Local Government Energy Audit Report

Stillwater Campus

April 30, 2024

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Disclaimer

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

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

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

Incentive values provided in this report are estimated based on previously run state efficiency programs. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available utility program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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

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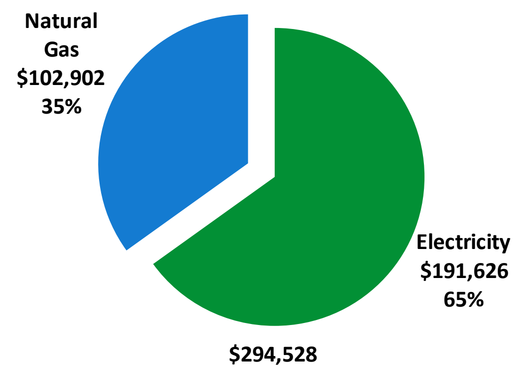
1 Executive Summary

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $294,528 Electricity: 1,359,070 kWh Natural Gas: 75,492 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

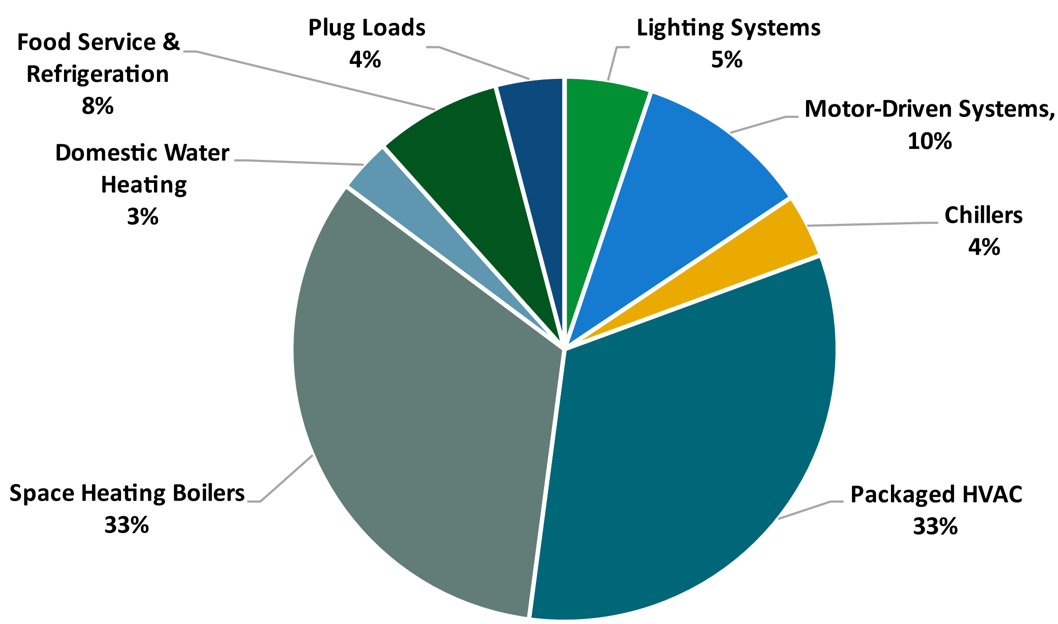


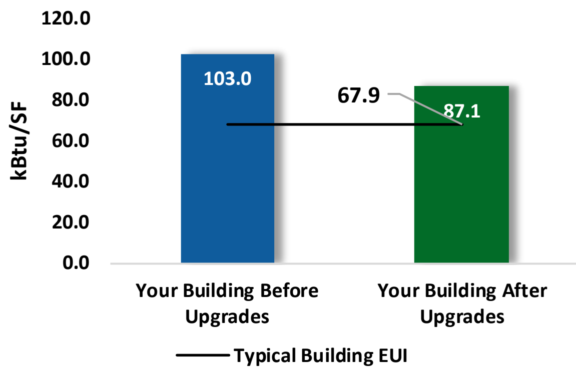
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

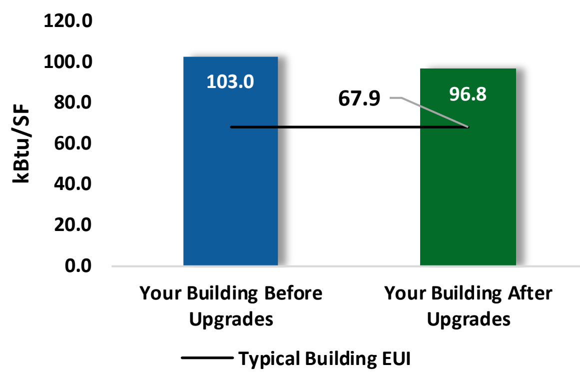
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$419,132
Potential Rebates & Incentives[1]	$21,839
Annual Cost Savings	$62,140
Annual Energy Savings	Electricity: 387,068 kWh Natural Gas: 5,549 Therms
Greenhouse Gas Emission Savings	227 Tons
Simple Payback	6.4 Years
Site Energy Savings (All Utilities)	15%



Scenario 2: Cost Effective Package[2]

Installation Cost	$83,029
Potential Rebates & Incentives	$14,864
Annual Cost Savings	$30,574
Annual Energy Savings	Electricity: 217,343 kWh Natural Gas: -52 Therms
Greenhouse Gas Emission Savings	109 Tons
Simple Payback	2.2 Years
Site Energy Savings (all utilities)	6%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that may apply.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**99,472**	**17.7**	**-19**	**$13,762**	**$29,532**	**$7,299**	**$22,233**	**1.6**	**97,904**
ECM 1	Install LED Fixtures	Yes	6,644	0.0	0	$937	$3,903	$1,100	$2,803	3.0	6,690
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	3,689	0.8	-1	$510	$1,287	$200	$1,087	2.1	3,625
ECM 3	Retrofit Fixtures with LED Lamps	Yes	84,051	16.4	-18	$11,613	$22,748	$5,999	$16,749	1.4	82,590
ECM 4	Install LED Exit Signs	Yes	5,088	0.5	-1	$703	$1,593	$0	$1,593	2.3	4,999
Lighting Control Measures			**26,664**	**5.2**	**-6**	**$3,684**	**$15,183**	**$3,895**	**$11,288**	**3.1**	**26,197**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	22,521	4.4	-5	$3,111	$11,808	$1,620	$10,188	3.3	22,128
ECM 6	Install High/Low Lighting Controls	Yes	4,142	0.8	-1	$572	$3,375	$2,275	$1,100	1.9	4,070
Variable Frequency Drive (VFD) Measures			**139,656**	**25.6**	**0**	**$19,691**	**$150,813**	**$8,175**	**$142,638**	**7.2**	**140,632**
ECM 7	Install VFDs on Constant Volume (CV) Fans	No	110,908	21.7	0	$15,638	$137,420	$5,975	$131,445	8.4	111,683
ECM 8	Install VFDs on Chilled Water Pumps	Yes	28,748	3.9	0	$4,053	$13,393	$2,200	$11,193	2.8	28,949
HVAC System Improvements			**2,121**	**0.0**	**15**	**$508**	**$505**	**$80**	**$425**	**0.8**	**3,934**
ECM 9	Install Pipe Insulation	Yes	2,121	0.0	15	$508	$505	$80	$425	0.8	3,934
Domestic Water Heating Upgrade			**7,104**	**0.0**	**4**	**$1,061**	**$1,477**	**$390**	**$1,087**	**1.0**	**7,664**
ECM 10	Install Low-Flow DHW Devices	Yes	7,104	0.0	4	$1,061	$1,477	$390	$1,087	1.0	7,664
Food Service & Refrigeration Measures			**22,884**	**1.7**	**0**	**$3,227**	**$25,217**	**$2,000**	**$23,217**	**7.2**	**23,044**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	5,243	0.6	0	$739	$6,066	$800	$5,266	7.1	5,279
ECM 12	Refrigeration Controls	No	10,166	0.2	0	$1,433	$17,541	$1,000	$16,541	11.5	10,238
ECM 13	Vending Machine Control	Yes	7,475	0.9	0	$1,054	$1,610	$200	$1,410	1.3	7,527
Custom Measures			**89,167**	**0.0**	**560**	**$20,207**	**$196,405**	**$0**	**$196,405**	**9.7**	**155,370**
ECM 14	Installation of an Energy Management System	No	55,404	0.0	488	$14,465	$177,474	$0	$177,474	12.3	112,940
ECM 15	Replace Electric Water Heater with Heat Pump Water Heater	Yes	40,516	0.0	0	$5,713	$15,263	$0	$15,263	2.7	40,799
ECM 16	Replace Gas Fired Water Heater with Heat Pump Water Heater	No	-6,753	0.0	72	$29	$3,668	$0	$3,668	126.5	1,630
TOTALS (COST EFFECTIVE MEASURES)			**217,343**	**28.4**	**-5**	**$30,574**	**$83,029**	**$14,864**	**$68,165**	**2.2**	**218,254**
TOTALS (ALL MEASURES)			**387,068**	**50.3**	**555**	**$62,140**	**$419,132**	**$21,839**	**$397,292**	**6.4**	**454,745**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

** - 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

Utility-run energy efficiency programs and 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.

Options from Your Utility Company

Prescriptive and Custom Rebates

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 Prescriptive and Custom Rebates 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 may be required for some incentives. Contact your utility company for more details prior to project installation.

Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized contractor. This program can provide incentives up to 70% or 80% of the cost of selected measures. A Direct Install contractor will assess and verify individual measure eligibility and perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Engineered Solutions

The Engineered Solutions program provides tailored energy-efficiency assistance and turnkey engineering services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. The program provides all professional services from audit, design, construction administration, to commissioning and measurement and verification for custom whole-building energy-efficiency projects. Engineered Solutions 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.

For more details on these programs please contact your utility provider.

Options from New Jersey's Clean Energy Program

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 and Power (CHP)

The CHP program provides incentives for combined heat and power (i.e., 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.

Successor Solar Incentive Program (SuSI)

New Jersey is committed to supporting solar energy. Solar projects help the state reach the renewable goals outlined in the state's Energy Master Plan. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available, but certified solar projects are able to earn one SREC II (Solar Renewable Energy Certificates II) for each megawatt-hour of solar electricity produced from a qualifying solar facility.

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.

Large Energy User Program (LEUP)

LEUP is designed to promote self-investment in energy efficiency. It incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

For more details on these programs please visit New Jersey's Clean Energy Program website .

2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Stillwater Campus. 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.

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 22, 2023, TRC performed an energy audit at Stillwater Campus located in Northfield, New Jersey. TRC met with Rick McGee to review the facility operations and help focus our investigation on specific energy-using systems.

The Stillwater Campus is a 118,316-square foot complex comprised of four multi-story structures with original construction from approximately 1895. The main campus building (Stillwater Building) totals 40,000 square feet. Spaces include classrooms, auditorium, offices, cafeteria, corridors, stairwells, restrooms, kitchen, and mechanical space.

D building, at 20,316 square feet includes offices, corridors, stairwells, restrooms, and mechanical space. The youth center is a 28,000 square foot building that includes offices, cafeteria, corridors, restrooms, stairwells, dining room, and mechanical space. The central distribution facility is a 30,000 square foot structure. Spaces include a lounge, hallways, offices, corridors, stairwells, restrooms, warehouse, commercial kitchen, and mechanical space.

Lighting for all facilities is provided mainly by linear fluorescent T8 fixtures with electronic ballasts with some LED fixtures. Each of the four facilities has its own boilers for heating, and the Stillwater Building is equipped with a chiller for cooling. Cooling is further facilitated by several window and package air conditioner units, located in all facilities. Additionally, the Stillwater Building and youth center are equipped with emergency backup generators to ensure a continuous power supply.

The buildings share one electric meter and are served by multiple gas meters.

2.2 Building Occupancy

The Stillwater Building, D building, youth center, and central distribution building are occupied from Monday to Friday, during regular business hours from 8:30 AM to 5:00 PM. The youth center building is also used on weekends. The other facilities are occupied intermittently on weekends as required for maintenance and operations.

Building Name	Weekday/Weekend	Operating Schedule
Staillwater Campus-Main	Weekday	8:30 AM - 5:00 PM
	Weekend	No
Stillwater Campus - Central Distribution	Weekday	8:30 AM - 5:00 PM
	Weekend	No
Stillwater Campus - D Building	Weekday	8:30 AM - 5:00 PM
	Weekend	No
Stillwater Campus - Youth Center	Weekday	8:30 AM - 5:00 PM
	Weekend	8:30 AM - 5:00 PM

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

The Stillwater Building has walls made of poured concrete with a brick veneer. The roof is flat, covered with modified bitumen and gravel, and is in good condition. The roof encloses conditioned space. Most windows are single pane with wood frames. The glass-to-frame seals are in fair condition, and operable window weather seals are also in fair condition with little evidence of excessive wear. Exterior doors have wood frames and are in fair condition with worn door seals.

Stillwater Building: Building Envelope

Stillwater Building: Building Envelope

Stillwater Building: Windows

Stillwater Building: Doors

The D building's walls are poured concrete with a brick veneer. The roof is flat and in fair condition, enclosing conditioned space. Most windows are single pane with wood frames. The glass-to-frame and operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have wood frames and are in fair condition.

D Building: Building Envelope

D Building: Window

The central distribution building's walls are concrete block over structural steel with a stone facade. The roof is flat, covered with a black membrane, and in fair condition. It encloses conditioned space. Most windows are double pane with aluminum frames. The glass-to-frame seals and operable window weather seals are in fair condition. Exterior doors have aluminum frames and are in fair condition with undamaged door seals.

Central Distribution: Roof

Central Distribution: Building Envelope

Central Distribution: Doors

Central Distribution: Window

The Youth center has walls made of poured concrete with a brick veneer. The roof is flat, covered with modified bitumen and gravel and is in good condition. The roof encloses conditioned space. Most windows are single pane with wood frames. The glass-to-frame and operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have wood frames and are in fair condition. Overall, the building envelope is in fair condition.

Youth Center: Building Envelope

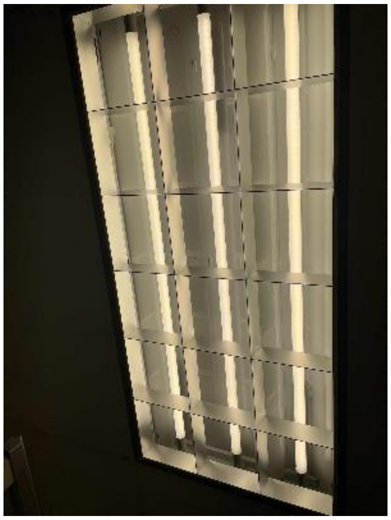
Youth Center: Typical Roof

Youth Center: Typical Windows

Youth Center: Building Envelope

2.4 Lighting Systems

The main lighting system in the Stillwater Building uses 32-Watt linear fluorescent T8 lamps, along with several LED fixtures, lamps, and linear tubes. Fixtures come in various types, including 2-lamp, 3-lamp, and 4-lamp, 4-foot long recessed, surface mounted, and pendant fixtures with linear tube lamps. Some areas in the clinic are illuminated by LED fixtures or LED linear tubes, and there are also plug-in LED lamps in the corridor area. Most interior light fixtures are controlled by manual wall switches, with some restrooms using occupancy sensors.



Stillwater Building-LED Linear Tubes

Stillwater Building: Occupancy Control

Stillwater Building: Typical T8 Lamps

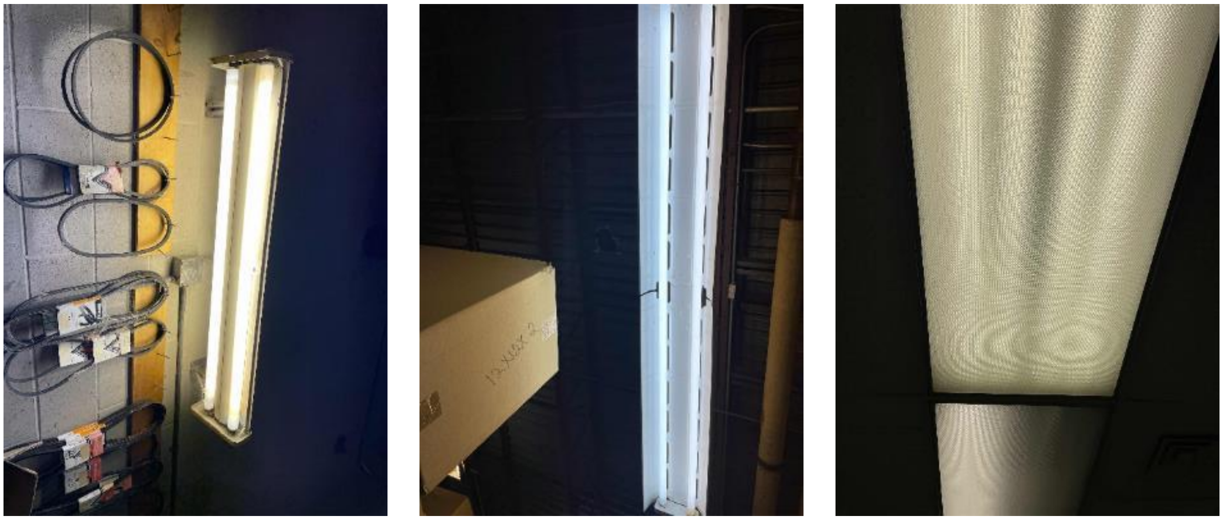
For the D building, the primary interior lighting system uses 32-Watt linear fluorescent T8 lamps, and there is an A19 incandescent screw-in lamp in the Alzheimer's Association area. Fixture types include 2-lamp and 4-lamp, 4-foot long recessed, surface mounted, and pendant fixtures with linear tube lamps. Most interior light fixtures are controlled by manual wall switches.

D Building: -Incandescent lamps

D Building: Typical T8 Fixtures

D Building: Typical T8 Fixtures

Similarly, in the central distribution building, the primary interior lighting system utilizes 32-Watt linear fluorescent T8 lamps, and there are LED fixtures in the warehouse area. Fixture types include 2-lamp and 4-lamp, 4-foot long recessed, surface mounted, and pendant fixtures with linear tube lamps. Most interior light fixtures are controlled by manual wall switches.



Central Distribution: Typical T8 Fluorescent Fixtures

In the youth center building, the primary interior lighting system also uses 32-Watt linear fluorescent T8 lamps, along with a ceiling mounted LED fixture. Fixture types include 2-lamp, 3-lamp, and 4-lamp, 4-foot long recessed, surface mounted, and pendant fixtures with linear tube lamps. Most interior light fixtures are controlled by manual wall switches.

Generally, T8 fluorescent lamps use electronic ballasts. All light fixtures are in good condition, and interior lighting levels are generally sufficient. Most exit signs in all four buildings are LED fixtures, except for some incandescent exit signs in the Stillwater and central distribution buildings.

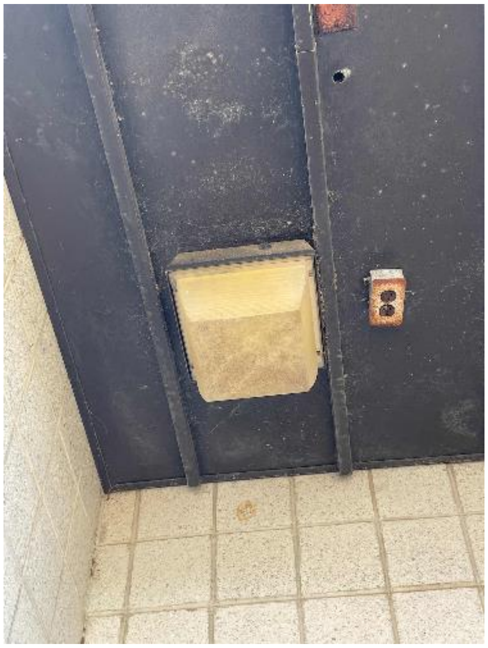
Youth Center Building: Typical T8 Fluorescent and LED Fixtures

The Stillwater Building uses outdoor wall-mounted LED fixtures and metal halide lamps. These fixtures are controlled by a mix of timers and photocells. In the D building, exterior fixtures use metal halide lamps controlled by timers. The youth center's exterior fixtures consist of a mix of metal halide, LED, and compact fluorescent lamps (CFL), all controlled by timers. For the central distribution building, exterior fixtures use metal halide and incandescent lamps controlled by timers and wall switches, respectively.

Stillwater Building: Exterior LED Fixture

Stillwater Building: Exterior MH Fixture

D Building Exterior MH Fixture



Central Distribution: Exterior MH Fixture

Youth Center: Exterior CFL Fixture

Youth Center: Exterior MH Fixture

2.5 Air Handling Systems

Unitary Electric HVAC Equipment

The central distribution building has two window air conditioners with a rating of 0.83 tons, serving the office and warehouse areas. In the D building, there are multiple window air conditioners used to cool the Alzheimer's Association, Cape Atlantic offices, and engineering offices. All units are similar in size, are operating within their useful life, in fair condition, and are standard efficiency.

Central Distribution: Typical Window AC

D Building: Typical Window AC

The youth center building has two window air conditioners for the family service office and one split air source heat pump with a rating of 1 ton and a heating capacity of 13 MBh.

Although the Stillwater Building has a chiller handling the majority of the cooling load, there are several window air conditioners and split systems serving different parts of the building, including the environmental unit, library, health planning, server room, and other areas. These units range from 0.67 tons to 5 tons with various Energy Efficiency Ratios (EERs). These are all operating within their useful life, in fair condition, and are standard efficiency.

Stillwater Campus: Typical Split System Condensing Unit

Youth Center: Mini Split Heat Pump

Unitary Heating Equipment

Six electric resistance heaters serve the office area of the central distribution building, while nine natural gas unit heaters serve the warehouse areas, kitchen, and hallway. These heaters have capacities ranging from 17 MBh to 150 MBh. These are all operating within their useful life, in fair condition, and are standard efficiency.

For the Stillwater Campus Building, there are four electric resistance heaters serving the boiler room, county health office, and commodities offices, with capacities ranging from 7.5 kW to 10 kW. Additionally, there are 17 unit ventilators with electric resistance heaters serving the clinic, chairman's office, corridor, freeholder area, library, and veterans department. These are all operating within their useful life, in fair condition, and are standard efficiency.

Central Distribution: Unit Heater

Central Distribution: Electric Resistance Heater

Central Distribution: Unit Heater

Central Distribution: Electric Resistance Heater

Packaged Units

The central distribution, youth center and Stillwater Building are served with package units with DX cooling and there is a package heat pump serving AHU-2 for youth center. These units are mostly controlled by individual thermostats, and they range in size from 3 tons to 15 tons. All these units are in fair condition with EERs that range from 10 to 13 depending on the equipment. Many of the units include a heating component. These are all operating within their useful life, in fair condition, and are standard efficiency.

The following table illustrates the building areas served and size of packaged roof top units.

Unit	Building/Area Served	Size-Cooling (Ton)	Size Heating (MBh)
Package Unit	Central distribution-Main Building	4.00	-
Package Unit	Central distribution-Main Building	10.00	200.00
Package Unit	Central distribution-Main Building	6.50	180.00
Package Unit	Central distribution-Main Building	3.00	100.00
Package Unit	Central distribution-Main Building	4.00	-
Package Unit	Central distribution-Main Building	7.50	-
Package Unit	Central distribution-Main Building	4.00	-
Package Unit	Central distribution-Main Building	-	500.00
Package Unit	Central distribution-Main Building	4.00	-
Package Unit	Youth center	20.00	389.00
Package Unit	Youth center-AHU 1	16.00	250.00
Packaged Air-Source HP	Youth center-AHU 2	15.00	156.00
Package Unit	Package unit-Bridge-Stillwater Campus	7.50	200.00

Refer to Appendix A for detailed information about each unit.

Stillwater Campus-Typical Package Unit

Youth Center-Typical Package Unit

Central Distribution: Typical Package Unit

Air Handling Units (AHUs)

Stillwater Building has three air handling units that provide heating and cooling. These units are each equipped with a supply fan motor, hot water heating coil, and cooling coil. The supply fan motors are assumed to be 5 hp, constant speed, and standard efficiency. The boiler supplies heating and the chiller provides cooling. Stillwater Building also has six smaller air handlers that provide cooling only. They are connected to split systems, each including a 5-ton capacity outdoor condensing unit. The outdoor condensing units are in fair condition.

Stillwater Campus: Typical Air Handling Units

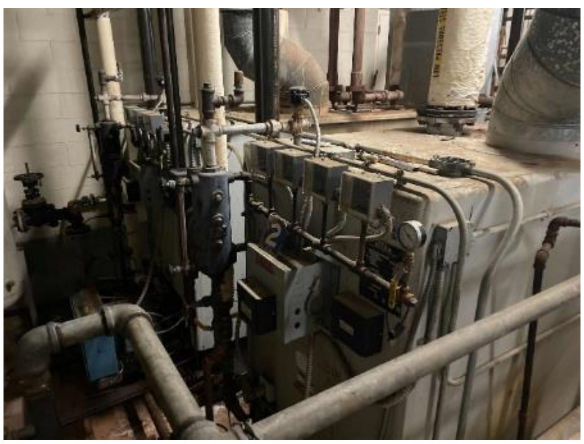
2.6 Heating Hot Water and Steam Systems

The facilities have multiple boilers. The central distribution building is equipped with two Bryan forced draft steam boilers, each with an output capacity of 1,680 MBh and an 80% efficiency rating. These boilers, installed in 1995, are in fair condition and operate using a lead-lag control scheme. For the ventral distribution building, there is one, 1.5 hp combustion air motor for the boiler.

In the D building area, there is a non-condensing hot water boiler with a 660 MBh output capacity and an 88% nominal efficiency. This boiler was installed in 1995-and is in fair condition. It operates through an automated control scheme. In the D building area, the boiler is served by three pumps, one primary and two secondaries. The boiler provides hot water to radiators and unit heaters throughout the entire facility.

The Stillwater Building relies on two ATH brand non-condensing boilers, recently installed, with a total output capacity of 927 MBh and 92.7% nominal efficiency. These boilers are in good condition and use a lead-lag control scheme. The Stillwater Building's boilers are equipped with three variable speed pumps, each with a capacity of 3 hp. The boilers provide hot water to radiators and unit heaters throughout the entire facility.

The youth center building has a non-condensing hot water boiler with a 675 MBh output capacity and a 90% nominal efficiency, installed in 2007. This boiler, in fair condition, operates through an automated control scheme. In the youth center building, the boiler is served by three pumps, one primary and two secondaries.



Steam Boiler-Central Distribution

Boiler Area: Stillwater Building

Hydronic Boiler- D Building

Hydronic Boiler: Youth Center

2.7 Chilled Water Systems

The Stillwater Building chiller plant includes a Daikin variable-speed air-cooled scroll chiller with a capacity of 84.4 tons. The system is configured in a primary-secondary distribution loop with two constant flow pumps rated at 10 hp. The chiller is responsible for meeting the main cooling needs of the Stillwater Building. It was manufactured in 2007 and is currently in fair condition.

Air Cooled Chiller: Stillwater Building

2.8 Domestic Hot Water

Hot water for the Stillwater Building is generated by an 80-gallon, 18 kW electric storage water heater. In the D building, a 50-gallon, 4.5 kW electric storage water heater is used for hot water production. The central distribution building utilizes a 91-gallon, 199.9 MBh natural gas-fired storage water heater with 80% efficiency rating, along with a 1500 MBh, 85% efficient boiler. The youth center building employs four electric storage water heaters ranging from 30 gallons to 119 gallons and between 4.5 kW and 9 kW in capacity. All the units are in fair condition.

The domestic hot water pipes in the central distribution building, D building, and youth center building are partially insulated, with the insulation in poor condition.

2.9 Food Service Equipment

Central distribution houses a kitchen that uses a combination of gas and electric equipment to prepare meals for students and staff, including breakfast, lunch, and dinner. The main cooking is done with a convection gas-fired and electric ovens, and bulk prepared foods are stored in electric holding cabinets. The equipment is not highly efficient but is in good condition.

The dishwashers in the central distribution and youth center buildings are not ENERGY STAR certified and operate at low temperatures.

Our analysis determined that this building's food service equipment accounts for a relatively high proportion of overall energy use. While cost effective opportunities to replace equipment are limited at this time, we recommend that you work with your food service equipment suppliers to maintain equipment in a way that minimizes energy use. This may include cleaning air intakes and exhausts or other methods of keeping your existing equipment operating in top shape. When food service equipment is eventually replaced, consider installing high efficiency or ENERGY STAR labeled equipment.

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

Central Distribution: Insulated Food Holding Cabinet

Youth Center: Dishwasher

Central Distribution: Dishwasher

Central Distribution: Gas Convection Oven

2.10 Refrigeration

The central distribution kitchen has three stand-up refrigerators with solid doors. Additionally, there is a stand-up solid door freezer in the youth center building and three stand-up refrigerators with glass doors in the clinic area of Stillwater Building. All equipment is standard and in fair condition.

There are five walk-in coolers, two low-temperature freezers, and one medium-temperature freezer in the central distribution kitchen area. Additionally, the central distribution kitchen has two standard efficiency commercial ice makers that vary in size, and they are in good condition.

Our analysis determined that this building's refrigeration equipment accounts for a relatively high proportion of overall energy use. While cost effective opportunities to replace equipment are limited at this time, we recommend that you work with your refrigeration suppliers to maintain equipment in a way that minimizes energy use. When refrigeration equipment does need to be replaced consider installing high efficiency or ENERGY STAR labeled equipment.

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

Typical Stand-up Solid Door Refrigerator

Typical Stand-up Glass Door Refrigerator

Low Temperature Freezer: Central Distribution

Walk In Cooler: Central Distribution

Commercial Ice Maker: Central Distribution

2.11 Plug Load and Vending Machines

The location is 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 73 computer workstations spread across the four buildings, with the Stillwater Building housing 50 of them. There are various other plug loads in common areas and offices, such as microwaves, coffee machines, printers, copiers, televisions, and toaster ovens.

Additionally, each of the four buildings is equipped with residential-style refrigerators for storing food for facility staff. The refrigerators vary in condition and efficiency. The youth center also contains clothes dryers, washers, electric stoves, and electric ovens.

There are four refrigerated beverage vending machines in central distribution, Stillwater Building, and the youth center. Also, there are three non-refrigerated vending machines in central distribution, D building, and youth center. These vending machines are not equipped with occupancy-based controls.

Typical Non-Refrigerated Vending Machine

Typical Residential Style Refrigerator

Youth Center: Clothes Dryer and Washer

Typical Microwave

2.12 Water-Using Systems

Stillwater Building has 29 restrooms with toilets, urinals, sinks, and one kitchen area. There are 29 faucet aerators in these restrooms, each with a flow rate of 2.2 gallons per minute (gpm) or higher. Additionally, the building has six kitchen aerators and five showerheads, rated at 2.2 gpm or higher. There are two restrooms in the D building with five restroom faucets, and three kitchen faucets rated at 2.2 gpm or higher.

The central distribution building features two restrooms with toilets, urinals, sinks, and one kitchen area. This building has two kitchen faucets, seven restroom faucets, and two showerheads rated at 2.2 gpm or higher. The youth center building has six restrooms with toilets, urinals, and sinks and is equipped with 14 restroom faucets, three kitchen faucets, and four showerheads, all rated at 2.2 gpm or higher.

Stillwater Building: Typical Restroom Sinks

D Building: Typical Kitchen Sinks

Youth Central Building: Typical Restroom Sinks

Youth Center Building: Typical Kitchen Sinks

2.13 On-Site Generation

Stillwater Building and youth center each are equipped with gas-fired emergency generators that, in the event of a power outage, serve critical services. They are tested regularly but only used for emergencies.

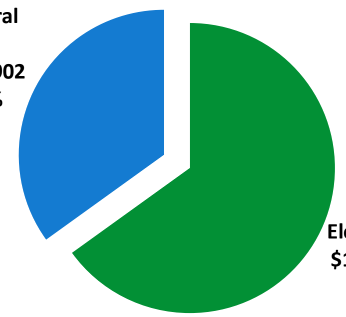
Stillwater Building: Generator

Youth Center Building: Generator

3 Energy Use and Costs

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

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	1,359,070 kWh	$191,626
Natural Gas	75,492 Therms	$102,902
Total		**$294,528**



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.

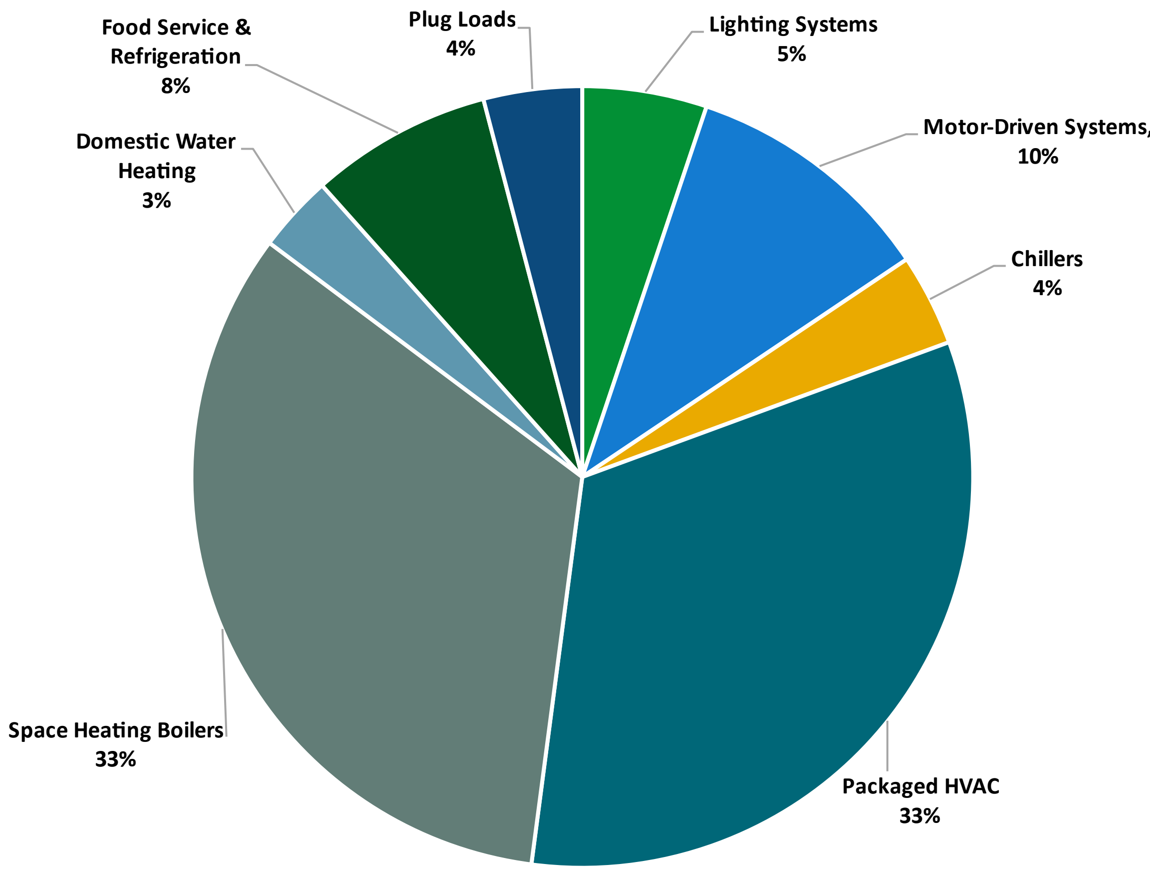
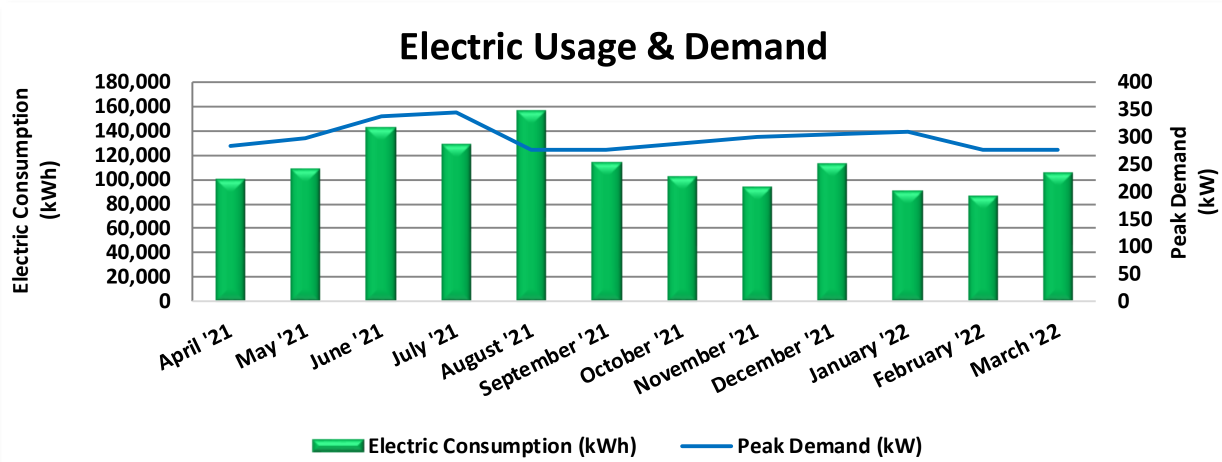


Figure 4 - Energy Balance

3.1 Electricity

Atlantic City Electric delivers electricity under rate class Annual General Service Secondary, with electric production provided by Constellation New Energy, a third-party supplier.



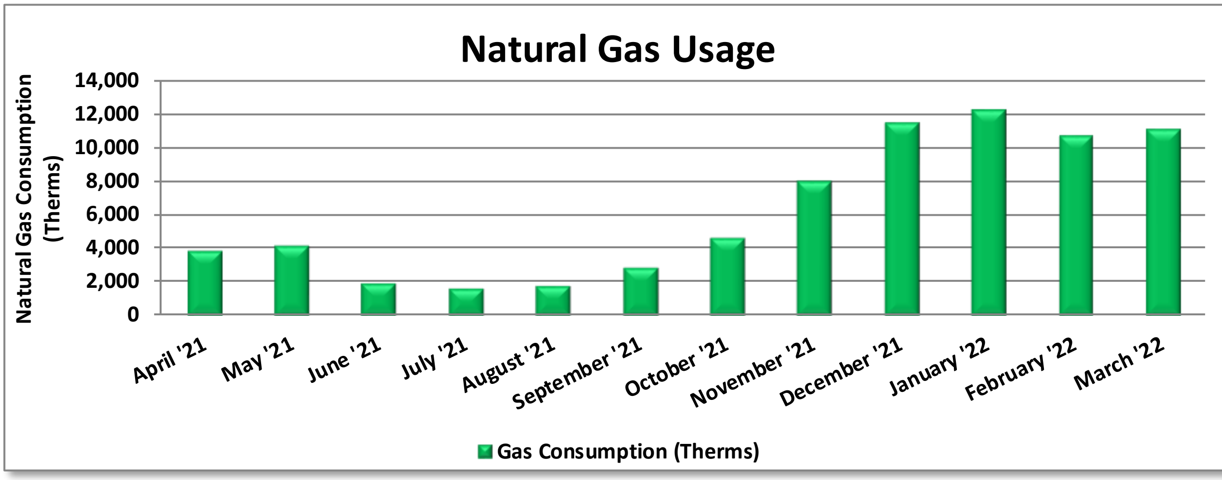
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
5/5/21	28	100,800	283	$3,000	$13,661
6/3/21	29	108,900	297	$3,259	$14,833
7/7/21	34	143,400	339	$4,361	$20,310
8/4/21	28	129,600	345	$3,655	$18,220
9/8/21	35	156,600	276	$3,655	$21,350
10/7/21	29	114,600	276	$3,028	$15,958
11/5/21	29	102,600	288	$3,166	$14,535
12/3/21	28	94,500	300	$3,186	$13,694
1/4/22	32	113,100	305	$3,234	$16,389
2/4/22	31	91,500	309	$3,247	$12,781
3/2/22	26	86,400	276	$3,112	$12,721
4/4/22	33	105,900	276	$3,808	$15,599
Totals	**362**	**1,347,900**	**345**	**$40,711**	**$190,051**
Annual	**365**	**1,359,070**	**345**	**$41,048**	**$191,626**

Notes:

- Peak demand of 345 kW occurred in July '21.
- Average demand over the past 12 months was 297 kW.
- The average electric cost over the past 12 months was $0.141/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.
- The buildings are served by a single electric meter.

3.2 Natural Gas

South Jersey Gas delivers natural gas under rate class GSGFT, with natural gas supply provided by UGI Energy, a third-party supplier.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
5/5/21	28	3,872	$5,220
6/3/21	29	4,187	$5,642
7/7/21	34	1,900	$2,660
8/5/21	29	1,656	$2,328
9/8/21	34	1,815	$2,540
10/7/21	29	2,893	$3,997
11/5/21	29	4,635	$6,385
12/3/21	28	8,042	$10,981
1/6/22	34	11,556	$15,608
2/3/22	28	12,341	$16,789
3/2/22	27	10,795	$14,696
4/4/22	33	11,180	$15,210
Totals	**362**	**74,871**	**$102,056**
Annual	**365**	**75,492**	**$102,902**

Notes:

- The average gas cost for the past 12 months is $1.363/therm, which is the blended rate used throughout the analysis.
- Natural gas is provided to the complex through several gas meters.

3.3 Benchmarking

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

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

Benchmarking Score	N/A

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

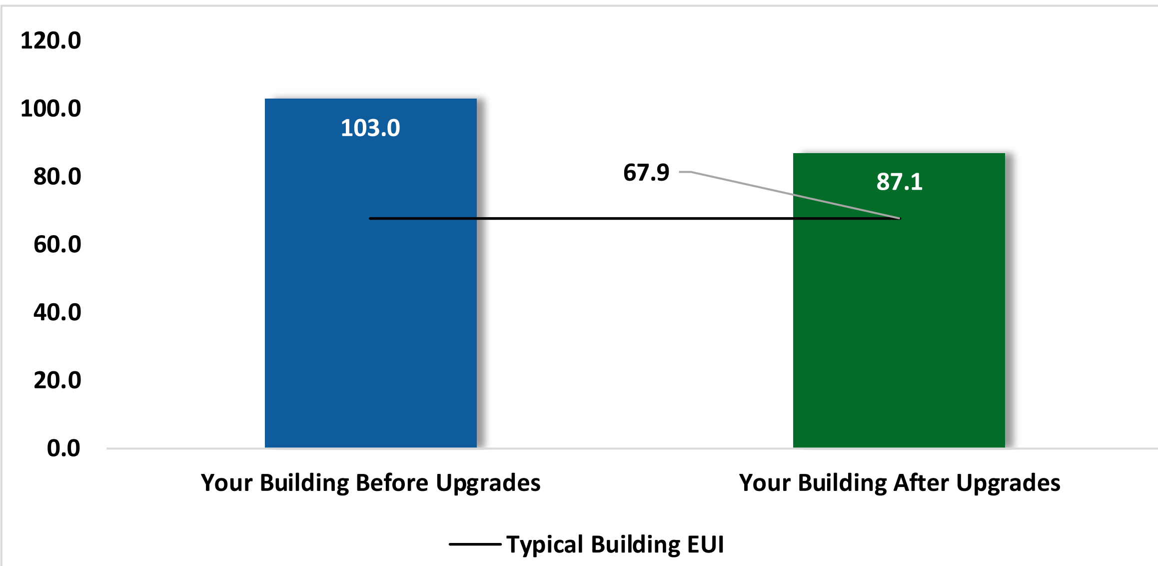


Figure 5 - Energy Use Intensity Comparison[3]

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. Several factors can cause a building to vary from 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.

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

For more information on ENERGY STAR and Portfolio Manager, visit their website.

4 Energy Conservation Measures

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

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

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

Financial incentives in this report are based on the previously run state rebate program SmartStart, which has been retired. Now, all investor-owned gas and electric utility companies are offering complementary energy efficiency programs directly to their customers. Some measures and proposed upgrades may be eligible for higher incentives than those shown below. The incentives in the summary tables should be used for high-level planning purposes. To verify incentives, reach out to your utility provider or visit the NJCEP website for more information.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**99,472**	**17.7**	**-19**	**$13,762**	**$29,532**	**$7,299**	**$22,233**	**1.6**	**97,904**
ECM 1	Install LED Fixtures	Yes	6,644	0.0	0	$937	$3,903	$1,100	$2,803	3.0	6,690
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	3,689	0.8	-1	$510	$1,287	$200	$1,087	2.1	3,625
ECM 3	Retrofit Fixtures with LED Lamps	Yes	84,051	16.4	-18	$11,613	$22,748	$5,999	$16,749	1.4	82,590
ECM 4	Install LED Exit Signs	Yes	5,088	0.5	-1	$703	$1,593	$0	$1,593	2.3	4,999
Lighting Control Measures			**26,664**	**5.2**	**-6**	**$3,684**	**$15,183**	**$3,895**	**$11,288**	**3.1**	**26,197**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	22,521	4.4	-5	$3,111	$11,808	$1,620	$10,188	3.3	22,128
ECM 6	Install High/Low Lighting Controls	Yes	4,142	0.8	-1	$572	$3,375	$2,275	$1,100	1.9	4,070
Variable Frequency Drive (VFD) Measures			**139,656**	**25.6**	**0**	**$19,691**	**$150,813**	**$8,175**	**$142,638**	**7.2**	**140,632**
ECM 7	Install VFDs on Constant Volume (CV) Fans	No	110,908	21.7	0	$15,638	$137,420	$5,975	$131,445	8.4	111,683
ECM 8	Install VFDs on Chilled Water Pumps	Yes	28,748	3.9	0	$4,053	$13,393	$2,200	$11,193	2.8	28,949
HVAC System Improvements			**2,121**	**0.0**	**15**	**$508**	**$505**	**$80**	**$425**	**0.8**	**3,934**
ECM 9	Install Pipe Insulation	Yes	2,121	0.0	15	$508	$505	$80	$425	0.8	3,934
Domestic Water Heating Upgrade			**7,104**	**0.0**	**4**	**$1,061**	**$1,477**	**$390**	**$1,087**	**1.0**	**7,664**
ECM 10	Install Low-Flow DHW Devices	Yes	7,104	0.0	4	$1,061	$1,477	$390	$1,087	1.0	7,664
Food Service & Refrigeration Measures			**22,884**	**1.7**	**0**	**$3,227**	**$25,217**	**$2,000**	**$23,217**	**7.2**	**23,044**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	5,243	0.6	0	$739	$6,066	$800	$5,266	7.1	5,279
ECM 12	Refrigeration Controls	No	10,166	0.2	0	$1,433	$17,541	$1,000	$16,541	11.5	10,238
ECM 13	Vending Machine Control	Yes	7,475	0.9	0	$1,054	$1,610	$200	$1,410	1.3	7,527
Custom Measures			**89,167**	**0.0**	**560**	**$20,207**	**$196,405**	**$0**	**$196,405**	**9.7**	**155,370**
ECM 14	Installation of an Energy Management System	No	55,404	0.0	488	$14,465	$177,474	$0	$177,474	12.3	112,940
ECM 15	Replace Electric Water Heater with Heat Pump Water Heater	Yes	40,516	0.0	0	$5,713	$15,263	$0	$15,263	2.7	40,799
ECM 16	Replace Gas Fired Water Heater with Heat Pump Water Heater	No	-6,753	0.0	72	$29	$3,668	$0	$3,668	126.5	1,630
TOTALS			**387,068**	**50.3**	**555**	**$62,140**	**$419,132**	**$21,839**	**$397,292**	**6.4**	**454,745**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**99,472**	**17.7**	**-19**	**$13,762**	**$29,532**	**$7,299**	**$22,233**	**1.6**	**97,904**
ECM 1	Install LED Fixtures	6,644	0.0	0	$937	$3,903	$1,100	$2,803	3.0	6,690
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	3,689	0.8	-1	$510	$1,287	$200	$1,087	2.1	3,625
ECM 3	Retrofit Fixtures with LED Lamps	84,051	16.4	-18	$11,613	$22,748	$5,999	$16,749	1.4	82,590
ECM 4	Install LED Exit Signs	5,088	0.5	-1	$703	$1,593	$0	$1,593	2.3	4,999
Lighting Control Measures		**26,664**	**5.2**	**-6**	**$3,684**	**$15,183**	**$3,895**	**$11,288**	**3.1**	**26,197**
ECM 5	Install Occupancy Sensor Lighting Controls	22,521	4.4	-5	$3,111	$11,808	$1,620	$10,188	3.3	22,128
ECM 6	Install High/Low Lighting Controls	4,142	0.8	-1	$572	$3,375	$2,275	$1,100	1.9	4,070
Variable Frequency Drive (VFD) Measures		**28,748**	**3.9**	**0**	**$4,053**	**$13,393**	**$2,200**	**$11,193**	**2.8**	**28,949**
ECM 8	Install VFDs on Chilled Water Pumps	28,748	3.9	0	$4,053	$13,393	$2,200	$11,193	2.8	28,949
HVAC System Improvements		**2,121**	**0.0**	**15**	**$508**	**$505**	**$80**	**$425**	**0.8**	**3,934**
ECM 9	Install Pipe Insulation	2,121	0.0	15	$508	$505	$80	$425	0.8	3,934
Domestic Water Heating Upgrade		**7,104**	**0.0**	**4**	**$1,061**	**$1,477**	**$390**	**$1,087**	**1.0**	**7,664**
ECM 10	Install Low-Flow DHW Devices	7,104	0.0	4	$1,061	$1,477	$390	$1,087	1.0	7,664
Food Service & Refrigeration Measures		**12,718**	**1.5**	**0**	**$1,793**	**$7,676**	**$1,000**	**$6,676**	**3.7**	**12,806**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	5,243	0.6	0	$739	$6,066	$800	$5,266	7.1	5,279
ECM 13	Vending Machine Control	7,475	0.9	0	$1,054	$1,610	$200	$1,410	1.3	7,527
Custom Measures		**40,516**	**0.0**	**0**	**$5,713**	**$15,263**	**$0**	**$15,263**	**2.7**	**40,799**
ECM 15	Replace Electric Water Heater with Heat Pump Water Heater	40,516	0.0	0	$5,713	$15,263	$0	$15,263	2.7	40,799
TOTALS		**217,343**	**28.4**	**-5**	**$30,574**	**$83,029**	**$14,864**	**$68,165**	**2.2**	**218,254**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**99,472**	**17.7**	**-19**	**$13,762**	**$29,532**	**$7,299**	**$22,233**	**1.6**	**97,904**
ECM 1	Install LED Fixtures	6,644	0.0	0	$937	$3,903	$1,100	$2,803	3.0	6,690
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	3,689	0.8	-1	$510	$1,287	$200	$1,087	2.1	3,625
ECM 3	Retrofit Fixtures with LED Lamps	84,051	16.4	-18	$11,613	$22,748	$5,999	$16,749	1.4	82,590
ECM 4	Install LED Exit Signs	5,088	0.5	-1	$703	$1,593	$0	$1,593	2.3	4,999

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 is proposed, we suggest converting all of a specific lighting type (e.g., linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

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

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

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

Affected Building Areas: exterior fixtures at central distribution, D building, youth center, and Stillwater Building

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected Building Areas: warehouse and central distribution T-12 fixtures

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent, 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. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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

Affected Building Areas: all areas with fluorescent fixtures with T8 tubes, CLFs, and incandescent lamps for the exterior 1-central distribution, Alzheimer's Association-D building, Stillwater Building attic, and youth center

ECM 4: Install LED Exit Signs

Replace incandescent or compact fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output. Maintenance savings and improved reliability may also be achieved, as the longer-lasting LED lamps will not need to be replaced as often as the existing lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**26,664**	**5.2**	**-6**	**$3,684**	**$15,183**	**$3,895**	**$11,288**	**3.1**	**26,197**
ECM 5	Install Occupancy Sensor Lighting Controls	22,521	4.4	-5	$3,111	$11,808	$1,620	$10,188	3.3	22,128
ECM 6	Install High/Low Lighting Controls	4,142	0.8	-1	$572	$3,375	$2,275	$1,100	1.9	4,070

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

ECM 5: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected Building Areas: all buildings as applicable in offices, conference rooms, restrooms, warehouse area, clinic, and storage rooms

ECM 6: Install High/Low Lighting Controls

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

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

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

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 the area.

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

Affected Building Areas: corridors and stairwells at the Stillwater Building

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**139,656**	**25.6**	**0**	**$19,691**	**$150,813**	**$8,175**	**$142,638**	**7.2**	**140,632**
ECM 7	Install VFDs on Constant Volume (CV) Fans	110,908	21.7	0	$15,638	$137,420	$5,975	$131,445	8.4	111,683
ECM 8	Install VFDs on Chilled Water Pumps	28,748	3.9	0	$4,053	$13,393	$2,200	$11,193	2.8	28,949

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

ECM 7: Install VFDs on Constant Volume (CV) Fans

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

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

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

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating. Prior to implementation, verify minimum fan speed in cooling mode with the manufacturer. Note that savings will vary depending on the operating characteristics of each AHU.

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

Affected Air Handlers: various exhaust fans and package units-supply fans in central distribution, youth center, and Stillwater Building as per Appendix A

ECM 8: Install VFDs on Chilled Water Pumps

Install VFDs to control chilled water pumps. Two-way valves must serve the chilled water coils being served and the chilled water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the chilled water distribution, they will need to be modified when this measure is implemented. As the chilled water valves close, the differential pressure increases, and the VFD modulates the pump speed to maintain a differential pressure setpoint.

For systems with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping off will need to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

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

Affected Pumps: chilled water pumps at the Stillwater Building

4.4 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**2,121**	**0.0**	**15**	**$508**	**$505**	**$80**	**$425**	**0.8**	**3,934**
ECM 9	Install Pipe Insulation	2,121	0.0	15	$508	$505	$80	$425	0.8	3,934

ECM 9: Install Pipe Insulation

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

Affected Systems: domestic hot water piping at Central distribution, D building, and Youth center

4.5 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**7,104**	**0.0**	**4**	**$1,061**	**$1,477**	**$390**	**$1,087**	**1.0**	**7,664**
ECM 10	Install Low-Flow DHW Devices	7,104	0.0	4	$1,061	$1,477	$390	$1,087	1.0	7,664

ECM 10: 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.

Additional cost savings may result from reduced water usage.

4.6 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**22,884**	**1.7**	**0**	**$3,227**	**$25,217**	**$2,000**	**$23,217**	**7.2**	**23,044**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	5,243	0.6	0	$739	$6,066	$800	$5,266	7.1	5,279
ECM 12	Refrigeration Controls	10,166	0.2	0	$1,433	$17,541	$1,000	$16,541	11.5	10,238
ECM 13	Vending Machine Control	7,475	0.9	0	$1,054	$1,610	$200	$1,410	1.3	7,527

ECM 11: Refrigerator/Freezer Case Electrically Commutated Motors

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

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

ECM 12: Refrigeration Controls

We evaluated installing additional controls to optimize the operation of walk-in coolers and freezers.

Many walk-in coolers and freezers have continuously operating electric heaters on the doors to prevent condensation formation. This measure adds a control system feature to shut off the door heaters when the humidity level is low enough that condensation will not occur if the heaters are off. This is done by measuring the ambient humidity and temperature of the store, comparing that to the dewpoint, and using pulse width modulation to control the anti-sweat door heaters.

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

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

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

ECM 13: Vending Machine Control

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

4.7 Custom Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Custom Measures		**89,167**	**0.0**	**560**	**$20,207**	**$196,405**	**$0**	**$196,405**	**9.7**	**155,370**
ECM 14	Installation of an Energy Management System	55,404	0.0	488	$14,465	$177,474	$0	$177,474	12.3	112,940
ECM 15	Replace Electric Water Heater with Heat Pump Water Heater	40,516	0.0	0	$5,713	$15,263	$0	$15,263	2.7	40,799
ECM 16	Replace Gas Fired Water Heater with Heat Pump Water Heater	-6,753	0.0	72	$29	$3,668	$0	$3,668	126.5	1,630

ECM 14: Installation of an Energy Management System

We evaluated installation of an energy management, or building automation, system. Most larger facilities have some type of building automation system (BAS), which provides for centralized, remote control and monitoring of HVAC equipment, and sometimes lighting or other building systems. A BAS utilizes a system of temperature and pressure sensors that obtain feedback about field conditions and provide signals to control systems that adjust HVAC system operation for optimal functioning. Thirty years ago, most control systems were pneumatic systems driven by compressed air, with pneumatic thermostats and air driven actuators for valves and dampers. Pneumatic controls have largely been replaced by direct digital control (DDC) systems, but many pneumatic systems remain. Contemporary DDC systems afford tighter controls and enhanced monitoring and trending capabilities as compared to the older systems.

Often smaller facilities are not equipped with central controls. For many small sites, it has been less costly to install distributed local controls, such as programmable thermostats and timeclocks, rather than centralized DDC. Local controls do a reasonably good job of scheduling equipment and maintaining operating conditions by relying on controls integral to HVAC units, such as logic for compressor staging, to manage the equipment operating algorithms.

Even for smaller sites, inefficiencies arise when temperature sensors and thermostat schedules are not maintained, when there are separate systems for heating and cooling, and especially when equipment is added, or the facility is reconfigured or repurposed.

Based on our survey, it appears that the installation of a BAS at your site could increase the efficiency of your building HVAC system operation.

A controls upgrade would enable automated equipment start and stop times, temperature setpoints, lockouts and deadbands to be programmed remotely using a graphic interface. Controls can be configured to optimize ventilation and outside air intake by adjusting economizer position, damper function, and fan speed. Existing chilled and hot water distribution system controls are typically tied in, including associated pumps and valves. Coordinated control of HVAC systems is dependent on a network of sensors and status points. A comprehensive building control system provides monitoring and control for all HVAC systems, so operators can adjust system programming for optimal comfort and energy savings.

It is recommended that an HVAC engineer or contractor who specializes in BAS be contacted for a detailed evaluation and implementation costs. For the purposes of this report, the potential energy savings and measure costs were estimated based on industry standards and previous project experience. Further analysis should be conducted for the feasibility of this measure. This is not an investment grade analysis nor should be used as a basis for design and construction.

A high-level evaluation of potential savings and costs is provided for demonstration purposes only. It is a screening evaluation for the potential in installing a BAS. Based on industry standards and previous project experience, the potential energy savings may be up to 20% of existing HVAC energy use. We estimate the cost for installing a BAS is approximately $2.00 per square foot. Actual savings and costs will need to be outlined by the specific contractor engaged to implement the system. For the purposes of this report, we have conservatively estimated savings to be 7.0% of the HVAC energy consumption baseline.

ECM 15: Replace Electric Water Heater with Heat Pump Water Heater

A typical electric water heater uses electric resistance coils to heat water at a coefficient of performance (COP) of 1. Air source heat pump water heaters (HPWH) use a refrigeration cycle to transfer heat from the surrounding air to the domestic water. The typical average COP for a HPWH is about 2.5, so they require significantly less electricity to produce the same amount of hot water as a traditional electric water heater. There are two types of HPWH, those integrated with the heat pump and storage tank in the same unit, and those that are split into two sections (with the storage tank separate from the heat pump). The following addresses integrated HPWH.

HPWH reject cold air. As such, they need to be installed in an unconditioned space of about 750 cubic feet with good ventilation. Ideal locations are garages, large enclosed, unconditioned storage areas, or areas with excess heat such as a furnace or boiler room.[4] The HPWH will also produce condensate so accommodations for draining the condensate need to be provided.

Most HPWH operate effectively down to an air temperature of 40 °F. Below that temperature, an electric resistance booster heater is typically required to achieve full heating capacity. It is critical that the HPWH controls are set up so that the electric resistance heat only engages when the air temperature is too cold for the HPWH to extract heat from it. HPWHs have a slow recovery. During periods of high demand, the electric resistance heating element, if enabled, may be energized to maintain set point, thus reducing the overall efficiency of the unit. It is recommended that a careful analysis of the hot water demand be conducted to determine if the application makes economic sense, and the HPWH heating capacity and storage are properly sized.

HPWH operate most effectively when the temperature difference between the incoming and outgoing water is high. Generally, this means that cold make-up water should be piped to the bottom of the tank and return water should be piped to the top of the tank in order to maintain stratification within the storage tank. Water should be drawn from the bottom of the tank to be heated. If there is a DHW recirculation pump, it should only be operated during high hot water demand periods.

Affected Systems: One unit each at D building and Stillwater Building, and five distributed units in the youth center building

ECM 16: Replace Gas Fired Water Heater with Heat Pump Water Heater

We evaluated replacing a gas fired hot water heater with a heat pump water heater. A gas fired water heater uses a burner to heat water. Air source heat pump water heaters (HPWH) use a refrigeration cycle to transfer heat from the surrounding air to the domestic water. Water heater efficiency is rated by the uniform energy factor (UEF). For a relative comparison of water heater UEFs, the criteria for certifying a water heater in the ENERGY STAR program are provided below. These values indicate that HPWH heaters are significantly more efficient than gas fired water heaters.

There are two types of HPWH: those integrated with the heat pump and storage tank in the same unit, and those that are split into two sections (with the storage tank separate from the heat pump). The measure considers an integrated HPWH.

[4]https://basc.pnnl.gov/code-compliance/heat-pump-water-heaters-code-compliance-brief#:~:text=HPWH%20must%20have%20unrestricted%20airflow,depending%20on%20size%20of%20system

ENERGY STAR Uniform Energy Factor (UEF) Criteria for Certified Water Heaters *

Water Heater Type	Minimum UEF	Other
Integrated HPWH	3.3	
Integrated HPWH	2.2	120 Volt, 15 Amp circuit
Split System HPWH	2.2	
Gas Fired Storage	0.64	< 55-gal, Medium Draw Pattern
Gas Fired Storage	0.68	< 55-gal, High Draw Pattern
Gas Fired Storage	0.78	> 55-gal, Medium Draw Pattern
Gas Fired Storage	0.80	> 55-gal, High Draw Pattern
Gas Fired Storage	0.80	Residential Duty
Gas Fired Instantaneous	0.87	

** Note: Uniform Energy Factor (UEF): The newest measure of water heater overall efficiency. The higher the UEF value is, the more efficient the water heater. UEF is determined by the Department of Energy's test method outlined in 10 CFR Part 430, Subpart B, Appendix E.*[5]

HPWH reject cold air. As such, they need to be installed in an unconditioned space of about 750 cubic feet with good ventilation[6]. Ideal locations are garages, large enclosed, unconditioned storage areas, or areas with excess heat such as a furnace or boiler room. The HPWH will also produce condensate so accommodations for draining the condensate need to be provided.

Most HPWH operate effectively down to an air temperature of 40 °F. Below that temperature, an electric resistance booster heater is typically required to achieve full heating capacity. It is critical that the HPWH controls are set up so that the electric resistance heat only engages when the air temperature is too cold for the HPWH to extract heat from it. HPWHs have a slow recovery. During periods of high demand, the electric resistance heating element, if enabled, may be energized to maintain set point, thus reducing the overall efficiency of the unit. It is recommended that a careful analysis of the hot water demand be conducted to determine if the application makes economic sense, and the HPWH heating capacity and storage are properly sized.

HPWH operate most effectively when the temperature difference between the incoming and outgoing water is high. Generally, this means that cold make-up water should be piped to the bottom of the tank and return water should be piped to the top of the tank in order to maintain stratification within the storage tank. Water should be drawn from the bottom of the tank to be heated. If there is a DHW recirculation pump, it should only be operated during high hot water demand periods.

Switching from a gas fired water heater to a HPWH has the potential to reduce the sites overall greenhouse gas emissions. If the electricity for the HPWH is provided by an on-site photovoltaic (PV)

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[5] https://www.energy.gov/sites/prod/files/2014/06/f17/rwh_tp_final_rule.pdf

[6] https://basc.pnnl.gov/code-compliance/heat-pump-water-heaters-code-compliance-brief#:~:text=HPWH%20must%20have%20unrestricted%20airflow,depending%20on%20size%20of%20system

system then there are essentially no greenhouse gas (GHG) emissions. A 2016 study conducted at Cornell [7]calculated the kg of methane (CH_4) and carbon dioxide (CO_2) produced per GJ of water heated. The study compared HPWH to gas and electric fired, storage and tankless water heaters. The study also considered electricity produced from natural gas and coal fired electric plants. In all cases the study found that HPWHs produced less methane than all of the other water heaters. The study also found that HPWH produced less carbon dioxide than electric resistance water heaters but more carbon dioxide than tankless gas water heaters and about the same amount of carbon dioxide as storage gas water heaters. The summary tables provide the reduction in CO2 equivalent emissions based on the typical New Jersey electric utility.

Affected Systems: Central distribution gas tank heater

4.8 Measures for Future Consideration

There are additional opportunities for improvement that Atlantic County may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment, and/or include significant system reconfiguration. These measure(s) are therefore beyond the scope of this energy audit. These measure(s) are described here to support a whole building approach to energy efficiency and sustainability.

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

- Evaluate these measures further.
- Develop firm costs.
- Determine measure savings.
- Prepare detailed implementation plans.

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

Electric Sub Metering

Electricity use varies in different facilities, and plant operators need to perform their own investigations and analyses to understand how their facilities consume energy. Facility staff expressed interest in sub metering all key four buildings, which are currently served by the same master meter. Utility bills indicate how much energy a facility uses across the entire facility, but submetering provides more detailed data on the energy consumption of specific systems and even on individual pieces of equipment, depending on how extensively meters are installed. Electric submeters alone do not save energy, but they are a useful tool under the right circumstances. Electric sub-meters can provide facility staff with real-time energy use data for specific buildings, information that enhances the potential for greater energy management activities. Revenue grade submeters are a tool that allow operators to better understand how and where electricity is used at the facility. Better resolution of system energy use can lead to operational changes

[7] Greenhouse gas emissions from domestic hot water: Heat pumps compared to most commonly used systems. Bongghi Hong, Robert W. Howarth. Department of Ecology and Evolutionary Biology, Cornell University. Energy Science and Engineering 2016.

or even equipment modifications or replacement, which often result in reduced energy use, which often result in reduced energy use.

Upgrade to a Heat Pump System

Electric resistance heating units work by passing an electric current through wires to heat them. The system is 100% efficient since for every unit of electricity consumed, one unit of heat is produced.

But there is a way to convert electricity to create heat at better than a 1:1 ratio. Heat pumps operate on a more efficient principle, the refrigeration cycle. Instead of directly converting electricity to heat, electricity does the work, via a compressor, of moving refrigerant through a system that transfers heat from a cooler place to a warmer place. That system can move three to five as much energy as is available using electric resistance heating methods. Heat pumps work in a similar manner to an air conditioner, except they reverse the cooling process to circulate warm air instead of cold air. Also, heat pumps are generally capable of dispensing refrigerated air as they can typically be operated in air conditioning mode.

Electric resistance heat, including electric furnaces and baseboard heaters, can be inexpensive to install but often expensive to run. Facilities with these systems can save substantial energy at a moderate cost by installing a heat pump when they replace a central air conditioner.

Even in buildings without central air-conditioning, there are opportunities to save energy when an existing electric furnace needs to be replaced, as well as opportunities to install ductless electric heat pumps in buildings with baseboard electric heaters and electric fan coils. Unit ventilators with built-in electric resistance heaters can be replaced with unit ventilators with integrated heat pumps.

Electric heat pumps have high coefficient of performance (COP) ratings and are substantially more efficient than traditional electric heating systems. Further investigation is required to determine whether installing a heat pump system is a cost-effective solution when replacing existing electrical heating systems.

5 Energy Efficient Best Practices

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

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

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

Energy Tracking with ENERGY STAR Portfolio Manager

You've heard it before—you cannot manage what you do not 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[8]. 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 can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Lighting Maintenance

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

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

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

Motor Controls

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

Motor Maintenance

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

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°F -10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Steam Trap Repair and Replacement

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

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 and efficiently. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the boiler tubes to improve heat transfer.

Furnace Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

Water Heater Maintenance

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

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

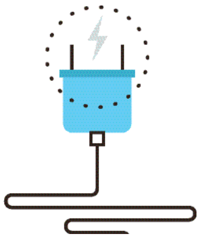
- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues, and you should have the unit serviced by a professional.
- For electric water heaters,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

Refrigeration Equipment Maintenance

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

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

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[9]. Your local utility may offer incentives or rebates for this equipment.

Water Conservation

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

For more information regarding water conservation go to the EPA's WaterSense website[10] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[11] 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.

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[9] 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.

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

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

6 On-site Generation

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

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

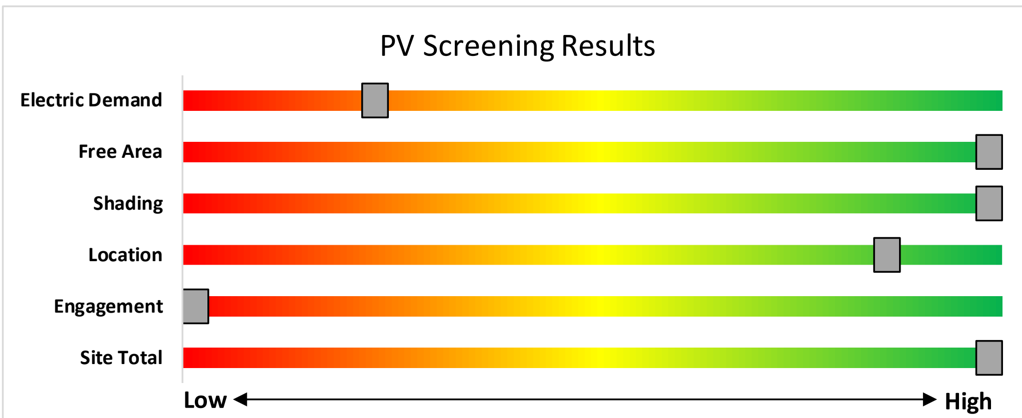
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	297	kW DC STC
Electric Generation	353,837	kWh/yr
Displaced Cost	$49,890	/yr
Installed Cost	$849,400	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available for solar projects. Solar projects may qualify to earn SREC- IIs (Solar Renewable Energy Certificates-II), however, the project owners *must* register their solar projects prior to the start of construction to establish the project's eligibility.

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:

Successor Solar Incentive Program (SuSI): https://www.njcleanenergy.com/renewable-energy/programs/susi-program

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

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

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

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

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.

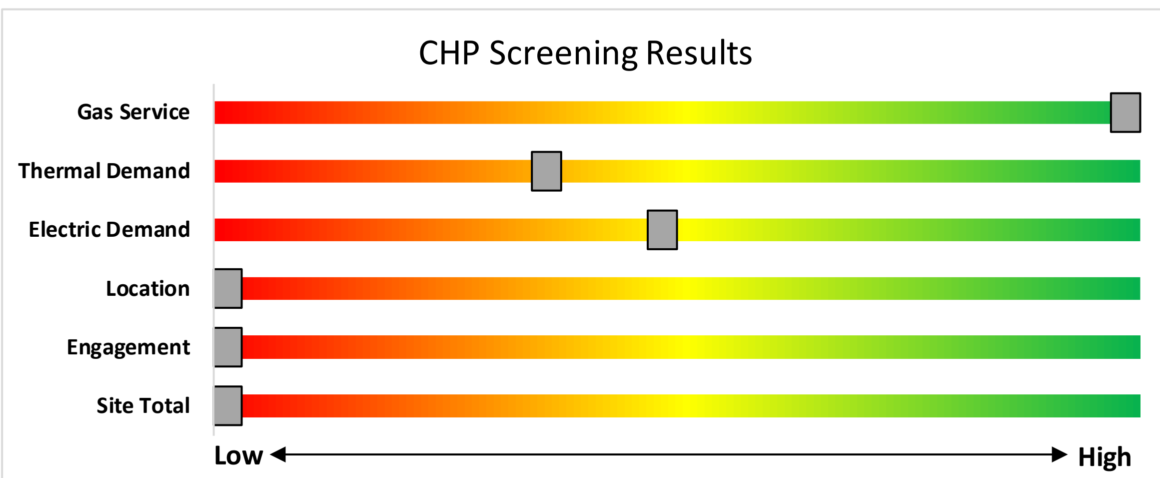


Figure 9 - Combined Heat and Power Screening

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/.](http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/)

7 Electric Vehicles (EV)

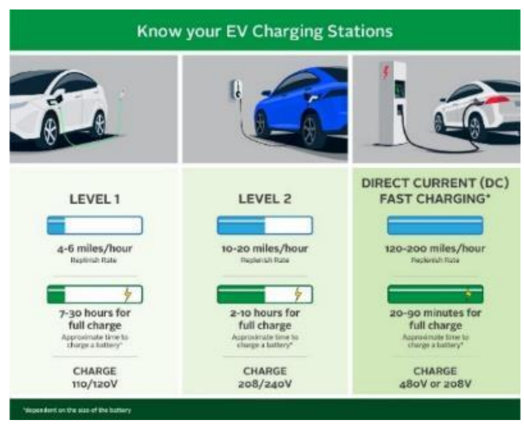
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes all-electric vehicles as zero-emission vehicles because they produce no direct exhaust or tailpipe emissions.

EVs are typically more expensive than similar conventional and hybrid vehicles, although some cost can be recovered through fuel savings, federal tax credit, or state incentives.

7.1 Electric Vehicle Charging

EV charging stations provide a means for electric vehicle operators to recharge their batteries at a facility. While many EV drivers charge at home, others do not have access to regular home charging, and the ability to charge at work or in public locations is critical to making EVs practical for more drivers. Charging can also be used for electric fleet vehicles, which can reduce fuel and maintenance costs for fleets that replace gas or diesel vehicles with EVs.

EV charging comes in three main types. For this assessment, the screening considers addition of Level 2 charging, which is most common at workplaces and other public locations. Depending on the site type and usage, other levels of charging power may be more appropriate.



The preliminary assessment of EV charging at the facility shows that there is medium potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

The type and size of the parking area impact the costs and feasibility of adding EV charging. Parking structure installations can be less costly than surface lot installations as power may be readily available, and equipment and wiring can be surface mounted. Parking lot installations often require trenching through concrete or asphalt surface. Large parking areas provide greater flexibility in charger siting than smaller lots.

The location and capacity of facility electric panels also impact charger installation costs. A Level 2 charger generally requires a dedicated 208-240V, 40 Amp circuit. The electric panel nearest the planned installation may not have available capacity and may need to be upgraded to serve new EV charging loads. Alternatively, chargers could be powered from a more distant panel. The distance from the panel to the location of charging stations ties directly to costs, as conduits, cables, and potential trenching costs all increase on a per-foot basis. The more charging stations planned, the more likely it is that additional electrical capacity will be needed.

Other factors to consider when planning for EV charging at a facility include who the intended users are, how long they park vehicles at the site, and whether they will need to pay for the electricity they use.

The graphic below displays the results of the EV charging assessment conducted as part of this audit. The position of each slider indicates the impact each factor has on the feasibility of installing EV charging at the site.

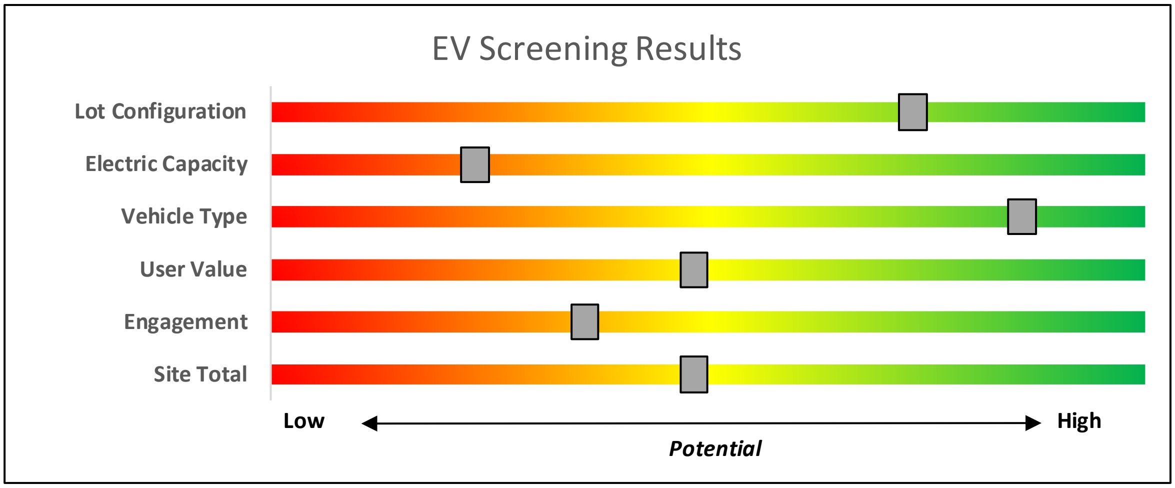


Figure 10 – EV Charger Screening

Electric Vehicle Programs Available

New Jersey is leading the way on electric vehicle (EV) adoption on the East Coast. There are several programs designed to encourage EV adoption in New Jersey, which is crucial to reaching a 100% clean energy future.

NJCEP offers a variety of EV programs for vehicles, charging stations, and fleets. Certain EV charging stations that receive electric utility service from Atlantic City Electric Company (ACE) or Public Service Electric & Gas Company (PSE&G), may be eligible for additional electric vehicle charging incentives directly from the utility. Projects may be eligible for both the incentives offered by this BPU program and incentives offered by ACE or PSE&G, up to 90% of the combined charger purchase and installation costs. Please check ACE or PSE&G program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

Both Jersey Central Power & Light (JCP&L) and Rockland Electric (RECO) have filed proposals for EV charging programs. BPU staff is currently reviewing those proposals.

For more information and to keep up to date on all EV programs please visit https://www.njcleanenergy.com/commercial-industrial/programs/electric-vehicle-programs

8 Project Funding and Incentives

Ready to improve your building's performance? New Jersey's Clean Energy Programs and Utility Energy Efficiency Programs can help. Pick the program that works best for you. This section provides an overview of currently available incentive programs in.

8.1 Utility Energy Efficiency Programs

The Clean Energy Act, signed into law by Governor Murphy in 2018, requires New Jersey's investor-owned gas and electric utilities to reduce their customers' use by set percentages over time. To help reach these targets the New Jersey Board of Public Utilities approved a comprehensive suite of energy efficiency programs to be run by the utility companies.

Prescriptive and Custom

The Prescriptive and Custom rebate program through your utility provider 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.

Equipment Examples

Lighting
Lighting Controls
HVAC Equipment
Refrigeration
Gas Heating
Gas Cooling
Commercial Kitchen Equipment
Food Service Equipment
Variable Frequency Drives
Electronically Commutate Motors
Variable Frequency Drives
Plug Loads Controls
Washers and Dryers
Agricultural
Water Heating

The Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type. The Custom program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives.

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 or less 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.

How to Participate

To participate in Direct Install, you will work with a participating contractor. 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 Direct Install program, subject to program rules and eligibility, while the remaining percent of the cost is paid to the contractor by the customer.

Engineered Solutions

The Engineered Solutions Program provides tailored energy-efficiency assistance and services to municipalities, universities, schools, hospitals and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. Customers receive expert guided services, including investment-grade energy auditing, engineering design, installation assistance, construction administration, commissioning, and measurement and verification (M&V) services to support the implementation of cost-effective and comprehensive efficiency projects. Engineered Solutions is generally a good option for medium to large sized facilities with a peak demand over 200 kW looking to implement as many measures as possible under a single project to achieve deep energy savings. Engineered Solutions 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 for this program are based on project scope and energy savings achieved.

For more information on any of these programs, contact your local utility provider or visit https://www.njcleanenergy.com/transition.

8.2 New Jersey's Clean Energy Programs

Save money while saving the planet! New Jersey's Clean Energy Program is a statewide program that offers incentives, programs, and services that benefit New Jersey residents, businesses, educational, non-profit, and government entities to help them save energy, money, and the environment.

Large Energy Users

The Large Energy Users Program (LEUP) is designed to foster self-directed investment in energy projects. This program is offered to New Jersey's largest energy customers that annually contribute at least $200,000 to the NJCEP aggregate of all buildings/sites. This equates to roughly $5 million in energy costs in the prior fiscal year.

Incentives

Incentives are based on the specifications below. The maximum incentive per entity is the lesser of:

- $4 million
- 75% of the total project(s) cost
- 90% of total NJCEP fund contribution in previous year
- $0.33 per projected kWh saved; $3.75 per projected Therm saved annually

How to Participate

To participate in LEUP, you will first need submit an enrollment application. This program requires all qualified and approved applicants to submit an energy plan that outlines the proposed energy efficiency work for review and approval. Applicants may submit a Draft Energy Efficiency Plan (DEEP), or a Final Energy Efficiency Plan (FEEP). Once the FEEP is approved, the proposed work can begin.

Detailed program descriptions, instructions for applying, and applications can be found at www.njcleanenergy.com/LEUP.

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 will 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.

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The program is used to register and certify 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 SREC-IIs (Solar Renewable Energy Certificates-II). SuSI consists of two sub-programs. The Administratively Determined Incentive (ADI) Program and the Competitive Solar Incentive (CSI) Program.

Administratively Determined Incentive (ADI) Program

The ADI Program provides administratively set incentives for net metered residential projects, net metered non-residential projects 5 MW or less, and all community solar projects.

After the registration is accepted, construction is complete, and a complete final as-built packet has been submitted, the project is issued a New Jersey certification number, which enables it to generate New Jersey SREC- IIs.

Market Segments	Size MW dc	Incentive Value ($/SREC II)	Public Entities Incentive Value - $20 Adder ($/SRECII)
Net Metered Residential	All types and sizes	$90	N/A
Small Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects smaller than 1 MW	$100	$120
Large Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects 1 MW to 5 MW	$90	$110
Small Net Metered Non-Residential Ground Mount	Projects smaller than 1 MW	$85	$105
Large Net Metered Non-Residential Ground Mount	Projects 1 MW to 5 MW	$80	$100
LMI Community Solar	Up to 5 MW	$90	N/A
Non-LMI Community Solar	Up to 5 MW	$70	N/A
Interim Subsection (t)	All types and sizes	$100	N/A

Eligible projects may generate SREC-IIs for 15 years following the commencement of commercial operations which is defined as permission to operate (PTO) from the Electric Distribution Company. After 15 years, projects may be eligible for a NJ Class I REC.

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

The ADI Program online portal is now open to new registrations.

Competitive Solar Incentive Program

The Competitive Solar Incentive (CSI) Program will provide competitively set incentives for grid supply projects and net metered non-residential projects greater than 5MW (dc). The program is currently under development. For updates, please continue to check the Solar Proceedings page on the New Jersey's Clean Energy Program website.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan.

If you are considering installing solar photovoltaics on your building, visit the following link for more information: https://njcleanenergy.com/renewable-energy/programs/susi-program.

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 into contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the energy conservation measures (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 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.

9 Project Development

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

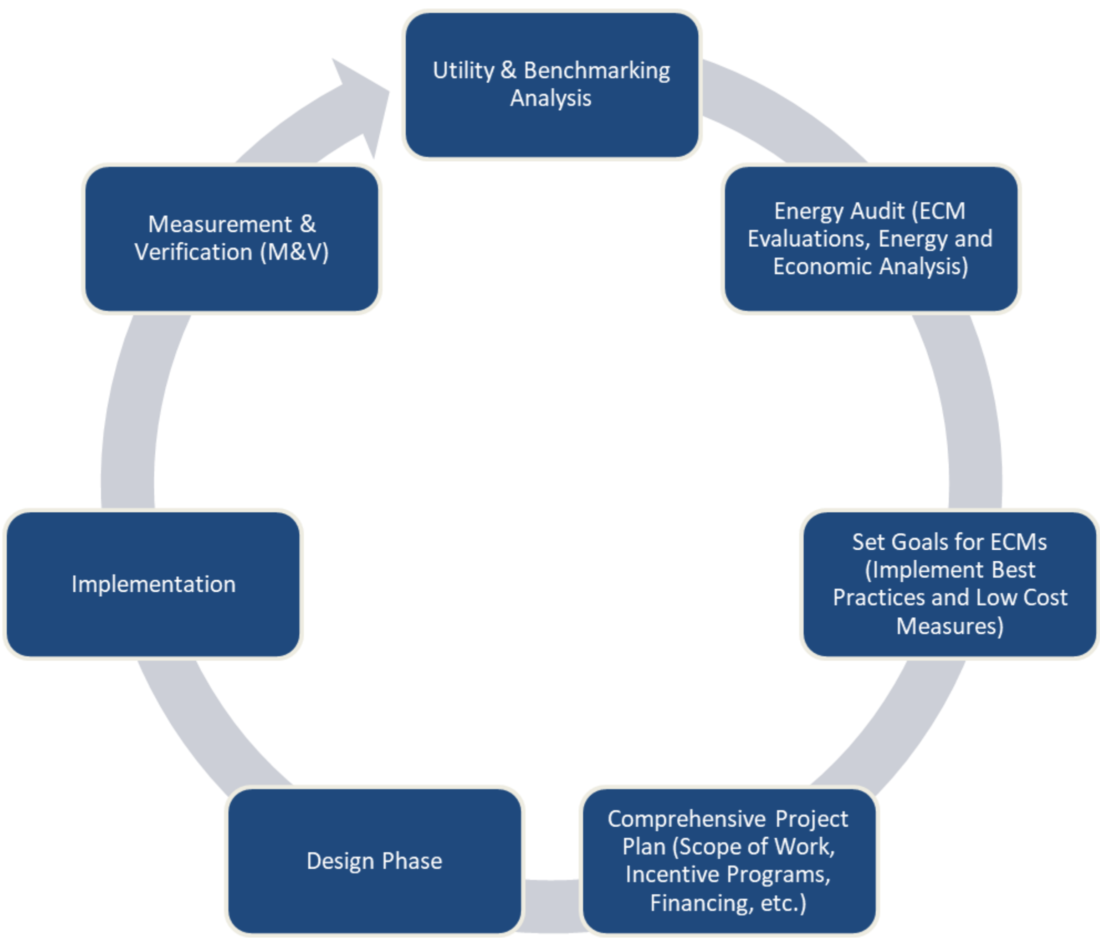


Figure 11 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 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. Though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

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

A list of licensed third-party electric suppliers is available at the NJBPU website[12].

10.2 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 fluctuate monthly. The utility provides basic gas supply service to customers who choose not to buy from a third-party supplier for natural gas commodity.

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[13].

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior 1-Central Distribution	1	Incandescent: (1) 40W A19 Screw-In Lamp	Wall Switch		40	4,368	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	6	4,368	0.0	149	0	$21	$17	$1	0.8
Exterior 1-Central Distribution	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,368	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,368	0.0	144	0	$20	$37	$10	1.3
Exterior 1-Central Distribution	8	Metal Halide: (1) 70W Lamp	Timeclock		95	4,368	1	Fixture Replacement	No	8	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Timeclock	23	4,368	0.0	2,516	0	$355	$1,703	$800	2.5
Hallway-Central Distribution	2	Exit Signs: Incandescent	None		30	8,760	4	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	463	0	$64	$145	$0	2.3
Hallway-Central Distribution	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.3	1,261	0	$174	$526	$105	2.4
Hallway-Central Distribution	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,587	0	$219	$635	$135	2.3
Kitchen 1-Central Distribution	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,269	0	$175	$562	$115	2.5
Lounge 1-Central Distribution	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,269	0	$175	$562	$115	2.5
Lounge 2-Central Distribution	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,269	0	$175	$562	$115	2.5
Office - Open Plan 1-Central Distribution	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.1	635	0	$88	$262	$60	2.3
Restroom - Female 1-Central Distribution	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.1	540	0	$75	$380	$65	4.2
Restroom - Male 1-Central Distribution	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.2	901	0	$124	$453	$85	3.0
Warehouse 1-Central Distribution	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	40	3,900	5	None	Yes	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	2,691	0.0	106	0	$15	$0	$0	0.0
Warehouse 1-Central Distribution	10	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	3,900	2, 5	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	2,691	1.0	4,647	-1	$642	$1,557	$235	2.1
Warehouse 1-Central Distribution	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,900	3, 5	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,691	0.0	91	0	$13	$303	$41	20.7
Warehouse 1-Central Distribution	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.1	360	0	$50	$73	$20	1.1
Warehouse 2-Central Distribution	2	Exit Signs: Incandescent	None		30	8,760	4	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	463	0	$64	$145	$0	2.3
Warehouse 2-Central Distribution	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,269	0	$175	$562	$115	2.5
Warehouse 2-Central Distribution	4	Linear Fluorescent - T8: 8' T8 (59W) - 1L	Wall Switch	S	58	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (1) 8' Lamp	Occupancy Sensor	36	2,691	0.1	569	0	$79	$177	$40	1.7
Alzheimer's Association-D Building	1	Incandescent: (1) 25W A19 Screw-In Lamp	Wall Switch	S	25	3,900	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	4	3,900	0.0	90	0	$12	$17	$1	1.3
Alzheimer's Association-D Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.1	240	0	$33	$73	$20	1.6
Boiler room-D Building	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,900	3, 5	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,691	0.0	91	0	$13	$149	$26	9.7
Cape Atlantic-D Building	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
Cape Atlantic-D Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.0	180	0	$25	$37	$10	1.1

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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Cape Atlantic-D Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.1	317	0	$44	$343	$55	6.6
Engineering-D Building	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
Engineering-D Building	26	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	26	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	1.8	8,252	-2	$1,140	$2,439	$590	1.6
Entrance-D Building	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
Entrance-D Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.1	240	0	$33	$73	$20	1.6
Exterior 1-D Building	1	Metal Halide: (1) 250W Lamp	Timeclock		295	4,368	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	75	4,368	0.0	961	0	$135	$471	$50	3.1
Restroom - Female 1-D Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.1	240	0	$33	$73	$20	1.6
Restroom - Male 1-D Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.1	240	0	$33	$73	$20	1.6
Third floor-D Building	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
Third floor-D Building	26	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	26	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	1.8	8,252	-2	$1,140	$2,439	$590	1.6
Boiler Room-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.1	635	0	$88	$262	$60	2.3
Clinic-Stillwater	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Clinic-Stillwater	7	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,900	5	None	Yes	7	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	2,691	0.0	93	0	$13	$0	$0	0.0
Clinic-Stillwater	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	30	3,900	5	None	Yes	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	30	2,691	0.0	40	0	$6	$0	$0	0.0
Clinic-Stillwater	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,900	3, 5	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,691	0.0	91	0	$13	$303	$41	20.7
Clinic-Stillwater	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,269	0	$175	$562	$115	2.5
Phone room-Stillwater	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.1	540	0	$75	$380	$65	4.2
Restroom - Female 7-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Male 6-Stillwater	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,135		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,135	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 5-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Unisex 6-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Unisex 7-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Unisex 8-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Bridge-Stillwater	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Bridge-Stillwater	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	1.0	4,443	-1	$614	$1,292	$315	1.6
Chairman Office-Stillwater	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.5	2,222	0	$307	$781	$175	2.0
Corridor 2-Stillwater	8	LED Lamps: (2) 5.5W Plug-In Lamps	None	S	10	4,380	6	None	Yes	8	LED Lamps: (2) 5.5W Plug-In Lamps	High/Low Control	10	3,022	0.0	119	0	$17	$0	$0	0.0
Corridor 2-Stillwater	2	LED Lamps: (5) 5.5W Plug-In Lamps	Wall Switch	S	25	4,380	6	None	Yes	2	LED Lamps: (5) 5.5W Plug-In Lamps	High/Low Control	25	3,022	0.0	75	0	$10	$225	$70	15.0
Corridor 2-Stillwater	2	LED Lamps: (8) 5.5W Plug-In Lamps	None	S	40	4,380	6	None	Yes	2	LED Lamps: (8) 5.5W Plug-In Lamps	High/Low Control	40	3,022	0.0	119	0	$17	$225	$70	9.4
County Health Offices-Stillwater	3	Exit Signs: Incandescent	None		30	8,760	4	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	694	0	$96	$217	$0	2.3
County Health Offices-Stillwater	14	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,900	3, 5	Relamp	Yes	14	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,691	0.3	1,277	0	$176	$725	$119	3.4
County Health Offices-Stillwater	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.2	721	0	$100	$146	$40	1.1
County Health Offices-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.1	635	0	$88	$262	$60	2.3
Environmental Unit-Stillwater	1	Exit Signs: Incandescent	None		30	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	231	0	$32	$72	$0	2.3
Environmental Unit-Stillwater	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.2	952	0	$132	$489	$95	3.0
Exterior 1-Stillwater	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		15	4,368		None	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	15	4,368	0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		200	4,368		None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	200	4,368	0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell		25	3,900		None	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	25	3,900	0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	3	Metal Halide: (1) 150W Lamp	Timeclock		190	4,368	1	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	45	4,368	0.0	1,900	0	$268	$1,037	$150	3.3
Free holders-Stillwater	3	Exit Signs: Incandescent	None		30	8,760	4	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	694	0	$96	$217	$0	2.3
Free holders-Stillwater	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,269	0	$175	$562	$115	2.5
Kitchen 1-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.1	240	0	$33	$73	$20	1.6
Library-Stillwater	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.3	1,269	0	$175	$562	$115	2.5
Restroom - Female 4-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Female 5-Stillwater	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,135		None	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,135	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 6-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,691	0.1	540	0	$75	$226	$50	2.4
Restroom - Male 4-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Male 5-Stillwater	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	S	44	2,135		None	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,135	0.0	0	0	$0	$0	$0	0.0
Restroom - Unisex 3-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - Unisex 4-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,691	0.1	540	0	$75	$226	$50	2.4
Stairs 1-8-Stillwater	32	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,160	3, 6	Relamp	Yes	32	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,870	1.3	6,149	-1	$849	$2,968	$1,440	1.8
Veterans department-Stillwater	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
Veterans department-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.1	317	0	$44	$73	$20	1.2
Veterans department-Stillwater	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,691	0.2	1,010	0	$139	$705	$95	4.4
Attic-Stillwater	4	Incandescent: (1) 30W A19 Screw-In Lamp	Wall Switch	S	30	3,900	3, 5	Relamp	Yes	4	LED Lamps: A19 Lamps	Occupancy Sensor	5	2,691	0.1	456	0	$63	$339	$39	4.8
Commodities Offices-Stillwater	5	Exit Signs: Incandescent	None		30	8,760	4	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,156	0	$160	$362	$0	2.3
Commodities Offices-Stillwater	15	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,900	5	None	Yes	15	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,691	0.1	339	0	$47	$270	$35	5.0
Commodities Offices-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,691	0.1	360	0	$50	$189	$40	3.0
Commodities Offices-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.1	635	0	$88	$262	$60	2.3
Corridor 1-Stillwater	6	Exit Signs: Incandescent	None		30	8,760	4	Fixture Replacement	No	6	LED Exit Signs: 2 W Lamp	None	6	8,760	0.1	1,388	0	$192	$434	$0	2.3
Corridor 1-Stillwater	29	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	4,380	3, 6	Relamp	Yes	29	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	3,022	2.0	10,337	-2	$1,428	$3,243	$1,595	1.2
Health Planning-Stillwater	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,900	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.0	69	0	$9	$33	$6	2.8
Health Planning-Stillwater	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3, 5	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,691	0.4	1,904	0	$263	$708	$155	2.1
Restroom - Female 1-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,691	0.1	540	0	$75	$226	$50	2.4
Restroom - Female 2-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,691	0.1	540	0	$75	$226	$50	2.4
Restroom - Female 3-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Male 1-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,691	0.1	540	0	$75	$226	$50	2.4
Restroom - Male 2-Stillwater	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,691	0.1	540	0	$75	$226	$50	2.4
Restroom - Male 3-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Unisex 1-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Restroom - Unisex 2-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,900	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.0	212	0	$29	$55	$15	1.4
Server Room 1-Stillwater	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,900	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.1	240	0	$33	$73	$20	1.6
Elevator 1-Youth Center	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	5,460	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,767	0.0	255	0	$35	$181	$32	4.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior 1-Youth Center	2	Compact Fluorescent: (1) 20W Plug-in Lamps	Timeclock		20	4,368	3	Relamp	No	2	LED Lamps: (1) 12W Plug-In Lamp	Timeclock	14	4,368	0.0	52	0	$7	$34	$2	4.4
Exterior 1-Youth Center	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		100	4,368		None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	100	4,368	0.0	0	0	$0	$0	$0	0.0
Exterior 1-Youth Center	2	Metal Halide: (1) 150W Lamp	Timeclock		190	4,368	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	45	4,368	0.0	1,267	0	$179	$692	$100	3.3
Restroom - Female 3-Youth Center	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,460	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,767	0.1	757	0	$105	$226	$50	1.7
Restroom - Male 3-Youth Center	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	5,460	3, 5	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,767	0.2	1,135	0	$157	$434	$80	2.3
Youth center-Youth Center	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
Youth center-Youth Center	1	LED - Fixtures: Ceiling Mount	Wall Switch	S	15	5,460		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	15	5,460	0.0	0	0	$0	$0	$0	0.0
Youth center-Youth Center	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	5,460	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,767	0.1	504	0	$70	$189	$40	2.1
Family Services-Youth Center	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Family Services-Youth Center	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	5,460	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,767	0.0	255	0	$35	$181	$32	4.2
Family Services-Youth Center	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,460	3, 5	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,767	0.3	2,222	0	$307	$635	$135	1.6
Restroom - Female 1-Youth Center	8	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	S	53	5,460	3, 5	Relamp	Yes	8	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	3,767	0.3	1,701	0	$235	$660	$107	2.4
Restroom - Female 2-Youth Center	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,460	3, 5	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,767	0.1	889	0	$123	$262	$60	1.6
Restroom - Male 1-Youth Center	8	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	S	53	5,460	3, 5	Relamp	Yes	8	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	3,767	0.3	1,701	0	$235	$660	$107	2.4
Restroom - Male 2-Youth Center	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,460	3, 5	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,767	0.1	889	0	$123	$262	$60	1.6
Women's Shelter-Youth Center	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Women's Shelter-Youth Center	59	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	5,460	3, 5	Relamp	Yes	59	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,767	4.1	26,215	-5	$3,622	$5,389	$1,320	1.1

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New Jersey's cleanenergy program™

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room-Central Distribution	Boiler-Central Distribution	1	DHW Circulation Pump	0.8	72.0%	No				8,760		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room-Central Distribution	Boiler-Central Distribution	2	DHW Circulation Pump	0.3	65.0%	No				8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	Air Compressor	2	Air Compressor	5.0	87.5%	No				5,694		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Exhaust Fan	3	Exhaust Fan	0.8	72.0%	No	Greenheck	Cube 30 15		4,118	7	No	81.1%	Yes	3	0.8	4,327	0	$610	$9,925	$150	16.0
Exterior 1-Central Distribution	Exhaust Fan	5	Exhaust Fan	0.8	72.0%	No				4,118	7	No	81.1%	Yes	5	1.3	7,211	0	$1,017	$16,542	$250	16.0
Exterior 1-Central Distribution	Exhaust Fan	5	Exhaust Fan	0.5	70.0%	No	Greenheck	Cube 24 7		4,118	7	No	78.2%	Yes	5	0.9	4,890	0	$690	$15,680	$250	22.4
Exterior 1-Central Distribution	Exhaust Fan	1	Exhaust Fan	0.3	68.0%	No	Emerson	5DDU12CA		4,118	7	No	73.4%	Yes	1	0.1	639	0	$90	$3,038	$50	33.1
Warehouse 2-Central Distribution	Garage Door Opener	4	Other	0.5	70.0%	No				1,092		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	1.5	77.0%	No	York	D4CE048A46TGA		4,118	7	No	86.5%	Yes	1	0.5	2,687	0	$379	$3,887	$75	10.1
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	2.0	78.0%	No	Trane			4,118	7	No	86.5%	Yes	1	0.7	3,476	0	$490	$4,182	$100	8.3
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	2.0	78.0%	No	York	DM078N15Q4AT A1A		4,118	7	No	86.5%	Yes	1	0.7	3,476	0	$490	$4,182	$100	8.3
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	1.5	77.0%	No	York	D7CG036N07946 TGA		4,118	7	No	86.5%	Yes	1	0.5	2,687	0	$379	$3,887	$75	10.1
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	1.5	77.0%	No	York	D4CE048A46TGA		4,118	7	No	86.5%	Yes	1	0.5	2,687	0	$379	$3,887	$75	10.1
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	2.0	78.0%	No	Trane	TSC90		4,118	7	No	86.5%	Yes	1	0.7	3,476	0	$490	$4,182	$100	8.3
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	1.5	77.0%	No	York	D4CE048A46TGA		4,118	7	No	86.5%	Yes	1	0.5	2,687	0	$379	$3,887	$75	10.1
Package Unit-Central Distribution	Indoor Blower	1	Supply Fan	1.5	77.0%	No	0	0		4,118	7	No	86.5%	Yes	1	0.5	2,687	0	$379	$3,887	$75	10.1
Boiler Room-Central Distribution	Boiler-Central Distribution	2	Combustion Air Fan	1.5	77.0%	No				3,569		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room-Central Distribution	Boiler-Central Distribution	1	Heating Hot Water Pump	0.8	72.0%	No				3,569		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
D Building:Boiler Room-D Building	Boiler Room-D Building	1	Heating Hot Water Pump	0.3	65.0%	No	Bell & Gossett			3,569		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
D Building:Boiler Room-D Building	Boiler Room-D Building	2	Heating Hot Water Pump	0.3	65.0%	No				3,569		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1-Youth Center	Exterior 1	3	Exhaust Fan	0.3	68.0%	No				4,392		No	68.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator 1-Youth Center	Elevator 1	1	Other	25.0	85.0%	No				600		No	85.0%	No		0.0	0	0	$0	$0	$0	0.0
Women's Shelter-Youth Center	Women's Shelter	2	Other	0.8	72.0%	No	Molekule			4,118		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Split unit-Wall Mounted-Youth Center	Split unit-Wall Mounted	1	Supply Fan	0.5	70.0%	No				4,392		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Package Unit-Aaon-Youth Center	Package Unit-Aaon	1	Supply Fan	3.0	81.0%	No				4,392	7	No	89.5%	Yes	1	1.0	5,329	0	$751	$4,555	$200	5.8
Boiler Room-Youth Center	Boiler Room-D Building	1	Heating Hot Water Pump	1.5	77.0%	No				3,569		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room-Youth Center	Boiler Room-D Building	2	Heating Hot Water Pump	0.3	65.0%	No				3,569		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Youth Center Package Heat Pump	AHU 2	1	Supply Fan	3.0	81.0%	No				4,392	7	No	89.5%	Yes	1	1.0	5,329	0	$751	$4,555	$200	5.8
Package Unit-Youth Center	Package Unit-Youth Center	1	Supply Fan	3.0	81.0%	No				4,392	7	No	89.5%	Yes	1	1.0	5,329	0	$751	$4,555	$200	5.8
Boiler Room-Stillwater	Chilled Water Pump	2	Chilled Water Pump	10.0	89.5%	No	Baldor			4,408	8	No	91.7%	Yes	2	3.9	28,748	0	$4,053	$13,393	$2,200	2.8
Exterior 1-Stillwater	Exhaust Fan	1	Exhaust Fan	0.8	72.0%	No				4,118		No	72.0%	No		0.0	0	0	$0	$0	$0	0.0
Phone room-Stillwater	Nat gas generator	1	Other	15.0	90.0%	No				600		No	90.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator 1-Stillwater	Elevator	1	Other	20.0	86.0%	No				600		No	86.0%	No		0.0	0	0	$0	$0	$0	0.0
Environmental Unit-Stillwater	Environmental Unit-Stillwater	1	Supply Fan	5.0	87.5%	No				4,118	7	No	89.5%	Yes	1	1.5	6,847	0	$965	$5,028	$900	4.3
Attic-Stillwater	Attic-Stillwater	6	Supply Fan	3.0	81.0%	No				4,118	7	No	89.5%	Yes	6	5.9	29,973	0	$4,226	$27,329	$1,200	6.2
Health Planning-Stillwater	Health Planning-Stillwater	1	Supply Fan	5.0	87.5%	No				4,118	7	No	89.5%	Yes	1	1.5	6,847	0	$965	$5,028	$900	4.3
Health Planning-Stillwater	Health Planning-Stillwater	1	Supply Fan	5.0	87.5%	No				4,118	7	No	89.5%	Yes	1	1.5	6,847	0	$965	$5,028	$900	4.3

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room-Stillwater	Boiler Room	3	Heating Hot Water Pump	3.0	87.0%	Yes	Baldor			3,569		No	87.0%	No		0.0	0	0	$0	$0	$0	0.0
Clinic-Stillwater	Mini Split AC	1	Supply Fan	0.5	70.0%	No	Sanyo			4,118		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Freeholder-Stillwater	Mini Split AC	1	Supply Fan	0.5	70.0%	No	Samsung			4,118		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Server room-Stillwater	Mini Split AC	1	Supply Fan	0.5	70.0%	No	Daikin			4,118		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 2-Stillwater	Package unit-Bridge	1	Supply Fan	2.0	78.0%	No				4,118	7	No	86.5%	Yes	1	0.7	3,476	0	$490	$4,182	$100	8.3

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - Open Plan 1-Central Distribution	Office - Open Plan 1-Central Distribution	1	Window AC	0.83		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Warehouse 1-Central Distribution	Warehouse	1	Window AC	0.83		10.00		Frigidaire		W		No							0.0	0	0	$0	$0	$0	0.0
Office - Open Plan 1-Central Distribution	Office - Open Plan 1-Central Distribution	6	Electric Resistance Heat		7.00		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Hallway-Central Distribution	Hallway-Central Distribution	1	Unit Heater		150.00		0.8 AFUE	Modine		W		No							0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	Kitchen 1-Central Distribution	1	Unit Heater		17.00		1 COP	Dayton		W		No							0.0	0	0	$0	$0	$0	0.0
Warehouse 1-Central Distribution	Warehouse 1-Central Distribution	2	Unit Heater		100.00		0.8 AFUE	Reznor		W		No							0.0	0	0	$0	$0	$0	0.0
Warehouse 2-Central Distribution	Warehouse 2-Central Distribution	2	Unit Heater		150.00		0.8 AFUE	Reznor		W		No							0.0	0	0	$0	$0	$0	0.0
Warehouse 2-Central Distribution	Warehouse 2-Central Distribution	3	Unit Heater		150.00		0.8 AFUE	Reznor		W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	4.00		11.00		York	D4CE048A46TGA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	10.00	200.00	10.00	0.8 AFUE	Trane		W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	6.50	180.00	10.00	0.8 AFUE	York	DM078N15Q4AT A1A	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	3.00	100.00	10.00	0.8 AFUE	York	D7CG036N07946 TGA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	4.00		11.00		York	D4CE048A46TGA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	7.50		10.00		Trane	TSC90	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	4.00		11.00		York	D4CE048A46TGA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit		500.00		0.8 AFUE			W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Central Distribution	Central Distribution-Main Building	1	Package Unit	4.00		11.00		York	D4CE048A46TGA	W		No							0.0	0	0	$0	$0	$0	0.0
Alzheimer's Association-D Building	D-Building:Alzheimer's Association-D Building	5	Window AC	0.83		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Cape Atlantic-D Building	D-Building:Cape Atlantic-D Building	4	Window AC	0.83		10.00				W		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Engineering-D Building	D-Building:Engineering-D Building	7	Window AC	0.83		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Family Services-Youth Center	Family Services-Youth Center	2	Window AC	0.83		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Youth Center	Youth Center	1	Split-System Air-Source HP	1.00	13.80	12.00	3.51685452531256 COP	Panasonic	CU-E12NKUA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Youth Center	Youth Center	1	Package Unit	20.00	389.00	10.00	0.8 AFUE	Aaon	RN-020-3A-EA19-389	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Youth Center	Youth Center-AHU 1	1	Package Unit	16.00	250.00	10.00	0.8 AFUE	McQuay	ACZ016AC27-ER11	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Youth Center	Youth Center-AHU 2	1	Packaged Air-Source HP	15.00	156.00	13.00	3.81231671554252 COP	Trane	TWA180E40RAB	W		No							0.0	0	0	$0	$0	$0	0.0
Environmental Unit-Stillwater	Environmental Unit	1	Window AC	0.67		10.80				W		No							0.0	0	0	$0	$0	$0	0.0
Library-Stillwater	Library	1	Window AC	0.67		10.80		Frigidaire	FRE086AT7	W		No							0.0	0	0	$0	$0	$0	0.0
Health Planning-Stillwater	Health Planning	1	Window AC	0.67		10.80		Goldstar		W		No							0.0	0	0	$0	$0	$0	0.0
Server Room 1-Stillwater	Server Room 1	1	Window AC	0.67		10.80		Frigidaire		W		No							0.0	0	0	$0	$0	$0	0.0
Clinic-Stillwater	Clinic	1	Unit Ventilator		5.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Chairman Office-Stillwater	Chairman Office	2	Unit Ventilator		5.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Corridor 2-Stillwater	Corridor 2	2	Unit Ventilator		5.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Free holders-Stillwater	Free holders	6	Unit Ventilator		5.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Library-Stillwater	Library	1	Unit Ventilator		5.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Veterans department-Stillwater	Veterans department	5	Unit Ventilator		5.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	AHU-1	1	Split-System	4.83		11.80			TZAL 360-DC	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	AHU-2	1	Split-System	5.00		10.00			TZAA-360-CC757	W		No							0.0	0	0	$0	$0	$0	0.0

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)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior 1-Stillwater	AHU-3	1	Split-System	5.00		10.00			TTP060D400A0	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	AHU-4	1	Split-System	4.83		11.80			TZAL 360-DC	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	AHU-5	1	Split-System	5.00		10.00			TCD60B41SA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	AHU-6	1	Split-System	5.00		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Boiler Room-Stillwater	Boiler Room-Stillwater	1	Electric Resistance Heat		25.59		1 COP	Berko		W		No							0.0	0	0	$0	$0	$0	0.0
County Health Offices-Stillwater	County Health Offices-Stillwater	1	Electric Resistance Heat		35.14		1 COP	Qmark	MUH 104	W		No							0.0	0	0	$0	$0	$0	0.0
Commodities Offices-Stillwater	Commodities Offices-Stillwater	2	Electric Resistance Heat		26.34		1 COP	Qmark	MUH 074	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	Mini-Split-Stillwater	1	Split-System	3.00		8.30		Daikin	RKS36LVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	Mini-Split-Stillwater	1	Split-System	3.00		10.00		Mitsuibishi	MUZ-D36NA	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	Mini-Split-Stillwater	1	Split-System	2.50		10.00		Sanyo	C3072R	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1-Stillwater	Mini-Split-Stillwater	1	Split-System	3.00		10.00		Samsung	AQX36VFUAGM	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior 2-Stillwater	Package unit-Bridge	1	Package Unit	7.50	200.00	10.00	0.8 AFUE	Comfortmaker	RGMA75H201	W		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
		Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior 1-Stillwater	Air Cooled Chiller-Stillwater	1	Air-Cooled Scroll Chiller	84.40	Daikin	AGZ090EDSEPNN 00	W		No							0.0	0	0	$0	$0	$0	0.0

Space Heating Boiler 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)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Warehouse 2-Central Distribution	Central Distribution-Main Building	2	Forced Draft Steam Boiler	1,680	Bryan	CL210-S-15-FDG	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room-D Building	D- Building: Main Building	1	Non-Condensing Hot Water Boiler	660	Lochinvar	PBN-750	W		No						0.0	0	0	$0	$0	$0	0.0
Exterior 1-Youth Center	Youth Center-Building	1	Non-Condensing Hot Water Boiler	675	Ao Smith		W		No						0.0	0	0	$0	$0	$0	0.0
Boiler Room-Stillwater	Stillwater Building	2	Non-Condensing Hot Water Boiler	927	ATH	KN-10	W		No						0.0	0	0	$0	$0	$0	0.0

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Warehouse 2-Central Distribution	Central Distribution - Restroom/Kitchen	9	20	2.00	0.0	0	15	$209	$266	$40	1.1
Boiler room-D Building	D Building-Restroom/Kitchen	9	10	1.00	0.0	1,061	0	$150	$119	$20	0.7
Family Services-Youth Center	Youth Center Building-DHW	9	10	1.00	0.0	1,061	0	$150	$119	$20	0.7

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Warehouse 2-Central Distribution	Central Distribution - Restroom/Kitchen	1	Storage Tank Water Heater (> 50 Gal)	Rheem-Ruud	G91-200-1	W		No						0.0	0	0	$0	$0	$0	0.0
Warehouse 2-Central Distribution	Central Distribution - Restroom/Kitchen	1	Boiler	PK Thermific	N-1500-2	W		No						0.0	0	0	$0	$0	$0	0.0
Boiler room-D Building	D Building-Restroom/Kitchen	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	RE350S6-1NCWW	W		No						0.0	0	0	$0	$0	$0	0.0
Clinic-Stillwater	StillwaterClinic-Stillwater	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	CEHD801833HCF	W		No						0.0	0	0	$0	$0	$0	0.0
Youth center	Youth center	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	RE350S6-1NCWW	W		No						0.0	0	0	$0	$0	$0	0.0
Family Services-Youth Center	Family Services-Youth Center	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	LD80R3-3G090	W		No						0.0	0	0	$0	$0	$0	0.0
Women's Shelter-Youth Center	Women's Shelter-Youth Center	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	LD120R33B100	W		No						0.0	0	0	$0	$0	$0	0.0
Women's Shelter-Youth Center	Women's Shelter-Youth Center	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	MG36527194	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommendation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen-Central Distribution	10	2	Faucet Aerator (Kitchen)	2.50	1.50	0.0	0	0	$6	$14	$4	1.7
Restroom-Central Distribution	10	7	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	3	$36	$50	$25	0.7
Restroom-Central Distribution	10	2	Showerhead	2.50	1.50	0.0	0	1	$17	$179	$30	8.7
Restroom-D Building	10	5	Faucet Aerator (Lavatory)	2.20	0.50	0.0	556	0	$78	$36	$18	0.2
Kitchen-D Building	10	3	Faucet Aerator (Kitchen)	2.50	1.50	0.0	196	0	$28	$22	$6	0.6
Kitchen-Stillwater	10	6	Faucet Aerator (Kitchen)	2.20	1.50	0.0	275	0	$39	$43	$12	0.8
Restrooms-Stillwater	10	29	Faucet Aerator (Lavatory)	2.20	0.50	0.0	3,225	0	$455	$208	$104	0.2
Restrooms-Stillwater and Youth Center	10	9	Showerhead	2.20	1.50	0.0	1,157	0	$163	$804	$135	4.1
Kitchen-Youth Center	10	3	Faucet Aerator (Kitchen)	2.20	1.50	0.0	137	0	$19	$22	$6	0.8
Restrooms-Youth Center	10	14	Faucet Aerator (Lavatory)	2.20	0.50	0.0	1,557	0	$220	$100	$50	0.2

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1-Central Distribution	1	Cooler (35F to 55F)	Vollrath		11, 12	Yes	Yes	Yes	0.1	1,163	0	$164	$2,799	$205	15.8
Kitchen 1-Central Distribution	1	Cooler (35F to 55F)		LET160	11, 12	Yes	Yes	Yes	0.1	1,455	0	$205	$2,799	$205	12.6
Kitchen 1-Central Distribution	1	Cooler (35F to 55F)	Vollrath		11, 12	Yes	Yes	Yes	0.1	1,832	0	$258	$3,103	$245	11.1
Kitchen 1-Central Distribution	1	Cooler (35F to 55F)	Hardford		11, 12	Yes	Yes	Yes	0.1	1,338	0	$189	$2,799	$205	13.7
Kitchen 1-Central Distribution	1	Cooler (35F to 55F)	Vollrath	KR-1000	11, 12	Yes	Yes	Yes	0.1	1,280	0	$180	$2,799	$205	14.4
Hallway-Central Distribution	1	Low Temp Freezer (-35F to -5F)	Elliott-Williams	LET1201F	11, 12	Yes	Yes	Yes	0.1	2,819	0	$398	$3,103	$245	7.2
Hallway-Central Distribution	1	Low Temp Freezer (-35F to -5F)	Bally		11, 12	Yes	Yes	Yes	0.1	2,819	0	$398	$3,103	$245	7.2
Kitchen 1-Central Distribution	1	Medium Temp Freezer (0F to 30F)			11, 12	Yes	Yes	Yes	0.1	2,702	0	$381	$3,103	$245	7.5

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1-Central Distribution	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Continental	2F-SS	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	2	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Traulsen	ARI232LUT-FHS	No		No	0.0	0	0	$0	$0	$0	0.0
Youth Center	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	Hoshizaki	CF1S-FS	Yes		No	0.0	0	0	$0	$0	$0	0.0
Youth Center	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Hoshizaki	CR1S-FS	Yes		No	0.0	0	0	$0	$0	$0	0.0
Clinic-Stillwater	1	Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.)	American Biotech Supply	PH-ABT-HC-33G	No		No	0.0	0	0	$0	$0	$0	0.0
Clinic-Stillwater	1	Stand-Up Refrigerator, Glass Door (>50 cu. ft.)	TRUE	GDM-72	No		No	0.0	0	0	$0	$0	$0	0.0
Clinic-Stillwater	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Carrier	MC1100	No		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1-Central Distribution	1	Self-Contained Unit (<175 lbs/day), Batch	Follett	MFD400A	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	1	Self-Contained Unit (≥175 lbs/day), Batch	Scotsman		No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1-Central Distribution	1	Electric Convection Oven (Full Size)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	1	Gas Convection Oven (Full Size)	Vulcan		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	1	Insulated Food Holding Cabinet (1/2 Size)	Metro	C5-6 Series	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	1	Gas Rack Oven (Double)	Blodgett		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	1	Gas Rack Oven (Single)			No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	1	Electric Steamer	Rational	CMP 101	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1-Central Distribution	1	Gas Steamer			No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Kitchen 1-Central Distribution	1	Single Tank Conveyor (Low Temp)	Hobart	CRS76A	Electric	None	No		No	0.0	0	0	$0	$0	$0	0.0
Women's Shelter-Youth Center	1	Under Counter (Low Temp)	Whirpool		Electric	None	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Office-Central Distribution	8	Desktop	150	No		
Lounge-Central Distribution	2	Microwave	1,000	No		
Lounge-Central Distribution	3	Refrigerator (Residential)	218	No		
Lounge-Central Distribution	2	Toaster	850	No		
Office - Open Plan 1-Central Distribution	1	Paper Shredder	150	No		
Office - Open Plan 2-Central Distribution	1	Printer (Medium/Small)	200	No		
Office - Open Plan 3-Central Distribution	2	Printer/Copier (Large)	600	No		
Cape Atlantic-D Building	1	Coffee Machine	900	No		
Alzheimer's Association-D Building	8	Desktop	150	No		
Cape Atlantic-D Building	2	Microwave	1,000	No		
Alzheimer's Association-D Building	1	Paper Shredder	150	No		
Alzheimer's Association-D Building	1	Printer (Medium/Small)	200	No		
Alzheimer's Association-D Building	2	Printer/Copier (Large)	600	No		
Alzheimer's Association-D Building	2	Refrigerator (Residential)	218	No		
Alzheimer's Association-D Building	2	Toaster	850	No		
Kitchen-Stillwater	10	Coffee Machine	900	No		
Clinic-Stillwater	50	Desktop	150	No		
Kitchen-Stillwater	8	Microwave	1,000	No		
Clinic-Stillwater	8	Paper Shredder	150	No		
Clinic-Stillwater	16	Printer (Medium/Small)	200	No		
County Health Offices-Stillwater	12	Printer/Copier (Large)	600	No		
Health Planning-Stillwater	4	Refrigerator (Mini)	153	No		
Clinic-Stillwater	13	Refrigerator (Residential)	218	No		
County Health Offices-Stillwater	4	Television	80	No		
Kitchen-Stillwater	4	Toaster	850	No		
Kitchen-Stillwater	5	Toaster Oven	1,200	No		
Youth Center	4	Clothes Dryer	5,000	No		
Youth Center	4	Clothes Washer	900	No		
Women's Shelter-Youth Center	2	Coffee Machine	900	No		
Youth Center	7	Desktop	150	No		
Youth center	5	Microwave	1,000	No		
Youth Center	1	Paper Shredder	150	No		
Youth Center	4	Printer (Medium/Small)	200	No		
Youth Center	3	Printer/Copier (Large)	600	No		
Youth Center	4	Refrigerator (Mini)	153	No		

	Existing Conditions					
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**	**Manufacturer**	**Model**
Youth Center	5	Refrigerator (Residential)	218	No		
Youth Center	11	Television	80	No		
Youth Center	1	Toaster	850	No		
Youth Center	3	Toaster Oven	1,200	No		
Youth Center	5	Water Cooler	92	No		
Youth center	1	Electric stove	1,500	No		
Women's Shelter-Youth Center	1	Electric Oven	2,500	No		

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	**Quantity**	**Vending Machine Type**	**ECM #**	**Install Controls?**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Total Incentives**	**Simple Payback w/ Incentives in Years**
Hallway-Central Distribution	1	Refrigerated	13	Yes	0.2	1,612	0	$227	$230	$50	0.8
Hallway-Central Distribution	1	Non-Refrigerated	13	Yes	0.0	343	0	$48	$230	$0	4.8
County Health Offices-Stillwater	1	Refrigerated	13	Yes	0.2	1,612	0	$227	$230	$50	0.8
County Health Offices-Stillwater	1	Non-Refrigerated	13	Yes	0.0	343	0	$48	$230	$0	4.8
Family Services-Youth Center	1	Non-Refrigerated	13	Yes	0.0	343	0	$48	$230	$0	4.8
Family Services-Youth Center	1	Refrigerated	13	Yes	0.2	1,612	0	$227	$230	$50	0.8
Women's Shelter-Youth Center	1	Refrigerated	13	Yes	0.2	1,612	0	$227	$230	$50	0.8

Custom (High Level) Measure Analysis

Installation of an Energy Management System

Building Square Footage	118,316	**Fuel Utility Rate**	$13.631 MMBtu
Percent of Conditioned Area Impacted	75%	**Blended Electric Utility Rate**	$0.141 kWh

Existing Conditions						Proposed Conditions					Energy Impact & Financial Analysis										
Description	**Area(s)/System(s) Served**	**Remaining Useful Life**	**Total HVAC Motor Usage kWh**	**Total HVAC Electric Usage kWh**	**Total HVAC Fuel Usage MMBtu**	**Description**	**% Savings HVAC Motor Usage kWh**	**% Savings HVAC Electric Usage kWh**	**% Savings HVAC Fuel Usage MMBtu**	**Estimated Cost per Sqft**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Base Incentives**	**Enhanced Incentives**	**Total Incentives**	**Total Net Cost**	**Payback w/o Incentives in Years**	**Simple Payback w/ Incentives in Years**
Limited/No HVAC Controls	HVAC Equipment & Systems	15	369,650	421,841	6,973	Installation of an Energy Management System	7%	7%	7%	$2.00	0.00	55,404	488	$14,465	$177,474	$0	$0	$0	$177,474	12.27	12.27

Electric Tank Water Heater to HPWH

NOTE: HPWH calculation should not be used for existing water heaters with a storage capacity greater than 120 gal.

Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis										
Description	**Area(s)/System(s) Served**	**SF of Area Served**	**Fuel Type**	**Input Capacity per Unit (kW)**	**Tank Capacity per Unit (Gal)**	**Description**	**COP**	**Tank Capacity per Unit (Gal)**	**Estimated Unit Cost**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Base Incentives**	**Enhanced Incentives**	**Total Incentives**	**Total Net Cost**	**Payback w/o Incentives in Years**	**Payback w/ Incentives in Years**
Storage Tank Water Heater (>50 Gal)	D Building- Restroom/Kitchen	8,500	Electric	4.5	50	Heat Pump Water Heater	2.5	50	$2,383.17	0.00	7,175	0	$1,012	$2,383	$0	$0	$0	$2,383	2.35	2.35
Storage Tank Water Heater (> 50 Gal)	StillwaterClinic-Stillwater	12,500	Electric	18.0	80	Heat Pump Water Heater	2.5	80	$3,322.98	0.00	10,551	0	$1,488	$3,323	$0	$0	$0	$3,323	2.23	2.23
Storage Tank Water Heater (>50 Gal)	Youth center	27,000	Electric	23.0	279	Heat Pump Water Heater	2.5	279	$9,557.05	0.00	22,790	0	$3,213	$9,557	$0	$0	$0	$9,557	2.97	2.97

APPENDIX B: ENERGY STAR STATEMENT OF ENERGY PERFORMANCE

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

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ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Stillwater Complex (campus)

Primary Property Type: Office
Gross Floor Area (ft²): 118,316
Built: 1913

For Year Ending: March 31, 2022
Date Generated: November 06, 2023

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Stillwater Complex (campus) 201 Shore Road Northfield, New Jersey 08225	Atlantic County 1227 Drexel Avenue Atlantic City, NJ 08401 (609) 343-2284	Chris Palermo 1227 Drexel Avenue PO Box 1107 Atlantic City, NJ 08404-1107 (609) 343-2284 Palermo_christopher@aclink.org

Property ID: 28841578

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
103.3 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	7,590,167 (62%)	
Electric - Grid (kBtu)	4,626,901 (38%)	

Source EUI
176.9 kBtu/ft²

National Median Comparison

National Median Site EUI (kBtu/ft²)	67.9
National Median Source EUI (kBtu/ft²)	116.4
% Diff from National Median Source EUI	52%

Annual Emissions

Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	819

Signature & Stamp of Verifying Professional

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

LP Signature: ______________________Date: ___________

Licensed Professional

____ ________
,
(___)____-______
____

Professional Engineer or Registered Architect Stamp (if applicable)

Appendix C: Glossary

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

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

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