - Fixtures: Wall-Wash Lights	Other	13	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Canopy	4	LED - Fixtures: Ceiling Mount	Other		18	4,380		None	No	4	LED - Fixtures: Ceiling Mount	Other	18	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Wall Mounted	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other		57	4,380		None	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Other	57	4,380	0.0	0	0	\$0	\$0	\$0	0.0

Motor Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
		Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boiler-1	1	Combustion Air Fan	1.0	82.5%	No	W	2,745		No	82.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Boiler-2	1	Combustion Air Fan	1.0	82.5%	No	W	2,745		No	82.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Air Compressor 1	1	Air Compressor	1.5	84.0%	No	W	2,190		No	84.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Air Compressor 2	1	Air Compressor	1.5	84.0%	No	W	2,190		No	84.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	DHW Circulation Pump	2	Water Supply Pump	0.2	60.0%	No	W	8,760		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Sump Pump	1	Process Pump	0.5	76.2%	No	W	2,745		No	76.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Vacuum Pumps	2	Other	1.5	84.0%	No	W	2,745		No	84.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Boiler Pumps	3	Boiler Feed Water Pump	0.5	78.2%	No	W	2,745		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	HHWP-1,2	2	Heating Hot Water Pump	10.0	90.2%	Yes	W	3,391		No	90.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Classrooms	Unit Ventilators	32	Supply Fan	0.1	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Media Center	Unit Ventilators	4	Supply Fan	0.3	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Stage	Stage	1	Supply Fan	2.0	84.0%	No	W	2,745		No	84.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Exhaust Fan	3	Exhaust Fan	0.3	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Exhaust Fan	3	Exhaust Fan	0.3	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Exhaust Fan	1	Exhaust Fan	0.3	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	Kitchen Hood MUA-1	1	Supply Fan	2.0	84.0%	No	W	2,745		No	84.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	EF-1,2	2	Exhaust Fan	0.1	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Gas Range KX-1	1	Exhaust Fan	1.0	82.5%	No	W	2,745		No	82.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Pizza Oven KX-2	1	Exhaust Fan	0.3	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Gym Storage	Gym AHU-1	1	Supply Fan	0.5	78.2%	No	W	2,745		No	78.2%	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?	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Gym Storage	Gym AHU-2	1	Supply Fan	1.5	84.0%	No	W	2,745		No	84.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Gym	1	Supply Fan	0.5	78.2%	No	W	2,745		No	78.2%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Gym	1	Supply Fan	0.3	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0

Electric HVAC Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis						
		System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	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/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives
Cafeteria	Cafeteria	1	Split-System Air-Source HP	2.50	32.00	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Cafeteria	Cafeteria	3	Split-System Air-Source HP	2.50	32.00	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Classroom	Classroom	1	Window AC	0.42		W		No						0.0	0	0	\$0	\$0	\$0	0.0
Office	Office	1	Packaged Terminal AC	1.21		W		No						0.0	0	0	\$0	\$0	\$0	0.0
Conference Room	Conference Room	1	Window AC	0.83		W		No						0.0	0	0	\$0	\$0	\$0	0.0
Main Office	Main Office	1	Window AC	1.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0
Break Room	Break Room	1	Window AC	1.25		W		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	Gym	1	Packaged Air-Source HP	7.50	7.17	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Roof	Gym	1	Packaged AC	4.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0
Courtyard	Media Center	3	Split-System AC	2.50		W		No						0.0	0	0	\$0	\$0	\$0	0.0
Courtyard	Media Center Office	1	Split-System AC	1.00		W		No						0.0	0	0	\$0	\$0	\$0	0.0

Fuel Heating Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions					Proposed Conditions						Energy Impact & Financial Analysis						
		System Quantity	System Type	Output Capacity per Unit (MBh)	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boiler-1	1	Forced Draft Steam Boiler	#####	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Boiler-2	1	Forced Draft Steam Boiler	#####	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Boiler-3	1	Condensing Hot Water Boiler	#####	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Boiler-4	1	Condensing Hot Water Boiler	#####	W		No						0.0	0	0	\$0	\$0	\$0	0.0

DHW Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions				Proposed Conditions						Energy Impact & Financial Analysis							
		System Quantity	System Type	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years	
Boiler Room	DHWH-1	1	Storage Tank Water Heater (> 50 Gal)	W		No							0.0	0	0	\$0	\$0	\$0	0.0

Low-Flow Device Recommendations

Location	Recommendation Inputs					Energy Impact & Financial Analysis						
	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	5	6	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	17	\$150	\$43	\$0	0.3
Restrooms	5	13	Faucet Aerator (Lavatory)	1.50	0.50	0.0	0	22	\$191	\$93	\$0	0.5

Commercial Refrigerator/Freezer Inventory & Recommendations

Location	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
	Quantity	Refrigerator/ Freezer 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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	No	6	Yes	0.3	2,507	0	\$445	\$2,787	\$300	5.6
Kitchen	2	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Freezer Chest	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	6	Yes	0.1	694	0	\$123	\$1,728	\$125	13.0

Cooking Equipment Inventory & Recommendations

Location	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
	Quantity	Equipment Type	High Efficiency Equipment?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Gas Griddle (4 Feet Width)	Yes		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	No		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!
Kitchen	1	Electric Convection Oven (Half Size)	No		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!
Kitchen	1	Gas Griddle (≥6 Feet Width)	Yes		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!

Plug Load Inventory

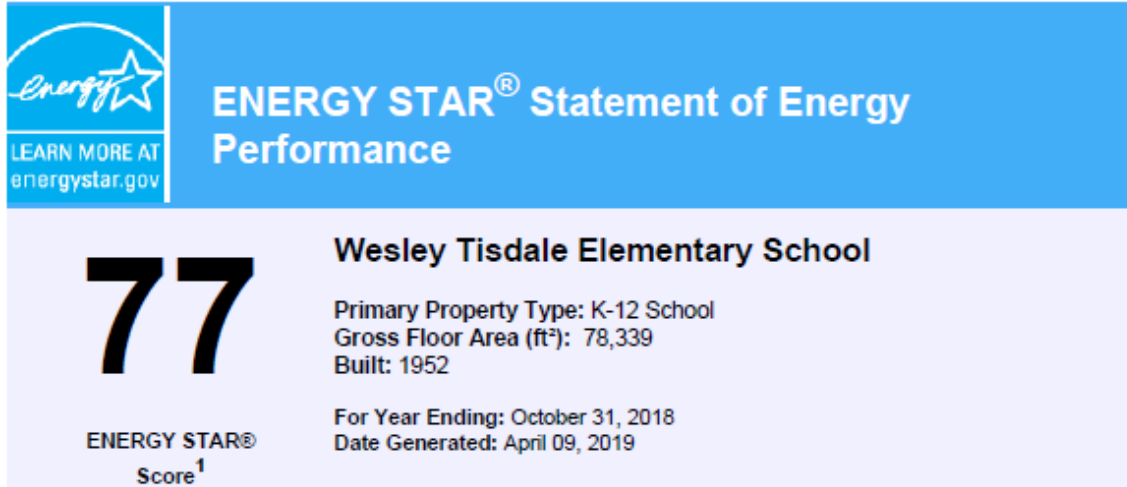
Existing Conditions				
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified ?
Classrooms	66	Computers	120.0	Yes
Classrooms	8	Computer Cart	240.0	No
Offices	5	Laptop	120.0	No
Classrooms	36	Small Printer	46.0	Yes
Offices	2	Medium Printer	55.0	Yes
Main Office/Copy Room	3	Copy Machine	600.0	Yes
Main Office	1	Paper Shredder	46.0	Yes
Classrooms	36	Projectors	120.0	Yes
Classrooms/Break Room	4	Microwave	800.0	No
Classrooms	1	Small Refrigerator	120.0	No
Break Room	2	Large Refrigerator	145.0	Yes
Break Room	2	Coffee Machine	255.0	Yes
Break Room	1	Toaster Oven	550.0	No
Gym	3	Ceiling Fan	100.0	No
Classrooms	40	Portable Fan	50.0	Yes
Classrooms	1	Plasma Tv	244.0	No
Classrooms	1	LCD Tv - 42"	120.0	Yes
Classrooms	2	LCD Tv - 50"	120.0	Yes
Classrooms	1	LED Tv - 50"	120.0	Yes
Home Economics Room	1	Electric Stove	3,000.0	Yes
Outdoor	1	LED School Sign	434.0	Yes
Kitchen	1	Steam Serving Table	228.0	No

Vending Machine Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Break Room	1	Refrigerated	7	Yes	0.2	1,612	0	\$286	\$230	\$50	0.6

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.



ENERGY STAR® Statement of Energy Performance

77
ENERGY STAR® Score¹

Wesley Tisdale Elementary School
Primary Property Type: K-12 School
Gross Floor Area (ft²): 78,339
Built: 1952

For Year Ending: October 31, 2018
Date Generated: April 09, 2019

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 Wesley Tisdale Elementary School 200 Island Ave Ramsey, New Jersey 07446	Property Owner Ramsey Board of Education 266 East Main Street Ramsey, NJ 07446 () -	Primary Contact Thomas O'Hern 266 East Main Street Ramsey, NJ 07446 2017852300 tohern@ramsey.k12.nj.us
Property ID: 6767995		

Energy Consumption and Energy Use Intensity (EUI)				
Site EUI 72.7 kBtu/ft ²	Annual Energy by Fuel		National Median Comparison	
	Natural Gas (kBtu)	4,555,992 (80%)		National Median Site EUI (kBtu/ft ²)
	Electric - Grid (kBtu)	1,141,646 (20%)	National Median Source EUI (kBtu/ft ²)	137.7
			% Diff from National Median Source EUI	-26%
Source EUI 101.9 kBtu/ft ²	Annual Emissions			
			Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	287

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

() -



Professional Engineer 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	<i>British thermal unit</i> : 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	<i>Combined heat and power</i> . Also referred to as cogeneration.
COP	<i>Coefficient of performance</i> : 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	<i>Demand control ventilation</i> : a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
US DOE	<i>United States Department of Energy</i>
EC Motor	<i>Electronically commutated motor</i>
ECM	<i>Energy conservation measure</i>
EER	<i>Energy efficiency ratio</i> : a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	<i>Energy Use Intensity</i> : 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	<i>United States Environmental Protection Agency</i>
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
GHG	<i>Greenhouse gas</i> : 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	<i>Gallons per flush</i>

gpm	<i>Gallon per minute</i>
HID	<i>High intensity discharge</i> : high-output lighting lamps such as high-pressure sodium, metal halide, and mercury vapor.
hp	<i>Horsepower</i>
HPS	<i>High-pressure sodium</i> : a type of HID lamp.
HSPF	<i>Heating seasonal performance factor</i> : a measure of efficiency typically applied to heat pumps. Heating energy provided divided by seasonal energy input.
HVAC	<i>Heating, ventilating, and air conditioning</i>
IHP 2014	US DOE Integral Horsepower rule. The current ruling regarding required electric motor efficiency.
IPLV	<i>Integrated part load value</i> : a measure of the part load efficiency usually applied to chillers.
kBtu	One thousand British thermal units
kW	<i>Kilowatt</i> : equal to 1,000 Watts.
kWh	<i>Kilowatt-hour</i> : 1,000 Watts of power expended over one hour.
LED	<i>Light emitting diode</i> : a high-efficiency source of light with a long lamp life.
LGEA	<i>Local Government Energy Audit</i>
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	<i>Metal halide</i> : a type of HID lamp.
MBh	<i>Thousand Btu per hour</i>
MBtu	<i>One thousand British thermal units</i>
MMBtu	<i>One million British thermal units</i>
MV	<i>Mercury Vapor</i> : a type of HID lamp.
NJBPU	<i>New Jersey Board of Public Utilities</i>
NJCEP	<i>New Jersey Clean Energy Program</i> : 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	<i>Photovoltaic</i> : refers to an electronic device capable of converting incident light directly into electricity (direct current).

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