

Township of Montville

March 17, 2010



Final Energy Audit Report

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Executive Summary

As part of an initiative to reduce energy cost and consumption, the Township of Montville has secured the services of Camp Dresser and McKee (CDM) to perform an energy audit for six (6) buildings which are owned and operated by the Township in an effort to develop comprehensive Energy Conservation and Retrofit Measures (ECRMs).

CDM's energy audit team visited the facilities on December 14, 2009. As a result of the site visit and evaluation of the historical energy usage of the facilities, CDM was successful in identifying opportunities for energy savings measures.

CDM has also evaluated the potential for renewable energy technologies to be implemented at the Township's facilities to offset the electrical energy usage. Specifically, the use of solar electric photovoltaic panels, ground source heat pumps and wind turbines were investigated.

CDM solicited a proposal from a third party electric energy supplier to investigate any additional energy cost savings that may be available for the Township. Additionally, there is potential for the Township to make money by participation in a Demand Response Program, as discussed in Section 5.2.

Not all ECRMs identified as a result of the energy audit are recommended. ECRMs must be economically feasible to be recommended to the Township for implementation. The feasibility of each ECRM was measured through a simple payback analysis. The simple payback period was determined after establishing Engineer's Opinion of Probable Construction Cost estimates, O&M estimates, projected annual energy savings estimates, and the potential value of New Jersey Clean Energy rebates, or Renewable Energy Credits, if applicable. ECRMs with a payback period of 20 years or less can be recommended.

Historical Energy Usage

The following table, Table ES-1, summarizes the historical energy usage at each of the Township's facilities as presented in Section 3. These values can serve as a benchmarking tool, along with the building profiles that have been established through the EPA's Portfolio Manager Program, to quantify the reduction in electrical energy and natural gas usage following the implementation of the recommended ECRMs.

Table ES-1: Summary of Annual Energy Usage & Cost						
	Electrical Energy Use (kWH)	Peak Summer Demand (kW)	Peak Winter Demand (kW)	Fuel Use for Entire Building (therms)	Cost for Electric Service	Cost for Fuel
Public Works Building	97,680	26	32	11,944	\$16,230	\$16,085
Library	588,680	161	153	25,314	\$98,559	\$30,079
Municipal Building	387,600	129	91	15,155	\$65,227	\$21,067
Public Safety Building	426,800	94	72	11,399	\$68,176	\$15,920
Senior House	87,680	51	51	5,401	\$15,953	\$8,178
Youth Center ¹	38,500	25	28	3,568	\$7,226	\$5,710

1. Youth Center natural gas usage and cost is based on 65% of the total, as the total usage also accounts for the Field House, which was not included in the audit.

Recommended ECRMs

The following Table ES-2 presents the ranking of recommended ECRMs identified for the building lighting and HVAC systems based on the simple payback analysis.

Additional ECRMs associated with the building envelope and other miscellaneous appliances were identified and evaluated, as discussed in Sections 2 and 4; however, were not recommended due to longer payback periods. This table includes the Engineer's Opinion of Probable Construction Cost, projected annual energy cost savings, projected annual energy usage savings, and total simple payback period for each recommended ECRM. The ECRMs are ranked based on payback period.

Table ES-3 summarizes the Total Engineer's Opinion of Probable Construction Cost, annual energy savings, projected annual energy and O&M cost savings and the payback period based on the implementation of all recommended ECRMs.

Table ES-2¹ Ranking of Energy Savings Measures Summary					
Overall Ranking (Based on Simple Payback)	ECRM	Total Cost	Energy Savings	Annual Fiscal Savings²	Simple Payback (Years)
1	Library – Boiler Controls	\$8,060	8,411 Therms	\$15,107	0.5
2	Public Works Building – Lighting Upgrades	\$18,842	56,194.9 kWh	\$3,138	6.0
3	Municipal Building – Lighting Upgrades	\$215,575	170,207.1 kWh	\$14,503	8.2
4	Senior House – Lighting Upgrades	\$692	7,442.8 kWh	\$63	10.9
5	Library – Lighting Upgrades	\$139,942	230,469.3 kWh	\$10,418	13.4
6	Municipal Building – Boiler Upgrade	\$55,141	948 Therms	\$2,988	18.5
7	Youth Center – Lighting Upgrades	\$188,697	108,209.3 kWh	\$7,496	25.2
8	Public Safety Building – Lighting Upgrades	\$168,393	106,678.3 kWh	\$5,421	31.1

1. Engineers Probable Construction Cost takes into account any applicable rebates.
2. Annual Fiscal Savings takes into account additional O&M cost or savings associated with the measure.

Table ES-3: Recommended ECRM's¹			
Total Engineer's Opinion of Probable Construction Cost	Projected Annual Energy Savings (kWh or therms)	Annual Fiscal Savings	Simple Payback Period (years)
\$795,342	679,201.7 kWh 9,359 Therms	\$59,134	13.5

1. Does not include energy savings associated with Solar Energy System.

Renewable Energy Technologies

Solar Energy

Section 4 of the report provides for an economic evaluation of a solar energy system recommended to be installed at several of the Township's facilities. The evaluation covered the economic feasibility of the Township installing a solar energy system under a typical construction contract and to assume full responsibility of the operation of such a system.

Based on a simple payback model, summarized in Table ES-4, it would benefit the Township to further investigate the installation of a solar energy system at three (3) buildings. This is primarily based on the initial upfront capital investment required for a solar energy system installation and the 15.0 year payback period. This payback period may justify installing the solar energy system. Other options such as Power

Purchase Agreements are potentially available as well to help finance the project. Solar technology is constantly changing and will most likely continue to lower in price.

Two major factors influencing the project financial evaluation is the variance of the prevailing energy market conditions and Solar Renewable Energy Credit (SREC) rates, with the largest impact to the payback model being the SREC credit pricing. For the payback model, conservative estimates of the SREC's market value over a 15 year period were assumed, as discussed in Section 4.

Table ES-4 includes a simple payback analysis for the installation of a solar energy system at the identified Township buildings.

Table ES-4: Simple Payback Analysis for Solar Energy Systems

Parameter	Solar
Estimated Budgetary Project Cost	\$3,048,894.4
1 st Year Production	255,340 kWh
Annual Electric Savings	\$42,931
Annual Estimated SREC Revenue	\$160,975
Project Simple Payback	15.0 Years

Section 1

Introduction

1.1 General

As part of an initiative to reduce energy cost and consumption, the Township of Montville has secured the services of Camp Dresser and McKee (CDM) to perform an energy audit at six (6) of the township facilities in an effort to develop comprehensive energy conservation initiatives.

The performance of an Energy Audit requires a coordinated phased approach to identify, evaluate and recommend energy conservation and retrofit measures (ECRM). The various phases conducted under this Energy Audit included the following:

- Gather preliminary data on all facilities;
- Facility inspection;
- Identify and evaluate potential ECRMs;
- Develop the energy audit report.

Figure 1-1 is a schematic representation of the phases utilized by CDM to prepare the Energy Audit Report.

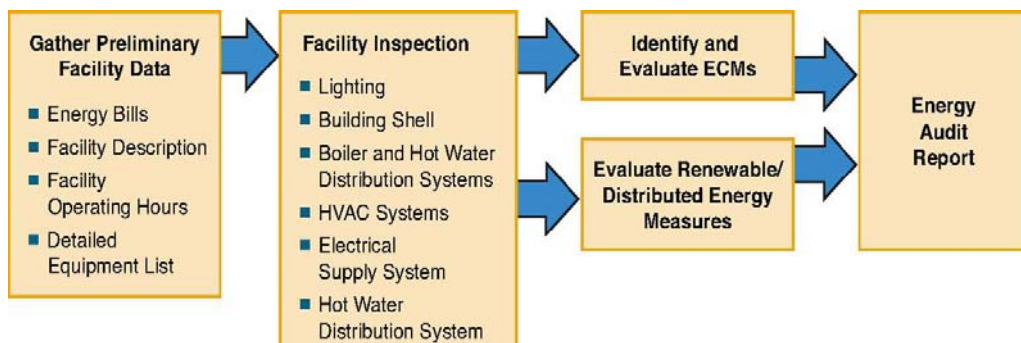


Figure 1-1: Energy Audit Phases

1.2 Background

The buildings that were included in the energy audit for the Township of Montville were the Public Works Building, Library, Municipal Building, Public Safety Building, Youth Center and Senior House.

The Public Works Building is a 10,300 ft² building that was originally built in 1987. The building is utilized for DPW employee offices and garage space, and is occupied by six (6) employees. The building is typically occupied between 8:30am and 4:30pm during the week.

The Library is an 18,547 ft² building that was built in 1994. The library houses books and computers and has large meeting rooms for the general public and office areas for the employees. The library is occupied from 7:00am to approximately 7:00pm during the week and is open on the weekends.

The Municipal Building is a 40,254 ft² building that was originally built in 1992, with a recent HVAC upgrade in 2000. The facility is occupied by 60 municipal employees and has numerous offices and conference rooms. The building is occupied from 7:00am to 7:00pm during the week.

The Public Safety Building is an 18,000 ft² building that was originally built in 2001. The building serves as the Township's police head quarters and municipal court and is occupied 24 hours a day, 7 days a week.

The Youth Center is a 2,791 ft² building that was originally built in 2002. The Youth Center is utilized by the Township's youth for recreational purposes. The building is utilized approximately 40 hours each week and has at least two (2) employees present in addition to the youth occupants.

The Senior House is a 5,596 ft² building that was originally built in 1909 with an addition and renovations completed in 2002. The building is utilized by the Township's senior population and consists of two large open rooms, a kitchen, a basement and office areas. The senior house is occupied approximately 75 hours each week and has at least two (2) employees present, in addition to the senior citizens.

1.3 Purpose and Scope

The objective of the energy audit is to identify energy conservation and retrofit measures to reduce energy usage and to develop an economic basis to financially validate the planning and implementation of identified energy conservation and retrofit measures.

The buildings were originally designed to comfortably house staff and the Township's residents with limited emphasis on energy consumption. Currently, due to the rising costs of power and the desire to minimize dependence on foreign oil supplies, energy consumption is taking a higher priority across the nation. Significant energy savings may be available with retrofits to the buildings' envelopes, heating, cooling systems and lighting systems. It should be noted that the magnitude of energy savings available is not only dependent on the type of heating, lighting or insulation systems that are in use, but also on the age and condition of the equipment and the capital available to implement major changes.

The purpose of this energy audit is to identify the various critical building comfort systems within the buildings that are major consumers of electrical energy and are clear candidates for energy savings measures. In addition, the potential for alternative energy systems to be installed at each building was evaluated and presented herein.

In addition to identifying ECRMs and the potential for on-site energy generation, an alternate third party electric supplier was contacted in an effort to identify further cost savings available for the Township, by switching service providers. This is discussed further in Section 5.

Section 2

Facility Description

2.1 Public Works Building

2.1.1 Description of Building Envelope

The energy audit included an evaluation of the building's envelope (exterior shell) to determine the components' effective R-values to be utilized in the building model and to locate and fix any thermal weaknesses that may be present. The components of a building envelope include the exterior walls, foundation, and roof. The construction and material, age, and general condition of these components, including exterior windows and doors, impact the building's energy use.

The walls of the Public Works Building are concrete masonry CMU blocks. The existing roofing system throughout the building consists of insulation and an asphalt roof over flat roof decks. The age of the roof was not able to be confirmed. Pooling was observed. Asphalt roofs are a very common, low-tech, waterproofing system for flat roofs; however, they are prone to cracking. It is recommended that a qualified roofing contractor evaluate the system, including the structural capacity of the building frame, and repair or replace the existing asphalt roof system with an EPDM membrane roofing system. A roof replacement may be costly; therefore, the system analysis including the structural integrity of the building may warrant the application of an elastomeric waterproof roof coating system to rectify any leaks and improve the level of insulation that the current roof is providing.

It is also recommended that a white thermal barrier coating be considered. This coating works to reduce the surface temperature of the roof by reflecting the UV rays, and provides insulation for the interior of the building reducing the heating and cooling loads.

The windows throughout the building are double pane windows. The exterior doors, both access way and overhead are FRP. FRP doors are highly recommended on an energy efficiency level. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability, as the doors will not expand or contract with changing climate.

2.1.2 Description of Building HVAC

The majority of the heat provided to the the garage areas of the Public Works building is done so by ceiling-mounted gas-fired radiant tube heaters. A rooftop gas-fired air handling unit provides additional heat to the garage. The office areas of the building are also heated by rooftop air handling units, with one unit dedicated to the upper level, and another to the lower level.

Cooling is provided only to the office areas through the rooftop air handling units, which are packaged with DX refrigerant cooling coils.

2.1.3 Description of Building Lighting

The Public Works Building existing lighting system consists of 1X4 (2 lamp), and 2X4 (4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, high pressure sodium, and CFL fixtures. See Section 4 for a more detailed description.

2.2 Library

2.2.1 Description of Building Envelope

The library is slab on grade construction, with CMU block foundation walls. The walls consist of brick façade, insulation and plywood interior. The library has wood cathedral ceilings. The existing roofing system throughout the building consists of insulation and a shingled asphalt roof over sloped roof decks.

The windows throughout the building are double paned, tinted windows with aluminum frames. The exterior doors are FRP.

It was determined that the building envelope is in good condition and is currently providing a high level of insulation. As such, any modifications to the insulation system would not prove to be cost effective from an energy savings stand-point.

2.2.2 Description of Building HVAC

A natural gas-fired cast iron hot water boiler located in the boiler room provides heat for the entire building. Air handling units at each end of the building then utilize hot water coils to heat the various spaces.

Two chillers located outside provide chilled water to the aforementioned air handling units to cool the Library.

Rather than switching from cooling to heating modes seasonally, both the chiller and the boiler operate year-round and cool or heat the spaces as needed. For example, it is not uncommon in the winter for the boiler to heat the building in the morning, and the chiller to then start up in the afternoon to offset heat gain from the large amount of lighting in this building,.

Domestic hot water for this building is generated by a heat exchanger that interacts with the building hot water heating system.

2.2.3 Description of Building Lighting

The Library existing lighting system consists of 1X4 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 2X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and BIAx fixtures. See Section 4 for a more detailed description.

2.3 Municipal Building

2.3.1 Description of Building Envelope

The Municipal Building walls consist of brick façade, cavity, and CMU back up blocks. The existing roofing system throughout the building consists of insulation and a shingled asphalt roof over sloped wood roof decks.

The windows throughout the building are insulating double paned. The exterior doors are glass with metal frames with atriums.

It was determined that the building envelope is in good condition and is currently providing a high level of insulation. As such, any modifications to the insulation system would not prove to be cost effective from an energy savings stand-point.

2.3.2 Description of Building HVAC

Eight natural gas-fired cast iron hot water boilers located in the basement boiler room provide heat to the entire building through a hot water system. This system provides hot water to the main air handling unit serving the building, as well as to reheat coils in variable air volume (VAV) boxes serving each space.

A chiller located outside provides chilled water to the main air handling unit to cool the building.

2.3.3 Description of Building Lighting

The Municipal Building existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.4 Public Safety Building

2.4.1 Description of Building Envelope

The Public Safety Building walls consist of brick façade, cavity, and 2" of rigid insulation and CMU back up blocks. The existing roofing system throughout the building consists of insulation and EPDM sheet membrane roof over flat roof decks.

The windows throughout the building are insulating double paned. The exterior doors are glass with metal frames with atriums. There are insulated overhead doors for the garage.

It was determined that the building envelope is in good condition and is currently providing a high level of insulation. As such, any modifications to the insulation system would not prove to be cost effective from an energy savings stand-point.

2.4.2 Description of Building HVAC

Heating in the Public Safety Building is primarily provided by three natural gas-fired rooftop air handling units. Additionally, three small cast iron boilers generate hot water for VAV reheat coils, and several cabinet unit heaters throughout the building.

Cooling is provided to the entire building by the three rooftop air handling units, which have packaged DX cooling coils. Additionally, the dispatch room has a dedicated cooling system with a rooftop air cooled condensing units serving an indoor air handling unit. The server rooms in the building also utilize split cooling systems with the condensing units located outside on the ground.

2.4.3 Description of Building Lighting

The Public Safety Building existing lighting system consists of 1X4 (2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.5 Youth Center

2.5.1 Description of Building Envelope

The Youth Center is slab on grade, wood frame construction with stone foundation. The walls consist of cedar siding, batting insulation and plywood interior. The existing roofing system throughout the building consists of insulation and wood shingled roof over sloped roof decks.

The windows throughout the building are insulating double paned. The exterior doors are plywood. The wood doors are not recommended from an energy standing as the doors are subject to expand or contract with changing climate. As shown in the adjacent picture, the doors are not currently providing a complete seal.



The Youth Center was built in 2001 and the construction and architecture of the building was dictated by the historical significance of the location.

2.5.2 Description of Building HVAC

Three gas-fired forced air furnaces located in the attic provide heating for the Youth Center.

Cooling is provided to the aforementioned air handling units through split system condensing units located outside the building.

2.5.3 Description of Building Lighting

The Youth Center existing lighting system consists of 1X4 (1 lamp), 1X8 (2 lamp), and 2X4 (2, and 3 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.6 Senior House

2.6.1 Description of Building Envelope

The Senior House is wood frame construction with brick foundation, originally built in 1890. The walls consist of aluminum siding, batt insulation, and plywood interior. The existing roofing system throughout the building consists of asphalt shingled roof over sloped wood roof decks. The floor of the attic space consists of fiberglass insulation and wood deck.

The windows throughout the building are insulating double paned. The exterior door is a sliding glass door with metal frames, with an atrium.

It was determined that the building envelope is in good condition and is currently providing a high level of insulation. As such, any modifications to the insulation system would not prove to be cost effective from an energy savings stand-point.

2.6.2 Description of Building HVAC

Three gas-fired forced air furnaces located in the attic provide heating for the Senior Center.

Cooling is provided to the aforementioned air handling units through split system condensing units located outside the building.

2.6.3 Description of Building Lighting

The Senior House existing lighting system consists of 2X4 (2, and 4 lamp) T8 linear fluorescent fixtures with electronic ballasts, incandescent, and CFL fixtures. See Section 4 for a more detailed description.

2.7 Miscellaneous Equipment

It was noted that the Public Safety Building has two (2) Energy Star copiers. It is recommended that the Township continue implementing the standardized use of Energy Star appliances as the need arises. In addition to the use of Energy Star copiers, Energy Star refrigerators and freezers, for example, use up to 40% less energy than models built in 2001. Energy Star appliances will not only reduce the Township's utility bills, but will also outperform standard appliances due to the improved design and advanced technologies.

In addition to replacing old appliances with Energy Star appliances, the following two maintenance procedures can work to save the energy consumed by the Township's refrigerators. One is cleaning dirty condenser coils twice a year. A refrigerator's

condenser coils and cooling fins are located either under the unit behind a grille in the front or on the back of the appliance. The coils can be cleaned with a brush or vacuum cleaner hose. The second source of wasted energy associated with a refrigerator is the door seal. Realigning the door or replacing a no longer airtight door seal will work to improve energy efficiency.

It may also be considered that the 'Vending Misers' be purchased and utilized for vending machines throughout the Township's facilities. A 'Vending Miser' powers down a vending machine when the surrounding area is unoccupied and automatically repowers when the area is occupied, utilizing an infrared sensor. Similarly to occupancy sensors on lighting fixtures; however, the vending miser also monitors the ambient temperature while the vending machine is powered down and uses this as sort of an internal thermostat to power up the machine and ensure that the drinks remain cold. The implementation of a 'Vending Miser' also reduces maintenance costs and extends the life of the machine, by reducing the number of compressor cycles. A 'Vending Miser' is a \$180 investment, but has been found to reduce power consumption of a cold drink vending machine by an average of 46%.

Section 3

Baseline Energy Use

3.1 Utility Data Analysis

The first step in the energy audit process is the compilation and quantification of the facility's current and historical energy usage and associated utility costs. It is important to establish the existing patterns of electric and gas usage in order to be able to identify areas in which energy consumption can be reduced.

For this study, the monthly gas and electric bills per facility were analyzed and unit costs of energy were obtained. The unit cost of energy, as determined from the information provided by the Township, was utilized in determining the feasibility of switching from one energy source to another or reducing the demand on that particular source of energy to create annual cost savings for the Township.

3.1.1 Electric Charges

It is also important to understand how the utility's charge for the service. The majority of the energy consumed is electric as a result of both indoor and outdoor lighting and appliances, such as kitchen appliances, computers, printers and projectors. Electricity is charged by three basic components: electrical consumption (kWH), electrical demand (kW) and power factor (kVAR) (reactive power). The cost for electrical consumption is similar to the cost for fuel and the monthly consumption appears on the utility bill as kWH consumed per month with a cost figure associated with it. The service connections are either billed on a flat rate or time of day rates per kWH.

Electrical demand can be as much as 50 percent or more of the electric bill. The maximum demand (kW value) during the billing period is multiplied by the demand cost factor and the result is added to the electric bill. It is often possible to decrease the electric bill by 15 – 25 percent by reducing the demand, while still using the same amount of energy.

The power factor (reactive power) is the power required to energize electric and magnetic fields that result in the production of real power. Power factor is important because transmission and distribution systems must be designed and built to manage the need for real power, as well as the reactive power component (the total power). If the power factor is low, then the total power required can be greater than 50 percent or more than the real power alone. The power factor charge is a penalty for having a low power factor. Fortunately, this penalty charge does not impact the Township.

The other parts of the electric bill are the supply charges, delivery charges, system benefits, transmission revenue adjustments, state and municipality tariff surcharges and sales taxes, which cannot be avoided.

JCP&L is the current supplier and distributor of electric energy for the Township.

3.1.2 Natural Gas Charges

New Jersey Natural Gas is the current supplier and distributor of natural gas for the Township. The Township is charged for the cost of the natural gas, a delivery charge and a customer charge, which covers gas administration charges.

3.2 Facility Results

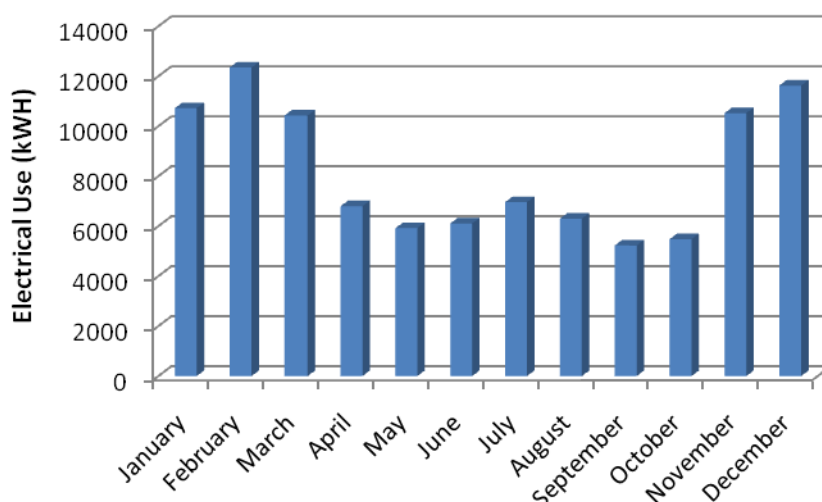
3.2.1 Public Works Building

Electric power for the Public Works Building is fed from one General Secondary Service three phase line from JCP&L. Figure 3.2-1 illustrates the average monthly total energy consumption from December 2006 through September 2009. For example, for the month of October, the bar graph represents average energy consumption for October 2007 and October 2008. This same graphical representation approach has been carried through for all months and is typical for all graphs presented in this Section. Electrical usage has been averaged by month for the above referenced time period to portray a more encompassing monthly usage trend.

From this graph, it can be determined that the electrical baseline consumption for the Public Works Building is approximately 5,000 kWh/month.

Figure 3.2-2 illustrates the average monthly demand load for the Public Works Building from December 2006 through September 2009.

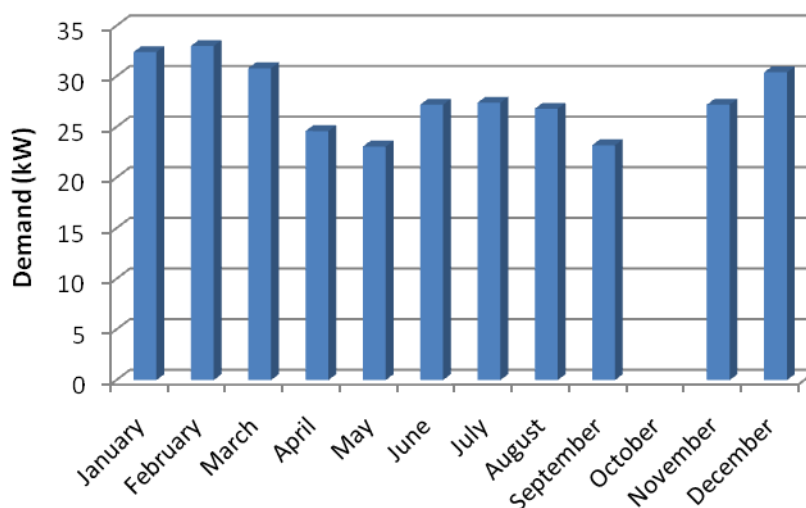
Figure 3.2-1: DPW Electrical Usage



The most recent tariff rates available at the time of this audit for the DPW's electrical service, from JCP&L are as follows:

	Acct #: 1000056283979
Customer Charge:	\$11.65/month
Basic Generation Service:	\$0.108987/kWh
Delivery Service Charges:	\$0.018897/kWh
	\$3.581696/kW
Non-Utility Generation Charges:	\$0.016960/kWh
Societal Benefits Charge:	\$0.003222/kWh (2X monthly kWh)
System Control Charge:	\$0.00008/kWh
RGGI Recovery Charge:	\$0.000064/kWh (above 1,160 kWh)

Figure 3.2-2: DPW's Maximum Monthly Demand¹

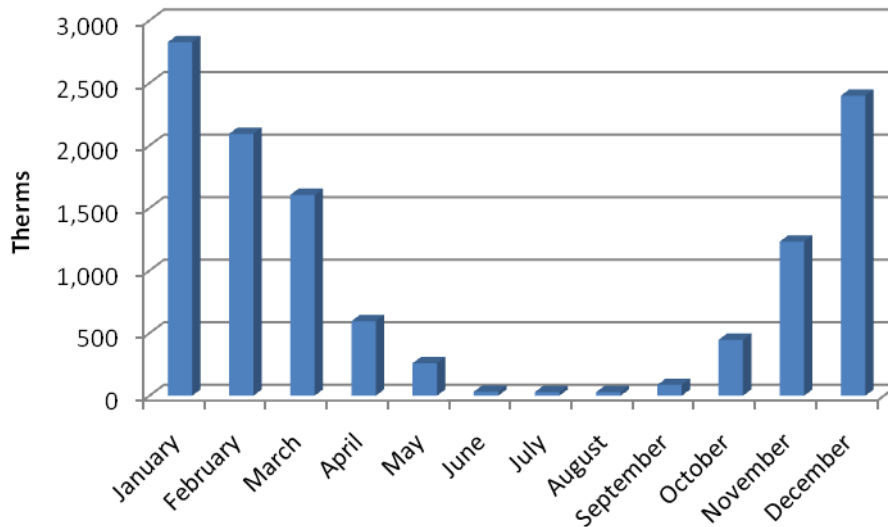


1. The October usage illustrated in Figure 3.2-1 was provided on an account summary sheet from the Township and did not include the max monthly demand for the month of October.

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -3 illustrates the DPW building's monthly average natural gas consumption from January 2007 through September 2009.

Figure 3.2-3: DPW's Gas Usage



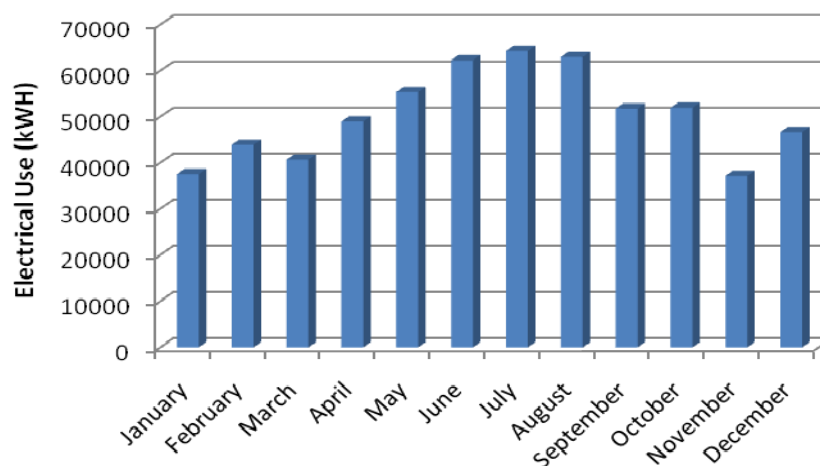
For more on the Public Works building's gas usage, refer to Section 4.2.

3.2.2 Library

Electric power for Library is fed from one General Secondary Service three phase line from JCP&L. Figure 3.2-4 illustrates the average monthly total energy consumption from January 2007 through September 2009. From this graph, it can be determined that the electrical baseline consumption for the Library is approximately 36,000 kWh/month.

Figure 3.2-5 illustrates the monthly demand load for the Library from January 2007 through September 2009.

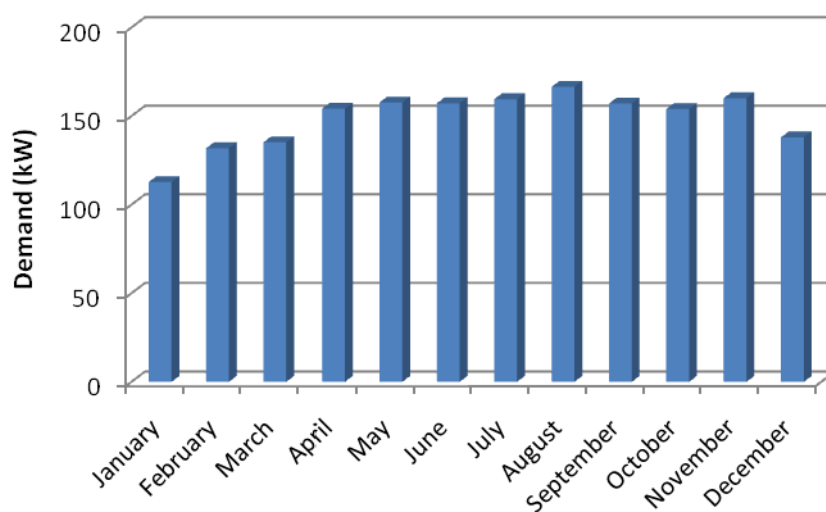
Figure 3.2-4: Library Electrical Usage



The most recent tariff rates available at the time of this audit for the Library, are as follows:

	Acct #: 100007439795
Customer Charge:	\$11.65/month
Basic Generation Service (BGS) Energy Charge:	\$0.112658/kWh
BGS Transmission Charge:	\$0.006601/kWh
Delivery Service Charges:	\$0.057366/kWh (For first 1,000 kWh)
	\$0.004958/kWh (For remainder)
	\$6.47/kW (above 10 kW)
Non-Utility Generation Charges:	\$0.01696/kWh
Societal Benefits Charge:	\$0.006444/kWh
Transitional Assessment Charge:	\$0.002928/kWh
System Control Charge:	\$0.000079/kWh
RGGI Recovery Charge:	\$0.000064/kWh (73% of total kWh)

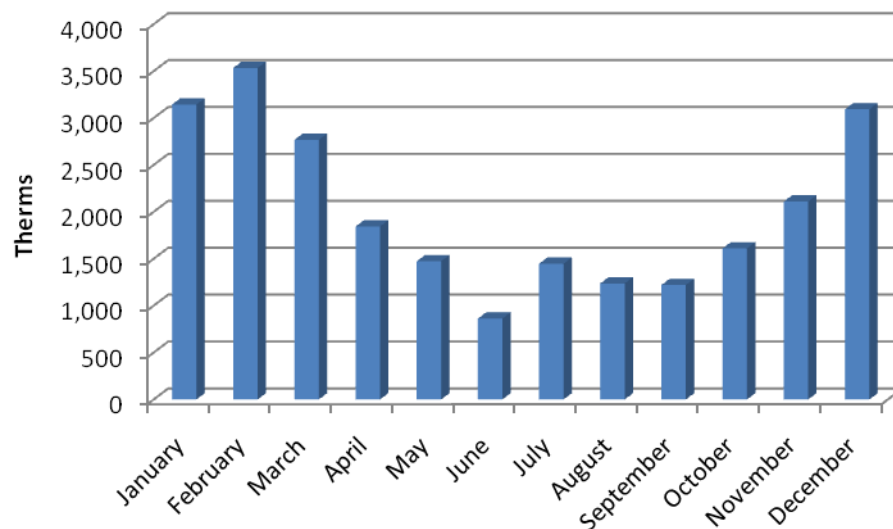
Figure 3.2-5: Library
Maximum Monthly Demand



Refer to Table 3.3-1, in Section 3.3 for average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -6 illustrates the Library's monthly average natural gas consumption from December 2006 through September 2009.

Figure 3.2-6: Library's Gas Usage



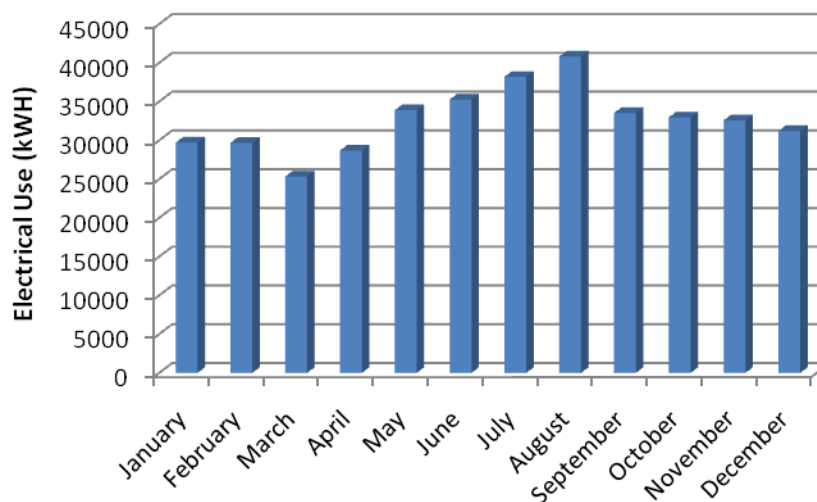
For more on the Library's gas usage, refer to Section 4.2.

3.2.3 Municipal Building

Electric power for the Municipal Building is fed from one General Secondary Service three phase line from JCP&L. Figure 3.2-7 illustrates the average monthly total energy consumption from December 2006 through September 2009. From this graph, it can be determined that the electrical baseline consumption for the Municipal Building is approximately 25,000 kWh/month.

Figure 3.2-8 illustrates the monthly demand load for the Municipal Building from December 2006 through September 2009.

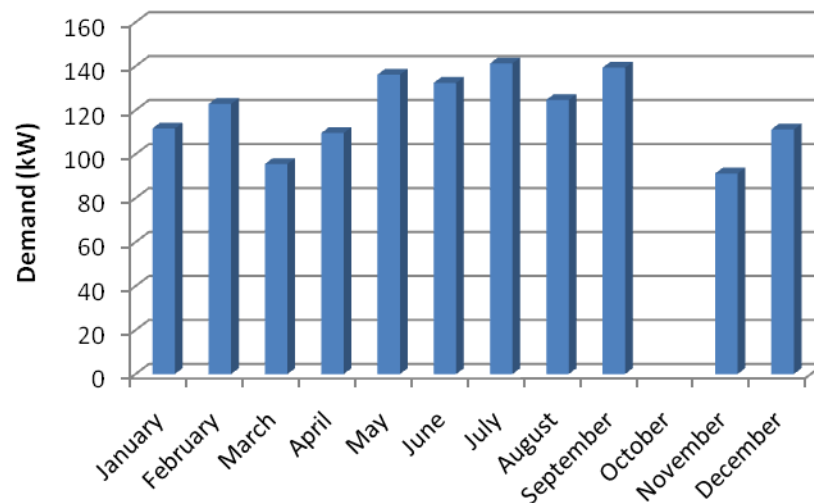
Figure 3.2-7: Municipal Building's Electrical Usage



The most recent tariff rates available at the time of this audit for the Municipal Building, are as follows:

	Acct #: 100007989070
Customer Charge:	\$11.65/month
Basic Generation Service:	\$0.108987/kWh
Delivery Service Charges:	\$0.009597/kWh
	\$5.942251/kW
Non-Utility Generation Charges:	\$0.01696/kWh
Societal Benefits Charge:	\$0.003222/kWh (2X monthly kWh)
System Control Charge:	\$0.000079/kWh
RGGI Recovery Charge:	\$0.000064/kWh (72% of total kWh)

Figure 3.2-8: Municipal Building's Maximum Monthly Demand¹

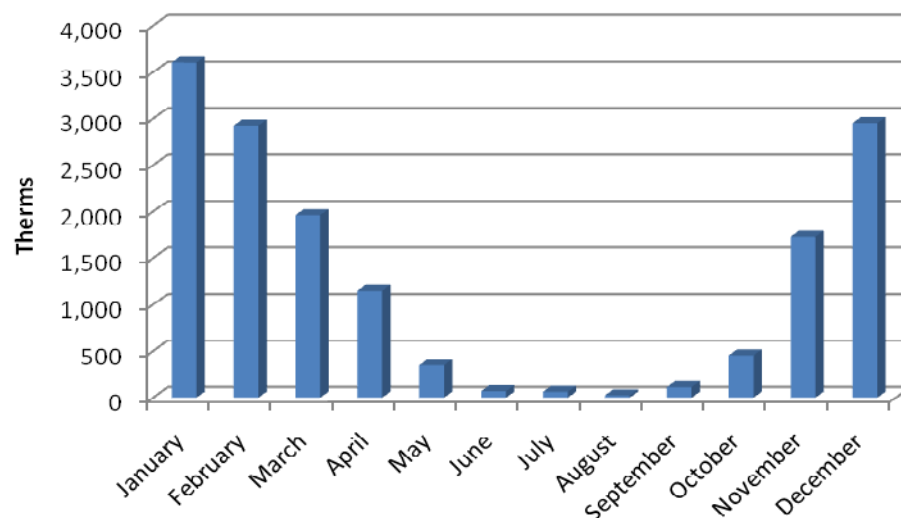


2. The October usage illustrated in Figure 3.2-7 was provided on an account summary sheet from the Township and did not include the max monthly demand for the month of October.

Refer to Table 3.3-1, in Section 3.3, for average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -9 illustrates the Municipal Building's monthly average natural gas consumption from January 2007 through September 2009.

Figure 3.2-9: Municipal Building's Gas Usage



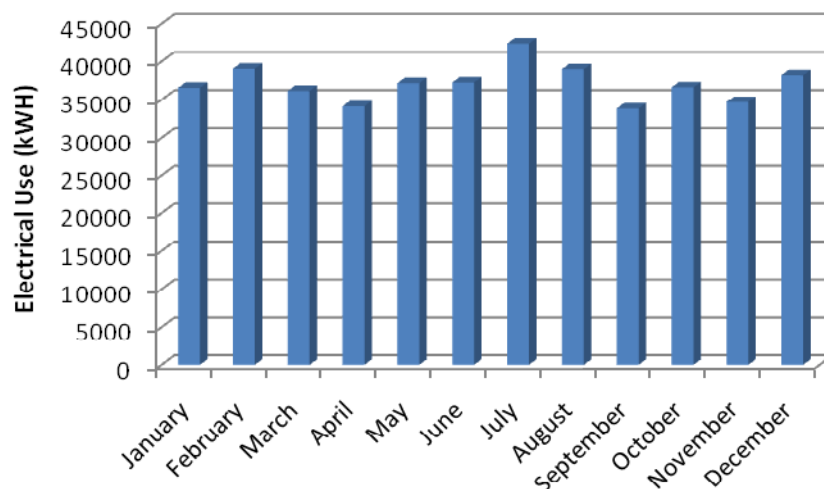
For more on the Municipal Building's gas usage, refer to Section 4.2.

3.2.4 Public Safety Building

Electric power for Public Safety Building is fed from one General Secondary Service three phase line from JCP&L. Figure 3.2-10 illustrates the average monthly total energy consumption from December 2006 through September 2009. From this graph, it can be determined that the electrical baseline consumption for the Public Safety Building is approximately 33,000 kWh/month.

Figure 3.2-11 illustrates the monthly demand load for the Public Safety Building from December 2006 through September 2009.

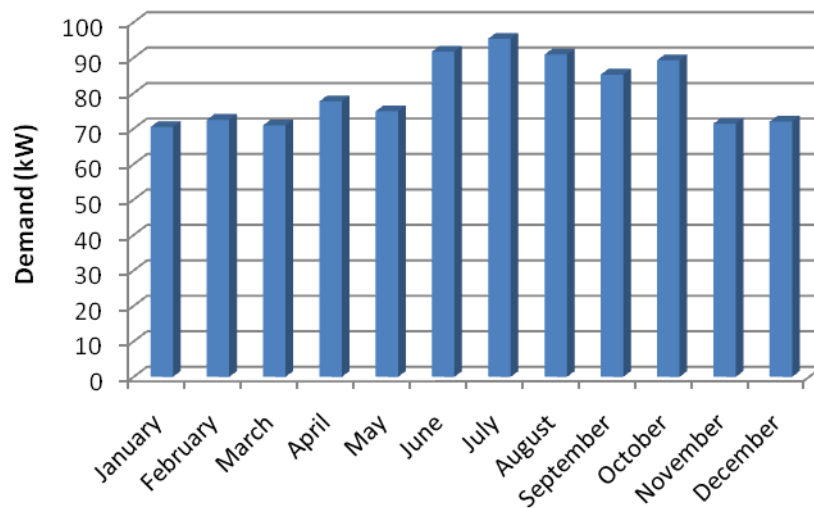
Figure 3.2-10: Public Safety Building's Electrical Usage



The most recent tariff rates available at the time of this audit for the Public Safety Building's service, are as follows:

	Acct #: 1000043610425
Customer Charge:	\$11.65/month
Basic Generation Service:	\$0.108987/kWh
Delivery Service Charges:	\$0.009724/kWh
	\$5.767251/kW
Non-Utility Generation Charges:	\$0.01696/kWh
Societal Benefits Charge:	\$0.003222/kWh (2X monthly kWh)
System Control Charge:	\$0.000079/kWh
RGGI Recovery Charge:	\$0.000064/kWh (above 5,360 kWh)

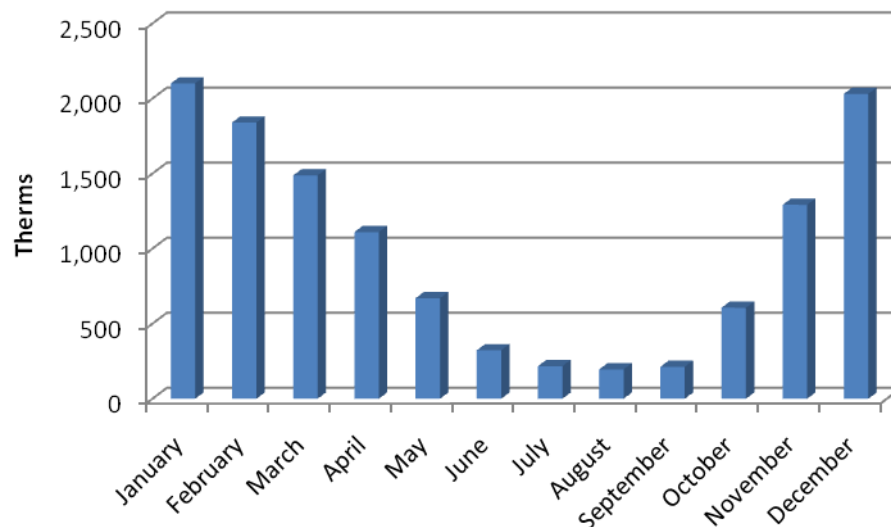
**Figure 3.2-11: Public Safety Building's
Maximum Monthly Demand**



Refer to Table 3.3-1, in Section 3.3, for average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for complete Historical Data Analysis.

Figure 3.2 -12 illustrates the Public Safety Building's monthly average natural gas consumption from January 2007 through September 2009.

Figure 3.2-12: Public Safety Building's Gas Usage



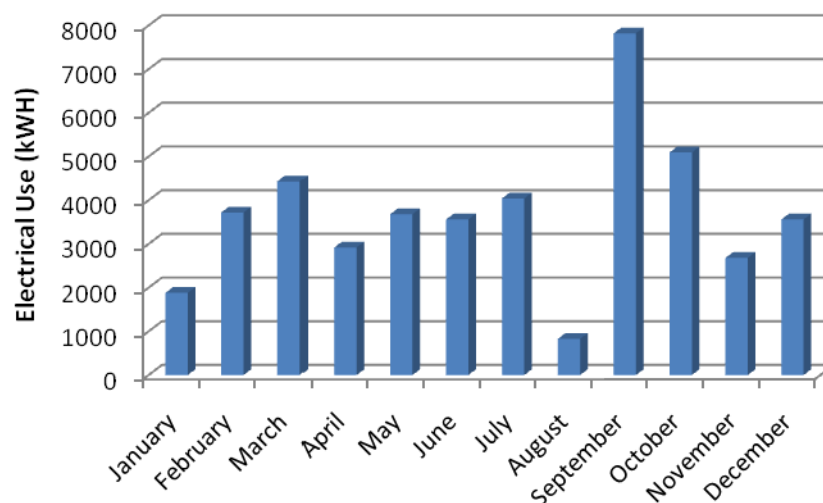
For more on the Public Safety Building's gas usage, refer to Section 4.2.

3.2.5 Youth Center

Electric power for the Youth Center is fed from one General Secondary Service single phase line from JCP&L. Figure 3.2-13 illustrates the average monthly total energy consumption from January 2007 through September 2009. From this graph, it can be determined that the electrical baseline consumption for the Youth Center is approximately 800 kWh/month.

Figure 3.2-14 illustrates the monthly demand load for the Youth Center from January 2007 through September 2009.

Figure 3.2-13: Youth Center Electrical Usage

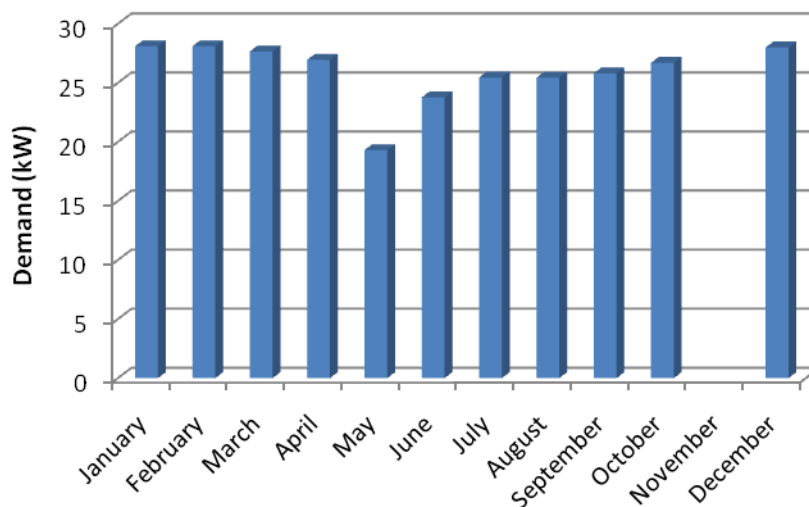


The most recent tariff rates available at the time of this audit for the Youth Center's service, are as follows:

	Acct #: 1000038832836
Customer Charge:	\$3.25/month
Basic Generation Service:	\$0.108984/kWh
Delivery Charges:	\$3.16/kW (above 10 kW)
Non-Utility Generation Charges:	\$0.01696/kWh
Societal Benefits Charge:	\$0.00644/kWh (first 1,000 kWh)
	\$0.006322/kWh (remaining kWh)
Delivery Service Charges:	\$0.028687/kWh

	Acct #: 1000038832836
System Control Charge:	\$0.000079/kWh
RGGI Recovery Charge:	\$0.000064/kWh (3.3% of total)

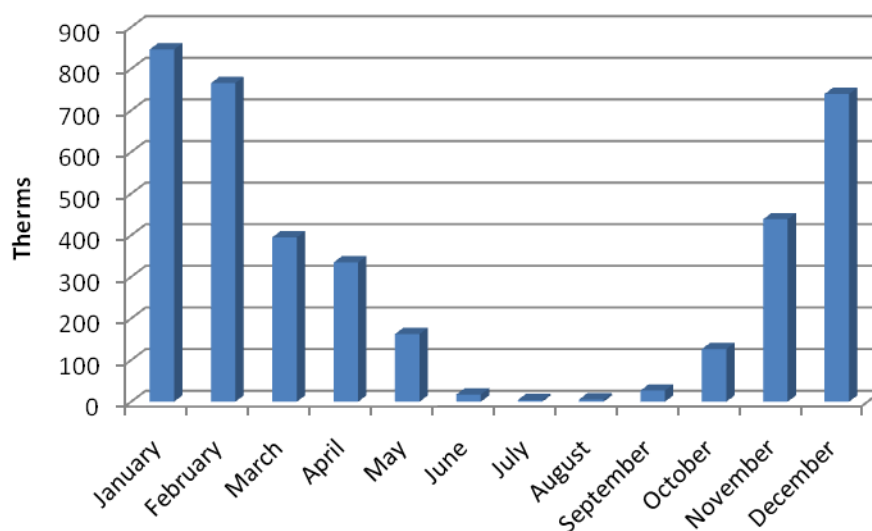
**Figure 3.2-14: Youth Center
Maximum Monthly Demand**



Refer to Table 3.3-1, in Section 3.3, for average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -15 illustrates the Youth Center's monthly average natural gas consumption from January 2007 through September 2009.

Figure 3.2-15: Youth Center's Gas Usage



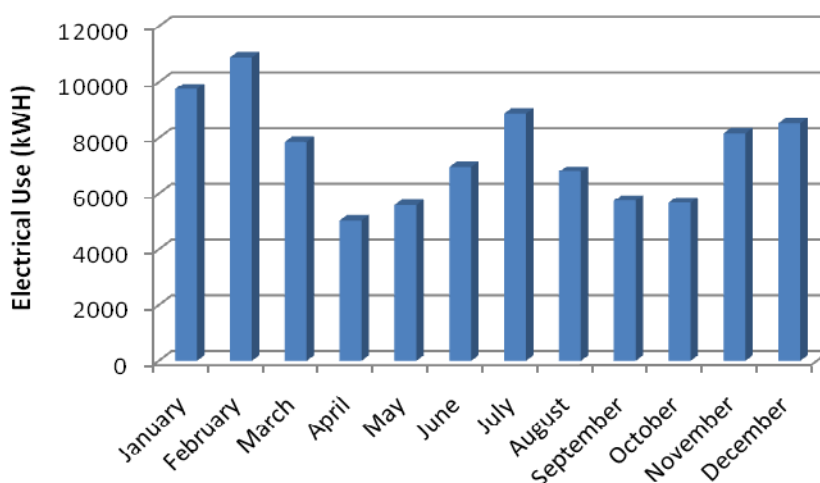
For more on the Youth Center's gas usage, refer to Section 4.2.

3.2.6 Senior House

Electric power for Senior House is fed from one General Secondary Service single phase line from JCP&L. Figure 3.2-16 illustrates the average monthly total energy consumption from December 2006 through September 2009. From this graph, it can be determined that the electrical baseline consumption for the Senior House is approximately 5,000 kWh/month.

Figure 3.2-17 illustrates the monthly demand load for the Senior House from December 2006 through September 2009.

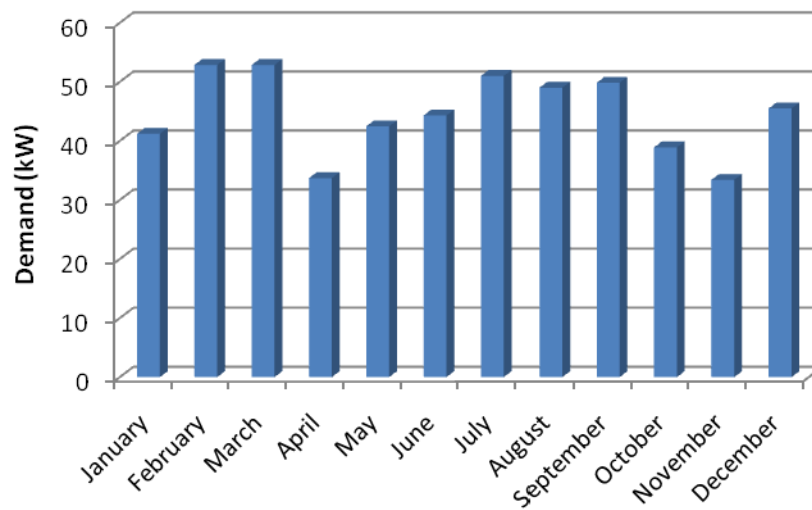
Figure 3.2-16: Senior House Electrical Usage



The most recent tariff rates available at the time of this audit for the Senior House service, are as follows:

	Acct #: 100008645416
Customer Charge:	\$3.25/month
Basic Generation Service:	\$0.108988/kWh
Delivery Service Charges:	\$0.020486/kWh
	\$5.18631/kW
Non-Utility Generation Charges:	\$0.01696/kWh
Societal Benefits Charge:	\$0.003222/kWh (2X monthly kWh)
System Control Charge:	\$0.000079/kWh
RGGI Recovery Charge:	\$0.000064/kWh (80% of total)

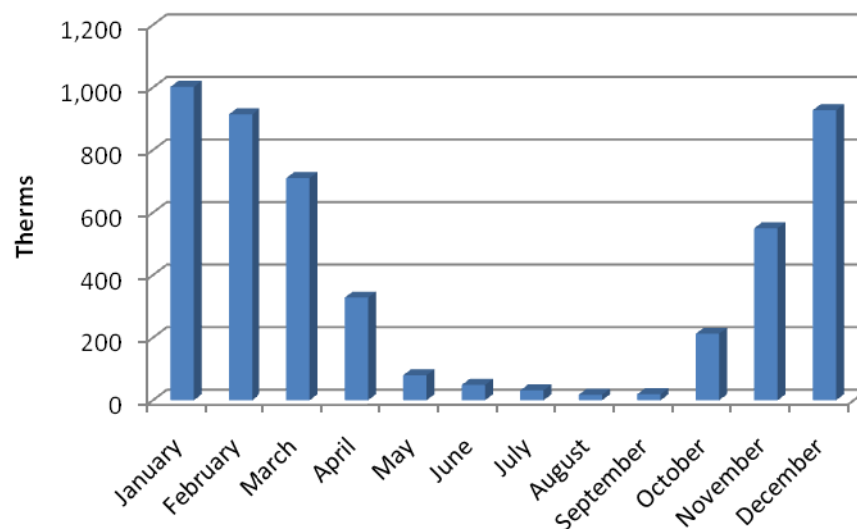
**Figure 3.2-17: Senior House
Maximum Monthly Demand**



Refer to Table 3.3-1, in Section 3.3, for average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -18 illustrates the Senior House's monthly average natural gas consumption from January 2007 through September 2009.

Figure 3.2-18: Senior House's Gas Usage



For more on the Senior House's gas usage, refer to Section 4.2.

3.3 Aggregate Costs

For the purposes of computing energy savings for all identified energy conservation and retrofit measures, aggregate unit costs for electrical energy and fuel, in terms of cost/kWH and cost/therm, were determined for each service location and utilized in the simple payback analyses discussed in subsequent sections. The aggregate unit cost accounts for all distribution and supply charges for each location. Table 3.3-1 and Table 3.3-2 summarize the aggregate costs for electrical energy consumption and therms utilized, respectively.

Table 3.3-1: Electrical Aggregate Unit Costs

Service Location	Aggregate \$ / kW-hr
DPW	\$0.1699
Library	\$0.1646
Municipal Building	\$0.1712
Public Safety Building	\$0.1604
Youth Center	\$0.1948
Senior House	\$0.1830

Table 3.3-2: Natural Gas Aggregate Unit Costs

Service Location	Aggregate \$ / therm
DPW	\$1.56
Library	\$1.38
Municipal Building	\$1.57
Public Safety Building	\$1.57
Youth Center	\$1.92
Senior House	\$1.66

3.4 Portfolio Manager

3.4.1 Portfolio Manager Overview

Portfolio Manager is an interactive energy management tool that allows the Township to track and assess energy consumption at the facilities in a secure online environment. Portfolio Manager can help the Township set investment priorities, verify efficiency improvements, and receive EPA recognition for superior energy performance.

3.4.2 Energy Performance Rating

For many facilities, you can rate their energy performance on a scale of 1–100 relative to similar facilities nationwide. Your facility is *not* compared to the other facilities entered into Portfolio Manager to determine your ENERGY STAR rating. Instead, statistically representative models are used to compare your facility against similar facilities from a national survey conducted by the Department of Energy's Energy Information Administration. This national survey, known as the Commercial Building Energy Consumption Survey (CBECS), is conducted every four years, and gathers data on building characteristics and energy use from thousands of facilities across the United States. Your facility's peer group of comparison is those facilities in the CBECS survey that have similar facility and operating characteristics. A rating of 50 indicates that the facility, from an energy consumption standpoint, performs better than 50% of all similar facilities nationwide, while a rating of 75 indicates that the facility performs better than 75% of all similar facilities nationwide.

3.4.3 Portfolio Manager Account Information

A Portfolio Manager account has been established for the Township, which includes a profile for the six (6) buildings. Information entered into this Portfolio Manager Facility profile, including electrical energy consumption and natural gas consumption has been used to establish a performance baseline.

It is recommended that the information be updated to track the buildings' energy usage. Only the Municipal Building was eligible for an energy star label and rating, as compared to other 'office' buildings. At the time of the audit the Municipal Building received a rating of 78, with the use of a default computer count. This information would have to be updated and confirmed in order to apply for an energy star label.

Appendix B contains the Statement of Energy Performance developed for the Municipal Building and a Portfolio Manager Reference sheet.

The following website link, username and password shall be used to access the Portfolio Manager account and building profiles that has been established for the Township:

<https://www.energystar.gov/istar/pmpam/>

USERNAME: MontvilleTWP

PASSWORD: EnergyStar

Section 4

Energy Conservation and Retrofit Measures (ECRM)

4.1 Building Lighting Systems

The goal of this section is to present any lighting energy conservation measures that may also be cost beneficial. It should be noted that replacing current bulbs with more energy-efficient equivalents will have a small effect on the building heating and cooling loads. The building cooling load will see a small decrease from an upgrade to more efficient bulbs and the heating load will see a small increase, as the more energy efficient bulbs give off less heat.

Please note that the Engineer's Estimate of Probable Construction Costs presented herein are estimates based on historic data compiled from similar installations and engineering opinions. Additional engineering will be required for each measure identified in this report and final scope of work and budget cost estimates will need to be confirmed prior to the coordination of project financing or the issuance of a Request for Proposal.

4.1.1 Public Works Building

It is recommended that the existing lighting system at the Public Works Building, as discussed in Section 2.1.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-1 below.

Table 4.1-1 Public Works Building Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Metal Halide to Fluorescent Conversion, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 5.28kW, 15,364.9 kWh and \$2,610.5

Exterior Lighting: 0.40kW, 1,550.6 kWh and \$263.5

The following table, Table 4.1-2, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Public Works Building. Included in this simplified payback analysis summary table is the 'Annual Return on Investment' (AROI) values. This value is a performance measure used to evaluate the efficiency of an investment and is calculated using the following equation:

$$AROI = \frac{AECS + OCS}{NET\ ECM\ Cost} - \frac{1}{Lifetime}$$

Where OCS = Operating Cost Savings, and AECS = Annual Energy Cost Savings.

Also included in the table are net present values for each option. The NPV calculates the present value of an investment's future cash flows based on the time value of money, which is accounted for by a discount rate (DR) (assume bond rate of 3%). NPV is calculated using the following equation:

$$NPV = \sum_{n=0}^N \frac{C_n}{(1 + DR)^n}$$

Where C_n=Annual cash flow, and N = number of years.

The IRR expresses an annual rate that results in a break-even point for the investment. If the Township is currently experiencing a lower return on their capital than the IRR, the project is financially advantageous. This measure also allows the Township to compare ECM's against each other to determine the most appealing choices.

$$IRR \rightarrow 0 = \sum_{n=0}^N \frac{C_n}{(1 + IRR)^n}$$

Where C_n=Annual cash flow, and N = number of years.

The lifetime energy savings represents the cumulative energy savings over the assumed life of the ECM.

Table 4.1-2 Public Works Building Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	\$16,861.9	\$4,329.8	\$21,191.6
New Jersey SmartStart Rebate	-\$2,350*	-\$0*	-\$2,350*
Total Cost	\$14,511.9	\$4,329.8	\$18,841.6
Annual Energy Savings	\$2,610.5	\$263.5	\$2,873.9
Simple Payback	5.1 years	16.4 years	6.0 years
Annual Return on Investment (AROI)	13.13%	-0.56%	9.99%
Lifetime Energy Savings (15 years)**	\$48,552.5	\$4,900.8	\$53,451.4
Annual Maintenance Cost Savings (AMCS)	\$263.06	\$1.10	\$264.15
Internal Rate of Return (IRR)	20.80%	1.52%	17.06%
Net Present Value (NPV)	\$26,645.5	-\$479.3	\$26,164.7

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.

**3% yearly inflation on electricity costs.

***See Appendix H & J for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.2 Library

It is recommended that the existing lighting system at the Library, as discussed in Section 2.2.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaires to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-3 below.

Table 4.1-3 Library Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Metal Halide to Fluorescent Conversion, Incandescent to Compact Fluorescent Conversion
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 9.9kW, 39,604.8 kWh and \$6,518.9

Exterior Lighting: 4.9kW, 21,494.9 kWh and \$3,538.1

The following table, Table 4.1-4, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Library.

Table 4.1-4 Library Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	\$29,510.4	\$114,731.2	\$144,241.6
New Jersey SmartStart Rebate	-\$4,300*	-\$0*	-\$4,300*
Total Cost	\$25,210.4	\$114,731.2	\$139,941.6
Annual Energy Savings	\$6,518.9	\$3,538.1	\$10,057
Simple Payback	3.6 years	32.0 years	13.4 years
Annual Return on Investment (AROI)	20.44%	-3.54%	0.78%
Lifetime Energy Savings (15 years)**	\$121,244.5	\$65,804.8	\$187,049.3
Annual Maintenance Cost Savings (AMCS)	\$314.85	\$45.98	\$360.83
Internal Rate of Return (IRR)	29.08%	-5.83%	3.98%
Net Present Value (NPV)	\$73,483.7	-\$62,656.6	\$10,827.1

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.

**3% yearly inflation on electricity costs.

***See Appendix H & J for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled “Proposed Operational Hours without Sensors” and “Proposed Operational Hours with Sensors” in Appendix D.

4.1.3 Municipal Building

It is recommended that the existing lighting system at the Municipal Building, as discussed in Section 2.3.3 be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-5 below.

Table 4.1-5 Municipal Building Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 18.4kW, 40,348.9 kWh and \$6,907.7

Exterior Lighting: 6.8kW, 29,615.0 kWh and \$5,070.1

The following table, Table 4.1-6, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at Municipal Building.

Table 4.1-6 Municipal Building Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	\$77,037.6	\$147,961.9	\$224,999.7
New Jersey SmartStart Rebate	-\$9,425*	-\$0*	-\$9,425*
Total Cost	\$67,612.8	\$147,961.9	\$215,574.7
Annual Energy Savings	\$6,907.7	\$5,070.1	\$11,977.8
Simple Payback	7.9 years	23.2 years	8.2 years
Annual Return on Investment (AROI)	7.23%	-3.21%	0.06%
Lifetime Energy Savings (15 years)**	\$128,475.72	\$94,298.35	\$222,774.07
Annual Maintenance Cost Savings (AMCS)	\$2,485.78	\$37.67	\$2,524.9
Internal Rate of Return (IRR)	13.09%	-4.82%	2.33%
Net Present Value (NPV)	\$62,659.85	-\$73,675.79	-\$10,998.63

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.

**3% yearly inflation on electricity costs.

***See Appendix H & J for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.4 Public Safety Building

It is recommended that the existing lighting system at the Public Safety Building, as discussed in Section 2.4.3, be upgraded to utilize occupancy sensors. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-7 below.

Table 4.1-7 Public Safety Building Lighting System Improvements	
Interior Lighting	Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included for exterior fixtures in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 0kW, 4943.3 kWh and \$792.9

Exterior Lighting: 6.6kW, 28,627.9 kWh and \$4,591.9

The following table, Table 4-11, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Public Safety Building.

Table 4.1-8 Public Safety Building Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	\$6,596.7	\$162,706.3	\$169,303
New Jersey SmartStart Rebate	-\$910*	-\$0*	-\$910*
Total Cost	\$5,686.7	\$162,706.3	\$168,393
Annual Energy Savings	\$792.9	\$4,591.9	\$5,384.8
Simple Payback	7.17 years	35.2 years	31.1 years
Annual Return on Investment (AROI)	7.28%	-3.82%	-3.45
Lifetime Energy Savings (15 years)**	\$14,747.08	\$85,404.35	\$138,600.97
Annual Maintenance Cost Savings (AMCS)	\$0.00	\$36.41	\$36.41
Internal Rate of Return (IRR)	13.83%	-6.72%	-5.52%
Net Present Value (NPV)	\$5,860.4	-\$95,399.3	-\$89,538.9

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.

**3% yearly inflation on electricity costs.

***See Appendix H & J for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.5 Youth Center

It is recommended that the existing lighting system at Youth Center, as discussed in Section 2.5.3, be upgraded to utilize occupancy sensors. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-9 below.

Table 4.1-9 Youth Center Lighting System Improvements	
Interior Lighting	Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies for the exterior fixtures included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 0 kW, 1,153.2 kWh and \$224.6

Exterior Lighting: 8.5 kW, 37,101.8 kWh and \$7,227.4

The following table, Table 4.1-10, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Youth Center.

Table 4.1-10 Youth Center Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	\$6,343.0	\$182,529.4	\$188,872.4
New Jersey SmartStart Rebate	-\$175*	-\$0*	-\$175*
Total Cost	\$6,186.0	\$182,529.4	\$188,697.4
Annual Energy Savings	\$224.6	\$7,227.4	\$7,452.1
Simple Payback	27.5 years	25.1 years	25.2 years
Annual Return on Investment (AROI)	-3.03%	-2.68%	-2.69%

Table 4.1-10 Youth Center Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Lifetime Energy Savings (15 years)**	\$4,177.3	\$134,421.8	\$138,600.97
Annual Maintenance Cost Savings (AMCS)	\$0	\$43.95	\$43.95
Internal Rate of Return (IRR)	-4.26%	-3.34%	-3.37%
Net Present Value (NPV)	\$-2,897.13	-\$76,751.3	-\$79,647

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.

**3% yearly inflation on electricity costs.

***See Appendix H & J for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled “Proposed Operational Hours without Sensors” and “Proposed Operational Hours with Sensors” in Appendix D.

4.1.6 Senior House

It is recommended that the existing lighting system at the Senior House, as discussed in Section 2.6.3, be upgraded to utilize occupancy sensors. One option is proposed in Appendix D for interior lighting, and is listed in Table 4.1-11 below.

Table 4.1-11 Senior House Lighting System Improvements	
Interior Lighting	Incandescent to Compact Fluorescent Conversion, Occupancy Sensors

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 0.1kW, 217.1 kWh and \$39.7

The following table, Table 4.1-12, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at Senior House.

Table 4.1-12 Senior House Lighting System Improvements***	
	Interior Lighting
Engineer's Opinion of Probable Cost	\$797.1
New Jersey SmartStart Rebate	-\$105*
Total Cost	\$692.1
Annual Energy Savings	\$39.7
Simple Payback	10.9 years
Annual Return on Investment (AROI)	2.47%
Lifetime Energy Savings (15 years)**	\$738.38
Annual Maintenance Cost Savings (AMCS)	\$23.51
Internal Rate of Return (IRR)	5.99%
Net Present Value (NPV)	\$166.72

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.

**3% yearly inflation on electricity costs.

***See Appendix H & J for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.2 HVAC Systems

The goal of this section is to present any heating and cooling energy reduction and cost saving measures that may also be cost beneficial. Where possible, measures will be presented with a life-cycle cost analysis. This analysis displays a payback period based on weighing the capital cost of the measure against predicted annual fiscal savings. To do this, the buildings have been modeled as accurately as possible to predict energy usage for space heating and cooling, as well as domestic hot water use.

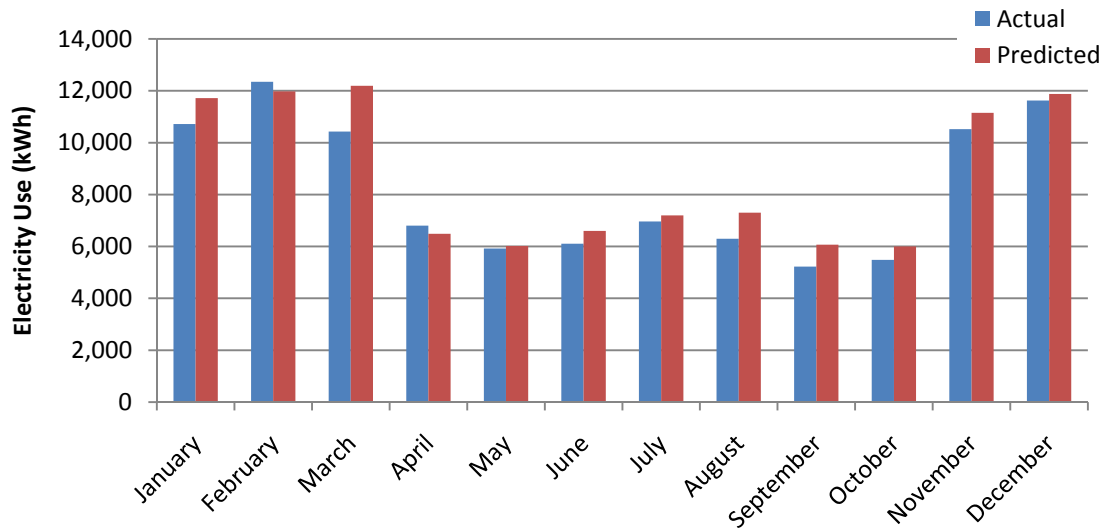
Each building is modeled using software called eQuest, a Department of Energy-sponsored energy modeling program, to establish a baseline space heating and cooling energy usage. Climate data from Boonton, NJ was used for analyses. From this, the model may be calibrated, using historical utility bills, to predict the impact of theoretical energy savings measures.

Once annual energy savings from a particular measure have been predicted and the initial capital cost has been estimated, payback periods may be approximated. Equipment cost estimate calculations are provided in Appendix H.

4.2.1 Public Works Building

A model of the Public Works Building was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity bills from December, 2006 through November, 2009, and natural gas bills from January, 2007 through October, 2009. Figure 4.2-1 below compares actual monthly electricity usages, with those predicted by the eQuest model. Historical monthly usages were averaged for each month observed over multiple years. For example, usage during the month of June was averaged for the three years, to yield an approximate average usage during the month of June.

Figure 4.2-1: Public Works Building Electricity Usage



It may be seen that the electricity usage spikes drastically during November through March. As CDM found no electrical resistance heaters in the building, this is likely attributed to eight truck engine pre heaters, which operate on average 20 hours per day during the winter months. For modeling purposes, these have been incorporated into the assumed miscellaneous load for those five months.

CDM urges the Township to reevaluate the necessity of the block heaters. Building electricity usage increases by approximately 5,000 kWh per month when they are in use. This equates to an increase of \$800-\$900 in electricity costs each month. If the vehicles are being held in a garage that is maintained above 32F, block heaters should not be warranted. If vehicles are kept outside, perhaps parking them inside where space is available can help to reduce the number of block heaters needed. Just using one less block heater should reduce the monthly electricity bill for this building by \$100-\$150 per month.

Once the eQuest model was calibrated, it could be used to predict approximate major usage categories, such as lighting, plug loads (miscellaneous), ventilation, and

cooling. It should be noted that these are only estimated usages based on information gathered during CDM's field audit. Figure 4.2-2 presents this information to help the Township visualize where CDM anticipates the electricity is ultimately being used.

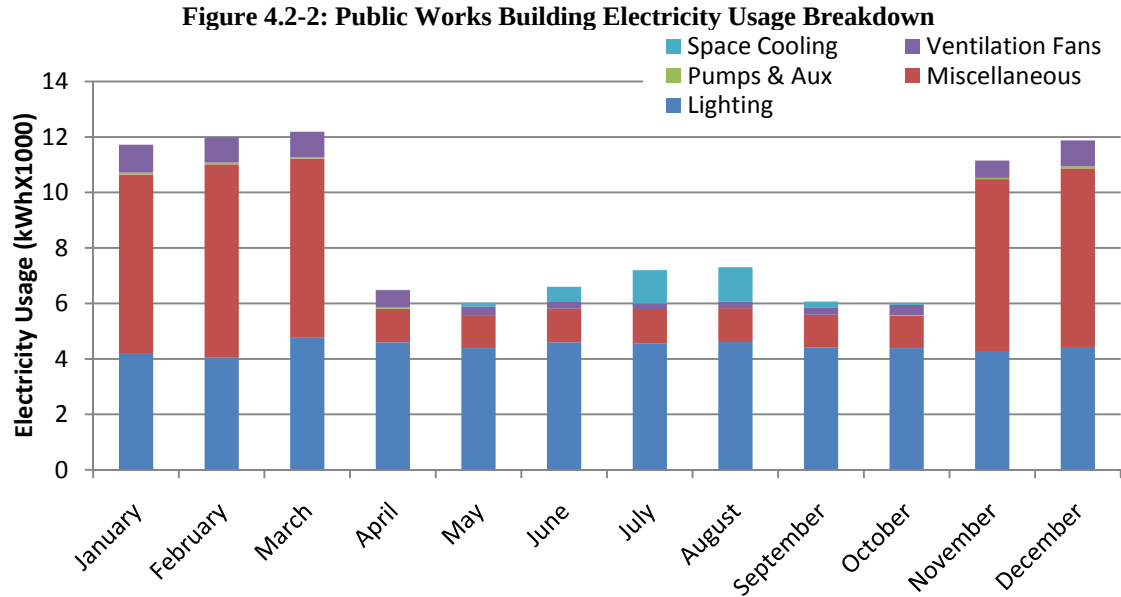
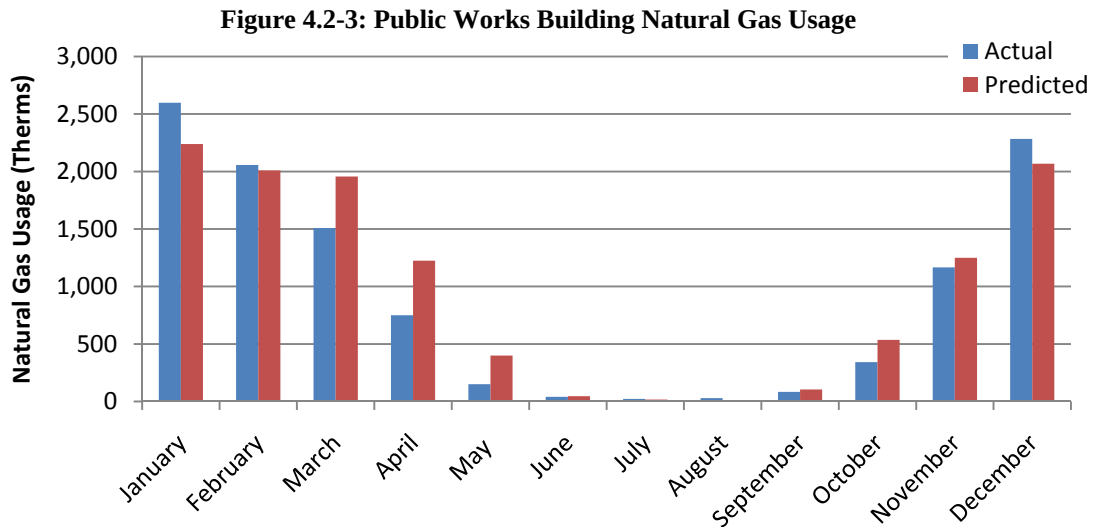


Figure 4.2-3 below compares actual natural gas usage to model-predicted natural gas use.



HVAC systems used within the DPW building were found to be relatively new and in good working order. Additionally, systems appeared to be operating efficiently and did not warrant immediate upgrades or renovations. Therefore, CDM has no recommendations for the HVAC systems in this building.

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a window air conditioning unit has a median service life of 10 years. Therefore, if a window unit has been in service for more than 10 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.2-1 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included. Where equipment ages were not found on the equipment tags, they have been estimated based on the unit appearance or approximate renovation dates. In some cases, service locations may have been estimated based on unit proximity. Additionally, in cases where a unit's manufacturer and/or model could not be determined due to an unreadable, faded, destroyed, or lost tag, manufacturer and model number information has been represented as "unknown".

Table 4.2-1 Public Works Building HVAC Equipment Service Lives							
Description	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
Rooftop Packaged Air Handling Unit (RTU)	Roof	Lower Level Office Area	Lennox	GCS16-060-120-57	80%	~10	15
RTU	Roof	Upper Level Office Area	Ruud	UKKA-A048CK13E	80%	<15	15
RTU (Heat only)	Roof	Garage	Reznor	Unknown	80%	~10	15
Infrared Gas-Fired Radiant Tube Heater (RTH)	Garage (Six Units Total)	Garage	Reznor	Unknown	~80%	<10	18

CDM also creates an inventory of observed domestic water heaters. This will attempt to inform the Township of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as

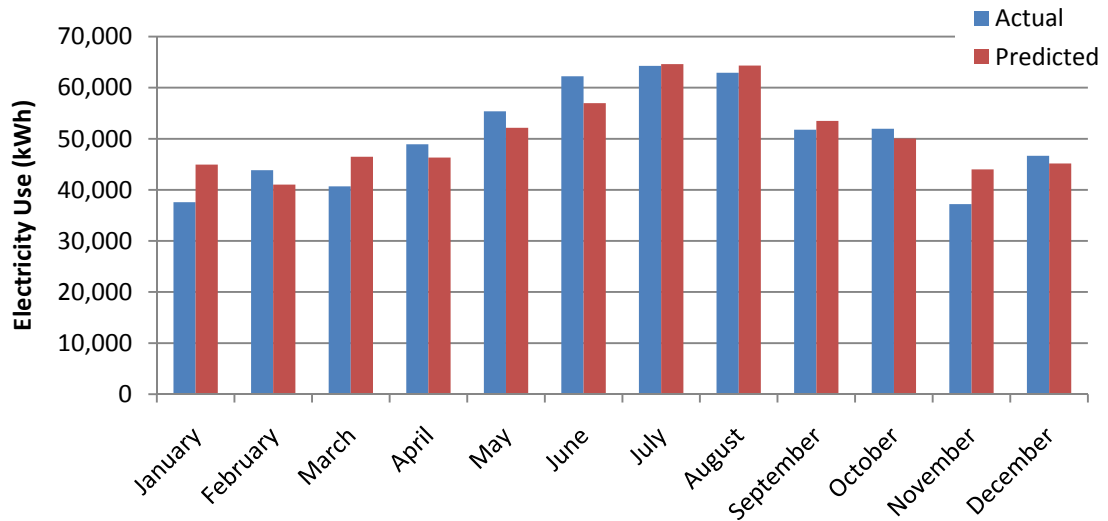
they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-2 below.

Table 4.2-2 Public Works Building Domestic Water Heaters					
Location	Make	Storage Capacity (Gallons)	Type	Heating Capacity	Observed Condition
Garage Mezzanine	Rheem	40	Gas	40 MBH	Good

4.2.2 Library

A model of the Library was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity bills from January, 2007 through September, 2009, and natural gas bills from January, 2007 through October, 2009. Figure 4.2-4 below compares actual monthly electricity usages, with those predicted by the eQuest model. Historical monthly usages were averaged for each month observed over multiple years.

Figure 4.2-4: Library Electricity Usage



Once the eQuest model was calibrated, it could be used to predict approximate major usage categories, such as lighting, plug loads (miscellaneous), ventilation, and cooling. It should be noted that these are only estimated usages based on information gathered during CDM's field audit. Figure 4.2-5 presents this information to help the Township visualize where CDM anticipates the electricity is ultimately being used.

Figure 4.2-5: Library Electricity Usage Breakdown

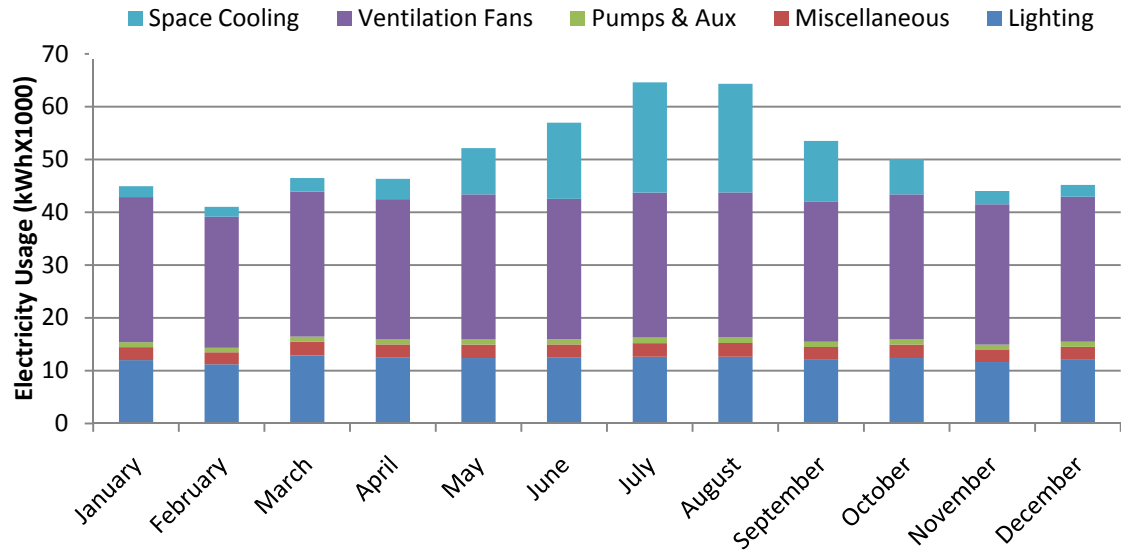
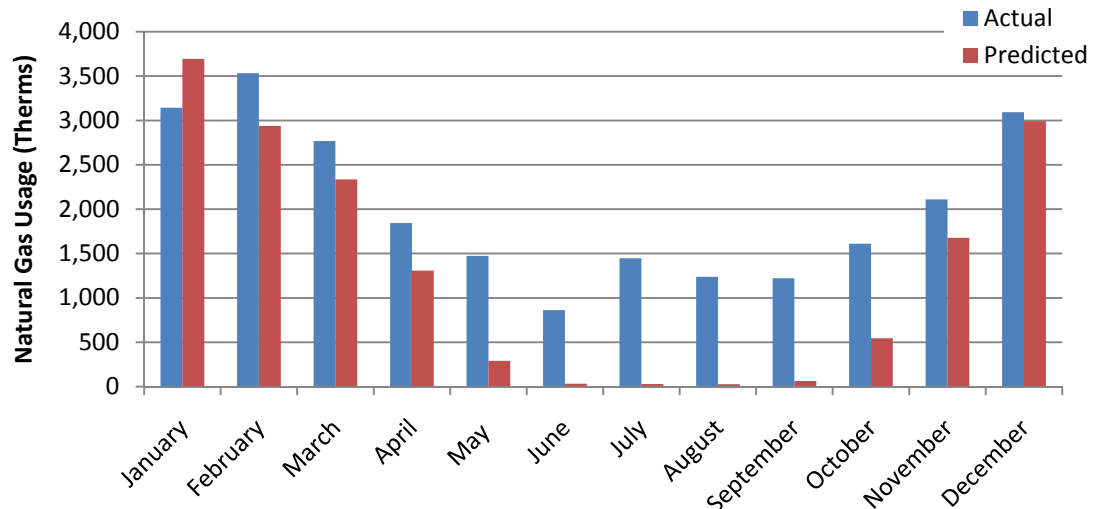


Figure 4.2-6 below compares actual natural gas usage to model-predicted natural gas use. As noted in Section 2, the boiler is used year-round. However, CDM was not able to create an eQuest model that called on the boiler year-round. Therefore, a model was created to closely approximate winter usage, as the boiler's primary purpose is to maintain a comfortable interior environment during the heating season. For this model, it was assumed that the boiler has been regulated to only fire when the outside air temperature is below 60 degrees F.

Figure 4.2-6: Library Natural Gas Usage



Implementation of controls to regulate the boiler to only fire when the outside air temperature is below 60 degrees will help to alleviate the excessive summer usage being seen in Figure 4.2-6. Table 4.2-3 displays projected savings from such controls. It is CDM's assertion that following the implementation of this type of control, the

natural gas consumption for the library will more closely mimic the predicted usage demonstrated in Figure 4.2-6. Natural gas savings in Table 4.2-3 reflect the approximate difference between predicted and actual usage in Figure 4.2-6.

As the boiler currently is used to generate domestic hot water, it is anticipated that a natural-gas fired boiler will be necessary during the summer, while the boiler is offline. Therefore, the cost of a domestic gas-fired water heater has been factored into the initial capital cost realized in Table 4.2-3.

Table 4.2-3: Library Boiler Controls Payback	
Predicted Annual Savings (Therms)	8,411
Annual Savings (Gas)	\$11,607
Initial Capital Cost of Upgrade	\$8,060
Incentives	\$0
Cost of Upgrade	\$8,060
Simple Payback**	0.5
Lifetime Energy Savings (15 years)*	\$200,725
Annual Maintenance Cost Savings (AMCS)	\$3,500
Annual Return on Investment (AROI)	139.84%
Internal Rate of Return (IRR)	147.01%
Net Present Value (NPV)	\$160,974

*Assumes 2% yearly inflation on natural gas costs, 3% yearly inflation on electricity costs

**Accounts for both O&M savings and energy savings

While CDM has conservatively accounted for the addition of a gas-fired domestic water heater, a less expensive option may be an instantaneous water heater. These do not store domestic hot water, and instead only fire to heat water as it is being used. If domestic hot water usage is relatively low in this building, the Township may want to consider implementation of an instantaneous water heater.

CDM anticipates a typical cast iron boiler system will cost \$3,500 per year to operate and maintain. However, this figure is representative of a boiler that is used during the heating season only. As the library is currently using the boiler system year round, it is likely that the O&M costs are closer to \$7,000 per year. Leaving the boiler system off for half of the year should save approximately \$3,500 per year. Additionally, operating the boiler during the heating season only should drastically increase the boiler's life, and would facilitate access to perform routine maintenance while the boiler is off-line in the summer.

All major equipment noted during CDM's on site audit is listed in Table 4.2-4 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-4 Library HVAC Equipment Service Lives							
Description	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
Air Handling Unit (AHU) (AC-2)	Mechanical Room	Library Main Area	McQuay	CAH008GDAC	N/A*	~2	25
AHU (AC-1)	Mechanical Room	Library Main Area	McQuay	CAH014GDAC	N/A*	~2	25
AHU (AC-6)	Mechanical Room (Near Projector Room)	Assembly Wing	McQuay	CAH010GDAC	N/A*	<5	25
AHU (AC-7)	Mechanical Room (Near Projector Room)	Assembly Wing	McQuay	CAH004GDAC	N/A*	<5	25
Chiller	Outside	Entire Building	Trane	RAUCC404BJ13D	EER 11.4	16	20
Chiller	Outside	Entire Building	Trane	RAUCC404BJ13D	EER 11.4	16	20
Boiler, Cast Iron	Boiler Room	Entire Building	Hydrotherm	MR-1000C-P	80%	14	35

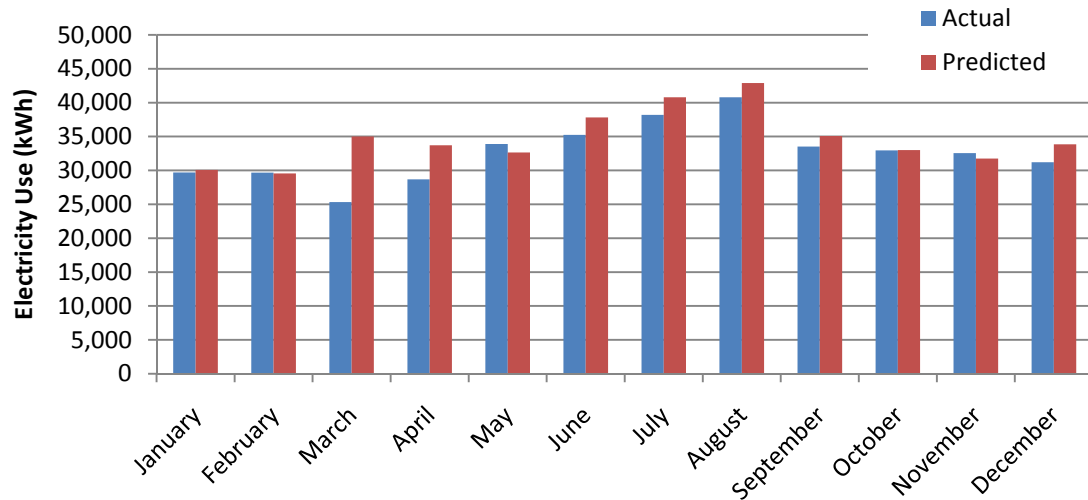
*Unit has only hot and chilled water coils - efficiency accounted for at chillers & boilers.

The domestic hot water for the building is generated by a heat exchanger that interacts with the building hot water heating system. Therefore, there were no noted domestic water heaters.

4.2.3 Municipal Building

A model of the Municipal Building was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity bills from January, 2007 through November, 2009, and natural gas bills from January, 2008 through October, 2009. Figure 4.2-7 below compares actual monthly electricity usages, with those predicted by the eQuest model. Historical monthly usages were averaged for each month observed over multiple years.

Figure 4.2-7: Municipal Building Electricity Usage



Once the eQuest model was calibrated, it could be used to predict approximate major usage categories, such as lighting, plug loads (miscellaneous), ventilation, and cooling. It should be noted that these are only estimated usages based on information gathered during CDM's field audit. Figure 4.2-8 presents this information to help the Township visualize where CDM anticipates the electricity is ultimately being used.

Figure 4.2-8: Municipal Building Electricity Usage Breakdown

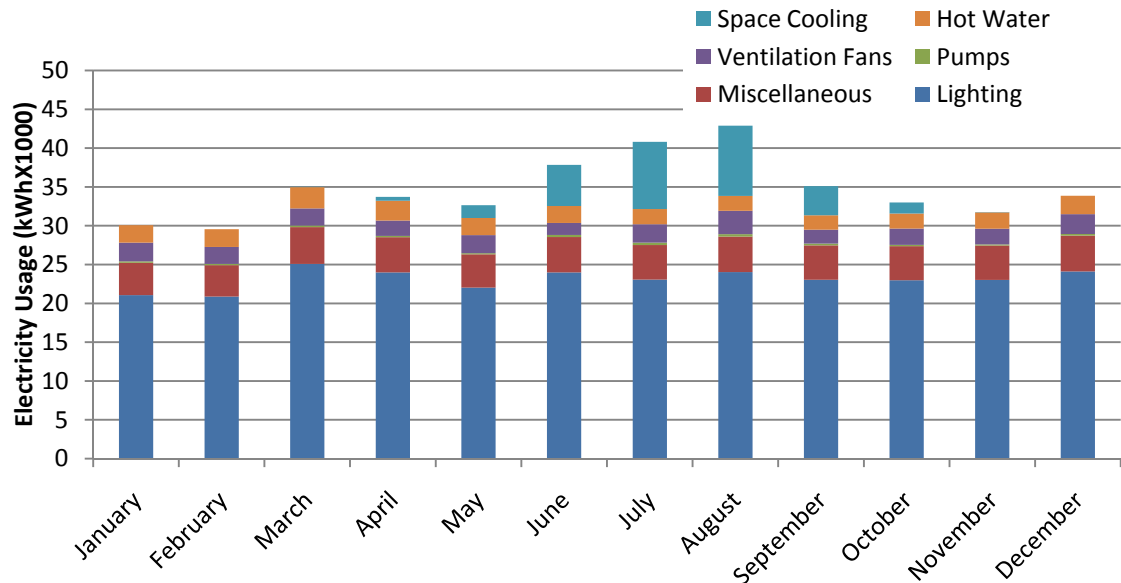
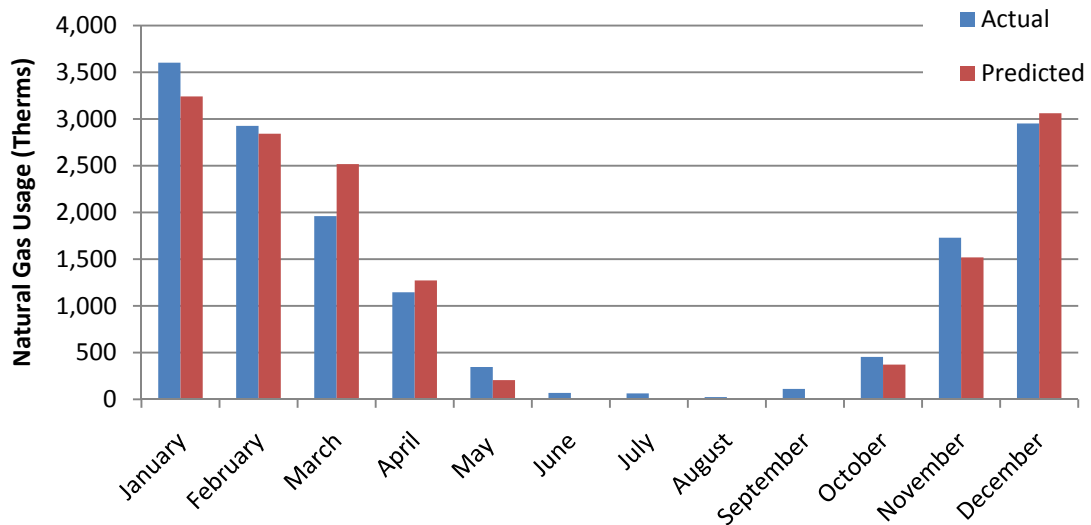


Figure 4.2-9 below compares actual natural gas usage to model-predicted natural gas use.

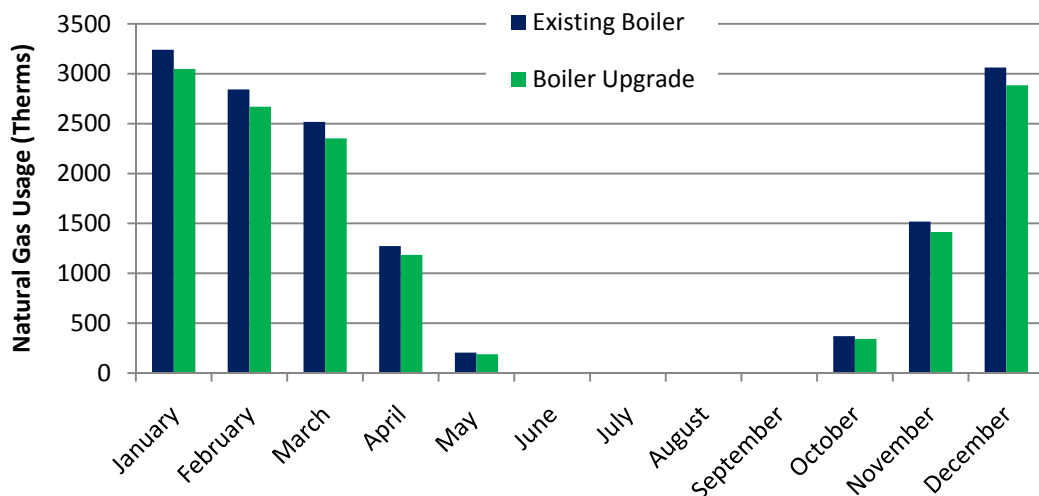
Figure 4.2-9: Municipal Building Natural Gas Usage



Currently, the Municipal Building system utilizes four (4) Sentinel cast iron boilers, each with a gross input rating of 245 MBH; and four (4) Sentinel cast iron boilers, each with a gross input rating of 175 MBH. CDM estimates these eight boilers to be 80% efficient.

Replacing the existing boiler system with a high-efficiency, condensing boiler may provide significant savings. Figure 4.2-10 compares current gas usage with predicted gas usage resulting from a switch to a condensing boiler. Condensing boilers are modeled with a full-load efficiency of ~90% and return water temperature of 100°F.

Figure 4.2-10: Municipal Building Boiler Upgrade Predicted Natural Gas Usage



Fiscal savings from such an upgrade are then identified in Table 4.2-5 below. Lifetime savings calculations for all ECRM's may be found in Appendix J. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of cast iron boilers. CDM estimates the existing cast iron boiler system costs around \$3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around \$2,000 per year. Therefore, replacing the existing boiler system with a 2,000 MBH condensing boiler should result in an operation and maintenance cost increase of \$1500 per year.

Table 4.2-5: Municipal Building Boiler Upgrade Payback	
Predicted Annual Savings (Therms)	948
Annual Savings (Gas)	\$1,488
Initial Capital Cost of Upgrade	\$57,141
Incentives	\$2,000
Cost of Upgrade	\$55,141
Simple Payback**	18.5
Lifetime Energy Savings (24 years)*	\$45,279
Annual Maintenance Cost Savings (AMCS)	\$1,500
Annual Return on Investment (AROI)	1.25%
Internal Rate of Return (IRR)	5.02%
Net Present Value (NPV)	\$14,482

*Assumes 2% yearly inflation on natural gas costs, 3% yearly inflation on electricity costs

**Accounts for both O&M savings and energy savings

All major equipment noted during CDM's on site audit is listed in Table 4.2-6 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included. Where equipment ages were not found on the equipment tags, they have been estimated based on the unit appearance or approximate renovation dates. In some cases, service locations may have been estimated based on unit proximity. Additionally, in cases where a unit's manufacturer and/or model could not be determined due to an unreadable, faded, destroyed, or lost tag, manufacturer and model number information has been represented as "unknown".

Table 4.2-6 Municipal Building HVAC Equipment Service Lives							
Description	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
Boiler, Cast Iron	Boiler Room (4 Units)	Entire Building	Sentinel	SE-245EDP	80%	10	35
Boiler, Cast Iron	Boiler Room (4 Units)	Entire Building	Sentinel	GG-175HE5	80%	16	35

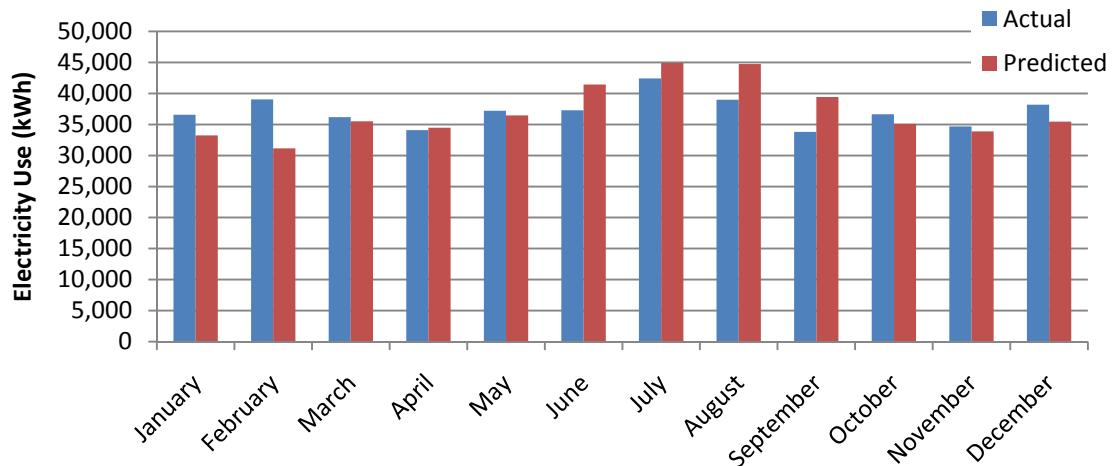
Table 4.2-6 Municipal Building HVAC Equipment Service Lives							
AHU	Basement, Boiler Room	Entire Building	Snyder General	Unknown	N/A*	15	25
Chiller	Outside	Entire Building	McQuay	ALR075C	Unknown	~15	20

*Unit has only hot and chilled water coils - efficiency accounted for at chillers & boilers.

4.2.4 Public Safety Building

A model of the Public Safety Building was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity bills from January, 2007 through September, 2009, and natural gas bills from January, 2007 through October, 2009. Figure 4.2-11 below compares actual monthly electricity usages, with those predicted by the eQuest model. Historical monthly usages were averaged for each month observed over multiple years.

Figure 4.2-11: Public Safety Building Electricity Usage



Once the eQuest model was calibrated, it could be used to predict approximate major usage categories, such as lighting, plug loads (miscellaneous), ventilation, and cooling. It should be noted that these are only estimated usages based on information gathered during CDM's field audit. Figure 4.2-12 presents this information to help the Township visualize where CDM anticipates the electricity is ultimately being used.

Figure 4.2-12: Public Safety Building Electricity Usage Breakdown

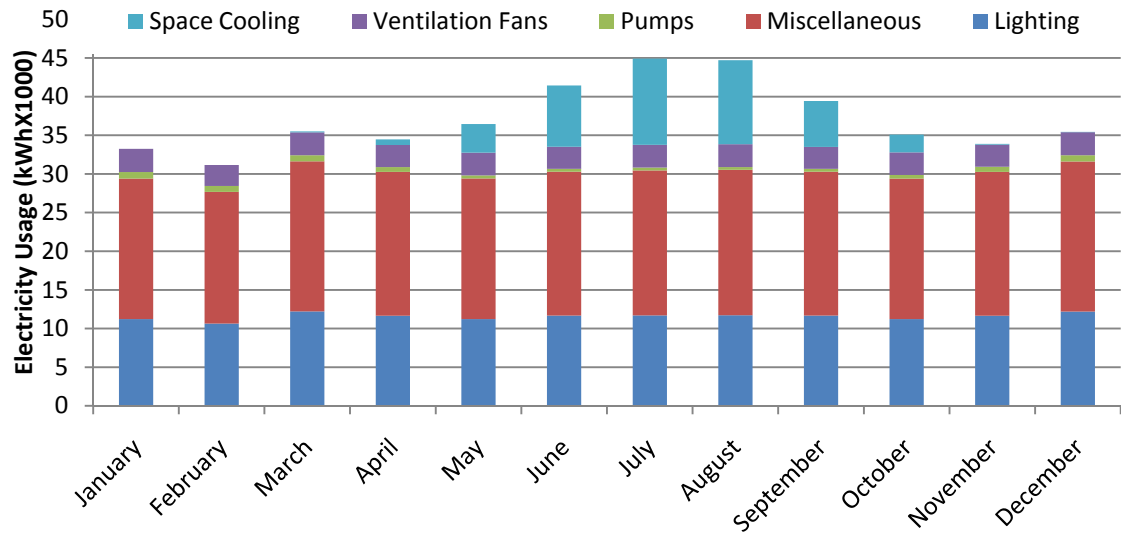
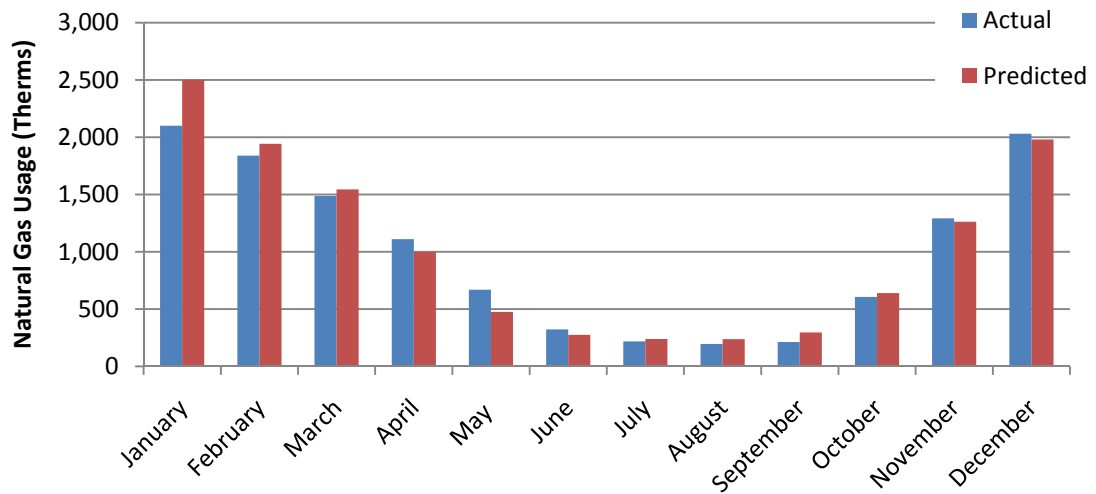


Figure 4.2-13 below compares actual natural gas usage to model-predicted natural gas use.

Figure 4.2-13: Public Safety Building Natural Gas Usage



As the building was only built eight years ago, the HVAC systems are still relatively new and in good working order. Additionally, systems appeared to be operating efficiently and did not warrant immediate upgrades or renovations. Therefore, CDM has no recommendations for the HVAC systems in this building.

All major equipment noted during CDM's on site audit is listed in Table 4.2-7 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-7 Public Safety Building HVAC Equipment Service Lives							
Description	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
Through-Wall A/C Unit (TWAC)	Upper Level Server Room	Upper Level Server Room	EMI	American Series	Unknown	8	15
TWAC	Lower Level Server Room	Lower Level Server Room	EMI	American Series	Unknown	8	15
Air-Cooled Condensing Unit (ACCU)	Outside	Lower Level Server Room TWAC	EMI	SCC24DF0000AA0A	SEER 10.6	8	20
ACCU	Outside	Upper Level Server Room TWAC	Trane	2TTR2048A1000AA	SEER 12	8	20
Boiler, Cast Iron	Boiler Room	Entire Building	Weil McLain	GV-6	87%	8	35
RTU (AC-1)	Roof	Most Office Areas	Trane	YCD360A4LH2A2D F30BC00F0400000	80% EER Unknown	8	15
RTU (AC-3)	Roof	Corridor & Judge's Chamber Area	Trane	SFHFC204P136C3 CDC001ABCE0000 C000T0Y0000	80% EER 9.4	8	15
RTU	Roof	Courtroom	Trane	YCH074C4C0BE	80% EER Unknown	8	15
ACCU	Roof	Dispatch Room	Trane	2TTR2036A1000AA	SEER 12	8	20
ACCU	Roof	Server Room	EMI	SCC15DA0000AA0A	SEER 10.3	8	20

CDM also creates an inventory of observed domestic water heaters. This will attempt to inform the Township of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-8 below.

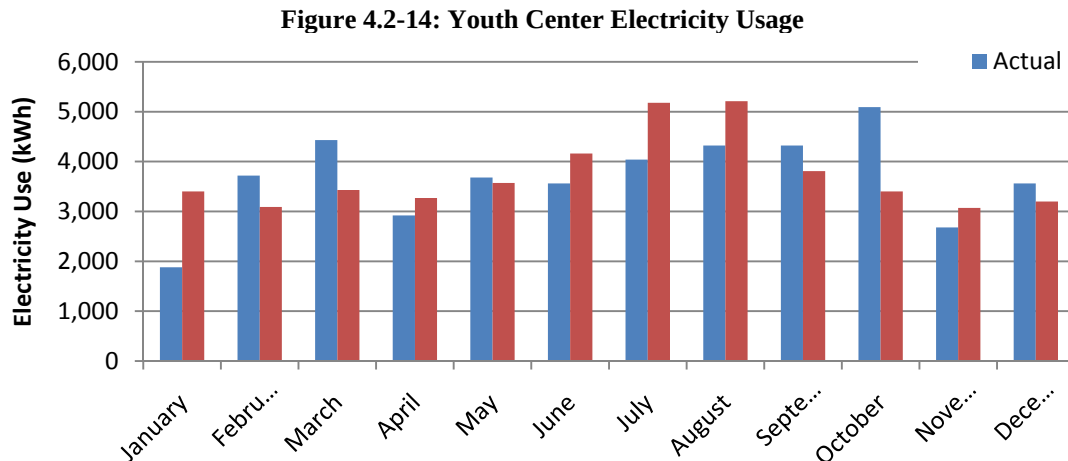
Table 4.2-8 Public Safety Building Domestic Water Heaters					
Location	Make	Storage Capacity (Gallons)	Type	Heating Capacity	Observed Condition
Boiler Room	Turbopower	125	Gas	199 MBH	Good

4.2.5 Youth Center

A model of the Youth Center was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity bills from January, 2007 through October, 2009, and natural gas bills from January, 2007 through October, 2009.

Due to the significant number of bills with estimated electricity usage in lieu of actual meter reads, the monthly electricity usage trend available differed from what CDM would expect for this type of building. Consequently, CDM was not able to model the building with a trend that closely matched the actual usage trend available. Therefore, CDM calibrated the eQuest model for this building based on actual annual electricity and natural gas usage, with an electricity trend that CDM would expect to find if all monthly bills were actual meter reads, taken on or around the same date from month to month.

Figure 4.2-14 below compares actual monthly electricity usages, with those predicted by the eQuest model. Historical monthly usages were averaged for each month observed over multiple years.



Once the eQuest model was calibrated, it could be used to predict approximate major usage categories, such as lighting, plug loads (miscellaneous), ventilation, and cooling. It should be noted that these are only estimated usages based on information gathered during CDM's field audit. Figure 4.2-15 presents this information to help the Township visualize where CDM anticipates the electricity is ultimately being used.

Figure 4.2-15: Youth Center Electricity Usage Breakdown

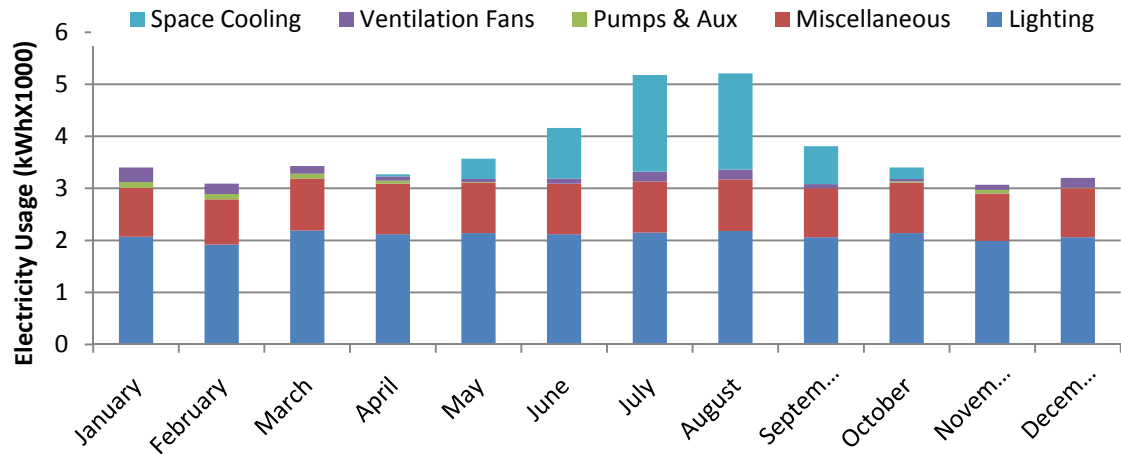
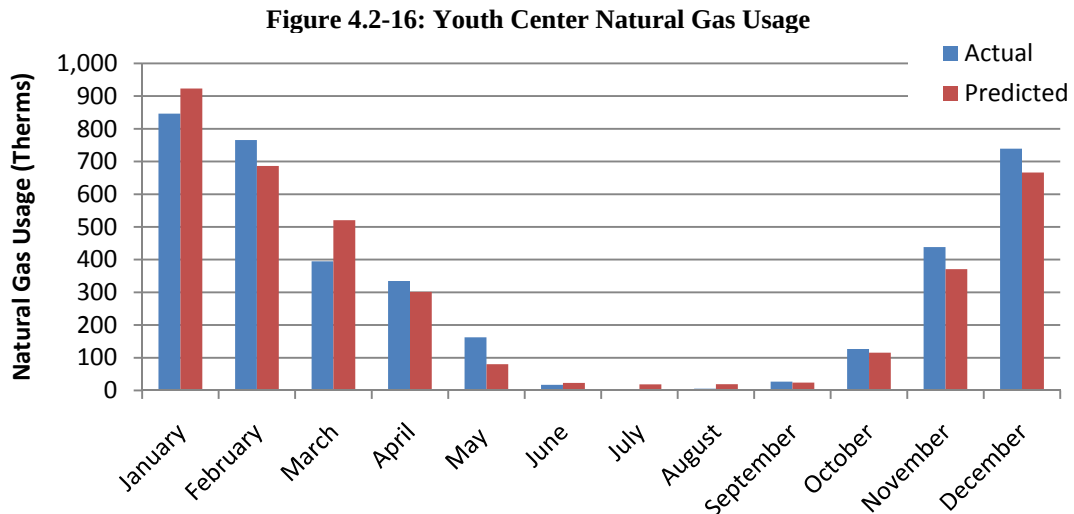


Figure 4.2-16 below compares actual natural gas usage to model-predicted natural gas use.



As the building was only built nine years ago, the HVAC systems are still relatively new and in good working order. Additionally, systems appeared to be operating efficiently and did not warrant immediate upgrades or renovations. Therefore, CDM has no recommendations for the HVAC systems in this building.

All major equipment noted during CDM's on site audit is listed in Table 4.2-9 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-9 Youth Center HVAC Equipment Service Lives							
Description	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
AHU, Forced air furnace	Attic (3 Units)	Entire Building	Lennox	GHR26	80%	9	18
ACCU	Outside (3 Units)	Three Lennox AHUs in Attic	Lennox	HS29-060-9Y-OPT	EER 10.4	9	20

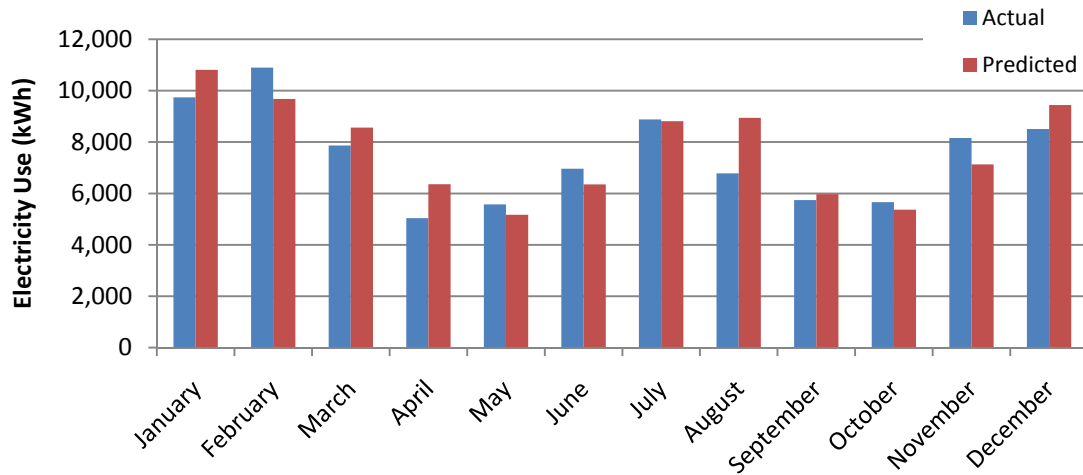
CDM also creates an inventory of observed domestic water heaters. This will attempt to inform the Township of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-10 below.

Table 4.2-10 Youth Center Domestic Water Heaters					
Location	Make	Storage Capacity (Gallons)	Type	Heating Capacity	Observed Condition
DHW Closet	Rheem	30	Electric	4.5 kW	Good

4.2.6 Senior House

A model of the Senior House was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity bills from January, 2007 through September, 2009, and natural gas bills from January, 2007 through September, 2009. Figure 4.2-17 below compares actual monthly electricity usages, with those predicted by the eQuest model. Historical monthly usages were averaged for each month observed over multiple years.

Figure 4.2-17: Senior House Electricity Usage



Once the eQuest model was calibrated, it could be used to predict approximate major usage categories, such as lighting, plug loads (miscellaneous), ventilation, and cooling. It should be noted that these are only estimated usages based on information gathered during CDM's field audit. Figure 4.2-18 presents this information to help the Township visualize where CDM anticipates the electricity is ultimately being used.

Figure 4.2-18: Senior House Electricity Usage Breakdown

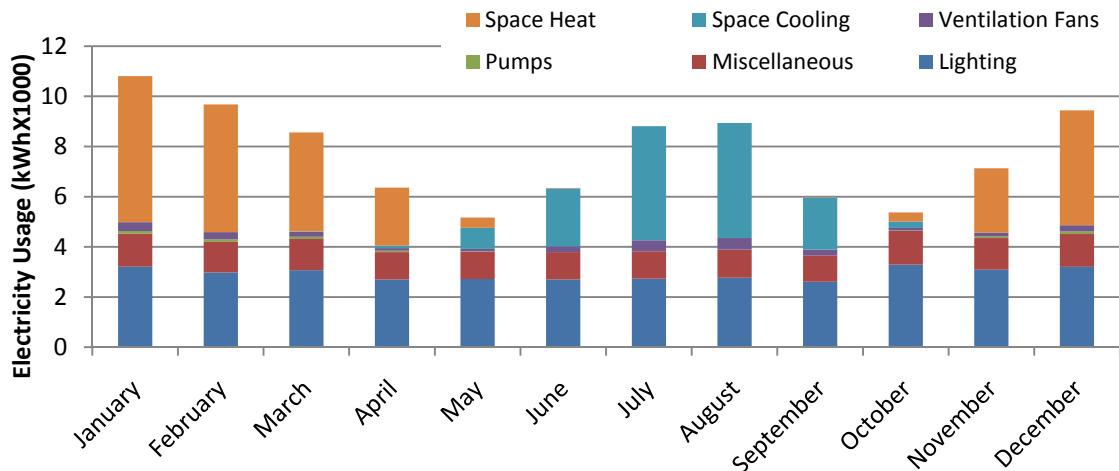
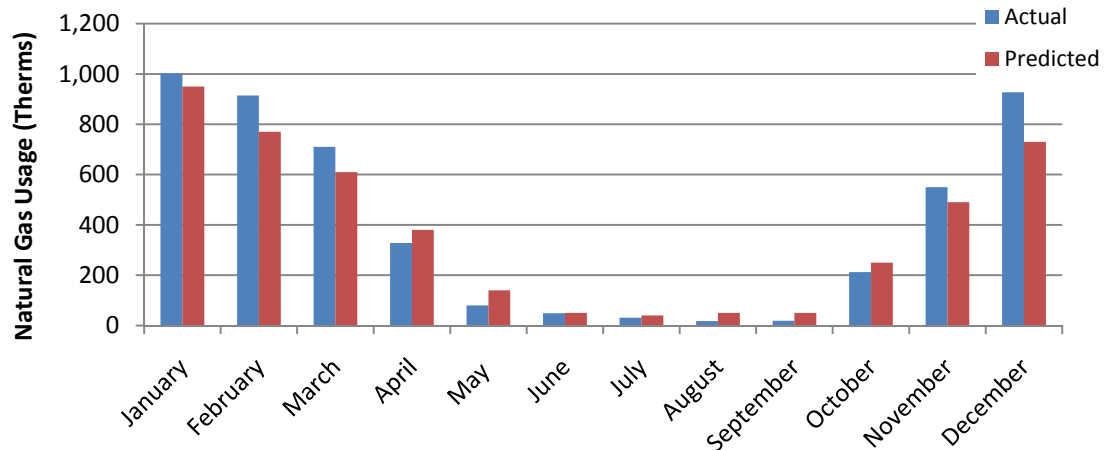


Figure 4.2-19 below compares actual natural gas usage to model-predicted natural gas use.

The HVAC systems are still relatively new and in good working order. Additionally, systems appeared to be operating efficiently and did not warrant immediate upgrades or renovations. Therefore, CDM has no recommendations for the HVAC systems in this building.

Figure 4.2-19: Senior House Natural Gas Usage



All major equipment noted during CDM's on site audit is listed in Table 4.2-11 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-11 Senior House HVAC Equipment Service Lives

Description	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
Forced Air Furnace (HVAC-1)	Attic	Front Section of Building, Recreation Room	Reznor	Unknown	80%	<10	18
Forced Air Furnace (HVAC-2)	Attic	Middle Section of Building, Recreation Room	Reznor	Unknown	80%	<10	18
Forced Air Furnace (HVAC-3)	Attic	Rear Section of Building	Reznor	Unknown	80%	<10	18
ACCU	Outside	HVAC-1	Carrier	38AKS016 -- 510	EER 9.5-10.0	<10	20
ACCU	Outside	HVAC-2	Carrier	38AKS016 -- 510	EER 9.5-10.0	<10	20
ACCU	Outside	HVAC-3	Carrier	38AKS012 -- 501	EER 10.3-10.9	<10	20

CDM also creates an inventory of observed domestic water heaters. This will attempt to inform the Township of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-12 below.

Table 4.2-12 Senior House Domestic Water Heaters					
Location	Make	Storage Capacity (Gallons)	Type	Heating Capacity	Observed Condition
Basement	State	75	Gas	75 MBH	Good

4.3 Alternative Energy Sources

4.3.1 Photovoltaic Solar Energy System Overview

Photovoltaic (PV) cells convert energy in sunlight directly into electrical energy through the use of silicon semi conductors, diodes and collection grids. Several PV cells are then linked together in a single frame of module to become a solar panel. PV cells are able to convert the energy from the sun into electricity. The angle of inclination of the PV cells, the amount of sunlight available, the orientation of the panels, the amount of physical space available and the efficiency of the individual panels are all factors that affect the amount of electricity that is generated.

Based on the estimated cumulative total available roof area, calculations determine that the installation of three PV systems, with a total rating of approximately 202.3 kW (dc) will be appropriate for the Montville Township Public Works, Public Safety, and Municipal Building roofs.

As part of this energy audit, a preliminary engineering feasibility study of the sites outlined above to support solar generation facilities was completed consisting of the following tasks:

- Site Visit by our engineers.
- Satellite Image Analysis and Conceptual design and layout of the photovoltaic system
- Design and construction cost estimates
- Determine a preliminary design for the size and energy production of the solar system.

The total unobstructed available area of each section of the roof with southern exposure was evaluated. It is important to note the following:

1. The structural integrity of the roofs was not confirmed during our site visit. The three buildings may require some degree of roofing work prior to the implementation of a solar system.
2. In the case of the flat areas, the PV system sizing and kWh production was calculated assuming the installation of a crystalline module facing south direction (220 Degree Azimuth) and tilted approximately 20 degrees to allow better rain water shedding and snow melting. Please note that the kWh production as well as system size may differ significantly based on final panel tilt selected during the RFP and design phase.
3. Blended electric rates were used based on actual utility bills and were applied for the facility.

The following is a preliminary study on the feasibility of installing a PV solar system at the Public Works, Public Safety, and Municipal Buildings to generate a portion of each buildings electricity requirements. The system is designed to offset the electric purchased from the local utility and not as a backup or emergency source of power.

In order to determine the best location for the installation of the PV solar system, a satellite image analysis and site walkthrough of the buildings was performed on December 14, 2009. As per the Scope of Work, only the building roofs were considered for PV installation.



Also, as part of our assessment we investigated possible locations for electrical equipment that need to be installed such as combiner boxes, disconnect switches and DC to AC inverters. Consideration was also given to locations of interconnection between the solar system and building's electrical grid.

4.3.1.1 Public Works Building

The roof of the Public Works Building is a flat roof with a very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a system rated at approximately 58.41 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 500A, 3 Phase, 480V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.2 Public Safety Building

The roof of the Public Safety Building is flat with a very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a system rated at approximately 50.46 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 400A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.3 Municipal Building

The roof of the Municipal Building is a pitched roof with a very few obstructions such as exhaust fans, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a system rated at approximately 93.49 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 125A, 3 Phase 208V service entrance equipment wherein

the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.4 Basis for Design and Calculations

The most common roof mounted system is referred to as a (“fixed tilt”) system typically mounted to a metal rack that can be fixed at a specific angle. There are also (“tracking systems”) or movable along one or two axes to follow the position of the sun during the day. For a roof-mounted PV system, tracking systems are very rarely installed and are usually used for ground-mounted systems only, as they require more complex racks and higher maintenance costs. For the “fixed” system, the tilt is determined based on the following factors: geographical location, total targeted kWh production, seasonal electricity requirements and weather conditions such as wind. Ideally, the module tilt for New Jersey should be 25-35 degrees with an azimuth as close as possible to 180 (south); however, our experience has shown that PV systems are typically installed at a tilt of 20 degrees or lower in order to avoid any issues with wind and to maximize total system size

The type of PV panels and equipment used to mount the system shall be determined based on the wind conditions and structural integrity of the roof determined during the design phase of the project. In general, penetration/tie-down systems, non-penetrating ballasted type systems, or a combination of the two should be considered.

Calculation of PV System Yield

An industry accepted software package, PV Watts, and the website www.solar-estimate.org was used to calculate projected annual electrical production of the crystalline silicon PV system in its first year, as summarized in Table 4.3-1. The system was design to provide maximum kWh production based on available roof space. The assumptions we used in the calculations were as follows:

Public Works Building: Average monthly electrical usage: 8,190 kWh, average aggregate electrical rate: \$0.1699/kWh, available roof space: 6,000 square feet, solar rating: 4.68 kWh/m² per day.

Public Safety Building: Average monthly electrical usage: 35,355 kWh, average aggregate electrical rate: \$0.1604/kWh, approximate available roof space: 6,000 square feet, solar rating: 4.68 kWh/m² per day.

Municipal Building: Average monthly electrical usage: 32,773 kWh, average aggregate electrical rate: \$0.1712/kWh, available roof space: 10,000 square feet, solar rating: 4.68 kWh/m² per day.

Table 4.3-1 System Summary

Site	Est. Area (ft ²)	kWh	Annual Energy Savings	Est. Annual SREC	Lifetime Energy Savings (25 Years)*	Annual Return On Investment (AROI)	Net Present Value (NPV)	Internal Rate of Return (IRR)
Public Works Building	5,841	73,713	\$12,523.8	\$46,471	\$463,941	2.4%	-\$188,986	0.5%
Public Safety Building	5,043	63,643	\$10,208.3	\$40,123	\$378,164	2.2%	-\$70,833	1.9%
Municipal Building	9,349	117,984	\$20,198.9	\$74,381	\$748,263	2.8%	-\$212,407	1.2%

*3% yearly inflation on electricity costs

Total Costs

It should be noted that construction costs are only estimates based on historic data compiled from similar installations, and engineering opinion. Additional engineering and analysis is required to confirm the condition of the roofs, structural integrity of the roofs, the system type, sizing, costs and savings. Budget costs assume existing roofs are structurally sound, do not need to be replaced, and can accommodate a solar system. For illustration purposes, a draft financial analysis pro forma is attached outlining all project costs and revenues.

Table 4.3-2 Budget Installation Cost

Budget Installation Cost	\$3,048,894.4
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As stated above the estimated installation costs are based on significant experience with the pricing of solar installations in New Jersey, and are intended to provide the Township with a realistic budget cost. A typical solar installation can vary in cost from \$7.00 - \$10.00 per watt depending on size, complexity of the system, labor rates, etc. Approximately 60-70% of that number is material costs while the balance is labor, engineering, etc. Like any installation, certain conditions can affect a price upward or downward. For purposes of this analysis the estimated installation cost does not include any roofing or structural work which may be required to maintain warranties or for additional structural support. We have included a budget of \$9/watt for the solar system installation with an additional estimated budget of \$100,000 for potential electric service work.

Refer to Section 7 for discussion on Solar Renewable Energy Certificates and other financing options for solar projects. The financial model in Appendix E provides an annual forecast illustration of project revenues and costs for 25 years.

4.3.2 Geothermal Energy

Geothermal systems utilize the constant temperature of the earth throughout the year (at depths from 5 ft. to 1,000 ft. the earth temperature remains at 53 deg. F) as the

primary source of energy for the heating/cooling and domestic hot water production. Additionally, since the earth is maintained at a constant temperature from heat absorbed from the sun this energy is considered a “renewable resource,” and therefore is not as reliant on existing supplies of fossil fuels.

Even though this application requires significantly higher up-front costs, it has several advantages over conventional HVAC systems such as substantially lower operating and maintenance costs. The life span of the system is longer than conventional heating and cooling systems. Most loop fields are warranted for 25 to 50 years and are expected to last at least 50 to 100 years. However it is important to note that geothermal systems are more difficult to install in existing facilities and require higher capital cost due to having to complete significant infrastructure changes. Therefore, installation of a geothermal system is not recommended at any of the Township’s facilities at this point.

4.3.3 On-Site Wind Power Generation

On-site wind power generation typically utilizes a form of turbine, which is rotated with the flow of wind across it, this rotational force powers a generator, producing DC electricity. The DC electricity is then converted into AC electricity, which can be used for commercial power, or can be fed back into the power grid, reducing the overall electric demand. The size of the turbine is proportional to the amount of wind and concurrently the amount of energy it can produce. An ideal location for a wind turbine is 20 feet above any surrounding object within a 250 foot radius. In general this relates to a property size of one acre or more.

To get a general idea if your region has good wind resources, 3Tier’s FirstLook online wind mapping tool was utilized to determine that the local average wind speed is 7.8 mph or 3.5 m/s. In general, an average of 9 mph wind speed, as determined over the course of a year is required to ‘fuel’ the wind turbine.

On-site wind power generation is not recommended for the Township, as a preliminary evaluation based on the average maintained wind speed in this area would result in an annual electrical energy output of 4,334 kWh. The system would require a high initial investment, including feasibility studies, material and labor costs, installation, and lifetime maintenance costs and would not generate enough energy savings to result in an attractive payback period.

Section 5

Evaluation of Energy Purchasing and Procurement Strategies

5.1 Energy Deregulation

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law, the deregulation of the market, allowed all consumers to shop for their electric supplier. The intent was to create a competitive market for electrical energy supply. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party supplier. Energy deregulation in New Jersey increased the energy buyers' options by separating the function of electricity distribution from that of electricity supply.

Jersey Central Power and Light (JCP&L) is currently the generator and supplier of electrical energy for the Township. Energy deregulation creates the opportunity to choose your electric generation supplier. The benefit of this is the ability to choose a supplier based on what is important to you, for example, lowest rate or how the electric generation supply is produced.

To sell electric generation service in New Jersey, electric power suppliers must be licensed by the New Jersey Board of Public Utilities (NJ BPU). They must also be registered with the local public utility (JCP&L) to sell electric service in that utility's service areas. The following suppliers are licensed with the NJ BPU and are registered to sell electric service in the JCP&L service territory:

- Amerada Hess Corp
- BOC Energy Services
- Con Edison Solutions, Inc.
- Constellation New Energy, Inc.
- Direct Energy, LLC.
- First Energy Solutions Corp.
- Glacial Energy
- Integrys Energy Service
- Liberty Power
- Pepco Energy Services, Inc.
- PP&L Energy Plus, LLC.
- Reliant Energy Solutions East, LLC.
- Sempra Energy Solutions
- South Jersey Energy
- Strategic Energy LLC
- Suez Energy Resources NA, Inc
- UGI Energy Services

5.1.1 Alternate Third Party Electrical Energy Supplier

In evaluating the potential for an alternative third party supplier, CDM contacted and requested a proposal for electrical service from Glacial Energy. The objective of which was to get an overall idea of whether or not switching electric energy suppliers is an avenue that should be pursued further to obtain electrical energy cost savings.

Glacial Energy has proposed a flat rate retail cost per kWh over the next 6 or 12 month period for four (4) electric accounts. The proposal is included in Appendix F.

The following table, Table 5.1-1, summarizes the annual cost savings available based on historical energy consumption and the proposed energy rate for a 12 month term. The retail rates used in this analysis represent the baseline generation rates from the two suppliers and do not include any applicable demand charges, societal benefits charges, transmission charges, energy charges, reconciliation charges, transitional assessment charges or system control charges that were included in the aggregate rates presented in Section 3. These baseline generation rates, are used for comparison purposes to identify any potential energy cost savings, as all other applicable charges cannot be avoided by switching suppliers. This summary table, which utilizes the historical electrical energy usage presented in Appendix A, confirms the information and available cost savings presented by Glacial Energy.

Table 5.1-1: Potential Energy Cost Savings with an Alternate Third Party Supplier - Glacial Energy

Service Location	Average Annual Consumption (kWH)	Projected Annual Cost with JCP&L (@ \$0.12334/kWH)	Proposed Annual Cost with Glacial Energy (@ \$0.10999/kWH)	Potential Annual Savings (\$)
Senior House	89,803	\$11,076	\$9,866	\$1,210
Municipal Building	391,773	\$48,321	\$43,091	\$5,230
Youth Center	44,210	\$5,453	\$4,862	\$591
Public Safety Building	445,127	\$54,901	\$48,959	\$5,942
Total Potential Annual Savings:				\$12,973

As energy cost savings are available by switching to a third party supplier, such as Glacial Energy, this is a recommended energy cost savings measure. The estimated annual cost savings available by switching to Glacial Energy is an 11% savings. CDM recommends that the Township investigate this cost savings opportunity further and

compare proposals from alternate third party suppliers to obtain the lowest electrical energy rates available.

5.2 Demand Response Program

Demand Response is a program through which a business can make money on reducing their electricity use when wholesale electricity prices are high or when heavy demand causes instability on the electric grid, which can result in voltage fluctuations or grid failure. Demand Response is an energy management program that compensates the participant for reducing their energy consumption at critical times. Demand Response is a highly efficient and cost effective means of reducing the potential for electrical grid failure and price volatility and is one of the best solutions to the Mid-Atlantic region's current energy challenges.

The program provides at least 2 hours advance notice before curtailment is required. There is typically 1 event a year that lasts about 3 hours in the summer months, when demand for electricity is at its highest.

Participation in Demand Response is generally done through companies known as Curtailment Service Providers, or CSPs, who are members of PJM Interconnection. There is no cost to enroll in the program and participation is voluntary, for instance, you can choose when you want to participate. In most cases, there is no penalty for declining to reduce your electricity use when you're asked to do so. The event is managed remotely by notifying your staff of the curtailment request and then enacting curtailment through your Building Management System. CSPs will share in a percentage of your savings, which may differ among various CSPs, since there may be costs associated with the hardware and /or software required for participation, so it is recommended that a number of CSPs be contacted to review their offers.

Section 6

Ranking of Energy Conservation and Retrofit Measures (ECRM)

6.1 ECRMs

The main objective of this energy audit is to identify potential Energy Conservation and Retrofit Measures and to determine whether or not the identified ECRM's are economically feasible to warrant the cost for planning and implementation of each measure. Economic feasibility of each identified measure was evaluated through a simple payback analysis. The simple payback analysis consists of establishing the Engineer's Opinion of Probable Construction Cost estimates; O&M cost savings estimates, projected annual energy savings estimates and the potential value of New Jersey Clean Energy Rebates or Renewable Energy Credits, if applicable. The simple payback period is then determined as the amount of time (years) until the energy savings associated with each measure amounts to the capital investment cost.

As discussed in Section 3, aggregate unit costs for electrical energy delivery and usage and natural gas delivery and usage, which accounts for all demand and tariff charges at each complex, was determined and utilized in the simple payback analyses.

In general, ECRMs having a payback period of 20 years or less have been recommended and only those recommended ECRMs within Section 4 of the report have been ranked for possible implementation. The most attractive rankings are those with the lowest simple payback period.

Ranking of ECRMs has been broken down into the following categories:

- Lighting Systems
- HVAC Systems
- Solar Systems

6.1.1 Lighting Systems

Table 6.1-1 includes the recommended ECRMs to provide energy savings for all building lighting systems, which include the installation of energy-efficient luminaires and occupancy sensors. A detailed discussion on building lighting systems is presented in Section 4.1.

Table 6.1-1 Ranking of Energy Savings Measures Summary – Lighting System Retrofits					
Complex	Retrofit Cost	Incentives	Total Cost	Annual Fiscal Savings	Simple Payback (Years)
Public Works Building	\$21,191.6	\$2,350	\$18,841.6	\$3,138.1	6.0
Municipal Building	\$224,999.7	\$9,425	\$215,574.7	\$14,502.7	8.2
Senior House	\$797.1	\$105	\$692.1	\$63.2	10.9
Library	\$144,241.6	\$4,300	\$139,941.6	\$10,417.8	13.4
Youth Center	\$188,872.4	\$175	\$188,697.4	\$7,496.1	25.2
Public Safety Building	\$169,303	\$910	\$168,393	\$5,421.2	31.1

6.1.2 HVAC Systems

Table 6.1-2 includes the recommended ECRM to provide energy savings for building HVAC systems, which provide a simple payback of less than 20 years. Additionally, despite their slightly longer payback, boiler upgrades are shown as they are recommended as well. A detailed discussion on building HVAC systems is presented in Section 4.4.

Table 6.1-2 Ranking of Energy Savings Measures Summary – HVAC System Upgrade					
Building & Measure	Retrofit Cost	Incentives	Total Cost	Annual Fiscal Savings	Simple Payback (Years)
Library – Boiler Controls	\$8,060	\$0	\$8,060	\$15,107	0.5
Municipal Building – Boiler Upgrade	\$57,141	\$2,000	\$55,141	\$2,988	18.5

6.1.3 Solar Energy

Implementation of a new solar energy system has been evaluated to determine the economic feasibility for furnishing and installing such systems for Montville Township. Based on the simple payback modeling performed, it would benefit the Township to further investigate installing the solar energy systems. This is primarily based on the initial upfront capital investment required for a solar energy system installation and an acceptable payback period.

Two major factors influencing the project financial evaluation is the variance of the prevailing energy market conditions and Solar Renewable Energy Credit (SREC) rates, with the largest impact to the simple payback model being the SREC credit pricing.

Table 6.1-4, includes a ranking of the solar energy ECRMs evaluated for Montville Township.

Table 6.1-4 Ranking of Energy Savings Measures Summary – Solar Energy Systems				
Building & Measure	Retrofit Cost	Annual SREC Credit	Annual Fiscal Savings	Simple Payback (Years)
Municipal Building	\$1,353,276.88	\$74,381	\$20,198.9	14.3
Public Works Building	\$899,429.38	\$46,471	\$12,523.8	15.2
Public Safety Building	\$796,188.13	\$40,123	\$10,208.3	15.8

Section 7

Available Grants, Incentives and Funding Sources

7.1 Solar Energy Incentives and Financial Options

7.1.1 Solar Renewable Energy Certificates

As part of New Jersey's Renewable Portfolio Standards (RPS), electric suppliers are required to have an annually-increasing percentage of their retail sales generated by solar energy. Electric suppliers fulfill this obligation by purchasing SRECs from the owners of solar generating systems. One SREC is created for every 1,000 kWh (1 MWh) of solar electricity generated. Although solar systems generate electricity and SRECs in tandem, the two are independent commodities and sold separately. The RPS, and creation of SRECs, is intended to provide additional revenue flow and financial support for solar projects in New Jersey.

We have assumed what we believe to be a conservative estimate of the market value of SRECs over a 15 year period. Over the first 5 years, we have assumed that the SREC value would be at 80% of the NJBPU market forecast. For years 6 through 9, we have assumed that the SREC value would be at 75% of the NJBPU market forecast. Finally, for the balance of the term, we have assumed that the SREC value would be at a floor of \$350 per SREC. We believe these values to be conservative compared to recent market transactions. We know of recent transactions in excess of \$650 for 1 year, \$550 for 4 years and \$375 for 12 years. Should the winning developer have contracts in place, or a view of the market that SRECs will exceed our assumptions; the economics of the project will improve.

In addition, State law now requires that the utility must interconnect and net meter your photovoltaic system provided your system passes the local electrical inspection (National Electric Code) and meets the utility safety requirements as outlined in the law. Net metering is the term given which allows your utility meter to literally "spin backward" when the solar panels are producing more electricity than the building is using. However, given the high electrical demand of the facility at most times, this scenario is unlikely to happen.

7.1.2 Renewable Energy Certificates

New Jersey's Renewable Portfolio Standards (RPS) also allows for Renewable Energy Certificates (RECs) to be sold for other forms of renewable energy. In order to qualify to receive RECs, the renewable energy system must be in compliance with the RPS class 1 renewable energy requirements. Renewable energy systems in this class include: Solar electric generation (SRECs), wind energy, wave or tidal action energy, geothermal energy, etc. However, this rate is much lower than SRECs in New Jersey, as the government has outlined the specific program described above to generate interest in solar renewable energy systems. RECs are trading on the market for

anywhere between an average of \$10 to \$50 for every 1,000 kWh (1MWh). RECs, unlike SRECs, are capped at \$50, and may not be sold for more.

For the purpose of on-site wind generation analysis, CDM is using a standard average of REC pricing at \$25/MWh. This incentive is not capped at 15 years like SRECs; therefore it may be carried throughout the 25 year analysis performed. It should be noted that RECs vary greatly from region to region and the values assumed for this analysis may not reflect actual pricing at the time of construction.

7.1.3 Financing Options for Solar Projects

1. Direct Purchase – under this model, the Township would fund the project directly, and receive all of the financial benefits of a PV system directly.
2. Power Purchase Agreement (PPA) –under this model, a private, third party would invest all of the capital necessary to build, own, operate, and maintain the PV system. The third party would claim all of the financial benefits of the project, including federal tax incentives and accelerated depreciation benefits that public sector entities are not entitled to. The Township would enter into a 15 year agreement to purchase power from the PV system at a rate guaranteed to be less than the cost of power from the utility. It should be noted that most PPAs require a minimum system size of approximately 300 kW on one building.

Additional Potential Financial Incentives:

Clean Renewable Energy Bonds –The federal government made available \$750 Million in federal income tax credit allotments for local governments to support the installation of green energy generation systems including solar photovoltaic. Such allotments may provide for an interest-free loan for the issuer.

7.2 New Jersey Clean Energy Program

7.2.1 Introduction

New Jersey's Clean Energy Program (NJCEP) promotes increased energy efficiency and the use of clean, renewable sources of energy including solar, wind, geothermal, and sustainable biomass. The results for New Jersey are a stronger economy, less pollution, lower costs, and reduced demand for electricity. NJCEP offers financial incentives, programs, and services for residential, commercial, and municipal customers.

NJCEP reduces the need to generate electricity and burn fuel which eliminates the pollution that would have been caused by such electric generation or propane, natural gas or fuel oil usage. The benefits of these programs continue for the life of the measures installed, which on average is about 15 years. Thus, the public receives substantial environmental and public health benefits from programs that also lower energy bills and benefit the economy.

7.2.2 New Jersey Smart Start Program

The New Jersey Smart Start Program offers rebate incentives for several qualifying equipment such as high efficient premium motors and lighting, and lighting controls.

Incentive information and incentive calculation worksheets are provided for the various new equipment installation identified in this report and are included in Appendix G.

7.2.3 Pay for Performance Program

Another program offered through the New Jersey Smart Start Program, is the Pay for Performance Program. Local government agencies, which are not receiving Energy Efficiency and Conservation Block Grants, are eligible for participation in the program.

Incentives are available for buildings that are able to present an Energy Reduction Plans that reduce the building's current energy consumption by 15% or more, in addition to incentives for installing the recommended measures and incentives for presenting the energy savings in a post-construction benchmarking report. No more than 50% of the total energy savings may be derived from lighting retrofits. In addition, the total energy savings of 15% may not come from the implementation of one energy savings measure. The energy savings presented in this energy report do not warrant eligibility in the Pay for Performance Program.

7.2.4 Direct Install Program

Another program offered through the New Jersey Smart Start Program, is the Direct Install Program. Small to mid-sized commercial facilities with a peak electric demand not in excess of 200 kW in any of the preceding 12 months may be eligible for the Direct Install Program. This would include all six (6) facilities covered under this energy audit.

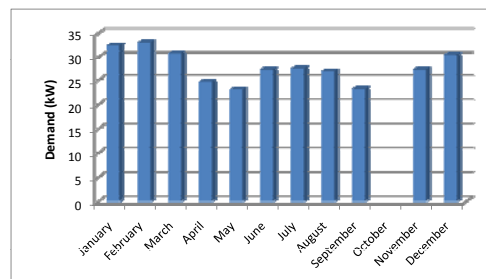
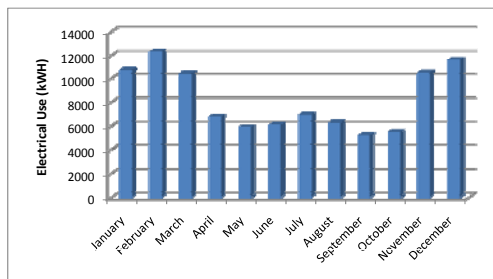
Direct Install covers lighting, HVAC, refrigeration, motors and variable frequency drive (VFD) energy efficiency measures. If eligible the program pays up to 80% of the retrofit costs, dramatically improving the payback associated with the measure.

APPENDIX A

UTILITY BILL INFORMATION

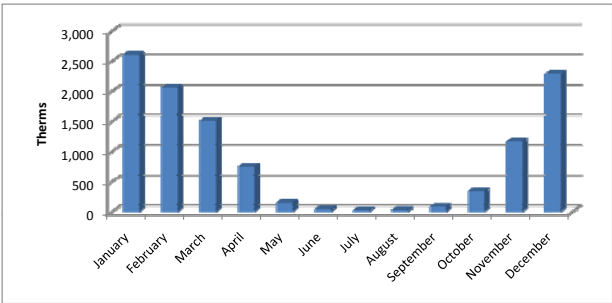
Electric Bills - DPW						
			Account #			
			1000056283979			
Comments	Month	Year	JCP&L Charges	kWH	Cost Per KWH	Measured Demand
	December	2006	\$1,403.60	10480	\$0.13	32.8
	January	2007	\$1,384.28	10,320	\$0.13	31.6
	February	2007	\$1,814.63	14,040	\$0.13	34.0
	March	2007	\$1,297.90	10,080	\$0.13	29.2
	April	2007	\$918.22	6,960	\$0.13	23.6
	May	2007	\$957.40	5,840	\$0.16	24.4
	June	2007	\$1,055.55	5,640	\$0.19	28.8
	July	2007				
	August	2007				
	September	2007	\$822.95	5,440	\$0.15	24.0
	October	2007				
	November	2007				
	December	2007	\$1,756.85	11,720	\$0.15	28.0
	January	2008	\$1,700.74	11,120	\$0.15	33.2
from spreadsheet provided, not actual bill	February	2008	\$1,810.08	12,080	\$0.15	
from spreadsheet provided, not actual bill	March	2008	\$1,606.26	11,200	\$0.14	
	April	2008	\$1,002.56	6,640	\$0.15	25.6
	May	2008	\$998.55	5,720	\$0.17	21.6
from spreadsheet provided, not actual bill	June	2008	\$1,225.70	6,480	\$0.19	
from spreadsheet provided, not actual bill	July	2008	\$1,410.60	7,600	\$0.19	28.0
	August	2008	\$1,102.95	5,760	\$0.19	
from spreadsheet provided, not actual bill	September	2008				
	October	2008	\$906.88	5,480	\$0.17	
	November	2008	\$1,627.44	10,520	\$0.15	27.2
	December	2008	\$2,026.40	12,680	\$0.16	30.4
	January	2009				
	February	2009	\$1,784.88	10,920	\$0.16	32.0
	March	2009	\$1,622.58	10,000	\$0.16	32.4
	April	2009				
	May	2009	\$1,166.81	6,200	\$0.19	23.2
	June	2009	\$1,150.90	6,200	\$0.19	25.6
	July	2009	\$1,178.09	6,320	\$0.19	26.8
	August	2009	\$1,250.86	6,840	\$0.18	26.8
	September	2009	\$812.62	4,760	\$0.17	22.4
	October	2009				
	November	2009				

Month	Average Use (KWH)	Average Demand (KW)
January	10720	32
February	12347	33
March	10427	31
April	6800	25
May	5920	23
June	6107	27
July	6960	27
August	6300	27
September	5227	23
October	5480	
November	10520	27
December	11627	30
Total	98433	



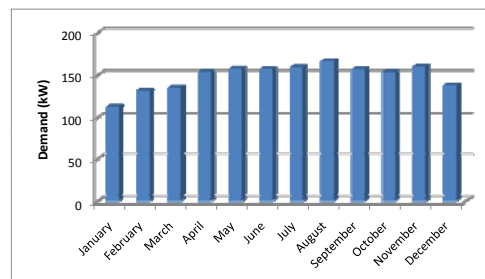
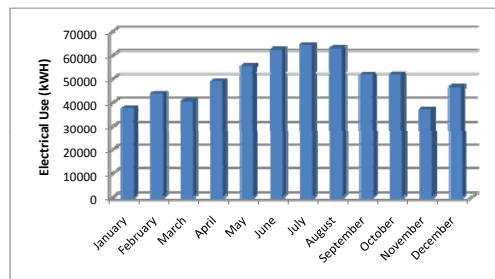
Natural Gas Bills - DPW						
NING Account #22-0009-3099-52, Meter# 00522745						
Date	Year	Use (Therms)	Total Charge	Cost/Therm	Month	Adjusted Monthly Usage
Jan 17 - Feb 20	2007	3121.07	\$4,022.02	\$1.29	January	
Feb 20 - Mar 20	2007	2125.20	\$2,932.59	\$1.38	February	
Mar 20 - May 17	2007	1140.70	\$1,608.03	\$1.41	March	
	2007				April	
	2007				May	
	2007				June	
	2007				July	
	2007				August	
	2007				September	
	2007				October	
	2007				November	
	2007				December	
Jan 17 - Feb 20	2008	2223.60	\$3,176.99	\$1.43	January	2,224
Feb 20 - Mar 18	2008	1518.65	\$2,313.84	\$1.52	February	1,989
Mar 18 - May 19	2008	1002.82	\$1,699.90	\$1.70	March	1,347
	2008	116.96	\$232.00		April	708
May 19 - July 22	2008	86.98	\$197.12	\$2.27	May	107
	2008				June	58
July 22 - Aug 18	2008	30.46	\$68.54	\$2.25	July	10
Aug 18 - Sept 12	2008	1.05	\$13.69		August	21
Sept 12 - Oct 17	2008	75.35	\$138.43	\$1.84	September	26
Oct 17 - Nov 17	2008	877.72	\$1,337.37	\$1.52	October	343
	2008	1744.77	\$2,444.77	\$1.40	November	1,167
Dec 18 - Jan 19	2008	3360.47	\$4,428.51	\$1.32	December	2,283
Jan 19 - Feb 19	2009	2194.69	\$2,638.82	\$1.20	January	2,972
Feb 19 - Mar 18	2009	1983.37	\$2,188.99	\$1.10	February	2,124
Mar 18 - Apr 21	2009	1046.00	\$1,194.61	\$1.14	March	1,671
Apr 21 - May 22	2009	282.12	\$454.14	\$1.61	April	791
May 22 - June 19	2009	16.67	\$211.32		May	194
Jun 19 - Jul 18	2009	37.54	\$231.91		June	24
Jul 18 - Aug 17	2009	29.16	\$223.55		July	35
Aug 17 - Sept 21	2009	52.06	\$241.76		August	37
Sep 21 - Oct 21	2009	320.38	490.00	\$1.53	September	142

Month	Average Therm Usage
January	2,598
February	2,056
March	1,509
April	749
May	150
June	41
July	22
August	29
September	84
October	343
November	1,167
December	2,283



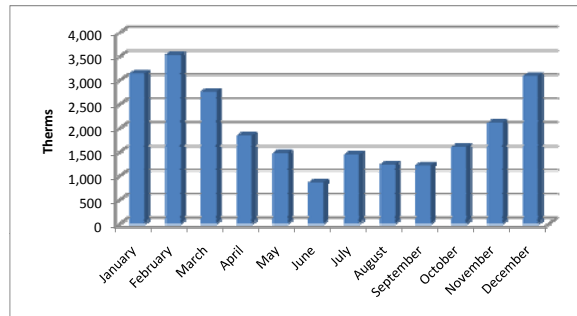
Electric Bills - Library						
			Account #			
			100007439795			
Comments	Month	Year	JCP&L Charges	kWH	Cost Per KWH	Measured Demand
	December	2006				
	January	2007	\$4,722.25	35,520	\$0.13	102.0
	February	2007	\$6,223.69	49,120	\$0.13	101.1
	March	2007	\$5,544.90	42,360	\$0.13	136.4
	April	2007	\$6,319.50	48,280	\$0.13	155.4
	May	2007	\$8,686.14	55,440	\$0.16	170.2
	June	2007				
	July	2007	\$11,582.95	67,960	\$0.17	
	August	2007	\$10,885.57	63,240	\$0.17	177.0
	September	2007	\$7,963.44	56,680	\$0.14	154.5
	October	2007	\$8,239.32	58,600	\$0.14	155.0
	November	2007	\$3,952.88	26,680	\$0.15	182.2
	December	2007	\$5,990.86	45,640	\$0.13	
	January	2008	\$6,292.40	40,520	\$0.16	135.4
	February	2008	\$6,297.13	40,320	\$0.16	148.0
	March	2008	\$5,994.71	41,440	\$0.14	118.7
	April	2008	\$7,327.74	50,320	\$0.15	151.6
	May	2008	\$8,742.37	51,720	\$0.17	151.8
	June	2008	\$11,808.18	67,080	\$0.18	153.8
	July	2008	\$11,296.50	63,720	\$0.18	157.6
	August	2008	\$10,512.42	59,040	\$0.18	161.2
	September	2008	\$8,852.83	57,720	\$0.15	156.2
	October	2008	\$7,171.85	45,320	\$0.16	153.0
	November	2008	\$7,309.05	47,720	\$0.15	138.0
	December	2008	\$5,602.17	33,040	\$0.17	128.8
	January	2009	\$5,985.06	36,720	\$0.16	100.9
	February	2009	\$7,017.05	42,120	\$0.17	146.3
	March	2009	\$6,378.68	38,240	\$0.17	150.5
	April	2009	\$7,820.32	48,200	\$0.16	155.6
	May	2009	\$10,486.76	59,000	\$0.18	151.0
	June	2009	\$10,130.81	57,400	\$0.18	160.6
	July	2009	\$10,662.85	61,080	\$0.17	161.4
	August	2009	\$11,464.82	66,480	\$0.17	161.2
	September	2009	\$8,529.68	53,360	\$0.16	160.5
	October	2009				
	November	2009				

Month	Average Use (KWH)	Average Demand (KW)
January	37587	113
February	43853	132
March	40680	135
April	48933	154
May	55387	158
June	62240	157
July	64253	160
August	62920	166
September	51787	157
October	51960	154
November	37200	160
December	46680	138
Total	603480	



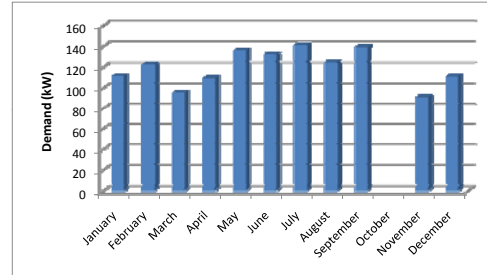
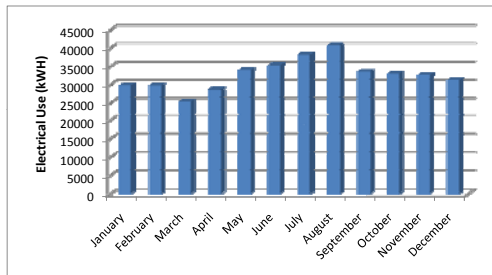
Natural Gas Bills - Library						
NJNG Account #04-1220-8825-13, Meter# 00543815						
Date	Year	Use (Therms)	Total Charge	Cost/Therm	Month	Adjusted Monthly Usage
Dec 21 - Jan 23	2006	3979.24	\$4,979.17	\$1.25	December	
Jan 23 - Feb 22	2007	4467.91	\$5,709.95	\$1.28	January	4,142
Feb 22 - Mar 23	2007	3686.88	\$5,081.29	\$1.38	February	4,208
Mar 23 - Apr 24	2007	864.43	\$1,212.25	\$1.40	March	2,746
Apr 24 - May 18	2007	3539.29	\$4,854.05	\$1.37	April	1,756
May 18 - June 22	2007	28.46	\$54.47	\$1.91	May	2,369
June 22 - July 25	2007	3329.9	\$4,407.33	\$1.32	June	1,129
July 25 - Aug 21	2007	1303.42	\$1,633.60	\$1.25	July	2,654
Aug 21 - Sept 21	2007	1754.3	\$2,051.05	\$1.17	August	1,454
Sept 21 - Oct 22	2007	1677.81	\$2,070.83	\$1.23	September	1,729
Oct 22 - Nov 17	2007	1770.07	\$2,384.20	\$1.35	October	1,709
Nov 17 - Dec 21	2007	3601.94	\$4,897.81	\$1.36	November	2,381
Dec 21 - Jan 18	2007	1996.21	\$2,724.96	\$1.37	December	3,067
Jan 18 - Feb 22	2008	3253.77	\$4,633.79	\$1.42	January	2,415
Feb 22 - Mar 19	2008	2923.33	\$4,471.00	\$1.53	February	3,144
Mar 19 - Apr 23	2008	2559.75	\$4,130.35	\$1.61	March	2,802
Apr 23 - May 21	2008	143.78	\$267.35	\$1.86	April	1,754
May 21 - July 22	2008	315.84	\$636.32	\$2.01	May	201
	2008				June	211
July 22 - Aug 20	2008	1529.9	\$2,633.21	\$1.72	July	510
Aug 20 - Sept 16	2008	958.83	\$1,486.23	\$1.55	August	1,340
Sept 16 - Oct 21	2008	1725.35	\$2,484.80	\$1.44	September	1,214
Oct 21 - Nov 18	2008	1083.87	\$1,680.55	\$1.55	October	1,512
Nov 18 - Dec 22	2008	3351.19	\$4,608.45	\$1.38	November	1,840
Dec 22 - Jan 23	2008	2659.71	\$3,575.80	\$1.34	December	3,121
Jan 23 - Feb 23	2009	3301.56	\$3,822.21	\$1.16	January	2,874
Feb 23 - Mar 25	2009	3144.98	\$3,386.52	\$1.08	February	3,249
Mar 25 - Apr 23	2009	1974.64	\$2,146.15	\$1.09	March	2,755
Apr 23 - May 23	2009	2108.00	\$2,192.63	\$1.04	April	2,019
May 23 - June 23	2009	1331.15	\$1,501.24	\$1.13	May	1,849
June 23 - Jul 20	2009	1075.89	\$1,305.33	\$1.21	June	1,246
Jul 20 - Aug 21	2009	1375.62	\$1,563.94	\$1.14	July	1,176
	2009				August	917
Sep 23 - Oct 23	2009	2153.95	\$2,245.86	\$1.04	September	718

Month	Average Therm Usage
January	3,144
February	3,534
March	2,768
April	1,843
May	1,473
June	862
July	1,447
August	1,237
September	1,220
October	1,610
November	2,110
December	3,094



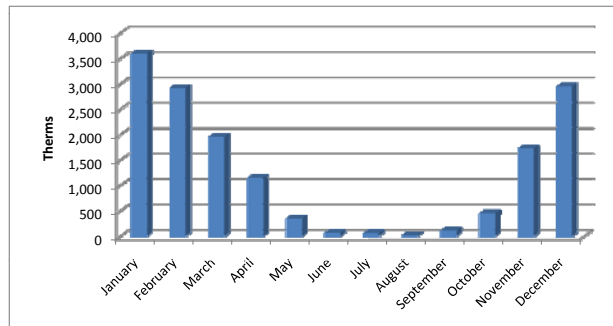
Electric Bills - Municipal Building						
			Account #			
			100007989070			
Comments	Month	Year	JCP&L Charges	kWH	Cost Per KWH	Measured Demand
	December	2006	\$4,108.07	31,120	\$0.13	167.8
	January	2007	\$3,728.89	27,680	\$0.13	167.8
	February	2007	\$4,239.86	32,400	\$0.13	167.8
	March	2007	\$3,707.21	27,200	\$0.14	110.3
	April	2007	\$4,019.71	30,080	\$0.13	109.6
	May	2007	\$5,741.91	34,480	\$0.17	152.1
	June	2007	\$6,951.93	39,600	\$0.18	135.4
	July	2007	\$6,909.89	38,240	\$0.18	159.1
	August	2007				
	September	2007	\$5,383.63	35,600	\$0.15	156.1
	October	2007				
	November	2007				
	December	2007	\$4,869.10	32,240	\$0.15	83.0
	January	2008	\$4,572.29	30,160	\$0.15	83.6
from spreadsheet provided, not actual bill	February	2008	\$4,050.17	26,560	\$0.15	
from spreadsheet provided, not actual bill	March	2008	\$4,208.51	19,120	\$0.22	
	April	2008	\$4,149.67	27,280	\$0.15	109.6
	May	2008	\$5,724.08	32,480	\$0.18	128.2
	June	2008	\$6,517.92	34,320		
	July	2008	\$7,506.98	40,800	\$0.18	140.4
	August	2008				
from spreadsheet provided, not actual bill	September	2008	\$6,403.47	34,320	\$0.19	
from spreadsheet provided, not actual bill	October	2008	\$5,271.12	32,960	\$0.16	
	November	2008	\$5,102.74	32,560	\$0.16	91.2
	December	2008	\$4,903.03	30,240	\$0.16	83.0
	January	2009	\$5,083.74	31,280	\$0.16	83.7
	February	2009	\$4,839.09	30,080	\$0.16	77.9
	March	2009	\$4,717.67	29,680	\$0.16	80.8
	April	2009				
	May	2009	\$6,509.36	34,720	\$0.19	128.2
	June	2009	\$5,899.78	31,840	\$0.19	129.5
	July	2009	\$6,442.46	35,520	\$0.18	124.4
	August	2009	\$7,214.45	40,800	\$0.18	124.7
	September	2009	\$5,094.50	30,640	\$0.17	122.6

Month	Average Use (KWH)	Average Demand (KW)
January	29707	112
February	29680	123
March	25333	96
April	28680	110
May	33893	136
June	35253	132
July	38187	141
August	40800	125
September	33520	139
October	32960	
November	32560	91
December	31200	111
Total	391773	



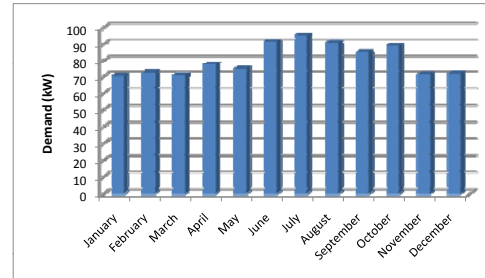
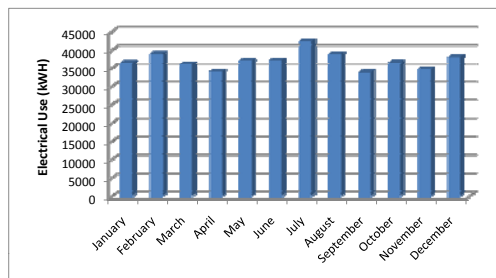
Natural Gas Bills - Municipal Building						
NJNG Account #06-1228-0985-12, Meter# 00535669						
Date	Year	Use (Therms)	Total Charge	Cost/Therm	Month	Adjusted Monthly Usage
Jan 18 - Feb 20	2007	4407.00	\$5,633.61	\$1.28	January	
Feb 20 - Mar 20	2007	1808.98	\$2,498.48	\$1.38	February	3,541
Mar 20 - Apr 20	2007	1747.74	\$2,437.65	\$1.39	March	1,789
Apr 20 - May 18	2007	485.64	\$684.88	\$1.41	April	1,327
May 18 - June 20	2007	56.68	\$93.51	\$1.65	May	343
June 20 - July 21	2007	188.43	\$265.74	\$1.41	June	101
July 21 - Aug 17	2007	3.21	\$19.12	\$5.96	July	127
Aug 17 - Sept 18	2007	177.69	\$222.67	\$1.25	August	61
Sept 18 - Oct 18	2007	100.51	\$136.94	\$1.36	September	152
Oct 18 - Nov 14	2007	976.66	\$1,300.72	\$1.33	October	393
	2007				November	
	2007				December	
Jan 16 - Feb 20	2008	2791.55	\$3,984.61	\$1.43	January	
Feb 20 - Mar 19	2008	2333.91	\$3,572.58	\$1.53	February	2,639
Mar 19 - Apr 21	2008	1298.63	\$2,094.50	\$1.61	March	1,989
Apr 21 - May 19	2008	664.5	\$1,168.17	\$1.76	April	1,087
May 19 - June 19	2008	109.66	\$218.48	\$1.99	May	480
June 19 - July 22	2008	76.92	\$167.13	\$2.17	June	99
July 22 - Aug 18	2008	3.21	\$20.73	\$6.46	July	52
Aug 18 - Sept 15	2008	5.34	\$23.29	\$4.36	August	4
Sept 15 - Oct 17	2008	74.67	\$133.59	\$1.79	September	28
Oct 17 - Nov 14	2008	1399.76	\$2,133.35	\$1.52	October	516
	2008	2391.21	\$3,380.04	\$1.41	November	1,730
Dec 18 - Jan 21	2008	4074.65	\$5,395.50	\$1.32	December	2,952
Jan 21 - Feb 19	2009	2660.7	\$3,259.64	\$1.23	January	3,603
Feb 19 - Mar 18	2009	2469.94	\$2,780.03	\$1.13	February	2,597
Mar 18 - Apr 21	2009	1375.53	\$1,611.31	\$1.17	March	2,105
Apr 21 - May 22	2009	320.63	\$591.49	\$1.84	April	1,024
May 22 - June 19	2009	3.19	\$301.03	\$94.37	May	215
Jun 19 - Jul 17	2009	10.63	\$308.28	\$29.00	June	6
Jul 17 - Aug 18		5.31	\$303.12	\$57.08	July	9
Aug 18 - Sep 21		13.80	\$310.24	\$22.48	August	8
Sep 21 - Oct 21		430.52	\$693.17	\$1.61	September	153

Month	Average Therm Usage
January	3,603
February	2,926
March	1,961
April	1,146
May	346
June	68
July	63
August	24
September	111
October	454
November	1,730
December	2,952



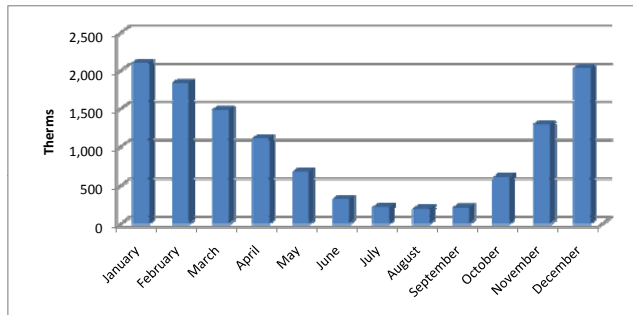
Electric Bills - Public Safety Building						
			Account #			
			1000043610425			
Comments	Month	Year	JCP&L Charges	kWH	Cost Per KWH	Measured Demand
	December	2006	\$4,974.69	39760	\$0.13	73.4
	January	2007	\$4,603.95	36,160	\$0.13	72.4
	February	2007	\$5,133.14	40,880	\$0.13	72.5
	March	2007	\$4,944.71	40,640	\$0.12	72.9
	April	2007	\$4,451.40	35,800	\$0.12	79.0
	May	2007	\$5,944.41	40,400	\$0.15	74.3
	June	2007	\$6,348.23	37,000	\$0.17	105.3
	July	2007	\$7,335.47	43,840	\$0.17	97.9
	August	2007	\$6,266.52	37,120	\$0.17	90.9
	September	2007	\$5,561.47	41,040	\$0.14	78.7
	October	2007	\$5,102.15	36,640	\$0.14	89.3
	November	2007				
	December	2007	\$5,483.63	37,400	\$0.15	70.0
from spreadsheet provided, not actual bill	January	2008	\$5,731.33	39,440	\$0.15	71.0
from spreadsheet provided, not actual bill	February	2008	\$5,369.55	36,880	\$0.15	
	March	2008	\$5,436.02	39,360	\$0.14	
	April	2008	\$4,580.71	32,400	\$0.14	76.4
	May	2008	\$5,595.89	34,160	\$0.16	77.9
from spreadsheet provided, not actual bill	June	2008	\$6,398.39	35,680	\$0.18	
from spreadsheet provided, not actual bill	July	2008	\$7,646.82	43,680	\$0.18	94.1
from spreadsheet provided, not actual bill	August	2008	\$7,126.78	40,720	\$0.18	
from spreadsheet provided, not actual bill	September	2008	\$4,901.99	31,880	\$0.15	
	October	2008				
	November	2008	\$5,239.60	34,680	\$0.15	71.4
	December	2008	\$5,872.21	37,440	\$0.16	72.6
	January	2009	\$5,394.61	34,120	\$0.16	68.0
	February	2009	\$6,164.98	39,400	\$0.16	72.5
	March	2009	\$4,477.35	28,520	\$0.16	69.0
	April	2009				
	May	2009	\$6,407.98	37,040	\$0.17	72.6
	June	2009	\$6,693.65	39,160	\$0.17	78.2
	July	2009	\$6,898.23	39,760	\$0.17	94.1
	August	2009	\$6,746.81	39,120	\$0.17	90.9
	September	2009	\$4,597.74	28,520	\$0.16	91.8
	October	2009				
	November	2009				

Month	Average Use (KWH)	Average Demand (KW)
January	36573	70
February	39053	73
March	36173	71
April	34100	78
May	37200	75
June	37280	92
July	42427	95
August	38987	91
September	33813	85
October	36640	89
November	34680	71
December	38200	72
Total	445127	



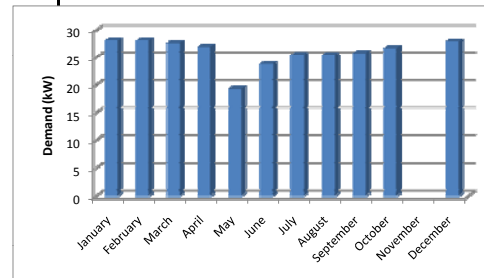
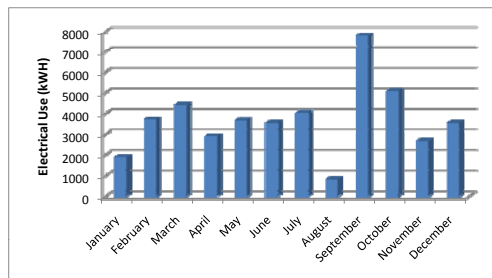
Natural Gas Bills - Public Safety Building						
NJNG Account #22-0007-7102-75, Meter# 00696524						
Date	Year	Use (Therms)	Total Charge	Cost/Therm	Month	Adjusted Monthly Usage
Jan 11 - Feb 13	2007	2242.91	\$2,814.08	\$1.25	January	
Feb 13 - Mar 15	2007	2237.44	\$3,070.51	\$1.37	February	2,240
Mar 15 - Apr 16	2007	1530.92	\$2,140.78	\$1.40	March	1,884
Apr 16 - May 11	2007	567.21	\$794.67	\$1.40	April	1,049
May 11 - June 14	2007	655.59	\$920.79	\$1.40	May	611
June 14 - July 18	2007	234.23	\$328.54	\$1.40	June	445
July 18 - Aug 13	2007	464.38	\$597.27	\$1.29	July	349
Aug 13 - Sept 13	2007	70.68	\$98.75	\$1.40	August	268
Sept 13 - Oct 12	2007	359.38	\$441.28	\$1.23	September	215
Oct 12 - Nov 7	2007	697.69	\$913.89	\$1.31	October	529
Nov 7 - Dec 13	2007	1936.84	\$2,656.99	\$1.37	November	1,317
	2007				December	
Jan 15 - Feb 13	2008	1917.57	\$2,687.70	\$1.40	January	1,918
Feb 13 - Mar 13	2008	1439.6	\$2,178.96	\$1.51	February	1,679
Mar 13 - Apr 15	2008	1295.64	\$2,072.95	\$1.60	March	1,368
	2008	818.61	\$1,397.39	\$1.71	April	1,057
	2008	476.38	\$891.77	\$1.87	May	647
June 13 - July 15	2008	204.24	\$413.34	\$2.02	June	340
July 15 - Aug 12	2008	261.67	\$497.11	\$1.90	July	233
Aug 12 - Sept 9	2008	267.34	\$430.21	\$1.61	August	265
Sept 9 - Oct 10	2008	342.76	\$517.81	\$1.51	September	305
Oct 10 - Nov 11	2008	1025.99	\$1,581.88	\$1.54	October	684
Nov 11 - Dec 12	2008	1509.14	\$2,154.41	\$1.43	November	1,268
Dec 12 - Jan 14	2008	2553.45	\$3,463.43	\$1.36	December	2,031
Jan 14 - Feb 12	2009	2013.69	\$2,542.49	\$1.26	January	2,284
Feb 12 - Mar 12	2009	1188.2	\$1,430.91	\$1.20	February	1,601
Mar 12 - Apr 15	2009	1232.71	\$1,415.16	\$1.15	March	1,210
Mar 12 - May 15	2009	1216.72	\$1,599.23	\$1.31	April	1,225
May 15 - June 15	2009	283.60	\$485.66	\$1.71	May	750
June 15 - Jul 13	2009	82.76	\$304.07	\$3.67	June	183
Jul 13 - Aug 12	2009	57.54	\$280.60	\$4.88	July	70
Aug 12 - Sep 15	2009	49.16	\$269.64	\$5.48	August	53
Sep 15 - Oct 14	2009	186.03	\$392.78	\$2.11	September	118

Month	Average Therm Usage
January	2,101
February	1,840
March	1,487
April	1,110
May	670
June	323
July	217
August	195
September	213
October	606
November	1,292
December	2,031



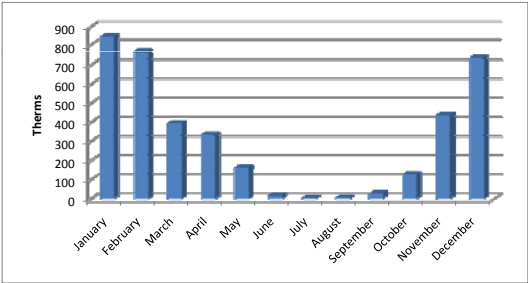
Electric Bills - Youth Center						
			Account #			
			100038832836			
Comments	Month	Year	JCP&L Charges	kWH	Cost Per KWH	Measured Demand
	December	2006				
Billed on actual meter reading	January	2007	\$297.61	1,600	\$0.19	28.7
Billed on actual meter reading	February	2007	\$526.55	3,600	\$0.15	28.7
Billed on estimate usage	March	2007	\$969.74	7,720	\$0.13	28.7
Billed on estimate usage	April	2007	\$475.81	3,280	\$0.15	28.7
Billed on estimate usage	May	2007	\$490.11	3,400	\$0.14	19.3
Billed on estimate usage	June	2007	\$912.82	5,200	\$0.18	21.8
Billed on actual meter reading	July	2007	\$382.00	1,360	\$0.28	26.6
Billed on estimate usage	August	2007	\$204.06	360	\$0.57	28.1
	September	2007				
Billed on estimate usage	October	2007	\$589.61	3,880	\$0.15	27.6
	November	2007				
	December	2007				
Billed on estimate usage	January	2008	\$379.20	2,000	\$0.19	27.6
Billed on estimate usage from spreadsheet provided, not actual bill	February	2008	\$640.73	3,960	\$0.16	27.6
from spreadsheet provided, not actual bill	March	2008	\$675.58	3,690		
from spreadsheet provided, not actual bill	April	2008	\$526.28	3,280		
Billed on estimate usage	May	2008	\$615.36	3,960	\$0.16	19.3
Billed on actual meter reading from spreadsheet provided, not actual bill	June	2008	\$505.51	2,120	\$0.24	25.8
Billed on estimate usage from spreadsheet provided, not actual bill	July	2008	\$1,139.21	6,040		
Billed on estimate usage from spreadsheet provided, not actual bill	August	2008	\$318.28	1,000	\$0.32	24.1
from spreadsheet provided, not actual bill	September	2008	\$1,561.09	8,880		
from spreadsheet provided, not actual bill	October	2008	\$1,554.15	8,880		
from spreadsheet provided, not actual bill	November	2008	\$527.96	2,680		
Billed on estimate usage	December	2008	\$621.01	3,560	\$0.17	28.0
Billed on estimate usage	January	2009	\$408.47	2,040	\$0.20	28.0
Billed on estimate usage	February	2009	\$635.38	3,600	\$0.18	28.0
Billed on actual meter reading	March	2009	\$374.48	1,880	\$0.20	26.6
Billed on actual meter reading	April	2009	\$464.99	2,200	\$0.21	25.2
	May	2009				
Billed on actual meter reading	June	2009	\$684.10	3,360	\$0.20	23.7
Billed on actual meter reading	July	2009	\$900.99	4,720	\$0.19	24.3
Billed on estimate usage	August	2009	\$334.08	1,120	\$0.30	24.1
Billed on actual meter reading	September	2009	\$1,200.19	6,760	\$0.18	25.8
Billed on actual meter reading	October	2009	\$459.11	2,520	\$0.18	25.8
	November	2009				

Month	Average Use (KWH)	Average Demand (KW)
January	1880	28
February	3720	28
March	4430	28
April	2920	27
May	3680	19
June	3560	24
July	4040	25
August	827	25
September	7820	26
October	5093	27
November	2680	
December	3560	28
Total	44210	



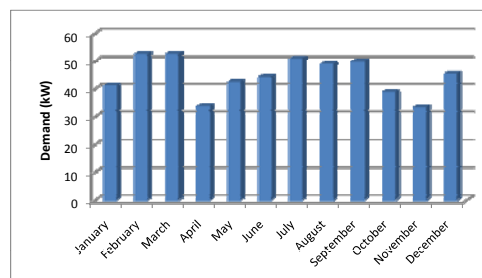
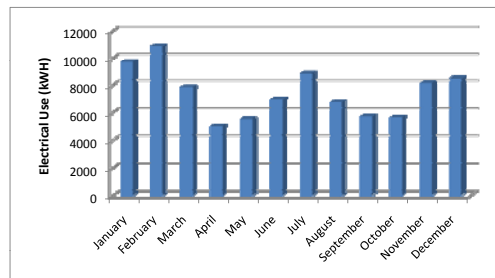
Natural Gas Bills - Youth Center							
NJNG Account #22-0005-6944-27, Meter# 00719452							
Date	Year	Use at Youth Center & Field House (Therms)	Use at Youth Center (65%) (Therms)	Total Charge	Cost/Therm	Month	Adjusted Monthly Usage
Jan 18 - Feb 20	2007	2956.47	1922	\$3,814.34	\$1.29	January	
Feb 20 - Mar 22	2007	2668.90	1735	\$3,698.29	\$1.39	February	
Mar 22 - May 19	2007	1125.99	732	\$1,587.70	\$1.41	March	
	2007					April	
	2007					May	
	2007					June	
	2007					July	
	2007					August	
	2007					September	
	2007					October	
	2007					November	
	2007					December	
Jan 16 - Feb 20	2008	1742	1132	\$2,492.18	\$1.43	January	
Feb 20 - Mar 19	2008	528.55	344	\$820.75	\$1.55	February	869
Mar 19 - Apr 21	2008	699.83	455	\$1,135.69	\$1.62	March	381
Apr 21 - May 16	2008	691.62	450	\$1,172.92	\$1.70	April	453
May 16 - July 21	2008	67.38	44	\$161.86	\$2.40	May	314
	2008					June	29
July 21 - Aug 18	2008	11.61	8	\$35.47	\$3.06	July	3
Aug 18 - Sept 15	2008	5.26	3	\$23.18	\$4.41	August	6
Sept 15 - Oct 17	2008	42.06	27	\$87.27	\$2.07	September	11
Oct 17 - Nov 17	2008	499.84	325	\$851.30	\$1.70	October	127
Nov 17 - Dec 18	2008	1023.95	666	\$1,521.04	\$1.49	November	438
Dec 18 - Jan 21	2008	1364.57	887	\$1,908.39	\$1.40	December	739
Jan 21 - Feb 19	2009	1176.94	765	\$1,511.32	\$1.28	January	846
Feb 19 - Mar 23	2009	700.06	455	\$901.43	\$1.29	February	662
Mar 23 - Apr 21	2009	488.67	318	\$667.85	\$1.37	March	409
Apr 21 - May 21	2009	21.00	14	\$220.53		April	216
May 21 - June 19	2009	8.37	5	\$209.01		May	11
Jul 19 - Jul 17	2009	8.38	5	\$209.33		June	5
Jul 17 - Aug 17	2009	8.37	5	\$209.22		July	5
Aug 17 - Sep 19	2009	5.23	3	\$205.95		August	5
Sep 19 - Oct 21	2009	183.94	120	\$370.10	\$2.01	September	42

Month	Average Therm Usage
January	846
February	766
March	395
April	335
May	163
June	17
July	4
August	5
September	27
October	127
November	438
December	739



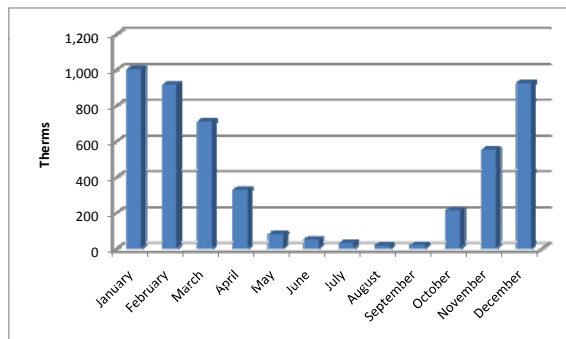
Electric Bills - Senior House						
			Account #			
			100008645416			
Comments	Month	Year	JCP&L Charges	kWH	Cost Per KWH	Measured Demand
	December	2006	\$1,020.80	7,280	\$0.14	54.6
	January	2007				
	February	2007	\$1,483.59	11,280	\$0.13	54.6
	March	2007	\$1,077.26	8,000	\$0.13	54.6
	April	2007	\$955.99	6,880	\$0.14	32.1
	May	2007	\$1,052.27	5,880	\$0.18	39.0
	June	2007	\$1,437.58	7,320	\$0.20	48.3
	July	2007	\$1,596.02	8,240	\$0.19	51.0
	August	2007	\$1,333.11	6,600	\$0.20	49.0
	September	2007	\$1,211.00	7,320	\$0.17	49.3
	October	2007	\$939.19	5,640	\$0.17	38.9
	November	2007				
	December	2007	\$1,255.69	7,920	\$0.16	30.8
	January	2008	\$1,383.05	8,960	\$0.15	51.0
from spreadsheet provided, not actual bill	February	2008	\$1,524.82	10,808	\$0.14	
from spreadsheet provided, not actual bill	March	2008	\$1,164.10	7,760	\$0.15	
	April	2008	\$623.01	3,200	\$0.19	35.3
	May	2008	\$1,054.94	5,360	\$0.20	39.0
from spreadsheet provided, not actual bill	June	2008	\$1,549.70	7,520	\$0.21	
	July	2008	\$1,894.89	9,680	\$0.20	51.0
	August	2008				
	September	2008				
from spreadsheet provided, not actual bill	October	2008	\$1,089.93	5,680	\$0.19	
	November	2008	\$1,331.53	8,160	\$0.16	33.4
	December	2008	\$1,674.90	10,320	\$0.16	51.1
	January	2009	\$1,721.95	10,520	\$0.16	31.4
	February	2009	\$1,718.03	10,600	\$0.16	51.1
	March	2009	\$1,293.81	7,840	\$0.17	51.1
	April	2009				
	May	2009	\$1,245.53	5,480	\$0.23	49.4
	June	2009	\$1,219.41	6,040	\$0.20	40.3
	July	2009	\$1,714.65	8,720	\$0.20	51.0
	August	2009	\$1,419.20	6,960	\$0.20	49.0
	September	2009	\$901.16	4,160	\$0.22	50.4
	October	2009				
	November	2009				

Month	Average Use (KWH)	Average Demand (KW)
January	9740	41
February	10896	53
March	7867	53
April	5040	34
May	5573	42
June	6960	44
July	8880	51
August	6780	49
September	5740	50
October	5660	39
November	8160	33
December	8507	46
Total	89803	



Natural Gas Bills - Senior House						
NJNG Account #22-0007-4665-24, Meter# 00696475						
Date	Year	Use (Therms)	Total Charge	Cost/Therm	Month	Adjusted Monthly Usage
Jan 11 - Feb 13	2007	946.49	\$1,390.73	\$1.47	January	
Feb 13 - Mar 15	2007	908.27	\$1,335.18	\$1.47	February	927
Mar 15 - Apr 16	2007	552.77	\$818.50	\$1.48	March	731
Apr 16 - May 11	2007	42.17	\$73.37	\$1.74	April	297
May 11 - June 14	2007	51.65	\$90.16	\$1.75	May	47
June 14 - July 18	2007	4.22	\$21.24	\$5.03	June	28
July 18 - Aug 13	2007	21.11	\$42.76	\$2.03	July	13
Aug 13 - Sept 14	2007	5.28	\$22.77	\$4.31	August	13
Sept 14 - Oct 12	2007	27.4	\$54.81	\$2.00	September	16
Oct 12 - Nov 7	2007	212.16	\$317.86	\$1.50	October	120
Nov 7 - Dec 13	2007	709.86	\$1,041.24	\$1.47	November	461
	2007				December	
Jan 15 - Feb 13	2008	925.14	\$1,348.51	\$1.46	January	925
Feb 13 - Mar 13	2008	694.58	\$1,016.19	\$1.46	February	810
Mar 13 - Apr 15	2008	567.43	\$832.94	\$1.47	March	631
	2008	48.28	\$81.66	\$1.69	April	308
	2008	101.78	\$161.80	\$1.59	May	75
June 13 - July 15	2008	26.32	\$53.04	\$2.02	June	64
July 15 - Aug 12	2008	11.61	\$31.83	\$2.74	July	19
Aug 12 - Sept 9	2008	9.47	\$28.75	\$3.04	August	11
Sept 9 - Oct 10	2008	34.7	\$69.41	\$2.00	September	22
Oct 10 - Nov 11	2008	575.61	\$929.43	\$1.61	October	305
Nov 11 - Dec 12	2008	702.58	\$1,130.37	\$1.61	November	639
Dec 12 - Jan 14	2008	1152.05	\$1,722.55	\$1.50	December	927
Jan 14 - Feb 12	2009	1005.79	\$1,406.64	\$1.40	January	1,079
Feb 12 - Mar 12	2009	1004.75	\$1,379.40	\$1.37	February	1,005
Mar 12 - Apr 15	2009	533.86	\$797.92	\$1.49	March	769
Apr 15 - May 15	2009	224.66	\$378.45	\$1.68	April	379
May 15 - June 15	2009	11.51	\$43.11	\$3.75	May	118
Jun 15 - Jul 13	2009	98.47	\$179.93	\$1.83	June	55
Jul 13 - Aug 12	2009	26.15	\$66.28	\$2.53	July	62
Aug 12 - Sep 15	2009	31.38	\$74.77	\$2.38	August	29

Month	Average Therm Usage
January	1,002
February	914
March	710
April	328
May	80
June	49
July	31
August	18
September	19
October	212
November	550
December	927



APPENDIX B

STATEMENT OF ENERGY PERFORMANCE

PORTFOLIO MANAGER REFERENCE SHEET



STATEMENT OF ENERGY PERFORMANCE

Montville Municipal Building

Building ID: 2002478

For 12-month Period Ending: September 30, 2009¹

Date SEP becomes ineligible: N/A

Date SEP Generated: January 13, 2010

Facility

Montville Municipal Building
195 Changebridge Road
Montville, NJ 07045

Facility Owner

Township of Montville
195 Changebridge Road
Montville, NJ 07044

Primary Contact for this Facility

Adam Brewer
195 Changebridge Road
Montville, NJ 07044

Year Built: 1992

Gross Floor Area (ft²): 40,254Energy Performance Rating² (1-100) 78**Site Energy Use Summary³**

Electricity - Grid Purchase(kBtu)	1,329,804
Natural Gas (kBtu) ⁴	1,561,056
Total Energy (kBtu)	2,890,860

Energy Intensity⁵

Site (kBtu/ft ² /yr)	72
Source (kBtu/ft ² /yr)	151

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	286
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Electric Distribution Utility

FirstEnergy - Jersey Central Power & Lt Co

National Average Comparison

National Average Site EUI	102
National Average Source EUI	215
% Difference from National Average Source EUI	-30%
Building Type	Office

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Meets Industry Standards⁶ for Indoor Environmental Conditions:

Ventilation for Acceptable Indoor Air Quality	N/A
Acceptable Thermal Environmental Conditions	N/A
Adequate Illumination	N/A

Certifying Professional

Matthew Goss
15 British American Blvd
Latham, NY 12110

Notes:

1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.

NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☒
Building Name	Montville Municipal Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	195 Changebridge Road, Montville, NJ 07045	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Municipal Building (Office)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☒
Gross Floor Area	40,254 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Weekly operating hours	60 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	65	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	89 (Default)	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: FirstEnergy - Jersey Central Power & Lt Co

Fuel Type: Electricity		
Meter: Acct# 100007989070 (kWh (thousand Watt-hours)) Space(s): Entire Facility Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
08/17/2009	09/16/2009	40,800.00
07/17/2009	08/16/2009	35,520.00
06/17/2009	07/16/2009	31,840.00
05/17/2009	06/16/2009	34,720.00
04/17/2009	05/16/2009	28,680.00
03/17/2009	04/16/2009	29,680.00
02/17/2009	03/16/2009	30,080.00
01/17/2009	02/16/2009	31,280.00
12/17/2008	01/16/2009	30,240.00
11/17/2008	12/16/2008	32,560.00
10/17/2008	11/16/2008	32,960.00
Acct# 100007989070 Consumption (kWh (thousand Watt-hours))		358,360.00
Acct# 100007989070 Consumption (kBtu (thousand Btu))		1,222,724.32
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		1,222,724.32
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐
Fuel Type: Natural Gas		
Meter: Meter# 00535669 (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
08/17/2009	09/16/2009	13.80
07/17/2009	08/16/2009	5.31
06/17/2009	07/16/2009	10.63
05/17/2009	06/16/2009	3.19
04/17/2009	05/16/2009	320.63
03/17/2009	04/16/2009	1,375.53
02/17/2009	03/16/2009	2,469.94
01/17/2009	02/16/2009	2,660.70
12/17/2008	01/16/2009	4,074.65
11/17/2008	12/16/2008	2,391.21
10/17/2008	11/16/2008	1,399.76

Meter# 00535669 Consumption (therms)	14,725.35
Meter# 00535669 Consumption (kBtu (thousand Btu))	1,472,535.00
Total Natural Gas Consumption (kBtu (thousand Btu))	1,472,535.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Additional Fuels

Do the fuel consumption totals shown above represent the total energy use of this building?
Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.

☐

On-Site Solar and Wind Energy

Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.

☐

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same as the PE that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility

Montville Municipal Building
195 Changebridge Road
Montville, NJ 07045

Facility Owner

Township of Montville
195 Changebridge Road
Montville, NJ 07044

Primary Contact for this Facility

Adam Brewer
195 Changebridge Road
Montville, NJ 07044

General Information

Montville Municipal Building	
Gross Floor Area Excluding Parking: (ft ²)	40,254
Year Built	1992
For 12-month Evaluation Period Ending Date:	September 30, 2009

Facility Space Use Summary

Municipal Building	
Space Type	Office
Gross Floor Area(ft ²)	40,254
Weekly operating hours	60
Workers on Main Shift	65
Number of PCs ^d	89
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 09/30/2009)	Baseline (Ending Date 09/30/2009)	Rating of 75	Target	National Average
Energy Performance Rating	78	78	75	N/A	50
Energy Intensity					
Site (kBtu/ft ²)	72	72	76	N/A	102
Source (kBtu/ft ²)	151	151	159	N/A	215
Energy Cost					
\$/year	\$ 79,058.38	\$ 79,058.38	\$ 83,384.47	N/A	\$ 112,753.41
\$/ft ² /year	\$ 1.96	\$ 1.96	\$ 2.07	N/A	\$ 2.80
Greenhouse Gas Emissions					
MtCO ₂ e/year	286	286	302	N/A	408
kgCO ₂ e/ft ² /year	7	7	7	N/A	10

More than 50% of your building is defined as Office. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

Notes:

o - This attribute is optional.

d - A default value has been supplied by Portfolio Manager.

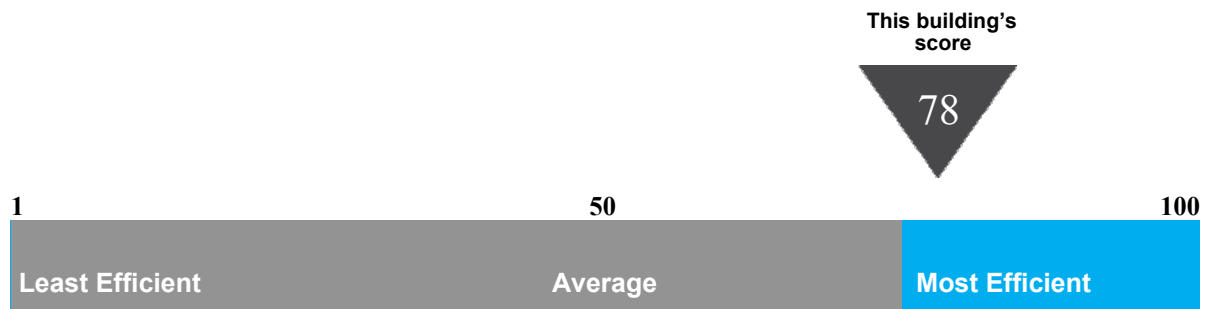
Statement of Energy Performance

2009

Montville Municipal Building
195 Changebridge Road
Montville, NJ 07045

Portfolio Manager Building ID: 2002478

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 151 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending September 2009

Buildings with a score of
75 or higher may qualify
for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S.
Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification





PORTFOLIO MANAGER QUICK REFERENCE GUIDE

Portfolio Manager is an interactive energy management tool that allows you to track and assess energy and water consumption across your entire portfolio of buildings in a secure online environment. Use this Quick Reference Guide to identify opportunities for energy efficiency improvements, track your progress over time, and verify results.

IDENTIFY ENERGY EFFICIENCY PROJECTS

Use Portfolio Manager to identify under-performing buildings to target for energy efficiency improvements and establish baselines for setting and measuring progress for energy efficiency improvement projects over time.

STEP	ACTIVITY	ACTION
1	Access Portfolio Manager. (step not shown)	Visit www.energystar.gov/benchmark . Scroll down to the Login section on the right-hand side in the middle of the page.
2	Access your account: (step not shown) • Create a new account. • Login to an existing account.	• Click REGISTER, and follow instructions. • Enter user name and password, and click LOGIN.
3	Review system updates and enter account. (step not shown)	Click ACCESS MY PORTFOLIO , located below Welcome to Portfolio Manager .
4	Add a new facility. (step not shown)	Click ADD a Property, located in the upper right portion of the screen.
5	Select property type and enter general facility information. (step not shown)	Select the option that most closely resembles your facility and click CONTINUE . Enter general data and click SAVE . For more information on facility space types, see: www.energystar.gov/index.cfm?c=eligibility.bus_portfolio/portfolio_manager_space_types .
6	Enter space use data.	From the Facility Summary page, shown above, go to the Space Use section, located half way down the page, and click ADD SPACE . • Enter a facility name. In the Select a Space Type menu, select the appropriate space type(s) for your building. If your space is not listed, select Other. Click CONTINUE. • Enter building characteristics. Click SAVE. Information required for each space type is listed here: www.energystar.gov/index.cfm?c=eligibility.bus_portfolio/portfolio_manager_space_types. • Repeat steps above to add all major spaces in your facility. Use bulk import service to minimize manual data entry of large sets of facility data (10 or more facilities or campuses are required). • Go back to My Portfolio by clicking on the link in the upper left portion of the page. • Click IMPORT Facility Data Using Templates, located below Add a Property.
7	Enter energy use data.	From the Facility Summary page, go to the Energy Meters section, located below the Space Use section, and click ADD METER . • Enter meter name, type, and units. Click SAVE. • Enter number of months and start date. Click CONTINUE. • Enter energy use and cost for each month. Click SAVE. • Repeat for all energy meters and fuel types.

PORTFOLIO MANAGER

[ACCOUNT INFORMATION](#)
[CONTACTS](#)
[FAQ](#)
[FREQUENTLY ASKED QUESTIONS](#)
[CONTACT US](#)
[HELP](#)
[LOGOUT](#)

[Home](#) > **My Portfolio**

Group Averages

Baseline Rating: 72 Facilities Included: 1	Current Rating: 80 Facilities Included: 1
Change from Baseline: Group Adjusted Percent Energy Use (%): -14.8% Facilities Included: 2	

Averages are weighted by Total Floor Space.
[More about Baselines](#)
[More about Change from Baseline: Adjusted Energy Use](#)

[Add a Property](#)
[Import Facility Data Using Templates](#)

Work with Facilities
[Update Multiple Meters](#)
[Share Facilities](#)
[Request Energy Performance Report](#)

Apply for Recognition
[Apply for the ENERGY STAR](#)
[ENERGY STAR Leaders](#)

Automated Benchmarking
[Get Started Now](#)

My Facilities
My Campuses

GROUP: Fire Stations

8

VIEW: Summary View

9a

[Download](#) in Excel

Search Facility Name:

Search

Results 1 - 2 of 2

All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Facility Name	Current Source Energy Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use (%)	Change from Baseline: Energy Use Intensity (kBtu/Sq. Ft.)	Change from Baseline: GHG Emissions (MtCO ₂ e)	Total Energy Cost per Sq. Ft. (US Dollars (\$))
Fire Station 1	160.1	-12.3	-6.1	-275.86	\$0.30
Fire Station 2	172.6	-17.2	-10.7	-488.62	\$0.37

[Download](#) in Excel

9b

Search Facility Name:

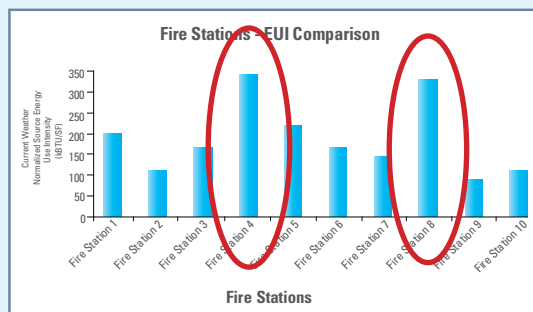
Search

Results 1 - 2 of 2

All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

The rating is calculated by using the last day of the latest full calendar month where all meters in the facility have meter entries; the Period Ending date reflects that particular date.

STEP	ACTIVITY	ACTION
8	Create custom groups.	Organize facilities into groups (e.g., Fire Stations, Northwest Region). Groups are completely customizable, and each facility may belong to multiple groups. - From the My Portfolio page, click CREATE GROUP, located directly to the right of the Group drop-down menu. - Follow instructions to select buildings and name your group. - Once they have been saved, custom groups will be available in the Group drop-down menu.
9	View and interpret results.	Option 1: Go to My Portfolio and view all buildings to compare performance metrics. Option 2: Export data to Microsoft® Excel. - On the My Portfolio page, select the view, from the View drop-down menu that will display the data you wish to export. The My Portfolio page will update to display the selected view. (9a) - Select the DOWNLOAD IN EXCEL link. A File Download dialog window will open. Follow the steps provided by Excel. (9b) - Use Excel functionality to view building energy performance graphically. The example below shows a comparison of Energy Use Intensity for a portfolio of fire stations, identifying under-performing buildings to target for energy efficiency improvements.



TRACK PROGRESS OVER TIME

Portfolio Manager comes pre-populated with nine standard summary views of facility data, which are displayed on the My Portfolio summary page. These standard views include:

- Summary: Energy Use
- Performance: Green House Gas Emissions
- Performance: Financial
- Performance: Water Use

Additionally, users can create and save custom downloadable views by choosing from more than 70 different metrics. The default view set by the user will display automatically after logging into Portfolio Manager, and data from all views can be exported to Microsoft® Excel.

PORTFOLIO MANAGER

Home > My Portfolio

GROUP: Fire Stations | Create Group | Edit Group | View All

VIEW: MyView | **Create View** | Edit View | View All

Download in Excel

Results 1 - 2 of 2

Facility Name	Number of Students	% Difference from National Average Source EUI	Baseline Weather Normalized Source Energy Intensity (kBtu/Sq. Ft.)	Current Weather Normalized Source Energy Intensity (kBtu/Sq. Ft.)	Baseline Rating (1-100)	Current Rating (1-100)	Total Floor Space (Sq. Ft.)
Fire Station 1	0	-32.6	180.4	160.1	72	80	300,000
Fire Station 2	0	9.9	208.4	172.6	N/A	N/A	300,000

PORTFOLIO MANAGER

Home > My Portfolio > Create New View

Create New View
How do I use this page?

Number of Facilities to display on each page:
☐ 25 ☒ 50 ☐ 100 ☐ All (note: larger Portfolios will take longer to load)

To create/edit a custom View of your facilities in Portfolio Manager, select **up to 7** columns from the list below. Use "Preferred Column Order" to set the order in which they will display in the View.

View Name: **Set this View as My Portfolio Default:** ☐

Preferred Column Order	Facility Data	Preferred Column Order	Facility Data
ENERGY STAR Rating			Water
	Baseline Rating (1-100) (N/A for Campuses)		Indoor Water Cost (US Dollars (\$))
	Current Rating (1-100) (N/A for Campuses)		Indoor Water Use (kGal)
	Target Rating (1-100) (N/A for Campuses)		Indoor Water Use per Sq. Ft. (kGal)
			Outdoor Water Cost (US Dollars (\$))
			Outdoor Water Use (kGal)
			Total Indoor and Outdoor Water Cost (US Dollars (\$))
			Total Indoor and Outdoor Water Use (kGal)
			Wastewater/Sewer Cost (US Dollars (\$))
			Wastewater/Sewer Use (kGal)
			Water Use Alerts (N/A for Campuses)
			Performance: GHG Emissions

CREATE A CUSTOM VIEW

STEP ACTION

- From the **My Portfolio** page or the **Facility Summary** page, select the **Create View** link, located directly to the right of the **View** drop-down menu.
- Enter a name for the view. To set as the default view, select the box labeled **Set this View as My Portfolio Default**, located directly to the right of **View Name**. You may include up to 7 (seven) columns in each view.
- Choose each metric to be included in the view by selecting an order number from the **Preferred Column Order** drop-down menu to the left of the **Facility Data** column.
- Click **SAVE** at the bottom of the page. You will be returned to the **My Portfolio** page, and your custom view will be available in the **View** drop-down menu. (step not shown)

VERIFY AND DOCUMENT RESULTS

Use Portfolio Manager to quickly and accurately document reductions in energy use, greenhouse gas emissions, water use, and energy costs for an individual building or an entire portfolio. This valuable information can be used to provide a level of transparency and accountability to help demonstrate strategic use of funding.

Generate a Statement of Energy Performance that includes valuable information about your building's performance, including:

- Normalized energy use intensity
- National average comparisons
- Greenhouse gas emissions
- Energy performance rating (if available)

In addition, you can also request an Energy Performance Report to see the change in performance over time for selected buildings or an entire portfolio. Available comparative metrics in this report include:

- Normalized energy use intensity
- Total electric use
- Total natural gas use
- Energy performance rating (if available)

CMIS No. 2050-0347

STATEMENT OF ENERGY PERFORMANCE

Fire Station 2

Building ID: 1642681
For 12-month Period Ending: December 31, 2008
Date SEP becomes ineligible: N/A
Date SEP Generated: March 05, 2009

Facility Fire Station 2 000 Blank Street Arlington, VA 22209	Facility Owner N/A	Primary Contact for this Facility N/A
Year Built: 1990 Gross Floor Area (ft²): 300,000	Energy Intensity⁵ Site (kBtu/ft²/yr) 52 Source (kBtu/ft²/yr) 173	
Energy Performance Rating ² (1-100)	Emissions (based on site energy use) Greenhouse Gas Emissions (MTCO ₂ e/year) 2,352	
Site Energy Use Summary³ Electricity (kBtu) 15,500,000 Natural Gas (kBtu) Total Energy (kBtu)	Energy Intensity⁴ Site (kBtu/ft²/yr) 62 Source (kBtu/ft²/yr) 173 Emissions (based on site energy use) Greenhouse Gas Emissions (MTCO ₂ e/year) 2,352	
Electric Distribution Utility Virginia Electric & Power Co National Average Comparison National Average Site EUI 78 National Average Source EUI 157 % Difference from National Average Source EUI 10% Building Type Fire Station/Police Station	Stamp of Certifying Professional Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate. Certifying Professional N/A	
Meets Industry Standards⁶ for Indoor Environmental Conditions: Ventilation for Acceptable Indoor Air Quality N/A Acceptable Thermal Environmental Conditions N/A Adequate Illumination N/A		

Notes:
1. Application for the ENERGY STAR award is submitted by EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on facility zip code.
5. Intensity values are normalized to 1000 sq ft of floor area.
6. See ASHRAE 90.1-2001, Table 6.1 for more information.

ENERGY STAR **PORTFOLIO MANAGER**

Home > My Portfolio > Fire Station 2

Facility Summary: **Fire Station 2**
[How do I use this page?](#)

Building ID: 1642681
Level of Access: Building Data Administrator

Electric Distribution Utility: Virginia Electric & Power Co
Regional Power Grid: [SERC Virginia/Carolina](#)
[Select my Power Generation Plant](#) to calculate my electric emissions rate
Electric Emissions Rate (lbCO₂/kWh) 151.7 ([what is this?](#))

1 [Generate a Statement of Energy Performance](#) for uses other than applying for the ENERGY STAR

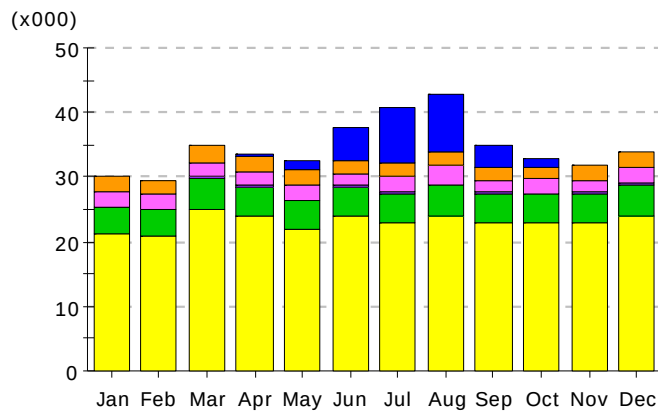
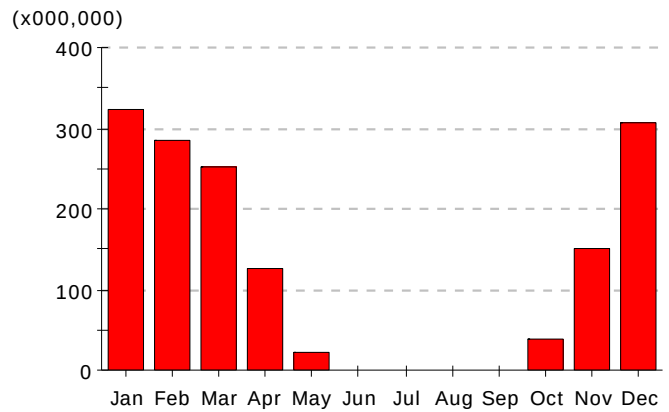
General Information	
Address: 000 Blank Street, Arlington, VA 22209	
Year Built: 1990	
Property Type: Single Facility	
Baseline Rating: N/A	Current Rating: N/A
Eligibility for the ENERGY STAR	
N/A	

GENERATE A STATEMENT OF ENERGY PERFORMANCE AND AN ENERGY PERFORMANCE REPORT

STEP	ACTION
1	From your selected building's Facility Summary page, click GENERATE A STATEMENT OF ENERGY PERFORMANCE .
2	On the next page, select a period ending date. (step not shown)
3	Click GENERATE REPORT , located in the bottom right corner of the screen. (step not shown)
4	Save the Statement of Energy Performance, accompanying Data Checklist, and Facility Summary that include information on energy use intensity and greenhouse gas emissions.
5	From the My Portfolio page, click REQUEST ENERGY PERFORMANCE REPORT , located under Work with Facilities , which shows reductions in key performance indicators over a user-specified time period. Specify the type of report, the facilities to be included, and the requested report columns. The report will be e-mailed to a user-specified address within one business day. (step not shown)

APPENDIX C

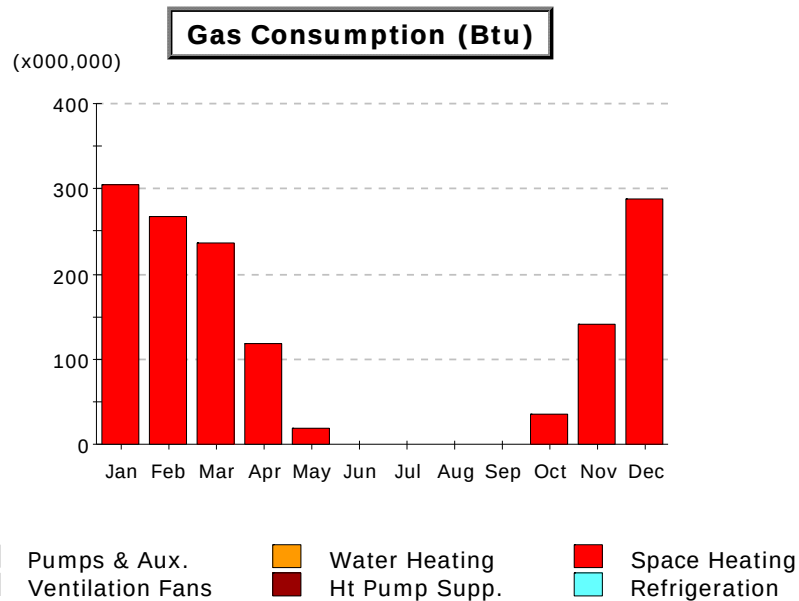
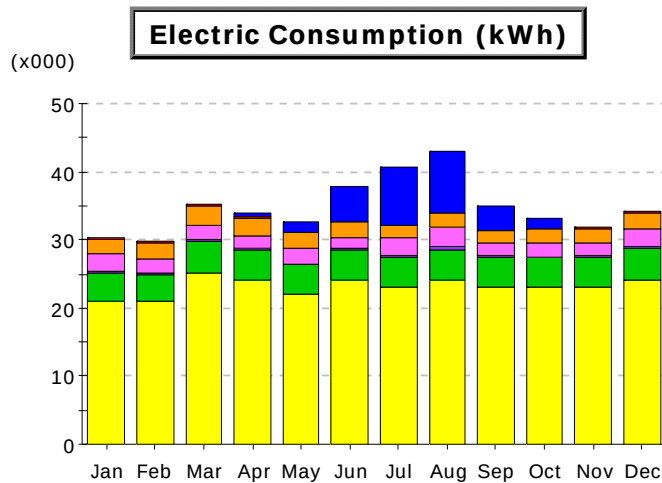
eQUEST MODEL RUN SUMMARIES

Electric Consumption (kWh)**Gas Consumption (Btu)****Electric Consumption (kWh x000)**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.05	0.48	1.66	5.29	8.65	9.04	3.74	1.42	0.05	-	30.40
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	2.25	2.29	2.74	2.57	2.20	2.19	1.96	1.93	1.85	1.94	2.10	2.37	26.40
Vent. Fans	2.41	2.17	2.21	1.97	2.33	1.53	2.37	3.00	1.79	2.11	2.01	2.56	26.46
Pumps & Aux.	0.19	0.18	0.19	0.16	0.15	0.28	0.30	0.32	0.24	0.15	0.15	0.20	2.54
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	4.15	4.03	4.75	4.54	4.28	4.55	4.45	4.57	4.43	4.39	4.42	4.62	53.18
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	21.07	20.88	25.08	23.99	22.03	23.99	23.07	24.03	23.04	22.99	23.03	24.11	277.32
Total	30.08	29.55	35.02	33.72	32.66	37.83	40.80	42.91	35.09	33.01	31.76	33.88	416.31

Gas Consumption (Btu x000,000)

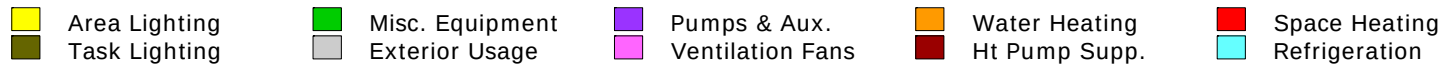
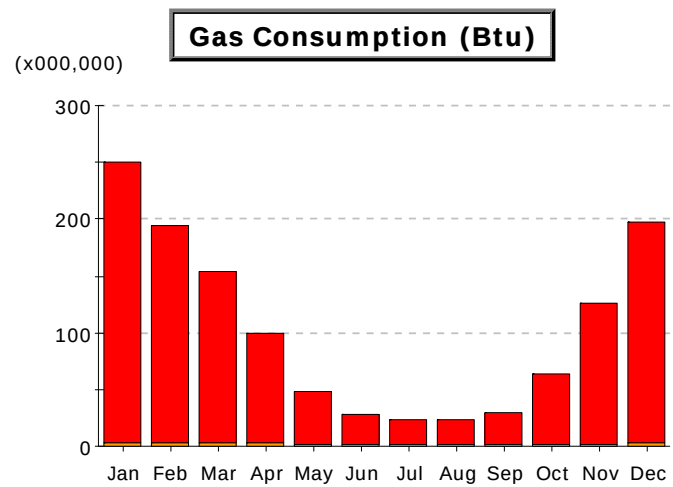
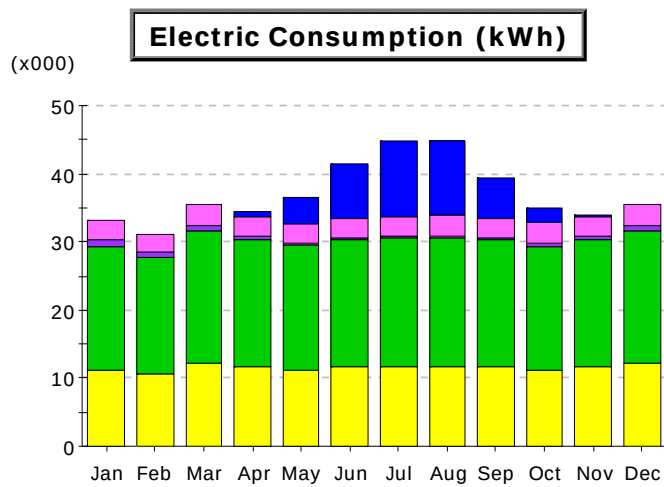
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	324.1	284.3	251.7	127.3	20.6	-	-	-	0.5	37.1	151.8	306.2	1,503.7
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	324.1	284.3	251.7	127.3	20.6	-	-	-	0.5	37.1	151.8	306.2	1,503.7

**Electric Consumption (kWh x000)**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.05	0.48	1.66	5.29	8.65	9.04	3.74	1.42	0.05	-	30.40
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.25	0.22	0.19	0.10	0.02	-	-	-	0.00	0.03	0.12	0.24	1.17
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	2.25	2.29	2.74	2.57	2.20	2.19	1.96	1.93	1.85	1.94	2.10	2.37	26.40
Vent. Fans	2.41	2.17	2.21	1.97	2.33	1.53	2.37	3.00	1.79	2.11	2.01	2.56	26.46
Pumps & Aux.	0.22	0.21	0.22	0.18	0.15	0.28	0.30	0.32	0.24	0.16	0.17	0.23	2.69
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	4.15	4.03	4.75	4.54	4.28	4.55	4.45	4.57	4.43	4.39	4.42	4.62	53.18
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	21.07	20.88	25.08	23.99	22.03	23.99	23.07	24.03	23.04	22.99	23.03	24.11	277.32
Total	30.36	29.80	35.24	33.84	32.68	37.83	40.80	42.91	35.09	33.04	31.90	34.14	417.63

Gas Consumption (Btu x000,000)

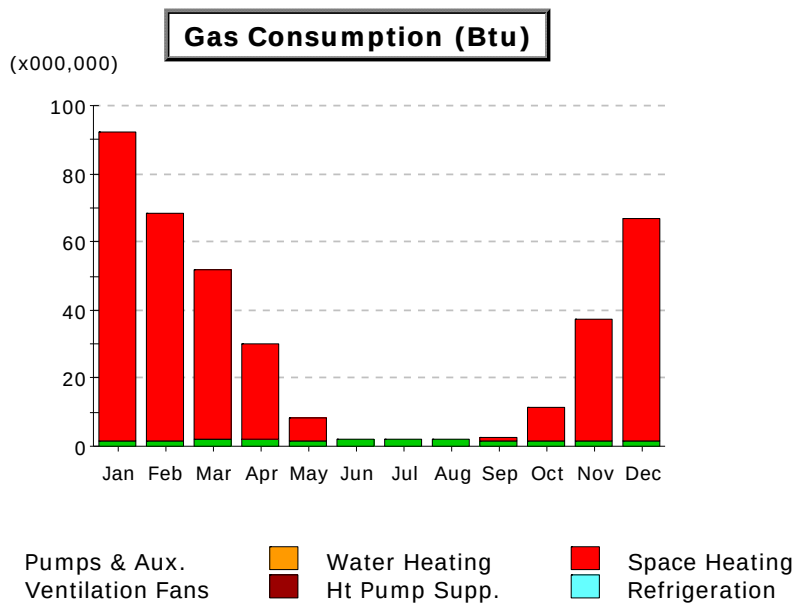
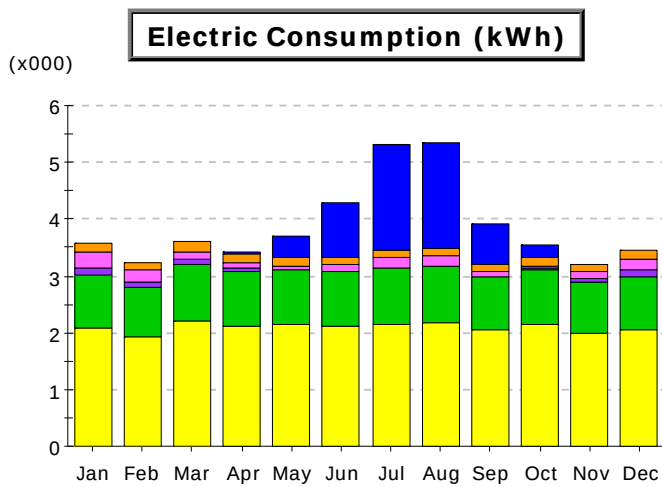
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	304.8	266.9	235.2	118.5	18.9	-	-	-	0.4	34.3	141.4	288.4	1,408.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	304.8	266.9	235.2	118.5	18.9	-	-	-	0.4	34.3	141.4	288.4	1,408.8

**Electric Consumption (kWh x000)**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.11	0.73	3.69	7.93	11.15	10.88	5.94	2.31	0.10	0.05	42.89
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	3.01	2.70	2.97	2.87	2.94	2.85	2.95	2.95	2.84	2.92	2.85	2.97	34.82
Pumps & Aux.	0.85	0.76	0.78	0.62	0.40	0.36	0.36	0.37	0.36	0.48	0.68	0.82	6.83
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	18.17	17.05	19.43	18.60	18.19	18.62	18.77	18.81	18.62	18.17	18.60	19.41	222.45
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	11.22	10.64	12.21	11.66	11.23	11.68	11.69	11.72	11.68	11.22	11.66	12.20	138.81
Total	33.25	31.15	35.49	34.48	36.45	41.43	44.93	44.73	39.44	35.10	33.89	35.44	445.79

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	247.6	191.9	151.7	97.3	45.2	25.3	21.9	21.9	27.7	62.0	123.9	195.6	1,212.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	2.5	2.4	2.7	2.5	2.3	2.2	2.0	1.9	1.9	2.0	2.2	2.5	27.1
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	250.1	194.3	154.4	99.9	47.5	27.5	23.9	23.8	29.6	63.9	126.2	198.1	1,239.3

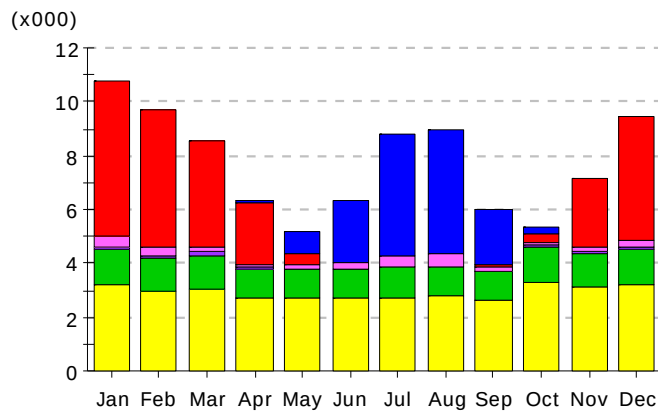
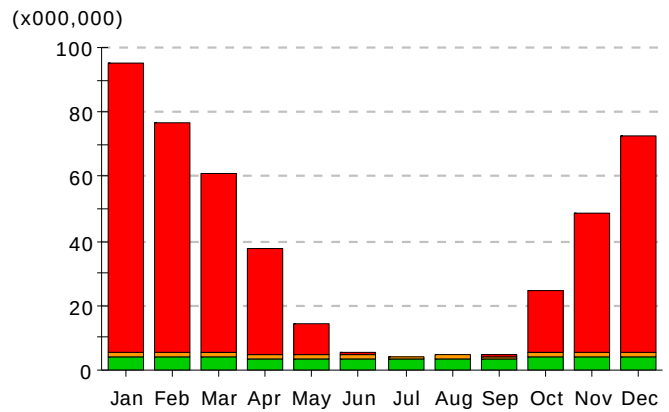


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.00	0.04	0.39	0.97	1.86	1.85	0.73	0.22	0.00	-	6.06
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.15	0.15	0.17	0.16	0.15	0.13	0.13	0.12	0.12	0.13	0.13	0.14	1.67
Vent. Fans	0.28	0.20	0.15	0.08	0.06	0.10	0.19	0.19	0.08	0.05	0.10	0.19	1.69
Pumps & Aux.	0.11	0.10	0.09	0.06	0.01	-	-	-	0.00	0.02	0.07	0.10	0.57
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.94	0.87	1.00	0.97	0.97	0.97	0.98	0.99	0.94	0.97	0.91	0.94	11.44
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	2.07	1.92	2.19	2.12	2.14	2.12	2.15	2.18	2.06	2.14	1.99	2.06	25.14
Total	3.56	3.24	3.60	3.43	3.71	4.30	5.30	5.34	3.92	3.53	3.19	3.44	46.58

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	90.56	66.97	50.11	28.30	6.23	0.45	-	-	0.61	9.71	35.35	64.82	353.10
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	1.74	1.66	1.93	1.86	1.81	1.86	1.85	1.90	1.80	1.81	1.73	1.80	21.74
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	92.30	68.62	52.04	30.16	8.04	2.31	1.85	1.90	2.40	11.53	37.08	66.62	374.85

Electric Consumption (kWh)**Gas Consumption (Btu)****Electric Consumption (kWh x000)**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.01	0.10	0.84	2.31	4.55	4.59	2.07	0.26	-	-	14.72
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	5.83	5.09	3.95	2.31	0.41	0.02	-	-	0.01	0.36	2.56	4.58	25.11
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	0.35	0.29	0.20	0.10	0.10	0.23	0.44	0.46	0.23	0.10	0.15	0.25	2.91
Pumps & Aux.	0.11	0.10	0.09	0.06	0.01	-	-	-	0.00	0.02	0.07	0.10	0.57
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	1.31	1.22	1.24	1.09	1.09	1.09	1.09	1.12	1.05	1.34	1.26	1.31	14.20
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	3.21	2.98	3.07	2.70	2.72	2.70	2.73	2.77	2.61	3.29	3.09	3.20	35.07
Total	10.81	9.67	8.56	6.35	5.17	6.34	8.82	8.93	5.97	5.38	7.13	9.44	92.58

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	89.75	71.74	55.28	33.08	9.72	0.70	-	-	0.53	19.59	43.70	67.25	391.34
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	1.39	1.32	1.38	1.22	1.16	1.06	1.01	0.97	0.92	1.16	1.17	1.29	14.06
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	4.05	3.85	4.00	3.46	3.37	3.46	3.43	3.53	3.34	4.18	4.01	4.17	44.84
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	95.18	76.91	60.66	37.77	14.25	5.23	4.44	4.50	4.79	24.92	48.87	72.72	450.24

APPENDIX D

LIGHTING UPGRADES

Appendix D - Lighting Upgrades

Building	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	Existing Fixture Watts	Existing kW	Operating Hours	Existing kWh	Existing Annual Energy Cost	Proposed Replacement Solution	Qty of Existing Fixtures	Proposed Fixture Watts	Proposed kW Base	Proposed Operational Hours Without Sensors	Proposed Operational Hours With Sensors	Proposed kWh Without Sensors	Proposed kWh With Sensors	Proposed Occupancy Sensor Type	Occupancy Sensor Quantity	Total kW Saved	Total kWh Saved	Energy Cost Savings	Ballast/Fixture/Reflector Per Unit Price	Bulb (Per Unit Price)	Labor (Per Unit Price)	Occupancy Sensor (Per Unit Price)	Occupancy Sensor (Per Unit Labor Price)	Labor Subtotal	Materials Subtotal	Labor & Materials Subtotal	Labor Total	Materials Total	Labor & Materials Total	
Public Works Building - Interior	Garage	400W Metal Halide Fixtures	10	4580	4.58	2912	13336.96	\$2,265.9	Replace Metal Halide Fixtures with 6-Lamp Fluorescent Highway Fixtures	10	2260	2.26	2912	2912	6581.12	6581.12	None Proposed	0	2.32	6755.84	1,147.8	\$168.0	\$105.0	\$100.0	\$0.0	\$0.0	\$100.0	\$273.0	\$0.0	\$373.0	\$1,000.0	\$2,730.0	\$3,730.0
Public Works Building - Interior	Garage	12 Lamp Fluorescent Highway Fixtures	15	6780	6.78	2912	19743.36	\$3,354.4	None Proposed	15	6780	6.78	2912	2912	19743.36	19743.36	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Public Works Building - Interior	Garage	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	4	342.4	0.3424	2912	997.0688	\$169.4	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	4	194.4	0.1944	2912	2912	566.0928	566.0928	None Proposed	0	0.148	430.976	73.2	\$70.0	\$10.0	\$65.0	\$0.0	\$0.0	\$65.0	\$80.0	\$145.0	\$280.0	\$320.0	\$580.0	
Public Works Building - Interior	Garage	3x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	4	342.4	0.3424	2912	997.0688	\$169.4	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	4	194.4	0.1944	2912	2912	566.0928	566.0928	None Proposed	0	0.148	430.976	73.2	\$70.0	\$10.0	\$65.0	\$0.0	\$0.0	\$65.0	\$80.0	\$145.0	\$280.0	\$320.0	\$580.0	
Public Works Building - Interior	Other Building Areas	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	28	4793.6	4.7936	2912	13958.9632	\$2,371.6	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	28	2724.4	2.7244	2912	2912	7933.4528	7933.4528	None Proposed	0	2.0692	6025.5104	1,023.7	\$105.0	\$20.0	\$65.0	\$0.0	\$0.0	\$65.0	\$125.0	\$190.0	\$1,820.0	\$3,500.0	\$5,320.0	
Public Works Building - Interior	Other Building Areas	42W CFL Fixture	1	49	0.049	2912	142.688	\$24.2	NONE PROPOSED	1	49	0.049	2912	2912	142.688	142.688	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
Public Works Building - Interior	Locker Room	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	8	1369.6	1.3696	2912	3988.2752	\$677.6	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	8	778.4	0.7784	2912	2912	2266.7008	2266.7008	None Proposed	0	0.5912	1721.5744	292.5	\$105.0	\$20.0	\$65.0	\$0.0	\$0.0	\$65.0	\$125.0	\$190.0	\$520.0	\$1,000.0	\$1,520.0	
Public Works Building - Interior	Locker Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	0.0507	2912	147.6384	\$25.1	None Proposed	1	50.7	0.0507	2912	2912	147.6384	147.6384	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Public Works Building - Exterior	Exterior	Exterior Wall Packs (Assume 70w)	3	270	0.27	4368	1179.36	\$200.4	Replace 70W Wall Pack Fixture with LED Area Light	3	165	0.165	4368	4368	720.72	720.72	None Proposed	0	0.105	458.64	77.9	\$0.0	\$800.0	\$186.0	\$0.0	\$0.0	\$186.0	\$800.0	\$986.0	\$558.0	\$2,400.0	\$2,958.0	
Public Works Building - Exterior	Exterior	150W Incandescent Fixture	2	300	0.3	4368	1310.4	\$222.6	Replace 150W Incandescent Fixture with 25W CFL	2	50	0.05	4368	4368	218.4	218.4	None Proposed	0	0.25	1092	185.5	\$0.0	\$7.0	\$20.0	\$0.0	\$0.0	\$20.0	\$7.0	\$27.0	\$40.0	\$14.0	\$54.0	
Public Works Building - Exterior	Exterior	Ballast	1	90	0.09	4368	393.12	\$66.8	None Proposed	1	90	0.09	4368	4368	393.12	393.12	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Corridor	42W CFL Fixture	2	98	0.098	2080	203.84	\$37.3	NONE PROPOSED	2	98	0.098	2080	2080	203.84	203.84	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Gym	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	34	1723.8	1.7238	2080	3585.504	\$656.1	None Proposed	34	1723.8	1.7238	2080	2080	3585.504	3585.504	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Kitchen	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	6	672	0.672	2080	1297.76	\$255.8	None Proposed	6	672	0.672	2080	2080	1297.76	1297.76	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Kitchen	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	0.0507	2080	105.456	\$19.3	None Proposed	1	50.7	0.0507	2080	2080	105.456	105.456	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Mens Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	0.1521	500	76.05	\$13.9	None Proposed	3	152.1	0.1521	500	350	76.05	53.235	Ceiling Mounted Occupancy Sensor	1	0	22.815	4.2	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5
Senior House - Interior	Womens Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	0.1521	500	76.05	\$13.9	None Proposed	3	152.1	0.1521	500	350	76.05	53.235	Ceiling Mounted Occupancy Sensor	1	0	22.815	4.2	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5
Senior House - Interior	Common Area	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	0.6084	2080	1265.472	\$231.6	None Proposed	12	608.4	0.6084	2080	2080	1265.472	1265.472	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Office	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	0.1014	2080	210.912	\$38.6	None Proposed	2	101.4	0.1014	2080	1456	210.912	147.6384	Ceiling Mounted Occupancy Sensor	1	0	63.2736	11.6	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5
Senior House - Interior	Office	65W Incandescent Fixture	1	65	0.065	2080	135.2	\$24.7	Replace 65W Incandescent Fixture with 13W CFL	1	13	0.013	2080	2080	27.04	27.04	None Proposed	0	0.052	108.16	19.8	\$0.0	\$5.0	\$20.0	\$0.0	\$0.0	\$20.0	\$5.0	\$25.0	\$20.0	\$5.0	\$25.0	
Senior House - Interior	Stairwell	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	0.1521	2080	316.368	\$57.9	None Proposed	3	152.1	0.1521	2080	2080	316.368	316.368	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Basement	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	0.1014	500	50.7	\$9.3	None Proposed	2	101.4	0.1014	500	500	50.7	50.7	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Senior House - Interior	Attic	13W CFL Fixture	3	39	0.039	500	19.5	\$3.6	None Proposed	3	39	0.039	500	500	19.5	19.5	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Youth Center - Interior	Youth Center	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	21	1848	1.848	2080	3843.84	\$748.8	None Proposed	21	1848	1.848	2080	1456	3843.84	2690.688	Ceiling Mounted Occupancy Sensor	5	0	1153.152	224.8	\$0.0	\$0.0	\$0.0	\$515.0	\$367.5	\$0.0	\$0.0	\$0.0	\$0.0	\$1,837.5	\$2,575.0	\$4,412.5
Youth Center - Interior	Youth Center	250W MH Recessed Fixture	45	12825	12.825	2080	26676	\$5,196.5	None Proposed	45	12825	12.825	2080	2080	26676	26676	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Youth Center - Interior	Mens Bathroom	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	3	264	0.264	500	132	\$25.7	None Proposed	3	264	0.264	500	500	132	132	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Youth Center - Interior	Womens Bathroom	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	3	264	0.264	500	132	\$25.7	None Proposed	3	264	0.264	500	500	132	132	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Youth Center - Interior	Youth Center	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	202.8	0.2028	2080	421.824	\$82.2	None Proposed	4	202.8	0.2028	2080	2080	421.824	421.824	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Youth Center - Interior	Youth Center	1x8 Fixture w/ 2-T8 Lamps w/ Electronic Ballasts	4	202.8	0.2028	2080	421.824	\$82.2	None Proposed	4	202.8	0.2028	2080	2080	421.824	421.824	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Youth Center - Interior	Youth Center	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	26	660.4	0.6604	2080	1373.632	\$267.6	None Proposed	26	660.4	0.6604	2080	2080	1373.632	1373.632	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Youth Center - Exterior	Exterior	Pole Mounted Luminaire - 2 Head (Assume 400W MH)	12	10992	10.992	4368	48013.056	\$9,252.9	Replace 400W MH fixture with LED Area Light	12	5568	5.568	4368	4368	24321.024	24321.024	None Proposed	0	5.424	23692.032	4,615.2	\$1,200.0	\$4,000.0	\$836.0	\$0.0	\$0.0	\$836.0	\$5,200.0	\$6,036.0	\$10,032.0	\$62,400.0	\$72,432.0	
Youth Center - Exterior	Exterior	Pole Mounted Luminaire - 1 Head (Assume 400W MH)	11	5038	5.038	4368	22095.594	\$4,286.8	Replace 400W MH fixture with LED Area Light	11	2552	2.552	4368	4368	11147.136	11147.136	None Proposed	0	2.466	10858.848	2,115.3	\$1,200.0	\$2,000.0	\$703.0	\$0.0	\$0.0	\$703.0	\$3,200.0	\$3,903.0	\$7,733.0	\$35,200.0	\$42,933.0	
Youth Center - Exterior	Exterior	Pole Mounted Luminaire(Assume 200W MH)	4	1188	1.188	4368	5189.184	\$1,010.9	Replace 200W MH fixture with LED Area Light	4	604	0.604	4368	4368	2638.272	2638.272	None Proposed	0	0.584	2550.912	496.9	\$1,200.0	\$1,000.0	\$703.0	\$0.0	\$0.0	\$703.0	\$2,200.0	\$2,903.0	\$2,812.0	\$8,800.0	\$11,612.0	
Municipal Building - Interior	Admin Office	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	2	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	97.2	0.0972	2080	1456	202.176	141.5232	Ceiling Mounted Occupancy Sensor	1	0.074	214.5728	36.7	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$203.5	\$263.0	\$466.5	
Municipal Building - Interior	Conference Room	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	2	256.8	0.2568	2080	534.144	\$91.4	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	146	0.146	2080	1456	303.68	212.576	Ceiling Mounted Occupancy Sensor	1	0.1108	321.568	55.1	\$85.0	\$15.0	\$65.0	\$103.0	\$73.5	\$65.0	\$100.0	\$165.0	\$203.5	\$303.0	\$506.5	
Municipal Building - Interior	Engineering	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	2	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	97.2	0.0972	2080	2080	202.176	202.176	None Proposed	0	0.074	153.92	26.4	\$70.0	\$10.0	\$65.0	\$0.0	\$0.0	\$65.0	\$80.0	\$145.0	\$130.0	\$160.0	\$290.0	
Municipal Building - Interior	Engineering	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	31	5307.2	5.3072	2080	11038.976	\$1,889.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	31	3016.3	3.0163	2080	2080	6273.904	6273.904	None Proposed	0	2.2909	4765.072	815.8	\$105.0	\$20.0	\$65.0	\$0.0	\$0.0	\$65.0	\$125.0	\$190.0	\$2,015.0	\$3,875.0	\$5,890.0	
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0											

Appendix D - Lighting Upgrades

Building	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	Existing Fixture Watts	Existing kW	Operating Hours	Existing kWh	Existing Annual Energy Cost	Proposed Replacement Solution	Qty of Existing Fixtures	Proposed Fixture Watts	Proposed kW Base	Proposed Operational Hours Without Sensors	Proposed Operational Hours With Sensors	Proposed kWh Without Sensors	Proposed kWh With Sensors	Proposed Occupancy Sensor Type	Occupancy Sensor Quantity	Total kW Saved	Total kWh Saved	Energy Cost Savings	Ballast/Fixture/Reflector Per Unit Price	Bulb (Per Unit Price)	Labor (Per Unit Price)	Occupancy Sensor (Per Unit Price)	Occupancy Sensor (Per Unit Labor Price)	Labor Subtotal	Materials Subtotal	Labor & Materials Subtotal	Labor Total	Materials Total	Labor & Materials Total
Municipal Building - Interior	Stairwell	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	1	85.6	0.0856	2080	178.048	\$30.5	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	48.6	0.0486	2080	2080	101.088	101.088	None Proposed	0	0.037	76.96	13.2	\$70.0	\$10.0	\$65.0	\$0.0	\$0.0	\$65.0	\$80.0	\$145.0	\$65.0	\$80.0	\$145.0
Municipal Building - Interior	Server Room	1x6 Fixture w/ 2-T12 Lamps w/ Magnetic Ballast	1	85.6	0.0856	2080	178.048	\$30.5	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	48.64	0.04864	2080	1456	101.1712	70.81984	Ceiling Mounted Occupancy Sensor	1	0.03696	107.22816	18.4	\$55.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$65.0	\$130.0	\$138.5	\$168.0	\$306.5
Municipal Building - Interior	Electrical Room	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	5	428	0.428	2080	890.24	\$152.4	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	5	243	0.243	2080	1456	505.44	353.808	Ceiling Mounted Occupancy Sensor	1	0.185	536.432	91.8	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$398.5	\$503.0	\$901.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	4	513.6	0.5136	2080	1068.288	\$182.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	4	292	0.292	2080	1456	607.36	425.152	Ceiling Mounted Occupancy Sensor	1	0.2216	643.136	110.1	\$85.0	\$15.0	\$65.0	\$103.0	\$73.5	\$65.0	\$100.0	\$165.0	\$333.5	\$503.0	\$836.5
Municipal Building - Interior	Office	2x2 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	2	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	97.2	0.0972	2080	1456	202.176	141.5232	Ceiling Mounted Occupancy Sensor	1	0.074	214.5728	36.7	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$203.5	\$263.0	\$466.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	16	2739.2	2.7392	2080	5697.536	\$975.4	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	16	1556.8	1.5568	2080	1456	3238.144	2266.7008	Ceiling Mounted Occupancy Sensor	1	1.1824	3430.8352	587.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$1,113.5	\$2,103.0	\$3,216.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	5	856	0.856	2080	1780.48	\$304.8	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	5	486.5	0.4865	2080	1456	1011.92	708.344	Ceiling Mounted Occupancy Sensor	1	0.3695	1072.136	183.5	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$398.5	\$728.0	\$1,126.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	10	1712	1.712	2080	3560.96	\$609.6	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	10	973	0.973	2080	1456	2023.84	1416.688	Ceiling Mounted Occupancy Sensor	1	0.739	2144.272	367.1	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$772.5	\$1,263.0	\$2,076.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	7	1198.4	1.1984	2080	2492.672	\$426.7	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	7	681.1	0.6811	2080	1456	1416.688	991.6816	Ceiling Mounted Occupancy Sensor	1	0.5173	1500.9904	257.0	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$528.5	\$978.0	\$1,506.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	2	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	97.2	0.0972	2080	1456	202.176	141.5232	Ceiling Mounted Occupancy Sensor	1	0.074	214.5728	36.7	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$203.5	\$263.0	\$466.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	3	513.6	0.5136	2080	1068.288	\$182.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	3	291.9	0.2919	2080	1456	607.152	425.0064	Ceiling Mounted Occupancy Sensor	1	0.2217	643.2816	110.1	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$298.5	\$478.0	\$746.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	7	599.2	0.5992	2080	1246.336	\$213.4	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	7	340.2	0.3402	2080	1456	707.616	495.3312	Ceiling Mounted Occupancy Sensor	1	0.259	751.0048	128.6	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$528.5	\$663.0	\$1,191.5
Municipal Building - Interior	Office	1x4 Fixtures w/ 1-T12 Lamp Fixture w/ Magnetic Ballast	1	42.8	0.0428	2080	89.024	\$15.2	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	24.32	0.02432	2080	1456	50.5856	35.40992	Ceiling Mounted Occupancy Sensor	1	0.01848	53.61408	9.2	\$35.0	\$5.0	\$65.0	\$103.0	\$73.5	\$65.0	\$40.0	\$105.0	\$138.5	\$143.0	\$281.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	2	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	97.2	0.0972	2080	1456	202.176	141.5232	Ceiling Mounted Occupancy Sensor	1	0.074	214.5728	36.7	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$203.5	\$263.0	\$466.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	1	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	97.3	0.0973	2080	1456	202.384	141.6688	Ceiling Mounted Occupancy Sensor	1	0.0739	214.4272	36.7	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$138.5	\$228.0	\$366.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	2	342.4	0.3424	2080	712.192	\$121.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	194.6	0.1946	2080	1456	404.768	283.3376	Ceiling Mounted Occupancy Sensor	1	0.1478	428.8544	73.4	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$203.5	\$353.0	\$556.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	1	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	97.3	0.0973	2080	1456	202.384	141.6688	Ceiling Mounted Occupancy Sensor	1	0.0739	214.4272	36.7	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$138.5	\$228.0	\$366.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	1	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	97.3	0.0973	2080	1456	202.384	141.6688	Ceiling Mounted Occupancy Sensor	1	0.0739	214.4272	36.7	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$138.5	\$228.0	\$366.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	3	513.6	0.5136	2080	1068.288	\$182.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	3	291.9	0.2919	2080	1456	607.152	425.0064	Ceiling Mounted Occupancy Sensor	1	0.2217	643.2816	110.1	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$298.5	\$478.0	\$746.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	3	513.6	0.5136	2080	1068.288	\$182.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	3	291.9	0.2919	2080	1456	607.152	425.0064	Ceiling Mounted Occupancy Sensor	1	0.2217	643.2816	110.1	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$298.5	\$478.0	\$746.5
Municipal Building - Interior	Office	26W CFL Fixture	4	104	0.104	2080	216.32	\$37.0	None Proposed	4	104	0.104	2080		151.424	151.424	Ceiling Mounted Occupancy Sensor	1	0	64.896	11.1	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 4-T12 Lamp Fixture w/ Magnetic Ballast	4	684.8	0.6848	2080	1424.384	\$243.9	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	4	389.2	0.3892	2080	1456	809.536	566.6752	Ceiling Mounted Occupancy Sensor	1	0.2956	857.7088	146.8	\$105.0	\$20.0	\$65.0	\$103.0	\$73.5	\$65.0	\$125.0	\$190.0	\$333.5	\$603.0	\$936.5
Municipal Building - Interior	Office	1x4 Fixtures w/ 1-T12 Lamp Fixture w/ Magnetic Ballast	1	42.8	0.0428	2080	89.024	\$15.2	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	24.32	0.02432	2080	1456	50.5856	35.40992	Ceiling Mounted Occupancy Sensor	1	0.01848	53.61408	9.2	\$35.0	\$5.0	\$65.0	\$103.0	\$73.5	\$65.0	\$40.0	\$105.0	\$138.5	\$143.0	\$281.5
Municipal Building - Interior	Office	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	2	171.2	0.1712	2080	356.096	\$61.0	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	2	97.2	0.0972	2080	1456	202.176	141.5232	Ceiling Mounted Occupancy Sensor	1	0.074	214.5728	36.7	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$203.5	\$263.0	\$466.5
Municipal Building - Interior	Office	2x2 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	1	85.6	0.0856	2080	178.048	\$30.5	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf., 0.78 Ballast Factor Ballast	1	48.6	0.0486	2080	1456	101.088	70.7616	Ceiling Mounted Occupancy Sensor	1	0.037	107.2864	18.4	\$70.0	\$10.0	\$65.0	\$103.0	\$73.5	\$65.0	\$80.0	\$145.0	\$138.5	\$183.0	\$321.5
Municipal Building - Interior	Basement	2x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast																														

Appendix D - Lighting Upgrades

Building	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	Existing Fixture Watts	Existing kW	Operating Hours	Existing kWh	Existing Annual Energy Cost	Proposed Replacement Solution	Qty of Existing Fixtures	Proposed Fixture Watts	Proposed kW Base	Proposed Operational Hours Without Sensors	Proposed Operational Hours With Sensors	Proposed kWh Without Sensors	Proposed kWh With Sensors	Proposed Occupancy Sensor Type	Occupancy Sensor Quantity	Total kW Saved	Total kWh Saved	Energy Cost Savings	Ballast/Fixture/Reflector Per Unit Price	Bulb (Per Unit Price)	Labor (Per Unit Price)	Occupancy Sensor (Per Unit Price)	Occupancy Sensor (Per Unit Labor Price)	Labor Subtotal	Materials Subtotal	Labor & Materials Subtotal	Labor Total	Materials Total	Labor & Materials Total	
Library - Interior	Library	3x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast	5	428	0.428	4004	1713.712	\$282.1	Replace T12 Bulbs With High Perf. T8 Bulbs, Replace Ballast w/ High Perf. 0.78 Ballast Factor Ballast	5	243	0.243	4004	4004	972.972	972.972	None Proposed	0	0.185	740.74	121.9	\$70.0	\$10.0	\$65.0	\$0.0	\$0.0	\$65.0	\$80.0	\$145.0	\$325.0	\$400.0	\$725.0	
Library - Interior	Library	2x2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballast	16	811.2	0.8112	4004	3248.0448	\$534.6	None Proposed	16	811.2	0.8112	4004	4004	3248.0448	3248.0448	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Library - Interior	Library	400W Metal Halide Fixtures	22	10076	10.076	4004	40344.304	\$6,640.7	Replace Metal Halide Fixtures with 8-Lamp Fluorescent Highway Fixtures	22	4972	4.972	4004	4004	19907.888	19907.888	None Proposed	0	5.104	20436.416	3,363.8	\$168.0	\$105.0	\$100.0	\$0.0	\$100.0	\$273.0	\$373.0	\$2,200.0	\$6,006.0	\$8,206.0		
Library - Interior	Library	150W Incandescent Fixture	4	600	0.6	4004	2402.4	\$395.4	Replace 150W Incandescent Fixture with 25W CFL	4	100	0.1	4004	4004	400.4	400.4	None Proposed	0	0.5	2002	329.5	\$0.0	\$7.0	\$20.0	\$0.0	\$0.0	\$20.0	\$7.0	\$27.0	\$80.0	\$28.0	\$108.0	
Library - Interior	Library	250W MH Fixture	10	2850	2.85	4004	11411.4	\$1,878.3	None Proposed	10	2850	2.85	4004	4004	11411.4	11411.4	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Library - Interior	Library	BIAx Fixtures	400	22000	22	4005	88110	\$14,502.9	None Proposed	400	22000	22	4005	4005	88110	88110	None Proposed	1	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Library - Exterior	Library	Flood Lights (Assume 400W MH)	2	916	0.916	4368	4001.088	\$658.6	Replace 400W MH fixture with LED Area Light	2	464	0.464	4368	4368	2026.752	2026.752	None Proposed	0	0.452	1974.336	325.0	\$0.0	\$2,000.0	\$133.0	\$0.0	\$0.0	\$133.0	\$2,000.0	\$2,133.0	\$266.0	\$4,000.0	\$4,266.0	
Library - Exterior	Library	Exterior Wall Packs (Assume 70w)	5	450	0.45	4368	1965.6	\$323.5	Replace 70W Wall Pack Fixture with LED Area Light	5	275	0.275	4368	4368	1201.2	1201.2	None Proposed	0	0.175	764.4	125.8	\$0.0	\$800.0	\$186.0	\$0.0	\$0.0	\$186.0	\$800.0	\$986.0	\$930.0	\$4,000.0	\$4,930.0	
Library - Exterior	Library	Pole Mounted Luminaire - 1 Head (Assume 400W MH)	15	6870	6.87	4368	30008.16	\$4,939.3	Replace 400W MH fixture with LED Area Light	15	3480	3.48	4368	4368	15200.64	15200.64	None Proposed	0	3.39	14897.52	2,437.3	\$1,200.0	\$2,000.0	\$703.0	\$0.0	\$0.0	\$703.0	\$3,200.0	\$3,903.0	\$10,545.0	\$48,000.0	\$58,545.0	
Library - Exterior	Library	Pole Mounted Luminaire - 2 Head (Assume 400W MH)	2	1832	1.832	4368	8002.176	\$1,317.2	Replace 400W MH fixture with LED Area Light	2	928	0.928	4368	4368	4053.504	4053.504	None Proposed	0	0.904	3948.672	650.0	\$1,200.0	\$4,000.0	\$836.0	\$0.0	\$0.0	\$836.0	\$5,200.0	\$6,036.0	\$1,672.0	\$10,400.0	\$12,072.0	
Public Safety Building - Interior	Court Room	250W MH Fixture	6	1710	1.71	2080	3556.8	\$570.5	None Proposed	6	1710	1.71	2080	2080	3556.8	3556.8	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Public Safety Building - Interior	Court Room	400W MH Fixture	20	9180	9.18	2080	19052.8	\$3,056.1	None Proposed	20	9180	9.18	2080	2080	19052.8	19052.8	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Hallway	42W CFL Fixture	6	294	0.294	2080	611.52	\$98.1	NONE PROPOSED	6	294	0.294	2080	2080	611.52	611.52	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Mens Bathroom	42W CFL Fixture	3	147	0.147	500	73.5	\$11.8	NONE PROPOSED	3	147	0.147	500	500	73.5	73.5	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Mens Bathroom	1x4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	50.8	0.0508	500	25.4	\$4.1	None Proposed	2	50.8	0.0508	500	500	25.4	25.4	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Womens Bathroom	42W CFL Fixture	3	147	0.147	500	73.5	\$11.8	NONE PROPOSED	3	147	0.147	500	500	73.5	73.5	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Womens Bathroom	1x4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	50.8	0.0508	500	25.4	\$4.1	None Proposed	2	50.8	0.0508	500	500	25.4	25.4	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Office	2x4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	760.5	0.7605	2080	1581.84	\$253.7	None Proposed	15	760.5	0.7605	2080	1456	1581.84	1107.288	Ceiling Mounted Occupancy Sensor	1	0	474.552	76.1	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	2	176	0.176	2080	366.08	\$58.7	None Proposed	2	176	0.176	2080	1456	366.08	256.256	Ceiling Mounted Occupancy Sensor	1	0	109.824	17.6	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	2	176	0.176	2080	366.08	\$58.7	None Proposed	2	176	0.176	2080	1456	366.08	256.256	Ceiling Mounted Occupancy Sensor	1	0	109.824	17.6	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	6	528	0.528	2080	1098.24	\$176.2	None Proposed	6	528	0.528	2080	1456	1098.24	768.768	Ceiling Mounted Occupancy Sensor	1	0	329.472	52.8	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	2	176	0.176	2080	366.08	\$58.7	None Proposed	2	176	0.176	2080	1456	366.08	256.256	Ceiling Mounted Occupancy Sensor	1	0	109.824	17.6	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	2	176	0.176	2080	366.08	\$58.7	None Proposed	2	176	0.176	2080	1456	366.08	256.256	Ceiling Mounted Occupancy Sensor	1	0	109.824	17.6	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	6	528	0.528	2080	1098.24	\$176.2	None Proposed	6	528	0.528	2080	1456	1098.24	768.768	Ceiling Mounted Occupancy Sensor	1	0	329.472	52.8	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	1	88	0.088	2080	183.04	\$29.4	None Proposed	1	88	0.088	2080	1456	183.04	128.128	Ceiling Mounted Occupancy Sensor	1	0	54.912	8.8	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	2	176	0.176	2080	366.08	\$58.7	None Proposed	2	176	0.176	2080	1456	366.08	256.256	Ceiling Mounted Occupancy Sensor	1	0	109.824	17.6	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	1	88	0.088	2080	183.04	\$29.4	None Proposed	1	88	0.088	2080	1456	183.04	128.128	Ceiling Mounted Occupancy Sensor	1	0	54.912	8.8	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	42W CFL Fixture	8	392	0.392	2080	815.36	\$130.8	NONE PROPOSED	8	392	0.392	2080	1456	815.36	570.752	Ceiling Mounted Occupancy Sensor	1	0	244.608	39.2	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	5	440	0.44	2080	915.2	\$146.8	None Proposed	5	440	0.44	2080	1456	915.2	640.64	Ceiling Mounted Occupancy Sensor	1	0	274.56	44.0	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Dispatch	1x4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	0.1014	2080	210.912	\$33.8	None Proposed	2	101.4	0.1014	2080	2080	210.912	210.912	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Dispatch	42W CFL Fixture	12	588	0.588	2080	1223.04	\$196.2	NONE PROPOSED	12	588	0.588	2080	2080	1223.04	1223.04	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Bathroom	42W CFL Fixture	9	441	0.441	2080	917.28	\$147.1	NONE PROPOSED	9	441	0.441	2080	2080	917.28	917.28	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Mens Bathroom	42W CFL Fixture	4	196	0.196	500	98	\$15.7	NONE PROPOSED	4	196	0.196	500	500	98	98	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Mens Bathroom	1x4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	25.4	0.0254	500	12.7	\$2.0	None Proposed	1	25.4	0.0254	500	500	12.7	12.7	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Womens Bathroom	42W CFL Fixture	4	196	0.196	500	98	\$15.7	NONE PROPOSED	4	196	0.196	500	500	98	98	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Womens Bathroom	1x4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	25.4	0.0254	500	12.7	\$2.0	None Proposed	1	25.4	0.0254	500	500	12.7	12.7	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	113	2x4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	0.0507	2080	105.456	\$16.9	None Proposed	1	50.7	0.0507	2080	2080	105.456	105.456	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	3	264	0.264	2080	549.12	\$88.1	None Proposed	3	264	0.264	2080	1456	549.12	384.384	Ceiling Mounted Occupancy Sensor	1	0	164.736	26.4	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Office	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	6	528	0.528	2080	1098.24	\$176.2	None Proposed	6	528	0.528	2080	1456	1098.24	768.768	Ceiling Mounted Occupancy Sensor	1	0	329.472	52.8	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5	
Public Safety Building - Interior	Judge	2x4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	3	264	0.264	2080	549.12	\$88.1	None Proposed	3	264	0.264	2080	2080	549.12	549.12	None Proposed	0															

Appendix D - Lighting Upgrades

Building	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	Existing Fixture Watts	Existing kW	Operating Hours	Existing kWh	Existing Annual Energy Cost	Proposed Replacement Solution	Qty of Existing Fixtures	Proposed Fixture Watts	Proposed kW Base	Proposed Operational Hours Without Sensors	Proposed Operational Hours With Sensors	Proposed kWh Without Sensors	Proposed kWh With Sensors	Proposed Occupancy Sensor Type	Occupancy Sensor Quantity	Total kW Saved	Total kWh Saved	Energy Cost Savings	Ballast/Fixture/Reflector Per Unit Price	Bulb (Per Unit Price)	Labor (Per Unit Price)	Occupancy Sensor (Per Unit Price)	Occupancy Sensor (Per Unit Labor Price)	Labor Subtotal	Materials Subtotal	Labor & Materials Subtotal	Labor Total	Materials Total	Labor & Materials Total
Public Safety Building - Interior	Office	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	202.8	0.2028	2080	421.824	\$67.7	None Proposed	4	202.8	0.2028	2080	1456	421.824	295.2768	Ceiling Mounted Occupancy Sensor	1	0	126.5472	20.3	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5
Public Safety Building - Interior	Cells	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	50.8	0.0508	2080	105.664	\$16.9	None Proposed	2	50.8	0.0508	2080	2080	105.664	105.664	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Garage	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	20	1014	1.014	2080	2109.12	\$338.3	None Proposed	20	1014	1.014	2080	2080	2109.12	2109.12	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Office	42W CFL Fixture	1	49	0.049	2080	101.92	\$16.3	NONE PROPOSED	1	49	0.049	2080	2080	101.92	101.92	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Interior	Office	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	1	88	0.088	2080	183.04	\$29.4	None Proposed	1	88	0.088	2080	1456	183.04	128.128	Ceiling Mounted Occupancy Sensor	1	0	54.912	8.8	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5
Public Safety Building - Interior	Boiler Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	0.1521	500	76.05	\$12.2	None Proposed	3	152.1	0.1521	500	350	76.05	53.235	Ceiling Mounted Occupancy Sensor	1	0	22.815	3.7	\$0.0	\$0.0	\$0.0	\$103.0	\$73.5	\$0.0	\$0.0	\$0.0	\$73.5	\$103.0	\$176.5
Public Safety Building - Interior	Boiler Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	0.1521	500	76.05	\$12.2	None Proposed	3	152.1	0.1521	500	500	76.05	76.05	None Proposed	0	0	0	0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Safety Building - Exterior	Exterior	Pole Mounted Luminaire - 1 Head (Assume 400W MH)	29	12282	13.282	4368	58015.776	\$9,305.7	Replace 400W MH fixture with LED Area Light	29	6728	6.728	4368	4368	29387.904	29387.904	None Proposed	0	6.954	28627.872	4,591.9	\$1,200.0	\$2,000.0	\$703.0	\$0.0	\$0.0	\$703.0	\$3,200.0	\$3,903.0	\$20,387.0	\$92,800.0	\$113,187.0

APPENDIX E

SOLAR ENERGY FINANCING WORKSHEET

Montville Public Safety Building

Design Goal: Provide 15% of average annual electricity

Solar Rating (Zip Code: 07045)	4.68 kWh/sq-m/day
Solar Capacity Required	50.43 kW
Roof Space Needed	5,043 sq-ft
Annual kWh	63,643
Net System installation Cost	\$553,870
Inflated System Installation Cost	\$796,188.13

Assumptions

Annual System Degredation	0.50%
Annual Utility Inflation	3.78%
Federal Tax %	28.00%
State Tax %	7.80%
Annual Maintenance Costs	2%

Year	Utility Price	Solar kWh	Utility Savings	SRECS	Maintenance Costs	Annual Cash Flow	Cummulative Cash Flow	15 year G.O. Bond	Remaining Cash Flow	Plus DSA	Remaining Cash Flow
Install											
1	0.1604	63,643.0	\$10,208.3	\$40,123	(\$1,273)	\$49,058.4	\$49,058.4	(\$75,057.72)	(\$25,999.3)	\$30,023.1	\$4,023.7
2	0.1665	63,324.8	\$10,541.2	\$38,924	(\$1,266)	\$48,199.0	\$97,257.4	(\$75,057.72)	\$22,199.6	\$30,023.1	\$52,222.7
3	0.1728	63,008.2	\$10,885.0	\$37,750	(\$1,260)	\$47,374.6	\$144,631.9	(\$75,057.72)	\$69,574.2	\$30,023.1	\$99,597.3
4	0.1793	62,693.1	\$11,240.0	\$36,434	(\$1,254)	\$46,420.3	\$191,052.2	(\$75,057.72)	\$115,994.5	\$30,023.1	\$146,017.6
5	0.1861	62,379.7	\$11,606.5	\$35,164	(\$1,248)	\$45,523.4	\$236,575.6	(\$75,057.72)	\$161,517.9	\$30,023.1	\$191,541.0
6	0.1931	62,067.8	\$11,985.0	\$33,939	(\$1,241)	\$44,682.6	\$281,258.2	(\$75,057.72)	\$206,200.5	\$30,023.1	\$236,223.6
7	0.2004	61,757.4	\$12,375.9	\$32,756	(\$1,235)	\$43,896.9	\$325,155.1	(\$75,057.72)	\$250,097.4	\$30,023.1	\$280,120.5
8	0.2080	61,448.6	\$12,779.5	\$31,615	(\$1,229)	\$43,165.1	\$368,320.2	(\$75,057.72)	\$293,262.5	\$30,023.1	\$323,285.6
9	0.2158	61,141.4	\$13,196.2	\$30,513	(\$1,223)	\$42,486.2	\$410,806.5	(\$75,057.72)	\$335,748.7	\$30,023.1	\$365,771.8
10	0.2240	60,835.7	\$13,626.5	\$29,449	(\$1,217)	\$41,859.3	\$452,665.8	(\$75,057.72)	\$377,608.1	\$30,023.1	\$407,631.2
11	0.2325	60,531.5	\$14,070.9	\$28,423	(\$1,211)	\$41,283.5	\$493,949.3	(\$75,057.72)	\$418,891.5	\$30,023.1	\$448,914.6
12	0.2412	60,228.8	\$14,529.8	\$27,433	(\$1,205)	\$40,757.8	\$534,707.1	(\$75,057.72)	\$459,649.4	\$30,023.1	\$489,672.5
13	0.2504	59,927.7	\$15,003.6	\$26,477	(\$1,199)	\$40,281.7	\$574,988.8	(\$75,057.72)	\$499,931.0	\$30,023.1	\$529,954.1
14	0.2598	59,628.1	\$15,492.9	\$25,554	(\$1,193)	\$39,854.2	\$614,843.0	(\$75,057.72)	\$539,785.3	\$30,023.1	\$569,808.4
15	0.2696	59,329.9	\$15,998.1	\$24,663	(\$1,187)	\$39,474.9	\$654,317.9	(\$75,057.72)	\$579,260.1	\$30,023.1	\$609,283.2
16	0.2798	59,033.3	\$16,519.9	0	(\$1,181)	\$15,339.2	\$669,657.1		\$669,657.1		\$669,657.1
17	0.2904	58,738.1	\$17,058.6	0	(\$1,175)	\$15,883.8	\$685,540.9		\$685,540.9		\$685,540.9
18	0.3014	58,444.4	\$17,614.9	0	(\$1,169)	\$16,446.0	\$701,986.9		\$701,986.9		\$701,986.9
19	0.3128	58,152.2	\$18,189.3	0	(\$1,163)	\$17,026.3	\$719,013.1		\$719,013.1		\$719,013.1
20	0.3246	57,861.4	\$18,782.5	0	(\$1,157)	\$17,625.3	\$736,638.4		\$736,638.4		\$736,638.4
21	0.3369	57,572.1	\$19,395.0	0	(\$1,151)	\$18,243.6	\$754,882.0		\$754,882.0		\$754,882.0
22	0.3496	57,284.3	\$20,027.5	0	(\$1,146)	\$18,881.8	\$773,763.8		\$773,763.8		\$773,763.8
23	0.3628	56,997.8	\$20,680.6	0	(\$1,140)	\$19,540.7	\$793,304.4		\$793,304.4		\$793,304.4
24	0.3765	56,712.9	\$21,355.0	0	(\$1,134)	\$20,220.8	\$813,525.2		\$813,525.2		\$813,525.2
25	0.3908	56,429.3	\$22,051.4	0	(\$1,129)	\$20,922.9	\$834,448.1		\$834,448.1		\$834,448.1

Montville Public Works Building

Design Goal: Provide 75% of average annual electricity

Solar Rating (Zip Code: 07045)	4.68 kWh/sq-m/day
Solar Capacity Required	58.41 kW
Roof Space Needed	5,841 sq-ft
Annual kWh	73,713
Net System installation Cost	\$625,690
Inflated System Installation Cost	\$899,429

Assumptions

Annual System Degredation	0.50%
Annual Utility Inflation	3.78%
Federal Tax %	28.00%
State Tax %	7.80%
Annual Maintenance Costs	2%

Year	Utility Price	Solar kWh	Utility Savings	SRECS	Maintenance Costs	Annual Cash Flow	Cummulative Cash Flow	15 year G.O. Bond	Remaining Cash Flow	Plus DSA	Remaining Cash Flow
Install											
1	0.1699	73,713.0	\$12,523.8	\$46,471	(\$1,474)	\$57,521.0	\$57,521.0	(\$84,790.32)	(\$27,269.3)	\$33,916.1	\$6,646.8
2	0.1763	73,344.4	\$12,932.3	\$45,083	(\$1,467)	\$56,548.4	\$114,069.4	(\$84,790.32)	\$29,279.1	\$33,916.1	\$63,195.2
3	0.1830	72,977.7	\$13,354.0	\$43,723	(\$1,460)	\$55,617.2	\$169,686.6	(\$84,790.32)	\$84,896.3	\$33,916.1	\$118,812.4
4	0.1899	72,612.8	\$13,789.5	\$42,199	(\$1,452)	\$54,536.2	\$224,222.8	(\$84,790.32)	\$139,432.5	\$33,916.1	\$173,348.6
5	0.1971	72,249.8	\$14,239.2	\$40,728	(\$1,445)	\$53,522.5	\$277,745.4	(\$84,790.32)	\$192,955.1	\$33,916.1	\$226,871.2
6	0.2045	71,888.5	\$14,703.5	\$39,309	(\$1,438)	\$52,574.7	\$330,320.1	(\$84,790.32)	\$245,529.8	\$33,916.1	\$279,445.9
7	0.2123	71,529.1	\$15,183.0	\$37,939	(\$1,431)	\$51,691.5	\$382,011.6	(\$84,790.32)	\$297,221.3	\$33,916.1	\$331,137.4
8	0.2203	71,171.4	\$15,678.1	\$36,617	(\$1,423)	\$50,871.6	\$432,883.3	(\$84,790.32)	\$348,092.9	\$33,916.1	\$382,009.1
9	0.2286	70,815.6	\$16,189.4	\$35,341	(\$1,416)	\$50,113.9	\$482,997.2	(\$84,790.32)	\$398,206.9	\$33,916.1	\$432,123.0
10	0.2373	70,461.5	\$16,717.4	\$34,109	(\$1,409)	\$49,417.3	\$532,414.5	(\$84,790.32)	\$447,624.2	\$33,916.1	\$481,540.3
11	0.2462	70,109.2	\$17,262.5	\$32,920	(\$1,402)	\$48,780.8	\$581,195.3	(\$84,790.32)	\$496,405.0	\$33,916.1	\$530,321.1
12	0.2555	69,758.6	\$17,825.5	\$31,773	(\$1,395)	\$48,203.5	\$629,398.9	(\$84,790.32)	\$544,608.5	\$33,916.1	\$578,524.7
13	0.2652	69,409.8	\$18,406.8	\$30,666	(\$1,388)	\$47,684.5	\$677,083.4	(\$84,790.32)	\$592,293.0	\$33,916.1	\$626,209.2
14	0.2752	69,062.8	\$19,007.1	\$29,597	(\$1,381)	\$47,223.0	\$724,306.4	(\$84,790.32)	\$639,516.0	\$33,916.1	\$673,432.2
15	0.2856	68,717.5	\$19,626.9	\$28,566	(\$1,374)	\$46,818.3	\$771,124.7	(\$84,790.32)	\$686,334.3	\$33,916.1	\$720,250.5
16	0.2964	68,373.9	\$20,267.0	0	(\$1,367)	\$18,899.5	\$790,024.1		\$790,024.1		\$790,024.1
17	0.3076	68,032.0	\$20,927.9	0	(\$1,361)	\$19,567.2	\$809,591.4		\$809,591.4		\$809,591.4
18	0.3192	67,691.9	\$21,610.4	0	(\$1,354)	\$20,256.5	\$829,847.9		\$829,847.9		\$829,847.9
19	0.3313	67,353.4	\$22,315.1	0	(\$1,347)	\$20,968.0	\$850,816.0		\$850,816.0		\$850,816.0
20	0.3438	67,016.6	\$23,042.8	0	(\$1,340)	\$21,702.5	\$872,518.4		\$872,518.4		\$872,518.4
21	0.3568	66,681.6	\$23,794.3	0	(\$1,334)	\$22,460.6	\$894,979.1		\$894,979.1		\$894,979.1
22	0.3703	66,348.1	\$24,570.2	0	(\$1,327)	\$23,243.3	\$918,222.4		\$918,222.4		\$918,222.4
23	0.3843	66,016.4	\$25,371.5	0	(\$1,320)	\$24,051.2	\$942,273.5		\$942,273.5		\$942,273.5
24	0.3988	65,686.3	\$26,198.9	0	(\$1,314)	\$24,885.1	\$967,158.7		\$967,158.7		\$967,158.7
25	0.4139	65,357.9	\$27,053.2	0	(\$1,307)	\$25,746.1	\$992,904.7		\$992,904.7		\$992,904.7

Montville Municipal Building

Design Goal: Provide 30% of average annual electricity

Solar Rating (Zip Code: 07045)	4.68 kWh/sq-m/day
Solar Capacity Required	93.49 kW
Roof Space Needed	9,349 sq-ft
Annual kWh	117,984
Net System installation Cost	\$941,410
Inflated System Installation Cost	\$1,353,277

Assumptions

Annual System Degredation	0.50%
Annual Utility Inflation	3.78%
Federal Tax %	28.00%
State Tax %	7.80%
Annual Maintenance Costs	2%

Year	Utility Price	Solar kWh	Utility Savings	SRECS	Maintenance Costs	Annual Cash Flow	Cummulative Cash Flow	15 year G.O. Bond	Remaining Cash Flow	Plus DSA	Remaining Cash Flow
Install											
1	0.1712	117,984.0	\$20,198.9	\$74,381	(\$2,360)	\$92,220.7	\$92,220.7	(\$127,575.24)	(\$35,354.6)	\$51,030.1	\$15,675.5
2	0.1777	117,394.1	\$20,857.6	\$72,159	(\$2,348)	\$90,669.0	\$182,889.7	(\$127,575.24)	\$55,314.4	\$51,030.1	\$106,344.5
3	0.1844	116,807.1	\$21,537.8	\$69,982	(\$2,336)	\$89,183.6	\$272,073.3	(\$127,575.24)	\$144,498.1	\$51,030.1	\$195,528.2
4	0.1914	116,223.1	\$22,240.1	\$67,543	(\$2,324)	\$87,458.8	\$359,532.1	(\$127,575.24)	\$231,956.9	\$51,030.1	\$282,987.0
5	0.1986	115,642.0	\$22,965.4	\$65,189	(\$2,313)	\$85,841.8	\$445,374.0	(\$127,575.24)	\$317,798.7	\$51,030.1	\$368,828.8
6	0.2061	115,063.7	\$23,714.3	\$62,917	(\$2,301)	\$84,330.5	\$529,704.4	(\$127,575.24)	\$402,129.2	\$51,030.1	\$453,159.3
7	0.2139	114,488.4	\$24,487.7	\$60,725	(\$2,290)	\$82,922.7	\$612,627.1	(\$127,575.24)	\$485,051.9	\$51,030.1	\$536,082.0
8	0.2220	113,916.0	\$25,286.2	\$58,609	(\$2,278)	\$81,616.4	\$694,243.5	(\$127,575.24)	\$566,668.3	\$51,030.1	\$617,698.4
9	0.2304	113,346.4	\$26,110.8	\$56,566	(\$2,267)	\$80,409.9	\$774,653.4	(\$127,575.24)	\$647,078.2	\$51,030.1	\$698,108.3
10	0.2391	112,779.7	\$26,962.3	\$54,595	(\$2,256)	\$79,301.4	\$853,954.8	(\$127,575.24)	\$726,379.6	\$51,030.1	\$777,409.7
11	0.2481	112,215.8	\$27,841.6	\$52,692	(\$2,244)	\$78,289.3	\$932,244.2	(\$127,575.24)	\$804,668.9	\$51,030.1	\$855,699.0
12	0.2575	111,654.7	\$28,749.6	\$50,856	(\$2,233)	\$77,372.2	\$1,009,616.4	(\$127,575.24)	\$882,041.1	\$51,030.1	\$933,071.2
13	0.2672	111,096.4	\$29,687.1	\$49,083	(\$2,222)	\$76,548.6	\$1,086,165.0	(\$127,575.24)	\$958,589.7	\$51,030.1	\$1,009,619.8
14	0.2773	110,540.9	\$30,655.2	\$47,373	(\$2,211)	\$75,817.3	\$1,161,982.2	(\$127,575.24)	\$1,034,407.0	\$51,030.1	\$1,085,437.1
15	0.2878	109,988.2	\$31,654.9	\$45,722	(\$2,200)	\$75,177.1	\$1,237,159.3	(\$127,575.24)	\$1,109,584.0	\$51,030.1	\$1,160,614.1
16	0.2987	109,438.3	\$32,687.2	0	(\$2,189)	\$30,498.5	\$1,267,657.7		\$1,267,657.7		\$1,267,657.7
17	0.3100	108,891.1	\$33,753.2	0	(\$2,178)	\$31,575.4	\$1,299,233.1		\$1,299,233.1		\$1,299,233.1
18	0.3217	108,346.7	\$34,853.9	0	(\$2,167)	\$32,687.0	\$1,331,920.1		\$1,331,920.1		\$1,331,920.1
19	0.3338	107,804.9	\$35,990.5	0	(\$2,156)	\$33,834.4	\$1,365,754.5		\$1,365,754.5		\$1,365,754.5
20	0.3465	107,265.9	\$37,164.2	0	(\$2,145)	\$35,018.9	\$1,400,773.4		\$1,400,773.4		\$1,400,773.4
21	0.3596	106,729.6	\$38,376.2	0	(\$2,135)	\$36,241.6	\$1,437,015.0		\$1,437,015.0		\$1,437,015.0
22	0.3732	106,195.9	\$39,627.7	0	(\$2,124)	\$37,503.8	\$1,474,518.8		\$1,474,518.8		\$1,474,518.8
23	0.3873	105,664.9	\$40,920.0	0	(\$2,113)	\$38,806.7	\$1,513,325.5		\$1,513,325.5		\$1,513,325.5
24	0.4019	105,136.6	\$42,254.4	0	(\$2,103)	\$40,151.7	\$1,553,477.1		\$1,553,477.1		\$1,553,477.1
25	0.4171	104,610.9	\$43,632.4	0	(\$2,092)	\$41,540.2	\$1,595,017.3		\$1,595,017.3		\$1,595,017.3

APPENDIX F

GLACIAL ENERGY - ALTERNATIVE ELECTRIC SUPPLIER QUOTE

Savings Analysis Proposal - JCP&L

Glacial Energy



This proposal illustrates how you can maximize your energy cost savings by choosing Glacial Energy as your preferred electricity supplier. This proposal is based on your organization's estimated usage (kwh) and demand (kw) over the coming year.

Secure your savings today!

Contract Summary - Forecasted Price Comparison

Company Name: The Township of Montville
Billing Address: 356 Route 202, Montville, NJ 07045

Start Month: Feb-10
Number of LDC Accounts: 4
Retail Margin Adder: N/A

Forecasted Customer Usage Data Summary

Usage (kwh): 914,418
Avg Monthly Usage (kwh): 76,201
Peak Monthly kw: 290
Peak Load Factor: 36%
Capacity PLC: 221
Transmission PLC: 243

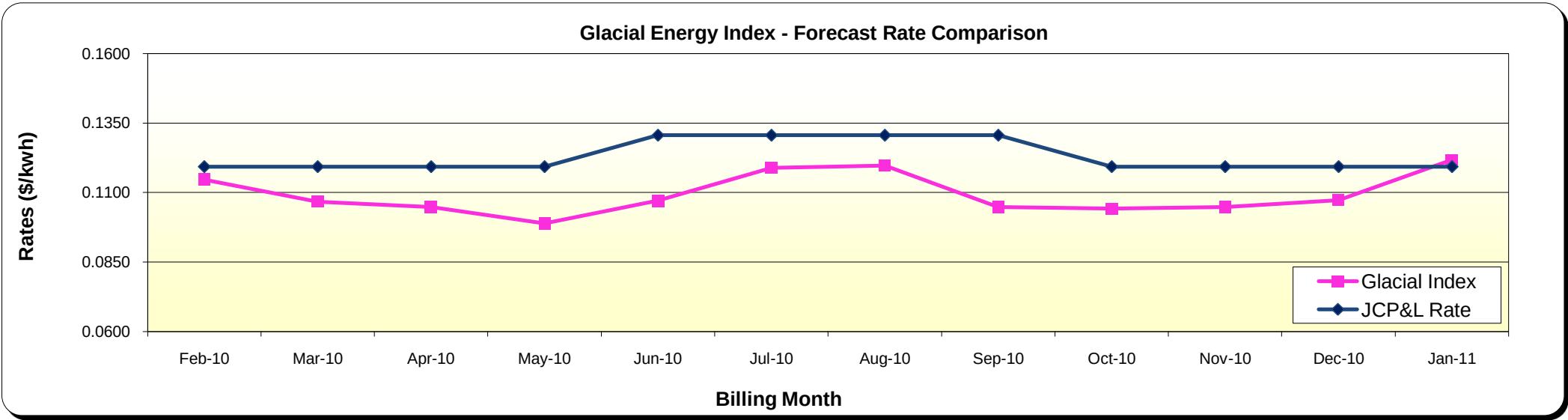
Estimated Rate Comparison over the next 12 months

Avg Rate (\$/kwh)*: \$ 0.12334
Annual Utility Charges: \$ 112,784

Glacial Energy Index: \$ 0.10999
Glacial Charges: \$ 100,575

Savings Summary

Estimated Savings vs. Utility \$ 12,209
Savings (Glacial vs. Utility) 11%

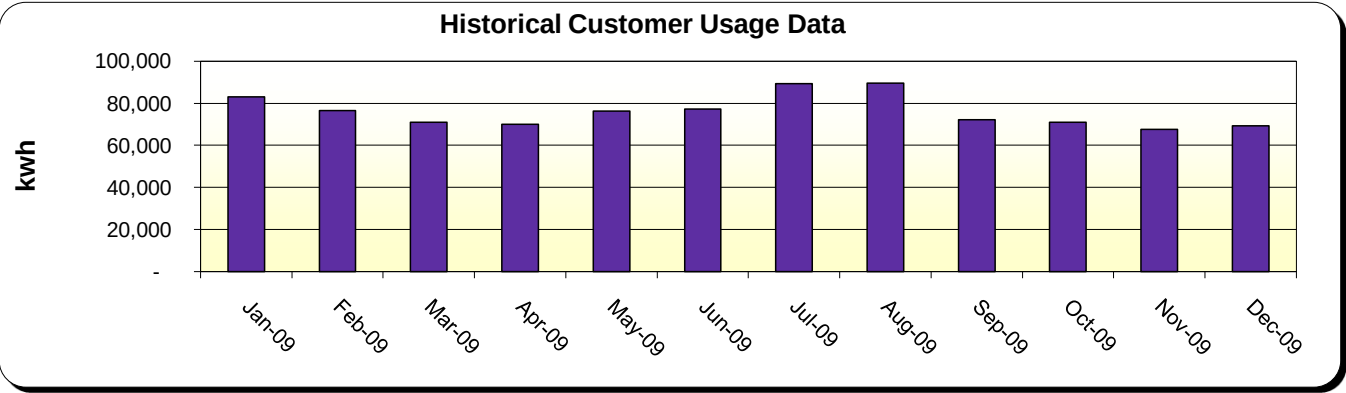


Glacial Index Includes:

- a. Estimated weighted average Wholesale Energy price
- b. Ancillary Services & requirements
- c. Zonal Congestion
- d. Market Scheduling and Forecasting Fees
- e. PJM ISO Fees
- f. Transmission Losses & Charges
- g. Capacity Charges
- h. NJ SUT

Glacial Index Excludes:

- a. Any charges from the LDC companies - Wires
- b. Non NJ SUT Taxes (SUT rates & charges noted above)



LDC Account No:	Physical Address:
1 08017381800000146416	356 Route 202, Montville, NJ 07045
2 08017381800000942005	195 Changebridge Road, Montville, NJ 07045
3 08017381800005806139	130 Changebridge Road, Montville, NJ 07045
4 08017381800006025068	360 Main Road, Montville, NJ 07045

1. The Glacial Index price is based in large part on forecasted ISO charges and estimated future zonal energy prices.
2. The forward tariff rates are based on the latest, pending or estimated utility rates (inclusive of NJ SUT), applicable for this rate schedule(s).
Rate listed is an average over the next 12 months. Your current average utility rate for the first month on the forecast graph is \$0.11926/kwh.

Savings Analysis Proposal - JCP&L

Glacial Energy



This proposal illustrates how you can maximize your energy cost savings by choosing Glacial Energy as your preferred electricity supplier. This proposal is based on your organization's estimated usage (kwh) and demand (kw) over the coming year.

Contract Summary - Historical Utility Charges

Company Name: The Township of Montville
Billing Address: 356 Route 202, Montville, NJ 07045

Historical Timeframe (mo.): 6
Start Month: Jul-09
Number of LDC Accounts: 4

6 month Period Summary

Usage (kwh): 459,089
Avg Monthly Usage (kwh): 76,515
Peak Monthly kw: 290
Peak Load Factor: 36%
Capacity PLC: 221
Transmission PLC: 243

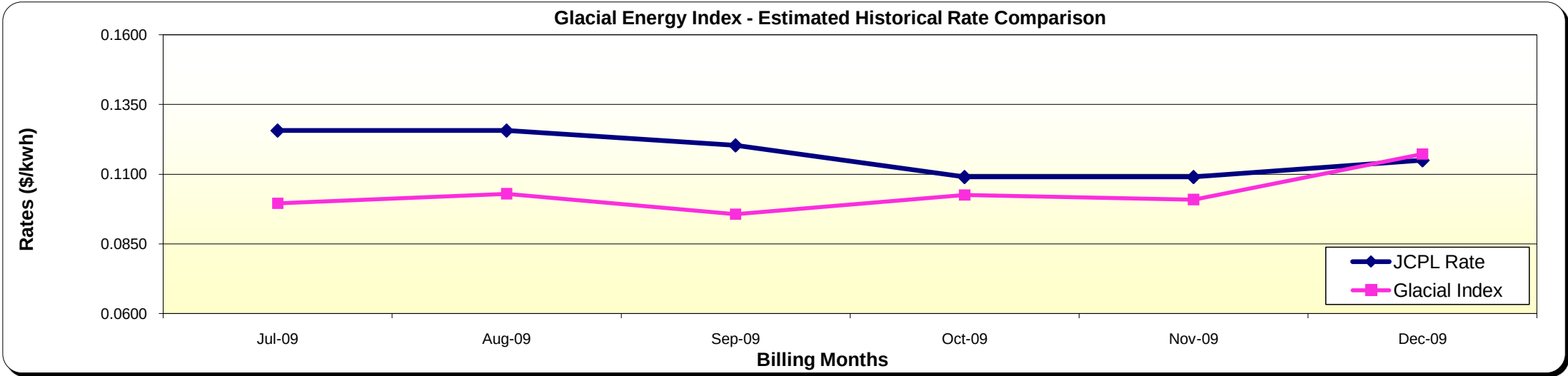
Estimated Historical Utility Charges

Avg Rate (\$/kwh): \$ 0.11818
Annual Utility Charges: \$ 54,253

Glacial Energy Index: \$ 0.10294
Glacial Charges: \$ 47,261

Savings Summary

Estimated Savings vs. Utility \$ 6,993
Savings (Glacial vs. Utility) 13%



- Glacial Index Includes:
- a. Estimated Weighted average Wholesale Energy price
 - b. Ancillary Services & requirements
 - c. Zonal Congestion
 - d. Market Scheduling and Forecasting Fees
 - e. PJM ISO Fees
 - f. Transmission Losses & Charges
 - g. Capacity Charges
 - h. NJ SUT Taxes

- Glacial Index Excludes:
- a. Any charges from the LDC companies - Wires
 - b. Non NJ SUT Taxes (SUT rates & charges noted above)

1. The historic tariff rate comparison is based on historical usage and current, pending or estimated utility rates (inclusive of NJ SUT) for the appropriate rate schedule(s).

APPENDIX G

NJ SMARTSTART INCENTIVES INFORMATION AND WORKSHEETS



2010 Prescriptive Lighting Application

Customer Information

Company		Electric Utility Serving Applicant		Electric Account No.		Installation Date	
Facility Address				City		State	
						Zip	
Type of Project ☐ New Construction ☐ Renovation ☐ Equipment Replacement						Size of Building	
Company Mailing Address				City		State	
						Zip	
Contact Person (Name/Title)				Telephone No. ()		Fax No. ()	
Incorporated? ☐ Yes ☐ No ☐ Exempt				Federal Tax ID# or SSN		Email Address	
Incentive Payment to ☐ Customer ☐ Contractor ☐ Other				Please assign payment to contractor/vendor/other indicated below Customer Signature			

Payee Information (must submit W-9 form with application)

Payee Information (must submit W-9 form with application)						Email Address	
Company		Contact Name		Incorporated? Yes No		Federal Tax ID#	
Street Address		City		State Zip		Telephone No. () Fax No. ()	

Contractor/Vendor Information (if different from Payee)

Contractor/Vendor Information (if different from Payee)						Email Address	
Company		Contact Name		Incorporated? ☐ Yes ☐ No		Federal Tax ID#	
Street Address		City		State Zip		Telephone No. () Fax No. ()	

Building Type (circle one)

Education-Primary School; Education-Community College; Education-University; Grocery; Medical-Hospital; Medical-Clinic; Lodging Hotel(Guest Rooms); Lodging Motel; Manufacturing-Light Industrial; Office-Large; Office-Small; Restaurant-Sit Down; Restaurant-Fast Food; Retail-3 Story Large; Retail- Single Story Large; Retail-Small; Storage Conditioned; Storage Unconditioned; Warehouse; Other

Prescriptive Lighting Incentive

\$_____ Total Incentive (per attached worksheet calculations)

Note: Prescriptive Lighting Worksheet must accompany this application.

Specific Program Requirements* (These requirements are in addition to the Program Terms and Conditions.)

1. Please refer to the Program Guide for additional applicable technical requirements.
2. Include the manufacturer's specification sheet with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. Incentives for T-5 and T-8 lamps with electronic ballasts are available only for fixtures with a Total Harmonic Distortion of $\leq 20\%$.
4. All eligible lighting devices must be UL listed.
5. Requirements for CFL fixtures (must meet all requirements):
 - Fixtures must be new and ENERGY STAR qualified
 - Fixtures must have replaceable electronic ballasts
 - Total Harmonic Distortion (THD) must not exceed 33%
 - Power factor of the ballast must be no less than 90%
 - The manufacturer must warrant all fixtures for a minimum of 3 years. Warranty does not pertain to lamps or photocells not physically part of the fixture.
 - The installer must warrant fixture installation – minimum of 1 yr.
- 5.1 Screw-in PAR 38 or 30 Compact Fluorescent Lamps (CFL) with Aluminum Reflectors replacing existing incandescent fixtures.
 - The lamp must be warranted by the manufacturer for 8,000 hours
 - Total Harmonic Distortion must not exceed 33%
 - Power factor of the ballast must be $\geq 90\%$
6. Pulse Start Metal Halide (including pole-mounted parking lot lighting) must have a 12% minimum wattage reduction.
7. T-5 or T-8 Fixtures replacing incandescent or T-12 fluorescent fixtures greater than 250 watt or High Intensity Discharge shall comply as follows:
 - 7.1 T-5 fixtures replacing T-12 fluorescent or incandescent fixtures 250 watts or greater, or HID fixtures shall have a ballast factor greater than or equal to 1.0; have reflectivity greater than or equal to 91%; have a minimum 2 lamps; and be designated as F54T5 HO.
 - 7.2 T-8 fixtures replacing T-12 fluorescent or incandescent fixtures 250 watts or greater, or HID fixtures shall have a ballast factor greater than or equal to 1.14; have reflectivity greater than or equal to 91%; have a minimum of 4 lamps; and be designated as F32T8, minimum 32 watts.
 - 7.3 Incentives for delamped T-8 lamps with new reflectors are available only for fixtures with a Total Harmonic Distortion of $\leq 20\%$. Electronic ballast replacement required for all eligible delamped fixtures. Eligible delamping can include reduction in linear lamp feet from existing conditions. For example, 1-8' linear fluorescent lamp can be considered as 2-4' linear lamps. U-bend lamps 4' in total length can be considered as 2-F17/T8 lamps.
 - 7.4 Electronic ballast replacement is necessary for all eligible delamped fixtures.
 - 7.5 Reduced wattage T8 (28W/25W 4') (1-4 lamps) retrofit requires lamp and ballast replacement.
8. LED Refrigerated/Freezer Case Lighting must meet NEEP Design Lights Consortium Standards or be on an ENERGY STAR or a SSL Qualified Product list. For new door installations on existing open cases, indicate the number of LED fixtures to be installed. Also indicate "New Door" in the Fixture Type column on the Prescriptive Lighting Worksheet (ie. New Door 5' LED).

Application Checklist (Before submitting your application, please make sure you have signed in the space below and completed the following items.)

- ☐ Payee Information is filled out and a W-9 form of the payee is included
- ☐ Manufacturer's specification sheets for proposed technology are included
- ☐ A copy (all pages) of a recent month's utility bill is included

ACKNOWLEDGEMENT

CUSTOMER'S SIGNATURE _____	By signing, I certify that I have read, understand and agree to the Specific Program Requirements/Terms and Conditions listed on this application form, I will also submit for approval a properly completed application package, which includes this signed application, worksheet (if applicable), manufacturer's specification sheets and complete utility bill (name and address on utility bill must match name and address on application).
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Prescriptive Lighting Measures and Incentives*

Type of Fixture			Incentive
Recessed and Surface-Mounted Compact Fluorescents (New Fixtures Replacing Incandescent Fixtures Only): Only available for hard-wired, electronically ballasted new fixtures with rare earth phosphor lamps and 4-pin based tubes (including: twin tube, quad tube, triple tube, 2D or circline lamps), THD<33% and BF>0.9			\$25 per 1-lamp fixture \$30 per 2-lamp or more fixture
Screw-in PAR 38 or PAR 30 (CFL) as per 5.1 above			\$7 per lamp replaced
High-Efficiency Fluorescent Fixtures: For retrofit of T-12 fixtures to T-5 or T-8 with electronic ballasts			\$15 per fixture (1-4 lamps retrofits)
For replacement of fixtures with new T-5 or T-8 fixtures			
Type of Old Fixture	Wattage of Old Fixture	Type of New Fixture	Incentive Per Fixture Removed
HID, T-12, Incandescent	≥ 1000 Watts	T-5, T-8	\$284
HID, T-12, Incandescent	400-999 Watt	T-5, T-8	\$100
HID, T-12, Incandescent	250-399 Watt	T-5, T-8	\$50
HID only	175-249 Watt	T-5, T-8	\$45
HID only	100-174 Watt	T-5, T-8	\$30
HID only	75-99 Watt	T-5, T-8	\$16
T-12 only	<250 Watt	T-5, T-8 (1 & 2 lamp)	\$25
T-12 only	<250 Watt	T-5, T-8 (3 & 4 lamp)	\$30
For retrofit of T-8 fixtures by permanent delamping & new reflectors are available only for fixtures with a total Harmonic Distortion of ≤20%. Electronic ballast replacement required for all eligible delamped fixtures.			\$20 per fixture
New Construction & Complete Renovation			Performance based only
LED Exit Signs (new fixtures only): For existing facilities with connected load <75 kW			\$20 per fixture
For existing facilities with connected load ≥ 75 kW			\$10 per fixture
Pulse Start Metal Halide (for fixtures ≥ 150 watts)			\$25 per fixture (includes parking lot lighting)
Parking lot low bay - LED			\$43 per fixture
T-12 to T-8 fixtures by permanent delamping & new reflectors. Electronic ballast replacement is necessary for all eligible delamped fixtures.			\$30 per fixture
Retrofit of existing 32 watt T-8 system to Reduced Wattage (28W/25W 4')			\$10 per fixture (1-4 lamps)
LED Refrigerated/Freezer Case Lighting: Incentive for replacement of fluorescent lighting systems in medium or low temperature display cases			\$42 per 5' LED fixture \$65 per 6' LED fixture
Induction Lighting Fixtures Retrofit of HID			\$50 per HID (≥100W) fixture retrofitted with induction lamp, power coupler and generator. Replacement unit must use 30% less wattage per fixture than existing HID system
Replacement of HID			\$70 per HID (≥100W) fixture with a new induction fixture

Mail or fax your application package DIRECTLY to the Commercial/Industrial Market Manager.

New Jersey's Clean Energy Program
 c/o TRC Energy Services
 900 Route 9 North, Suite 104 • Woodbridge, NJ 07095
 Phone: 866-657-6278 • Fax: 732-855-0422

Visit our web site: NJCleanEnergy.com/ssb



Program Terms and Conditions

Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

Design Services – Services that may be offered to design professionals under the Program.

Energy-Efficient Measures – Any device eligible to receive a Program Incentive payment through the NJ Clean Energy Commercial and Industrial Program (New Jersey SmartStart Buildings).

New Jersey Utilities – The regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Market Manager – TRC Energy Services.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

Program Incentives – Refers to the amount or level of incentive that the Program provides to Participating Customers pursuant to the Program offered herein (see description under “Incentive Amount” heading).

Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above. Program Incentives for new construction are available only for projects in areas designated for growth in the State Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for new Program incentives throughout the State. Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Locator available from the HMFA website or contact the Market Manager if you are uncertain about project eligibility.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy efficient measures that were pre-approved (for exceptions to this condition, please refer to “Exceptions for Approval”). In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheet and manufacturer’s cut sheets (where appropriate). This information must be submitted to the Market Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Market Manager on or before December 31, 2010 in order to be eligible for 2010 incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Market Manager’s approval letter is not eligible for an incentive. The Market Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. **Any Customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

Exceptions for Approval – The Application and Eligibility Process pertains to all projects except for those involving either Unitary HVAC or Motors having an incentive amount less than \$5,000. These measures, at this incentive level, may be installed without prior approval. In addition, but at the sole discretion of the Market Manager, emergency replacement of equipment may not require a prior approval determination and letter. **In such cases, please notify the Market Manager of such emergencies as early as possible, that an application will soon be sent in that was not pre-approved.**

Post Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Market Manager’s initial approval letter.

Please refer to the Program Guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Market Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to \$500,000 per utility account in a calendar year. Contact the Market Manager regarding any questions.

Tax Liability – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their Federal Tax Identification number or social security number to the Market Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (Business Assistance or Incentive Clearance Certificate) that is dated within 90 days of equipment installation.

Endorsement – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Market Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual, and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.



Specific Program Requirements* (These requirements are in addition to the Program Terms and Conditions.)

1. Please refer to the Program Guide for additional applicable technical requirements.
2. Include the manufacturer's specification sheet with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. Incentives for T-5 and T-8 lamps with electronic ballasts are available only for fixtures with a Total Harmonic Distortion of $\leq 20\%$.
4. All eligible lighting devices must be UL listed.
5. Requirements for CFL fixtures (must meet all requirements):
 - Fixtures must be new and Energy Star qualified
 - Fixtures must have replaceable electronic ballasts
 - Total Harmonic Distortion (THD) must not exceed 33%
 - Power factor of the ballast must be no less than 90%
 - The manufacturer must warrant all fixtures for a minimum of 3 years. Warranty does not pertain to lamps or photocells not physically part of the fixture.
 - The installer must warrant fixture installation – minimum of 1 yr.
- 5.1 Screw-in PAR 38 or 30 Compact Fluorescent Lamps (CFL) with Aluminum Reflectors replacing existing incandescent fixtures.
 - The lamp must be warranted by the manufacturer for 8,000 hours
 - Total Harmonic Distortion must not exceed 33%
 - Power factor of the ballast must be $\geq 90\%$
6. Pulse Start Metal Halide (including pole-mounted parking lot lighting) must have a 12% minimum wattage reduction.
7. T-5 or T-8 Fixtures replacing incandescent or T-12 fluorescent fixtures greater than 250 watt or High Intensity Discharge shall comply as follows:
 - 7.1 T-5 fixtures replacing T-12 fluorescent or incandescent fixtures 250 watts or greater, or HID fixtures shall have a ballast factor greater than or equal to 1.0; have reflectivity greater than or equal to 91%; have a minimum 2 lamps; and be designated as F54T5 HO.
 - 7.2 T-8 fixtures replacing T-12 fluorescent or incandescent fixtures 250 watts or greater, or HID fixtures shall have a ballast factor greater than or equal to 1.14; have reflectivity greater than or equal to 91%; have a minimum of 4 lamps; and be designated as F32T8, minimum 32 watts.
 - 7.3 Incentives for delamped T-8 lamps with new reflectors are available only for fixtures with a total Harmonic Distortion of $\leq 20\%$. Electronic ballast replacement required for all eligible delamped fixtures. Eligible delamping can include reduction in linear lamp feet from existing conditions. For example, 1-8' linear fluorescent lamp can be considered as 2-4' linear lamps. U-bend lamps 4' in total length can be considered as 2-F17/T8 lamps.
 - 7.4 Electronic ballast replacement is necessary for all eligible delamped fixtures.
 - 7.5 Reduced wattage T8 (28W/25W 4') (1-4 lamps) retrofit requires lamp and ballast replacement.
8. LED Refrigerated/Freezer Case Lighting must meet NEEP Design Lights Consortium Standards or be on an ENERGY STAR or a SSL Qualified Product list. For new door installations on existing open cases, indicate the number of LED fixtures to be installed. Also indicate "New Door" in the Fixture Type column on the Prescriptive Lighting Worksheet (ie. New Door 5' LED).

ACKNOWLEDGEMENT

CUSTOMER'S SIGNATURE	By signing, I certify that I have read, understand and agree to the Specific Program Requirements/Terms and Conditions listed on this application form. I will also submit for approval a properly completed application package, which includes this signed application, worksheet (if applicable), manufacturer's specification sheets and complete utility bill (name and address on utility bill must match name and address on application).
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Prescriptive Lighting Measures and Incentives*			
Type of Fixture		Incentive	
Recessed and Surface-Mounted Compact Fluorescents (New Fixtures Replacing Incandescent Fixtures Only): Only available for hard-wired, electronically ballasted new fixtures with rare earth phosphor lamps and 4-pin based tubes (including: twin tube, quad tube, triple tube, 2D or circline lamps), THD $\leq 33\%$ and BF ≥ 0.9		\$25 per 1-lamp fixture \$30 per 2-lamp or more fixture	
Screw-in PAR 38 or PAR 30 (CFL) as per 5.1 above		\$7 per lamp replaced	
High-Efficiency Fluorescent Fixtures: For retrofit of T-12 fixtures to T-5 or T-8 with electronic ballasts		\$15 per fixture (1-4 lamps retrofits)	
For replacement of fixtures with new T-5 or T-8 fixtures			
Type of Old Fixture	Wattage of Old Fixture	Type of New Fixture	Incentive Per Fixture Removed
HID, T-12, Incandescent	≥ 1000 Watts	T-5, T-8	\$284
HID, T-12, Incandescent	400-999 Watt	T-5, T-8	\$100
HID, T-12, Incandescent	250-399 Watt	T-5, T-8	\$50
HID only	175-249 Watt	T-5, T-8	\$43
HID only	100-174 Watt	T-5, T-8	\$30
HID only	75-99 Watt	T-5, T-8	\$16
T-12 only	≤ 250 Watt	T-5, T-8 (1 & 2 lamp)	\$25
T-12 only	≤ 250 Watt	T-5, T-8 (3 & 4 lamp)	\$30
For retrofit of T-8 fixtures by permanent delamping & new reflectors are available only for fixtures with a total Harmonic Distortion of $\leq 20\%$. Electronic ballast replacement required for all eligible delamped fixtures.		\$20 per fixture	
New Construction & Complete Renovation		Performance based only	
LED Exit Signs (new fixtures only): For existing facilities with connected load < 75 kW		\$20 per fixture	
For existing facilities with connected load ≥ 75 kW		\$10 per fixture	
Pulse Start Metal Halide (for fixtures ≥ 150 watts)		\$25 per fixture (includes parking lot lighting)	
Parking lot low bay - LED		\$43 per fixture	
T-12 to T-8 fixtures by permanent delamping & new reflectors. Electronic ballast replacement is necessary for all eligible delamped fixtures.		\$30 per fixture	
Retrofit of existing 32 watt T-8 system to Reduced Wattage (28W/25W 4')		\$10 per fixture (1-4 lamps)	
LED Refrigerated/Freezer Case Lighting: Incentive for replacement of fluorescent lighting systems in medium or low temperature display cases		\$42 per 5' LED Fixture \$65 per 6' LED Fixture	
Induction Lighting Fixtures Retrofit of HID		\$50 per HID ($\geq 100W$) fixture retrofitted with induction lamp, power coupler and generator. Replacement unit must use 50% less wattage per fixture than existing HID system	
Replacement of HID		\$70 per HID ($\geq 100W$) fixture with a new induction fixture	

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*Incentives/Requirements subject to change.



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Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

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Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Market Manager – TRC Energy Services.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

Program Incentives – Refers to the amount or level of incentive that the Program provides to Participating Customers pursuant to the Program offered herein (see description under “Incentive Amount” heading).

Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above. Program Incentives for new construction are available only for projects in areas designated for growth in the State Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for new Program incentives throughout the State. Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Locator available from the HMFA website or contact the Market Manager if you are uncertain about project eligibility.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy efficient measures that were pre-approved (for exceptions to this condition, please refer to “Exceptions for Approval”). In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheet and manufacturer’s cut sheets (where appropriate). This information must be submitted to the Market Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Market Manager on or before December 31, 2010 in order to be eligible for 2010 incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Market Manager’s approval letter is not eligible for an incentive. The Market Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. **Any Customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

Exceptions for Approval – The Application and Eligibility Process pertains to all projects except for those involving either Unitary HVAC or Motors having an incentive amount less than \$5,000. These measures, at this incentive level, may be installed without prior approval. In addition, but at the sole discretion of the Market Manager, emergency replacement of equipment may not require a prior approval determination and letter. **In such cases, please notify the Market Manager of such emergencies as early as possible, that an application will soon be sent in that was not pre-approved.**

Post Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Market Manager’s initial approval letter.

Please refer to the Program Guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Market Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to \$500,000 per utility account in a calendar year. Contact the Market Manager regarding any questions.

Tax Liability – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their Federal Tax Identification number or social security number to the Market Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (Business Assistance or Incentive Clearance Certificate) that is dated within 90 days of equipment installation.

Endorsement – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Market Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual, and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.



2010 Lighting Controls Application

Customer Information

Company		Electric Utility Serving Applicant		Electric Account No.		Installation Date	
Facility Address				City		State Zip	
Type of Project ☐ New Construction ☐ Renovation ☐ Equipment Replacement						Size of Building	
Company Mailing Address				City		State Zip	
Contact Person (Name/Title)				Telephone No. ()		Fax No. ()	
Incorporated? ☐ Yes ☐ No ☐ Exempt				Federal Tax ID# or SSN		Email Address	
Incentive Payment to ☐ Customer ☐ Contractor ☐ Other				Please assign payment to contractor/vendor/other indicated below Customer Signature			

Payee Information (must submit W-9 form with application)

Company						Contact Name		Incorporated? Yes No		Email Address	
Street Address						City		State		Zip	
								Telephone No. ()		Fax No. ()	

Contractor/Vendor Information (if different from Payee)

Company						Contact Name		Incorporated? ☐ Yes ☐ No		Email Address	
Street Address						City		State		Zip	
								Telephone No. ()		Fax No. ()	

Building Type (circle one)

Education-Primary School; Education-Community College; Education-University; Grocery; Medical-Hospital; Medical-Clinic; Lodging Hotel(Guest Rooms); Lodging Motel; Manufacturing-Light Industrial; Office-Large; Office-Small; Restaurant-Sit Down; Restaurant-Fast Food; Retail-3 Story Large; Retail- Single Story Large; Retail-Small; Storage Conditioned; Storage Unconditioned; Warehouse; Other

Lighting Control Incentive

\$_____ Total Incentive (per attached worksheet calculations)

Note: Lighting Controls Incentive Worksheet must accompany this application.

Specific Program Requirements* (These requirements are in addition to the Program Terms and Conditions.)

1. Please refer to the Program Guide for additional applicable technical requirements, including special requirements for lighting controls.
2. Include the manufacturer's specification sheet with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. All lighting controls eligible for incentives must be UL listed.
4. Lighting control incentives are only available for control of eligible energy efficient lighting fixtures.
5. If more than one eligible lighting control device is associated with the same eligible fixture, the incentive paid will be for the lighting control device that yields the largest incentive only.
6. Occupancy Sensor Controls (existing facilities only):
 - There is no incentive available for occupancy sensors installed in a space where they are prohibited by state or local building or safety code. Additionally, no incentive is eligible for occupancy sensors in the following specific spaces in all cases: stairways, restrooms (remote mounted only allowed), elevators, corridors/hallways, lobbies, and closets/storage areas.
 - Incentives will only be paid for eligible occupancy sensors (OSW & OSR) controlling at least 2 eligible lighting fixtures and, for OSR installations, a minimum total connected load of 180 watts.
 - Incentives will only be paid for eligible OSRH occupancy sensors controlling eligible fixtures when the controlled wattage is greater than 180 watts.
 - Occupancy sensors with manual override to the "ON" position are ineligible for incentive.
7. High-Low Controls (OHLF and OHLH):
 - Incentives will not be paid for high-low controls on eligible fluorescent fixtures where daylight dimming controls can be effectively employed.
 - Incentives will not be paid for spaces smaller than 250 square feet.
 - Incentives available only when "low level" is no more than 60% of "high level."
 - Incentives are not available for the following spaces: stairways, elevators, corridors/hallways, or lobbies.
 - OHLF will control fixtures that have a ballast factor less than 1.0 for T-5s and 1.14 for T-8s.
 - OHLH will control fixtures that have a ballast factor greater than or equal to 1.0 for T-5s and 1.14 for T-8s.
8. Daylight Dimming Controls for eligible fixtures:
 - Incentives will only be paid for eligible daylight dimming controls operating at least 4 eligible ballasts with a minimum total connected load of 240 watts.
 - Dimming shall be continuous or stepped at 4 or more levels.
 - Incentives will be paid only for eligible daylight dimming control systems designed in accordance with IESNA practice as delineated in "RP-5-99, IESNA Recommended Practice of Daylighting."
 - DLD will control fixtures that have a ballast factor less than 1.0 for T-5s and 1.14 for T-8s.
 - DDH will control fixtures that have a ballast factor greater than or equal to 1.0 for T-5s and 1.14 for T-8s.

Application Checklist (Before submitting your application, please make sure you have signed in the space below and completed the following items.)

- ☐ Payee Information is filled out and a W-9 form of the payee is included
- ☐ Manufacturer's specification sheets for proposed technology are included
- ☐ A copy (all pages) of a recent month's utility bill is included

ACKNOWLEDGEMENT**CUSTOMER'S SIGNATURE**

By signing, I certify that I have read, understand and agree to the Specific Program Requirements/Terms and Conditions listed on this application form, I will also submit for approval a properly completed application package, which includes this signed application, worksheet (if applicable), manufacturer's specification sheets and complete utility bill (name and address on utility bill must match name and address on application).

Lighting Control Prescriptive Incentives*

Control Device Type	Incentive per Unit
OSW – Occupancy Sensor Wall Mounted (Existing facilities only)	\$20 per control
OSR – Occupancy Sensor Remote Mounted (Existing facilities only)	\$35 per control
DLD – Fluorescent Daylight Dimming	\$25 per fixture controlled
DLD – Fluorescent Daylight Dimming (Office Applications)	\$50 per fixture controlled
OHLF – Occupancy Controlled High-Low with Step Ballast	\$25 per fixture controlled
OSRH – Occupancy Sensor Remote Mounted	\$35 per control
OHLH – Occupancy Controlled High-Low with Step Ballast	\$75 per fixture controlled
DDH – Daylight Dimming	\$75 per fixture controlled

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New Jersey's Clean Energy Program
c/o TRC Energy Services
900 Route 9 North, Suite 104 • Woodbridge, NJ 07095
Phone: 866-657-6278 • Fax: 732-855-0422

Visit our web site: www.NJCleanEnergy.com



Program Terms and Conditions

Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

Design Services – Services that may be offered to design professionals under the Program.

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New Jersey Utilities – The regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Market Manager – TRC Energy Services.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

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Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above. Program Incentives for new construction are available only for projects in areas designated for growth in the State Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for new Program incentives throughout the State. Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Locator available from the HMFA website or contact the Market Manager if you are uncertain about project eligibility.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy efficient measures that were pre-approved (for exceptions to this condition, please refer to “Exceptions for Approval”). In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheet and manufacturer’s cut sheets (where appropriate). This information must be submitted to the Market Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Market Manager on or before December 31, 2010 in order to be eligible for 2010 incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Market Manager’s approval letter is not eligible for an incentive. The Market Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. **Any Customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

Exceptions for Approval – The Application and Eligibility Process pertains to all projects except for those involving either Unitary HVAC or Motors having an incentive amount less than \$5,000. These measures, at this incentive level, may be installed without prior approval. In addition, but at the sole discretion of the Market Manager, emergency replacement of equipment may not require a prior approval determination and letter. **In such cases, please notify the Market Manager of such emergencies as early as possible, that an application will soon be sent in that was not pre-approved.**

Post Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Market Manager’s initial approval letter.

Please refer to the Program Guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Market Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to \$500,000 per utility account in a calendar year. Contact the Market Manager regarding any questions.

Tax Liability – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their Federal Tax Identification number or social security number to the Market Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (Business Assistance or Incentive Clearance Certificate) that is dated within 90 days of equipment installation.

Endorsement – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Market Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual, and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.



Specific Program Requirements* (These requirements are in addition to the Program Terms and Conditions.)

1. Please refer to the Program Guide for additional applicable technical requirements, including special requirements for lighting controls.
2. Include the manufacturer's specification sheet with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. All lighting controls eligible for incentives must be UL listed.
4. Lighting control incentives are only available for control of eligible energy efficient lighting fixtures.
5. If more than one eligible lighting control device is associated with the same eligible fixture, the incentive paid will be for the lighting control device that yields the largest incentive only.
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New Jersey Clean Energy Program

Technical Worksheet – Solar Electric Equipment Information

Please carefully read all of the following information. With the help of your Installation Contractor, fully complete Sections A through D, as applicable, of the attached Technical Worksheet for Solar Electric Equipment, as well as the New Jersey Clean Energy Program Rebate Application Form.

GENERAL TERMS AND CONDITIONS

Rebates will be processed based on the date the New Jersey Clean Energy Program (NJCEP) approves the Final Application Form, not on the purchase date of the equipment. Program procedures and rebates are subject to change or cancellation without notice.

To qualify for a rebate, Applicant must comply with all Program Eligibility Requirements, Terms and Conditions, and Installation Requirements, and submit a completed Pre-Installation Application Form. For more information about the New Jersey Clean Energy Program, or for assistance in completing applications or forms, please see www.njcleanenergy.com or call 866-NJSMART

INSTALLATION REQUIREMENTS

Equipment installation must meet the following minimum requirements in order to qualify for payment under the provisions of the New Jersey Clean Energy Program; proposed changes to the requirements will be considered, but they must be documented by the Applicant or Installation Contractor and approved by the NJCEP. These requirements are not all-encompassing and are intended only to address certain minimum safety and efficiency standards.

A: Code Requirements

1. The installation must comply with the provisions of the National Electrical Code and all other applicable local, state and federal codes or practices.
2. All required permits must be properly obtained and posted.
3. The NJCEP Inspection must be performed before the local Building Code Enforcement Office. If not, this may delay the processing of the rebate.
4. All required inspections must be performed (i.e., Electrical/NEC, Local Building Codes Enforcement Office, etc.). Note: In order to ensure compliance with provisions of the NEC, an inspection by a state-licensed electrical inspector is mandatory.

B: Solar Electric Module Array

1. Modules must be UL Listed and must be properly installed according to manufacturer's instructions.
2. The maximum amount of sunlight available year-round on a daily basis should not be obstructed. All applications must include documentation of the impact from any obstruction on the annual performance of the solar electric array. This analysis can be performed by using the New Jersey Clean Power Estimator on the program website www.njcep.com.
3. In order to qualify for program incentives, the solar electric system must adhere to a minimum design threshold, relative to the estimated system production using PVWATTS:
 - Solar electric array orientations require that the calculated system output must be at least 80% of the default output calculated by PVWatts. Additionally, all individual series strings of modules output must be at least 70% of the default output calculated by PVWatts.
 - For building integrated solar electric systems (i.e., part of the building envelope materials are comprised of solar electric components), the estimated system output must be 40% of the default output estimated by PVWATTS.
4. System wiring must be installed in accordance with the provisions of the NEC.
5. All modules installed in a series string must be installed in the same plane.

C: Inverter and Controls

1. The inverter and controls must be properly installed according to manufacturer's instructions.
2. The inverter must be certified as compliant with the requirements of IEEE 929 for small photovoltaic systems and with UL 1741.
3. The system should be equipped with the following visual indicators and/or controls:
 - On/off switch • Operating mode setting indicator • AC/DC over current protection • Operating status indicator
4. Warning labels must be posted on the control panels and junction boxes indicating that the circuits are energized by an alternate power source independent of utility-provided power.
5. Operating instructions must be posted on or near the system, or on file with facilities operation and maintenance documents.
6. Systems must have monitoring capability that is readily accessible to the owner. This monitor (meter or display) must at minimum display instantaneous and cumulative production. All projects greater than 10kW must have an output meter that meets ANSI C.12 standards.

D: Control Panel to Solar Electric Array Wire Runs

1. Areas where wiring passes through ceilings, walls or other areas of the building must be properly restored, booted and sealed.
2. All interconnecting wires must be copper. (Some provisions may be made for aluminum wiring; approval must be received from utility engineering departments prior to acceptance.)
3. Thermal insulation in areas where wiring is installed must be replaced to "as found or better condition." Access doors to these areas must be properly sealed and gasketed.
4. Wiring connections must be properly made, insulated and weather-protected.
5. All wiring must be attached to the system components by the use of strain relief's or cable clamps, unless enclosed in conduit.
6. All outside wiring must be rated for wet conditions and/or encased in liquid-tight conduit.
7. Insulation on any wiring located in areas with potential high ambient temperature must be rated at 90° C or higher.
8. All wiring splices must be contained in UL-approved workboxes.

E: Batteries (If Applicable)

1. The batteries must be installed according to the manufacturer's instructions.
2. Battery terminals must be adequately protected from accidental contact.
3. DC-rated over current protection must be provided in accordance with the provisions of the NEC.

New Jersey Clean Energy Program

Technical Worksheet – Solar Electric Equipment Information

Original Application Date: _____	Revised Application Date: _____
Customer Name: _____ (Corresponding to Rebate Application Form)	Application Number: _____ (Assigned by the NJBPU)

A: EQUIPMENT INFORMATION

- Solar Electric Module Manufacturer: _____ Module Model Number: _____
- Power Rating per Module: _____ DC Watts (Refer to STC conditions) Number of Modules: _____
- Total Array Output: _____ DC Watts (No. of Modules x Power Rating)
- Inverter Manufacturer: _____ Inverter Model Number: _____
- Inverter's Continuous AC Rating: _____ AC Watts Number of Inverters: _____
- Total Inverter Output: _____ AC Watts (Inverter Continuous AC Rating x Number of Inverters)
- Inverter's Peak Efficiency: _____ (Refer to manufacturer's peak efficiency rating)

B: PROPOSED INSTALLATION/INTERCONNECTION INFORMATION

- Solar Electric Array Location: ☐ Rooftop ☐ Pole Mount or Ground Mount Location: _____
- Solar Electric Module Orientation: _____ degrees (e.g., 180 degrees magnetic south)
Note: in Central New Jersey, magnetic south compass reading is 10 degrees east of true south.
- Solar Electric Module Tilt: _____ degrees (e.g., flat mount = 0 degrees; vertical mount = 90 degrees)
- Solar Electric Module Tracking: ☐ Fixed ☐ Single-axis ☐ Double-axis
- Inverter Location: ☐ Indoor ☐ Outdoor Location: _____
- Utility-Accessible AC Disconnect Switch Location: _____
- System Type and Mode of Operation:
☐ Utility interactive (parallel/capable of back feeding the meter) ☐ with battery backup)
☐ Dedicated circuit, utility power as backup (transfer switch) ☐ with battery charging)
☐ Stand-alone (system confined to an independent circuit, no utility backup) ☐ with battery charging)

C: INCENTIVE REQUEST CALCULATION

- System rated output (Section A, line 3 above): _____ DC Watts
- Incentive Calculation (Calculate appropriate incentive based on System Rated Output):

Residential Applicants that perform Energy Efficiency Audit	Commercial, Farm, Public and Non-Profit
a. 0 to 10,000 Watts x \$1.75/Watt = \$ _____ +	0 to 50,000 Watts x \$1.00/Watt = \$ _____ +
Residential Applicants that <u>do not</u> perform Energy Efficiency Audit	
b. 0 to 10,000 Watts x \$1.55/Watt = \$ _____ +	Large PV Project Applications
	> 50,000 Watts = \$ _____ Not eligible for rebates
d. Total Rebate Calculation: \$ _____	Total Rebate Calculation: \$ _____
- School Applicants: Maximum Annual School Rebate: \$ _____
(For Public School applicants, enter the lesser value from no. 6 on the School Application form or \$50,000)
- Total Installed System Cost: \$ _____
(Eligible installed system cost includes all equipment, installation, and applicable interconnection costs before the New Jersey Clean Energy Program incentive.)
- Requested Incentive (Enter the appropriate value from C2. b or c): \$ _____

D: WARRANTY INFORMATION

- Module: _____ Years at _____ Percent of Rated Power Output
 - Inverter: _____ Years
 - Installation: _____ Years
- Revised January 2009

APPENDIX H

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS

CDM

15 British American Blvd
Latham, NY 12110
Phone (518) 782-4500
Fax (518) 786-3810

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Township of Montville
Estimate by: RKA
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Municipal Building Boiler, Gas-Fired, Condensing High Efficiency 2,000 MBH*	1	ea.	\$ 34,000.00	\$ 34,000.00	1	ea.	\$ 5,750.00	\$ 5,750.00	\$ 39,750.00
	Subtotal				34,000.00				5,750.00	

*Pricing per boiler manufacturer quote, dated 5/19/09

SUBTOTAL = \$ 39,750.00
MARKUP % = \$ 0.15
MARKUP = \$ 5,962.50
SUB-TOTAL w/ OH & P = \$ 45,712.50
CONTINGENCY % = 0.25
CONTINGENCY = \$ 11,428.13
BUDGET COST ESTIMATE = \$ 57,140.63

CDM

15 British American Blvd
 Latham, NY 12110
 Phone (518) 782-4500
 Fax (518) 786-3810

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Township of Montville
 Estimate by: RKA
 Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Library									
	Boiler Controls	1	ea.	\$ 160.00	\$ 160.00	1	ea.	\$ 48.00	\$ 48.00	\$ 208.00
2	Commercial, atmospheric, gas domestic water heater - 120 MBH input, 110 GPH	1	ea.	\$ 4,975.00	\$ 4,975.00	1	ea.	\$ 424.00	\$ 424.00	\$ 5,399.00
	Subtotal				4,975.00				424.00	

*Pricing per boiler manufacturer quote, dated 5/19/09

SUBTOTAL =	\$	5,607.00
MARKUP % =	\$	0.15
MARKUP =	\$	841.05
SUB-TOTAL w/ OH & P =	\$	6,448.05
CONTINGENCY % =		0.25
CONTINGENCY =	\$	1,612.01
BUDGET COST ESTIMATE =	\$	8,060.06

CDM

15 British American Blvd
Latham, NY 12110
Phone (518) 782-4500
Fax (518) 786-3810

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: Township of Montville
Estimate by: RNG
Checked by: JM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Public Works Building									
	Solar	1	ls.		\$ 419,212.30	1	ls.	\$ 206,477.70	\$ 206,477.70	\$ 625,690.00
	Subtotal				419,212.30				206,477.70	

SUBTOTAL = \$ 625,690.00
 MARKUP % = \$ 0.15
 MARKUP = \$ 93,853.50
 SUB-TOTAL w/ OH & P = \$ 719,543.50
 CONTINGENCY % = 0.25
 CONTINGENCY = \$ 179,885.88
 BUDGET COST ESTIMATE = \$ 899,429.38

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Public Safety Building									
	Solar	1	ls.		\$ 371,092.90	1	ls.	\$ 182,777.10	\$ 182,777.10	\$ 553,870.00
	Subtotal				371,092.90				182,777.10	

SUBTOTAL = \$ 553,870.00
 MARKUP % = \$ 0.15
 MARKUP = \$ 83,080.50
 SUB-TOTAL w/ OH & P = \$ 636,950.50
 CONTINGENCY % = 0.25
 CONTINGENCY = \$ 159,237.63
 BUDGET COST ESTIMATE = \$ 796,188.13

CDM

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Latham, NY 12110
Phone (518) 782-4500
Fax (518) 786-3810

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: Township of Montville
Estimate by: RNG
Checked by: JM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Municipal Building Solar	1	ls.		\$ 630,744.70	1	ls.	\$ 310,665.30	\$ 310,665.30	\$ 941,410.00
	Subtotal				630,744.70				310,665.30	

SUBTOTAL = \$ 941,410.00
MARKUP % = \$ 0.15
MARKUP = \$ 141,211.50
SUB-TOTAL w/ OH & P = \$ 1,082,621.50
CONTINGENCY % = 0.25
CONTINGENCY = \$ 270,655.38
BUDGET COST ESTIMATE = \$ 1,353,276.88

CDM

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Latham, NY 12110
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Fax (518) 786-3810

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: Township of Montville
Estimate by: RNG
Checked by: JM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Public Works Building Lighting Upgrades	1	ls.		\$ 10,284.00	1	ls.	\$ 4,458.00	\$ 4,458.00	\$ 14,742.00
	Subtotal				10,284.00				4,458.00	

SUBTOTAL = \$ 14,742.00
MARKUP % = \$ 0.15
MARKUP = \$ 2,211.30
SUB-TOTAL w/ OH & P = \$ 16,953.30
CONTINGENCY % = 0.25
CONTINGENCY = \$ 4,238.33
BUDGET COST ESTIMATE = \$ 21,191.63

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Library Lighting Upgrades	1	ls.		\$ 80,099.00	1	ls.	\$ 20,243.00	\$ 20,243.00	\$ 100,342.00
	Subtotal				80,099.00				20,243.00	

SUBTOTAL = \$ 100,342.00
MARKUP % = \$ 0.15
MARKUP = \$ 15,051.30
SUB-TOTAL w/ OH & P = \$ 115,393.30
CONTINGENCY % = 0.25
CONTINGENCY = \$ 28,848.33
BUDGET COST ESTIMATE = \$ 144,241.63

CDM

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Latham, NY 12110
Phone (518) 782-4500
Fax (518) 786-3810

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: Township of Montville
Estimate by: RNG
Checked by: JM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Public Safety Building Lighting Upgrades	1	ls.		\$ 95,478.00	1	ls.	\$ 22,298.00	\$ 22,298.00	\$ 117,776.00
	Subtotal				95,478.00				22,298.00	

SUBTOTAL = \$ 117,776.00
MARKUP % = \$ 0.15
MARKUP = \$ 17,666.40
SUB-TOTAL w/ OH & P = \$ 135,442.40
CONTINGENCY % = 0.25
CONTINGENCY = \$ 33,860.60
BUDGET COST ESTIMATE = \$ 169,303.00

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Municipal Building Lighting Upgrades	1	ls.		\$ 118,426.00	1	ls.	\$ 38,095.50	\$ 38,095.50	\$ 156,521.50
	Subtotal				118,426.00				38,095.50	

SUBTOTAL = \$ 156,521.50
MARKUP % = \$ 0.15
MARKUP = \$ 23,478.23
SUB-TOTAL w/ OH & P = \$ 179,999.73
CONTINGENCY % = 0.25
CONTINGENCY = \$ 44,999.93
BUDGET COST ESTIMATE = \$ 224,999.66

CDM

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Latham, NY 12110
Phone (518) 782-4500
Fax (518) 786-3810

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: Township of Montville
Estimate by: RNG
Checked by: JM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Youth Center Lighting Upgrades	1	ls.		\$ 108,975.00	1	ls.	\$ 22,414.50	\$ 22,414.50	\$ 131,389.50
	Subtotal				108,975.00				22,414.50	

SUBTOTAL = \$ 131,389.50
MARKUP % = \$ 0.15
MARKUP = \$ 19,708.43
SUB-TOTAL w/ OH & P = \$ 151,097.93
CONTINGENCY % = 0.25
CONTINGENCY = \$ 37,774.48
BUDGET COST ESTIMATE = \$ 188,872.41

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Senior House Lighting Upgrades	1	ls.		\$ 314.00	1	ls.	\$ 240.50	\$ 240.50	\$ 554.50
	Subtotal				314.00				240.50	

SUBTOTAL = \$ 554.50
MARKUP % = \$ 0.15
MARKUP = \$ 83.18
SUB-TOTAL w/ OH & P = \$ 637.68
CONTINGENCY % = 0.25
CONTINGENCY = \$ 159.42
BUDGET COST ESTIMATE = \$ 797.09

APPENDIX I

FACILITY DATA FORMS

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Public Works Building			
Street Address 143 River Road		County Morris	
City Montville	State NJ	Zip 07045	
Facility's Description Facility is the 2 floor headquarters for the Public Works department and is comprised of 2 large bays, mechanic's workshop, offices, and locker room.			
Total Sq Ft 10,300	Year Built Renovated in 2005	Hours/Week Occupied 55	Number of Employees 8
Building Type (Check only one of the following):			
☐	Emergency Services	☒	Garage (and offices)
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☐	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: _____

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 1 / 1 / 08 to 12 / 31 / 08



ELECTRICITY

Electric Utility Name & Account Number(s)	
JCP&L 100056283979	
Annual kWh Use	Annual Electricity Cost
100,680	\$16,184
Max Summer kW	Max Winter kW
N/A	N/A

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
NJNG 220009309952	
Annual Use in Therms	Annual Natural Gas Cost
8,768	\$13,461

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
N/A	
Annual Use in Gallons	Annual Fuel Oil Cost
N/A	N/A

PROPANE

Propane Utility Name & Account Number(s)	
N/A	
Annual Use in Gallons	Annual Propane Cost
N/A	N/A

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type:	
N/A	
Annual Energy Use (indicate units)	Annual Energy Cost
N/A	N/A

STAFF USE ONLY

Date Received:	Project No.:

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Library			
Street Address 90 Horseneck Road		County Morris	
City Montville	State NJ	Zip 07045	
Facility's Description Public library with large area for books, meetings rooms, and offices.			
Total Sq Ft 18,547	Year Built 1994	Hours/Week Occupied 70	Number of Employees 20
Building Type (Check only one of the following):			
☐	Emergency Services	☐	Garage
☒	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☐	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: _____

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 1 / 1 / 08 to 12 / 31 / 08

ELECTRICITY

Electric Utility Name & Account Number(s) JCP&L 100007439795	
Annual kWh Use 605,440	Annual Electricity Cost \$98,098
Max Summer kW N/A	Max Winter kW N/A

NATURAL GAS

Natural Gas Utility Name & Account Number(s) NJNG 41220882513	
Annual Use in Therms 21,574	Annual Natural Gas Cost \$33,203

FUEL OIL

Fuel Oil Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Fuel Oil Cost N/A

PROPANE

Propane Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Propane Cost N/A

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type: N/A	
Annual Energy Use (indicate units) N/A	Annual Energy Cost N/A

STAFF USE ONLY

Date Received:	Project No:
----------------	-------------

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Municipal Building			
Street Address 195 Changebridge Road		County Morris	
City Montville		State NJ	Zip 07045
Facility's Description Primary location of municipal offices with large meeting room and numerous conference rooms.			
Total Sq Ft 40,254	Year Built 1992	Hours/Week Occupied 60	Number of Employees 65
Building Type (Check only one of the following):			
☐ Emergency Services		☐ Garage	
☒ Center/Meeting Hall/Library		☐ Offices	
☐ Recreation/Entertainment/Parks		☐ Religious	
☐ School		☐ School: College	
☐ Water Treatment/Pumping		☐ Other: _____	

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 1 / 1 / 0 8 to 1 2 3 1 0 8

ELECTRICITY

Electric Utility Name & Account Number(s) JCP&L 100007989070	
Annual kWh Use 371,440	Annual Electricity Cost \$62,032
Max Summer kW N/A	Max Winter kW N/A

NATURAL GAS

Natural Gas Utility Name & Account Number(s) NJNG 61228098512	
Annual Use in Therms 11,149	Annual Natural Gas Cost \$17,026

FUEL OIL

Fuel Oil Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Fuel Oil Cost N/A

PROPANE

Propane Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Propane Cost N/A

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type: N/A	
Annual Energy Use (indicate units) N/A	Annual Energy Cost N/A

STAFF USE ONLY

Date Received: _____	Project No.: _____
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APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for **each** building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Public Safety Building			
Street Address 362 Main Rd		County Morris	
City Montville	State NJ	Zip 07045	
Facility's Description Facility serves the Township as Police H.Q. and municipal court.			
Total Sq Ft 18,000	Year Built 2001	Hours/Week Occupied 168	Number of Employees 45
Building Type (Check only one of the following):			
☒	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☒	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☐	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: _____

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 1 / 1 / 08 to 12 / 3 / 08

ELECTRICITY

Electric Utility Name & Account Number(s) JCP&L 100043610425	
Annual kWh Use 440,000	Annual Electricity Cost \$68,523
Max Summer kW N/A	Max Winter kW N/A

NATURAL GAS

Natural Gas Utility Name & Account Number(s) NJNG 220007710275	
Annual Use in Therms 9,559	Annual Natural Gas Cost \$14,879

FUEL OIL

Fuel Oil Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Fuel Oil Cost N/A

PROPANE

Propane Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Propane Cost N/A

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type: N/A	
Annual Energy Use (indicate units) N/A	Annual Energy Cost N/A

STAFF USE ONLY

Date Received: _____	Project No.: _____
-----------------------------	---------------------------

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Youth Center			
Street Address 130 Changebridge Road		County Morris	
City Montville	State NJ	Zip 07045	
Facility's Description Youth center for recreational activities.			
Total Sq Ft 2,791	Year Built 2002	Hours/Week Occupied 40	Number of Employees 2
Building Type (Check only one of the following):			
☐ Emergency Services	☐ Garage		
☐ Center/Meeting Hall/Library	☐ Offices		
☒ Recreation/Entertainment/Parks	☐ Religious		
☐ School	☐ School: College		
☐ Water Treatment/Pumping	☐ Other: _____		

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 1 / 1 / 08 to 12 / 31 / 08

ELECTRICITY

Electric Utility Name & Account Number(s) JCP&L 100038832836	
Annual kWh Use 53,450	Annual Electricity Cost \$9,642
Max Summer kW N/A	Max Winter kW N/A

NATURAL GAS

Natural Gas Utility Name & Account Number(s) NJNG 22005694427 (Facility does not have a dedicated gas meter, thus usage is estimated)	
Annual Use in Therms 3,513	Annual Natural Gas Cost \$5,921

FUEL OIL

Fuel Oil Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Fuel Oil Cost N/A

PROPANE

Propane Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Propane Cost N/A

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type: N/A	
Annual Energy Use (indicate units) N/A	Annual Energy Cost N/A

STAFF USE ONLY

Date Received: _____	Project No.: _____
----------------------	--------------------

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Senior House			
Street Address 356 Main Road		County Morris	
City Montville	State NJ	Zip 07045	
Facility's Description Original structure built in est. 1909 with the addition of a large meeting room and commercial kitchen in 2002. Facility functions as the Senior Center with two large open rooms, office, basement and kitchen.			
Total Sq Ft 5,596	Year Built 1909/2002	Hours/Week Occupied 75	Number of Employees 2
Building Type (Check only one of the following):			
☐ Emergency Services	☐ Garage		
☐ Center/Meeting Hall/Library	☐ Offices		
☒ Recreation/Entertainment/Parks	☐ Religious		
☐ School	☐ School: College		
☐ Water Treatment/Pumping	☐ Other: _____		

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 1 / 1 / 0 8 to 1 2 / 3 1 0 8



ELECTRICITY

Electric Utility Name & Account Number(s) JCP&L 100008645416	
Annual kWh Use 88,848	Annual Electricity Cost \$15,459
Max Summer kW N/A	Max Winter kW N/A

NATURAL GAS

Natural Gas Utility Name & Account Number(s) NJNG 220007466524	
Annual Use in Therms 3,697	Annual Natural Gas Cost \$5,684

FUEL OIL

Fuel Oil Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Fuel Oil Cost N/A

PROPANE

Propane Utility Name & Account Number(s) N/A	
Annual Use in Gallons N/A	Annual Propane Cost N/A

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type: N/A	
Annual Energy Use (indicate units) N/A	Annual Energy Cost N/A

STAFF USE ONLY

Date Received: _____	Project No.: _____
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APPENDIX J

ECRM FINANCIAL ANALYSES

IRR, NPV, AROI - HVAC ECRMS

Boiler Upgrade Municipal Building		Boiler Controls Library	
Year	Cash Flow	Year	Cash Flow
0	(\$55,141.00)	0	(\$8,060.00)
1	\$2,988.00	1	\$11,607.00
2	\$3,077.64	2	\$11,955.21
3	\$3,169.97	3	\$12,313.87
4	\$3,265.07	4	\$12,683.28
5	\$3,363.02	5	\$13,063.78
6	\$3,463.91	6	\$13,455.69
7	\$3,567.83	7	\$13,859.37
8	\$3,674.86	8	\$14,275.15
9	\$3,785.11	9	\$14,703.40
10	\$3,898.66	10	\$15,144.50
11	\$4,015.62	11	\$15,598.84
12	\$4,136.09	12	\$16,066.80
13	\$4,260.17	13	\$16,548.81
14	\$4,387.98	14	\$17,045.27
15	\$4,519.62	15	\$17,556.63
16	\$4,655.21		
17	\$4,794.86		
18	\$4,938.71		
19	\$5,086.87		
20	\$5,239.48		
21	\$5,396.66		
22	\$5,558.56		
23	\$5,725.32		
24	\$5,897.08		
IRR	5.02%	IRR	147.01%
NPV	\$14,482.30	NPV	\$160,973.98
AROI	1.25%	AROI	137.34%

ECM	Municipal Building - Boiler Upgrade	Library - Boiler Controls
Assumed Inflation (Gas)	2%	2%
Initial Yearly Savings (Gas)	\$1,488.36	\$11,607.00
Assumed Inflation (Electricity)	3%	3%
Initial Yearly Savings (Electricity)		
Assumed Average Useful Life (Years)	24	15
Lifetime Savings	\$45,278.68	\$200,724.69
Year	Annual Savings	Annual Savings
1	\$1,488.36	\$11,607.00
2	\$1,518.13	\$11,839.14
3	\$1,548.49	\$12,075.92
4	\$1,579.46	\$12,317.44
5	\$1,611.05	\$12,563.79
6	\$1,643.27	\$12,815.07
7	\$1,676.14	\$13,071.37
8	\$1,709.66	\$13,332.79
9	\$1,743.85	\$13,599.45
10	\$1,778.73	\$13,871.44
11	\$1,814.30	\$14,148.87
12	\$1,850.59	\$14,431.85
13	\$1,887.60	\$14,720.48
14	\$1,925.35	\$15,014.89
15	\$1,963.86	\$15,315.19
16	\$2,003.14	
17	\$2,043.20	
18	\$2,084.06	
19	\$2,125.74	
20	\$2,168.26	
21	\$2,211.62	
22	\$2,255.86	
23	\$2,300.97	
24	\$2,346.99	
25		

ECM	Public Works Building Lighting	Library Lighting	Municipal Building Lighting	Public Safety Building Lighting	Youth Center Lighting	Senior House Lighting
Assumed Inflation (Gas)						
Initial Yearly Savings (Gas)						
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$2,873.90	\$10,057.00	\$11,977.80	\$5,384.80	\$7,452.10	\$39.70
Assumed Average Useful Life (Years)	15	15	15	15	15	15
Lifetime Savings	\$53,451.42	\$187,049.28	\$222,774.07	\$100,151.43	\$138,600.97	\$738.38
Year	Annual Savings	Annual Savings	Annual Savings	Annual Savings	Annual Savings	Annual Savings
1	\$2,873.90	\$10,057.00	\$11,977.80	\$5,384.80	\$7,452.10	\$39.70
2	\$2,960.12	\$10,358.71	\$12,337.13	\$5,546.34	\$7,675.66	\$40.89
3	\$3,048.92	\$10,669.47	\$12,707.25	\$5,712.73	\$7,905.93	\$42.12
4	\$3,140.39	\$10,989.56	\$13,088.47	\$5,884.12	\$8,143.11	\$43.38
5	\$3,234.60	\$11,319.24	\$13,481.12	\$6,060.64	\$8,387.40	\$44.68
6	\$3,331.64	\$11,658.82	\$13,885.55	\$6,242.46	\$8,639.03	\$46.02
7	\$3,431.59	\$12,008.58	\$14,302.12	\$6,429.73	\$8,898.20	\$47.40
8	\$3,534.53	\$12,368.84	\$14,731.18	\$6,622.62	\$9,165.14	\$48.83
9	\$3,640.57	\$12,739.91	\$15,173.12	\$6,821.30	\$9,440.10	\$50.29
10	\$3,749.79	\$13,122.10	\$15,628.31	\$7,025.94	\$9,723.30	\$51.80
11	\$3,862.28	\$13,515.77	\$16,097.16	\$7,236.72	\$10,015.00	\$53.35
12	\$3,978.15	\$13,921.24	\$16,580.08	\$7,453.82	\$10,315.45	\$54.95
13	\$4,097.49	\$14,338.88	\$17,077.48	\$7,677.44	\$10,624.91	\$56.60
14	\$4,220.42	\$14,769.04	\$17,589.80	\$7,907.76	\$10,943.66	\$58.30
15	\$4,347.03	\$15,212.11	\$18,117.50	\$8,144.99	\$11,271.97	\$60.05

ECM	Public Works Building Interior Lighting	Library Interior Lighting	Municipal Building Interior Lighting	Public Safety Building Interior Lighting	Youth Center Interior Lighting
Assumed Inflation (Gas)					
Initial Yearly Savings (Gas)					
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$2,610.50	\$6,518.90	\$6,907.70	\$792.90	\$224.60
Assumed Average Useful Life (Years)	15	15	15	15	15
Lifetime Savings	\$48,552.46	\$121,244.46	\$128,475.72	\$14,747.08	\$4,177.32
Year	Annual Savings	Annual Savings	Annual Savings	Annual Savings	Annual Savings
1	\$2,610.50	\$6,518.90	\$6,907.70	\$792.90	\$224.60
2	\$2,688.82	\$6,714.47	\$7,114.93	\$816.69	\$231.34
3	\$2,769.48	\$6,915.90	\$7,328.38	\$841.19	\$238.28
4	\$2,852.56	\$7,123.39	\$7,548.23	\$866.42	\$245.43
5	\$2,938.14	\$7,337.08	\$7,774.68	\$892.42	\$252.79
6	\$3,026.28	\$7,557.19	\$8,007.92	\$919.19	\$260.37
7	\$3,117.07	\$7,783.91	\$8,248.16	\$946.76	\$268.18
8	\$3,210.59	\$8,017.42	\$8,495.60	\$975.17	\$276.23
9	\$3,306.90	\$8,257.95	\$8,750.47	\$1,004.42	\$284.52
10	\$3,406.11	\$8,505.69	\$9,012.98	\$1,034.55	\$293.05
11	\$3,508.29	\$8,760.86	\$9,283.37	\$1,065.59	\$301.84
12	\$3,613.54	\$9,023.68	\$9,561.87	\$1,097.56	\$310.90
13	\$3,721.95	\$9,294.39	\$9,848.73	\$1,130.49	\$320.23
14	\$3,833.61	\$9,573.22	\$10,144.19	\$1,164.40	\$329.83
15	\$3,948.62	\$9,860.42	\$10,448.52	\$1,199.33	\$339.73

ECM	Public Works Building Exterior Lighting	Library Exterior Lighting	Municipal Building Exterior Lighting	Public Safety Building Exterior Lighting	Youth Center Exterior Lighting
Assumed Inflation (Gas)					
Initial Yearly Savings (Gas)					
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$263.50	\$3,538.10	\$5,070.10	\$4,591.90	\$7,227.40
Assumed Average Useful Life (Years)	15	15	15	15	15
Lifetime Savings	\$4,900.81	\$65,804.82	\$94,298.35	\$85,404.35	\$134,421.79
Year	Annual Savings	Annual Savings	Annual Savings	Annual Savings	Annual Savings
1	\$263.50	\$3,538.10	\$5,070.10	\$4,591.90	\$7,227.40
2	\$271.41	\$3,644.24	\$5,222.20	\$4,729.66	\$7,444.22
3	\$279.55	\$3,753.57	\$5,378.87	\$4,871.55	\$7,667.55
4	\$287.93	\$3,866.18	\$5,540.24	\$5,017.69	\$7,897.58
5	\$296.57	\$3,982.16	\$5,706.44	\$5,168.22	\$8,134.50
6	\$305.47	\$4,101.63	\$5,877.64	\$5,323.27	\$8,378.54
7	\$314.63	\$4,224.68	\$6,053.96	\$5,482.97	\$8,629.89
8	\$324.07	\$4,351.42	\$6,235.58	\$5,647.46	\$8,888.79
9	\$333.79	\$4,481.96	\$6,422.65	\$5,816.88	\$9,155.45
10	\$343.81	\$4,616.42	\$6,615.33	\$5,991.39	\$9,430.12
11	\$354.12	\$4,754.91	\$6,813.79	\$6,171.13	\$9,713.02
12	\$364.75	\$4,897.56	\$7,018.20	\$6,356.26	\$10,004.41
13	\$375.69	\$5,044.48	\$7,228.75	\$6,546.95	\$10,304.54
14	\$386.96	\$5,195.82	\$7,445.61	\$6,743.36	\$10,613.68
15	\$398.57	\$5,351.69	\$7,668.98	\$6,945.66	\$10,932.09

ECM	Montville Public Safety Building - Solar	Montville Public Works Building - Solar	Montville Municipal Building - Solar
Assumed Inflation (Gas)			
Initial Yearly Savings (Gas)			
Assumed Inflation (Electricity)	3%	3%	3%
Initial Yearly Savings (Electricity)	\$10,208.30	\$12,523.80	\$20,198.90
Assumed Average Useful Life (Years)	25	25	25
Lifetime Savings	\$378,164.01	\$463,941.15	\$748,263.38
<u>Year</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>
1	\$10,208.30	\$12,523.80	\$20,198.90
2	\$10,514.55	\$12,899.51	\$20,804.87
3	\$10,829.99	\$13,286.50	\$21,429.01
4	\$11,154.89	\$13,685.09	\$22,071.88
5	\$11,489.53	\$14,095.65	\$22,734.04
6	\$11,834.22	\$14,518.52	\$23,416.06
7	\$12,189.24	\$14,954.07	\$24,118.54
8	\$12,554.92	\$15,402.69	\$24,842.10
9	\$12,931.57	\$15,864.78	\$25,587.36
10	\$13,319.52	\$16,340.72	\$26,354.98
11	\$13,719.10	\$16,830.94	\$27,145.63
12	\$14,130.67	\$17,335.87	\$27,960.00
13	\$14,554.59	\$17,855.94	\$28,798.80
14	\$14,991.23	\$18,391.62	\$29,662.77
15	\$15,440.97	\$18,943.37	\$30,552.65
16	\$15,904.20	\$19,511.67	\$31,469.23
17	\$16,381.32	\$20,097.02	\$32,413.30
18	\$16,872.76	\$20,699.93	\$33,385.70
29	\$23,355.85	\$28,653.55	\$46,213.62
20	\$17,900.32	\$21,960.56	\$35,418.89
21	\$18,437.33	\$22,619.38	\$36,481.46
22	\$18,990.45	\$23,297.96	\$37,575.90
23	\$19,560.16	\$23,996.90	\$38,703.18
24	\$20,146.96	\$24,716.80	\$39,864.28
25	\$20,751.37	\$25,458.31	\$41,060.20

IRR, NPV, AROI - Lighting Upgrades

Based on inflation of: 3%

Lighting Public Works Building			Lighting Library			Lighting Municipal Building			Lighting Public Safety Building			Lighting Senior Home			Lighting Youth Center		
Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow
0		(\$18,841.60)	0		(\$139,941.60)	0		(\$215,574.70)	0		(\$168,393.00)	0		(\$692.10)	0		(\$188,697.40)
1	\$2,873.90	\$3,138.05	1	\$10,057.00	\$10,417.83	1	\$11,977.80	\$14,502.70	1	\$5,384.80	\$5,421.21	1	\$39.70	\$63.21	1	\$7,452.10	\$7,496.05
2	\$2,960.12	\$3,224.27	2	\$10,358.71	\$10,719.54	2	\$12,337.13	\$14,862.03	2	\$5,546.34	\$5,582.75	2	\$40.89	\$64.40	2	\$7,675.66	\$7,719.61
3	\$3,048.92	\$3,313.07	3	\$10,669.47	\$11,030.30	3	\$12,707.25	\$15,232.15	3	\$5,712.73	\$5,749.14	3	\$42.12	\$65.63	3	\$7,905.93	\$7,949.88
4	\$3,140.39	\$3,404.54	4	\$10,989.56	\$11,350.39	4	\$13,088.47	\$15,613.37	4	\$5,884.12	\$5,920.53	4	\$43.38	\$66.89	4	\$8,143.11	\$8,187.06
5	\$3,234.60	\$3,498.75	5	\$11,319.24	\$11,680.07	5	\$13,481.12	\$16,006.02	5	\$6,060.64	\$6,097.05	5	\$44.68	\$68.19	5	\$8,387.40	\$8,431.35
6	\$3,331.64	\$3,595.79	6	\$11,658.82	\$12,019.65	6	\$13,885.55	\$16,410.45	6	\$6,242.46	\$6,278.87	6	\$46.02	\$69.53	6	\$8,639.03	\$8,682.98
7	\$3,431.59	\$3,695.74	7	\$12,008.58	\$12,369.41	7	\$14,302.12	\$16,827.02	7	\$6,429.73	\$6,466.14	7	\$47.40	\$70.91	7	\$8,898.20	\$8,942.15
8	\$3,534.53	\$3,798.68	8	\$12,368.84	\$12,729.67	8	\$14,731.18	\$17,256.08	8	\$6,622.62	\$6,659.03	8	\$48.83	\$72.34	8	\$9,165.14	\$9,209.09
9	\$3,640.57	\$3,904.72	9	\$12,739.91	\$13,100.74	9	\$15,173.12	\$17,698.02	9	\$6,821.30	\$6,857.71	9	\$50.29	\$73.80	9	\$9,440.10	\$9,484.05
10	\$3,749.79	\$4,013.94	10	\$13,122.10	\$13,482.93	10	\$15,628.31	\$18,153.21	10	\$7,025.94	\$7,062.35	10	\$51.80	\$75.31	10	\$9,723.30	\$9,767.25
11	\$3,862.28	\$4,126.43	11	\$13,515.77	\$13,876.60	11	\$16,097.16	\$18,622.06	11	\$7,236.72	\$7,273.13	11	\$53.35	\$76.86	11	\$10,015.00	\$10,058.95
12	\$3,978.15	\$4,242.30	12	\$13,921.24	\$14,282.07	12	\$16,580.08	\$19,104.98	12	\$7,453.82	\$7,490.23	12	\$54.95	\$78.46	12	\$10,315.45	\$10,359.40
13	\$4,097.49	\$4,361.64	13	\$14,338.88	\$14,699.71	13	\$17,077.48	\$19,602.38	13	\$7,677.44	\$7,713.85	13	\$56.60	\$80.11	13	\$10,624.91	\$10,668.86
14	\$4,220.42	\$4,484.57	14	\$14,769.04	\$15,129.87	14	\$17,589.80	\$20,114.70	14	\$7,907.76	\$7,944.17	14	\$58.30	\$81.81	14	\$10,943.66	\$10,987.61
15	\$4,347.03	\$4,611.18	15	\$15,212.11	\$15,572.94	15	\$18,117.50	\$20,642.40	15	\$8,144.99	\$8,181.40	15	\$60.05	\$83.56	15	\$11,271.97	\$11,315.92
IRR 17.06%			IRR 3.98%			IRR 2.33%			IRR -5.52%			IRR 5.99%			IRR -3.37%		
NPV \$26,164.72			NPV \$10,827.13			NPV (\$10,998.63)			NPV (\$89,538.92)			NPV \$166.72			NPV (\$79,647.00)		
AROI 9.99%			AROI 0.78%			AROI 0.06%			AROI -3.45%			AROI 2.47%			AROI -2.69%		

Interior Lighting Public Works Building			Interior Lighting Library			Interior Lighting Municipal Building			Interior Lighting Public Safety Building			Interior Lighting Youth Center		
Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow
0		(\$14,511.90)	0		(\$25,210.40)	0		(\$67,612.80)	0		(\$5,686.70)	0		(\$6,168.00)
1	\$2,610.50	\$2,873.56	1	\$6,518.90	\$6,833.75	1	\$6,907.70	\$9,393.48	1	\$792.90	\$792.90	1	\$224.60	\$224.60
2	\$2,688.82	\$2,951.88	2	\$6,714.47	\$7,029.32	2	\$7,114.93	\$9,600.71	2	\$816.69	\$816.69	2	\$231.34	\$231.34
3	\$2,769.48	\$3,032.54	3	\$6,915.90	\$7,230.75	3	\$7,328.38	\$9,814.16	3	\$841.19	\$841.19	3	\$238.28	\$238.28
4	\$2,852.56	\$3,115.62	4	\$7,123.38	\$7,438.23	4	\$7,548.23	\$10,034.01	4	\$866.42	\$866.42	4	\$245.43	\$245.43
5	\$2,938.14	\$3,201.20	5	\$7,337.08	\$7,651.93	5	\$7,774.68	\$10,260.46	5	\$892.42	\$892.42	5	\$252.79	\$252.79
6	\$3,026.28	\$3,289.34	6	\$7,557.19	\$7,872.04	6	\$8,007.92	\$10,493.70	6	\$919.19	\$919.19	6	\$260.37	\$260.37
7	\$3,117.07	\$3,380.13	7	\$7,783.91	\$8,098.76	7	\$8,248.16	\$10,733.94	7	\$946.76	\$946.76	7	\$268.18	\$268.18
8	\$3,210.59	\$3,473.65	8	\$8,017.42	\$8,332.27	8	\$8,495.60	\$10,981.38	8	\$975.17	\$975.17	8	\$276.23	\$276.23
9	\$3,306.90	\$3,569.96	9	\$8,257.95	\$8,572.80	9	\$8,750.47	\$11,236.25	9	\$1,004.42	\$1,004.42	9	\$284.52	\$284.52
10	\$3,406.11	\$3,669.17	10	\$8,505.69	\$8,820.54	10	\$9,012.98	\$11,498.76	10	\$1,034.55	\$1,034.55	10	\$293.05	\$293.05
11	\$3,508.29	\$3,771.35	11	\$8,760.86	\$9,075.71	11	\$9,283.37	\$11,769.15	11	\$1,065.59	\$1,065.59	11	\$301.84	\$301.84
12	\$3,613.54	\$3,876.60	12	\$9,023.68	\$9,338.53	12	\$9,561.87	\$12,047.65	12	\$1,097.56	\$1,097.56	12	\$310.90	\$310.90
13	\$3,721.95	\$3,985.01	13	\$9,294.39	\$9,609.24	13	\$9,848.73	\$12,334.51	13	\$1,130.49	\$1,130.49	13	\$320.23	\$320.23
14	\$3,833.61	\$4,096.67	14	\$9,573.22	\$9,888.07	14	\$10,144.19	\$12,629.97	14	\$1,164.40	\$1,164.40	14	\$329.83	\$329.83
15	\$3,948.62	\$4,211.68	15	\$9,860.42	\$10,175.27	15	\$10,448.52	\$12,934.30	15	\$1,199.33	\$1,199.33	15	\$339.73	\$339.73
IRR 20.80%			IRR 29.08%			IRR 13.09%			IRR 13.83%			IRR -4.26%		
NPV \$26,645.48			NPV \$73,483.70			NPV \$62,659.85			NPV \$5,860.39			NPV (\$2,897.13)		
AROI 13.13%			AROI 20.44%			AROI 7.23%			AROI 7.28%			AROI -3.03%		

Exterior Lighting Public Works Building			Exterior Lighting Library			Exterior Lighting Municipal Building			Exterior Lighting Public Safety Building			Exterior Lighting Youth Center		
Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow	Year	Energy Savings	Cash Flow
0		(\$4,329.80)	0		(\$114,731.20)	0		(\$147,961.90)	0		(\$162,706.30)	0		(\$182,529.40)
1	\$263.50	\$264.60	1	\$3,538.10	\$3,584.08	1	\$5,070.10	\$5,107.77	1	\$4,591.90	\$4,628.31	1	\$7,227.40	\$7,271.35
2	\$271.41	\$272.51	2	\$3,644.24	\$3,690.22	2	\$5,222.20	\$5,259.87	2	\$4,729.66	\$4,766.07	2	\$7,444.22	\$7,488.17
3	\$279.55	\$280.65	3	\$3,753.57	\$3,799.55	3	\$5,378.87	\$5,416.54	3	\$4,871.55	\$4,907.96	3	\$7,667.55	\$7,711.50
4	\$287.93	\$289.03	4	\$3,866.18	\$3,912.16	4	\$5,540.24	\$5,577.91	4	\$5,017.69	\$5,054.10	4	\$7,897.58	\$7,941.53
5	\$296.57	\$297.67	5	\$3,982.16	\$4,028.14	5	\$5,706.44	\$5,744.11	5	\$5,168.22	\$5,204.63	5	\$8,134.50	\$8,178.45
6	\$305.47	\$306.57	6	\$4,101.63	\$4,147.61	6	\$5,877.64	\$5,915.31	6	\$5,323.27	\$5,359.68	6	\$8,378.54	\$8,422.49
7	\$314.63	\$315.73	7	\$4,224.68	\$4,270.66	7	\$6,053.96	\$6,091.63	7	\$5,482.97	\$5,519.38	7	\$8,629.89	\$8,673.84
8	\$324.07	\$325.17	8	\$4,351.42	\$4,397.40	8	\$6,235.58	\$6,273.25	8	\$5,647.46	\$5,683.87	8	\$8,888.79	\$8,932.74
9	\$333.79	\$334.89	9	\$4,481.96	\$4,527.94	9	\$6,422.65	\$6,460.32	9	\$5,816.88	\$5,853.29	9	\$9,155.45	\$9,199.40
10	\$343.81	\$344.91	10	\$4,616.42	\$4,662.40	10	\$6,615.33	\$6,653.00	10	\$5,991.39	\$6,027.80	10	\$9,430.12	\$9,474.07
11	\$354.12	\$355.22	11	\$4,754.91	\$4,800.89	11	\$6,813.79	\$6,851.46	11	\$6,171.13	\$6,207.54	11	\$9,713.02	\$9,756.97
12	\$364.75	\$365.85	12	\$4,897.56	\$4,943.54	12	\$7,018.20	\$7,055.87	12	\$6,356.26	\$6,392.67	12	\$10,004.41	\$10,048.36
13	\$375.69	\$376.79	13	\$5,044.48	\$5,090.46	13	\$7,228.75	\$7,266.42	13	\$6,546.95	\$6,583.36	13	\$10,304.54	\$10,348.49
14	\$386.96	\$388.06	14	\$5,195.82	\$5,241.80	14	\$7,445.61	\$7,483.28	14	\$6,743.36	\$6,779.77	14	\$10,613.68	\$10,657.63
15	\$398.57	\$399.67	15	\$5,351.69	\$5,397.67	15	\$7,668.98	\$7,706.65	15	\$6,945.66	\$6,982.07	15	\$10,932.09	\$10,976.04
IRR 1.52%			IRR -5.83%			IRR -4.82%			IRR -6.72%			IRR -3.34%		
NPV (\$479.29)			NPV (\$62,656.57)			NPV (\$73,675.79)			NPV (\$95,399.31)			NPV (\$76,751.33)		
AROI -0.56%			AROI -3.54%			AROI -3.21%			AROI -3.82%			AROI -2.68%		

IRR, NPV, AROI - PV Solar Energy Systems

Financial Calculations

Based on inflation of: 3%

O&M inflation: 3%

Montville Public Safety Building				Montville Public Works Building				Montville Municipal Building			
Year	Energy Savings	SREC Sales	Cash Flow	Year	Energy Savings	SREC Sales	Cash Flow	Year	Energy Savings	SREC Sales	Cash Flow
0			(\$796,188)	0			(\$899,429)	0			(\$1,353,277)
1	\$10,208	\$40,123	\$49,058	1	\$12,523	\$46,471	\$57,520	1	\$20,199	\$74,381	\$92,220
2	\$10,515	\$51,586	\$60,789	2	\$12,899	\$44,612	\$55,993	2	\$20,805	\$71,406	\$89,780
3	\$10,830	\$49,770	\$59,289	3	\$13,286	\$42,828	\$54,595	3	\$21,429	\$68,550	\$87,548
4	\$11,155	\$48,057	\$57,901	4	\$13,684	\$41,115	\$53,281	4	\$22,072	\$65,808	\$85,449
5	\$11,490	\$46,360	\$56,538	5	\$14,095	\$39,470	\$52,047	5	\$22,734	\$63,175	\$83,478
6	\$11,834	\$44,764	\$55,287	6	\$14,518	\$37,891	\$50,891	6	\$23,416	\$60,648	\$81,633
7	\$12,189	\$43,183	\$54,061	7	\$14,953	\$36,376	\$49,810	7	\$24,119	\$58,222	\$79,910
8	\$12,555	\$41,701	\$52,944	8	\$15,402	\$34,921	\$48,804	8	\$24,842	\$55,893	\$78,305
9	\$12,932	\$40,232	\$51,853	9	\$15,864	\$33,524	\$47,869	9	\$25,587	\$53,658	\$76,814
10	\$13,320	\$38,778	\$50,786	10	\$16,340	\$32,183	\$47,004	10	\$26,355	\$51,511	\$75,436
11	\$13,719	\$37,503	\$49,911	11	\$16,830	\$30,895	\$46,207	11	\$27,146	\$49,451	\$74,166
12	\$14,131	\$36,157	\$48,976	12	\$17,335	\$29,660	\$45,476	12	\$27,960	\$47,473	\$73,002
13	\$14,555	\$34,906	\$48,149	13	\$17,855	\$28,473	\$44,810	13	\$28,799	\$45,574	\$71,942
14	\$14,991	\$33,666	\$47,346	14	\$18,390	\$27,334	\$44,207	14	\$29,663	\$43,751	\$70,983
15	\$15,441	\$32,520	\$46,650	15	\$18,942	\$26,241	\$43,665	15	\$30,553	\$42,001	\$70,123
16	\$15,904		\$14,593	16	\$19,510		\$17,992	16	\$31,469		\$29,038
17	\$16,381		\$15,070	17	\$20,096		\$18,578	17	\$32,413		\$29,983
18	\$16,873		\$15,562	18	\$20,699		\$19,180	18	\$33,386		\$30,955
19	\$17,379		\$16,068	19	\$21,320		\$19,801	19	\$34,387		\$31,956
20	\$17,900		\$16,589	20	\$21,959		\$20,441	20	\$35,419		\$32,988
21	\$18,437		\$17,126	21	\$22,618		\$21,100	21	\$36,481		\$34,051
22	\$18,990		\$17,679	22	\$23,296		\$21,778	22	\$37,576		\$35,145
23	\$19,560		\$18,249	23	\$23,995		\$22,477	23	\$38,703		\$36,272
24	\$20,147		\$18,836	24	\$24,715		\$23,197	24	\$39,864		\$37,433
25	\$20,751		\$19,440	25	\$25,457		\$23,938	25	\$41,060		\$38,629
IRR			1.9%	IRR			0.5%	IRR			1.2%
NPV			(\$70,833)	NPV			(\$188,986)	NPV			(\$212,407)
AROI			2.2%	AROI			2.4%	AROI			2.8%

Lighting Maintenance Cost Savings

T12 to T8 Retrofit	T12 Bulb Cost	T8 Bulb Cost	T12 Bulb Average Lifetime (Years)	T8 Bulb Average Lifetime (Years)	Quantity of T12 Replacements vs. T8 Replacements	Cost of T12 Replacement over T8 Life	T8 Bulb Replacements Over Lifetime (15 Yrs)
1 Lamp	\$25.0	\$23.5	4.6	5.7	1.25	\$31.2	3
2 Lamp	\$69.9	\$67.0	4.6	5.7	1.25	\$87.4	3
3 Lamp	\$94.9	\$90.5	4.6	5.7	1.25	\$118.6	3
4 Lamp	\$119.8	\$114.0	4.6	5.7	1.25	\$149.8	3

Incandescent to CFL Retrofit	Incandescent Cost	CFL Cost	Incandescent Average Lifetime (Years)	CFL Average Lifetime (Years)	Quantity of Incandescent Replacements vs. CFL Replacements	Cost of Incandescent Replacement over CFL Life	CFL Replacements Over Lifetime (15 Yrs)
13 Watt	\$23.0	\$25.0	0.5	2.3	5	\$115.0	7
25 Watt	\$23.0	\$27.0	0.5	2.3	5	\$115.0	7
65 Watt	\$23.4	\$45.0	0.5	2.3	5	\$117.0	7

Metal Halide to LED Retrofit	Metal Halide Cost	LED Cost	Metal Halide Average Lifetime (Years)	LED Average Lifetime (years)	Quantity of Metal Halide Replacements vs. LED Replacements	Cost of Metal Halide Replacement over LED Life	LED Replacements Over Lifetime (15 Yrs)
400 Watt	\$86.0	\$2,871.0	4.6	22.8	5	\$430.0	1

150W HPS to 70W HPS	150 HPS Fixture Cost	70W HPS Fixture Cost	150 HPS Average Lifetime (Years)	70W HPS Average Lifetime (years)	Quantity of 150W HPS vs. 70W HPS Replacements	Cost of 150W HPS over 70W HPS	Replacements Over Lifetime (15 Yrs)
150 Watt	\$475.0	\$400.0	4.6	4.6	1,007.5	\$478.5	1

HPS to LED Retrofit	HPS Cost	LED Cost	HPS Average Lifetime (Years)	LED Average Lifetime (years)	Quantity of HPS Replacements vs. LED Replacements	Cost of HPS over LED Life	LED Replacements Over Lifetime (15 Yrs)
250 Watt	\$80.0	\$2,171.0	4.6	22.8	5	\$400.0	1
150 Watt	\$74.0	\$2,171.0	4.6	22.8	5	\$370.0	1
100 Watt	\$65.0	\$2,171.0	4.6	22.8	5	\$275.0	1
70 Watt	\$25.0	\$988.0	4.6	22.8	5	\$125.0	1

Incandescent to LED Retrofit	Incandescent Cost	LED Cost	Incandescent Average Lifetime (Years)	LED Average Lifetime (years)	Quantity of Incandescent Replacements vs. LED Replacements	Cost of Incandescent over LED Life	LED Replacements Over Lifetime (15 Yrs)
100 Watt	\$1.8	\$2,171.0	0.2	22.8	114,1552511	\$205.5	1
75 Watt	\$1.5	\$2,171.0	0.2	22.8	114,1552511	\$171.2	1

Metal Halide to Fluorescent	Metal Halide Cost	Fluorescent Cost	Metal Halide Average Lifetime (Years)	Fluorescent Average Lifetime (years)	Quantity of Metal Halide Replacements vs. Fluorescent Replacements	Cost of Metal Halide Replacement over Fluorescent Life	Replacements Over Lifetime (15 Yrs)
6 Lamp	\$86.0	\$288.0	4.6	5.7	1.25	\$107.5	3
4 Lamp	\$48.0	\$174.0	4.6	5.7	1.25	\$60.0	3

Interior & Exterior

Building	INC-CFL (13W)	INC-CFL (25W)	T12->T8 (1 Lamp)	T12->T8 (2 Lamp)	T12->T8 (3 Lamp)	T12->T8 (4 Lamp)	MH->FL (400W)	HPS->LED (70W)	HPS->LED (150W)	MH->LED (400W)	Total Maintenance Cost Savings	Annual Maintenance Cost Savings	Building
Public Works Total	\$0.0	\$705.2	\$0.0	\$91.8	\$0.0	\$2,833.5	\$315.4	\$16.4	\$0.0	\$0.0	\$3,962.3	\$264.15	Public Works Total
Library Total	\$0.0	\$0.0	\$0.0	\$1,056.3	\$124.6	\$3,541.9	\$662.3	\$27.4	\$0.0	\$0.0	\$5,412.4	\$360.65	Library Total
Municipal Total	\$18,687.3	\$2,115.5	\$180.3	\$4,041.3	\$1,557.9	\$10,704.4	\$0.0	\$5.5	\$16.2	\$565.0	\$37,873.4	\$2,524.90	Municipal Total
Public Safety Total	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$546.2	\$546.2	\$36.41	Public Safety Total
Senior Total	\$352.6	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$352.6	\$23.51	Senior Total
Youth Total	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$559.2	\$559.2	\$43.95	Youth Total

Interior

Building	INC-CFL (13W)	INC-CFL (25W)	T12->T8 (1 Lamp)	T12->T8 (2 Lamp)	T12->T8 (3 Lamp)	T12->T8 (4 Lamp)	MH->FL (400W)	Total Maintenance Cost Savings	Annual Maintenance Cost Savings	Building
Public Works Building - Interior	\$0.0	\$705.2	\$0.0	\$91.8	\$0.0	\$2,833.5	\$315.4	\$3,945.9	\$264.06	Public Works Building - Interior
Library - Interior	\$0.0	\$0.0	\$0.0	\$1,056.3	\$124.6	\$3,541.9	\$0.0	\$4,722.8	\$314.95	Library - Interior
Municipal Building - Interior	\$18,687.3	\$2,115.5	\$180.3	\$4,041.3	\$1,557.9	\$10,704.4	\$0.0	\$37,886.7	\$2,485.78	Municipal Building - Interior
Public Safety Building - Interior	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.00	Public Safety Building - Interior
Youth Center - Interior	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.00	Youth Center - Interior
Senior House - Interior	\$352.6	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$352.6	\$23.51	Senior House - Interior

Exterior

Building	HPS->LED (70W)	MH->LED (400W)	Total Maintenance Cost Savings	Annual Maintenance Cost Savings	Building
Public Works Building - Exterior	\$16.4	\$0.0	\$16.4	\$1.10	Public Works Building - Exterior
Library - Exterior	\$27.4	\$662.3	\$689.6	\$45.98	Library - Exterior
Municipal Building - Exterior	\$0.0	\$565.0	\$565.0	\$37.67	Municipal Building - Exterior
Public Safety Building - Exterior	\$0.0	\$546.2	\$546.2	\$36.41	Public Safety Building - Exterior
Youth Center - Exterior	\$0.0	\$559.2	\$559.2	\$43.95	Youth Center - Exterior