



Steven Winter Associates, Inc.
Architects and Engineers

293 Route 18 South, Suite 330
East Brunswick, NJ 08816
www.swinter.com

Telephone: (866) 676-1972
E-mail: swinter@swinter.com

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**Local Government Energy Program
Energy Audit Report**

For

***City of New Brunswick
New Brunswick Library
60 Livingston Ave
New Brunswick, NJ 08901***

Project Number: LGEA63



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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 New Brunswick Library 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 New Brunswick Library is a two story building totaling 20,000 square feet. The New Brunswick Library contains; administrative offices, computer areas, stack areas, archives, and reference area.

The New Brunswick Library is occupied consistently by approximately 400 people for 62 hours 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 New Brunswick Library 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, February, 2009 through January, 2010, the New Brunswick Library consumed a total of 168,480 kWh of electricity for a total cost of \$31,531. In the most recent full year of natural gas data collected, February, 2009 through January, 2010, 7,498 therms of gas were consumed for a total cost of \$8,759. With electricity and natural gas combined, the building consumed 1324.75 MMBtus of energy at a total cost of \$40,290.

SWA/BSG-PMK has entered energy information about the New Brunswick Library in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was classified as a Library 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 66 kBtu/ft²yr compared to the national average of a similar building consuming 104 kBtu/ft²yr. Implementing the recommendations included in this report will reduce the building energy consumption by approximately 22 kBtu/ft²yr. There may be energy procurement opportunities for City of New Brunswick to reduce annual utility costs, which are \$2,258/year higher, when compared to the average estimated NJ commercial utility rates.

Based on the assessment of the New Brunswick Library, 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:

At this time there are no capital improvements recommended by SWA/BSG-PMK.

Category II: Operations & Maintenance:

- Repair cracked and deteriorating EFIS and Stucco on exterior walls

- Repair roof leak

Category III: Energy Conservation Measures:

At this time, SWA/BSG-PMK highly recommends a total of 4 Energy Conservation Measures (ECMs) for the New Brunswick Library that are summarized in the following table. The total investment cost for these ECMs, with incentives, is **\$330,236** (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 **\$14,927** with an aggregated simple payback of approximately **22 years**. SWA/BSG-PMK estimates that implementing the highly recommended ECMs will reduce the carbon footprint of the facility by **115,432 lbs of CO₂**.

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 \$1,773.00.

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:

- Pay-for-Performance
- 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 \$0.19 \$/kWh
 Energy price escalation rate: 0% per DOE FEMP guidelines Gas rate \$1.13 \$/therm

Avg. Annual Demand: 0.00610 Area of Building (SF) 20,000

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, \$	CO2 Reduced, lbs/yr
1	Lighting Upgrades	Empirical Data	\$10,586	\$2,255	\$8,331	17,285	8.78	0	2.95	\$0	\$3,284	15	\$38,644	2.54	364%	24%	39%	\$30,874	23,680
	Occupancy Sensors		\$1,060	\$115	\$945	1,048	0.53	0	0.18	\$0	\$199	10	\$1,682	4.74	78%	8%	17%	\$754	1,436
2	Vending Miser	Similar Projects	\$250	\$0	\$250	1,610	0.82	0	0.27	\$0.00	\$306	10	\$2,583	0.82	933%	93%	122%	\$2,359	2,206
TOTAL			\$11,896	\$2,370	\$9,526	19,943	10.13	0	3.40	\$0.00	\$3,789	-	\$42,909	2.51	-	-	-	\$33,987	27,322

Table 2 - Recommended Extended-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, \$	CO2 Reduced, lbs/yr
3	High-Efficiency Chiller & AHUs	Contractor	\$240,000	\$2,600	\$237,400	45,566	23.14	0	7.77	\$0	\$8,657	24	\$143,509	27.42	-40%	-2%	-1%	-\$90,781	62,425
4	High-Efficiency Hot Water Heating System	Contractor	\$85,000	\$1,691	\$83,310	0	0.00	2,195.33	10.98	\$0	\$2,481	25	\$42,250	33.58	-49%	-2%	-2%	-\$40,112	25,685
TOTAL			\$325,000	\$4,291	\$320,710	45,566	23.14	2,195	18.75	\$0.00	\$11,138	-	\$185,759	28.79	-	-	-	-\$130,894	88,110

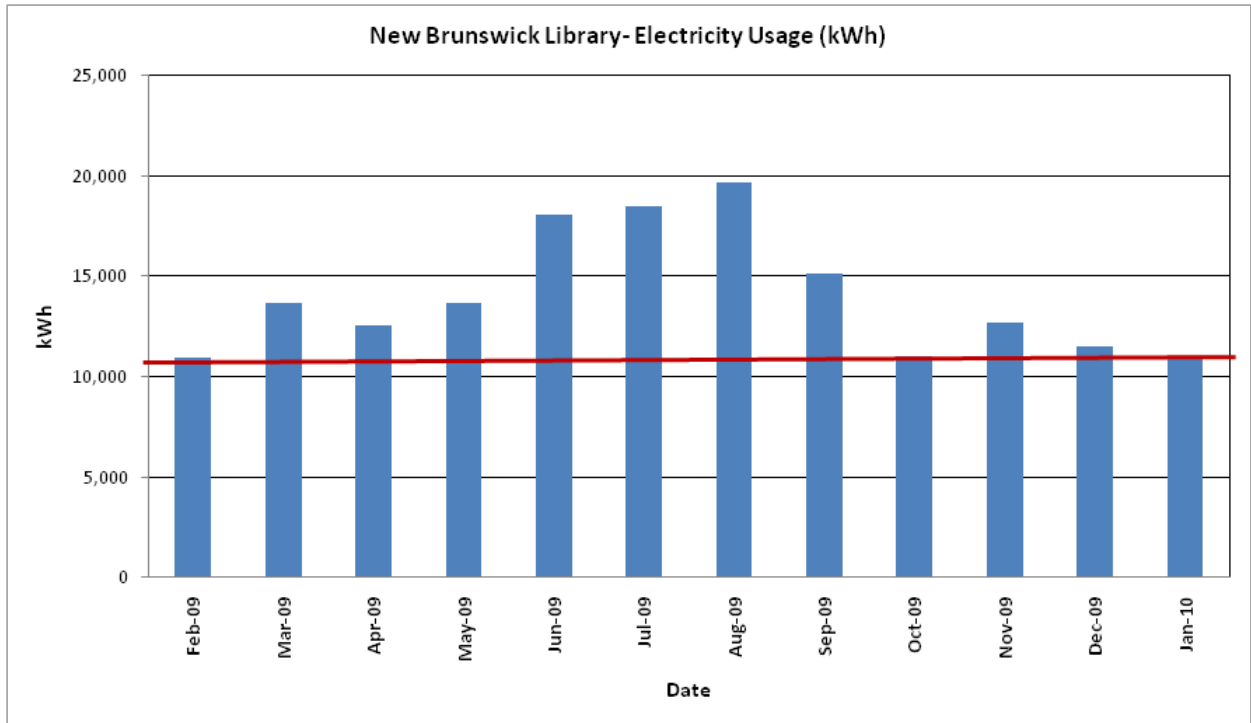
1. HISTORIC ENERGY CONSUMPTION

1.1. Energy Usage and Cost Analysis

SWA/BSG-PMK analyzed utility bills that were received from the utility company supplying the New Brunswick Library building with electric and natural gas from February, 2009 through January, 2010.

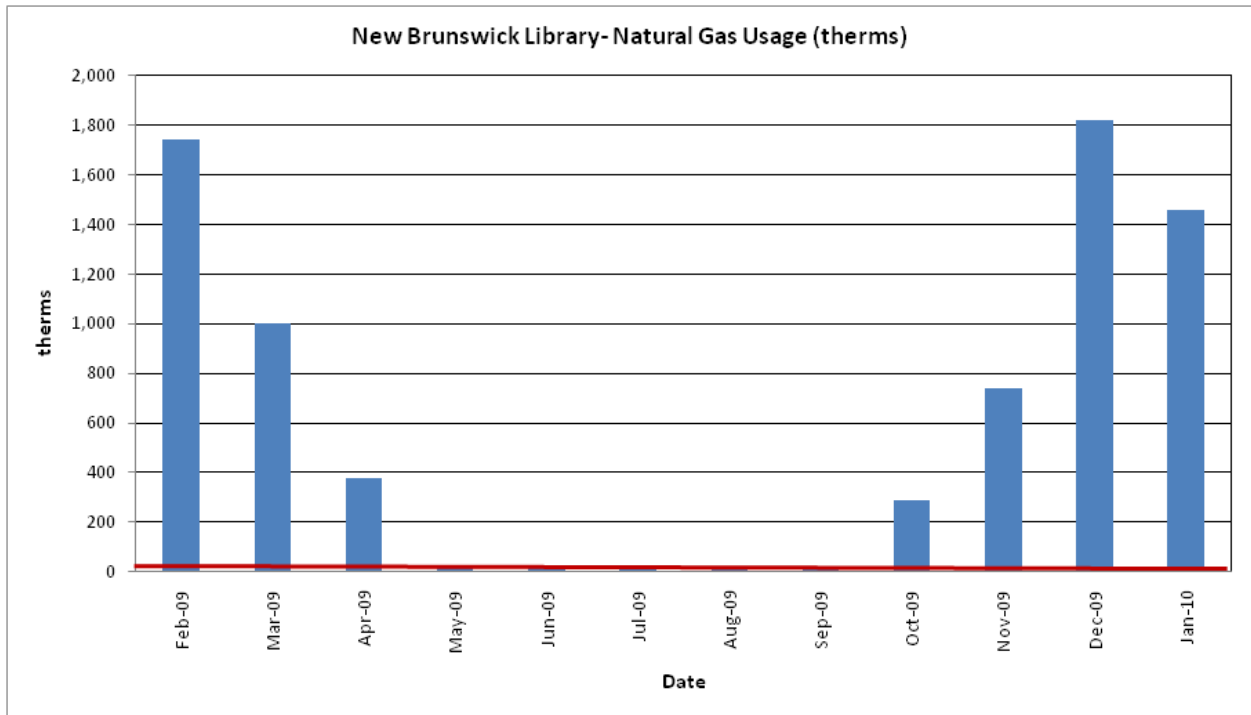
Electricity – The New Brunswick Library building is currently served by one electric meter. The facility currently receives electricity from Public Service Electric & Gas at **an average rate of \$0.19/kWh** based on 12 months of utility bills from February, 2009 through January, 2010. The facility consumed **approximately 168,480 kWh or \$31,531 worth of electricity** in the previous year with an average monthly demand of 86 kW.

The following charts show electricity usage for the New Brunswick Library building based on utility bills for the billing analysis period. The red line indicates the estimated base-load in kWh.



Natural Gas – The New Brunswick Library 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 7,498 therms or \$8,759 worth of natural gas** in the previous year.

The following charts show the natural gas usage for the New Brunswick Library 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 New Brunswick Library building currently receives electricity from Public Service Electric & Gas at a general service market rate for electricity use (kWh) with (kW) demand charge. The facility currently pays an average rate of approximately \$0.19/kWh based on the most recent 12 months of utility bills.

The New Brunswick Library 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 New Brunswick Library 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 Library preventing it from earning a performance rating which can be used to achieve an Energy Star building certification.

The Site Energy Use Intensity is 66 kBtu/sq.ft./yr compared to the national average of buildings classified as Library consuming 104 kBtu/sq.ft./yr. Implementing this report's recommended Energy Conservation Measures (ECMs) will reduce use by approximately 22 kBtu/sq.ft./yr.

SWA/BSG-PMK has created the Portfolio Manager site information for New Brunswick City Hall. This information can be accessed at: <https://www.energystar.gov/istar/pmpam/>, with the following:

Username: *cityofnewbrunswick*

Password: *newbrunswick*



STATEMENT OF ENERGY PERFORMANCE New Brunswick Library

Building ID: 2350395
For 12-month Period Ending: March 31, 2010¹
Date SEP becomes ineligible: N/A

Date SEP Generated: June 14, 2010

Facility	Facility Owner	Primary Contact for this Facility
New Brunswick Library 60 Livingston Ave 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
Gross Floor Area (ft²): 20,000

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	574,993
Natural Gas (kBtu) ⁴	747,512
Total Energy (kBtu)	1,322,505

Energy Intensity⁵

Site (kBtu/ft ² /yr)	66
Source (kBtu/ft ² /yr)	135

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	127
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Electric Distribution Utility

Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	246
% Difference from National Average Source EUI	-45%
Building Type	Library

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

N/A

Notes:

- 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.
- 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.
- Values represent energy consumption, annualized to a 12-month period.
- 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.
- Values represent energy intensity, annualized to a 12-month period.
- 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.

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, PE facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

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 partial two-story, (including a partial basement), 20,000 square feet Library building was originally constructed in 1903 with an addition completed in 1987. It houses administrative offices and areas, stack areas, a computer area and an archive.



Front Façade



Partial Side Façade (typ.)



Partial Right Side Façade (typ.)



Partial Left Side Façade (typ.)

2.2. Building occupancy profiles

Its occupancy is approximately 400 people daily, 62 hours 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 plaster and stucco and stone accents, over structural brick with 0 inches of assumed insulation. Other areas are constructed with the same finishes but with an assumed wall insulation level of approximately 3 inches of fiberglass batts. The interior is mostly plaster and finished gypsum wall board.

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 condition with only a few signs of uncontrolled moisture, air-leakage or other energy-compromising issues detected on all facades.

The following specific exterior wall problem spots and areas were identified:



Cracked/deteriorating EIFS/stucco showing signs of water or moisture damage

2.3.2. Roof

The building's roof is predominantly a flat and parapet type over assumed steel decking, with a EPDM single-membrane finish. It was replaced in 1998. Three inches of foam board roof insulation were recorded. Other parts of the building are also covered by a low-pitch gable type over an assumed wood structure with an asphalt shingle finish.. Zero inches of assumed roof insulation were recorded. This roof was replaced in 2003.

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

Roofs, related flashing, gutters and downspouts were inspected during the field audit. They were reported to be in overall poor but age-appropriate condition, with some signs of uncontrolled moisture, air-leakage and other energy-compromising issues.

The following specific roof problem spots were identified:



Signs of water damage on interior finishes due to flat roof leak above.

2.3.3. Base

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

Slab/perimeter insulation levels could not be verified in the field and are based on reports from building management.

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 condition with only a few but insignificant signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues detected in some areas inside.

2.3.4. Windows

The building contains basically one type of window.

- Double-hung type windows with a vinyl or aluminum frame, clear double glazing and some interior shading devices. The windows are located throughout the building and were replaced recently. Also, all windows received new weather stripping recently.

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 good condition with no 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.

- Glass with aluminum/steel frame type exterior doors. They are located throughout the building and were replaced recently.

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 condition with no 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

Heating in the library consists of a combination of forced hot air and a hydronic steam system. Radiators in the original section of the building are heated by a natural gas, 966 MBH, 81% efficient American Standard steam boiler, installed in 1987 and located in the basement. The addition to the building is heated by four (4)- 80 MBH, 95% efficient York forced-air furnaces, also located in the basement. Furnace #1 and Furnace #2, which share a cooling coil, heat the meeting room, and Furnace #3 and Furnace #4, which also share a cooling coil, heat the reference area. The units are approximately ten years old and were found to be in good working order. A Humphrey gas-fired unit heater, located in the basement storage room, has been disconnected from the gas line and is no longer in use.

Category III Recommendation – ECM #3:
Replace the current steam boiler with a high-efficiency hot water boiler, and install hot water outdoor air reset control (OAR). These controllers reduce the maximum boiler water temperature depending on the outside air temperature; for instance, if the outside air temperature is 0°F, the boiler temperature will be 180°F, but if the outside air temperature is 40°F, the boiler temperature will only need to be 130°F. Outdoor air reset generally decreases heating costs by 8-15%.

Category III Recommendation – ECM #4:
Replace all four (4) Carrier air-handlers with high-efficiency air-handlers equipped with hot water heating coils and chilled water cooling coils. Replace the Carrier units' four (4) corresponding condensers with a single 50-ton chiller and controls. The hot water will come from the boiler replacement.



Figure 1: American Standard steam boiler

2.4.2. Cooling

The two cooling coils that are associated with Furnaces #1 and #2, and Furnaces #3 and #4, are served by 7.5-ton York condensing units, which have a Seasonal Energy Efficiency Ratio (SEER) of 10. Two York air-handlers, mounted in the basement ceiling, are serviced by two 5-ton, 10 SEER York condensing units; these systems cool the children's room and the story room. Four Carrier air-handlers, located in the basement, were installed in 1972 and are fed by four condensers. The air-handlers, CAC-1, CAC-2, CAC-3, and CAC-4, cool the reading/art area, the children's room, the upper and lower stacks, and the reference room, respectively. CAC-1 and CAC-3 are serviced by 10-ton Carrier condensers; CAC-2 and CAC-4 are fed by Trenton condensers, which were manufactured for refrigeration systems rather than cooling systems. The tonnage of these two units is estimated to be 5 and 8 tons respectively.



Figure 2: Two 5-ton York condensing units

Category III Recommendation – ECM #4: Replace all four (4) Carrier air-handlers with high-efficiency air-handlers equipped with hot water heating coils and chilled water cooling coils. Replace the Carrier units' four (4) corresponding condensers with a single 30-ton chiller and controls. The hot water will come from the boiler replacement.

2.4.3. Ventilation

Two roof-mounted exhaust fans, EF-1 and EF-2, provide ventilation for restroom exhaust and the elevator machine room, respectively. Additional ventilation is provided by doors and windows.

2.4.4. Domestic Hot Water

Domestic hot water is provided by two water heaters. A 30-gallon GE natural gas water heater services the restroom sinks in the original section of the building, while a 12-gallon Bradford-White electric water heater services the restroom sinks in the new addition.



Figure 3: 30 gallon GE 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 1: 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

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>. The building is not currently equipped with energy vending miser devices for conserving energy usage by drinks and snacks vending machines. When equipped with the vending miser devices, vending machines use less energy and are comparable in daily energy performance to new ENERGY STAR qualified machines.

In this facility, there are (2) reference kiosks, a refrigerator, a microwave, a toaster, (49) computers, a TV, (2) vending machines, and (2) fax/copy machines. A Maytag de-humidifier is in the basement archives area. In this facility, some of the appliances found and noted in the attached equipment list were older than the 10 year threshold and should be considered for the Energy Star program.

Category III Recommendation – ECM #2: Install vending machine occupancy sensors on the soda vending machine, which will shut the power off when the vending machines are not being used.

2.5.3. Elevators

There are two elevators in this facility each was found to be operating and well maintained.

3. Building Systems Equipment List

New Brunswick Public Library							
Building System	Description	Locations	Model #	Fuel	Space Served	Year Installed	Estimtaed. Remaining Useful Life %
Heating	Steam boiler, 966/786 MBH input/output, 81% efficient	Basement	American Standard, M# PFA-505, S# 1B-31	Natural gas	Radiators, original section of building	1987	23%
	Gas burner, 966 MBH, 1/3 HP		Gordon-Piatt Energy Group, M# R6.2-G-03, S# AE724943	Electricity	Boiler	Approx. 2000	52%
	Burner motor, 1/3 HP, 3,450 RPM		Marathon Electric, M# TQM56S34D85A P, S# 95106340	Electricity	Burner		40%
Heating	Gas-fired unit heater, disconnected from gas line and not in use	Basement storage	Humphrey, M# 85	Natural gas	Basement storage	Approx. 1955	0%
Heating/ Cooling	Furnace #1: 80 MBH, 95% efficient	Basement, west	York, M# P3URC16N07501E, S# WLKM023868	Natural gas	New addition, meeting room	2001	50%
	Furnace #2: 80 MBH, 95% efficient		York, M# P3URC16N07501E, S# WLKM039913				
	Cooling coil, suitable for R-22 or Puron		York, M# G2FD090S35A, S# 6001M20476	Electricity			55%
	Condensing unit, 7.5 tons, 10 SEER	Outside	York, M# H4CE090A25C, S# NHKM094839				40%
Heating/ Cooling	Furnace #3: 80 MBH, 95% efficient	Basement, west	York, M# P3URC16N07501D, S# EHJM407632	Natural gas	New addition, reference	2000	44%
	Furnace #4: 80 MBH, 95% efficient		York, M# P3URC16N07501D, S# EHJM407607				
	Cooling coil, suitable for R-22 or Puron		York, M# G2FD090S35A, S# 6001M20476	Electricity			50%
	Condensing unit, 7.5 tons, 10 SEER	Outside	York, M# H4CE090A25C, S# NLJM139215				33%

Cooling	CAC-1: Air-handler	Basement	Carrier, M# 50BB008420, S# E294065	Electricity	Reading/art	1972	0%
	Air-cooled condenser, 10 tons	Outside	Carrier, M# 9AB12-114, S# 98X02098			Approx. 1998	40%
Cooling	CAC-2: Air-handler	Basement	Carrier, M# 50BB008420, S# A242976	Electricity	Children's room	1972	0%
	Air-cooled condenser	Outside	Trenton, M# TCHC08D			Approx. 2003	65%
Cooling	CAC-3: Air-handler	Basement	Carrier, M# 50BB012410, S# K293061	Electricity	Upper and lower stacks	1972	0%
	Air-cooled condenser, 10 tons	Outside	Carrier, M# 09AZH012---3, S# 273353K98			Approx. 1998	40%
Cooling	CAC-4: Air-handler	Basement	Carrier, M# 50BB008420, S# A242967	Electricity	Reference room	1972	0%
	Air-cooled condenser	Outside	Trenton, M# TCHC08D, S# 030304225			Approx. 2003	65%
Cooling	Air-handler	Basement ceiling, east end, close to boiler room	York, M# N2AHD10A06E, S# ENBS156642	Electricity	Children's room	1993	40%
	Condensing unit, 5 tons, 10 SEER	Outside	York (Nameplate not accessible)				0%
Cooling	Air-handler	Basement ceiling, east end, close to stairs	York, M# N2AHD10A06E, S# ENBS156640	Electricity	Story room	1993	15%
	Condensing unit, 5 tons, 10 SEER	Outside	York (Nameplate not accessible)				0%
Domestic hot water	Electric water heater, 12 gallons, 1.5 kW	Basement, west	Bradford-White, M# M12UT5S-1, S# EK 7283392	Electricity	New addition, bathroom sinks	2008	87%
Domestic hot water	30-gallon water heater, 32 MBH	Basement	GE, M# GG30T6A, S# GENG 0802A28710	Natural gas	Restroom sinks	2007	77%
Ventilation	EF-1: Exhaust fan	Roof	Not accessible	Electricity	Restroom exhaust	Unknown	50%
Ventilation	EF-2: Exhaust fan	Roof	Not accessible	Electricity	Elevator machine room	Unknown	50%

De-humidification	De-humidifier	Basement, archives	Maytag, M# M7DH65B2A, S# DR926578 118W	Electricity	Archives	Approx. 2005	70%
Appliances	Refrigerator	Break room	Electrolux, M# FRT21P5AW7, S# LA31026677	Electricity	Break room	2003	63%
Appliances	Microwave	Break room	GE, M# JES1339WC 03, S# HG900813U	Electricity	Break room	2004	67%
Appliances	Vending machines (Coke)	Break room	Dixie-Narco, M# DN 276E CC/S11-7, S# 1151 6626BY	Electricity	Break room	2000	60%
Appliances	Vending machine (snacks)	Break room	No nameplate	Electricity	Break room	1985	20%

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:

At this time there are no capital improvements recommended by SWA/BSG-PMK.

Category II: Operations & Maintenance:

Repair cracked and deteriorating EFIS and Stucco on exterior walls

Repair roof leak

Category III Recommendations: Energy Conservation Measures:

Summary Table

ECM #	Description
1	Lighting Upgrades & Occupancy Sensors
2	Vending Miser
3	High-Efficiency Chiller & AHUs
4	High-Efficiency Hot Water Heating System

ECM #1: Lighting Upgrades & Occupancy Sensors

Description:

Lighting at the Library primarily consists of standard-efficiency fixtures with T12 lamps and magnetic ballasts. A number of the fixtures have already been upgraded with T8 lamps and electronic ballasts. SWA/BSG-PMK recommends retrofitting the remaining 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 (Only)	Sensors (Only)	Complete Lighting Upgrade
Cost	\$10,586.00	\$1,060.00	\$11,646.00
Rebate	\$2,255.00	\$115.00	\$2,370.00
Net Cost	\$8,331.00	\$945.00	\$9,276.00
Savings (kWh)	17,285	1,048	18,034
Savings (\$)	\$3,284.06	\$199.18	\$3,426.53
Payback	2.5	4.7	2.7

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
1	Lighting Upgrades	Empirical Data	\$10,586	\$2,255	\$8,331	17,285	8.78	0	2.95	\$0	\$3,284	15	\$38,644	2.54	364%	24%	39%	\$30,874	23,680
	Occupancy Sensors		\$1,060	\$115	\$945	1,048	0.53	0	0.18	\$0	\$199	10	\$1,682	4.74	78%	8%	17%	\$754	1,436

Assumptions:

The electric cost used in this ECM was \$0.19/kWh, which was the facilities' average rate for the 12-month period from Feb, 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 \$2,370.

ECM #2: Vending Miser

Description:

The average vending machine consumes 4,025 kWh of energy per year, most of which can be attributed to lighting and cooling, which run 24 hours-per-day. Installing an occupancy sensor on the Library’s one (1) soft drink vending machine would activate the power to the unit when in use, and deactivate the power if the unit has not been used for more than 15 minutes. Vending machine lighting would remain off until the adjacent area is occupied again. The refrigeration unit will be shut down for a maximum two hours, in order to maintain a desirable temperature for the product.

Installation cost: \$250

Source of cost estimate: Similar Projects

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
2	Vending Miser	Similar Projects	\$250	\$0	\$250	1,610	0.82	0	0.27	\$0.00	\$306	10	\$2,583	0.82	933%	93%	122%	\$2,359	2,206

Assumptions:

The electric cost used in this ECM was \$0.19/kWh, which was the Library’s average rate for the 12-month period ranging from February, 2009 through February, 2010. The average vending machine consumes 4,025 kWh per year. Energy savings for a vending machine in low-traffic (less than 68 hours per week) areas is approximately 40%.

Rebates/financial incentives:

NJ Clean Energy – Direct Install program (60% of installed cost)

ECM #3: High-Efficiency Chiller & Air-Handling Units

Description:

The original section of the Library is cooled by four (4) condensers, two of which are designed for refrigeration use, which feed four (4) air-handlers. The cumulative cooling capacity for these systems are approximately 50 tons. The units have reached the end of their useful life, and it is recommended that the condensers be replaced by a single 50-ton, high-efficiency, air-cooled scroll chiller, and the air-handlers be replaced with high-efficiency units equipped with hot water coils, which will be fed by the hot water boiler recommended in ECM #4. Newer chiller models use Puron refrigerant, a more efficient fluid than the current R-22 refrigerant. This yields a lower kW/ton (kW of electric usage per ton of cooling) ratio, and a higher Energy Efficiency Ratio (EER). The recommended unit is rated at 13.2 EER (equivalent to a Seasonal Energy Efficiency Ratio, or SEER, of 15.1); the existing units had SEER values of 10 at the time of their purchase, but due to their age and condition, their SEER was estimated to decrease by 20%, to 8.

It should be noted that, while this measure would save energy, this would be considered an end-of-life measure due to the long payback of this system.

Installation cost: \$240,000

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, \$	CO ₂ Reduced, lbs/yr
3	High-Efficiency Chiller & AHUs	Contractor	\$240,000	\$2,600	\$237,400	45,566	23.14	0	7.77	\$0	\$8,657	24	\$143,509	27.42	-40%	-2%	-1%	-\$90,781	62,425

Assumptions:

Using 12 months of the facility's electric bills, it was determined that the cost of electricity is currently \$0.19/kWh. SEER values, as stated above, are 8 for the existing units and 15.1 for the recommended one. Per the American Society of Heating, Refrigeration & Air-Conditioning Engineers (ASHRAE), the outdoor dry bulb temperature is above 93°F 0.4% percent of a year, and the number of cooling degree-days for one year is 1,024. The desired indoor temperature during the cooling season was assumed to be 74°F.

The following equation, the degree-day equation for cooling systems, was used to calculate the electric consumptions of the current and proposed air-conditioners:

$$\frac{\text{Capacity} \times \text{Degree-Days} \times 24 \frac{\text{hours}}{\text{day}}}{1,000 \times \text{SEER} \times (\text{Temp}_{0.4\%} - \text{Temp}_{\text{indoor}})} = \text{Electric Consumption (in kWh)}$$

Rebates/financial incentives:

This ECM is calculated based on a projected eligibility for New Jersey's SmartStart Rebate, which pays up to \$52/ton for air-cooled chillers or a total of \$2,600.

ECM #4: High-Efficiency Hot Water Heating System

Description:

Heating is supplied to radiators in the original section of the building by an American Standard 966 MBH, natural gas, steam boiler, installed in 1987. The unit is nearing the end of useful life, and should be replaced on an as-fail basis. High-efficiency condensing, hot water boilers are now available, which are up to 95% efficient. Installing this system would require the installation of hot water coils in the air-handlers, circulation pumps, and hot water piping. The current boiler is 81% efficient at the time of its purchase, but due to its age and condition, its efficiency was estimated to decrease by 10%, to 71%. Hot water outdoor air reset control (OAR) should also be installed. These controllers reduce the maximum boiler water temperature depending on the outside air temperature; for instance, if the outside air temperature is 0°F, the boiler temperature will be 180°F, but if the outside air temperature is 40°F, the boiler temperature will only need to be 130°F. Outdoor air reset generally decreases heating costs by 8-15%.

It should be noted that, while this measure would save energy, this would be considered an end-of-life measure due to the long payback of this system.

Installation cost:

Estimated installed cost: \$85,000

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	High-Efficiency Hot Water Heating System	Contractor	\$85,000	\$1,691	\$83,310	0	0.00	2,195.33	10.98	\$0	\$2,481	25	\$42,250	33.58	-49%	-2%	-2%	-\$40,112	25,685

Assumptions:

The cost per therm of natural gas that was used, taken from twelve months of the Library’s energy bills, was \$1.14. Per the American Society of Heating, Refrigeration & Air-Conditioning Engineers (ASHRAE), the outdoor dry bulb temperature is above 10°F 99.6% percent of a year, and the number of heating degree-days for one year is 5,034. Due to the fact that the building only operates 55 out of a possible 168 hours every week,

only $\frac{55}{168}$ of the heating degree days were used for these calculations. The desired indoor temperature was estimated to be 68°F. The savings were calculated using the following equations:

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

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

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

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

The addition of OAR added an additional savings of 8%.

Rebates/financial incentives:

This ECM is calculated based on a projected eligibility for New Jersey’s SmartStart Rebate, which pays \$1.75 per MBH for boilers between 300 and 1,500 MBH, or \$1,691 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 pay 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 New Brunswick Library. 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.

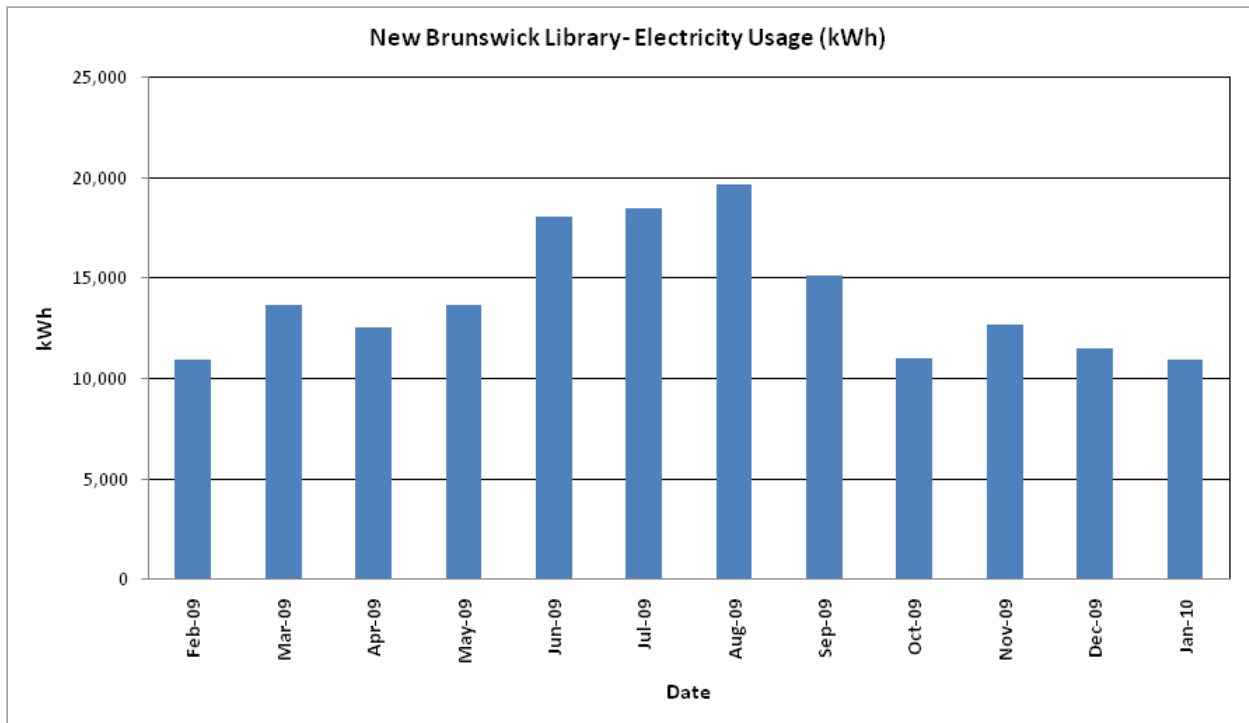
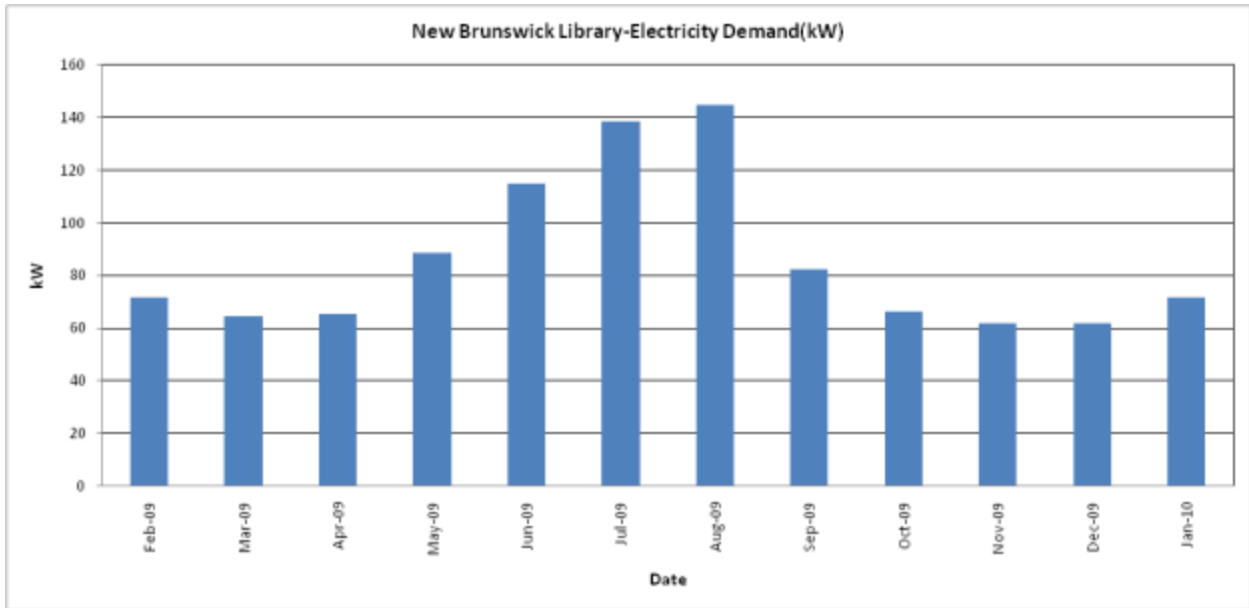
6.6. Wind

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.

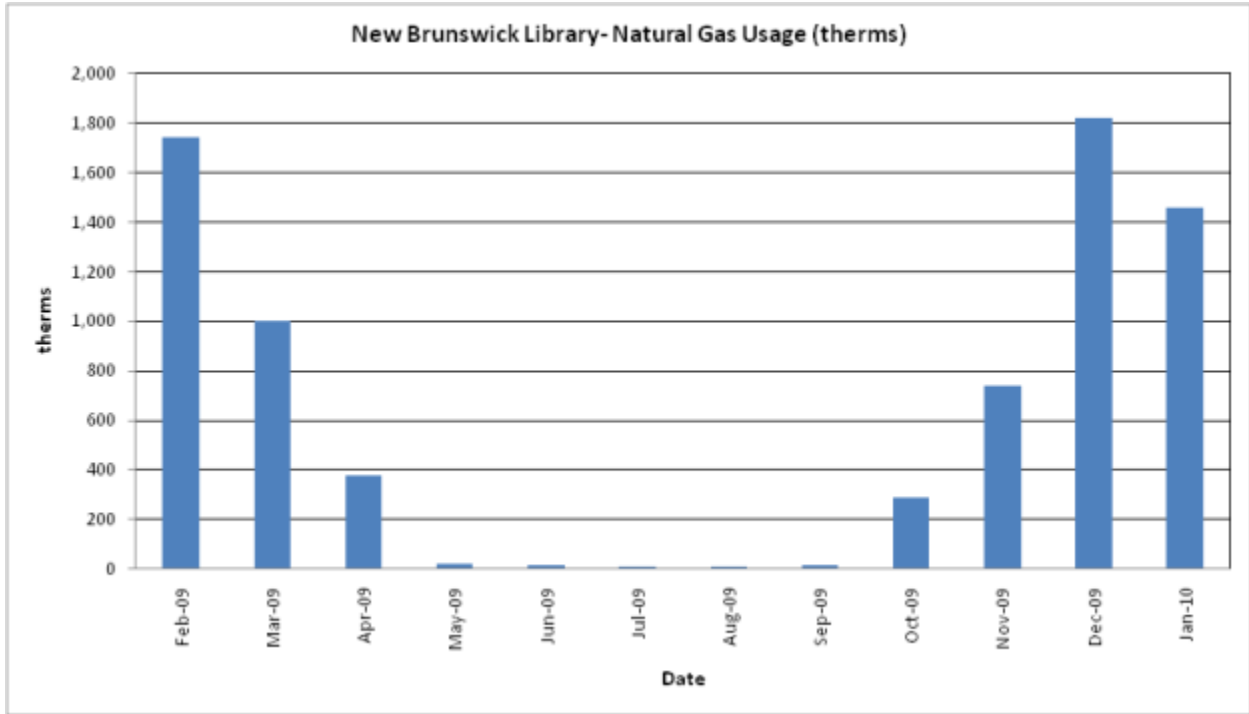
7. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

7.1. Energy Purchasing

The average electrical peak demand for the previous year was 86 kW and the maximum peak demand was 144.5 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.



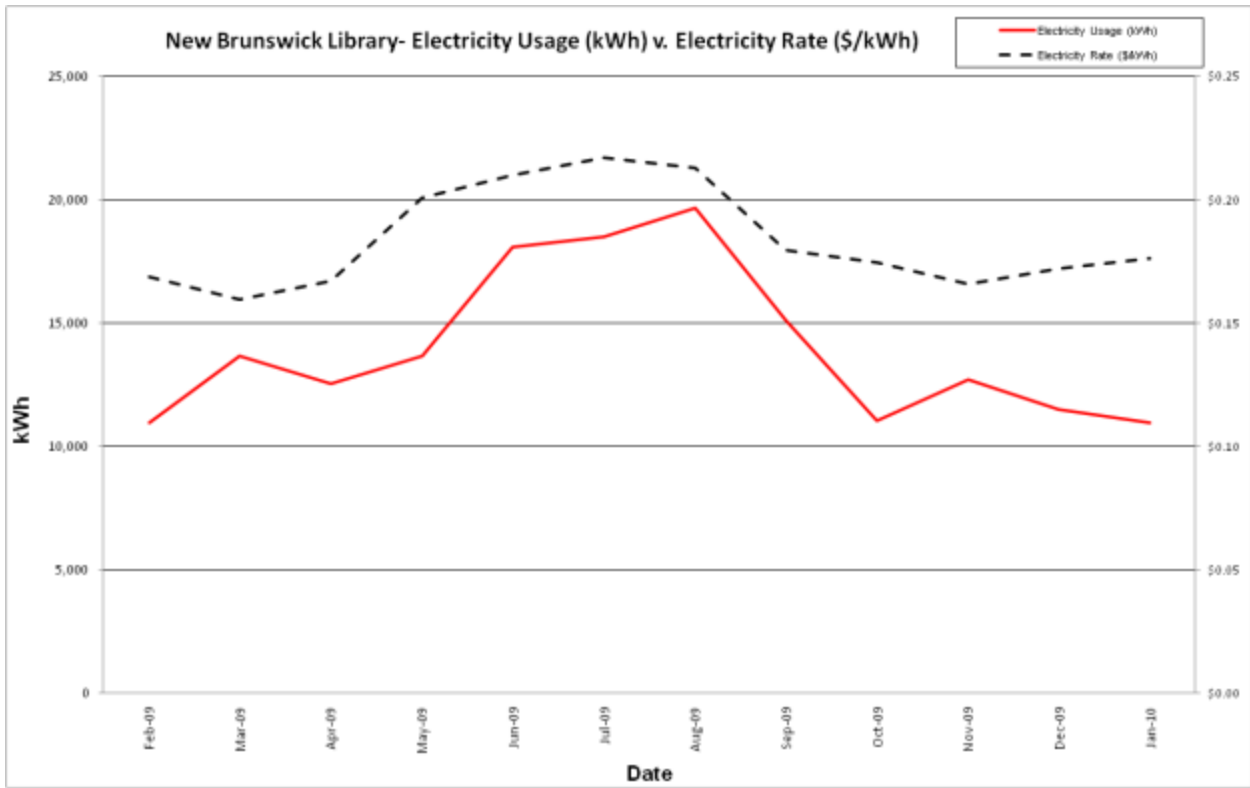
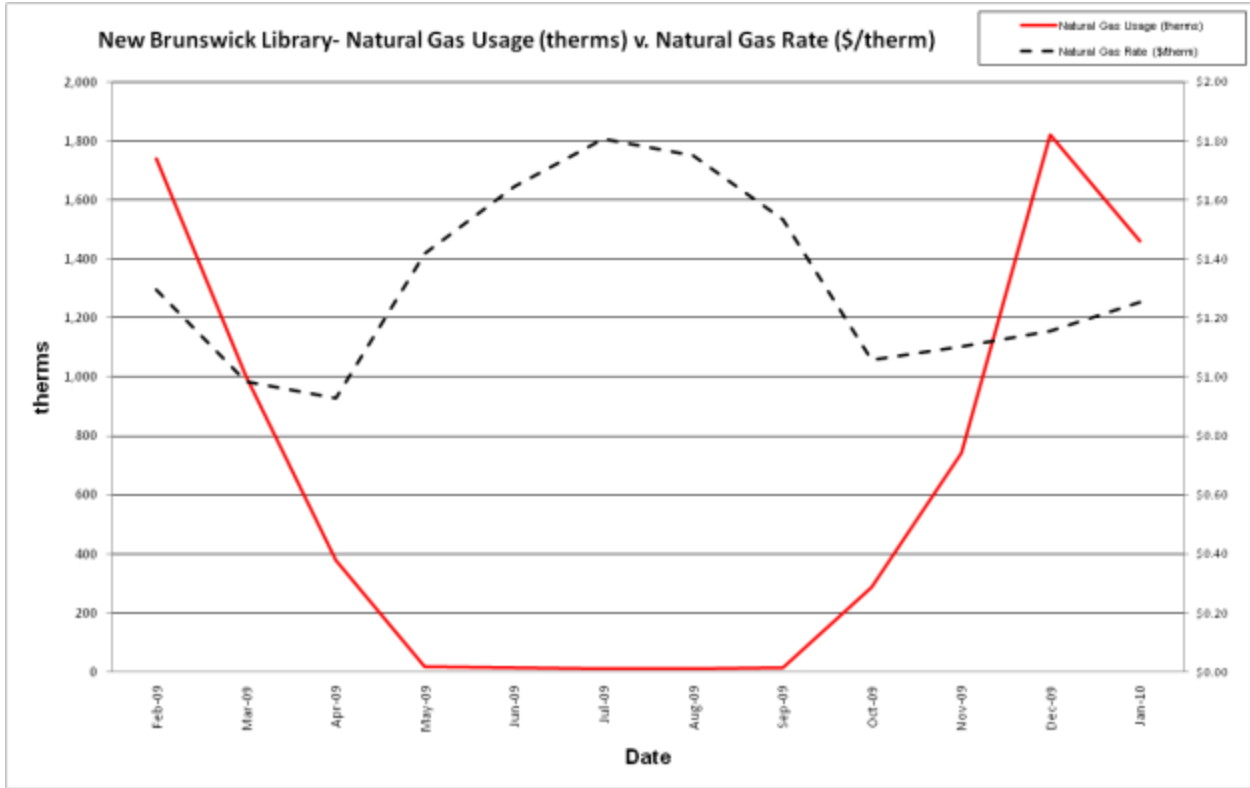
The natural gas usage shows that the most natural gas is consumed in the winter months, meaning the majority of natural gas use in this building is for heating.

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 New Brunswick Library 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 New Brunswick Library is direct-metered (via one meter) and currently purchases electricity from Public Service Electric & Gas at a general service rate. The general service rate for electric charges are market-rate based on use and the New Brunswick Library 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.

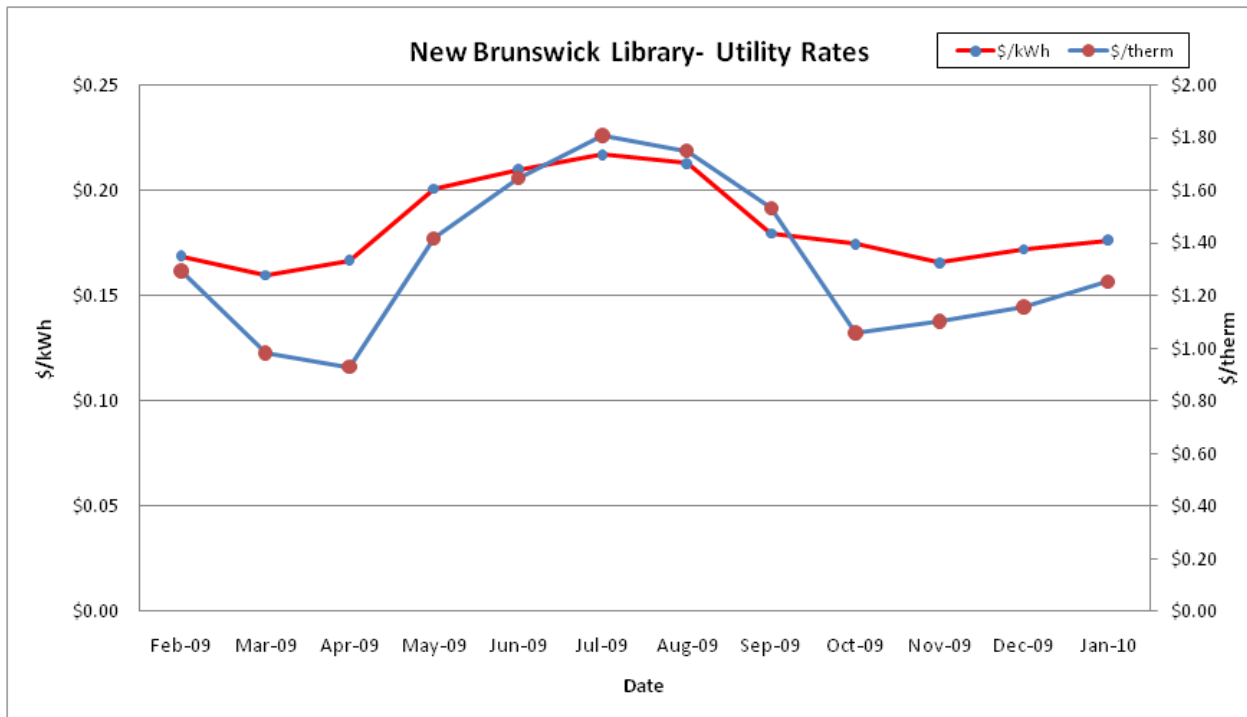
The following charts compare the utility consumption and utility rates for the natural gas and electricity over the previous 12 month period.



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 \$ 0.04/kWh, which would have equated to approximately \$2,258 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
Library
60 Livingston Avenue



Upgrade Code	Upgrade Description	Existing		Proposed		Lighting		
		Fixture	Watts	Fixture	Watts	Total # of Upgrades	Cost per Upgrade (\$)	SmartStart Rebate per Upgrade
1	Retrofit the 4' recessed fixture by replacing the (4) T12 Lamps and Magnetic Ballast(s) with (4) T8 Lamps and an Electronic Ballast	4L4' EE/STD	160	4L4' T8/ELEC	110	54	\$80.00	\$15.00
2	Retrofit the 4' wraparound fixture by replacing the (2) T12 Lamps and Magnetic Ballast(s) with (2) T8 Lamps and an Electronic Ballast	2L4' STD/STD	94	2L4' T8/ELEC	61	10	\$50.00	\$15.00
3	CFL Circle FC8T9 / No Upgrade	1L8" (DIA) EE/ELEC	22	No Upgrade	22	1	\$0.00	\$0.00
4	Retrofit the 4' wall mounted fixture by replacing 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
5	Retrofit the 8' fixture by replacing the (4) T12 Lamps and Magnetic Ballast(s) with (4) T8 Lamps and an Electronic Ballast	4L8' EE/STD	276	4L8' T8/ELEC	233	2	\$100.00	\$15.00
6	Retrofit the 8' fixture by replacing the (2) T12 Lamps and Magnetic Ballast(s) with (2) T8 Lamps and an Electronic Ballast	2L8' EE/STD	138	2L8' T8/ELEC	118	19	\$70.00	\$15.00
7	Replace the 60W Incandescent Lamps with 13W Compact Fluorescents	60W INCANDESCENT	60	13W CF/SI	15	1	\$6.00	\$0.00
8	Retrofit the 4' recessed fixture by replacing the (4) T12 Lamps and Magnetic Ballast(s) with (4) T8 Lamps and an Electronic Ballast	4L4' T8/ELEC	110	No Upgrade	110	20	\$0.00	\$0.00
9	Retrofit the 4' fixture by replacing the (2) T12 Lamps and Magnetic Ballast(s) with (2) T8 Lamps and an Electronic Ballast	2L4' STD/STD	94	2L4' T8/ELEC	61	6	\$50.00	\$15.00
10	Retrofit the 2x2 fixture by replacing the (2) T12 U-Tube Lamps and Magnetic Ballast(s) with (2) T8 U-Tube Lamps and an Electronic Ballast	2L22" STD/STD	94	2L22"	62	5	\$50.00	\$15.00
11	Retrofit the 4' recessed fixture by replacing the (4) T12 Lamps and Magnetic Ballast(s) with (4) T8 Lamps and an Electronic Ballast	4L4' EE/STD	160	4L4' T8/ELEC	110	26	\$80.00	\$15.00
12	26W Compact Fluorescent / No upgrade	26W CF/SI	28	No Upgrade	28	6	\$0.00	\$0.00
13	15W Compact Fluorescent / No upgrade	15W CF/SI	15	No Upgrade	15	13	\$0.00	\$0.00
14	Retrofit 2x2 Fixture with (2)T12 Lamps Lit Indirectly with (2)T8 Lamps and an Electronic Ballast	(2) F20T12/HPFMA G	56	(2) FO17T8/ELEC	34	9	\$40.00	\$15.00
15	Retrofit the 4' wraparound fixture by replacing the (1) T12 Lamps and Magnetic Ballast(s) with (1) T8 Lamps and an Electronic Ballast	1L4' EE/STD	50	1L4' T8/ELEC	31	2	\$40.00	\$15.00
16	15W CFL Wall Mounted Globe / No Upgrade	15W CF/SI	15	No Upgrade	15	10	\$0.00	\$0.00
17	Retrofit the 4' fixture by replacing the (6) T12 Lamps and Magnetic Ballast(s) with (6) T8 Lamps and an Electronic Ballast	6L4' T8/ELEC	200	No Upgrade	200	14	\$0.00	\$0.00
18	Replace 120W Incandescent Lamps in recessed fixture with 26W Compact Fluorescents	120W INCANDESCENT	120	26W CF/SI	28	5	\$10.00	\$0.00
19	Replace the (8) 15W Incandescent Candelabra with (8) 3W Compact Fluorescent Candelabra	(8) 15W CANDELABRA	120	(8) 5W CANDELABRA	40	2	\$70.00	\$0.00
20	4' Open Chanel Fixture with (2) T8 Lamps and an Electronic Ballast / No Upgrade	2L4' T8/ELEC	61	No Upgrade	61	5	\$0.00	\$0.00
21	Retrofit the 4' wraparound fixture by replacing the (2) T12 Lamps and Magnetic Ballast(s) with (2) T8 Lamps and an Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC	61	2	\$50.00	\$15.00
22	3' Indirect Lighting Fixture with (2) T8 Lamps and an Electronic Ballast / No Upgrade	(2) FO25T8/ELEC	48	No Upgrade	48	20	\$0.00	\$0.00

Summary

	Lighting (Only)	Sensors (Only)	Complete Lighting Upgrade
Cost	\$10,586.00	\$1,060.00	\$11,646.00
Rebate	\$2,255.00	\$115.00	\$2,370.00
Net Cost	\$8,331.00	\$945.00	\$9,276.00
Savings (kWh)	17,285	1,048	18,034
Savings (\$)	\$3,284.06	\$199.18	\$3,426.53
Payback	2.5	4.7	2.7

Variables:

\$0.19	Avg. Electric Rate (\$/kWh)
	Avg. Demand Rate (\$/kW)
3276	Operating Hours/Year
9	Operating Hours/Work Day

Assumptions:

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

Notes:

23	Retrofit the 4' fixture by replacing the (2) T12 Lamps and Magnetic Ballast(s) with (2) T8 Lamps and an Electronic Ballast	2L4' EE/STD	80	2L4' T8/ELEC	61	7	\$50.00	\$15.00
24	250W High Pressure Sodium	250W HPS/BALLAST	295	No Upgrade	295	3	\$0.00	\$0.00
25	Mini Wall Pack Lit with Compact Fluorescents	44W CF/SI	44	No Upgrade	44	2	\$0.00	\$0.00
26	150W High Pressure Sodium Wall Pack	150W HPS/BALLAST	190	No Upgrade	150	5	\$0.00	\$0.00
27	Retrofit Incandescent Exit Signs with LED	15W Exit	15	LED	2	11	\$40.00	\$10.00

Seq. #	Upgrade Code	Room/Area	Hrs/Work Day	Hrs/Year	Existing				Proposed				kW Reduction	Lighting				Occupancy Sensors (ONLY)				Lighting & Occupancy Sensors					
					Fixture	Qty.	Watts	Foot Candles	Fixture	Qty.	Watts	Energy Savings, kWh		Cost (\$)	Savings (\$)	Payback (yrs)	Energy Savings, kWh	Cost (\$)	Savings (\$)	Payback (yrs)	SmartStart Rebate Lighting	SmartStart Rebate Sensors	Energy Savings, kWh	Post-Rebate Cost (\$)	Savings (\$)	Payback (yrs)	
Totals:					29220	22601	6.619	17285	\$10,586.00	\$3,294.06	3.2	1048	\$1,060.00	\$199.18	5.3	\$2,255.00	\$115.00	18034	\$9,276.00	\$3,426.53	2.7						
1	1	Copy Room	8	2912	4L4' EE/STD	1	160	4L4' T8/ELEC	1	110	0.05	146	\$80.00	\$27.66	2.9	OSR	1	116	\$260.00	\$22.13	11.7	\$15.00	\$35.00	226	\$290.00	\$42.88	6.8
2	1	Break Room	8	2912	4L4' EE/STD	5	800	4L4' T8/ELEC	5	550	0.25	728	\$400.00	\$138.32	2.9			0	\$0.00	\$0.00		\$75.00	\$0.00	728	\$325.00	\$138.32	2.3
3	1	Storage Room	1	364	4L4' EE/STD	6	960	4L4' T8/ELEC	6	660	0.3	109	\$480.00	\$20.75	23.1			0	\$0.00	\$0.00		\$90.00	\$0.00	109	\$390.00	\$20.75	18.8
4	1	Office	8	2912	4L4' EE/STD	2	320	4L4' T8/ELEC	2	220	0.1	291	\$160.00	\$55.33	2.9	OSW	1	233	\$200.00	\$44.26	4.5	\$30.00	\$20.00	451	\$310.00	\$85.76	3.6
5	1	Office	8	2912	4L4' EE/STD	2	320	4L4' T8/ELEC	2	220	0.1	291	\$160.00	\$55.33	2.9	OSW	1	233	\$200.00	\$44.26	4.5	\$30.00	\$20.00	451	\$310.00	\$85.76	3.6
6	1	Foyer	8	2912	4L4' EE/STD	1	160	4L4' T8/ELEC	1	110	0.05	146	\$80.00	\$27.66	2.9			0	\$0.00	\$0.00		\$15.00	\$0.00	146	\$65.00	\$27.66	2.3
7	2	Boiler Room	1	364	2L4' STD/STD	4	376	2L4' T8/ELEC	4	244	0.132	48	\$200.00	\$9.13	21.9			0	\$0.00	\$0.00		\$60.00	\$0.00	48	\$140.00	\$9.13	15.3
8	3		1	364	1L8" (DIA) EE/ELI	1	22	No Upgrade	1	22	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
9	4		1	364	4L4' EE/STD	1	160	4L4' T8/ELEC	1	110	0.05	18	\$80.00	\$3.46	23.1			0	\$0.00	\$0.00		\$15.00	\$0.00	18	\$65.00	\$3.46	18.8
10	5	Basement Room	1	364	4L8' EE/STD	1	276	4L8' T8/ELEC	1	233	0.043	16	\$100.00	\$2.97	33.6			0	\$0.00	\$0.00		\$15.00	\$0.00	16	\$85.00	\$2.97	28.6
11	5	Basement Room	1	364	4L8' EE/STD	1	276	4L8' T8/ELEC	1	233	0.043	16	\$100.00	\$2.97	33.6			0	\$0.00	\$0.00		\$15.00	\$0.00	16	\$85.00	\$2.97	28.6
12	2		1	364	2L4' STD/STD	2	188	2L4' T8/ELEC	2	122	0.066	24	\$100.00	\$4.56	21.9			0	\$0.00	\$0.00		\$30.00	\$0.00	24	\$70.00	\$4.56	15.3
13	6		1	364	2L8' EE/STD	6	828	2L8' T8/ELEC	6	708	0.12	44	\$420.00	\$8.30	50.6			0	\$0.00	\$0.00		\$90.00	\$0.00	44	\$330.00	\$8.30	39.8
14	6	Basement Storage Room	1	364	2L8' EE/STD	4	552	2L8' T8/ELEC	4	472	0.08	29	\$280.00	\$5.53	50.6			0	\$0.00	\$0.00		\$60.00	\$0.00	29	\$220.00	\$5.53	39.8
15	7		1	364	60W INCANDESC	1	60	13W CF/SI	1	15	0.045	16	\$6.00	\$3.11	1.9			0	\$0.00	\$0.00		\$0.00	\$0.00	16	\$6.00	\$3.11	1.9
16	2	Additron Basement Room	1	364	2L4' STD/STD	4	376	2L4' T8/ELEC	4	244	0.132	48	\$200.00	\$9.13	21.9			0	\$0.00	\$0.00		\$60.00	\$0.00	48	\$140.00	\$9.13	15.3
17	8	Archive	2	728	4L4' T8/ELEC	20	2200	No Upgrade	20	2200	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
18	9	Furnace Room	1	364	2L4' STD/STD	6	564	2L4' T8/ELEC	6	366	0.198	72	\$300.00	\$13.69	21.9			0	\$0.00	\$0.00		\$90.00	\$0.00	72	\$210.00	\$13.69	15.3
19	1	Children's Area	8	2912	4L4' EE/STD	37	5920	4L4' T8/ELEC	37	4070	1.85	5387	\$2,960.00	\$1,023.57	2.9			0	\$0.00	\$0.00		\$555.00	\$0.00	5387	\$2,405.00	\$1,023.57	2.3
20	10		8	2912	2L22" STD/STD	5	470	2L22"	5	310	0.16	466	\$250.00	\$88.52	2.8			0	\$0.00	\$0.00		\$75.00	\$0.00	466	\$175.00	\$88.52	2.0
21	11		8	2912	4L4' EE/STD	2	320	4L4' T8/ELEC	2	220	0.1	291	\$160.00	\$55.33	2.9			0	\$0.00	\$0.00		\$30.00	\$0.00	291	\$130.00	\$55.33	2.3
22	12	Meeting Room Foyer	10	3640	26W CF/SI	5	140	No Upgrade	5	140	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
23	13	Elevator Foyer	10	3640	15W CF/SI	2	30	No Upgrade	2	30	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
24	13	Childrens Restroom	3	1092	15W CF/SI	2	30	No Upgrade	2	30	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
25	13	Office Area	10	3640	15W CF/SI	9	135	No Upgrade	9	135	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
26	14		10	3640	(2) F20T12/HPPFM	9	504	(2) FO17T8/ELEC	9	306	0.198	721	\$360.00	\$136.94	2.6			0	\$0.00	\$0.00		\$135.00	\$0.00	721	\$225.00	\$136.94	1.6
27	11	Meeting Room	8	2912	4L4' EE/STD	24	3840	4L4' T8/ELEC	24	2640	1.2	3494	\$1,920.00	\$663.94	2.9			0	\$0.00	\$0.00		\$360.00	\$0.00	3494	\$1,560.00	\$663.94	2.3
28	15	Stairwell	12	4368	1L4' EE/STD	2	100	1L4' T8/ELEC	2	62	0.038	166	\$80.00	\$31.54	2.5			0	\$0.00	\$0.00		\$30.00	\$0.00	166	\$50.00	\$31.54	1.6
29	18	Reference	8	2912	120W INCANDES	5	600	26W CF/SI	5	140	0.46	1340	\$50.00	\$254.51	0.2			0	\$0.00	\$0.00		\$0.00	\$0.00	1340	\$50.00	\$254.51	0.2
30	16	Lobby	12	4368	15W CF/SI	10	150	No Upgrade	10	150	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
31	17	Teen Room	8	2912	6L4' T8/ELEC	6	1200	No Upgrade	6	1200	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
32	17	Office	8	2912	6L4' T8/ELEC	2	400	No Upgrade	2	400	0	0	\$0.00	\$0.00		OSW	1	291	\$200.00	\$55.33	3.6	\$0.00	\$20.00	291	\$180.00	\$55.33	3.3
33	17	Media	8	2912	6L4' T8/ELEC	6	1200	No Upgrade	6	1200	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
34	19	Office Upstairs	8	2912	(8) 15W CANDEL	2	240	(8) 5W CANDELA	2	80	0.16	466	\$140.00	\$88.52	1.6	OSW	1	175	\$200.00	\$33.20	6.0	\$0.00	\$20.00	524	\$320.00	\$99.59	3.2
35	6	Attic	10	3640	2L8' EE/STD	9	1242	2L8' T8/ELEC	9	1062	0.18	655	\$630.00	\$124.49	5.1			0	\$0.00	\$0.00		\$135.00	\$0.00	655	\$495.00	\$124.49	4.0
36	12		1	364	26W CF/SI	1	28	No Upgrade	1	28	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
37	20	Stacks	8	2912	2L4' T8/ELEC	5	305	No Upgrade	5	305	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
38	21	Reference Office	8	2912	2L4' EE/STD	1	80	2L4' T8/ELEC	1	61	0.019	55	\$50.00	\$10.51	4.8			0	\$0.00	\$0.00		\$15.00	\$0.00	55	\$35.00	\$10.51	3.3
39	21	Safe	8	2912	2L4' EE/STD	1	80	2L4' T8/ELEC	1	61	0.019	55	\$50.00	\$10.51	4.8			0	\$0.00	\$0.00		\$15.00	\$0.00	55	\$35.00	\$10.51	3.3
40	22	Reference Area	8	2912	(2) FO25T8/ELEC	20	960	No Upgrade	20	960	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
41	23	Reference Storage	8	2912	2L4' EE/STD	7	560	2L4' T8/ELEC	7	427	0.133	387	\$350.00	\$73.59	4.8			0	\$0.00	\$0.00		\$105.00	\$0.00	387	\$245.00	\$73.59	3.3
42	27	exit	24	8736	15W Exit	11	165	LED	11	22	0.143	1249	\$440.00	\$237.36	1.9			0	\$0.00	\$0.00		\$110.00	\$0.00	1249	\$330.00	\$237.36	1.4
43	24	exterior	7	2548	250W HPS/BALL	3	885	No Upgrade	3	885	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
44	25	exterior	7	2548	44W CF/SI	2	88	No Upgrade	2	88	0	0	\$0.00	\$0.00				0	\$0.00	\$0.00		\$0.00	\$0.00	0	\$0.00	\$0.00	
45	26	exterior	7	2548	150W HPS/BALL	5	950	No Upgrade	5	750	0.2</																

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
Integrus Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrusenergy.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.southjerseyenergy.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

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Appendix C: Incentive Programs

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.