

**TOWNSHIP OF NORTH BRUNSWICK
PARKS
ENERGY ASSESSMENT**

for

**NEW JERSEY
BUREAU OF PUBLIC UTILITIES**



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1.0 INTRODUCTION & BACKGROUND

This report summarizes the energy audit for the North Brunswick Township park facilities, which include Apple Orchard Lane Soccer Fields, Caruso Park, Community Park, Renaissance Park, Sabella Park, and Veterans Park. The parks use electricity for night lighting at various sporting fields. There is also a single story 8,050 sq. ft. maintenance building and three 1,050 sq. ft. food concession buildings at Community Park.

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

This report shall cover the energy audit for the North Brunswick Township park facilities.

2.0 EXECUTIVE SUMMARY

This report details the results of the North Brunswick Township park facilities, including six parks which utilize electricity for night lighting at various sporting fields. In addition, Community Park contains an 8,050 sq. ft. maintenance building and three 1,050 sq. ft. food concession buildings. The following areas were evaluated for energy conservation measures:

- Occupancy sensors
- Space temperature setback
- Sports field lighting replacements

Various potential Energy Conservation Measures (ECMs) were identified. Potential annual savings of \$900 for the recommended ECMs may be realized with a payback of 5.4 years.

In general, an energy audit identifies, on average, savings of at least 10% of the annual utility costs. This milestone was not attained with the audit of the parks due to various factors. The field lighting at Community Park and Sabella Park was installed in 2007 and is assumed to be efficient green lighting. The interior lighting at the food concession stands and park maintenance building were not evaluated because they are also efficient T-8 florescent. Space temperature is already being set back in the maintenance building garage areas to 50°F during unoccupied hours. In addition, annual operating hours for all field lighting and irrigation pump motors is very low.

The ECMs identified in this report will allow for reduction of energy usage and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

ECM-5 Lighting Occupancy Sensors in Food Concession Restrooms

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
1,600	0	1,600	0	200	0.9	100	8.0	7.5

* Incentive shown is per the New Jersey Smart Start Program, 2009 Lighting Controls Application. Incentive is based on \$35 for ceiling-mounted occupancy sensors.

ECM-6 Install Occupancy Sensors for Maintenance Building Interior Lighting

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
3,400	0	4,400	0	500	1.2	300	6.8	6.2

* Incentive shown is per the New Jersey Smart Start Program, 2009 Lighting Controls Application. Incentive is based on 4 ceiling-mounted occupancy sensors and 9 wall-mounted occupancy sensors.

ECM-7 Apply Space Temperature Setback to Maintenance Building Office

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
300	0	1,500	0	200	9.0	N/A	1.5	N/A

3.0 EXISTING CONDITIONS

3.1 Building General

3.1.1 Building Structures

The sports lighting in Apple Orchard Lane Soccer Fields, Caruso Park, Renaissance Park, Sabella Park, and Veterans Park and Community Park, were assessed. Community Park also contains open pavilions, single maintenance building, and three food concession stands with public restrooms. These buildings, constructed in 2007, are the only significant energy users.

The maintenance building is a single story structure and houses office space for park employees, storage and maintenance bays for park vehicles. The building is steel column and beam construction with a concrete foundation and 6 inch concrete floor slab. The exterior is composed of sheet metal siding with metal fascia and 6 inches of R-19 fiberglass insulation in the walls. The roof is steel truss construction with metal roofing panels and 12 inches of R-38 fiberglass batt insulation.

The food concession buildings are each constructed of CMU walls on a concrete foundation and a 6 inch concrete floor slab, with wood frame and asphalt shingled roofs. The buildings contain a small kitchen area for food preparation and public restrooms.

3.1.2 Operating Hours

The parks are open daily from sunrise to sunset with the exception of the lighted sports field areas which remain open for the duration of scheduled events. The sports fields and food concession stands are used seasonally from mid-April to early December.

The Community Park maintenance building is open year round Monday through Friday from 6:30 AM – 4:30 PM, and closed for 13 holidays per year.

3.2 Utility Usage

The parks use electricity and municipal water, and are connected into the municipal sewage system.

Electricity is purchased from, and delivered by, the Public Service Electric and Gas Company (PSE&G). The Town of North Brunswick owns and operates the township's domestic water supply and sewer disposal systems, and does not charge the park facilities for water usage. For 2008, the parks had a combined electricity usage of 384,540 kWh, at a cost of \$124,000.

The average blended rate for electricity for all the parks combined is \$0.323 per kWh. A contributing factor for this high rate is that the parks incur monthly electric bill service charges and high supply demand rates during winter months when usage is minimal. The maintenance building is open year round and has an average blended rate of \$0.143 per kWh. Pricing information obtained from the Energy Information Administration (EIA) indicated that the average blended rate for commercial customers in New Jersey over the same period was \$0.147 per kWh. Additional lower electricity supply pricing may be available by switching to an alternate supplier. A list of electric suppliers licensed by the NJ Board of Public Utilities to sell electricity to customers served by PSE&G is provided in Appendix A.

The highest user of electricity is the Community Park which had a combined consumption of 195,440 kWh and a cost of \$60,800. The Community Park uses electricity for sports field lighting, maintenance

building, three food concession buildings, and two water irrigation pumps. The maintenance building was the largest single user, with a usage of 120,250 kWh for 2008. The building had a maximum demand of 74 kW and a minimum of 17 kW. The monthly average over the observed 12 month period was 45 kW. The building uses electricity for building heat, office air conditioning, lighting, office equipment and garage/shop equipment. The remaining parks use electricity for sports field lighting.

Utility data is also provided in Appendix A.

3.3 HVAC Systems

The only building with heating and cooling is the maintenance building at the Community Park. The food concession buildings are open seasonally and are not air conditioned or heated.

3.3.1 Individual Split System

The maintenance building has one individual air cooled heat pump air conditioning system used for heating and cooling the office area. The system includes an air handling unit with a direct expansion cooling coil and separate compressor/condenser unit located outside. The heat pump system is controlled by a thermostat.

3.3.2 Electric Unit Heaters.

The maintenance building garage areas are heated by six 7.5 kW unit heaters and each heater is controlled by a thermostat.

3.4 Lighting/Electrical Systems

Sports field lighting at the Community Park and Sabella Park consists of a 2008 installation of Musco's Green Lighting Model LS-1500, (1500 watt) metal halide fixtures. Field lighting at the remaining parks consists of older style Musco 1500 watt metal halide fixtures installed in the 1980s. Parking lot lighting consists of metal halide fixtures with 175 watt lamps.

Field lighting at Caruso Park is manually switched on and off by key access to a locked circuit breaker panel. Field lighting at the remaining parks is controlled by the park staff by use of a phone dial-in system. Parking lot lighting is controlled by photocells.

Interior lighting at the food concession and maintenance buildings consists of T-8 florescent manually controlled by switches. This lighting is energy efficient and, therefore, was not evaluated for energy conserving potential. In addition, the exterior building lighting is high pressure sodium and controlled by photocells, which is also energy efficient.

3.5 Plumbing Systems

The building plumbing systems consist of domestic water, sanitary, and vent piping. Domestic hot water for the maintenance building is produced by a 30 gallon tank style electric water heater. Plumbing fixtures include urinals, toilets, sinks, and hose bibbs. The Community Park has two water irrigation systems. The systems operate during periods of below average rainfall and controlled by park staff on an as-needed basis. The irrigation plumbing systems include below ground piping, spray nozzles, and pumps operated with variable speed drives.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Apple Orchard Park Sports Field Lighting Replacements

The soccer field lighting at Apple Orchard Park consists of 64, 1,500 watt metal halide lighting fixtures mounted on metal poles. Current lighting technology provides the ability to effectively illuminate the soccer fields with fixtures of the same wattage; however, fewer fixtures would be needed.

The lighting at the soccer fields was evaluated, and it was determined that the number of fixtures could be reduced to 44. To compute the annual savings for this ECM, an estimate of the annual operating hours was provided by park staff and the energy consumption of the light fixtures was determined to be 41,220 kWh per year. To calculate annual energy consumption utilizing efficient lighting, the proposed fixture power requirement was used with the same annual hours of operation. The difference between the existing and proposed annual energy consumption are the energy savings. Calculations are provided in Appendix B.

In addition to installing new fixtures and mounting hardware on the existing poles, modifications to electrical wiring would also be required.

The proposed lighting fixtures have an expected life of 25 years, according to the manufacturer and total energy savings over the life of the project are estimated at 342,300 kWh and \$140,000.

The implementation cost and savings related to this ECM are presented in Appendix B and summarized below:

ECM-1 Apple Orchard Park Sports Field Lighting Replacements

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost					Incentive*	(without incentive)	(with incentive)	
	Electricity		Natural Gas	Total	ROI			
\$	kW	kWh	Therms	\$		\$	Years	
120,000	30	13,690		5,600	0.17	N/A	21.4	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM.

This measure is not recommended.

4.2 ECM-2 Caruso Park Sports Field Lighting Replacements

The baseball field lighting at Caruso Park consists of 24, 1,500 watt metal halide lighting fixtures mounted on metal poles. Current lighting technology provides the ability to effectively illuminate the baseball field with fewer fixtures of the same wattage.

An evaluation determined that the lighting at the baseball field could be reduced to 16 fixtures. An estimate of the annual operating hours was provided by park staff, and energy consumption was determined to be 15,460 kWh per year. To calculate the annual energy consumption utilizing efficient lighting, the proposed fixture power requirement was used with the same annual hours of operation. The difference between existing and proposed annual energy consumption is the savings. Calculations are provided in Appendix C.

Implementation of this ECM would require the same procedure as ECM-1.

The proposed lighting fixtures have an expected life of 25 years, according to the manufacturer and total energy savings over the life of the project are estimated 136,300 kWh and \$60,000.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-2 Caruso Park Sports Field Lighting Replacements

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
55,000	10	5,450	0	2,400	0.09	N/A	22.9	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM.

This measure is not recommended.

4.3 ECM-3 Renaissance Park Sports Field Lighting Replacements

The field lighting fixtures at Renaissance Park consist of 1,500 watt metal halide fixtures. The 106 fixtures consist of 32 fixtures at the soccer field, 15 at the small baseball field, and 59 at the large baseball field. As with the two previous measures, newer technology provides the opportunity to effectively illuminate the fields with fewer fixtures.

The total fixtures at the three sports fields can be reduced to 76. Energy consumption of the light fixtures was determined to be 51,200 kWh per year, utilizing an estimate of annual operating hours provided by park staff. To calculate annual energy consumption utilizing efficient lighting, the proposed fixture power requirement was used with the same annual hours of operation. The savings are the difference between existing and proposed annual energy consumption. Calculations are provided in Appendix D.

Installation procedure is the same as ECM-1.

The proposed lighting fixtures have an expected life of 25 years, according to the manufacturer and total energy savings over the life of the project are estimated at 388,500 kWh and \$355,000.

The implementation cost and savings related to this ECM are presented in Appendix D and summarized below:

ECM-3 Renaissance Park Sports Field Lighting Replacements

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
218,000	50	15,540	0	14,200	0.63	N/A	15.4	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM.

This measure is not recommended.

4.4 ECM-4 Veterans Park Sports Field Lighting Replacements

The sports field lighting at Veterans Park consists of 32, 1,500 watt metal halide lighting fixtures on metal poles. Effective illumination of the fields could be provided with fewer fixtures of the same wattage, if upgraded fixtures were utilized based on newer lighting technologies available.

The number of fixtures could be reduced to 26, and annual savings were determined by utilizing the estimated annual operating hours provided by park staff. Energy consumption of the light fixtures was determined to be 25,920 kWh per year. Annual energy consumption utilizing efficient lighting was determined utilizing the proposed fixture power requirements with the same annual hours of operation. The difference between existing and proposed annual energy consumption are the energy savings. Calculations are provided in Appendix E.

Implementation of new fixtures and mounting hardware on existing poles, and modifications to electrical wiring is required.

The proposed lighting fixtures have an expected life of 25 years, according to the manufacturer and total energy savings over the life of the project are estimated at 139,800 kWh and \$77,500.

The implementation cost and savings related to this ECM are presented in Appendix E and summarized below:

ECM-4 Veterans Park Sports Field Lighting Replacements

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
	Cost	Electricity	Natural Gas	Total				ROI
\$	kW	kWh	Therms	\$		\$	Years	Years
100,000	10	5,600	0	3,100	(0.2)	N/A	>25	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM.

This measure is not recommended.

4.5 ECM-5 Lighting Occupancy Sensors in Food Concession Restrooms

Lighting fixtures in the restrooms are manually switched on and off, and operational from opening to closing of the buildings. Installing occupancy sensors can reduce the operating time of the restroom lighting fixtures. Occupancy sensors were not considered in the food concession kitchen areas as these rooms are fully occupied when the concession stands are open.

The energy consumption of the lighting fixtures was determined to be 2,140 kWh per year, and annual energy consumption was calculated utilizing occupancy sensors with the same fixture power requirements at reduced annual hours of operation. This ECM considers installation of approximately six ceiling mounted occupancy sensors. The difference between the existing and proposed annual energy consumption was the energy savings. Calculations are provided in Appendix F.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 24,000 kWh, and \$3,000.

The implementation cost and savings related to this ECM are presented in Appendix F and summarized as follows:

ECM-5 Lighting Occupancy Sensors in Food Concession Restrooms

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
1,600	0	1,600	0	200	0.9	100	8.0	7.5

* Incentive shown is per the New Jersey Smart Start Program, 2009 Lighting Controls Application. Incentive is based on \$35 for ceiling-mounted occupancy sensors.

This measure is recommended.

4.6 ECM-6 Install Occupancy Sensors for Maintenance Building Interior Lighting

Lighting fixtures throughout the building are manually switched on and off, and are operational from opening to closing of the building. The operating time of many of the building’s interior lighting fixtures can be reduced by installing occupancy sensors in the office areas, conference rooms, storage rooms, restrooms, and the garage storage areas. Occupancy sensors were not considered in the hallways or garage vehicle maintenance areas due to safety concerns.

The energy consumption of the lighting fixtures was determined to be 9,800 kWh per year. To calculate the annual energy consumption utilizing occupancy sensors the same fixture power requirement was used with the reduced annual hours of operation. Installation of approximately 13 occupancy sensors was considered. The difference between the existing and proposed annual energy consumption was the energy savings. Calculations are provided in Appendix G.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 65,600 kWh, and \$7,500.

The implementation cost and savings related to this ECM are presented in Appendix G and summarized below:

ECM-6 Install Occupancy Sensors for Maintenance Building Interior Lighting

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
3,400	0	4,400	0	500	1.2	300	6.8	6.2

* Incentive shown is per the New Jersey Smart Start Program, 2009 Lighting Controls Application. Incentive is based on 4 ceiling-mounted occupancy sensors and 9 wall-mounted occupancy sensors.

This measure is recommended.

4.7 ECM-7 Space Temperature Setback to Maintenance Building Office

The existing heating and cooling system is individually controlled by a wall-mounted thermostat. The heating setpoints on the thermostat is maintained at 68°F during occupied and 62°F during unoccupied hours. The cooling setpoint is 68°F when the building is occupied, and 72°F during unoccupied hours. This ECM evaluates applying night and weekend temperature setback to reduce energy consumption during unoccupied periods. Lowering the unoccupied heating setpoint temperature to 60°F and raising the

unoccupied cooling setpoint to 80°F, will result in a reduction in energy usage. The 68°F cooling setpoint is very low and raising it to a more common setpoint of 73°F will also save energy.

A block load building model was developed to approximate the existing energy load for the office section of the building. The block loads, provided in Appendix H, model the maximum overall cooling and heating load for the spaces. Parameters including roof, wall, and window construction, total envelope surface area, ventilation and infiltration loads, building occupancy, internal heat generation, and other sources of heat gain and loss were considered. By entering this calculated maximum load into a spreadsheet containing bin temperature data, the total accumulated year-round cooling and heating energy requirements were determined. Bin data for North Brunswick, NJ was not available; therefore, data from nearby Newark, NJ was used. The loads were then reconciled to the average yearly heating and cooling electric energy usage of the building.

To determine the proposed energy usage during temperature setback, a second bin spreadsheet was used for the new accumulated heating load, which was identical to the existing usage spreadsheet except the heating unoccupied temperature was lowered to 60°F. The difference in heating energy between the two models is taken as the savings. The same method was used to model the savings for night setback in the summer air conditioned area with the unoccupied cooling temperature raised to 80°F.

Space temperature setback would be accomplished by replacing the existing wall mounted thermostat with a programmable thermostat programmed to set back the temperatures during unoccupied hours.

HVAC controls have a life expectancy of 15 years according to ASHRAE and total energy savings over the life of the project are estimated at 22,500 kWh and \$3,000.

The implementation cost and savings related to this ECM are presented in Appendix H and summarized below:

ECM-7 Space Temperature Setback to Maintenance Building Office

Budgetary	Annual Utility Savings				Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total			
Cost	kW	kWh	Therms	\$	\$	Years	Years
300	0	1,500	0	200	9.0	N/A	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM.

This measure is recommended.

4.8 ECM-8 Install Premium Efficiency Motors on Irrigation Pumps

The existing electric motors on the irrigation pumps at the Community Park have a nameplate efficiency rating of 87.5 %. Premium efficiency motors utilize more copper in the motor windings and are more efficient at converting electrical energy into mechanical energy for the work needed to operate a pump. Premium efficiency motors of the same horsepower would have an efficiency rating of 92.7%. This ECM evaluates replacing the existing standard efficiency motors with premium efficiency motors.

Savings were determined by comparing the energy usage of the existing pump motors to the energy usage with premium efficiency motors. Replacing the motors will provide annual electrical savings of 360 kWh.

Savings are not attractive due to the low annual run hours for the pumps.

Premium efficient motors have an expected lifetime of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 5,400 kWh, and \$1,500.

The implementation cost and savings related to this ECM are presented in Appendix I and summarized below:

ECM-8 Install Premium Efficiency Motors Irrigation Pumps

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
2,900	1.0	360	0	100	(0.5)	N/A	>25	N/A

* There is no incentive available through the New Jersey Smart Start Program for this ECM. Motors must operate a minimum of 2,000 hours per year to qualify for an incentive.

This measure is not recommended.

4.9 Potential Incentives

The North Brunswick Parks maintenance building may be eligible for incentives by the New Jersey Office of Clean Energy. The largest incentives available will be for the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects in facilities that consume a minimum average electric demand of 200 kW per month (total of 12 months peak demand/12). Facilities that meet this criterion must also achieve a minimum performance target of 15% by using an approved simulation modeling tool before and after construction. To utilize this program, a P4P Partner would need to be engaged. The 200 kW/month average minimum has been dropped so any structure can apply. This new incentive structure will be in effect until December 31, 2009.

Implementing the measures identified in this report will allow the building to achieve a reduction of 4.9%. The building would not meet the 15% minimum and therefore would not be eligible to participate in the P4P program.

Incentives are also available for prescriptive measures for various types of equipment under the New Jersey SmartStart Buildings incentive program. Prescriptive measures are paid after installation and no energy savings verification will be required. There are incentives available under this program for the installation of occupancy sensors for lighting controls (ECM-5) and (ECM-6) suggested in this study. These incentives were calculated utilizing the New Jersey SmartStart Building Equipment incentive program. This program provides incentives dependent upon the existing equipment type and proposed equipment retrofit measure.

The P4P incentive calculations are presented in Appendix K.

5.0 ALTERNATIVE ENERGY SCREENING EVALUATION

Alternate energy was not evaluated for the park field lighting systems or food concession buildings due their limited seasonal hours of operation and minimal energy use. The evaluations for alternate energy are for the park maintenance facility located at Community Park.

5.1 Geothermal

Geothermal heat pumps (GHP) transfer heat between the constant temperature of the earth and the building to maintain the building's interior space conditions. Below the surface of the earth throughout New Jersey the temperature remains in the low 50°F range throughout the year. This stable temperature provides a source for heat in the winter and a means to reject excess heat in the summer. With GHP systems, water is circulated between the building and the piping buried in the ground. The ground heat exchanger in a GHP system is made up of a closed or open loop pipe system. Most common is the closed loop in which high density polyethylene pipe is buried horizontally at 4-6 feet deep or vertically at 100 to 400 feet deep. These pipes are filled with an environmentally friendly antifreeze/water solution that acts as a heat exchanger. In the summer, the water picks up heat from the building and moves it to the ground. In the winter the system reverses and fluid picks up heat from the ground and moves it to the building. Heat pumps make collection and transfer of this heat to and from the building possible.

The building has a mixture of HVAC systems including direct expansion split systems and electric unit heaters. To take advantage of a GHP system, the building would have to install a low temperature closed loop water source heat pump system to realize the benefit of the consistent temperature of the ground. A water to water heat pump system could be utilized and used in conjunction with the existing equipment however system modifications and the installation of fluid heat exchangers would be necessary.

This measure is not recommended due to the high cost to retrofit the existing systems.

5.2 Solar

5.2.1 Photovoltaic Rooftop Solar Power Generation

The maintenance building was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The New Jersey Clean Power Estimator provided by the New Jersey Clean Energy Program is presently being updated; therefore, the site recommended use of the PVWAT solar grid analyzer version 1. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWAT solar power generation model is provided in Appendix L.

The State of New Jersey incentives for non-residential PV applications is \$1.00/watt up to 50 kW of installed PV array. Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Municipalities do not pay federal taxes; therefore, would not be able to utilize the federal tax credit incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow

entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The cost of the ACP penalty for 2009 is \$689; this is the amount that must be paid per SERC by the high emission producers. The expected dollar amount that will be paid to the PV producer for 2009 is expected to be \$600/SREC credit. Payments that will be received from the PV producer will change from year to year dependent upon supply and demand. Renewable Energy Consultants is a third party SREC broker that has been approved by the New Jersey Clean Energy Program. As stated above there is no definitive way to calculate an exact price that will be received by the PV producer per SREC over the next 15 years. Renewable Energy Consultants estimated an average of \$487/ SERC per year and this number was utilized in the cash flow for this report.

As previously noted, the building had a maximum demand of 74 kW and a minimum of 17 kW. The monthly average over the observed 12 month period was 45 kW. The facility’s existing load will not justify the use of the maximum incentive cap of 50 kW of installed PV solar array; therefore, a 20 kW system size was selected for the calculations. The system costs for PV installations were derived from the most recent NYSEDA (New York State Energy Research and Development Agency) estimates of total cost of system installation. It should be noted that the cost of installation is currently \$10 per watt or \$10,000 per kW of installed system. This has increased in the past few years due to the rise in national demand for PV power generator systems. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

Photovoltaic (PV) Rooftop Solar Power Generation – 20 kW System

Budgetary	Annual Utility Savings				Total Savings	New Jersey Renewable Energy Incentive*	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total					
Cost	kW	kWh	Therms	\$	\$	\$	\$	Years	Years
200,000	0	23,660	0	3,400	3,400	20,000	11,500	>25	12.1

*Incentive based on New Jersey Renewable Energy Program for non-residential applications of \$1.00 per Watt of installed capacity
 ** Estimated Solar Renewable Energy Certificate Program (SREC) for 15 years at \$487/1000 kWh

This measure is not recommended at this time due to the long payback period; however, it could be a potentially viable renewable measure for the town to consider in the future if electricity rates continue to increase and if PV installation costs decline below \$10 per watt.

5.2.2 Solar Thermal Domestic Hot Water Plant

Active solar thermal systems use solar collectors to gather the sun’s energy to heat water, another fluid, or air. An absorber in the collector converts the sun’s energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed

on the roof of the building, oriented south, and tilted around the site’s latitude, to maximize the amount of radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system would transfer the heat from the panels to thermal storage tanks and transfer solar produced thermal energy to use for domestic hot water production. DHW is presently produced by an electric water heater and, therefore, this measure would save the site electricity.

Currently, an incentive is not available for installation of thermal solar systems. A Federal tax credit of 30% of installation cost for the thermal applications is available; however, the Township of North Brunswick does not pay Federal taxes and, therefore, would not benefit from this program.

The implementation cost and savings related to this ECM are presented in Appendix L and summarized below:

Solar Thermal Domestic Hot Water Plant

Budgetary	Annual Utility Savings				Total	New Jersey Renewable Energy Incentive	Payback (without incentive)	Payback (with incentive)
Cost	Electricity		Natural Gas	Total	Savings			
\$	kW	kWh	Therms	\$	\$	\$	Years	Years
25,800	0	1,400	0	200	200	N/A	>25	N/A

* No incentive is available in New Jersey at this time.

This measure is not recommended.

5.3 Wind

Small wind turbines use a horizontal axis propeller, or rotor, to capture the kinetic energy of the wind and convert it into rotary motion to drive a generator which usually is designed specifically for the wind turbine. The rotor consists of two or three blades, usually made from wood or fiberglass. These materials give the turbine the needed strength and flexibility, and have the added advantage of not interfering with television signals. The structural backbone of the wind turbine is the mainframe, and includes the slip-rings that connect the wind turbine, which rotates as it points into changing wind directions, and the fixed tower wiring. The tail aligns the rotor into the wind.

To avoid turbulence and capture greater wind energy, turbines are mounted on towers. Turbines should be mounted at least 30 feet above any structure or natural feature within 300 feet of the installation. Smaller turbines can utilize shorter towers. For example, a 250-watt turbine may be mounted on a 30-50 foot tower, while a 10 kW turbine will usually need a tower of 80-120 feet. Tower designs include tubular or latticed, guyed or self-supporting. Wind turbine manufacturers also provide towers.

The New Jersey Clean Energy Program for small wind installations has designated numerous pre-approved wind turbines for installation in the State of New Jersey. Incentives for wind turbine installations are based on kilowatt hours saved in the first year. Systems sized under 16,000 kWh per year of production will receive a \$3.20 per kWh incentive. Systems producing over 16,000 kWh will receive \$51,200 for the first 16,000 kWh of production with an additional \$0.50 per kWh up to a maximum cap of 750,000 kWh per year. Federal tax credits are also available for renewable energy projects up to 30%

of installation cost for systems less than 100 kW. However, as noted previously, municipalities do not pay federal taxes and is, therefore, not eligible for the tax credit incentive.

The most important part of any small wind generation project is the mean annual wind speed at the height of which the turbine will be installed. In the North Brunswick area, the map indicates a mean annual wind speed of 10 miles per hour. For the maintenance building, there are site restrictions. Parking lots, trees and local residential housing would greatly affect a tower location.

An aerial satellite image of the site and wind speed map is included in Appendix M.

This measure is not recommended due to the low mean annual wind speed.

5.4 Combined Heat and Power Generation (CHP)

Combined heat and power, cogeneration, is self-production of electricity on-site with beneficial recovery of the heat byproduct from the electrical generator. Common CHP equipment includes reciprocating engine-driven, micro turbines, steam turbines, and fuel cells. Typical CHP customers include industrial, commercial, institutional, educational institutions, and multifamily residential facilities. CHP systems that are commercially viable at the present time are sized approximately 50 kW and above, with numerous options in blocks grouped around 300 kW, 800 kW, 1,200 kW and larger. Typically, CHP systems are used to produce a portion of the electricity needed by a facility some or all of the time, with the balance of electric needs satisfied by purchase from the grid.

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location.

The maintenance building does have need for electrical generation and the ability to use most of the thermal byproduct during the winter. However thermal usage during the summer months is low, and thermal energy produced by the CHP plant will be wasted.

A viable option for a CHP plant would be a reciprocating engine natural gas-fired unit. However, the facility does not have a natural gas service and because the building is located in a residential area, noise would be an issue.

This measure is not recommended due to limited use of summertime heat, lack of a natural gas service, and noise issues.

5.5 Biomass Power Generation

Biomass power generation is a process in which waste organic materials are used to produce electricity or thermal energy. These materials would otherwise be sent to the landfill or expelled to the atmosphere. To participate in NJCEP's Customer On-Site Renewable Energy program, participants must install an on-site sustainable biomass or fuel cell energy generation system. Incentives for bio-power installations are available to support up to 1MW-dc of rated capacity.

*Class I organic residues are eligible for funding through the NJCEP CORE program. Class I wastes include the following renewable supply of organic material:

- Wood wastes not adulterated with chemicals, glues or adhesives
- Agricultural residues (corn stover, rice hulls or nut shells, manures, poultry litter, horse manure, etc) and/or methane gases from landfills
- Food wastes
- Municipal tree trimming and grass clipping wastes
- Paper and cardboard wastes
- Non adulterated construction wood wastes, pallets

The NJDEP evaluates biomass resources not identified in the RPS.

Examples of eligible facilities for a CORE incentive include:

- Digestion of sewage sludge
- Landfill gas facilities
- Combustion of wood wastes to steam turbine
- Gasification of wood wastes to reciprocating engine
- Gasification or pyrolysis of bio-solid wastes to generation equipment

* from NJOCE Website

This measure is not recommended because the building does not have a waste stream that can be utilized for the production of electricity or thermal energy.

5.5 Demand Response Curtailment

Presently, electricity is delivered by PSE&G, which receives the electricity from regional power grid RFC. PSE&G is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia including the State of New Jersey.

Utility Curtailment is an agreement with the PSE&G regional transmission organization and an approved Curtailment Service Provider (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator; therefore, reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand periods and PSE&G offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A PSE&G pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. The maintenance building had a maximum kW demand of 74 kW and a minimum kW of 17 kW during 2008. The monthly average over the observed 12 month period was 45 kW.

This measure is not recommended because the facility does not have adequate load to meet the required minimum load reduction.

6.0 EPA PORTFOLIO MANAGER

The United States Energy Protection Agency (EPA) is a federal agency in charge of regulating environment waste and policy in the United States. The mission of the EPA is to protect human health and the environment. The EPA has released an interactive energy management tool known as the EPA Portfolio Manger that allows building owners to track and assess energy consumption across their facility. This program is designed to allow property owners and managers to share, compare and improve upon their facility's energy consumption. Inputting such parameters at electricity, heating fuel, building characteristics and location into the website based program generates a naturalized energy rating score out of 100. The Portfolio Manager was to not able to provide the naturalized energy rating score for the facility because maintenance buildings of this type are not yet listed under the categories needed to provide the score and generate a full report. Once an account is registered, monthly utility data can be entered to track the savings progress and retrieve an updated energy rating score on a monthly basis.

The building has a Site Energy Usage Index (EUI) of 51 kBtu/ft²/yr. The national average EUI for similar buildings is 104 kBtu/ft²/yr. If the all of the measures recommended in this report for the maintenance building are fully implemented it is projected that the site EUI would be reduced to 49 kBtu/ft²/yr.

Information regarding the Energy Star Portfolio Manager is located in Appendix N. The user name and password for the Municipal Building's EPA Portfolio Manager Account was provided to Carmine DeMilio, Parks Supervisor for the Township of North Brunswick.

7.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the North Brunswick Township park facilities, in North Brunswick, New Jersey identified potential ECMs for occupancy sensors and space temperature setback. Potential annual savings of \$900 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-5 Lighting Occupancy Sensors in Food Concession Restrooms

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
1,600	0	1,600	0	200	0.9	100	8.0	7.5

* Incentive shown is per the New Jersey Smart Start Program, 2009 Lighting Controls Application. Incentive is based on \$35 for ceiling-mounted occupancy sensors.

ECM-6 Install Occupancy Sensors for Maintenance Building Interior Lighting

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
3,400	0	4,400	0	500	1.2	300	6.8	6.2

* Incentive shown is per the New Jersey Smart Start Program, 2009 Lighting Controls Application. Incentive is based on 4 ceiling-mounted occupancy sensors and 9 wall-mounted occupancy sensors.

ECM-7 Apply Space Temperature Setback to Maintenance Building Office

Budgetary	Annual Utility Savings				Potential	Payback	Payback	
Cost	Electricity		Natural Gas	Total	ROI	Incentive*	(without incentive)	(with incentive)
\$	kW	kWh	Therms	\$		\$	Years	Years
300	0	1,500	0	200	9.0	N/A	1.5	N/A

APPENDIX A

Utility Usage Analysis

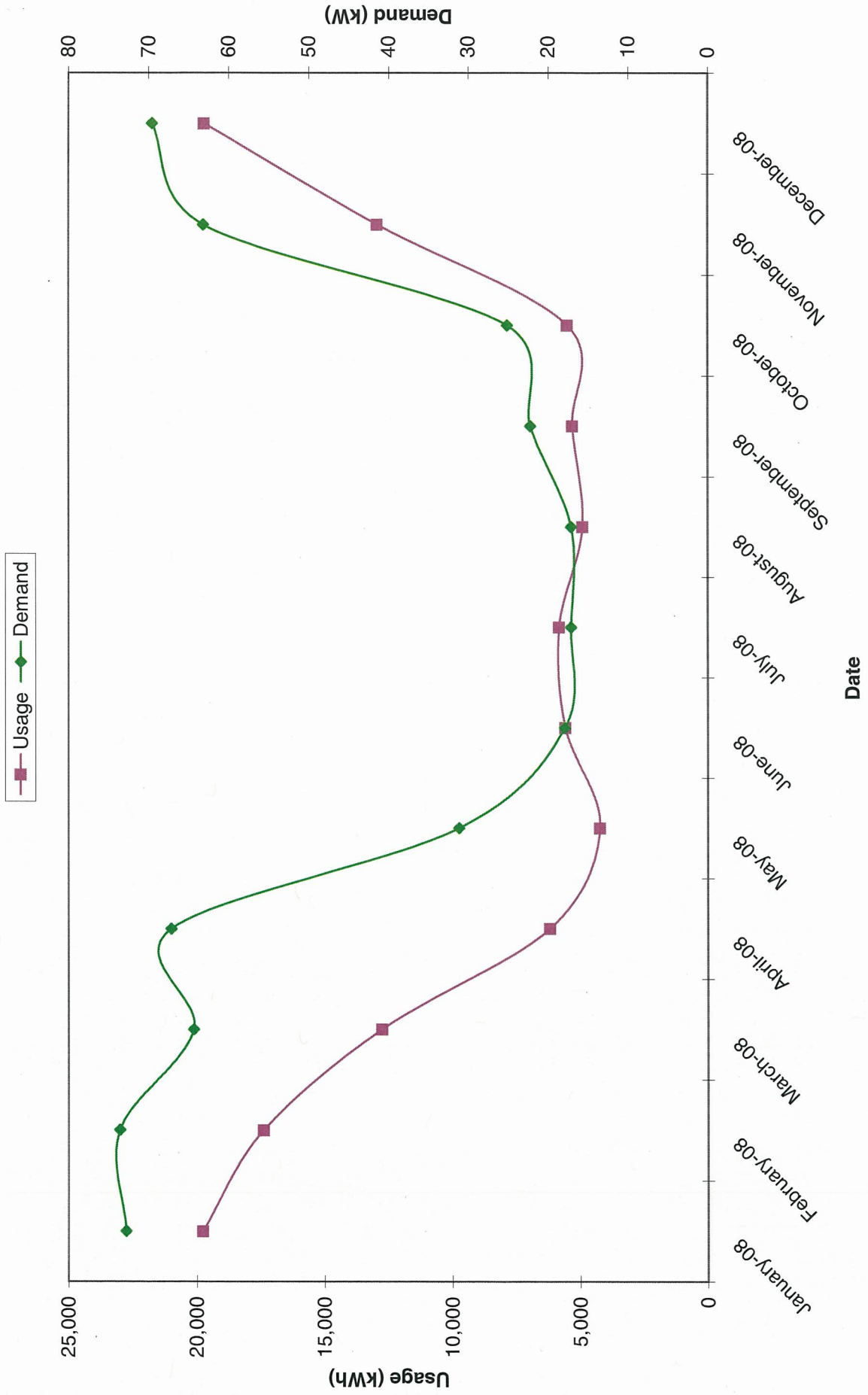
New Jersey BPU Energy Audit Program
 CHA #20418
 Building: Community Park Maintenance Facility

Account Number: 62 867 793 53 Meter Number: 9193702 Rate: GLP
 Public Service Electric & Gas Company (PSE&G)

Period	Electricity				Blended Rate (\$/kWh)
	kWh	kw	Cost (\$)	Demand Unit Cost (\$/kW)	
Jan-08	19,760	72.80	2,449.42	4.2843	0.1240
Feb-08	17,400	73.60	2,260.73	4.2808	0.1299
Mar-08	12,760	64.40	1,669.31	4.3360	0.1308
Apr-08	6,200	67.20	956.15	4.3176	0.1542
May-08	4,240	31.20	613.31	4.8064	0.1446
Jun-08	5,600	18.00	1,051.76	14.5328	0.1878
Jul-08	5,840	17.20	1,095.68	14.7529	0.1876
Aug-08	4,920	17.20	994.23	14.7529	0.2021
Sep-08	5,325	22.30	979.09	12.5327	0.1839
Oct-08	5,520	25.20	803.29	6.3913	0.1455
Nov-08	12,960	63.20	1,772.75	4.8902	0.1368
Dec-08	19,720	69.60	2,530.82	4.7986	0.1283
Total	120,245	73.60	\$17,176.54		0.1428
Monthly Ave.	10,020	45.16	\$1,431.38	5.90	

Service Charge	Electricity											Supply Total	Total
	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh				
\$4.24	\$283.49	\$0.00	\$140.99	\$118.30	\$197.36	\$744.38	\$13.33	\$15.08	\$1,676.63	\$1,705.04	\$2,449.42		
\$4.24	\$286.61	\$0.00	\$124.15	\$104.17	\$173.79	\$692.96	\$13.33	\$15.13	\$1,539.31	\$1,567.77	\$2,260.73		
\$4.24	\$250.78	\$0.00	\$91.05	\$76.39	\$127.44	\$549.90	\$13.33	\$15.13	\$1,090.95	\$1,119.41	\$1,669.31		
\$4.24	\$261.68	\$0.00	\$44.23	\$37.12	\$61.93	\$409.20	\$13.33	\$15.13	\$518.49	\$546.95	\$956.15		
\$4.24	\$121.50	\$0.00	\$30.25	\$25.38	\$42.35	\$223.72	\$13.33	\$15.13	\$361.13	\$389.59	\$613.31		
\$4.24	\$70.09	\$130.09	\$73.16	\$33.53	\$55.93	\$367.04	\$46.29	\$15.12	\$623.31	\$684.72	\$1,051.76		
\$4.24	\$66.98	\$124.30	\$76.30	\$34.96	\$58.33	\$365.11	\$47.35	\$15.12	\$668.10	\$730.57	\$1,095.68		
\$4.24	\$66.98	\$124.30	\$64.29	\$29.46	\$49.14	\$338.41	\$47.35	\$15.12	\$593.35	\$655.82	\$979.09		
\$4.24	\$88.25	\$128.30	\$48.26	\$31.14	\$52.72	\$352.91	\$47.16	\$15.77	\$563.25	\$626.18	\$979.09		
\$4.24	\$98.13	\$0.00	\$39.39	\$33.21	\$55.14	\$230.11	\$47.16	\$15.77	\$510.25	\$573.18	\$803.29		
\$4.24	\$246.11	\$0.00	\$92.46	\$85.72	\$129.44	\$557.97	\$47.16	\$15.79	\$1,151.83	\$1,214.78	\$1,772.75		
\$4.24	\$271.03	\$0.00	\$158.61	\$143.12	\$196.96	\$773.96	\$47.16	\$15.79	\$1,693.91	\$1,756.86	\$2,530.82		
\$50.88	\$2,111.63	\$506.99	\$983.14	\$752.50	\$1,200.53	\$5,605.67	\$396.28	\$184.08	\$10,990.51	\$11,570.87			

Community Park Maintenance Building

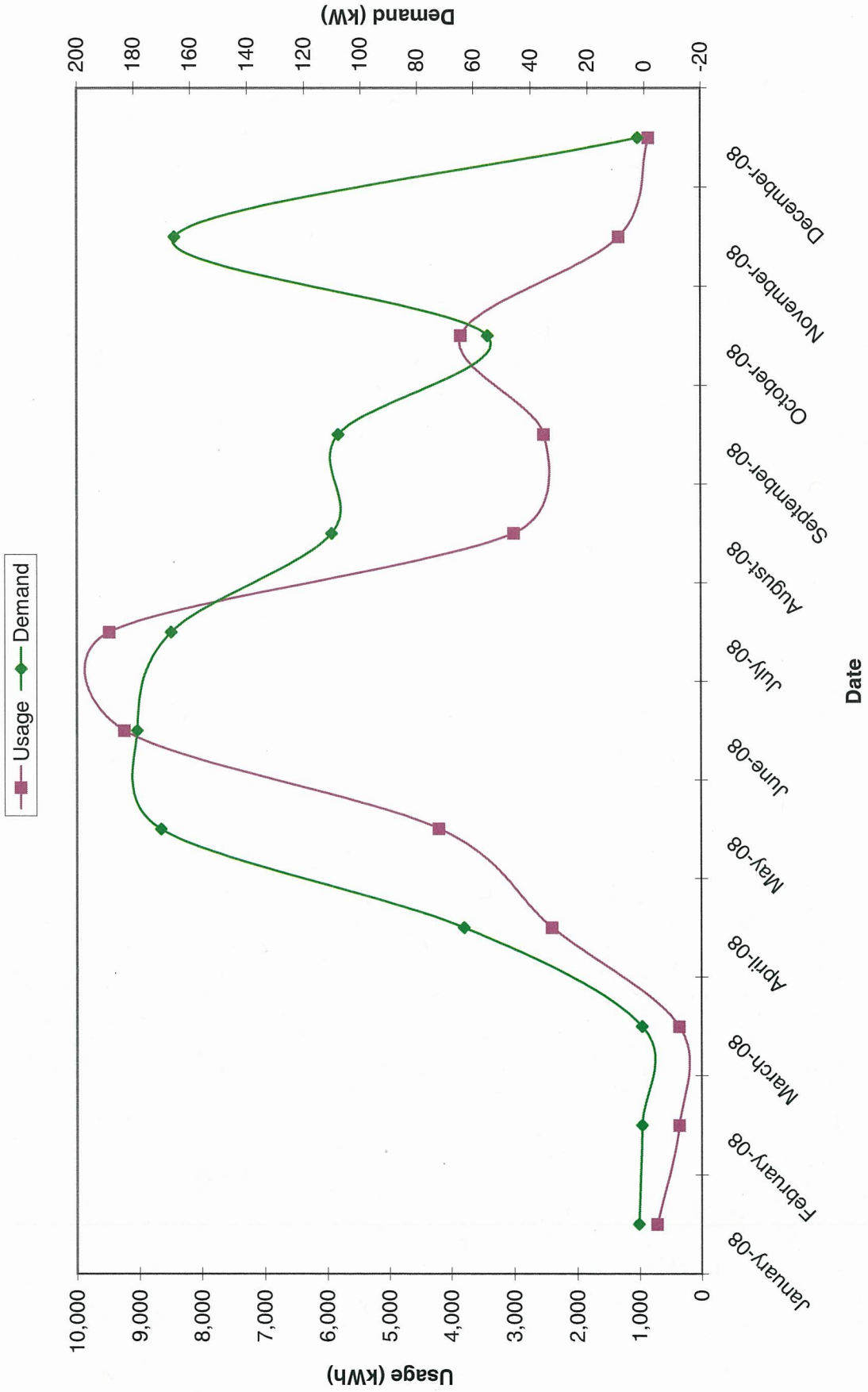


New Jersey BPU Energy Audit Program
 CHA #20418
 Building: Community Park Baseball Field Lighting
 Account Number: 62 867 791 59 Meter Number: 778017134 Rate: LPLS
 Public Service Electric & Gas Company (PSE&G)

Period	kWh	kW	Electricity		Supply Unit Cost (\$/kWh)	Blended Rate (\$/kWh)
			Cost (\$)	Demand Unit Cost (\$/kW)		
Jan-08	720	2.40	725.84	117.9875	0.0980	1.0081
Feb-08	360	1.20	692.35	233.1750	0.1123	1.9232
Mar-08	360	1.20	687.43	233.1750	0.0986	1.9095
Apr-08	2,400	63.60	1,109.76	7,9642	0.1069	0.4624
May-08	4,200	170.40	1,646.43	4,8448	0.1069	0.3920
Jun-08	9,240	178.80	4,201.36	14,4225	0.1353	0.4547
Jul-08	9,480	166.80	4,048.89	14,7480	0.1284	0.4271
Aug-08	3,000	110.40	2,639.28	16,6812	0.1345	0.8768
Sep-08	2,520	108.00	2,539.57	17,0142	0.1309	1.0078
Oct-08	3,840	55.20	1,659.71	15,2723	0.1158	0.4322
Nov-08	1,320	165.60	1,715.00	7,2420	0.1088	1.2992
Dec-08	840	2.40	1,131.67	280.3667	0.1032	1.3472
Total	38,280	178.80	\$22,797.29		0.1235	0.5955
Monthly Ave.	3,190	85.50	\$1,899.77	13.26		

Service Charge	Annual Demand kW	Summer Demand kW	On-peak kWh	Off-peak kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply on-peak kWh	Supply off-peak kWh	Supply Total	Total
\$372.11	\$7.74	\$0.00	\$0.78	\$1.56	\$4.31	\$7.19	\$393.69	\$121.63	\$153.80	\$24.02	\$32.70	\$332.15	\$725.84
\$372.11	\$3.87	\$0.00	\$0.78	\$0.39	\$2.16	\$3.60	\$382.91	\$121.63	\$154.31	\$24.89	\$8.61	\$309.44	\$692.35
\$372.11	\$3.87	\$0.00	\$0.39	\$0.78	\$2.16	\$3.60	\$382.91	\$121.63	\$154.31	\$12.08	\$16.50	\$304.52	\$687.43
\$372.11	\$205.74	\$0.00	\$5.10	\$2.74	\$14.37	\$23.98	\$623.44	\$121.63	\$154.31	\$154.19	\$56.19	\$486.32	\$1,109.76
\$372.11	\$549.61	\$0.00	\$8.23	\$5.49	\$25.15	\$41.95	\$1,002.54	\$121.63	\$154.31	\$252.97	\$114.98	\$643.89	\$1,646.43
\$372.11	\$576.70	\$1,353.61	\$19.61	\$10.59	\$55.32	\$92.29	\$2,480.23	\$494.22	\$154.21	\$920.96	\$251.74	\$1,721.13	\$4,201.36
\$372.11	\$538.00	\$1,261.52	\$14.90	\$16.08	\$56.76	\$94.68	\$2,354.05	\$506.24	\$154.21	\$639.58	\$394.81	\$1,694.84	\$4,048.89
\$372.11	\$348.34	\$828.74	\$4.31	\$3.92	\$15.08	\$25.17	\$1,587.67	\$506.24	\$154.21	\$185.15	\$96.30	\$941.90	\$2,539.57
\$372.11	\$178.04	\$0.00	\$8.23	\$4.31	\$23.10	\$38.35	\$624.14	\$504.23	\$160.76	\$274.89	\$95.69	\$1,035.57	\$1,659.71
\$372.11	\$534.13	\$0.00	\$2.36	\$1.95	\$8.73	\$13.19	\$932.47	\$504.15	\$160.99	\$75.73	\$41.66	\$782.53	\$1,715
\$372.11	\$7.74	\$0.00	\$1.50	\$2.00	\$6.09	\$8.39	\$397.83	\$504.15	\$160.99	\$36.79	\$31.91	\$733.84	\$1,131.67
Total	\$4,465.32	\$3,309.26	\$4,291.02	\$70.89	\$54.91	\$382.36	\$12,804.95	\$4,133.62	\$1,870.62	\$2,712.15	\$1,275.95	\$9,992.34	

Community Park Baseball Field Lighting



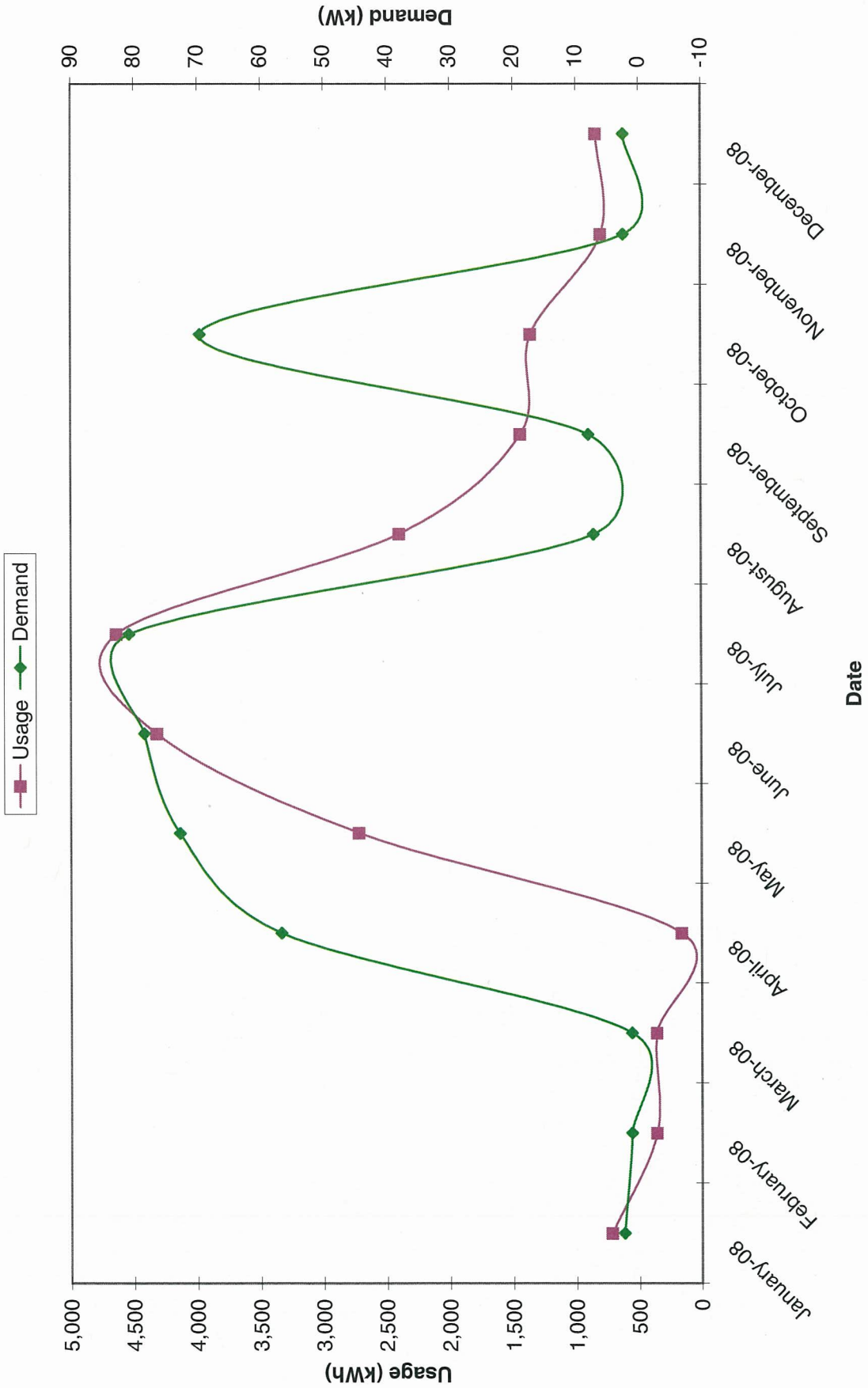
New Jersey BPU Energy Audit Program
 CHA #20418
 Building: Community Park Softball Field Lighting
 Account Number: 62 867 721 54 Meter Number: 778019524 Rate: LPLS
 Public Service Electric & Gas Company (PSE&G)

Period	kWh	kW	Electricity		Supply Unit Cost (\$/kWh)	Blended Rate (\$/kWh)
			Cost (\$)	Demand Unit Cost (\$/kW)		
Jan-08 *	720	2.40	725.84	117.9875	0.0980	1.0081
Feb-08 *	360	1.20	692.35	233.1750	0.1123	1.9232
Mar-08 *	360	1.20	687.43	233.1750	0.0986	1.9095
Apr-08	160	56.80	837.45	7.2456	0.1036	5.2341
May-08	2,720	72.80	1,082.35	5.8481	0.1046	0.3979
Jun-08	4,320	78.40	2,281.90	17.3889	0.1265	0.5282
Jul-08	4,640	80.80	2,377.49	17.3231	0.1305	0.5124
Aug-08	2,400	7.20	1,250.32	82.1403	0.1195	0.5210
Sep-08	1,440	8.00	1,073.24	68.5625	0.1060	0.7453
Oct-08	1,360	69.60	1,260.90	10.7372	0.1040	0.9271
Nov-08	800	2.40	984.40	221.0667	0.1022	1.2305
Dec-08 *	840	2.40	1,131.67	280.3667	0.1032	1.3472
Total	20,120	80.80	\$14,385.34		0.1124	0.7150
Monthly Ave.	1,677	31.93	\$1,198.78	17.90		

Service Charge	Annual Demand kW	Summer Demand kW	On-peak kWh	Off-peak kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply on-peak kWh	Supply off-peak kWh	Supply Total	Total
\$372.11	\$7.74	\$0.00	\$0.78	\$1.56	\$4.31	\$7.19	\$393.69	\$121.63	\$153.80	\$24.02	\$32.70	\$332.15	\$725.84
\$372.11	\$3.87	\$0.00	\$0.78	\$0.39	\$2.16	\$3.60	\$382.91	\$121.63	\$154.31	\$24.89	\$8.61	\$309.44	\$692.35
\$372.11	\$3.87	\$0.00	\$0.39	\$0.78	\$2.16	\$3.60	\$382.91	\$121.63	\$154.31	\$12.08	\$16.50	\$304.62	\$687.43
\$409.32	\$201.52	\$0.00	\$0.26	\$0.26	\$0.96	\$1.60	\$613.92	\$75.42	\$134.61	\$8.03	\$5.47	\$223.53	\$837.45
\$372.11	\$234.81	\$0.00	\$4.70	\$4.19	\$16.28	\$27.17	\$659.26	\$68.56	\$122.37	\$144.56	\$87.60	\$423.09	\$1,082.35
\$372.11	\$252.87	\$601.60	\$7.07	\$7.32	\$25.86	\$43.16	\$1,309.74	\$386.53	\$122.29	\$295.53	\$167.61	\$972.16	\$2,281.90
\$372.11	\$260.61	\$620.02	\$7.85	\$7.32	\$27.78	\$46.35	\$1,342.04	\$396.79	\$122.29	\$336.62	\$179.75	\$1,035.45	\$2,377.49
\$372.11	\$23.22	\$49.11	\$2.62	\$5.23	\$14.37	\$23.97	\$490.63	\$396.79	\$122.29	\$112.21	\$128.40	\$759.69	\$1,250.32
\$372.11	\$25.80	\$0.00	\$1.83	\$2.88	\$8.66	\$14.38	\$425.66	\$395.21	\$127.49	\$61.08	\$63.80	\$647.68	\$1,073.24
\$372.11	\$224.49	\$0.00	\$1.83	\$2.62	\$8.99	\$13.58	\$623.62	\$395.15	\$127.67	\$58.90	\$55.96	\$637.28	\$1,260.90
\$372.11	\$7.74	\$0.00	\$1.33	\$2.00	\$5.80	\$7.98	\$396.96	\$395.15	\$127.67	\$32.71	\$31.91	\$687.44	\$984.40
\$372.11	\$7.74	\$0.00	\$1.50	\$2.00	\$6.09	\$8.39	\$397.83	\$504.15	\$160.99	\$36.79	\$31.91	\$733.84	\$1,131.67
Total	\$4,130.42	\$1,270.73	\$29.44	\$34.30	\$117.33	\$192.58	\$7,021.34	\$2,874.49	\$1,469.10	\$1,110.63	\$778.11	\$6,232.33	
Monthly Ave.	1,677	31.93	\$1,198.78	17.90									

* Estimated - Bill information not available

Community Park Softball Field Lighting



New Jersey BPU Energy Audit Program
CHA #20418

Building: Community Park Soccer Field Lighting

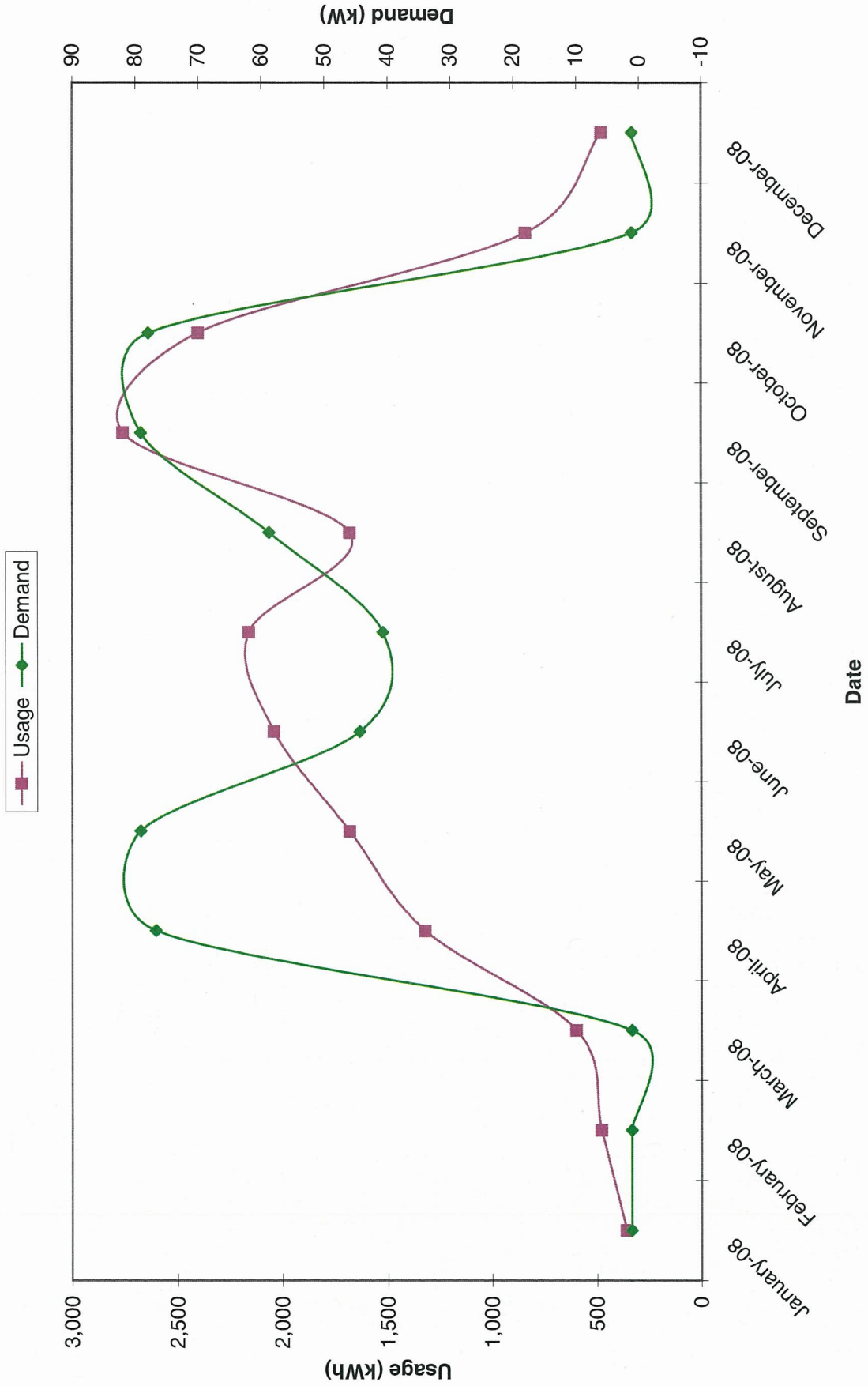
Account Number: 62 867 789 50 Meter Number: 778017574 Rate: GLP
Public Service Electric & Gas Company (PSE&G)

Period	Electricity			Supply Unit Cost (\$/kWh)	Blended Rate (\$/kWh)
	kWh	kW	Cost (\$)		
Jan-08	360	1.20	174.04	0.1080	0.4834
Feb-08	480	1.20	188.81	0.1115	0.3934
Mar-08	600	1.20	200.43	0.1086	0.3341
Apr-08	1,320	76.90	570.55	0.1067	0.4322
May-08	1,680	79.20	620.93	0.1083	0.3696
Jun-08	2,040	44.40	907.29	0.1403	0.4448
Jul-08	2,160	40.80	890.69	0.1434	0.4124
Aug-08	1,680	58.80	1,032.42	0.1496	0.6145
Sep-08	2,760	79.20	755.39	0.1156	0.2737
Oct-08	2,400	78.00	702.03	0.1126	0.2925
Nov-08	840	1.20	226.09	0.1112	0.2892
Dec-08 *	480	1.20	188.81	0.1115	0.3934
Total	16,800	79.20	\$6,457.48	0.1197	0.3844
Monthly Ave.	1,400	38.60	\$538.12	9.09	

* Estimated - Bill information not available

Electricity											Supply Total	Total
Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total		
\$4.24	\$4.67	\$0.00	\$2.57	\$2.16	\$3.60	\$17.24	\$96.59	\$29.67	\$30.54	\$156.80	\$174.04	
\$4.24	\$4.67	\$0.00	\$3.42	\$2.87	\$4.79	\$19.99	\$96.59	\$29.77	\$42.46	\$168.82	\$188.81	
\$4.24	\$4.67	\$0.00	\$4.28	\$3.59	\$5.99	\$22.77	\$96.59	\$29.77	\$51.30	\$177.66	\$200.43	
\$4.24	\$299.07	\$0.00	\$9.42	\$7.90	\$13.18	\$333.81	\$96.59	\$29.77	\$110.38	\$236.74	\$570.55	
\$4.24	\$308.41	\$0.00	\$11.99	\$10.06	\$16.78	\$351.48	\$96.59	\$29.77	\$143.09	\$269.45	\$620.93	
\$4.24	\$172.90	\$320.88	\$26.65	\$12.21	\$20.38	\$557.26	\$93.22	\$29.75	\$227.06	\$350.03	\$907.29	
\$4.24	\$158.88	\$294.86	\$28.23	\$12.93	\$21.58	\$520.72	\$93.11	\$29.75	\$247.11	\$369.97	\$890.69	
\$4.24	\$228.97	\$424.95	\$21.95	\$10.06	\$16.78	\$706.95	\$93.11	\$29.75	\$202.61	\$325.47	\$1,032.42	
\$4.24	\$308.41	\$0.00	\$19.70	\$16.60	\$27.56	\$376.51	\$92.74	\$31.01	\$255.13	\$378.88	\$755.39	
\$4.24	\$303.74	\$0.00	\$17.13	\$15.87	\$23.97	\$364.95	\$92.72	\$31.06	\$213.30	\$337.08	\$702.03	
\$4.24	\$4.67	\$0.00	\$6.76	\$6.10	\$8.39	\$30.16	\$92.72	\$31.06	\$72.15	\$195.93	\$226.09	
\$4.24	\$4.67	\$0.00	\$3.42	\$2.87	\$4.79	\$19.99	\$96.59	\$29.77	\$42.46	\$168.82	\$188.81	
\$46.64	\$1,799.06	\$1,040.69	\$152.10	\$100.35	\$163.00	\$3,301.84	\$1,040.57	\$331.13	\$1,595.13	\$2,966.83		

Community Park Soccer Field Lighting



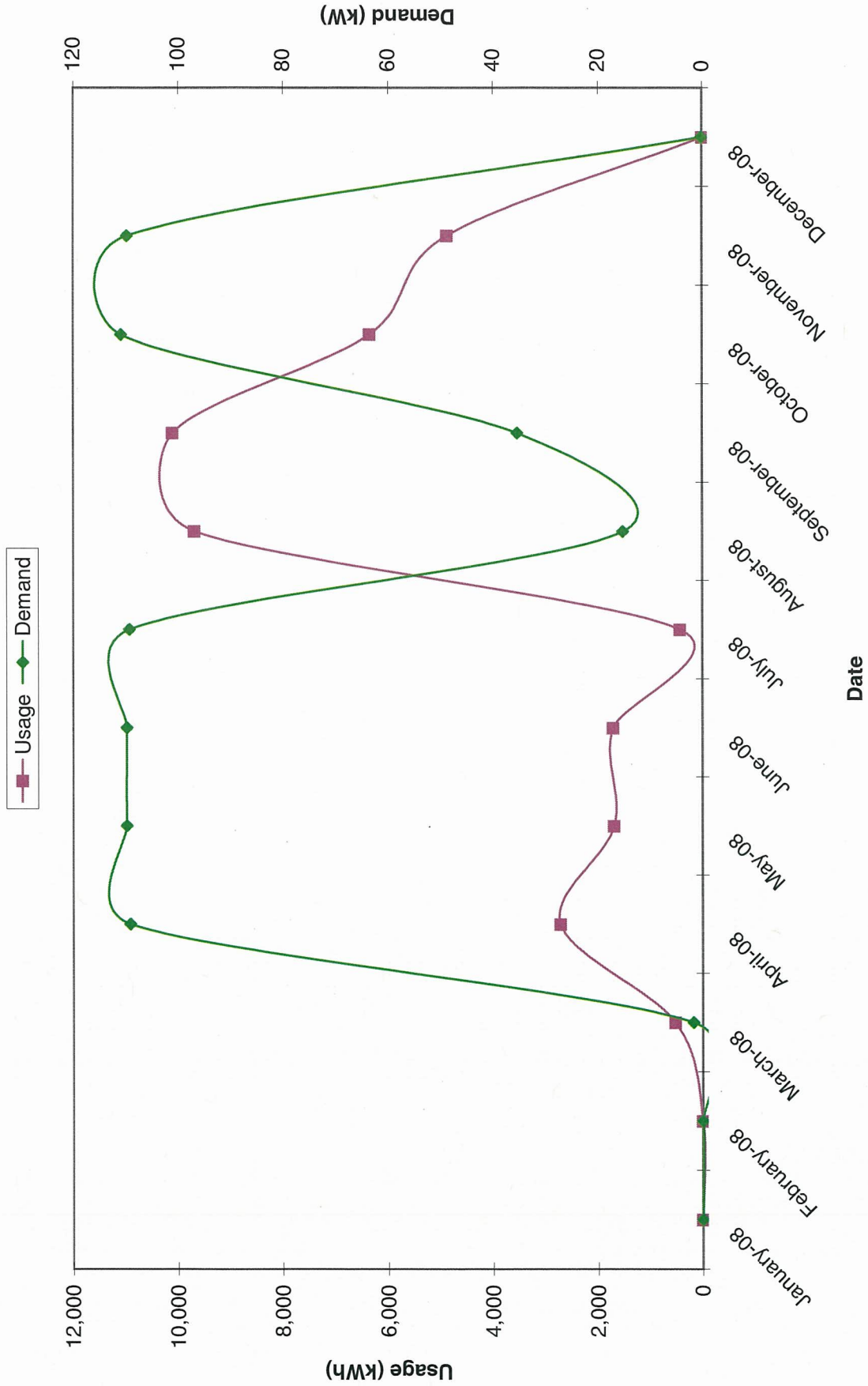
New Jersey BPU Energy Audit Program
 CHA #20418
 Building: Apple Orchard Soccer Field Lighting
 Account Number: 62 863 499 52 Meter Number: 286001633 Rate: GLP
 Public Service Electric & Gas Company (PSE&G)

Period	kWh	kW	Electricity			Blended Rate (\$/kWh)
			Cost (\$)	Demand Unit Cost (\$/kW)	Supply Unit Cost (\$/kWh)	
Jan-08	0	0.00	157.94			
Feb-08	0	0.00	158.25			
Mar-08	522	1.80	221.95	89.4556	0.1086	0.4252
Apr-08	2,718	109.10	873.20	5.3058	0.1067	0.3213
May-08	1,692	109.80	769.04	5.2967	0.1083	0.4545
Jun-08	1,710	109.80	769.04	5.2967	0.1071	0.4497
Jul-08	432	109.30	1,658.43	14.5674	0.1434	3.8390
Aug-08	9,693	15.30	1,690.32	19.4863	0.1432	0.1744
Sep-08	10,110	35.40	2,054.51	16.9503	0.1434	0.2032
Oct-08	6,354	110.90	1,549.88	7.3153	0.1156	0.2439
Nov-08	4,878	109.80	1,360.65	7.3505	0.1126	0.2789
Dec-08	0	0.20	384.53	1,901.4500		
Total	38,109	110.90	\$11,647.74		0.1285	0.3056
Monthly Ave.	3,176	59.28	\$970.65	9.42		

Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total	Total
\$4.24						\$4.24	\$62.73	\$90.97		\$153.70	\$157.94
\$4.24						\$4.24	\$62.73	\$91.28		\$154.01	\$158.25
\$4.24	\$7.01		\$3.72	\$3.13	\$5.21	\$23.31	\$62.73	\$91.28	\$44.63	\$198.64	\$221.95
\$4.24	\$424.85		\$19.39	\$16.27	\$27.14	\$491.89	\$62.73	\$91.28	\$227.30	\$381.31	\$3873.20
\$4.24	\$427.57		\$12.08	\$10.13	\$16.90	\$470.92	\$62.73	\$91.28	\$144.11	\$298.12	\$769.04
\$4.24	\$427.57		\$12.08	\$10.13	\$16.90	\$470.92	\$62.73	\$91.28	\$144.11	\$298.12	\$769.04
\$4.24	\$425.63	\$789.91	\$5.64	\$2.59	\$4.32	\$1,232.33	\$285.46	\$91.22	\$49.42	\$426.10	\$1,658.43
\$4.24	\$59.58	\$110.57	\$126.63	\$58.03	\$96.82	\$455.87	\$97.00	\$30.99	\$1,106.46	\$1,234.45	\$1,690.32
\$4.24	\$137.85	\$255.84	\$132.09	\$60.53	\$100.98	\$691.53	\$156.38	\$49.97	\$1,156.63	\$1,362.98	\$2,054.51
\$4.24	\$431.86		\$45.33	\$38.23	\$63.46	\$583.12	\$284.32	\$95.09	\$587.35	\$966.76	\$1,549.88
\$4.24	\$427.57		\$34.81	\$32.26	\$48.72	\$547.60	\$284.28	\$95.23	\$433.54	\$813.05	\$1,360.65
\$4.24	\$0.78					\$5.02	\$284.28	\$95.23		\$379.51	\$384.53
\$50.88	\$2,770.27	\$1,156.32	\$391.77	\$231.30	\$380.45	\$4,980.99	\$1,768.10	\$1,005.10	\$3,893.55	\$6,666.75	

Total	38,109	110.90	\$11,647.74		0.1285	0.3056
Monthly Ave.	3,176	59.28	\$970.65	9.42		

North Brunswick, NJ - Apple Orchard Lane Soccer Field



New Jersey BPU Energy Audit Program
 CHA #20418
 Building: Caruso Park Field Lighting

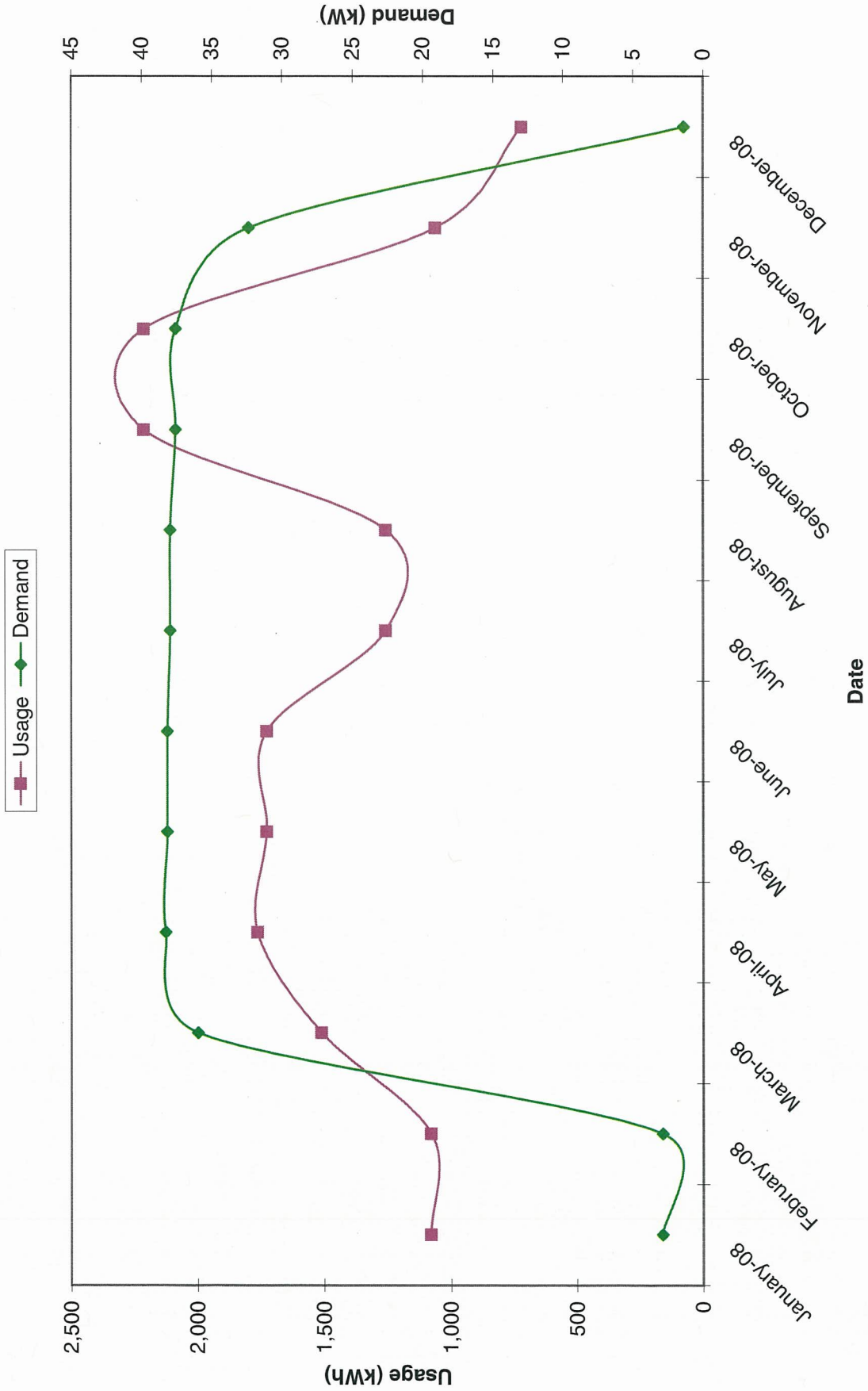
Account Number: 62 863 351 53 Meter Number: 686000161 Rate: GLP
 Public Service Electric & Gas Company (PSE&G)

Period	kWh	kW	Electricity			Blended Rate (\$/kWh)
			Cost (\$)	Demand Unit Cost (\$/kW)	Supply Unit Cost (\$/kWh)	
Jan-08 *	1,080	2.90	219.52	32.6862	0.1116	0.2033
Feb-08	1,080	2.90	219.52	32.6862	0.1116	0.2033
Mar-08	1,512	36.00	392.14	6.2136	0.1086	0.2594
Apr-08	1,728	38.30	425.16	6.0742	0.1067	0.2410
May-08 *	1,728	38.20	423.60	6.0798	0.1083	0.2451
Jun-08	1,260	38.00	822.34	16.7729	0.1434	0.6527
Jul-08	1,260	38.00	822.34	16.7729	0.1434	0.6527
Aug-08 *	2,214	37.60	622.86	9.6473	0.1156	0.2813
Sep-08 *	2,214	37.60	622.86	9.6473	0.1156	0.2813
Oct-08	1,062	32.40	466.38	10.5722	0.1126	0.4392
Nov-08	720	1.40	306.14	158.4429	0.1112	0.4252
Dec-08	720	1.40	306.14	158.4429	0.1112	0.4252
Total	17,622	38.30	\$5,766.46		0.1158	0.3272
Monthly Ave.	1,469	28.46	\$480.54	10.76		

* Estimated - Bill information not available

Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total	Total
\$4.24	\$11.29		\$7.70	\$6.47	\$10.78	\$40.48	\$31.46	\$52.04	\$95.54	\$179.04	\$219.52
\$4.24	\$11.29		\$7.70	\$6.47	\$10.78	\$40.48	\$31.46	\$52.04	\$95.54	\$179.04	\$219.52
\$4.24	\$140.19		\$10.79	\$9.05	\$15.10	\$179.37	\$31.46	\$52.04	\$129.27	\$212.77	\$392.14
\$4.24	\$149.14		\$12.99	\$10.56	\$17.61	\$194.14	\$31.46	\$52.04	\$147.52	\$231.02	\$425.16
\$4.24	\$148.75		\$12.33	\$10.35	\$17.26	\$192.93	\$31.46	\$52.04	\$147.17	\$230.67	\$423.60
\$4.24	\$148.75		\$12.33	\$10.35	\$17.26	\$192.93	\$31.46	\$52.04	\$147.17	\$230.67	\$423.60
\$4.24	\$147.98	\$274.63	\$16.46	\$7.54	\$12.58	\$463.43	\$162.75	\$52.01	\$144.15	\$358.91	\$822.34
\$4.24	\$146.42	\$274.63	\$15.79	\$13.32	\$22.11	\$201.88	\$162.10	\$54.22	\$204.66	\$420.98	\$622.86
\$4.24	\$146.42		\$15.79	\$13.32	\$22.11	\$201.88	\$162.10	\$54.22	\$204.66	\$420.98	\$622.86
\$4.24	\$126.17		\$7.98	\$7.02	\$10.61	\$155.62	\$162.08	\$54.29	\$94.39	\$310.76	\$466.38
\$4.24	\$5.45		\$5.80	\$5.23	\$7.20	\$27.92	\$162.08	\$54.29	\$61.85	\$278.22	\$306.14
\$50.88	\$1,329.83	\$549.26	\$141.32	\$107.22	\$175.98	\$2,354.49	\$1,162.62	\$633.28	\$1,616.07	\$3,411.97	

North Brunswick, NJ - Caruso Park



New Jersey BPU Energy Audit Program
 CHA #20418
 Building: Renaissance Park Field Lighting

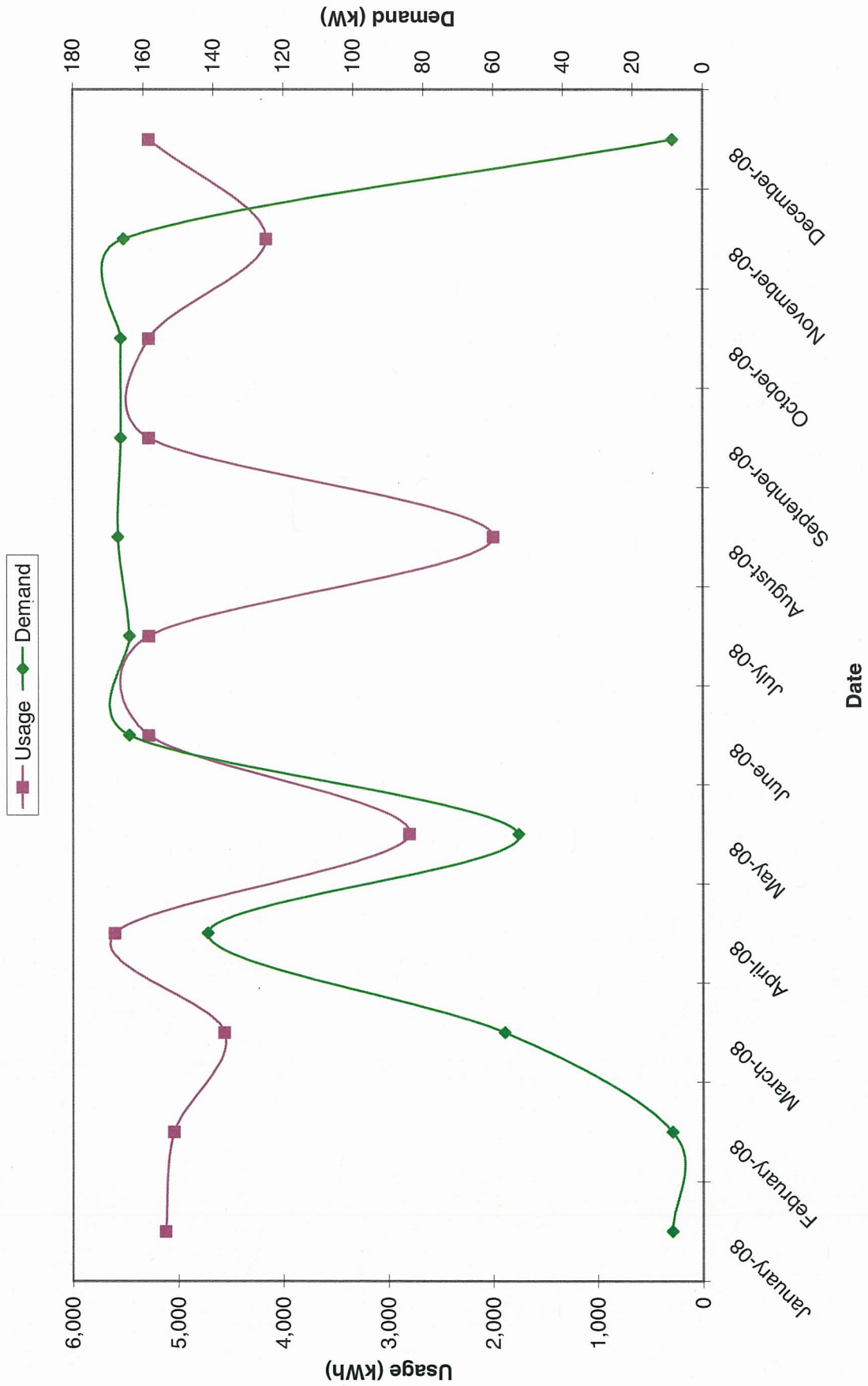
Account Number: 62 489 638 19 Meter Number: 778012728 Rate: LPLS
 Public Service Electric & Gas Company (PSE&G)

Period	kWh	kW	Electricity			Blended Rate (\$/kWh)
			Cost (\$)	Demand Unit Cost (\$/kW)	Supply Unit Cost (\$/kWh)	
Jan-08	5,120	8.80	1,270.04	75.7239	0.1007	0.2481
Feb-08	5,040	8.80	1,211.59	75.5670	0.1017	0.2404
Mar-08	4,560	56.80	1,321.32	16.9967	0.1025	0.2898
Apr-08	5,600	141.60	1,718.84	10.8225	0.1056	0.3069
May-08	2,800	52.80	1,135.87	17.1542	0.1053	0.4057
Jun-08	5,280	164.00	3,342.69	26.9475	0.1237	0.6331
Jul-08 *	5,280	164.00	3,342.69	26.9475	0.1237	0.6331
Aug-08	2,000	167.20	3,160.20	27.3806	0.1419	1.5801
Sep-08 *	5,280	166.40	2,316.15	12.4310	0.1369	0.4387
Oct-08	5,280	166.40	2,316.15	12.4310	0.1369	0.4387
Nov-08	4,160	165.60	2,081.25	12.3361	0.1173	0.5003
Dec-08	5,280	8.80	1,627.87	120.1750	0.1024	0.3083
Total	55,680	167.20	\$24,844.66		0.1158	0.4462
Monthly Ave.	4,640	106.93	\$2,070.39	19.97		

* Estimated - Bill information not available

Service Charge	Annual Demand kW	Summer Demand kW	On-Peak kWh	Off-Peak kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	On-Peak kWh	Off-Peak kWh	Supply Total	Total
\$372.11	\$28.38		\$7.32	\$9.40	\$30.65	\$50.83	\$498.69	\$139.30	\$214.48	\$222.94	\$194.63	\$771.35	\$1,270.04
\$372.11	\$28.38	\$6.28	\$10.18	\$30.18	\$30.18	\$50.33	\$497.46	\$139.15	\$159.16	\$196.37	\$219.45	\$714.13	\$1,211.59
\$372.11	\$163.20	\$6.28	\$8.62	\$27.31	\$45.54	\$45.54	\$643.06	\$139.15	\$159.36	\$195.40	\$184.35	\$678.26	\$1,321.32
\$372.11	\$456.72	\$10.72	\$7.58	\$33.53	\$55.94	\$55.94	\$936.60	\$139.15	\$159.36	\$326.73	\$157.00	\$782.24	\$1,718.84
\$372.11	\$170.30	\$5.23	\$3.92	\$16.76	\$27.97	\$27.97	\$596.29	\$139.15	\$159.36	\$159.66	\$81.41	\$539.58	\$1,135.87
\$372.11	\$528.97	\$1,258.45	\$10.72	\$6.54	\$31.61	\$52.73	\$2,261.13	\$370.84	\$159.30	\$403.16	\$148.26	\$1,081.56	\$3,342.69
\$372.11	\$528.97	\$1,258.45	\$10.72	\$6.54	\$31.61	\$52.73	\$2,261.13	\$370.84	\$159.30	\$403.16	\$148.26	\$1,081.56	\$3,342.69
\$372.11	\$539.29	\$1,283.01	\$4.19	\$2.36	\$11.97	\$19.99	\$2,232.92	\$522.82	\$159.25	\$184.59	\$60.62	\$927.28	\$3,160.20
\$372.11	\$536.71		\$15.42	\$1.83	\$31.34	\$52.73	\$1,010.14	\$521.67	\$163.01	\$578.96	\$42.37	\$1,306.01	\$2,316.15
\$372.11	\$534.13		\$10.18	\$3.40	\$26.69	\$41.55	\$988.06	\$520.66	\$166.26	\$332.59	\$73.68	\$1,093.19	\$2,081.25
\$372.11	\$28.38		\$7.52	\$11.55	\$36.21	\$52.73	\$508.50	\$520.66	\$166.26	\$215.42	\$217.03	\$1,119.37	\$1,627.87
Total	\$4,465.32	\$4,100.14	\$3,799.91	\$110.00	\$73.75	\$339.20	\$555.80	\$13,444.12	\$1,988.11	\$3,797.94	\$1,569.43	\$11,400.54	

North Brunswick, NJ - Renaissance Boulevard Field



New Jersey BPU Energy Audit Program
 CHA #20418
 Building: North Brunswick Township Sabella Park

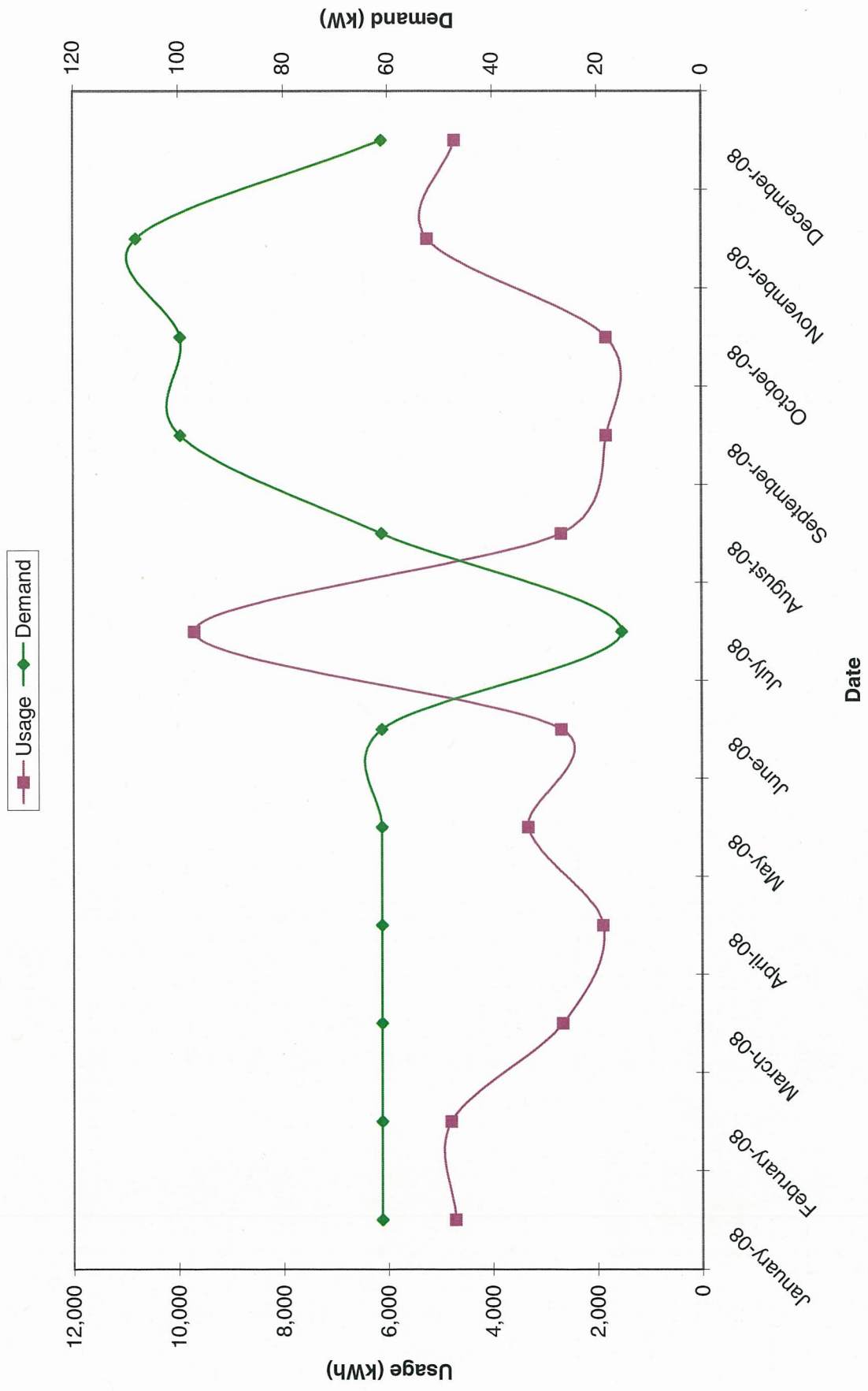
Account Number: 62 711 699 10 Meter Number: 266024481 Rate: GLP
 Public Service Electric & Gas Company (PSE&G)

Period	kWh	kW	Electricity			Blended Rate (\$/kWh)
			Cost (\$)	Demand Unit Cost (\$/kW)	Supply Unit Cost (\$/kWh)	
Jan-08	4,716	61.20	785.23	4.4605	0.1077	0.1665
Feb-08	4,797	61.20	812.51	4.5072	0.1110	0.1694
Mar-08	2,664	61.20	570.33	4.5074	0.1089	0.2141
Apr-08	1,890	61.20	482.21	4.5074	0.1069	0.2551
May-08	3,321	61.20	638.90	4.5074	0.1080	0.1924
Jun-08	2,682	61.20	1,170.34	13.0217	0.1376	0.4364
Jul-08*	9,693	15.30	1,690.32	19.4863	0.1432	0.1744
Aug-08	2,682	61.20	1,170.34	13.0217	0.1376	0.4364
Sep-08	1,820	99.60	1,120.44	8.7965	0.1319	0.6156
Oct-08	1,820	99.60	1,120.44	8.7963	0.1319	0.6156
Nov-08	5,240	108.00	1,147.22	5.0881	0.1133	0.2189
Dec-08*	4,716	61.20	785.23	4.4605	0.1077	0.1665
Total	46,041	108.00	\$11,493.48		0.1216	0.2496
Monthly Ave.	3,837	67.68	\$957.79	7.20		

* Estimated - Bill information not available

Service Charge	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total	Total
\$4.24	\$238.32	\$442.29	\$33.65	\$28.23	\$46.99	\$351.43	\$6.52	\$28.14	\$399.14	\$433.80	\$785.23
\$4.24	\$238.32	\$442.29	\$34.23	\$28.72	\$47.91	\$353.42	\$6.52	\$31.00	\$421.57	\$459.09	\$812.51
\$4.24	\$238.32	\$442.29	\$19.01	\$13.95	\$26.61	\$304.13	\$6.52	\$31.01	\$228.67	\$266.20	\$570.33
\$4.24	\$238.32	\$442.29	\$13.48	\$11.32	\$18.88	\$286.24	\$6.52	\$31.01	\$158.44	\$195.97	\$482.21
\$4.24	\$238.32	\$442.29	\$23.70	\$19.88	\$33.17	\$319.31	\$6.52	\$31.01	\$282.06	\$319.59	\$638.90
\$4.24	\$238.32	\$442.29	\$35.04	\$18.06	\$26.79	\$362.74	\$85.32	\$31.00	\$291.28	\$407.60	\$1,170.34
\$4.24	\$69.58	\$110.57	\$126.63	\$58.03	\$96.82	\$455.87	\$97.00	\$30.99	\$1,106.46	\$1,234.45	\$1,690.32
\$4.24	\$238.32	\$442.29	\$35.04	\$16.06	\$26.79	\$362.74	\$85.32	\$31.00	\$291.28	\$407.60	\$1,170.34
\$4.24	\$387.85	\$359.91	\$18.38	\$10.83	\$18.18	\$799.39	\$96.84	\$31.53	\$192.68	\$321.05	\$1,120.44
\$4.24	\$387.85	\$359.91	\$18.37	\$10.83	\$18.18	\$799.37	\$96.84	\$31.52	\$192.68	\$321.04	\$1,120.41
\$4.24	\$420.56	\$420.56	\$37.38	\$34.66	\$52.34	\$549.18	\$96.60	\$32.36	\$469.08	\$598.04	\$1,147.22
\$4.24	\$238.32	\$442.29	\$33.65	\$28.23	\$46.99	\$351.43	\$6.52	\$28.14	\$399.14	\$433.80	\$785.23
Total	\$50.88	\$3,162.40	\$1,714.96	\$428.56	\$278.80	\$6,095.25	\$597.04	\$368.71	\$4,432.48	\$5,398.23	

North Brunswick, NJ - Sabella Park



New Jersey BPU Energy Audit Program
 CHA #20418
 Building: Veterans Park Field Lighting

Account Number: 62 927 141 28 Meter Number: 258001730 Rate: GLP
 Public Service Electric & Gas Company (PSE&G)

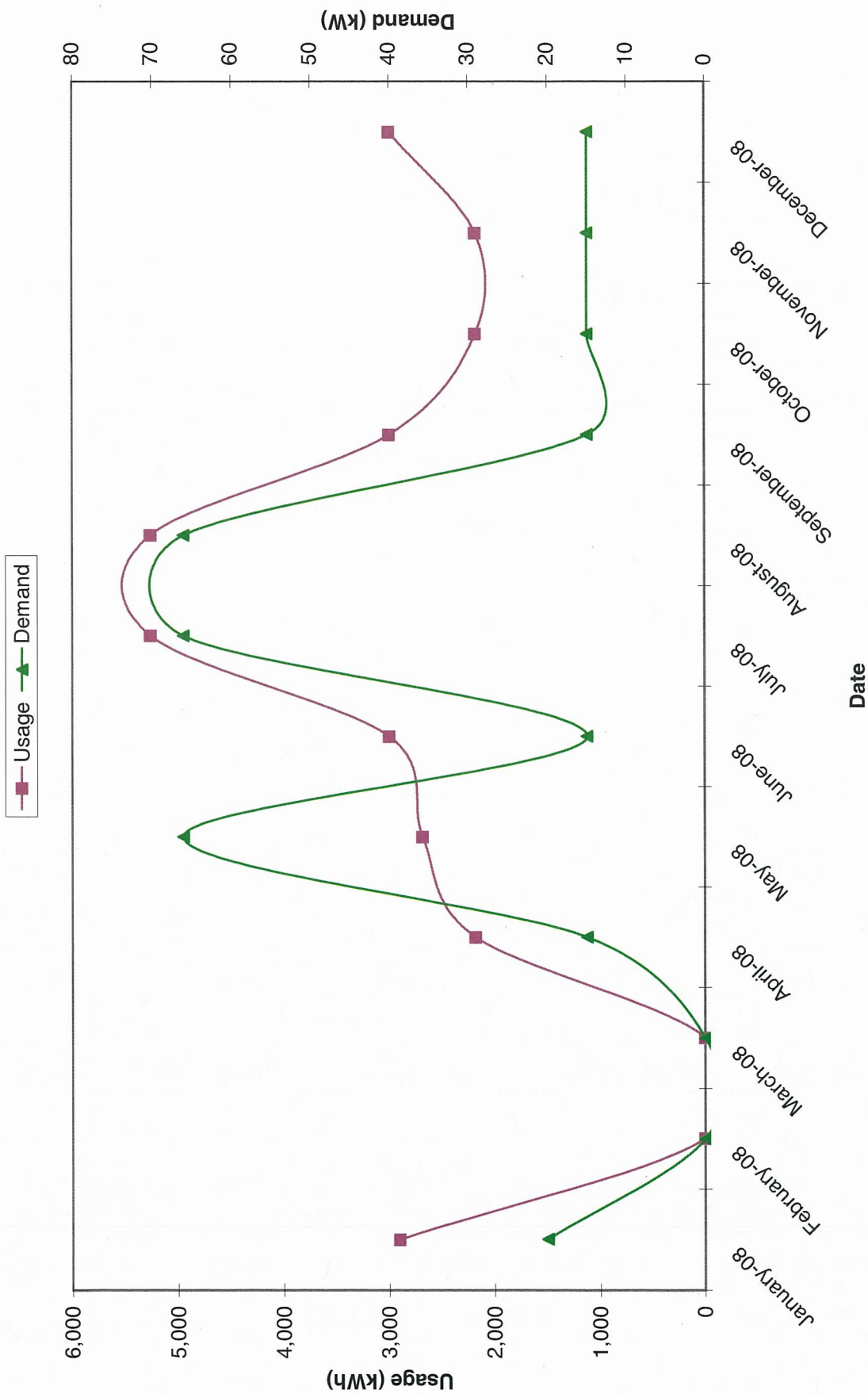
Period	Electricity				Blended Rate (\$/kWh)
	kWh	kW	Demand Unit Cost (\$/kW)	Supply Unit Cost (\$/kWh)	
Jan-08	2,900	20.00	510.77	0.1082	0.1761
Feb-08	0	0.00	119.35		
Mar-08	0	0.00	119.35		
Apr-08 *	2,180	15.00	627.45	25.1933	0.2878
May-08	2,680	66.00	683.75	5.8305	0.2551
Jun-08 *	3,000	15.00	916.51	32.2613	0.1428
Jul-08	5,260	66.00	1,809.82	15.9256	0.3441
Aug-08 *	5,260	66.00	1,809.82	15.9256	0.3441
Sep-08	3,000	15.00	916.51	32.2613	0.1428
Oct-08 *	2,180	15.00	627.45	25.1933	0.2878
Nov-08	2,180	15.00	627.45	25.1933	0.2878
Dec-08	3,000	15.00	715.77	25.1933	0.2386
Total	31,640	66.00	\$9,484.00	0.1278	0.2997
Monthly Ave.	2,637	25.67	\$790.33	17.50	

* Estimated - Bill information not available

Service Charge	Electricity											Supply Total	Total
	Annual Demand kW	Summer Demand kW	Delivery kWh	Societal Benefits kWh	Securitization Transition kWh	Delivery Total	Generation kW	Transmission kW	Supply kWh	Supply Total			
\$ 4.24	\$ 77.88	\$ -	\$ 20.70	\$ 17.36	\$ 28.97	\$ 149.15	\$ 38.27	\$ 76.60	\$ 246.75	\$ 361.62	\$ 510.77	\$ 510.77	
\$ 4.24	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.24	\$ 38.27	\$ 76.84	\$ -	\$ 115.11	\$ 119.35	\$ 119.35	
\$ 4.24	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.24	\$ 38.27	\$ 76.84	\$ -	\$ 115.11	\$ 119.35	\$ 119.35	
\$ 4.24	\$ 58.41	\$ -	\$ 15.56	\$ 14.42	\$ 21.77	\$ 114.40	\$ 239.32	\$ 80.17	\$ 193.56	\$ 513.05	\$ 627.45	\$ 627.45	
\$ 4.24	\$ 257.01	\$ 108.41	\$ 19.13	\$ 16.05	\$ 26.76	\$ 323.19	\$ 50.96	\$ 76.84	\$ 232.76	\$ 360.56	\$ 683.75	\$ 683.75	
\$ 4.24	\$ 58.41	\$ 108.41	\$ 39.20	\$ 17.96	\$ 29.97	\$ 258.19	\$ 240.31	\$ 76.79	\$ 341.22	\$ 658.32	\$ 916.51	\$ 916.51	
\$ 4.24	\$ 257.01	\$ 476.98	\$ 68.72	\$ 31.49	\$ 52.54	\$ 890.98	\$ 240.31	\$ 76.79	\$ 601.74	\$ 918.84	\$ 1,809.82	\$ 1,809.82	
\$ 4.24	\$ 257.01	\$ 476.98	\$ 68.72	\$ 31.49	\$ 52.54	\$ 890.98	\$ 240.31	\$ 76.79	\$ 601.74	\$ 918.84	\$ 1,809.82	\$ 1,809.82	
\$ 4.24	\$ 58.41	\$ 108.41	\$ 39.20	\$ 17.96	\$ 29.97	\$ 258.19	\$ 240.31	\$ 76.79	\$ 341.22	\$ 658.32	\$ 916.51	\$ 916.51	
\$ 4.24	\$ 58.41	\$ -	\$ 15.56	\$ 14.42	\$ 21.77	\$ 114.40	\$ 239.32	\$ 80.17	\$ 193.56	\$ 513.05	\$ 627.45	\$ 627.45	
\$ 4.24	\$ 58.41	\$ -	\$ 15.56	\$ 14.42	\$ 21.77	\$ 114.40	\$ 239.32	\$ 80.17	\$ 193.56	\$ 513.05	\$ 627.45	\$ 627.45	
\$ 4.24	\$ 58.41	\$ -	\$ 24.17	\$ 21.80	\$ 29.97	\$ 138.59	\$ 239.32	\$ 80.17	\$ 257.69	\$ 577.18	\$ 715.77	\$ 715.77	
\$50.88	\$1,199.37	\$1,170.78	\$326.52	\$197.37	\$316.03	\$3,260.95	\$2,084.29	\$934.96	\$3,203.80	\$6,223.05			

\$50.88 **\$1,199.37** **\$1,170.78** **\$326.52** **\$197.37** **\$316.03** **\$3,260.95** **\$2,084.29** **\$934.96** **\$3,203.80** **\$6,223.05**

North Brunswick, NJ - Vet Park



ELECTRIC MARKETERS LIST

The following is a listing of marketers/suppliers/brokers that have been licensed by the NJ Board of Public Utilities to sell electricity to residential, small commercial and industrial customers served by the Public Service Electric and Gas Company distribution system. **This listing is provided for informational purposes only and PSE&G makes no representations or warranties as to the competencies of the entities listed herein or to the completeness of this listing.**

American Powernet Management
867 Berkshire Blvd, Suite 101
Wyomissing, PA 19610
www.americanpowernet.com

Gerdau Ameristeel Energy Co.
North Crossman Road
Sayreville, NJ 08872

PPL EnergyPlus, LLC
Energy Marketing Center
Two North Ninth Street
Allentown, PA 18101
1-866-505-8825
<http://www.pplenergyplus.com/>

BOC Energy Services
575 Mountain Avenue
Murray Hill, NJ 07974
www.boc-gases.com

Gexa Energy LLC New Jersey
20 Greenway Plaza, Suite 600
Houston, TX 77046
(866) 304-GEXA
Beth.miller@gexaenergy.com

Sempra Energy Solutions
The Mac-Cali Building
581 Main Street, 8th Floor
Woodbridge, NJ 07095
(877) 273-6772
www.SempraSolutions.com

Commerce Energy Inc.
535 Route 38, Suite 138
Cherry Hill, NJ 08002
(888) 817-8572 or
(858) 910-8099
www.commerceenergy.com

Glacial Energy of New Jersey
2602 McKinney Avenue, Suite 220
Dallas, TX 75204
www.glacialenergy.com

South Jersey Energy Company
1 South Jersey Plaza, Route 54
Folsom, NJ 08037
(800) 756-3749
www.sjindustries.com

ConEdison Solutions
701 Westchester Avenue
Suite 201 West
White Plains, NY 10604
(800) 316-8011
www.ConEdSolutions.com

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095
www.hess.com

Strategic Energy, LLC
6 East Main Street, Suite 6E
Ramsey, NJ 07446
(888) 925-9115
www.sel.com

Constellation NewEnergy, Inc.
1199 Route 22 East
Mountainside, NJ 07092
908 228-5100
www.newenergy.com

Integrus Energy Services, Inc
99 Wood Avenue, Suite 802
Iselin, NJ 08830
www.integrusenergy.com

Suez Energy Resources NA
333 Thornall Street FL6
Edison, NJ 08818
866.999.8374(toll free)
www.suezenergyresources.com

Credit Suisse (USA), Inc.
700 College Road East
Princeton, NJ 08450
www.creditsuisse.com

Liberty Power Delaware, LLC
1901 W Cypress Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

UGI Energy Services, Inc.
d/b/a POWERMARK
1 Meridian Blvd. Suite 2C01
Wyomissing, PA 19610
(800) 427-8545
www.ugienergyservices.com

Direct Energy Services, LLC
One Gateway Center, Suite 2600
Newark, NJ 07102
(973) 799-8568
www.directenergy.com

Liberty Power Holdings, LLC
1901 W Cypress Creek Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

FirstEnergy Solutions
395 Ghent Road Suite 407
Akron, OH 44333
(800) 977-0500
www.fes.com

Pepco Energy Services, Inc.
d/b/a Power Choice
23 S. Kinderkamack Rd Ste D
Montvale, NJ 07645
(800) 363-7499
www.pepco-services.com

APPENDIX B

ECM-1 Apple Orchard Soccer Field Lighting Replacements



North Brunswick
 CHA #20418
 ECM-1 Apple Orchard Park Sports Field Lighting Replacements

Supply Cost of Electricity: \$0.129 \$/kWh
 Demand: \$9.42 \$/kW

	EXISTING CONDITIONS										RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS					
Field Code	Area Description	No. of Fixtures	Standard Fixture Code	NYSEDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
	Unique description of the location - Room number/Room name, Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
MH1500/1	Soccer Field	64	Musco MH 1500 W lamp	MH1500/1	1610	103.0	Breaker	400	41,216	44	Musco Green 1500 W	MH1500/1b	1564	68.8	Breaker	400	27,526	13,690	\$ 5,627.79	\$ 120,000	\$0	21.3	21.3
Total		64				103.0			41,216	44			1,564	69			27,526	13,690	\$5,628	\$120,000	\$0		21.3
																			Demand Savings	34.2	\$3,869		
																			kWh Savings	13,690	\$1,759		
																			Total savings		\$5,628		21.3

APPENDIX C

ECM-2 Caruso Park Lighting Replacements



North Brunswick
 CHA #20418
 ECM-2 Caruso Park Sports Field Lighting Replacements

Supply Cost of Electricity: \$0.116 \$/kWh
 Demand: \$10.76 \$/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS					
Field Code	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
MH1500/1	Baseball field	24	Musco MH 1500 W lamp	MH1500/1	1610	38.6	Breaker	400	15,456	16	Musco Green 1500 W	MH1500/1b	1564	25.0	Breaker	400	10,010	5,446	\$ 2,388.79	\$ 55,000.00	\$0		
	Total	24				38.6			15,456	16			1,564	25			10,010	5,446	\$ 2,389	\$55,000	\$0		
																		Demand Savings	13.6	\$1,758			
																		kWh Savings	5,446	\$631			
																		Total savings		\$2,389		23.0	23.0

APPENDIX D

ECM-3 Renaissance Park Lighting Replacements



Field Code	Area Description	EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS					
		No. of Fixtures	Standard Fixture Code	NYSEDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
MH1500/1	Soccer Field	32	Musco MH 1500 W lamp	MH1500/1	1610	51.5	Remote	300	15,456	24	Musco Green 1500 W	MH1500/1b	1564	37.5	Remote	300	11,261	4,195	\$ 3,836.93	\$0			
MH1500/1	Small Baseball Field	15	Musco MH 1500 W lamp	MH1500/1	1610	24.2	Remote	300	7,245	10	Musco Green 1500 W	MH1500/1b	1564	15.6	Remote	300	4,692	2,553	\$ 2,334.97	\$0			
MH1500/1	Large Baseball Field	59	Musco MH 1500 W lamp	MH1500/1	1610	95.0	Remote	300	28,497	42	Musco Green 1500 W	MH1500/1b	1564	65.7	Remote	300	19,706	8,791	\$ 8,039.88	\$0			
	Total	106				170.7			51,198	76			4,692	119			35,659	15,539	\$14,212	\$218,000	\$0		
																		Demand Savings	51.8	\$12,412			
																		kWh Savings	15,539	\$1,799			
																		Total savings	\$14,212			15.3	15.3

APPENDIX E

ECM-4 Veterans Park Lighting Replacements



North Brunswick
 CHA #20418
 ECM-4 Veterans Park Sports Field Lighting Replacements

Supply Cost of Electricity: \$0.128 \$/kWh
 Demand: \$17.50 \$/kW

Field Code	Area Description	EXISTING CONDITIONS								RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS						
		No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
MH1500/1	Baseball Field	32	Musco MH 1500 W lamp	MH1500/1	1620	51.8	Breaker	500	25,920	26	Musco Green 1500 W	MH1500/1b	1564	40.7	Breaker	500	20,332	5,588	\$ 3,061.11	\$ 100,000	\$0		
	Total	32				51.8			25,920	26			1,564	41			20,332	5,588	\$3,061	\$100,000	\$0		
																		11.2	\$2,347				
																		5,588	\$714				
																		\$3,061			32.7	32.7	

APPENDIX F

ECM-5 Install Occupancy Sensors in Food Concession Buildings

North Brunswick
CHA #20418
Community Park Food Concession Buildings (3)

ECM-5 Use of occupancy sensors for bath room lighting

Instructions and notes:

Input all applicable fixture codes from Light Table. In retrofit conditions indicate "Yes" if motion sensor is applicable
Use weekly hours if all fixtures on this sheet can be retrofitted with motion sensors, else use daily hours
Evaluate operating hours (location, traffic, etc.)

*Motion sensor =

hrs/week
hrs/week

0.1235 \$/KWh
0.1124 \$/KWh
0.1197 \$/KWh

Tip: Motion sensors stay On for approx. 10 minutes when activated. It may save operating hours by 25%, 30% or more.
Make sure that security or safety does not prevent installation of motion sensors
Make judgment when using Cost Tables

Baseball Meter Supply Cost of Electricity:
Softball Meter Supply Cost of Electricity:
Soccer Meter Supply Cost of Electricity:

Building Schedule:
Existing conditions (master switch):
Retrofit conditions (motion sensors):

Area Description	EXISTING CONDITIONS										RETROFIT CONDITION					COST ANALYSIS			
	Number of Fixtures	Fixture Code	Watts per Fixture	Number of Non-Operational Fixtures	Watts per Non-Operational Fixtures	kW/Space	Daily Hours	Annual Hours	Annual kWh	Motion sensor Yes or No	Number of Sensors Required	Daily Hours	Annual Hours	Annual kWh	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	Simple Payback	
Baseball Snack Shack Men's Bathroom	2	F43ILL	89	0	90.78	0.178	10	2,000	356	Yes	1	2.5	500	89	267	\$ 33	\$ 259	7.8	
Baseball Snack Shack Ladies Bathroom	2	F43ILL	89	0	90.78	0.178	10	2,000	356	Yes	1	2.5	500	89	267	\$ 33	\$ 259	7.8	
Softball Snack Shack Men's Bathroom	2	F43ILL	89	0	90.78	0.178	10	2,000	356	Yes	1	2.5	500	89	267	\$ 30	\$ 259	8.6	
Softball Snack Shack Ladies Bathroom	2	F43ILL	89	0	90.78	0.178	10	2,000	356	Yes	1	2.5	500	89	267	\$ 30	\$ 259	8.6	
Soccer Snack Shack Men's Bathroom	2	F43ILL	89	0	90.78	0.178	10	2,000	356	Yes	1	2.5	500	89	267	\$ 32	\$ 259	8.1	
Soccer Snack Shack Ladies Bathroom	2	F43ILL	89	0	90.78	0.178	10	2,000	356	Yes	1	2.5	500	89	267	\$ 32	\$ 259	8.1	
TOTALS -	12.0			0.0		1.1			2,136.0					534.0	1,602	\$ 190	\$ 1,551	8.2	

APPENDIX G

ECM-6 Install Occupancy Sensors in Park Maintenance Building

North Brunswick
CHA #20418
Park Maintenance Building

ECM-6 Use of occupancy sensors for interior lighting

Instructions and notes:

Input all applicable fixture codes from Light Table. In retrofit conditions indicate "Yes" if motion sensor is applicable
Use weekly hours if all fixtures on this sheet can be retrofitted with motion sensors, else use daily hours
Evaluate operating hours (location, traffic, etc.)
*Motion sensor =
Tip: Motion sensors stays On for approx. 10 minutes when activated. It may save operating hours by 25%, 30% or more.
Make sure that security or safety does not prevent installation of motion sensors
Make judgment when using Cost Tables

Building Schedule:
Existing conditions (master switch):
Retrofit conditions (motion sensors):
Maintenance building supply cost:

hrs/week
hrs/week
0.1158 \$/kWh

Area Description	EXISTING CONDITIONS						RETROFIT CONDITION						COST ANALYSIS					
	Number of Fixtures	Fixture Code	Watts per Fixture	Number of Non-Operational Fixtures	Watts per Non-Operational Fixtures	kW/Space	Daily Hours	Annual Hours	Annual kWh	Annual kWh	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	Simple Payback				
Office Area	17	F43ILL	89	0	90.78	1.513	10	2,500	3,783	Yes	2	8	2,000	3,026	757	\$ 88	\$ 517	5.9
Conference Room	8	F43ILL	89	0	90.78	0.712	7	1,750	1,246	Yes	2	3	750	534	712	\$ 82	\$ 517	6.3
Men's Room (conf room)	1	F43ILL	89	0	90.78	0.089	10	2,500	223	Yes	1	2	500	45	178	\$ 21	\$ 259	12.5
Ladle's Room (conf room)	1	F43ILL	89	0	90.78	0.089	10	2,500	223	Yes	1	2	500	45	178	\$ 21	\$ 259	12.5
Receptionist Area	1	F43ILL	89	0	90.78	0.089	10	2,500	223	Yes	1	7	1,750	156	67	\$ 8	\$ 259	33.4
Men's Room (office area)	3	F43ILL	89	0	90.78	0.267	10	2,500	668	Yes	1	4	1,000	267	401	\$ 46	\$ 259	5.6
Ladle's Room (office area)	3	F43ILL	89	0	90.78	0.089	6	1,500	134	Yes	1	2	500	45	89	\$ 10	\$ 259	25.1
Utility Room	1	F43ILL	89	0	90.78	0.089	6	1,500	134	Yes	1	2	500	45	89	\$ 10	\$ 259	25.1
Janitors Closet	1	F43ILL	89	0	90.78	0.089	6	1,500	134	Yes	1	2	500	45	89	\$ 10	\$ 259	25.1
Garage Storage Area	6	F83III	167	0	170.34	1.002	10	2,500	2,505	Yes	2	4	1,000	1,002	1,503	\$ 174	\$ 517	3.0
TOTALS -	42.0			0.0		4.2			9,803.0		13			5,429.8	4,373	\$ 506	\$ 3,361	6.6

APPENDIX H

ECM-7 Space Temperature Setback for Park Maintenance Building

North Brunswick
CHA #20418
Park Maintenance Building

ECM-7 Space Temperature Setback

Building Footprint	1,900 SF
Heat Content	3,413 Btu/KWh
Cooling Efficiency	1.3 kW/ton
Building Balance Temp.	60 °F
Internal Gains	17,232 Btu/h
Zone Internal Gain Factor	0.03
Ave Occ Internal Gain Factor	0.7

Ex Occupied Chg Temp.	68 °F
Ex Unoccupied Chg Temp.	72 °F
Prop Occupied Chg Temp.	73 °F
Prop Unoccupied Chg Temp.	80 °F
Unoccupied Cooling UA	233 Btu/hr/°F
Unoccupied Heating UA	275 Btu/hr/°F
Cooling Occ Enthalpy Setpoint	21.5 Bulb
Heating Occ Enthalpy Setpoint	21.5 Bulb

Ex Occupied Htg Temp.	68 °F
Ex Unoccupied Htg Temp.	62 °F
Prop Occupied Htg Temp.	68 °F
Prop Unoccupied Htg Temp.	60 °F
Unoccupied Heating UA	258 Btu/hr/°F
Unoccupied Heating UA	258 Btu/hr/°F

Blended Electric Cost	0.1428 \$/kWh
Heating Energy Savings	774 kWh
Cooling Energy Savings	728 kWh
Total Energy Savings	1,602 kWh
Total Cost Savings	\$ 228

Heating and cooling energy are unrelated in this model. If the building being analyzed is not cooled, disregard cooling energy calculations.

Avg Outdoor Air Temp. Bins °F	EXISTING LOADS										PROPOSED LOADS									
	Occupied					Unoccupied					Occupied					Unoccupied				
	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Internal Gain BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Internal Gain BTUH	Ventilation Load BTUH	Internal Gain BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy kWh	Proposed Heating Energy kWh				
102.5	49.1	0	0	0	-14,689	-29,761	-12,049	-12,049	-12,049	-12,049	-12,049	-12,049	-12,049	-12,049	-12,049	-12,049				
97.5	48.5	3	1	2	-12,560	-20,667	-12,049	-12,049	-10,431	-20,667	-12,049	-12,049	-10,431	-20,667	-12,049	-12,049				
92.5	39.5	34	10	24	-10,431	-16,534	-12,049	-12,049	-8,302	-16,534	-12,049	-12,049	-8,302	-16,534	-12,049	-12,049				
87.5	36.5	51	39	52	-8,302	-12,538	-12,049	-12,049	-6,322	-12,538	-12,049	-12,049	-6,322	-12,538	-12,049	-12,049				
82.5	34	60	50	58	-6,322	-9,658	-12,049	-12,049	-4,767	-9,658	-12,049	-12,049	-4,767	-9,658	-12,049	-12,049				
77.5	31.6	620	186	385	-4,045	-5,649	-12,049	-12,049	-3,195	-5,649	-12,049	-12,049	-3,195	-5,649	-12,049	-12,049				
72.5	29.2	664	198	466	-1,916	-2,342	-12,049	-12,049	-1,916	-2,342	-12,049	-12,049	-1,916	-2,342	-12,049	-12,049				
67.5	27	854	254	600	128	165	-12,049	-12,049	0	165	-12,049	-12,049	0	165	-12,049	-12,049				
62.5	24.5	927	276	651	1,406	1,819	-12,049	-12,049	1,406	1,819	-12,049	-12,049	1,406	1,819	-12,049	-12,049				
57.5	21.4	600	179	421	2,684	3,472	-12,049	-12,049	2,684	3,472	-12,049	-12,049	2,684	3,472	-12,049	-12,049				
52.5	18.7	610	182	428	3,962	5,126	-12,049	-12,049	3,962	5,126	-12,049	-12,049	3,962	5,126	-12,049	-12,049				
47.5	16.2	611	182	429	5,240	6,779	-12,049	-12,049	5,240	6,779	-12,049	-12,049	5,240	6,779	-12,049	-12,049				
42.5	14.4	656	195	461	6,518	8,432	-12,049	-12,049	6,518	8,432	-12,049	-12,049	6,518	8,432	-12,049	-12,049				
37.5	12.6	1,023	304	719	7,796	10,086	-12,049	-12,049	7,796	10,086	-12,049	-12,049	7,796	10,086	-12,049	-12,049				
32.5	10.7	794	218	516	9,074	11,739	-12,049	-12,049	9,074	11,739	-12,049	-12,049	9,074	11,739	-12,049	-12,049				
27.5	8.6	334	99	235	10,353	13,392	-12,049	-12,049	10,353	13,392	-12,049	-12,049	10,353	13,392	-12,049	-12,049				
22.5	6.8	252	75	177	11,631	15,046	-12,049	-12,049	11,631	15,046	-12,049	-12,049	11,631	15,046	-12,049	-12,049				
17.5	5.5	125	37	88	12,909	16,699	-12,049	-12,049	12,909	16,699	-12,049	-12,049	12,909	16,699	-12,049	-12,049				
12.5	4.1	47	14	33	14,187	18,353	-12,049	-12,049	14,187	18,353	-12,049	-12,049	14,187	18,353	-12,049	-12,049				
7.5	2.6	22	7	15	15,465	20,006	-12,049	-12,049	15,465	20,006	-12,049	-12,049	15,465	20,006	-12,049	-12,049				
2.5	1	13	4	9	16,743	21,659	-12,049	-12,049	16,743	21,659	-12,049	-12,049	16,743	21,659	-12,049	-12,049				
-2.5	0	0	0	0	18,021	23,313	-12,049	-12,049	18,021	23,313	-12,049	-12,049	18,021	23,313	-12,049	-12,049				
-7.5	-1.5	0	0	0	19,299	24,966	-12,049	-12,049	19,299	24,966	-12,049	-12,049	19,299	24,966	-12,049	-12,049				
TOTALS		8,760	2,607	6,153					3,426	2,697			12,860	2,697		12,107				

Existing Building Ventilation & Infiltration (ecb)	306 cfm
Overheat Ventilation Factor	1.00
Additional ventilation to offset overheat	0 cfm
Existing Building Ventilation & Infiltration (unocc)	306 cfm

HEAT GAIN/LOSS WORKSHEET

Project Name:
 Location:
 Building Name:
 Engineer:

Project No.:
 Site Elevation: Feet
 Date:
 Specific Volume: CF/#

Building/Facility Designation:

Outdoor Winter Design DB Temperature	<input type="text" value="1"/> *F	Indoor Winter Design DB Temperature	<input type="text" value="72"/> *F
Outdoor Summer Design DB Temperature	<input type="text" value="98"/> *F	Indoor Summer Design DB Temperature	<input type="text" value="68"/> *F
Outdoor Summer Design WB Temperature	<input type="text" value="74"/> *F	Indoor Summer Design WB Temperature	<input type="text" value="60"/> *F
Outdoor Summer Humidity Ratio	<input type="text" value="0.0121"/> ##	Indoor Air (70°F) Humidity Ratio	<input type="text" value="0.0078"/> ##

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)	R Value	Wall Type
<input type="checkbox"/> Steel Siding, 4" Insulation, Steel Siding	15.2	1
<input type="checkbox"/> Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
<input type="checkbox"/> 4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
<input type="checkbox"/> Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
<input type="checkbox"/> 4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
<input type="checkbox"/> 4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
<input type="checkbox"/> Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
<input type="checkbox"/> Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
<input type="checkbox"/> Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
<input type="checkbox"/> 4" Block, 1" insulation, 8" Block	19.9	16
<input checked="" type="checkbox"/> Steel Panel, 1.5" Air gap, R-19 Blanket Insul, 1.5" Air gap, 5/8" drywall	25.5	

Roofs (Select One)	R Value	Roof Type
<input type="checkbox"/> Tectum Deck, 3.3" Insul., BU Roof	13.0	1
<input type="checkbox"/> Steel Deck, 5" Insul., BU Roof	18.2	1
<input type="checkbox"/> Attic Roof with 6" Insul.	25.0	4
<input type="checkbox"/> 4" HW Concrete Deck, BU Roof	2.7	2
<input type="checkbox"/> Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
<input type="checkbox"/> Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
<input type="checkbox"/> Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
<input type="checkbox"/> Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
<input type="checkbox"/> Wood Deck, 6" insulation, Felt & Membrane	18.0	
<input checked="" type="checkbox"/> Steel Panel, R-38 Blown-In Insul, Plenum Space, Steel Roof Panel	40.20	

Windows (Select One)	U Value
<input type="checkbox"/> Aluminum Frame, 1/8" SP Glazing	1.05
<input type="checkbox"/> Aluminum Frame, 1/4" DP Glazing	0.60
<input type="checkbox"/> Aluminum Frame, 3/16" DP Glazing	0.62
<input checked="" type="checkbox"/> Aluminum Frame, 1/2" DP Glazing	0.50
<input type="checkbox"/> Skylights	0.90
<input type="checkbox"/> Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area: SF
 Occupied Area: SF
 Return Plenum?:

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	<input type="text" value="66"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="0"/> SF	<input type="text" value="21"/> SF	788 SF
East Exposure	<input type="text" value="31"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="30"/> SF	<input type="text" value="0"/> SF	351 SF
South Exposure	<input type="text" value="66"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="80"/> SF	<input type="text" value="21"/> SF	708 SF
West Exposure	<input type="text" value="31"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="12.3"/> Ft	<input type="text" value="0"/> SF	<input type="text" value="21"/> SF	360 SF

Forced Ventilation: cfm

HEAT GAIN/LOSS WORKSHEET

Project Name: Town Of North Brunswick
 Location: North Brunswick, NJ
 Building Name: Parks Maintenance Building
 Engineer: G Pfaff

Project No.: CHA #20418
 Site Elevation: 460 Feet
 Date: 11/13/09

Specific Volume 13.50 CF/#

Building/Facility Designation Office Area

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor	Glass Type	Solar Heat Gain
North Exposure	0	39 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	30	216 btu/h/sf	0.8	0.31	Glass Type C	1,607 Btu/hr
South Exposure	80	109 btu/h/sf	0.8	0.58	Glass Type C	4,046 Btu/hr
West Exposure	0	216 btu/h/sf	0.8	0.29	Glass Type C	0 Btu/hr
						5,653 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain	
North Exposure	791	0.04	30 °F	1.0	930 Btu/hr	
East Exposure	351	0.04	30 °F	1.0	413 Btu/hr	
South Exposure	711	0.04	35 °F	1.0	976 Btu/hr	
West Exposure	360	0.04	30 °F	1.0	424 Btu/hr	
Roof	1,980	0.02	50 °F	1.0	2,463 Btu/hr	
Fenestration	110	0.50	30 °F		1,650 Btu/hr	
Doors	63	0.14	30 °F		264 Btu/hr	
Ceiling	1,980	0.14	0 °F		0 Btu/hr	
Partition		0.05	0 °F		0 Btu/hr	
Floor	1,980	0.04	0 °F		0 Btu/hr	
						7,120 Btu/h

INTERNAL HEAT GAINS

Lights	1.60 w/sf x	1,980 Occ Area =	3.2 kW x 3.4x	1.0 RAF =	10,812 Btu/h	
Plug Load	0.25 w/sf x	1,980 Occ Area =	0.5 kW x 3.4x	1.0 RAF =	1,689 Btu/h	
People	5 people x	255 btu/person x	75% time in space =		956 Btu/h	
Computer Work Stations		5 Units x	120 W/Unit x	3414 =	2,048 Btu/h	
Equipment	0.5 kW x 3.413 =				1,707 Btu/h	
Misc.					0 Btu/h	
						17,212 Btu/h

VENTILATION AND INFILTRATION

	Area	Infiltration Factor	Perimeter Ratio	Coef	Temp. Diff.	Room Heat Gain
Walls	2,213 SF	0.12 CFM/SF		1.08	30 °F	9,313 Btu/h
Doors	63 SF	0.20 CFM/LF	0.95 LF/SF	1.08	30 °F	421 Btu/h
Windows	110 SF	0.20 CFM/LF	1.30 LF/SF	1.08	30 °F	1,003 Btu/h
Ventilation	0 cfm			1.08	30 °F	0 Btu/h
						10,736 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE

4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain	
North Exposure	0	0.04	30	1.0	0 Btu/hr	
East Exposure	0	0.04	30	1.0	0 Btu/hr	
South Exposure	0	0.04	35	1.0	0 Btu/hr	
West Exposure	0	0.04	30	1.0	0 Btu/hr	
Roof	1,980	0.02	50	0.0	0 Btu/hr	
						0 Btu/h

INTERNAL HEAT GAINS

Lights	1.60 w/sf x	1,980 Occ Area =	3.2 kW x 3413x	0.00 RAF =	0 Btu/h	
Misc.					0 Btu/h	
						0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT

Solar	5,653
Conduction to Room	7,120
Conduction to Plenum	0
Ventilation and Infiltration	10,736
Sub Total	23,509

SENSIBLE HEAT GAINS - TEMP. INDEPENDENT

Internal Gains to Room	17,212
Internal Gains to Plenum	0
Sub Total	17,212

HEAT GAIN/LOSS WORKSHEET

Project Name: Town Of North Brunswick
 Location: North Brunswick, NJ
 Building Name: Parks Maintenance Building
 Engineer: G Pfaff

Project No.: CHA #20418
 Site Elevation: 460 Feet
 Date: 11/13/09

Specific Volume 13.50 CF/#

Building/Facility Designation Office Area

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.	Room Heat Gain
Walls	1,980 SF	0.12 CFM/SF	4,800	0.0043 ##	4,953 Btu/h
Doors	63 SF	0.20 CFM/LF	4,800	0.0043 ##	250 Btu/h
Windows	110 SF	0.20 CFM/LF	4,800	0.0043 ##	596 Btu/h
Ventilation	0 cfm		4,800	0.0043 ##	0 Btu/h
People	5 people	0.75 time in space		250 Btu/hr/person	938 Btu/h
					6,737 Btu/h

Cooling Load Summary

	Sensible	Latent	Total	SHR=	
Temperature Dependent Gains	23,509	6,737	30,246		
Temperature Indep. Gains	17,212		17,212	0.86	
Total	40,722	6,737	47,459		

Building Cooling Load 4.0 Tons at 501 SF/Ton

Building Air Flow to Condition Space based on a 12°F Temp Rise is 3,136 CFM
1.58 CFM/sf

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.	Room Heat Gain
North Exposure	791	0.04	71	2,202 Btu/h
East Exposure	351	0.04	71	978 Btu/h
South Exposure	711	0.04	71	1,979 Btu/h
West Exposure	360	0.04	71	1,003 Btu/h
Fenestration	110	0.50	71	3,905 Btu/h
Roof	1,980	0.02	71	3,497 Btu/h
Doors	63	0.14	71	625 Btu/h
Ceiling	1,980	0.14	0	0 Btu/h
Partition	0	0.05	0	0 Btu/h
Floor	1,980	0.04	50	3,960 Btu/h

Ventilation and Infiltration

	Infiltration Factor	Coef	Temp. Difference	Air Flow	Room Heat Gain
Walls	2,213 SF	0.12 CFM/SF	71	266 cfm	20,408 Btu/h
Doors	63 SF	0.20 CFM/LF	71	12 cfm	922 Btu/h
Windows	110 SF	0.20 CFM/LF	71	29 cfm	2,198 Btu/h
Ventilation Load	0 cfm		71	0 cfm	0 Btu/h
Total Ventilation & Infiltration Load				306 cfm	23,527 Btu/h

Building Heating Load 41,676 btu/h
21.0 btu/sf

APPENDIX I

ECM-8 Install Premium Efficiency Motors on Irrigation Pumps



North Brunswick
CHA #20418
Community Park

ECM-5: Install Premium Efficiency Motors On Irrigation Pumps

Supply Electric Cost	\$/KWh	0.118
Demand Cost	\$/KW-month	5.00

Material	0.98
Labor	1.21
Equipment	1.00

#	Description	Location	Existing		New		New Load Factor	New HP	New Efficiency	New KW	Demand Savings \$	Annual Hours	kWh Savings	\$ kWh Savings	Total \$ Savings	Estimated Cost	Payback Years	Unit Costs			Subtotal Costs			Total Cost	Remarks	
			HP	Efficiency	Factor	Efficiency												Material	Labor	Equipment	Material	Labor	Equipment			
1	P-1	Outside	15	0.875	0.8	0.927	15	9.7	0.927	9.7	0.574	310	178	21	61	1,463	23.9	996	400	0	979	484	0	1,463		
2	P-2	Outside	15	0.875	0.8	0.927	15	9.7	0.927	9.7	0.574	310	178	21	61	1,463	23.9	996	400	0	979	484	0	1,463		
11																										
12																										
		Total	30				30	19.3		19.3	1.15	81	356	41	122	2,928	23.9									

Notes

- a Existing and new efficiencies should be entered if known. If not known, use provided curve fit based on "DOE Survey Installed Average" and NEMA Premium values, respectively.
- b Same as existing HP unless resized to better match load

APPENDIX J

New Jersey Pay For Performance Incentive Program



North Brunswick
 CHA #20418
 Community Park Maintenance Building

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per September, 2009.
 The values represented below are only applicable through December 31, 2009.

	Annual Utilities	
	kWh	Therms
Existing Usage	120,245	0
Proposed Savings	5,875	0
Existing Total MMBtus	410	
Proposed Savings MMBtus	20	
% Reduction	4.9%	
Proposed Annual Savings	\$721	

	≥%15 - < 20%	
	\$/kWh	\$/therm
Incentive #2	\$0.11	\$1.10
Incentive #3	\$0.07	\$0.70

	≥20%	
	\$/kWh	\$/therm
Incentive #2	\$0.22	\$2.20
Incentive #3	\$0.14	\$1.40

	Incentives \$		
	Elec	Gas	Total
Incentive #2	\$0	\$0	\$0
Incentive #3	\$0	\$0	\$0
Totals	\$0	\$0	\$0

Total Project Cost	\$3,699
% Incentives of Project Cost**	0.0%
Project Cost w/ Incentives*	\$3,699

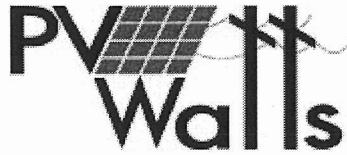
Project Payback (years)	
w/o Incentives	5.1
w/ Incentives	5.1

** Maximum allowable incentive is 50% of total project cost

APPENDIX K

Photovoltaic (PV) Rooftop Solar Power Generation





AC Energy & Cost Savings



Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	20.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	15.4 kW
Array Type:	Fixed Tilt
Array Tilt:	40.7°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	14.3 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	3.36	1656	236.81
2	4.05	1788	255.68
3	4.58	2169	310.17
4	4.84	2119	303.02
5	5.30	2335	333.91
6	5.33	2202	314.89
7	5.27	2224	318.03
8	5.25	2201	314.74
9	5.06	2135	305.31
10	4.46	2011	287.57
11	3.15	1435	205.21
12	2.87	1384	197.91
Year	4.46	23660	3383.38

[Output Hourly Performance Data](#)

[Output Results as Text](#)

*

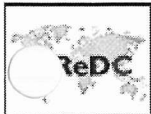
[About the Hourly Performance Data](#)

[Saving Text from a Browser](#)

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

Please send questions and comments regarding PVWATTS to Webmaster

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Cautions for Interpreting the Results

The monthly and yearly energy production are modeled using the PV system parameters you selected and weather data that are typical or representative of long-term averages. For reference, or comparison with local information, the solar radiation values modeled for the PV array are included in the performance results.

Because weather patterns vary from year-to-year, the values in the tables are better indicators of long-term performance than performance for a particular month or year. PV performance is largely proportional to the amount of solar radiation received, which may vary from the long-term average by $\pm 30\%$ for monthly values and $\pm 10\%$ for yearly values. How the solar radiation might vary for your location may be evaluated by examining the tables in the *Solar Radiation Data Manual for Flat-Plate and Concentrating Collectors* (http://rredc.nrel.gov/solar/old_data/nsrdb/redbook/).

For these variations and the uncertainties associated with the weather data and the model used to model the PV performance, future months and years may be encountered where the actual PV performance is less than or greater than the values shown in the table. The variations may be as much as 40% for individual months and up to 20% for individual years. Compared to long-term performance over many years, the values in the table are accurate to within 10% to 12%.

If the default overall DC to AC derate factor is used, the energy values in the table will overestimate the actual energy production if nearby buildings, objects, or other PV modules and array structure shade the PV modules; if tracking mechanisms for one- and two-axis tracking systems do not keep the PV arrays at the optimum orientation with respect to the sun's position; if soiling or snow cover related losses exceed 5%; or if the system performance has degraded from new. (PV performance typically degrades 1% per year.) If any of these situations exist, an overall DC to AC derate factor should be used with PVWATTS that was calculated using system specific component derate factors for *shading, sun-tracking, soiling, and age*.

The PV system size is the nameplate DC power rating. The energy production values in the table are valid only for crystalline silicon PV systems.

The cost savings are determined as the product of the number of kilowatt hours (kWh) and the cost of electricity per kWh. These cost savings occur if the owner uses all the electricity produced by the PV system, or if the owner has a net-metering agreement with the utility. With net-metering, the utility bills the owner for the net electricity consumed. When electricity flows from the utility to the owner, the meter spins forward. When electricity flows from the PV system to the utility, the meter spins backwards.

If net-metering isn't available and the PV system sends surplus electricity to the utility grid, the utility generally buys the electricity from the owner at a lower price than the owner pays the utility for electricity. In this case, the cost savings shown in the table should be reduced.

Besides the cost savings shown in the table, other benefits of PV systems include greater energy independence and a reduction in fossil fuel usage and air pollution. For commercial customers, additional cost savings may come from reducing demand charges. Homeowners can often include the cost of the PV system in their home mortgage as a way of accommodating the PV system's initial cost.

To accelerate the use of PV systems, many state and local governments offer financial incentives and programs. Go to <http://www.nrel.gov/stateandlocal> for more information.

Please send questions and comments to Webmaster

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APPENDIX L

Solar Thermal Domestic Hot Water Plant



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RENEWABLE ENERGY
THE INFINITE POWER
OF TEXAS

Interactive Energy Calculators

Our calculators help you understand energy production and consumption in a whole new way. Use them to develop a personal profile of your own energy use.

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- [Electric Power Pollution Calculator](#)
- [PV System Economics](#)
- [Solar Water Heating](#)
- [What's a Watt?](#)

Solar Water Heating Calculator

Water heating is a major energy consumer. Although the energy consumed daily is often less than for air conditioning or heating, it is required year round, making it a good application of solar energy. Use this calculator to explore the energy usage of your water heater, and to estimate whether a solar water heater could save you money.

Water Heater Characteristics			
Physical		Thermal	
Diameter (feet)	1.5	Water Inlet Temperature (Degrees F)	55
Capacity (gallons)	30	Ambient Temperature (Degrees F)	70
Surface Area (calculated - sq ft)	14.23	Hot Water Temperature (Degrees F)	120
Effective R-value	8	Hot Water Usage (Gallons per Day)	20
Energy Use			
444.7		Heat Delivered in Hot Water (BTU/hr)	
88.94		Heat loss through insulation (BTU/hr)	

Gas vs. Electric Water Heating		
Gas		Electric
0	Overall Efficiency	0.8167
0	Conversion Efficiency	0.98
NaN BTU/hr	Power Into Water Heater	544.5 BTU/hr
Cost		
\$ 0.40 /Therm	Utility Rates	\$ 0.14 /kWh
\$ NaN	Yearly Water Heating Cost	\$ 195.574
How Does Solar Compare?		
Solar Water Heater Cost: \$ 25815		Percentage Solar: 70
NaN years for gas	Payback Time for Solar System	188.565 years for electric

More information on solar water heating:

- [Fact sheet - Solar Water Heaters](#)
- [Fact sheet - Solar Water Heaters for Swimming Pools](#)
- [Kids fact sheet - Heat from the Sun](#)

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State Energy Conservation Office (SECO)

NUBPU Energy Audits
 CHA #20418
 Building: Community Park Maintenance Building

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

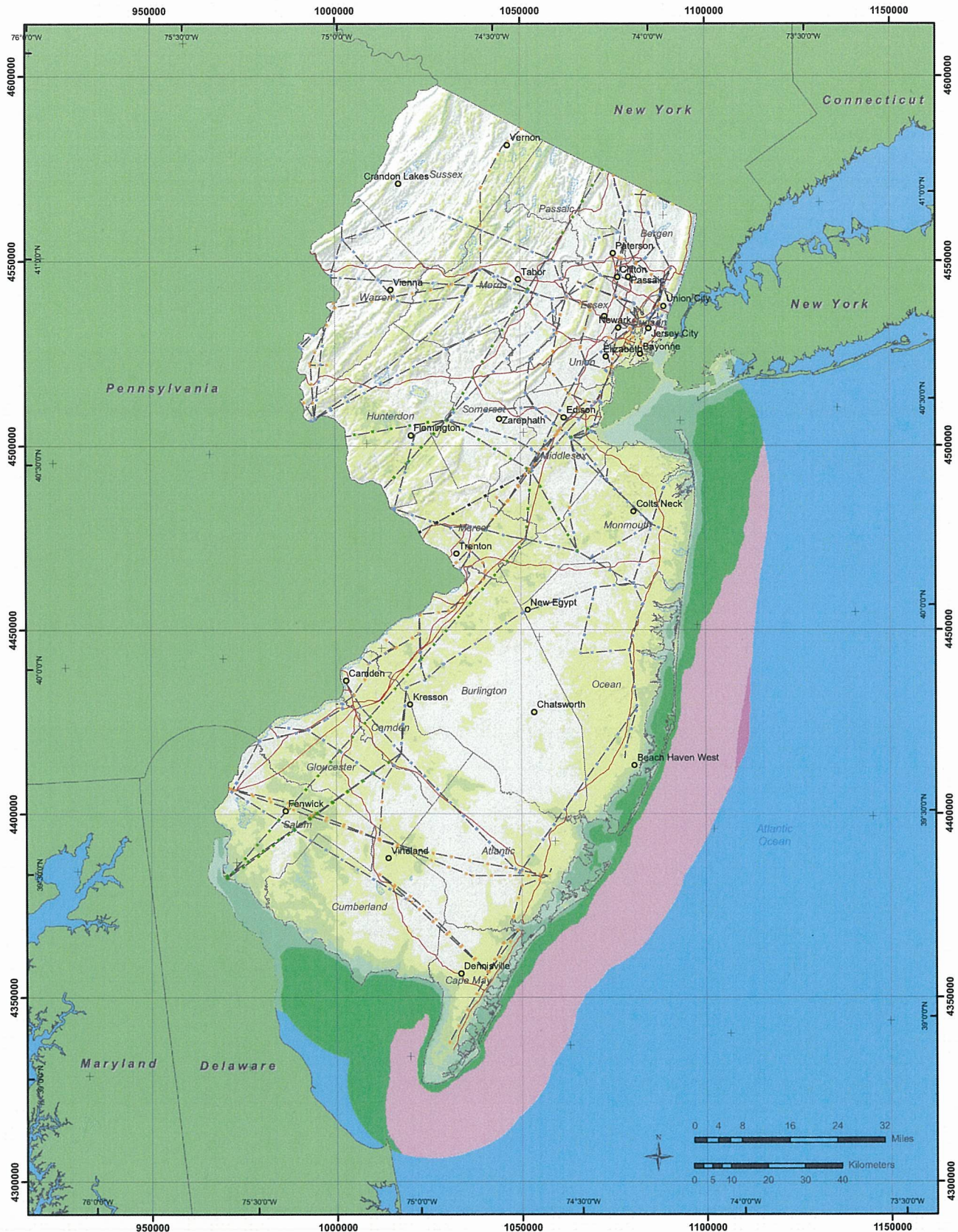
Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Synergy Solar Thermal System	2	ea				\$ -	\$ -	\$ 6,000	\$ 12,000	
Piping modifications	1	ls	\$ 1,000	\$ 1,700		\$ 980	\$ 2,057	\$ -	\$ 3,037	
Electrical modifications	1	ls	\$ 500	\$ 500		\$ 490	\$ 605	\$ -	\$ 1,095	
40 Gallon Storage Tanks	2	ea	\$ 200	\$ 250		\$ 400	\$ 500	\$ -	\$ 900	
5 Gallon Drip Tank	1	ea	\$ 100	\$ 78		\$ 100	\$ 78	\$ -	\$ 178	
						\$ -	\$ -	\$ -	\$ -	

\$ 17,210	Subtotal
\$ 2,582	15% Contingency
\$ 2,582	15% Contractor O&P
\$ 3,442	20% Engineering
\$ 25,815	Total

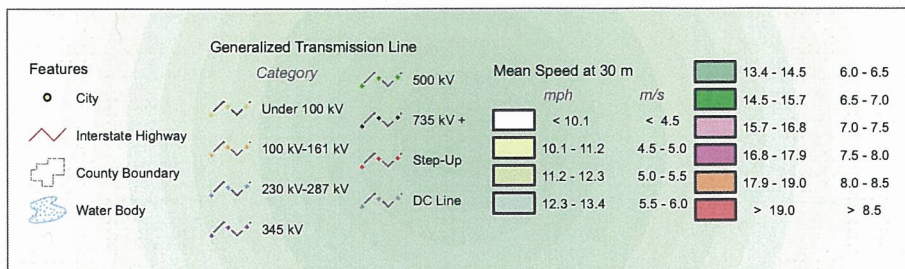
APPENDIX M

Wind





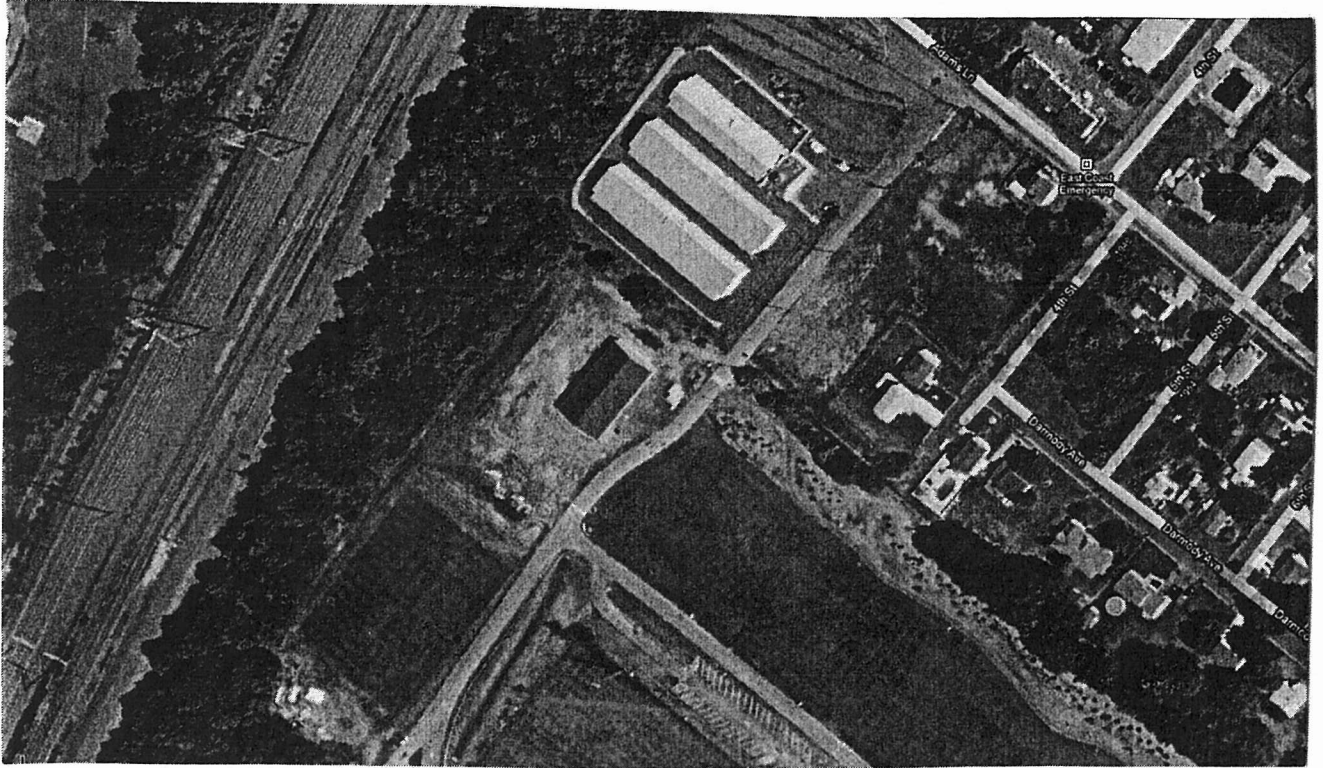
Wind Resource of New Jersey Mean Annual Wind Speed at 30 Meters



AWS Truewind

Projection: Transverse Mercator,
UTM Zone 17 WGS84
Spatial Resolution of Wind Resource Data: 200m
This map was created by AWS Truewind using the MesoMap system and historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement.

The transmission line information was obtained by AWS Truewind from the Global Energy Decisions Velocity Suite. AWS does not warrant the accuracy of the transmission line information.



APPENDIX N

EPA Portfolio Manager



STATEMENT OF ENERGY PERFORMANCE

North Brunswick Parks Building

Building ID: 1935582
For 12-month Period Ending: December 31, 2008¹
Date SEP becomes ineligible: N/A

Date SEP Generated: November 16, 2009

Facility

North Brunswick Parks Building
 2053 Route 130 South
 North Brunswick, NJ 08902

Facility Owner

Township of North Brunswick
 710 Herman Road
 North Brunswick, NJ 08902

Primary Contact for this Facility

Carmine Demilio
 710 Herman Road
 North Brunswick, NJ 08902

Year Built: 2007
Gross Floor Area (ft²): 8,050

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	410,276
Natural Gas - (kBtu) ⁴	0
Total Energy (kBtu)	410,276

Energy Intensity⁵

Site (kBtu/ft ² /yr)	51
Source (kBtu/ft ² /yr)	170

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	62
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Electric Distribution Utility

PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	-20%
Building Type	Other

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:

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Building Name	North Brunswick Parks Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
Type	Other	Is this an accurate description of the space in question?		<input type="checkbox"/>
Location	2053 Route 130 South, North Brunswick, NJ 08902	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		<input type="checkbox"/>
North Brunswick Parks Building (Other)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Gross Floor Area	8,050 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		<input type="checkbox"/>
Number of PCs	5 (Optional)	Is this the number of personal computers in the space?		<input type="checkbox"/>
Weekly operating hours	50 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		<input type="checkbox"/>
Workers on Main Shift	9 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		<input type="checkbox"/>

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric (kWh (thousand Watt-hours)) Space(s): Entire Facility Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
12/01/2008	12/31/2008	19,720.00
11/01/2008	11/30/2008	12,960.00
10/01/2008	10/31/2008	5,520.00
09/01/2008	09/30/2008	5,325.00
08/01/2008	08/31/2008	4,920.00
07/01/2008	07/31/2008	5,840.00
06/01/2008	06/30/2008	5,600.00
05/01/2008	05/31/2008	4,240.00
04/01/2008	04/30/2008	6,200.00
03/01/2008	03/31/2008	12,760.00
02/01/2008	02/29/2008	17,400.00
01/01/2008	01/31/2008	19,760.00
Electric Consumption (kWh (thousand Watt-hours))		120,245.00
Electric Consumption (kBtu (thousand Btu))		410,275.94
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		410,275.94
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	<input type="checkbox"/>

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	<input type="checkbox"/>

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
North Brunswick Parks Building
2053 Route 130 South
North Brunswick, NJ 08902

Facility Owner
Township of North Brunswick
710 Herman Road
North Brunswick, NJ 08902

Primary Contact for this Facility
Carmine Demilio
710 Herman Road
North Brunswick, NJ 08902

General Information

North Brunswick Parks Building	
Gross Floor Area Excluding Parking: (ft ²)	8,050
Year Built	2007
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

North Brunswick Parks Building	
Space Type	Other - Other
Gross Floor Area(ft ²)	8,050
Number of PCs ^o	5
Weekly operating hours ^o	50
Workers on Main Shift ^o	9

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 12/31/2008)	Baseline (Ending Date 12/31/2008)	Rating of 75	Target	National Average
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft ²)	51	51	0	N/A	104
Source (kBtu/ft ²)	170	170	0	N/A	213
Energy Cost					
\$/year	\$ 17,176.00	\$ 17,176.00	N/A	N/A	\$ 35,046.18
\$/ft ² /year	\$ 2.13	\$ 2.13	N/A	N/A	\$ 4.35
Greenhouse Gas Emissions					
MtCO ₂ e/year	62	62	0	N/A	127
kgCO ₂ e/ft ² /year	8	8	0	N/A	16

More than 50% of your building is defined as Other. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Other. This building uses X% less energy per square foot than the CBECS national average for Other.

Notes:

o - This attribute is optional.

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

APPENDIX O

Equipment Inventory



New Jersey BPU Energy Audit Program
 CHA #20418
 Township of North Brunswick
 Equipment Inventory - Community Park Maintenance Building

Description	Manufacturer Name	Model No. / Serial No.	Equipment Type	Capacity/Size	Location	Areas Served	Date Installed	Useable Life Expectancy	Other Info.
Trane Split System	Trane	Model No.2TTA3060A4000AA Serial No: 7084T6K4F	Heat Pump	5 Ton	AHU in Attic above men's room	Office Area	2007	20 Years	Compressor unit outside on pad
Unit Heater	TPI Corporation-Task Master	Model No: G3G517	Electric Unit Heater	7.5 kW	Garage Bay 1	North end of Garage Bay 1	2007	20 years	Electric
Unit Heater	TPI Corporation-Task Master	Model No: G3G517	Electric Unit Heater	7.5 kW	Garage Bay 1	South end of Garage Bay 1	2007	20 years	Electric
Unit Heater	TPI Corporation-Task Master	Model No: G3G517	Electric Unit Heater	7.5 kW	Garage Bay 2	North end of Garage Bay 2	2007	20 years	Electric
Unit Heater	TPI Corporation-Task Master	Model No: G3G517	Electric Unit Heater	7.5 kW	Garage Bay 2	South end of Garage Bay 2	2007	20 years	Electric
Unit Heater	TPI Corporation-Task Master	Model No: G3G517	Electric Unit Heater	7.5 kW	Garage Bay 3	North end of Garage Bay 3	2007	20 years	Electric
Unit Heater	TPI Corporation-Task Master	Model No: G3G517	Electric Unit Heater	7.5 kW	Garage Bay 3	South end of Garage Bay 3	2007	20 years	Electric
Hot Water Heater	Bradford White	Model No: MI5036BN10 Serial No:XJ0132410	HW Heater/Tank	30 gallons 45 kW	Mechanical Room	Bath Rooms	2007	20 Years	Electric