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Local Government Energy Program
Energy Audit Report

For

City of New Brunswick
Weston Mill Pump Station

Burnet St
New Brunswick, NJ 08901

Project Number: LGEA63

TABLE OF CONTENTS

INTRODUCTION

On April 30th, Steven Winter Associates, Inc. (SWA) and PMK Group, a business unit of Birdsall Services Group (BSG-PMK), performed an energy audit and assessment of the Weston Mill Pump Station in The City of New Brunswick, NJ. Current conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures for the building.

The single-story, (slab on grade), 1,875 square feet Pump Station was originally constructed in the 1960's. It houses pump equipment areas, an office and a bathroom.

Its occupancy is approximately 1 employee from 7am until 3:30pm 5 days a week.

Energy data and building information collected in the field were analyzed to determine the baseline energy performance of the building. Using spreadsheet-based calculation methods, SWA and PMK estimated the energy and cost savings associated with the installation of each of the recommended energy conservation measures. The findings for the building are summarized in this report.

The goal of this energy audit is to provide sufficient information to make decisions regarding the implementation of the most appropriate and most cost effective energy conservation measures for the building.

Launched in 2008, the LGEA Program provides subsidized energy audits for municipal and local government-owned facilities, including offices, courtrooms, town halls, police and fire stations, sanitation buildings, transportation structures, schools and community centers. The Program will subsidize 75% of the cost of the audit. If the net cost of the installed measures recommended by the audit, after applying eligible NJ SmartStart Buildings incentives, exceeds the remaining cost of the audit, then that additional 25% will also be paid by the program. The Board of Public Utilities (BPU's) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

EXECUTIVE SUMMARY

This document contains the energy audit report for the Weston Mill Pump Station in The City of New Brunswick, NJ 08901.

Based on the field visit performed by Steven Winter Associates (SWA) and PMK staff on April 30th, 2010 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

Current conditions

In the most recent full year of data collected, April, 2009 through March, 2010, the Weston Mill Pump Station consumed a total of 632,338 kWh of electricity for a total cost of $102,091. In the most recent full year of natural gas data collected, February, 2009 through January, 2010, 1,564 therms of natural gas were consumed for a total cost of $1,845. With electricity and natural gas combined, the building consumed 2,331 MMBtus of energy at a total cost of $103,936.

SWA/BSG-PMK has entered energy information about the Weston Mill Pump Station in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was classified as a Water Treatment/Distribution building preventing it from receiving a performance rating. Buildings achieving an Energy Star rating of 75 are eligible to apply for the Energy Star award and receive the Energy Star plaque to convey superior performance. These ratings also greatly help when applying for Leadership in Energy and Environmental Design (LEED) building certification through the United States Green Building Council (USGBC).

The Site Energy Use Intensity is 0 kBtu/gpd compared to the national average of a similar building consuming 2 kBtu/gpd. Implementing the recommendations included in this report will reduce the building energy consumption by approximately 54.4 kBtu/ft^{2}yr. There may be energy procurement opportunities for City of New Brunswick to reduce annual utility costs, which are $7,233/yr higher, when compared to the other City owned building's utility rates.

Based on the assessment of the Weston Mill Pump Station, SWA/BSG-PMK has separated the recommendations into three categories (See Section 4 for more details). These are summarized as follows:

Category I Recommendations: Capital Improvements:

- The roofing material has reached the end of its useful life and should be replaced in the near future.
- Pump #1 is recommended for replacement, along with its motor, but due to the fact that this pump is not functional and was not used at all between June, 2009 and May, 2010, replacing this pump would be considered a capital improvement.

Category II: Operations & Maintenance:

- Replace the existing through-the-wall air-conditioner with a new unit. Due to the fact that the existing unit is not functional and therefore consumes no energy, this measure cannot be considered an energy-conservation measure.
- Repair/Replace deteriorating wood trim
- Remove pest nests.

Category III: Energy Conservation Measures:

At this time, SWA/BSG-PMK highly recommends a total of **4** Energy Conservation Measures (ECMs) for the Weston Mill Pump Station that are summarized in the following table. The total investment cost for these ECMs, with incentives, is **$296,974** (based on a projected eligibility for New Jersey's Office of Clean Energy current incentive and rebate programs). SWA/BSG-PMK estimates a first year savings of **$5,633** with an aggregated simple payback of approximately **52 years**. SWA/BSG-PMK estimates that implementing the highly recommended ECMs will reduce the carbon footprint of the facility by **49,041 lbs of CO_2**.

The recommended ECMs and the list below are cost-effective energy efficiency measures and building upgrades that will reduce operating expenses for the City of New Brunswick. Based on the requirements of the LGEA program, the City of New Brunswick must commit to implementing some of these measures, and must submit paperwork to the Local Government Energy Audit program within one year of this report's approval to demonstrate that they have spent, net of other NJCEP incentives, at least 25% of the cost of the audit (per building). The minimum amount to be spent, net of other NJCEP incentives, is $369.25.

SWA recommends that the City of New Brunswick enroll in the following incentive programs through the NJ Office of Clean Energy in order to reduce the installation costs of most measures:

- Direct Install
- SmartStart

The building would not qualify for the Pay-for-Performance program since the energy audit did not show that source energy consumption could not be reduced by 15+%.

Please refer to Appendix C for further details.

The following table summarizes the proposed Energy Conservation Measures (ECM) and their economic relevance:

ROI: Return on Investment (%)

Assumptions:

Discount rate:	3.2% per DOE FEMP guidelines	Electricity rate	$0.16 $/kWh
Energy price escalation rate:	0% per DOE FEMP guidelines	Gas rate	$1.18 $/therm

Avg. Annual Demand: 0.00208 Area of Building (SF) 2,900

Table 1 - Highly Recommended 0-5 Year Payback ECMs

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO_2 Reduced, lbs/yr
1	Replace Unit Heaters w/ High-Intensity Infrared Heaters	Vendor Website	$4,000	$3,200	$800	0	0.00	504	17.40	$0	$595	15	$7,005	1.34	776%	52%	74%	$6,306	5,902
2	Tankless Water Heaters	Vendor Website	$700	$0	$700	3,977	0.69	0	4.68	$0	$636	15	$7,488	1.10	970%	65%	91%	$6,896	5,449
TOTAL			$4,700	$3,200	$1,500	3,977	0.69	504	22.07	$0	$1,232	-	$14,492	1.22	-	-	-	$13,203	11,351

Table 2 - Recommended End-of-Life ECMs

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO_2 Reduced, lbs/yr
3	Lighting Upgrades	Empirical Data	$1,474	$300	$1,174	533	0.09	0	0.63	$0	$85	15	$1,004	13.76	-14%	-1%	1%	-$155	731
4	Premium-Efficiency Motors & Pumps	Contractor	$295,000	$700	$294,300	26,977	4.67	0	31.74	$0	$4,316	18	$58,374	68.18	-80%	-4%	0%	-$237,470	36,959
TOTAL			$296,474	$1,000	$295,474	27,511	4.76	0	32.37	$0	$4,402	-	$59,378	67.13	-	-	-	-$237,625	37,690

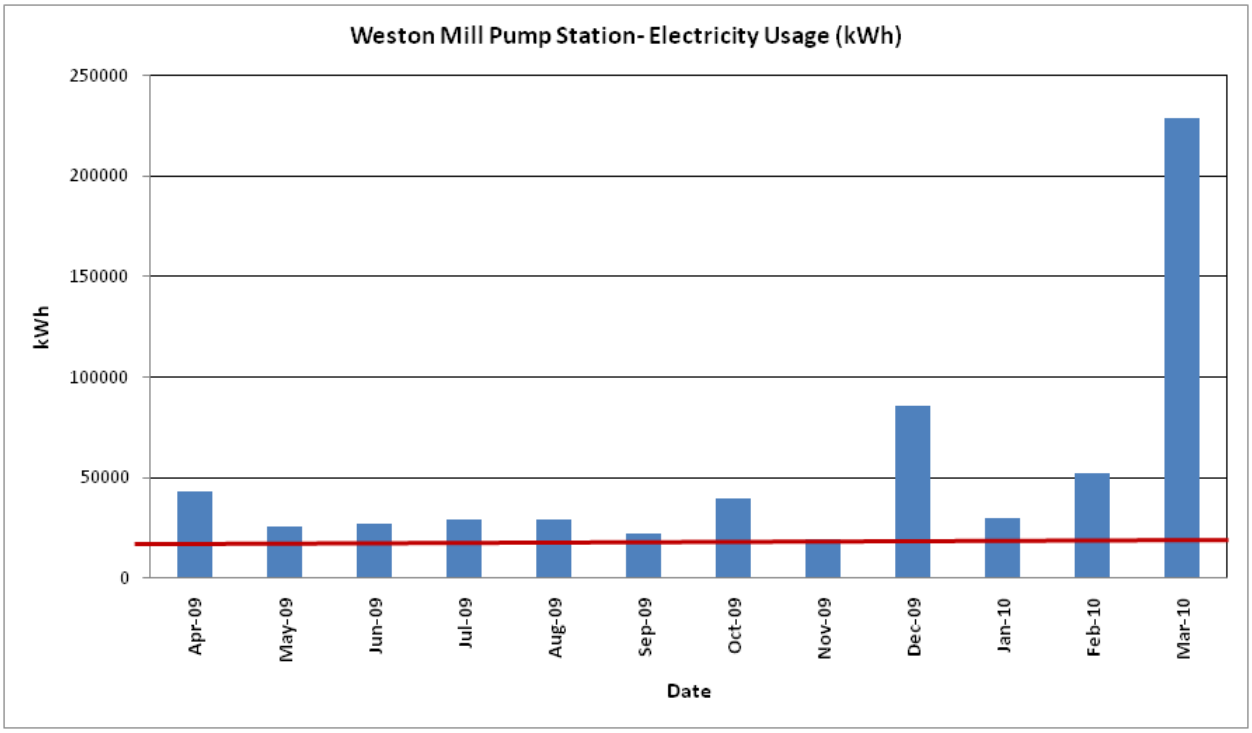
1. HISTORIC ENERGY CONSUMPTION

1.1. Energy Usage and Cost Analysis

SWA/BSG-PMK analyzed utility bills that were received from the utility company supplying the Weston Mill Pump Station building with electric from April, 2009 through March, 2010 and natural gas from February, 2009 through January, 2010.

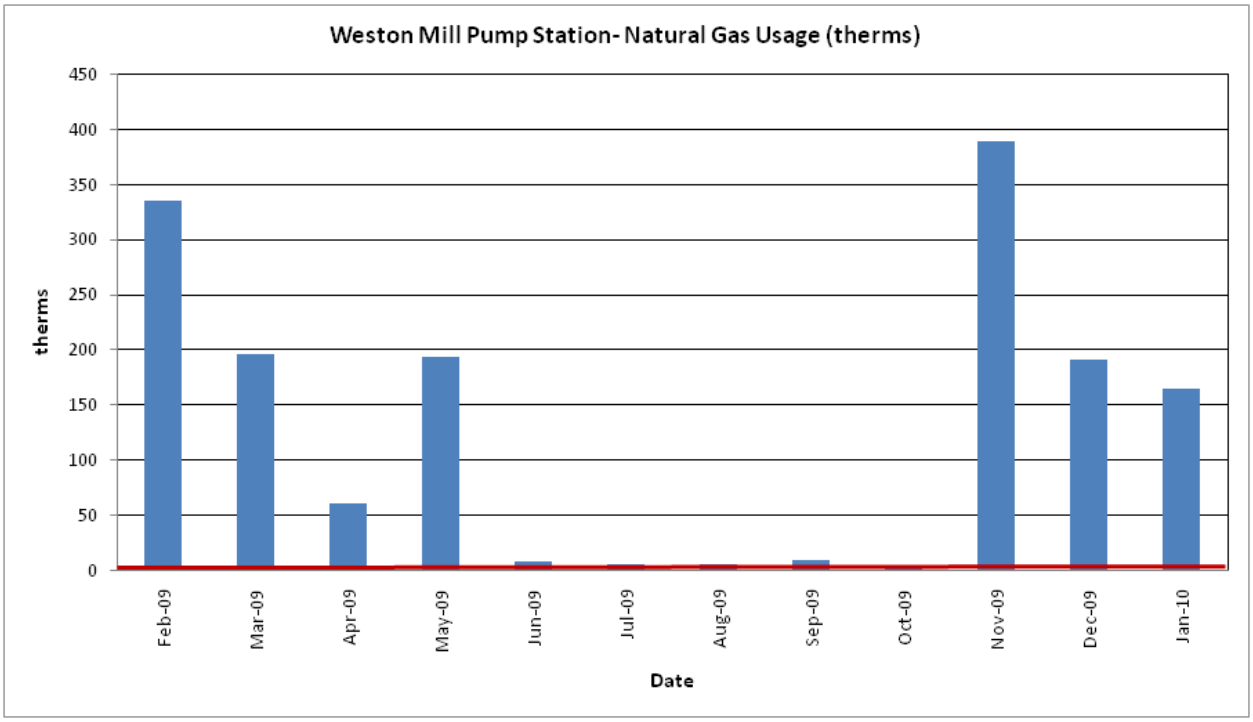
Electricity – The Weston Mill Pump Station building is currently served by one electric meter. The facility currently receives electricity transmission from Public Service Electric & Gas and electricity supply from Direct Energy at **an average rate of $0.16/kWh** based on 12 months of utility bills from April, 2009 through March, 2010. The facility consumed **approximately 632,338 kWh or $102,091worth of electricity** in the previous year with an average monthly demand of 86 kW.

The following charts show electricity usage for the Weston Mill Pump Station building based on utility bills for the billing analysis period. The red line indicates the estimated base-load in kWh.



Natural Gas – The Weston Mill Pump Station building is currently served by one meter for natural gas. The facility currently receives natural gas from Public Service Electric & Gas at **an average aggregated rate of $1.17/therm** based on 12 months of utility bills for February, 2009 through January, 2010. The facility consumed **approximately 1,564 therms or $1,845 worth of natural gas** in the previous year.

The following charts show the natural gas usage for the Weston Mill Pump Station building based on utility bills for the analysis period of February, 2009 through January, 2010.



The natural gas usage mimics seasonal needs for heating the buildings showing that natural gas is primarily used for heating. The red line indicates the base-load level for the heating, domestic hot water, and/or cooking needs. The natural gas usage above the red line shows the amount of natural gas used for heating.

1.2. Utility Rate

The Weston Mill Pump Station building currently receives electricity transmission from Public Service Electric & Gas and electricity supply from Direct Energy at a general service market rate for electricity use (kWh) with (kW) demand charge. The facility currently pays an average rate of approximately $0.16/kWh based on the most recent 12 months of utility bills.

The Weston Mill Pump Station building currently receives natural gas supply from Public Service Electric & Gas at a general service market rate for natural gas in therms. There is one gas meter that provides natural gas service to the facility. The average aggregated rate (supply and transport) for the meter is approximately $1.17/therm based on the most recent 12 months of utility bills.

1.3. Energy Benchmarking

SWA/BSG-PMK has entered energy information about the Weston Mill Pump Station building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The username is *cityofnewbrunswick* and the password is *newbrunswick*. The building was classified as a Water Treatment/Water Distribution building preventing it from earning a performance rating which can be used to achieve an Energy Star building certification.

The Site Energy Use Intensity is 0 kBtu/gpd compared to the national average of buildings classified as Water Treatment/Water Distribution consuming 2 kBtu/gpd. Implementing this report's recommended Energy Conservations Measures (ECMs) will reduce use by approximately 54.4 kBtu/sq.ft./yr.

SWA/BSG-PMK has created the Portfolio Manager site information for Weston Mill Pump Station. This information can be accessed at: https://www.energystar.gov/istar/pmpam/, with the following:

Username: *cityofnewbrunswick*
Password: *newbrunswick*

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Weston Mill Pump Station

Building ID: 2368894
For 12-month Period Ending: March 31, 2010[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: June 28, 2010

Facility	Facility Owner	Primary Contact for this Facility
Weston Mill Pump Station Burnet St New Brunswick, NJ 08901	City of New Brunswick 76 Bayard St New Brunswick, NJ 08901	Chris Butler 76 Bayard St New Brunswick, NJ 08901

Year Built: 1902
Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	2,157,539
Natural Gas (kBtu)[4]	156,369
Total Energy (kBtu)	2,313,908

Energy Intensity[5]	
Site (kBtu/gpd)	0
Source (kBtu/gpd)	1

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	337

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	2
National Average Source EUI	8
% Difference from National Average Source EUI	-88%
Building Type	Water Treatment

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 Standards[6] 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 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.

EPA Form 5900-16

2. FACILITY AND SYSTEMS DESCRIPTION

This section gives an overview of the current state of the facility and systems. Please refer to the Proposed Further Recommendations section for recommendations for improvement.

Based on visits from SWA on Friday, May 07, 2010, the following data was collected and analyzed.

2.1. Building Characteristics

The single-story, (slab on grade), 1,875 square feet Pump Station was originally constructed in the 1960's. It houses pump equipment areas, an office and a bathroom.

Front and Side Façade

Partial Side Façade (typ.)

Partial Rear Façade

Partial Side Façade (typ.)

2.2. Building occupancy profiles

Its occupancy is approximately 1 employee from 7am until 3:30pm 5 days a week.

2.3. Building Envelope

Due to unfavorable weather conditions (min. 18 deg. F delta-T in/outside and no/low wind), no exterior envelope infrared (IR) images were taken during the field audit.

General Note: All findings and recommendations on the exterior envelope (base, walls, roofs, doors and windows) are based on the energy auditors' experience and expertise, on construction document reviews (if available) and on detailed visual analysis, as far as accessibility and weather conditions allowed at the time of the field audit.

2.3.1. Exterior Walls

The exterior wall envelope is mostly constructed of brick veneer and some limestone accents, over glazed concrete block with 0 inches of detectable insulation. The interior is mostly glazed block and tile.

Note: Wall insulation levels could not be verified in the field and are based on reports from building management.

Exterior and interior wall surfaces were inspected during the field audit. They were found to be in overall acceptable and age-appropriate condition with no major signs of uncontrolled moisture, air-leakage or other energy-compromising issues.

2.3.2. Roof

The building's roof is predominantly a low-pitch gable type over a steel structure, with a slate shingle finish. It is original and has never been replaced. Zero inches of detectable were recorded.

Note: Roof insulation levels could visually be verified in the field by non-destructive methods.

Roofs, related flashing, gutters and downspouts were inspected during the field audit. They were reported to be in overall acceptable, age-appropriate condition, with no signs of uncontrolled moisture, air-leakage or other energy-compromising issues on any roof areas.

The following specific roof problem spots were identified:

The roofing material has reached the end of its useful lifespan and is in need of major maintenance program.

Deteriorating roof trim and compromised roof flashing detected

Squirrels nesting in roof openings

2.3.3. Base

The building's base is composed of a slab-on-grade floor with a perimeter foundation and no detectable slab edge/perimeter insulation.

Slab/perimeter insulation levels could not be verified in the field or on construction plans, and are based upon similar wall types and time of construction.

The building's base and its perimeter were inspected for signs of uncontrolled moisture or water presence and other energy-compromising issues. Overall the base was reported to be in acceptable and age appropriate condition with no signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues.

2.3.4. Windows

The building contains basically one type of window.

- Unit (fixed and casement) type windows with a wood and metal frame, clear single glazing and no interior or exterior shading devices. The windows are located throughout the building and are original and have never been replaced

Windows, shading devices, sills, related flashing and caulking were inspected as far as accessibility allowed for signs of moisture, air-leakage and other energy compromising issues. Overall, the windows were found to be in poor but age appropriate condition with signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues.

2.3.5. Exterior Doors

The building contains only one type of exterior door.

- Wood and glass type exterior doors. They are located throughout the building are possibly original.

All exterior doors, thresholds, related flashing, caulking and weather-stripping were inspected for signs of moisture, air-leakage and other energy-compromising issues. Overall, the doors were found to be in acceptable, age and use appropriate condition with only a few signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues.

2.3.6. Building Air Tightness

Overall the field auditors found the building to be reasonably air-tight with only a few areas of suggested improvements, as described in more detail earlier in this chapter.

The air tightness of buildings helps maximize all other implemented energy measures and investments, and minimizes potentially costly long-term maintenance, repair and replacement expenses.

2.4. HVAC systems

2.4.1.Heating

Heat is generated entirely by unit heaters. The pump room of the main building is heated by two large Janitrol gas-fired unit heaters, which had missing nameplates. The south building is heated by a Modine unit heater, rated at 75 MBH and 80% efficiency. The storage building is heated by two electric unit heaters.

Category III Recommendation – ECM #1: Replace the unit heaters, which have reached the end of their useful life, with gas-fired, high-intensity infrared radiant heaters, which are 100% efficient.

Modine gas-fired unit heater

2.4.2. Cooling

The only cooling unit in any of the facilities is a Kenmore through-the-wall air-conditioner, which does not work.

Category II Recommendation – Operations & Maintenance: Replace the existing through-the-wall air-conditioner with a new unit. Due to the fact that the existing unit is not functional and therefore consumes no energy, this measure cannot be considered an energy-conservation measure.

2.4.3. Ventilation

There are no exhaust fans at this facility; ventilation is provided by flues, doors, and windows.

2.4.4. Domestic Hot Water

Hot water is supplied to the main building and the storage building by two 30-gallon electric point-of-use water heaters.

Category III Recommendations – ECM #2: Replace the current electric water heaters, which have reached the end of their useful life, with tankless, point-of-use water heaters.

AO Smith electric water heater

2.5. Electrical systems

2.5.1. Lighting

A complete inventory of all interior, exterior, and exit sign light fixtures were examined and documented in Appendix A of this report including an estimated total lighting power consumption. The facility consists primarily of T12 Fluorescent fixtures with magnetic ballasts.

Category III Recommendation - ECM 3: Recommend upgrading all T-12 lighting fixtures with magnetic ballasts to T-8 fixtures with electronic ballasts. This and various other lighting upgrades are outlined in Appendix A.

2.5.2. Appliances and Process

2.5.2.1. Appliances

Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators use as little as 315 kWh / yr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Building management should select Energy Star label appliances and equipment when replacing: refrigerators, printers, computers, and copy machines, etc.

More information can be found in the "Products" section of the Energy Star website at: http://www.energystar.gov.

There is a Sharp microwave in the main building, and a Frigidaire refrigerator in the storage building.

2.5.2.2. Process

There are three centrifugal pumps in the main building and one in the south building. The pump in the South building is a 10,300 GPM De Leval pump with a 600 HP Continental motor. In the main building, Pump #1 is a 6,600 GPM De Leval pump with a 350 Westinghouse motor, Pump #3 is a 4,200 GPM American Well Works pump with a 300 HP Continental motor, and Pump #2 has a 200 HP Westinghouse motor.

Centrifugal pump

Category III Recommendations – ECM #4: Replace Pump #2, which has reached the end of its useful life; additionally, replace their motor with a premium-efficiency motor.

Category I Recommendation – Capital Improvements: Pump #1 is recommended for replacement, along with its motor, but due to the fact that this pump is not functional and was not used at all between June, 2009 and May, 2010, replacing this pump would be considered a capital improvement.

2.5.3.Elevators

There are no elevators in any of the three buildings.

3. Building Systems Equipment List

Weston Mill Pump Station							
Building System	Description	Locations	Model #	Fuel	Space Served	Year Installed	Estimtaed. Remaining Useful Life %
Heating	(2) large gas-fired units heaters	Pump room	Janitrol (nameplate missing)	Natural gas	Pump room	Approx. 1985	20%
Heating	Gas-fired unit heater; 75 MBH, 80% efficient	South building	Modine, M# P75A, S# 22J02015	Natural gas	South building	Approx. 1995	20%
Heating	Electric unit heater; 220 MBH	Storage building	No nameplate	Electricity	Storage building	Approx. 1985	20%
Heating	Electric unit heater; 10 kW	Storage building	Electromode, Cat. # EUH10B34CT	Electricity	Storage building	2002	38%
Cooling	Through-the-wall air-conditioner (unit does not work)	Office	Kenmore	Electricity	Office	Approx. 1990	0%
Domestic Hot Water	Electric water heater; 30 gallon, 1.65 kW	Storage building	Kenmore, M# 153.317671, S# A90805994	Electricity	Sink	1990	0%
Domestic Hot Water	Water heater; 30 gallons, 4.5 kW	Hallway	AO Smith, M# EES 30 915, S# ME96-0024242-915	Electricity	Bathroom sink	1996	0%
Pumping	Pump #1: Centrifugal pump; 185' head, 6,600 GPM, 1,200 RPM	Pump room	De Laval Steam Turbine Co., S# 251712	Electricity	Process	1950 Approx.	-
	Pump motor; 350 HP, 1,200 RPM		Westinghouse, S# IS37P375				
Pumping	Pump #3: Centrifugal pump; 220' head, 4,200 GPM, 1,800 RPM	Pump room	American Well Works, Fig. # RM-B, Size # 12, Shop # 55793	Electricity	Process	1980 Approx.	-
	Pump motor; 300 HP, 1,785 RPM		Continental Electro-Power, Frame # N509S, S# I65711				
Pumping	Pump #2: Centrifugal pump; 200 HP, 1,800 RPM	Pump room	Westinghouse, S# 8094271	Electricity	Process	1950 Approx.	-
Pumping	Pump #5: Centrifugal pump w/ VFD; 10,300 GPM, 178' head, 1,120 GPM	South building	De Laval Steam Turbine Co., S# 702728	Electricity	Process	1950 Approx.	-

	Pump motor; 600 HP, 1,187 RPM		Continental Electro-Power, Frame # N6865, S# I65712	Electricity			
Appliances	Microwave	Pump room	Sharp (nameplate missing)	Electricity	Pump room	Approx. 2005	50%
Appliances	Refrigerator	Storage building, 2nd floor	Frigidaire, M# FRC05L5DB0, S# RA62441589	Electricity	Storage building, 2nd floor	2006	79%

Note: *****The remaining useful life of a system (in %) is the relationship between the system manufactured and / or installed date and the standard life expectancy of similar equipment based on ASHRAE (2003), ASHRAE Handbook: HVAC Applications, Chapter 36.

4. ENERGY CONSERVATION MEASURES

Based on the assessment of this building, SWA and BSG-PMK have separated the investment opportunities into three categories of recommendations:

1. Capital Improvements – Upgrades not directly associated with energy savings
2. Operations and Maintenance – Low Cost/No Cost Measures
3. Energy Conservation Measures – Higher cost upgrades with associated energy savings

Category I Recommendations: Capital Improvements:

- The roofing material has reached the end of its useful life and should be replaced in the near future.
- Pump #1 is recommended for replacement, along with its motor, but due to the fact that this pump is not functional and was not used at all between June, 2009 and May, 2010, replacing this pump would be considered a capital improvement.

Category II: Operations & Maintenance:

- Replace the existing through-the-wall air-conditioner with a new unit. Due to the fact that the existing unit is not functional and therefore consumes no energy, this measure cannot be considered an energy-conservation measure.
- Repair/Replace deteriorating wood trim
- Remove pest nests.

Category III Recommendations: Energy Conservation Measures:

Summary Table

ECM #	Description
1	Replace Unit Heaters w/ High-Intensity Infrared Heaters
2	Tankless Water Heaters
3	Lighting Upgrades
4	Premium-Efficiency Motors & Pumps

ECM #1: Replace Gas-Fired Unit Heaters w/ High-Intensity Infrared Heaters

Description:

Heating is provided to the pump room by two (2) gas-fired unit heaters, installed in approximately 1985. The units had missing nameplates, but the size of the units indicates that they have heating capacities of 100 MBH. The units have passed the end their 13-year useful life, and should be replaced. High-intensity infrared unit heaters are available, which are 100% efficient. These units differ from unit heaters in that infrared heaters heat the objects beneath them, rather than the air in the space they are serving, which also prevents heat from escaping the building. The current units were 80% efficient at the time of their purchase, but due to their age and condition, their efficiency was estimated to decrease by 10%, to 70%.

Installation cost:

Estimated installed cost: $2,000 each, $4,000 total
Source of cost estimate: Vendor website

Economics:

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO_2 Reduced, lbs/yr
1	Replace Unit Heaters w/ High-Intensity Infrared Heaters	Vendor Website	$4,000	$3,200	$800	0	0.00	504	17.40	$0.00	$595	15	$7,005	1.34	776%	52%	74%	$6,306	5,902

Assumptions:

The cost per therm of natural gas that was used, taken from twelve months of the building's energy bills, was $1.18. Due to the fact that the units only operate 40 out of a possible 168 hours every week, only $\frac{40}{168}$ of the heating degree days were used for the calculations of the current energy consumptions. Per ASHRAE, the outdoor drybulb temperature is above 10°F 99.6% percent of a year, and the number of heating degree days per year is 5,034. The desired indoor temperature was estimated to be 68°F. The savings were calculated using the following equations:

$$\frac{\text{Capacity}\times\text{Degree-Days}\times 24}{\text{Efficiency}_{\text{current}}\times\left(\text{Temp.}_{\text{indoor}}-\text{Temp.}_{99.6\%}\right)}\times\frac{1\text{ therm}}{100{,}000.4\text{ BTU}}\times\frac{(\text{Weekly Operating Hours})}{24\times 7}=\text{Current Gas Input (therms)}$$

$$\text{Gas Output (therms)} = \text{Current Gas Input} \times \text{Efficiency}_{\text{current}}$$

$$\text{Proposed Gas Input (therms)} = \frac{\text{Gas Output}}{\text{Efficiency}_{\text{proposed}}}$$

$$\text{Savings (therms)} = \text{Current Gas Input} - \text{Proposed Gas Input}$$

Rebates/financial incentives:

This ECM is calculated based on a projected eligibility for New Jersey's Direct Install Rebate, which pays up to 80% of the total installation cost for the heaters, or $3,200 for this measure.

ECM #2: Point-of-Use Tankless Water Heater

Description:

Domestic hot water is provided by two electric water heaters with 30-gallon tanks, both of which are at or near the end of their useful life and should be replaced. Due to the fact that each of these units only service one restroom sink, both of which are seldom used, it is recommended that these units be replaced with small point-of-use tankless water heaters. The current units keep 30-gallons of water heated 24 hours-per-day; by comparison, a tankless water heater has a volume of only 2.75 gallons, and the unit would only heat the water when the sink is in use.

Installation cost:

Estimated installed cost: Installation: $350 each (Equipment: $160 each), $700 total
Source of cost estimate: Vendor website

Economics:

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO_2 Reduced, lbs/yr
2	Tankless Water Heaters	Vendor Website	$700	$0	$700	3,977	0.69	0	4.68	$0	$636	15	$7,488	1.10	970%	65%	91%	$6,896	5,449

Assumptions:

Using 12 months of the facility's electricity bills, it was determined that the cost of electricity is currently $0.16/kWh.

To calculate the savings from switching from electricity to gas, a spreadsheet created by Rheem was used. The temperature rise of the heated water was set at 77°F on the spreadsheet, and the energy factor (a unit that specifies the efficiency of water heaters) is specified as 0.94 for electric units with and without a tank. Weight of water was set at 8.33 pounds/gal. Using this data, the BTUs of output heat used for heating the water were calculated by the following equation:

$$BTUs_{output} = Vol. \times Wt._{Water} \times \Delta Temp.$$

The actual BTUs purchased by each unit are calculated using these values and the energy factors:

$$BTUs_{input} = \frac{BTUs_{output}}{\text{Energy Factor}}$$

The annual costs for heating the water can now be calculated using this data:

Rebates/financial incentives:

No rebates for electric water heaters could be found.

ECM #3: Lighting Upgrades & Occupancy Sensors

Description:

Lighting at the Weston Mills Pump Station primarily consists of standard-efficiency fixtures with T12 lamps and magnetic ballasts. SWA/BSG-PMK recommends retrofitting the T12 fixtures with T8 lamps and electronic ballasts and replacing the incandescent fixtures with compact fluorescent lamps. Lighting replacements typically yield a short payback and should because of the low cost to upgrade combined favorable energy savings.

Recommended lighting upgrades are detailed in Appendix A.

Installation cost:

	Lighting
Cost	$1,474.00
Rebate	$300.00
Net Cost	$1,174.00
Savings (kWh)	533
Savings ($)	$85.34
Payback	13.8

Source of cost estimate: Empirical Data

Economics:

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO2 Reduced, lbs/yr
3	Lighting Upgrades	Empirical Data	$1,474	$300	$1,174	533	0.09	0	0.63	$0	$85	15	$1,004	13.76	-14%	-1%	1%	-$155	731

Assumptions:

The electric cost used in this ECM was $0.16/kWh, which was the facilities' average rate for the 12-month period from February, 2009 through January, 2010. The replacements for each lighting fixture, the costs to replace or retrofit each one, and the rebates and wattages for each fixture are located in Appendix A.

Rebates/financial incentives:

The New Jersey SmartStart offers rebates for upgrading lighting fixtures and installing lighting controls. The total rebate this ECM qualifies for is $300.

ECM#4: Premium-Efficiency Motor & Pump

Description:

At the Weston Mill Pump Station, Pump #2, has reached the end of its useful life and should be replaced. This pump has a motor rated at 200 HP. Due to the age and condition of the motor, the efficiency was estimated to be 85%, with an additional 3.5% decrease due to rewinding. Pumps with high-efficiency, premium motors are available, which have efficiencies of 93%.

Due to the fact that the pump as well as the motor needs to be replaced (energy is consumed only by the motors, and the pumps are typically not recommended for replacement in an ECM), the payback for this ECM is very long, and should be considered an end-of-life measure. Pump #1 is also recommended for replacement, along with its motor, but due to the fact that this pump is not functional and was not used at all between June, 2009 and May, 2010, replacing this pump would be considered a capital improvement.

Installation cost:

Estimated installed cost: $295,000
Source of cost estimate: Contractor

Economics:

ECM #	ECM description	Source	Est. Installed Cost, $	Est. Incentives, $	Net Est. ECM Cost with Incentives, $	kWh, 1st Yr Savings	kW, Demand Reduction/Mo	Therms, 1st Yr Savings	kBtu/sq ft, 1st Yr Savings	Est. Operating Cost, 1st Yr Savings, $	Total 1st Yr Savings $	Life of Measure, Yrs	Est. Lifetime Energy Cost Savings, $	Simple Payback, Yrs	Lifetime Return on Investment, %	Annual Return on Investment, %	Internal Rate of Return, %	Net Present Value, $	CO2 Reduced, lbs/yr
4	Premium-Efficiency Motors & Pumps	Contractor	$295,000	$700	$294,300	26,977	4.67	0.00	31.74	$0	$4,316	$18	$58,374	68.18	-80%	-4%	0%	-$237,470	36,959

Assumptions:

The cost of electricity at the D&R Pump Station, taken from twelve months of electricity bills, is currently $0.16/kWh. The horsepower ratings of the three motors were converted to kW by multiplying by a factor of 0.746. In the calendar year beginning in June, 2009, and ending in May, 2010, Pump #2 was in operation for 1,037 hours. The electric consumptions of the existing and recommended pumps were calculated using the following equation:

$$\text{Electric input(kWh)} = \frac{\text{Operating hours} \times 0.746 \frac{\text{kW}}{\text{HP}} \times \text{HP} \times \%\text{ of total capacity}}{\text{Efficiency}}$$

Rebates/financial incentives:

This ECM is calculated based on a projected eligibility for New Jersey's SmartStart Rebate, which pays up to $700 per motor, or $700 for this measure.

5. ENERGY CONSERVATION MEASURE FUNDING ALTERNATIVES

BSG-PMK/SWA has reviewed several funding options for the purposes of subsidizing the costs for installing the energy conservation measures noted within this report.

Although funding options are constantly changing and updating this project may benefit from enrolling in a number of alternative programs such as the; The NJ SmartStart program with Technical Assistance, alternate funding by applying for financing and competitive grants through the United States Department of Energy as well as local utility incentive programs in an effort to offset a portion of the cost of ECM implementation.

The Smart Start program offers reimbursement incentives for various equipment purchases, and lighting incentives. The benefits and requirements of this program can be found at:

http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

The Pay-for-Performance program offers incentives for working with an approved contractor to create a scope of work that will reduce source energy consumption by 15+%. Incentives are achieved during various phases of reporting and implementation. The benefits and requirements of this program can be found at:

http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance

Financial assistance is also available through the United States Department of Energy in the form of; Grants, Cooperative Research and development agreements, small business innovation research, and Loan Guarantee Programs. Further information for these programs is available at:

http://www1.eere.energy.gov/financing/types_assistance.html

Local Utility incentives such as a Direct Install Program, offer incentives that can provide up to 80% subsidy of the cost to install particular ECM's. As each utility company has different guidelines and incentives it is important to contact your local utility authority for eligibility in these programs.

Additional funding may also be found through the following funding methods:

- Energy Savings Improvement Program (ESIP) – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements.

- Municipal Bonds – Municipal bonds are a bond issued by a city or other local government, or their agencies. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

- Power Purchase Agreement – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system.

BSG-PMK/SWA recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

6. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

6.1. Existing systems

There are currently no existing renewable energy systems.

6.2. Solar Photovoltaic

Photovoltaic (PV) technology was considered for installation on the roofs of the Weston Mill Pump Station. Based on the shading and the amount of roof area available with unobstructed southern exposure it was determined that PV installations are not cost effective or feasible for this location.

6.3. Solar Thermal Collectors

Solar thermal collectors are not recommended for this location based on the shading and amount of roof area available with unobstructed southern exposure.

6.4. Combined Heat and Power

Combined Heat Power is not applicable to this project because of the HVAC system type and limited domestic hot water usage.

6.5. Geothermal

Geothermal is not applicable to this project. A geothermal system would require the existing heating distribution system to be removed and replaced with a heat pump system. Large underground vertical or horizontal loop systems would need to be installed beneath the existing concrete pad and asphalt. These modifications to the existing heat distribution system would be extremely disruptive to the use of the building and the surrounding neighborhood in addition to the high cost of such an installation and retrofit.

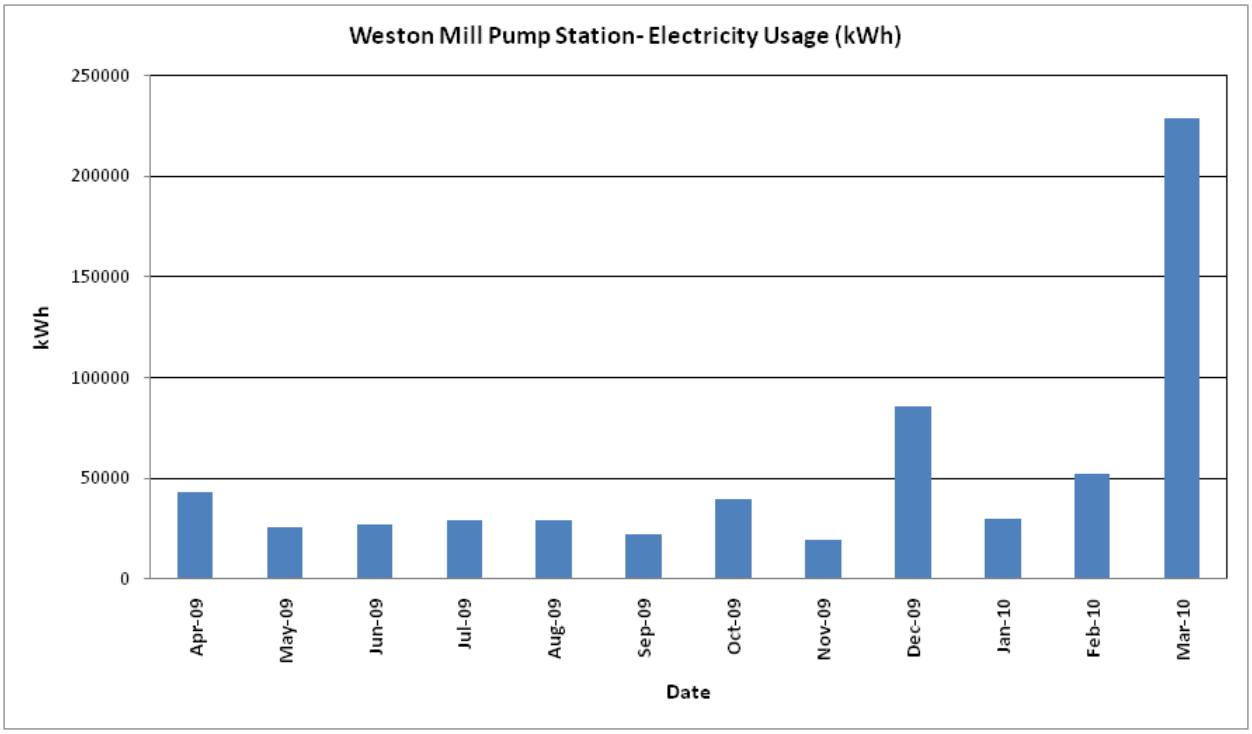
6.6. Wind

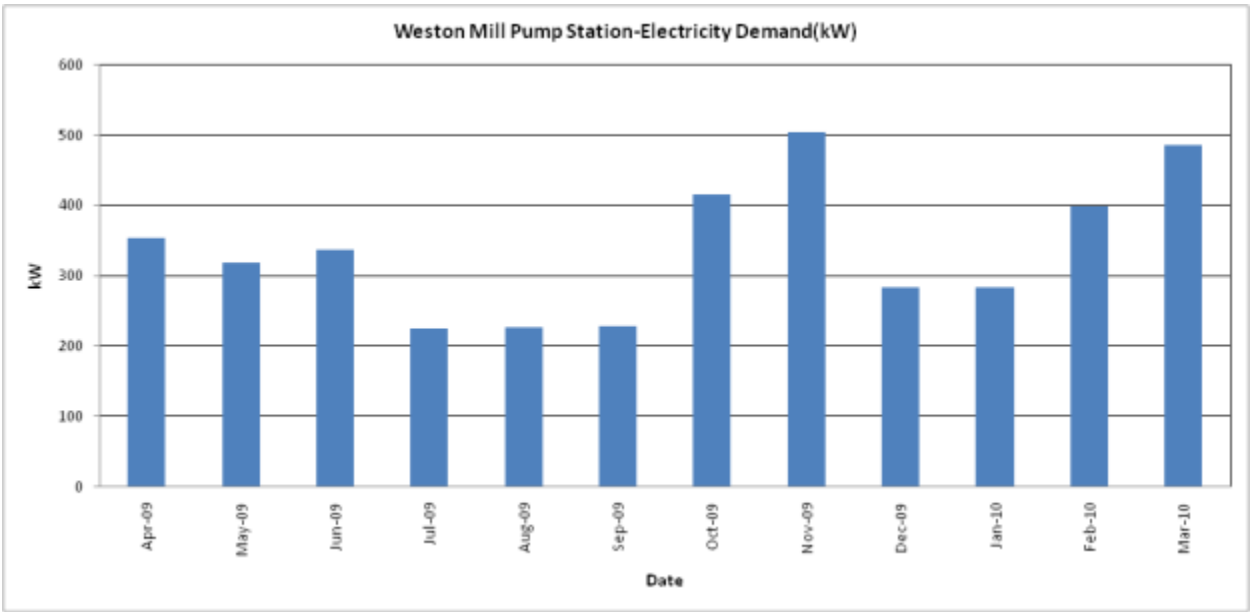
Wind power production is not appropriate for this location because required land is not available for the wind turbine. Also, the available wind energy resource is very low.

7. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

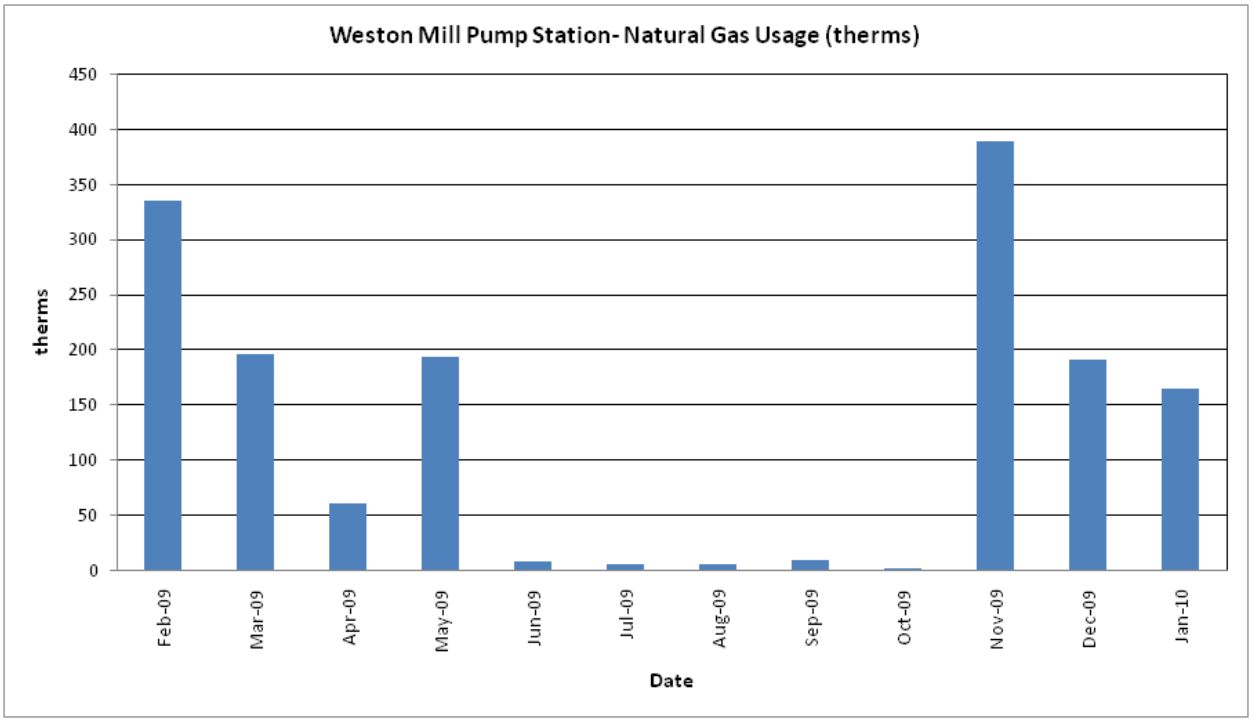
7.1. Energy Purchasing

The average electrical peak demand for the previous year was 338 kW and the maximum peak demand was 503.5 kW. The electric and gas load profiles for this project are presented in the following charts. The first chart shows electric demand (in kW) for the previous 12 months and the other two charts show electric and gas usage (in kWh), respectively.





The electrical demand peaks (except for a few fluctuations) reflect the electrical consumption peaks.



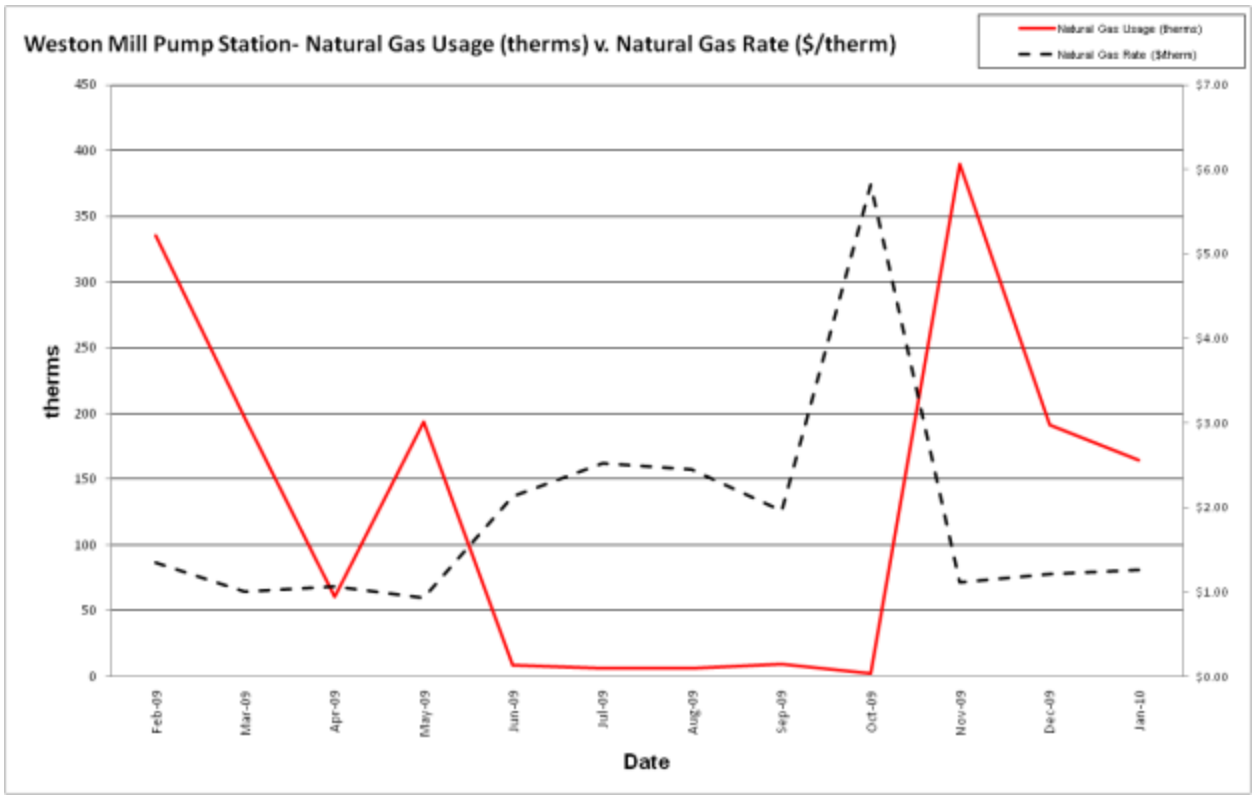
The natural gas usage shows that the most natural gas is consumed in the winter months, meaning the majority of natural gas use in this building is for heating.

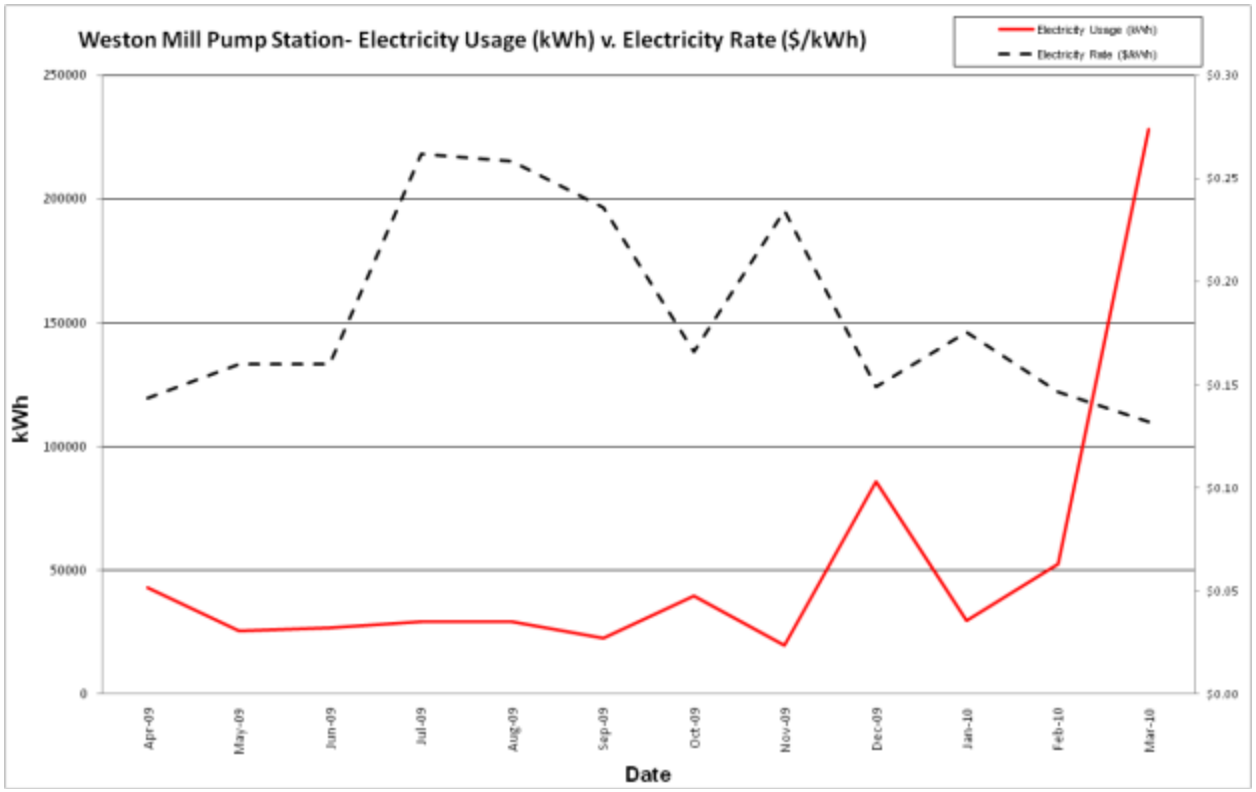
7.2. Tariff analysis

Currently, natural gas is provided via one gas meter with Public Service Electric & Gas serving as transmission and supply provider. The general service rate for natural gas charges a market-rate price based on use and the Weston Mill Pump Station billing data does not breakdown demand costs for all periods. Typically, the natural gas prices increase during the cooling months when natural gas is less of a demand.

The Weston Mill Pump Station is direct-metered (via one meter) and currently purchases electricity transmission from Public Service Electric & Gas and electricity supply from Direct Energy at a general service rate. The general service rate for electric charges are market-rate based on use and the Weston Mill Pump Station billing does show a breakdown of demand costs. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. Typically, the electricity prices increase during the cooling months when electricity is used by the HVAC condensing units and air handlers.

The following charts compare the utility consumption and utility rates for the natural gas and electricity over the previous 12 month period.

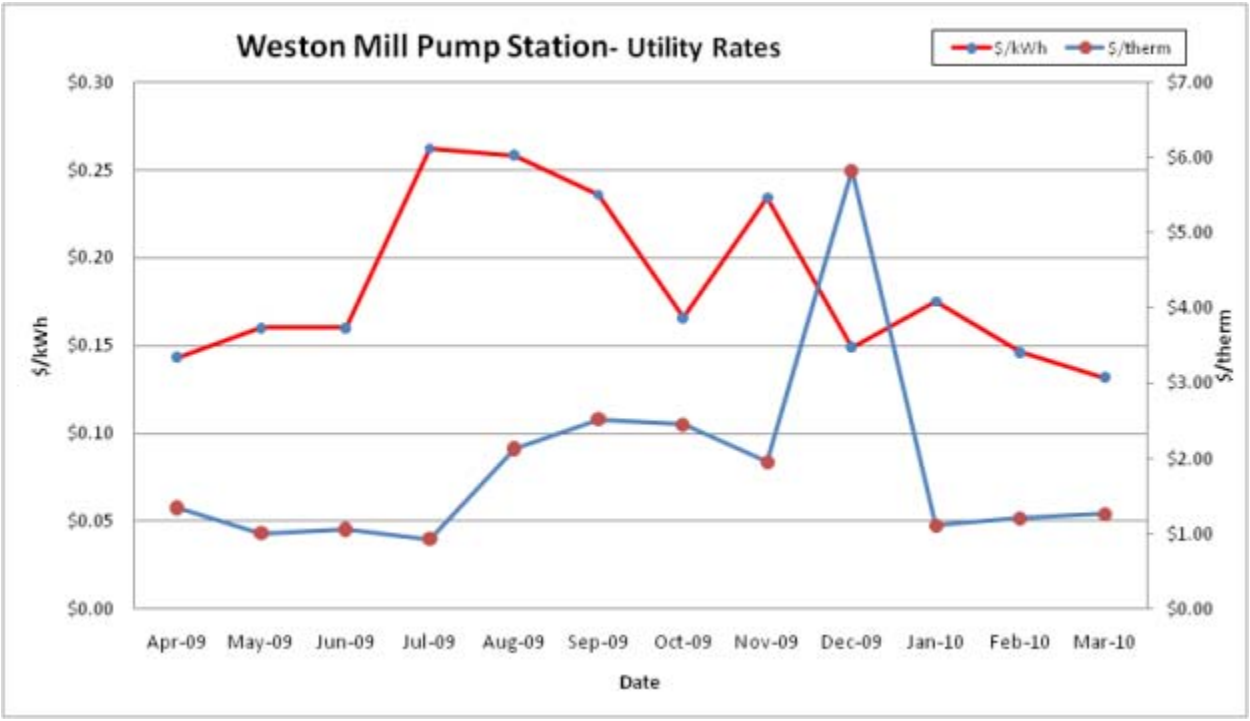

Weston Mill Pump Station- Natural Gas Usage (therms) v. Natural Gas Rate ($/therm)
Natural Gas Usage (therms)
Natural Gas Rate ($/therm)
therms
Date
Feb-09
Mar-09
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10


Weston Mill Pump Station- Electricity Usage (kWh) v. Electricity Rate ($/kWh)
Electricity Usage (kWh)
Electricity Rate ($/kWh)
kWh
Date
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10

7.3. Energy Procurement strategies

Billing analysis shows large price fluctuations of over the course of the year for the New Brunswick City Hall natural gas account. Changing third party suppliers could reduce the cost associated with energy procurement. Customers that have a large variation in monthly billing rates can often reduce the costs associated with energy procurement by selecting a third party energy supplier. Contact the NJ Energy Choice Program for further information on Energy Services Companies (ESCOs) that can act as third party energy suppliers. Appendix B contains a complete list of third party energy suppliers.

SWA/BSG-PMK also recommends that New Brunswick contact third party energy suppliers in order to negotiate a lower electricity rate. Comparing the current electric rate to average utility rates of similar type buildings in New Jersey, which are approximately $0.15/kWh, it may be possible to save up to $ 0.01/kWh, which would have equated to approximately $7,233 for the past 12 months. New Brunswick already purchases natural gas for lower rate than the average rate of $1.45/therm.



8. METHOD OF ANALYSIS

8.1. Assumptions and methods

Energy modeling method:	Spreadsheet-based calculation methods
Cost estimates:	RS Means 2009 (Facilities Maintenance & Repair Cost Data) RS Means 2009 (Building Construction Cost Data) RS Means 2009 (Mechanical Cost Data) Note: Cost estimates also based on utility bill analysis and prior experience with similar projects.

8.2. Disclaimer

This engineering audit was prepared using the most current and accurate fuel consumption data available for the site. The estimates that it projects are intended to help guide the owner toward best energy choices. The costs and savings are subject to fluctuations in weather, variations in quality of maintenance, changes in prices of fuel, materials, and labor, and other factors. Although we cannot guarantee savings or costs, we suggest that you use this report for economic analysis of the building and as a means to estimate future cash flow.

THE RECOMMENDATIONS PRESENTED IN THIS REPORT ARE BASED ON THE RESULTS OF ANALYSIS, INSPECTION, AND PERFORMANCE TESTING OF A SAMPLE OF COMPONENTS OF THE BUILDING SITE. ALTHOUGH CODE-RELATED ISSUES MAY BE NOTED, SWA STAFF HAVE NOT COMPLETED A COMPREHENSIVE EVALUATION FOR CODE-COMPLIANCE OR HEALTH AND SAFETY ISSUES. THE OWNER(S) AND MANAGER(S) OF THE BUILDING(S) CONTAINED IN THIS REPORT ARE REMINDED THAT ANY IMPROVEMENTS SUGGESTED IN THIS SCOPE OF WORK MUST BE PERFORMED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS THAT APPLY TO SAID WORK. PARTICULAR ATTENTION MUST BE PAID TO ANY WORK WHICH INVOLVES HEATING AND AIR MOVEMENT SYSTEMS, AND ANY WORK WHICH WILL INVOLVE THE DISTURBANCE OF PRODUCTS CONTAINING MOLD, ASBESTOS, OR LEAD.

LIGHTING ANALYSIS

New Brunswick
Weston Mill Pump Station
Burnet Street

BIRDSALL SERVICES GROUP
ENGINEERS & CONSULTANTS

Upgrade Code	Upgrade Description	Existing Fixture	Existing Watts	Proposed Fixture	Proposed Watts	Lighting Total # of Upgrades	Lighting Cost per Upgrade ($)	Lighting SmartStart Rebate per Upgrade
1	Retrofit the 4' wrap around fixture by replaceing the (4) T12 Lamps and Magnetic Ballast(s) with (4) T8 Lamps and an Electronic Ballast	4L4' EE/STD	160	4L4' T8/ELEC	110	1	$80.00	$15.00
2	Retrofit the 4' open fixture by replaceing the (2) T12 Lamps and Magnetic Ballast(s) with (2) T8 Lamps and an Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC	61	4	$50.00	$15.00
3	Replace the 60W Incandescent Lamps with 13W Compact Fluorescents	60W INCANDESCENT	60	13W CF/SI	15	3	$6.00	$0.00
4	250W High Pressure Sodium Fixture / No Upgrade	250W HPS/BALLAST	295	No Upgrade	295	6	$0.00	$0.00
5	250W Metal Halide Fixture / No Upgrade	250W MH/BALLAST	286	No Upgrade	286	1	$0.00	$0.00
6	Retrofit the 4' fixture by replaceing the (4) T12 Lamps and Magnetic Ballast(s) with (4) T8 Lamps and an Electronic Ballast	4L4' EE/STD	160	4L4' T8/ELEC	110	2	$50.00	$15.00
7	Retrofit the 4' recessed fixture by replaceing the (2) T12 Lamps and Magnetic Ballast(s) with (2) T8 Lamps and an Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC	61	13	$80.00	$15.00
8	Replace the 75W Incandescent Lamps with 15W Compact Fluorescents	75W INCANDESCENT	75	15W CF/SI	15	6	$6.00	$0.00
9						0	$0.00	$0.00
10						0	$0.00	$0.00
11						0	$0.00	$0.00
12						0	$0.00	$0.00

Summary

	Lighting (Only)	Sensors (Only)	Complete Lighting Upgrade
Cost	$1,474.00	$0.00	$1,474.00
Rebate	$300.00	$0.00	$300.00
Net Cost	$1,174.00	$0.00	**$1,174.00**
Savings (kWh)	533	0	**533**
Savings ($)	$85.34	$0.00	**$85.34**
Payback	13.8		**13.8**

Variables:

$0.16	Avg. Electric Rate ($/kWh)
	Avg. Demand Rate ($/kW)
2080	Operating Hours/Year
8	Operating Hours/Work Day

Assumptions:

25%	Occupancy Sensor Savings (Avg)
40%	Occupancy Sensor Savings(>Avg)

Notes:

Seq. #	Upgrade Code	Room/Area	Hrs/ Work Day	Hrs/ Year	Existing Fixture	Existing Qty.	Existing Watts	Existing Foot Candles	Proposed Fixture	Proposed Qty.	Proposed Watts	kW Reduction	Lighting Energy Savings, kWh	Lighting Cost ($)	Lighting Savings ($)	Lighting Payback (yrs)	Controls Type	Controls Qty.	Occupancy Sensors (ONLY) Energy Savings, kWh	Occupancy Sensors (ONLY) Cost ($)	Occupancy Sensors (ONLY) Savings ($)	Occupancy Sensors (ONLY) Payback (yrs)	SmartStart Rebate Lighting	SmartStart Rebate Sensors	Lighting & Occupancy Sensors Energy Savings, kWh	Lighting & Occupancy Sensors Post-Rebate Cost ($)	Lighting & Occupancy Sensors Savings ($)	Lighting & Occupancy Sensors Payback (yrs)
		Totals:	4526								3558	0.968	533	$1,474.00	$85.34	17.3			0	$0.00	$0.00		$300.00	$0.00	533	$1,174.00	$85.34	13.8
1	1	Office	8	2080	4L4' EE/STD	1	160		4L4' T8/ELEC	1	110	0.05	104	$80.00	$16.64	4.8			0	$0.00	$0.00		$15.00	$0.00	104	$65.00	$16.64	3.9
2	2	Hallway	8	2080	2L4' EE/STD	1	80		2L4' T8/ELEC	1	61	0.019	40	$50.00	$6.32	7.9			0	$0.00	$0.00		$15.00	$0.00	40	$35.00	$6.32	5.5
3	3	Bathroom	8	2080	60W INCANDESC	1	60		13W CF/SI	1	15	0.045	94	$6.00	$14.98	0.4			0	$0.00	$0.00		$0.00	$0.00	94	$6.00	$14.98	0.4
4	3	Hallway	8	2080	60W INCANDESC	1	60		13W CF/SI	1	15	0.045	94	$6.00	$14.98	0.4			0	$0.00	$0.00		$0.00	$0.00	94	$6.00	$14.98	0.4
5	4	Pump Room	8	2080	250W HPS/BALLA	6	1770		No Upgrade	6	1770	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
6	5		8	2080	250W MH/BALLA	1	286		No Upgrade	1	286	0	0	$0.00	$0.00				0	$0.00	$0.00		$0.00	$0.00	0	$0.00	$0.00	
7	6		8	2080	4L4' EE/STD	1	160		4L4' T8/ELEC	1	110	0.05	104	$50.00	$16.64	3.0			0	$0.00	$0.00		$15.00	$0.00	104	$35.00	$16.64	2.1
8	7	Pump #5 Pump House	0.5	130	2L4' EE/STD	13	1040		2L4' T8/ELEC	13	793	0.247	32	$1,040.00	$5.14	202.4			0	$0.00	$0.00		$195.00	$0.00	32	$845.00	$5.14	164.5
9	2	Storage Garage	0.5	130	2L4' EE/STD	1	80		2L4' T8/ELEC	1	61	0.019	2	$50.00	$0.40	126.5			0	$0.00	$0.00		$15.00	$0.00	2	$35.00	$0.40	88.6
10	6		0.5	130	4L4' EE/STD	1	160		4L4' T8/ELEC	1	110	0.05	7	$50.00	$1.04	48.1			0	$0.00	$0.00		$15.00	$0.00	7	$35.00	$1.04	33.7
11	8	Upstairs Office	0.5	130	75W INCANDESC	6	450		15W CF/SI	6	90	0.36	47	$36.00	$7.49	4.8			0	$0.00	$0.00		$0.00	$0.00	47	$36.00	$7.49	4.8
12	3	Storage Sally Port	0.5	130	60W INCANDESC	1	60		13W CF/SI	1	15	0.045	6	$6.00	$0.94	6.4			0	$0.00	$0.00		$0.00	$0.00	6	$6.00	$0.94	6.4
13	2		0.5	130	2L4' EE/STD	2	160		2L4' T8/ELEC	2	122	0.038	5	$100.00	$0.79	126.5			0	$0.00	$0.00		$30.00	$0.00	5	$70.00	$0.79	88.6

Appendix B: Third Party Energy Suppliers (ESCOs)

PSE&G SERVICE TERRITORY
Last Updated: 05/19/10

***CUSTOMER CLASS** - R – RESIDENTIAL C – COMMERCIAL I –INDUSTRIAL
****GREEN POWER MARKETER**

Supplier	Telephone & Web Site	*Customer Class
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	C ACTIVE
Commerce Energy, Inc. 4400 Route 9 South, Suite 100 Freehold, NJ 07728	(800) 556-8457 www.commerceenergy.com	C ACTIVE
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway 38 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	C ACTIVE
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com	C/I ACTIVE
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com	C ACTIVE
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	C/I ACTIVE
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	C/I ACTIVE
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, N.J. 08701	(800) 805-8586 www.gesc.com	R/C/I ACTIVE
Green Mountain Energy Company*** 3000 Atrium Way	(800) 810-7300	R/C/I

Mount Laurel, NJ 08054	www.greenmountain.com	**ACTIVE**
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com	**C/I** **ACTIVE**
Liberty Power Delaware, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**
Liberty Power Holdings, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	**C/I** **ACTIVE**
Sempra Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com	**C/I** **ACTIVE**
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.south jerseyenergy.com	**C/I** **ACTIVE**

Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com	**C/I** **ACTIVE**
Sterling Planet, Inc.*** 58 Otto Avenue Beverly, NJ 08010	(877) 457-2306 www.sterlingplanet.com	**R/C/I** **ACTIVE**
Strategic Energy, LLC 55 Madison Avenue, Suite 400 Morristown, NJ 07960	(888) 925-9115 www.sel.com	**C/I** **ACTIVE**
Suez Energy Resources NA, Inc. 333 Thornall Street, 6th Floor Edison, NJ 08837	(888) 644-1014 www.suezenergyresources.com	**C/I** **ACTIVE**
UGI Energy Services, Inc. 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	**R/C/I** **ACTIVE**
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	**R/C/I** **ACTIVE**

Back to the main supplier page

New Jersey Clean Energy Pay for Performance

The NJ Clean Energy Pay for Performance (P4P) Program relies on a network of Partners who provide technical services to clients. LGEA participating clients who are not receiving Direct Energy Efficiency and Conservation Block Grants are eligible for P4P. SWA is an eligible Partner and can develop an Energy Reduction Plan for each project with a whole-building traditional energy audit, a financial plan for funding the energy measures and an installation construction schedule.

The Energy Reduction Plan must define a comprehensive package of measures capable of reducing a building's energy consumption by 15+%. P4P incentives are awarded upon the satisfactory completion of three program milestones: submittal of an Energy Reduction Plan prepared by an approved Program Partner, installation of the recommended measures and completion of a Post-Construction Benchmarking Report. The incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum 15%performance threshold savings has been achieved.

For further information, please see: http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance/existing-buildings .

Direct Install 2010 Program*

Direct Install is a division of the New Jersey Clean Energy Programs' Smart Start Buildings. It is a turn-key program for small to mid-sized facilities to aid in upgrading equipment to more efficient types. It is designed to cut overall energy costs by upgrading lighting, HVAC and other equipment with energy efficient alternatives. The program pays **up to 60%** of the retrofit costs, including equipment cost and installation costs.

Eligibility:

- Existing small and mid-sized commercial and industrial facilities with peak electrical demand **below 200 kW** within 12 months of applying
- Must be located in New Jersey
- Must be served by one of the state's public, regulated or natural gas companies
    - Electric: Atlantic City Electric, Jersey Central Power & Light, Orange Rockland Electric, PSE&G
    - Natural Gas: Elizabethtown Gas, New Jersey Natural Gas, PSE&G, South Jersey Gas

For the most up to date information on contractors in New Jersey who participate in this program, go to: http://www.njcleanenergy.com/commercial-industrial/programs/direct-install

Smart Start

New Jersey's SmartStart Building Program is administered by New Jersey's Office of Clean Energy. The program also offers design support for larger projects and technical assistance for smaller projects. If your project specifications do not fit into anything defined by the program, there are even incentives available for custom projects.

There are a number of improvement options for commercial, industrial, institutional, government, and agricultural projects throughout New Jersey. Alternatives are designed to enhance quality while building in energy efficiency to save money. Project categories included in this program are New Construction and Additions, Renovations, Remodeling and

Equipment Replacement.

For the most up to date information on how to participate in this program, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings.

Renewable Energy Incentive Program*

The Renewable Energy Incentive Program (REIP) provides incentives that reduce the upfront cost of installing renewable energy systems, including solar, wind, and sustainable biomass. Incentives vary depending upon technology, system size, and building type. Current incentive levels, participation information, and application forms can be found at the website listed below.

Solar Renewable Energy Credits (SRECs) represent all the clean energy benefits of electricity generated from a solar energy system. SRECs can be sold or traded separately from the power, providing owners a source of revenue to help offset the cost of installation. All solar project owners in New Jersey with electric distribution grid-connected systems are eligible to generate SRECs. Each time a system generates 1,000 kWh of electricity an SREC is earned and placed in the customer's account on the web-based SREC tracking system.

For the most up to date information on how to participate in this program, go to: http://www.njcleanenergy.com/renewable-energy/home/home.

Utility Sponsored Programs

Check with your local utility companies for further opportunities that may be available.

Energy Efficiency and Conservation Block Grant Rebate Program

The Energy Efficiency and Conservation Block Grant (EECBG) Rebate Program provides supplemental funding up to $20,000 for eligible New Jersey local government entities to lower the cost of installing energy conservation measures. Funding for the EECBG Rebate Program is provided through the American Recovery and Reinvestment Act (ARRA).

For the most up to date information on how to participate in this program, go to: http://njcleanenergy.com/EECBG

Other Federal and State Sponsored Programs

Other federal and state sponsored funding opportunities may be available, including BLOCK and R&D grant funding. For more information, please check http://www.dsireusa.org/.

*Subject to availability. Incentive program timelines might not be sufficient to meet the 25% in 12 months spending requirement outlined in the LGEA program.