Steven Winter Associates, Inc.
Architects and Engineers

50 Washington Street
Norwalk, CT 06854
www.swinter.com

Telephone (203) 857-0200
Facsimile (203) 852-0741
E-mail: swinter@swinter.com

February 9th, 2010

Local Government Energy Program
Energy Audit Report

For

Hunterdon Polytech Career Academy
Main Building

10 Junction Road
Flemington, NJ 08822

Project Number: LGEA11

TABLE OF CONTENTS

INTRODUCTION

As an approved energy consulting firm under the Local Government Energy Audit Program (LGEA), Steven Winter Associates, Inc. (SWA) was selected to perform an energy audit and assessment for the Hunterdon Polytech Career Academy buildings. The audit included a review of the Main Building as well as the Building Trades building. The buildings are located in Flemington, NJ. A separate energy audit report is issued for each of the referenced buildings.

This report addresses the Hunterdon Polytech Career Academy - Main building located at 10 Junction Road Flemington, NJ. The current conditions and energy-related information were collected in order to analyze and suggest the implementation of building improvements and energy conservation measures.

The Main building, located at 10 Junction Road was built in 1975 with the culinary wing addition in 2006. The Main building consists of a total floor area of 28,645 square feet. The building is operated from 7 AM - 9:30 PM Monday through Thursday and from 7:00 AM – 4:00 PM on Friday. During the summer, the school is only used for a limited amount of classes. Hunterdon Polytech employs approximately 25-30 faculty members and contains 250-300 students.

The goal of this Local Government Energy Audit (LGEA) is to provide sufficient information to the Hunterdon Polytech Career Academy to make decisions regarding the implementation of the most appropriate and most cost effective energy conservation measures for the building.

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

- Section 1 and section 2 of the report cover a description and analysis of the building existing conditions.
- Section 3 provides a detail inventory of major electrical and mechanical systems in the building.
- Sections 4 through 7 provide a description of our recommendations.
- Appendices include further details and information supporting our recommendations.

EXECUTIVE SUMMARY

The energy audit performed by Steven Winter Associates (SWA) encompasses the Hunterdon Polytech Career Academy – Main building located at 10 Junction Road Flemington, NJ. The building is a single story building with a total floor area of 28,645 square feet. The building opened in 1975 with the culinary wing addition in 2006.

Based on the field visit performed by the SWA staff on July 22nd, 2009 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

Existing conditions

From April 2008 through April 2009, the period of analysis for this audit, the building consumed 514,026 kWh or $82,076 worth of electricity at an approximate rate of $0.160/kWh and 58,797 therms or $66,768 worth of natural gas at an approximate rate of $1.136 per therm. The joint energy consumption for the building, including both electricity and fossil fuel was 7,634 MMBtus of energy that cost a total of $148,844.

SWA has entered energy information about the Main building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The Main building and the Building Trades building both share a common meter and are part of the same facility, so the buildings have been benchmarked together as a K-12 school. Currently, the building has been rated as a 1 on a scale of 100 when compared to other K-12 schools around the country. This score is very low, however based on the fact that this is a polytechnic school that contains more electric-intensive equipment than most schools, the building performance score is deceptively low. SWA encourages Hunterdon Polytech Career Academy to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time.

Recommendations

Implementing this report's recommendations will reduce use by approximately 18.9 kBtu/ft^{2}yr, which would decrease the building's energy use intensity to 201.0 kBtu/ft^{2}yr.

The Hunterdon Polytech facilities have been reasonably well-maintained. Equipment was observed to be in age-appropriate condition and has a majority of remaining useful lifetime left. SWA recommends a package of measures that includes lighting, occupancy sensors, a proposed Photovoltaic (PV) system and retro-commissioning. The facilities could benefit from undergoing retro-commissioning. Retro-commissioning is a process that will allow an HVAC engineer to fine tune all of the HVAC system parameters to save energy and reduce waste where applicable. This is especially important for buildings that have undergone an addition or renovation, since it takes a holistic approach and adjusts each system according to new operational conditions as opposed to design conditions that pre-date any renovations. SWA observed operating conditions of the building and has provided a scope of work based on those observations.

Based on the assessment of the building, SWA has separated the recommendations into three categories (See Section 4 for more details). These are summarized as follows:

Category I Recommendations: Capital Improvement Measures

- None

Category II Recommendations: Operations and Maintenance

- Perform routine maintenance inspections on envelope
- Perform routine maintenance inspections of the roof
- Perform routine maintenance inspections of windows and doors
- Provide water efficient fixtures and controls
- Use Energy Star labeled appliances

Category III Recommendations: Energy Conservation Measures

At this time, SWA highly recommends a total of **2** Energy Conservation Measures (ECMs) for the Main building that is summarized in the following Table 1. The total investment cost for these ECMs with incentives is **$3,070**. SWA estimates a first year savings of **$1,045** with a simple payback of **2.7 years**. SWA also recommends **4** ECMs with a 5-10 year payback that is summarized in Table 2 and no End of Life Cycle ECMs.

The implementation of all the recommended ECMs would reduce the building electric usage by 27,391 kWh annually, or 5% of the building's current electric consumption. The implementation of all the recommended ECMs would also reduce natural gas usage by 4,459 therms or 8% of the building's current natural gas consumption. SWA estimates that implementing these ECMs will reduce the carbon footprint of the Main building by **98,196 lbs of CO_2**, which is equivalent to removing approximately 3 cars from the roads each year or avoiding the need of 180 trees to absorb the annual CO_2 produced. SWA also recommends that Hunterdon Polytech contacts third party energy suppliers in order to negotiate a lower electricity rate. Comparing the current electric rate to average utility rates of similar type buildings in New Jersey, it may be possible to save up to $0.010/kWh, which would have equated to $5,140 for the past 12 months.

There are various incentives that Hunterdon Polytech could apply for that could also help lower the cost of installing the ECMs. SWA recommends that the Hunterdon Polytech apply for the NJ SmartStart program through the New Jersey Office of Clean Energy. This incentive can help provide technical assistance for the building in the implementation phase of any energy conservation project. A new NJ Clean Power program, Direct Install, to be rolled out soon, could also assist to cover 80% of the capital investment.

The following two tables summarize the proposed Energy Conservation Measures (ECM) and their economic relevance.

Table 1 - Highly Recommended 0-5 Year Payback ECMs																		
ECM #	ECM description	Source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
1	Install 8 new CFLs	RSMeans, lit search	430	0	430	1,075	0.2	0	0.1	18	190	5	865	2.3	101.2	20.2	33.9	440	1,925
2	Install 12 new Occupancy Sensors	RSMeans, lit search	2,640	240	2,400	5,342	1.1	0	0.6	0	855	15	10,058	2.8	319.1	21.3	22.9	1,514	9,565
	TOTALS	-	**3,070**	**240**	**2,830**	**6,417**	**1.3**	**0**	**0.8**	**18**	**1,045**	-	**10,923**	**2.7**	-	-	-	**1,955**	**11,490**

Assumptions: Discount Rate: 3.2% per DOE FEMP; Energy Price Escalation Rate: 0% per DOE FEMP Guidelines
Note: A 0.0 electrical demand reduction / month indicates that it is very low / negligible

Table 2 - Recommended 5-10 Year Payback ECMs																		
ECM #	ECM description	Source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
3	Install 15 new LED exit signs	RSMeans, lit search	3,050	300	2,750	872	0.2	0	0.1	286	426	15	5,007	6.5	82.1	5.5	13.0	2,330	1,561
4	Retro-commissioning	Similar Projects	35,806	0	35,806	291	0.0	4,459	15.6	0	5,112	10	43,165	7.0	20.6	2.1	7.1	7,800	49,673
5	Install 10 kW PV system	Similar Projects	70,000	10,000	60,000	11,804	10.0	0	1.4	0	8,489	15	99,886	7.1	66.5	4.4	11.3	41,337	21,135
6	Install 15 new Pulse Start Metal Halide fixtures	RSMeans, lit search	12,079	375	11,704	8,007	1.7	0	1.0	267	1,548	15	18,217	7.6	55.6	3.7	10.1	6,777	14,337
	TOTALS	**-**	**120,935**	**10,675**	**110,260**	**20,974**	**11.9**	**4,459**	**18.1**	**553**	**15,574**	**-**	**166,275**	**7.1**	**-**	**-**	**-**	**58,244**	**86,706**

Note: For more details on End of Life Cycle ECMs and associated incremental cost for high efficiency equipment and performance see Section 4.

1. HISTORIC ENERGY CONSUMPTION

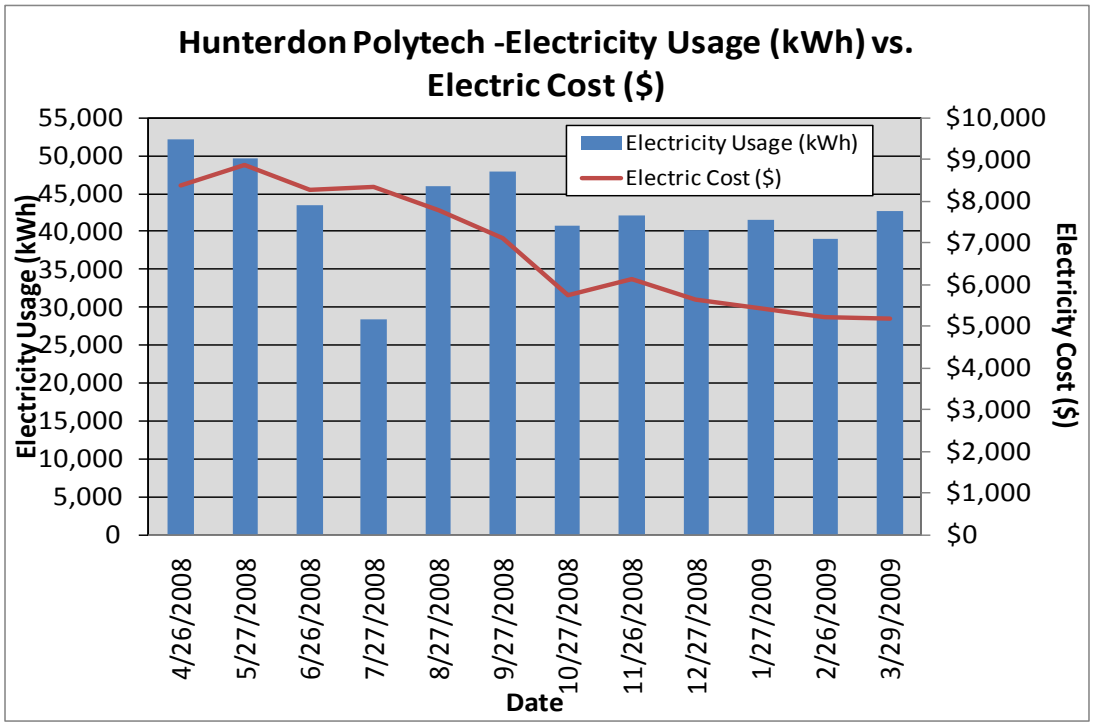
1.1. Energy usage, load profiles and cost analysis

SWA analyzed utility bills from **April 2008 through April 2009**(period of analysis) that were received from the utility companies supplying both the Main building and Building Trades building with electric and natural gas. The Main building and Building Trades building are part of the same facility and share both an electric meter and gas meter. Since the buildings share utility meters, it is not possible to separate out the usage for each building individually. As such, the utility bills have been analyzed per each meter, not by each building.

Electricity – Hunterdon Polytech buys electricity from JCP&L at **an average rate of $0.160/kWh** based on 12 months of utility bills from April 2008 to April 2009. Hunterdon Polytech purchased **approximately 514,026 kWh or $82,076 worth of electricity** in the previous year. The buildings are currently charged for demand (kW) which has been factored into each monthly bill. The electricity meter recorded an **average monthly demand of 125.4 kW** with a **monthly peak demand of 144 kW.**

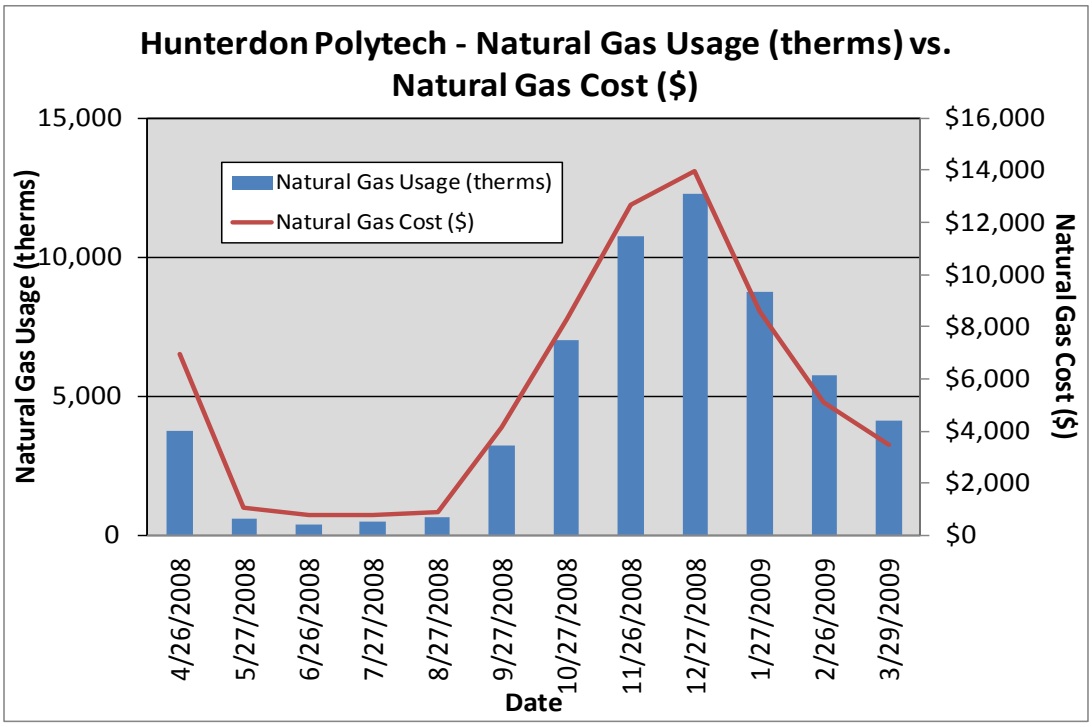
Natural gas – Hunterdon Polytech is currently served by one meter for natural gas. Hunterdon Polytech currently buys natural gas from Elizabethtown Gas at **an average aggregated rate of $1.136/therm** based on 12 months of utility bills for April 2008 to April 2009. Hunterdon Polytech purchased **approximately 58,797 therms or $66,768 worth of natural gas** in the previous year.

The following chart shows electricity use versus cost for Hunterdon Polytech based on utility bills for the 12 month period of April 2008 to April 2009.



Electricity use follows a trend as expected; peaking during the summer months when air conditioning units are used most and decreases during the winter. The cost of electricity fluctuates as expected with usage.

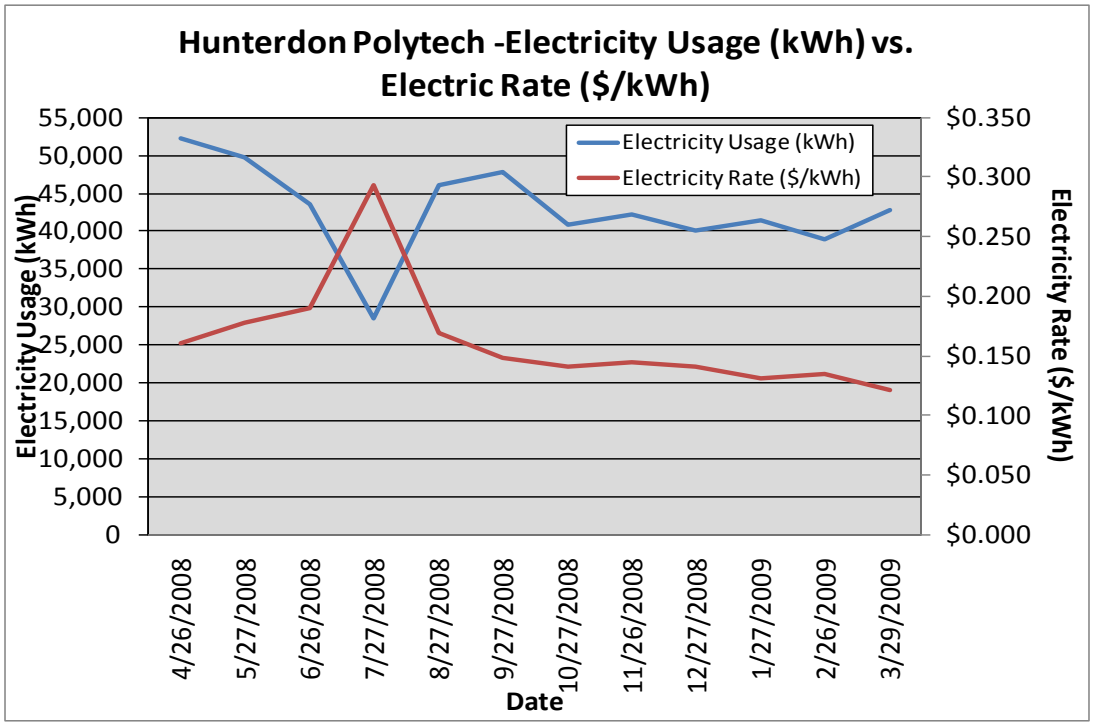
The following is a chart of the natural gas annual load profile for the building versus natural gas costs, peaking in the coldest months of the year and a chart showing natural gas consumption following the "heating degree days" curve.



In the above chart, the natural gas use follows a heating trend as expected. During the summer it is clear that the natural gas use is very minimal which reflects that heat is not being used and the domestic hot water (DHW) load is minimal.

1.2. Utility rate analysis

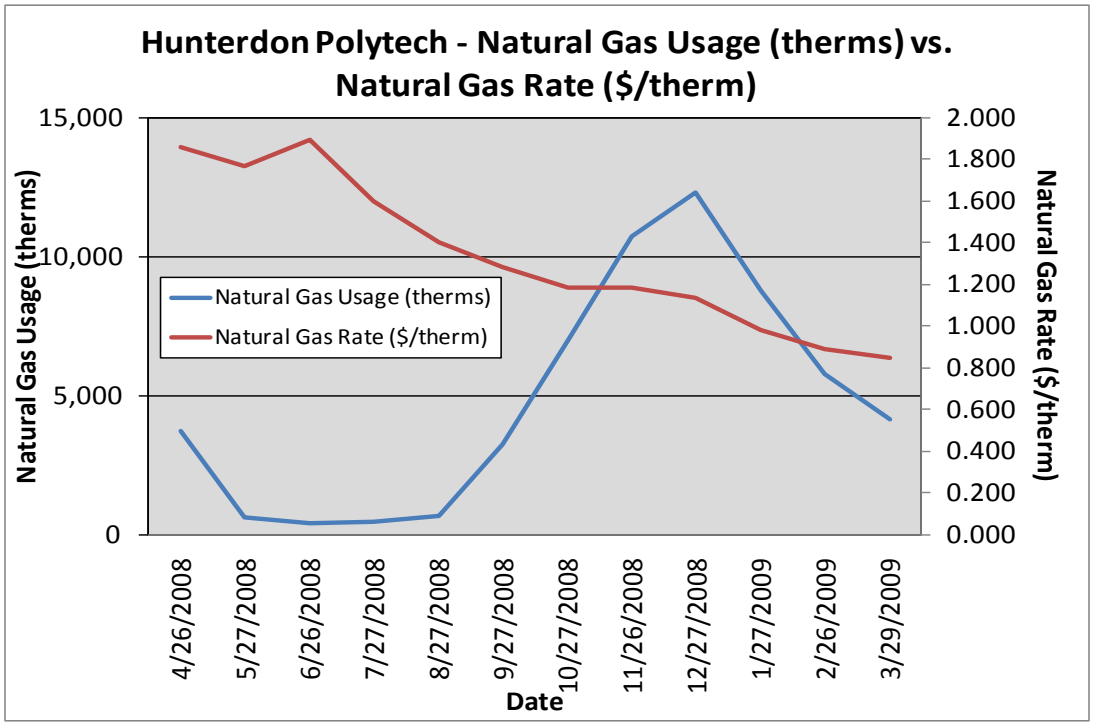
Hunterdon Polytech currently purchases electricity from JCP&L at a general service market rate for electricity use (kWh) including a separate (kW) demand charge that is factored into each monthly bill. Hunterdon Polytech currently pays an average rate of approximately $0.160/kWh based on the 12 months of utility bills of April 2008 to April 2009. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. The electric rate does not show large fluctuations throughout the year except for an anticipated rise in the summer time and small increase in the winter that corresponds to a spike in fuel prices. Based on these observations this appears to be the appropriate rate for the building.



Note: Electricity usage dropped during July when school was not fully in session, Costs increased during this period as a result of seasonal demand charges

Hunterdon Polytech currently purchases natural gas supply from the Elizabethtown Gas at a general service market rate for natural gas (therms). There is one gas meter that provides natural gas service to the both the Main building and Building Trades building currently. The average aggregated rate (supply and transport) for the meter is approximately $1.136/therm based on 12 months of utility bills for April 2008 to April 2009. The suppliers' general service rate for natural gas charges a market-rate price based on use and the Hunterdon Polytech billing does not breakdown demand costs for all periods. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. Typically, the natural gas prices increase during the summer months when natural gas is only used by the hot water boilers. The high gas price per therm fluctuations in the summer may be due to low use caps for the non-heating months. Thus the building pays for fixed costs such as meter reading charges during the summer months.

Some of the minor unusual utility fluctuations that showed up for a couple of months on the utility bills may be due to adjustments between estimated and actual meter readings.



1.3. Energy benchmarking

SWA has entered energy information about both Hunterdon Polytechnic buildings in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The Main building shares a common meter with the Building Trades building and therefore, the buildings have been benchmarked as a single building. The facility received a score of 1 out of 100 when compared to other K-12 schools. This number is deceiving and seems extremely low due to the fact that the school is a technical school with a higher density of electrical equipment as well as including a Building Trades building (technical building) that is separated from the Main building. SWA encourages the Hunterdon Polytech to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time.

The Site Energy Use Intensity is 219.9 kBtu/sq ft yr compared to the national average of a K-12 school consuming 93.0 kBtu/sq ft yr. Implementing this report's highly recommended Energy Conservations Measures (ECMs) will reduce use by approximately 0.8 kBtu/sqft yr, with an additional 18.1kBtu/sq ft yr from the recommended ECMs.

Per the LGEA program requirements, SWA has assisted Hunterdon Polytech to create an *Energy Star Portfolio Manager* account and has shared the facility information to allow future data to be added and tracked using the benchmarking tool. SWA is sharing this Portfolio Manager Site information with TRC Energy Services. As per requirements, the account information is provided below:

Username: HunterdonPolytech
Password: HUNTERDON

Also, below is a statement of energy performance generated based on historical energy consumption from the Portfolio Manager Benchmarking tool.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Hunterdon Co. Vocational School

Building ID: 1765668
For 12-month Period Ending: March 31, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: September 14, 2009

Facility
Hunterdon Co. Vocational School
10 Junction Rd
Flemington, NJ 08822

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1975
Gross Floor Area (ft²): 34,558

Energy Performance Rating[2] (1-100) 1

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	1,746,092
Natural Gas (kBtu)[4]	5,853,255
Total Energy (kBtu)	7,599,347

Energy Intensity[5]	
Site (kBtu/ft²/yr)	220
Source (kBtu/ft²/yr)	346

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	577

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison	
National Average Site EUI	93
National Average Source EUI	146
% Difference from National Average Source EUI	137%
Building Type	K-12 School

Stamp of Certifying Professional

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

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**	
Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

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

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, PE, facility inspection, and notarizing the SEP) and welcomes

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The building was originally built in 1975 and expanded with a culinary wing added in 2005. The building has a total building area of approximately 28,645 square feet. The Polytech Career Academy houses classrooms and shops for cosmetology, auto body, auto mechanics, small engines and culinary arts, besides administrative offices and a dining area.

2.2. Building occupancy profiles

The building is operated from 7 AM – 9:30 PM Monday through Thursday and from 7 AM – 4 PM on Friday. During the summer, the school is only used for a limited amount of classes. Hunterdon Polytech employs approximately 25-30 faculty members and contains 250-300 students.

2.3. Building envelope

2.3.1.Exterior Walls

Most of the exterior walls consist of 8" CMU blocks behind brick veneer finish with 2" rigid insulation. The newer culinary extension with the dining area and some other smaller volumes are emphasized by a horizontal metal clad façade system or EIFS. Due to warm temperature conditions at the time of the field visits, insulation levels could not be verified with the help of infrared technology. If desired, the school could contract a separate envelope inspection during cooler months.

Typical Building Elevations Showing the Various Materials and Methods

Overall, exterior and interior wall finishes of the envelope were found to be in age-appropriate, good condition with no major signs of water or air leakage or other energy compromising damage.

2.3.2.Roof

Most roof areas on both, the original building and the addition are flat, constructed of dark colored EPDM finish without a gravel layer. The dining area roof is a sloped painted standing seam metal type. SWA measured 3" foam insulation (R-18) over the steel decking as specified on the construction drawings. The original building's parapet is covered with a painted metal panel system that extends down to most window and garage door heaters.

No current leaks were mentioned to the auditors at the time of the field visit and no signs of roof leakage were detected. In an effort to get the maximum life expectancy out of the roofing material installed, SWA recommends following the installer's or manufacturer's recommended maintenance and inspection schedule. Due to warm temperature conditions at the time of the field visits, insulation levels could not be verified with the help of infrared technology.

2.3.3. Base

The building's base is a 4-6" concrete slab-on grade with a perimeter footing and specified slab edge insulation. There were not any reported problems with water penetration or moisture. The slab edge or perimeter insulation could not be verified and should be confirmed at the time of the above recommended insulation inspection during cooler months for usable infrared data evaluation.

2.3.4. Windows

The windows in the culinary wing are fixed vinyl type with low-e coating, and double-glazed.
The windows throughout the rest of the building were a mixture of fixed and casement windows, double pane with aluminum framing. All appeared to be in good condition. SWA recommends regular maintenance, caulking any broken seals around the window framing to ensure a tight seal.

Administrative Casement window

Casement window in Cosmetology classroom

2.3.5. Exterior doors

The aluminum framed exterior doors were observed to be in good condition except for missing or worn weather-stripping, including the garage type sectional overhead doors in the various shop areas. SWA recommends that the exterior doors of the building are weather-stripped in order to decrease the amount of conditioned air that is lost around each door. SWA also recommends checking the weather-stripping of each door on a regular basis or at least twice a year and replacing any broken seals immediately.

Worn Weather Stripping at Front Door and One of the Shop Side Doors

2.3.6. Building air tightness

Based on a visual inspection, the building was observed to be a relatively satisfactorily sealed building. There were not any major observed deficiencies of air tightness within the building besides the exterior doors. Classroom occupants should be made aware more often to keep doors closed since the corridors are not air-conditioned nor heated to the same temperature levels.

2.4. HVAC Systems

2.4.1. Heating

The Hunterdon Polytech - Main building contains a heating and cooling system that consists of six (6) Trane roof top split-system units located on the building roof serving the space. These rooftop units are controlled by programmable thermostats located within the building spaces. These rooftop units provide natural gas heating as well as refrigerant cooling to the space via ducts located in the ceiling plenum. The roof top units are provided with filters, DX cooling coils, supply fans, return fans and gas-fired furnaces. The air-handling units are currently run from 6am to 9pm, Monday through Thursday and from 6am to 5pm on Fridays.

The building also contains three (3) gas-fired heating and ventilating units to provide both heat and fresh air via ducts throughout the building. There are several cabinet unit heaters in the Transportation Shop area and cabinet unit heaters at the corridor and vestibule area. All of the mechanical equipment is approximately six (6) years old and is of the original condition. A complete mechanical schedule is located in Section 3 of this report.

2.4.2. Cooling

The Hunterdon Polytech - Main building is cooled using the six (6) Trane roof top split-system units mentioned in the heating section above. The roof top units contain a natural gas heating coil as well as a DX cooling coil. The units use fan power to move air across the cooling air and subsequently cool parts of the building via a duct system.

2.4.3. Ventilation

All of the heating and cooling units introduce fresh air throughout the building. Each unit takes outside air and then filters and conditions it before introducing it to the building. There are also several exhaust fans for toilets, area exhaust and shop exhaust that help induce fresh air into the building by reducing building pressure.

2.4.4. Domestic Hot Water

Domestic hot water is provided to the building by two (2) Lochinvar domestic hot water boilers. The boilers use natural gas and have a thermal efficiency of 85%. These boilers each have 100 gallons worth of storage.

It is not cost-effective to replace the existing water heating equipment with higher efficiency equipment. However, higher efficiency water heating equipment will save energy and should be strongly considered upon replacement of the equipment. Energy saving appliances bearing the ENERGY STAR label should be selected to ensure efficiency performance. Incentives may be available to offset any added costs for the installed equipment.

2.5. Electrical systems

2.5.1. Lighting

Interior Lighting – Most of the lighting within the Hunterdon Polytech Career Academy building consisted of efficient T8 lighting with electronic ballasts. There are 8 areas within the building that could benefit from installing Compact Fluorescent Lamps (CFLs).

SWA recommends installing occupancy sensors in areas that are used infrequently though out the day. The large women's restroom seen in the image below has sufficient day lighting with the lights off. SWA suggests adding occupancy sensors for this restroom as well as other bathrooms, utility rooms and small areas located through the building. SWA has identified a total of 12 areas that could benefit from the installation of an occupancy sensor. There are also 4 High Intensity Discharge (HID) metal halide fixtures located in a classroom within the building that could benefit from replacing with pulse start metal halide technology. See attached existing and proposed lighting schedule in Appendix A.

Exit Lights - Most of the exit signs in the Hunterdon Polytech – Main building are fluorescent exit signs. These lights were observed to contain 20W bulbs in comparison to an LED exit sign that only uses 5W. LED exit signs are always cost-effective since they use such little power and operate 24 hours a day, 365 days a year. SWA recommends installing 15 new LED exit signs throughout the building to replace the existing fluorescent exit signs. See attached existing and proposed lighting schedule in Appendix A.

Exterior Lighting – There were 11 light fixtures located in the parking let that used 400W probe start metal halide fixtures. SWA recommends replacing this with newer pulse start metal halide fixtures that only use 275W.

2.5.2. Appliances

SWA performed a basic survey of appliances installed at the Main building and has determined that it would not be cost-effective to replace any appliances at this time due to the age of the building. Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators use as little as 315 kWh / yr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Building management should select Energy Star label appliances and equipment when replacing: refrigerators, printers, and computers, copy machines, etc. More information can be found in the "Products" section of the Energy Star website at: http://www.energystar.gov.

Computers left on in the building consume a lot of energy. A typical desk top computer uses 65 to 250 watts and uses the same amount of energy when the screen saver is left on. Televisions in meeting areas use approximately 3-5 watts of electricity when turned off. SWA recommends all computers and all appliances (i.e. refrigerators, coffee makers, televisions, etc) be plugged in to power strips and turned off each evening just as the lights are turned off. The Hunterdon Polytech computers are generally programmed for the power save mode, to shut down after a period of time that they have not been used.

Building staff should ensure that all appliances are always shut off when rooms are not in use. Computers and other appliances should be shut down, or at least their screens should be when not in use for extended periods of time.

Computer left on in Culinary Wing

Refrigerator in Culinary Wing

2.5.3. Elevators

The Hunterdon Polytech – Main building is a one story building and therefore contains no elevator.

2.5.4. Process and others electrical systems

There are currently no other process or electrical systems present in the building.

3. EQUIPMENT LIST

Inventory

Building System	Description	Physical Location	Model#	Fuel	Space served	Estimated Remaining useful life %
HVAC	(2) Trane roof top unit	Main rooftop	YHC092	Electric/gas	Corridor, General Classroom	60%
	Nom cooling cap.: 7.5 ton					
	Heating input: 260 MBH					
	Heating output: 200 MBH					
	Fuel: Natural gas					
	Efficiency: 11.5 EER; 81 AFUE					
HVAC	Trane roof top unit	Main rooftop	YHC120	Electric/gas	General Office, Computer Lab, Culinary Arts	60%
	Nom cooling cap.: 10 ton					
	Heating input: 260 MBH					
	Heating output: 200 MBH					
	Fuel: Natural gas					
	Efficiency: 11.2 EER; 81 AFUE					
HVAC	Trane roof top unit	Main rooftop	YHC181	Electric/gas	Dining Area, Lobby	60%
	Nom cooling cap.: 15 ton					
	Heating input: 350 MBH					
	Heating output: 284 MBH					
	Fuel: Natural gas					
	Efficiency: 11.5 EER; 80.1 AFUE					
HVAC	(2) Greenheck heating and ventilating units	Main rooftop	IGX-118-H32-DB	Electric/gas	Transportation / Recreation Vehicle Transportation/ Autoshop	60%
	Duct heaters model: (2) PVF 350H					
	Heating input: (2) 350 MBH					
	Heating output: (2) 280 MBH					
	Fuel: Natural gas					
	Efficiency: 80 AFUE					
HVAC	Greenheck heating and ventilating units	Main rooftop	IGX-118-H32-DB	Electric/gas	Transportation/ Auto body,	60%
	Duct heaters model: (2) PVF 400H					
	Heating input: (2) 400 MBH					
	Heating output: (2) 320 MBH					
	Fuel: Natural gas					
	Efficiency: 80 AFUE					
HVAC	Greenheck make-up air unit	Rooftop of Culinary Wing	IGX-118-H32-DB	Electric/gas	Culinary Arts Kitchen	60%
	Duct heaters model: (2) PVF 350H					
	Heating input: (2) 350 MBH					
	Heating output: (2) 280 MBH					
	Fuel: Natural gas					
DHW	Manufacturer: Lochinvar	Mechanical Room	EWN300PM	Natural gas	All Areas	30%
	Input: 300 MBH					
	100 gal storage tank, model RJS 100					
	Fuel: Natural gas					

Note: The remaining useful life of a system (in %) is an estimate based on the system date of built and existing conditions derived from visual inspection.

4. ENERGY CONSERVATION MEASURES

Based on the assessment of the Hunterdon Polytech – Main building, SWA has separated the investment opportunities into three recommended categories:

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

Category I Recommendations: Capital Improvements

- None at this time

Category II Recommendations: Operations and Maintenance

- Perform routine maintenance inspections on envelope – SWA recommends that biannual inspections of the exterior walls are conducted as part of a preventative maintenance schedule. SWA observed some isolated instances at surface transitions and building corners that were starting to show signs of cracking and slight water damage. At this time, there are no major concerns with the exterior walls that should be addressed. Any weaknesses in the building structure that could allow either water or thermal presentation should be addressed immediately. Properly maintaining the exterior walls will ensure that the vapor barrier as well as insulation levels are not compromised.

- Perform routine maintenance inspections of the roof – SWA recommends that biannual inspections of the roof are conducted as part of a preventative maintenance schedule. At this time, there are no major concerns with the roofing material that should be addressed. Properly maintaining the roof will ensure that the vapor barrier as well as insulation levels are not compromised.

- Perform routine maintenance inspections of windows and doors– SWA recommends that biannual inspections of each window are conducted as part of a preventative maintenance schedule. The windows and doors appeared to be in excellent condition and are not in need of upgrading at this time. Typically, weather-stripping around windows and doors begin to show wear and tear over time. SWA recommends that weather-stripping is repaired or replaced as soon as soon as signs of deterioration are observed. Correcting weather-stripping issues prevent energy cost losses and comfort complaints.

- Provide water efficient fixtures and controls - Adding controlled on / off timers on all lavatory faucets is a cost-effective way to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators and / or low-flow fixtures to reduce water consumption. There are many retrofit options, which can be installed now or incorporated as equipment is replaced. Routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy. Retrofitting with more efficient water-consumption fixtures / appliances will save both energy and money through reduced energy consumption for water heating, while also decreasing water / sewer bills.

- Use Energy Star labeled appliances - such as Energy Star refrigerators that should replace older energy inefficient equipment.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM#	Description of Highly Recommended 0-5 Year Payback ECMs
1	Install 8 new CFLs
2	Install 12 new Occupancy Sensors
	Description of Recommended 5-10 Year Payback ECMs
3	Install 15 new LED exit signs
4	Retro-Commissioning
5	Install 10 kW PV system
6	Install 15 new Pulse Start Metal Halide fixtures

ECM#1: *Install 8 new CFL lamps*

Description:

The Main building contains mostly updated and efficient lighting however, there are 8 incandescent bulbs located in the building that should be upgraded to Compact Fluorescent Lamps (CFLs) in order to reduce the amount of electricity consumed within the building. In addition, there will be operating cost savings associated with each bulb since CFLs have a longer rated lifetime than halogen bulbs. See Appendix A for complete lighting schedule and analysis.

Installation cost:

Estimated installed cost: $430
Source of cost estimate: RS *Means; Published and established costs*

Economics:

ECM #	ECM description	source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
1	Install 8 new CFL lamps	RS Means, lit search	430	0	430	1,075	0.2	0	0.1	18	190	5	865	2.3	101.2	20.2	33.9	440	1,925

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operation cost savings based on avoided bulb replacement when upgrading to lighting that consists of longer rated burn hours.

Rebates / financial incentives:
There are currently no incentives for this measure at this time.

Options for funding ECM:
This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

ECM#2: *Install 12 new Occupancy Sensors*

Description:

The Main building current has many smaller rooms that are used sporadically throughout the day. These rooms include closets, mechanical rooms and bathrooms. SWA identified 12 areas that do not experience constant use throughout the day that could benefit from the installation of occupancy sensors. Please see Appendix A for a complete existing and proposed lighting schedule.

Installation cost:

Estimated installed cost: $2,400
Source of cost estimate: RS *Means; Published and established costs*

Economics:

ECM #	ECM description	source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
2	Install 12 new Occupancy Sensors	RSMeans, lit search	2,640	240	2,400	5,342	1.1	0	0.6	0	855	15	10,058	2.8	319.1	21.3	22.9	1,514	9,565

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis.

Rebates / financial incentives:
NJ Clean Energy – Lighting Controls, Wall mounted occupancy sensors ($20 per control).
Incentive amount for this application is $240.

Options for funding ECM:
This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

ECM#3: *Install 15 new LED exit signs*

Description:

A majority of the exit lighting in the Hunterdon Polytech – Main building is fluorescent exit signs. These signs were observed to contain 20W fluorescent bulbs in comparison to newer LED technology that uses only 5W. SWA recommends LED exit signs since they are always cost-effective since they use such little power and operate 24 hours per day. Please see attached existing and proposed lighting schedule located in Appendix A.

Installation cost:

Estimated installed cost: $2,750
Source of cost estimate: RS *Means; Published and established costs*

Economics:

ECM #	ECM description	source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
3	Install 15 new LED exit signs	RSMeans, lit search	3,050	300	2,750	872	0.2	0	0.1	286	426	15	5,007	6.5	82.1	5.5	13.0	2,330	1,561

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operation cost savings based on avoided bulb replacement when upgrading to lighting that consists of longer rated burn hours.

Rebates / financial incentives:
NJ Clean Energy – LED Exit Signs ($10/$20 per fixture)
Incentive amount for this application is $300.

Options for funding ECM:
This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

ECM#4: *Retro-Commissioning*

Description:

The Hunterdon Polytech Career Academy currently has high energy costs including excessive heating energy. SWA recommends that the building undergo re-commissioning in order to eliminate waste with the operation of the mechanical equipment. Mechanical equipment is installed in a building based on parameters the day they are installed. Retro-commissioning shall take a detailed look at the installation of mechanical equipment and determine more appropriate operating parameters as well as operation schedules in order to eliminate waste. Retro-commissioning shall include a detailed look at controls and should plan scheduling of controls to eliminate any unnecessary hours of use that the system is currently operated at. In addition, SWA recommends that retro-commissioning should include the evaluation and installation of demand-controlled ventilation at RTU (Return Air Unit) #3, RTU #4 and RTU #6. RTU #3 currently serves the dining area; RTU #4 serves the computer room and RTU #6 serves the culinary area. Demand-controlled ventilation includes installing CO2 sensors in the return air ducts of specific systems in order to reduce the runtime of equipment. Equipment will remain off until the sensors detect a CO2 level that reflects increased occupancy for a particular space. Demand-controlled ventilation is included in retro-commissioning as it will have a broad effect on equipment schedules and should be evaluated on the system level.

Installation cost:
Estimated installed cost: $35,806
Source of cost estimate: Similar Projects

Economics:

ECM #	ECM description	Source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
4	Retro-Commissioning	Similar Projects	35,806	0	35,806	291	0.0	4,459	15.6	0	5,112	10	43,165	7.0	20.6	2.1	7.1	7,800	49,673

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes retro-commissioning combine with demand-controlled ventilation in noted areas can save 10% of heating and cooling energy usage.

Rebates / financial incentives:

There are currently no incentives for this measure at this time.

Options for funding ECM:

This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

ECM#5: *Install 10kW PV system*

Description:

Currently, the Main building does not use any renewable energy systems. Renewable energy systems such as photovoltaic panels, can be mounted on the building roofs, and can offset a portion of the purchased electricity for the building. Power stations generally have two separate electrical charges: usage and demand. Usage is the amount of electricity in kilowatt-hours that a building uses from month to month. Demand is the amount of electrical power that a building uses at any given instance in a month period. During the summer periods, when electric demand at a power station is high due to the amount of air conditioners, lights, equipment, etc… being used within the region, demand charges go up to offset the utility's cost to provide enough electricity at that given time. Photovoltaic systems not only offset the amount of electricity use by a building, but also reduce the building's electrical demand, resulting in a higher cost savings as well. SWA presents below the economics, and recommends at this time that Hunterdon Polytechnic further review installing a 10kW PV system to offset electrical demand and reduce the annual net electric consumption for the building, and review guaranteed incentives from NJ rebates to justify the investment. The Main building is not eligible for a 30% federal tax credit. Instead, Hunterdon Polytechnic may consider applying for a grant and / or engage a PV generator / leaser who would install the PV system and then sell the power at a reduced rate. JCP&L provides the ability to buy SRECs at $600 / MWh or best market offer.

There are a few locations for a 10kW PV installation on the building roofs and away from shade. The size of the system was determined using the amount of roof surface area as a limiting factor. A PV system could be installed on a portion of the roof that faces South or West. The recommended system would fit on the main portion of the roof. A commercial multi-crystalline 123 watt panel (17.2 volts, 7.16 amps) has 10.7 square feet of surface area (11.51 watts per square foot). A 10kW system needs approximately 82 panels which would take up 870 square feet. The installation of a renewable Solar Photovoltaic power generating system could serve as a good educational tool and exhibit for the community.

Installation cost:

Estimated installed cost: $60,000
Source of cost estimate: Similar projects

Economics (with incentives):

ECM #	ECM description	source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
5	Install 10 kW PV System	Similar Projects	70,000	10,000	60,000	11,804	10.0	0	1.4	0	8,489	15	99,886	7.1	66.5	4.4	11.3	41,337	21,135

Assumptions: SWA estimated the cost and savings of the system based on past PV projects. SWA projected physical dimensions based on a typical Polycrystalline Solar Panel (123 Watts, model #ND-123UJF). PV systems are sized based on Watts and physical dimensions for an array will differ with the efficiency of a given solar panel (W/sq ft).

Rebates/financial incentives:
NJ Clean Energy - Renewable Energy Incentive Program, Incentive based on $1.00 / watt Solar PV application. Incentive amount for this application is $10,000.

http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program

NJ Clean Energy - Solar Renewable Energy Certificate Program. Each time a solar electric system generates 1000kWh (1MWh) of electricity, a SREC is issued which can then be sold or traded separately from the power. The buildings must also become net-metered in order to earn SRECs as well as sell power back to the electric grid. $6,600 has been incorporated in the above costs; however it requires proof of performance, application approval and negotiations with the utility.

Options for funding ECM:
This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

ECM#6: *Install 15 new Pulse Start Metal Halide fixtures*

Description:

The Main building currently contains 11 inefficient Probe-start metal halide light fixtures used for general exterior lighting as well as to illuminate the parking lot. There were also 4 High Intensity Discharge (HID) lights located in classrooms that could benefit from installing new pulse-start metal halides allows the existing light fixtures to use 1/3 less wattage. In addition, pulse start metal halides provide a better quality light for safety and also require less bulb replacements since the quality of light does not degrade over time. See Appendix A for complete lighting schedule and analysis.

Installation cost:

Estimated installed cost: $11,704
Source of cost estimate: RS *Means; Published and established costs*

Economics:

ECM #	ECM description	source	est. installed cost, $	est. incentives, $	net est. ECM cost with incentives, $	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, $	total 1st yr savings, $	life of measure, yrs	est. lifetime energy cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
6	Install 15 new Pulse Start Metal Halide fixtures	RS Means, lit search	12,079	375	11,704	8,007	1.7	0	1.0	267	1,548	15	18,217	7.6	55.6	3.7	10.1	6,777	14,337

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operation cost savings based on avoided bulb replacement when upgrading to lighting that consists of longer rated burn hours.

Rebates / financial incentives:
NJ Clean Energy Prescriptive Lighting – Metal Halide with pulse start ($25 per fixture)
Maximum incentive amount is $375.

Options for funding ECM:

This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are not currently any existing renewable energy systems.

5.2. Wind

A Wind system is not applicable for this building because the area does not have winds of sufficient velocity to justify installing a wind turbine system.

5.3. Solar Photovoltaic

Pleases see the above recommended ECM #5.

5.4. Solar Thermal Collectors

Solar thermal collectors are not cost effective for this building and would not be recommended due to the insufficient and not constant use of domestic hot water throughout the building to justify the expenditure.

5.5. Combined Heat and Power

CHP is not applicable for this building because of the existing HVAC system and insufficient domestic hot water use.

5.6. Geothermal

Geothermal is not applicable for this building because current HVAC equipment would need to be completely reconfigured and the total cost of installation would not be cost effective.

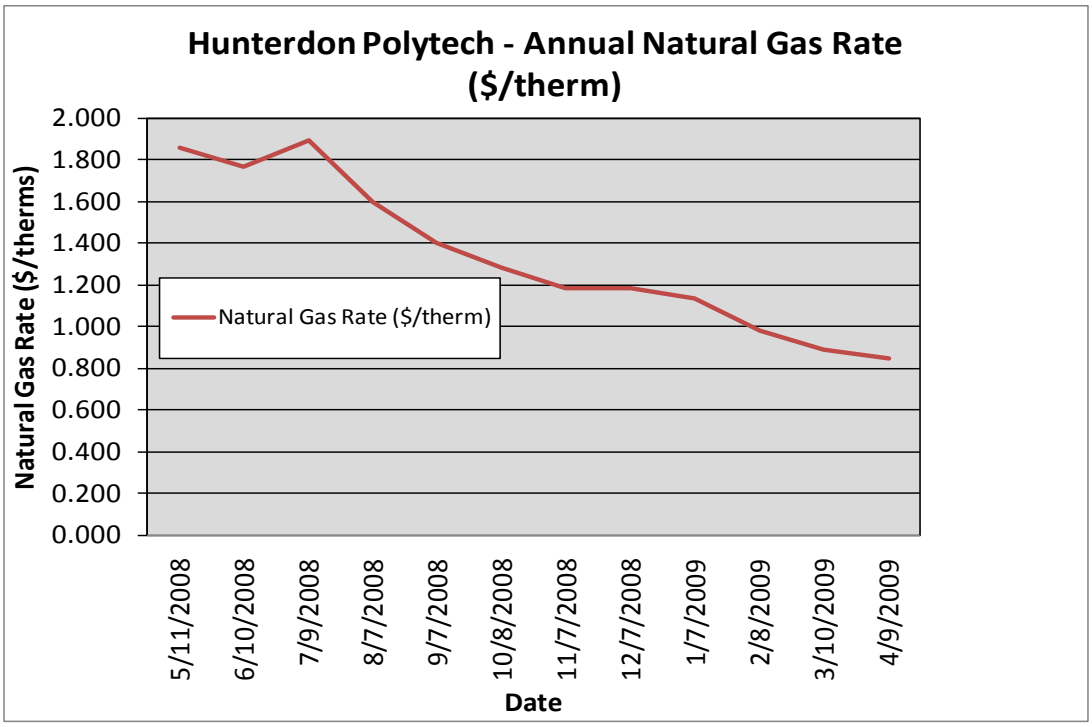
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

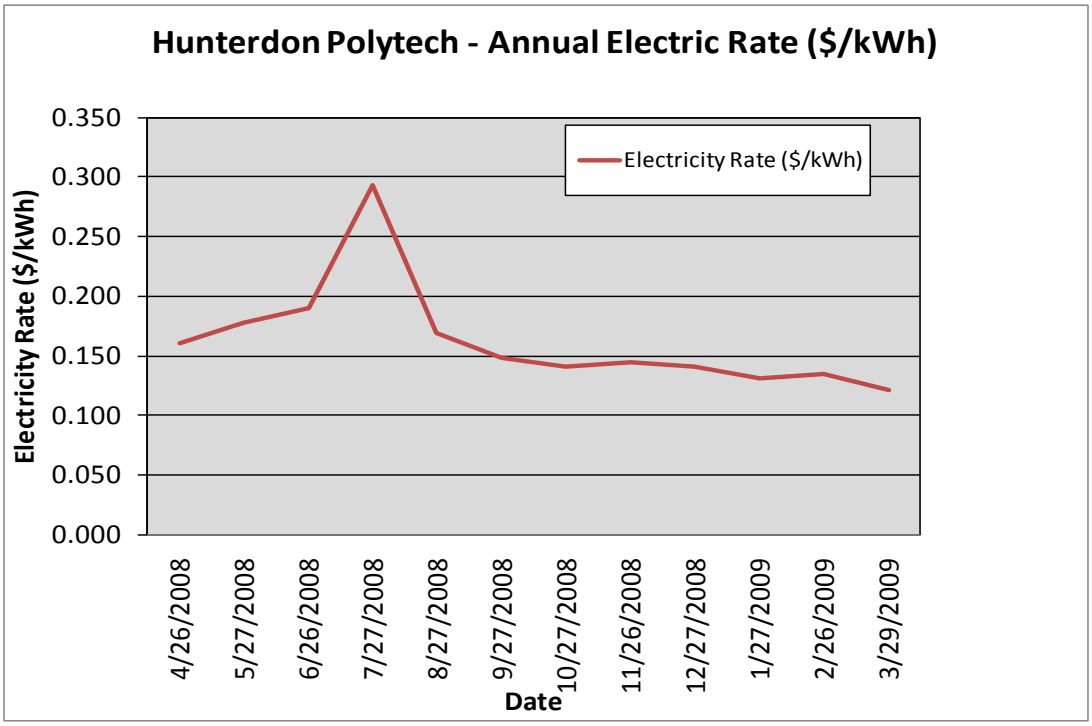
6.1. Energy Purchasing

Hunterdon Polytech receives natural gas via one incoming meter. Elizabethtown Gas supplies gas to the building. There is not an ESCO engaged in the process. An Energy Services Company (ESCO) is a consultancy group that engages in a performance based contract with a client firm to implement measures which reduce energy consumption and costs in a technically and financially viable manner. Electricity is also purchased via one incoming meter directly for the facility from JCP&L without an ESCO. SWA analyzed the utility rate for natural gas and electricity supply over an extended period. Electric bill analysis shows fluctuations of 59% over the most recent 12 month period. Natural gas bill analysis shows fluctuations up to over 100% over the most recent 12 month period. The high gas price per therm fluctuations in the summer may be due to low use caps for the non-heating months. Thus the building pays for fixed costs such as meter reading charges during the summer months.

Currently, New Jersey commercial buildings of similar type pay $0.150/kWh for electricity and $1.55/therm for natural gas. Currently, the electricity rate for Hunterdon Polytech is $.160/kWh, which means there is a potential cost savings of $5,140per year. The current natural gas rate for Hunterdon Polytech is $1.136/therm which is better than the average natural gas cost. A large cost savings potential

for electricity exists, however this involves contacting third party suppliers and negotiating utility rates. SWA recommends that Hunterdon Polytech further explore opportunities of purchasing electricity from third party energy suppliers in order to reduce rate fluctuation and ultimately reduce the annual cost of energy for the facilities. Appendix B contains a complete list of third party energy suppliers for the Hunterdon Polytech service area. Hunterdon Polytech may want to consider partnering with other school districts, municipalities, townships and communities to aggregate a substantial electric and natural gas use for better leveraging in negotiations with ESCOs and of improving the pricing structures. This sort of activity is happening in many parts of the country and in New Jersey.





6.2. Energy Procurement strategies

Also, Hunterdon Polytech would not be eligible for enrollment in a Demand Response Program, because there isn't the capability at this time to shed a minimum of 150 kW electric demand when requested by the utility during peak demand periods, which is the typical threshold for considering this option.

7. METHOD OF ANALYSIS

7.1. Assumptions and tools

Energy modeling tool:	Established / standard industry assumptions, DOE e-Quest
Cost estimates:	RS Means 2009 (Facilities Maintenance & Repair Cost Data) RS Means 2009 (Building Construction Cost Data) RS Means 2009 (Mechanical Cost Data) Published and established specialized equipment material and labor costs Cost estimates also based on utility bill analysis and prior experience with similar projects

7.2. Disclaimer

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

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

Appendix A: Lighting Study of Hunterdon Polytech – Main Building

Location			Existing Fixture Information												Retrofit Information												Annual Savings		
Marker	Floor	Room Identification	Fixture Type	Ballast	Lamp Type	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Controls	Operational Hours per Day	Operational Days per Year	Ballast Wattage	Total Watts	Energy Use kWh/year	Category	Fixture Type	Lamp Type	Ballast	Controls	# of Fixtures	# of Lamps per Fixture	Watts per Lamp	Operational Hours per Day	Operational Days per Year	Ballast Watts	Total Watts	Energy Use kWh/year	Fixture Savings (kWh)	Controls Savings (kWh)	Total Savings (kWh)
1	GF	Lobby Area	Screw-in	N	CFL	6	2	13	S	12	261	0	156	489	N/A	Screw-in	CFL	N	S	6	2	13	12	261	0	156	489	0	0	0
2	**GF**	**Lobby Area**	**Exit Sign**	**N**	**Fl.**	**1**	**1**	**15**	**N**	**24**	**261**	**2**	**17**	**106**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**1**	**1**	**5**	**24**	**261**	**1**	**6**	**38**	**69**	**0**	**69**
3	GF	Server Rm	Parabolic	E	4'T8	1	2	32	S	12	261	6	70	219	N/A	Parabolic	4'T8	E	S	1	2	32	12	261	6	70	219	0	0	0
4	GF	Server Rm	2'U-shape	E	T8 U	1	3	40	S	12	261	8	128	401	N/A	2'U-shape	T8 U	E	S	1	3	40	12	261	8	128	401	0	0	0
5	**GF**	**Admin. Office (115)**	**2'U-shape**	**E**	**T8 U**	**6**	**3**	**40**	**S**	**12**	**261**	**8**	**728**	**2,405**	**N/A**	**2'U-shape**	**T8 U**	**E**	**OS**	**6**	**3**	**40**	**9**	**261**	**8**	**728**	**1,804**	**0**	**601**	**601**
8	GF	Conference Room	2'U-shape	E	T8 U	3	3	40	S	2	261	8	368	200	N/A	2'U-shape	T8 U	E	S	3	3	40	2	261	8	368	200	0	0	0
9	GF	Conference Room	Screw-in	N	CFL	6	2	26	S	2	261	0	312	163	N/A	Screw-in	CFL	N	S	6	2	26	2	261	0	312	163	0	0	0
10	**GF**	**Principals office**	**2'U-shape**	**N**	**T8 U**	**3**	**3**	**40**	**S**	**12**	**261**	**8**	**368**	**1,203**	**N/A**	**2'U-shape**	**T8 U**	**N**	**OS**	**3**	**3**	**40**	**9**	**261**	**8**	**368**	**902**	**0**	**301**	**301**
11	GF	Auto Shop (101)	Parabolic	E	4'T8	52	2	32	S	12	193	6	3,334	8,430	N/A	Parabolic	4'T8	E	S	52	2	32	12	193	6	3,334	8,430	0	0	0
12	**GF**	**Auto Shop**	**Screw-in**	**N**	**Inc**	**2**	**1**	**100**	**S**	**12**	**193**	**0**	**200**	**463**	**CFL**	**Screw-in**	**CFL**	**N**	**S**	**2**	**1**	**35**	**12**	**193**	**0**	**70**	**162**	**301**	**0**	**301**
13	**GF**	**Bathroom Women**	**Parabolic**	**E**	**4'T8**	**6**	**2**	**32**	**S**	**12**	**261**	**6**	**390**	**1,315**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**6**	**2**	**32**	**9**	**261**	**6**	**390**	**987**	**0**	**329**	**329**
14	**GF**	**Bathroom Women**	**Screw-in**	**N**	**CFL**	**1**	**2**	**26**	**S**	**12**	**261**	**0**	**52**	**163**	**C**	**Screw-in**	**CFL**	**N**	**OS**	**1**	**2**	**26**	**9**	**261**	**0**	**52**	**122**	**0**	**41**	**41**
15	**GF**	**Bathroom Men**	**Parabolic**	**E**	**4'T8**	**3**	**2**	**32**	**S**	**12**	**261**	**6**	**198**	**658**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**3**	**2**	**32**	**9**	**261**	**6**	**198**	**493**	**0**	**164**	**164**
16	**GF**	**Bathroom Men**	**Screw-in**	**N**	**CFL**	**1**	**2**	**26**	**S**	**12**	**261**	**0**	**52**	**163**	**C**	**Screw-in**	**CFL**	**N**	**OS**	**1**	**2**	**26**	**9**	**261**	**0**	**52**	**122**	**0**	**41**	**41**
17	**GF**	**Storage Rm**	**Screw-in**	**N**	**Inc**	**1**	**1**	**60**	**S**	**2**	**261**	**0**	**60**	**31**	**CFL**	**Screw-in**	**CFL**	**N**	**S**	**1**	**1**	**20**	**2**	**261**	**0**	**20**	**10**	**21**	**0**	**21**
18	**GF**	**Nurse's Station**	**2'U-shape**	**E**	**T8 U**	**5**	**2**	**40**	**S**	**12**	**193**	**8**	**408**	**1,019**	**N/A**	**2'U-shape**	**T8 U**	**E**	**OS**	**5**	**2**	**40**	**9**	**193**	**8**	**408**	**764**	**0**	**255**	**255**
19	GF	Nurse's Station Bathroom	Parabolic	E	4'T8	1	2	32	S	12	193	6	70	162	N/A	Parabolic	4'T8	E	S	1	2	32	12	193	6	70	162	0	0	0
20	**GF**	**Recreational Vehicles Shop (102)**	**Parabolic**	**E**	**4'T8**	**50**	**2**	**32**	**S**	**12**	**193**	**6**	**3,206**	**8,106**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**50**	**2**	**32**	**9**	**193**	**6**	**3,206**	**6,080**	**0**	**2,027**	**2,027**
21	**GF**	**Recreational Vehicles Shop**	**Exit Sign**	**N**	**Fl.**	**1**	**1**	**15**	**N**	**24**	**193**	**2**	**17**	**79**	**LEDex**	**Exit Sign**	**LED**	**N**	**OS**	**1**	**1**	**5**	**18**	**193**	**1**	**6**	**21**	**51**	**7**	**58**
22	**GF**	**Recreational Vehicles Shop**	**Screw-in**	**N**	**Inc**	**3**	**1**	**100**	**S**	**12**	**193**	**0**	**300**	**695**	**CFL**	**Screw-in**	**CFL**	**N**	**OS**	**3**	**1**	**35**	**9**	**193**	**0**	**105**	**182**	**452**	**61**	**512**
23	**GF**	**Display Cases in Hallway**	**Parabolic**	**E**	**4'T8**	**4**	**4**	**32**	**S**	**12**	**193**	**13**	**525**	**1,306**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**4**	**4**	**32**	**9**	**193**	**13**	**525**	**980**	**0**	**327**	**327**
24	GF	Cosmetology Lab (105)	Parabolic	E	4'T8	22	3	32	S	12	193	10	2,122	5,401	N/A	Parabolic	4'T8	E	S	22	3	32	12	193	10	2,122	5,401	0	0	0
25	**GF**	**Cosmetology Lab (106)**	**Exit Sign**	**N**	**Fl.**	**1**	**1**	**15**	**N**	**24**	**193**	**2**	**17**	**79**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**1**	**1**	**5**	**24**	**193**	**1**	**6**	**28**	**51**	**0**	**51**
26	GF	Cosmetology Lab 2 (104)	Parabolic	E	4'T8	15	3	32	S	12	193	10	1,450	3,682	N/A	Parabolic	4'T8	E	S	15	3	32	12	193	10	1,450	3,682	0	0	0
27	**GF**	**Cosmetology Lab 3 (105)**	**Exit Sign**	**N**	**Fl.**	**1**	**1**	**15**	**N**	**24**	**193**	**2**	**17**	**79**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**1**	**1**	**5**	**24**	**193**	**1**	**6**	**28**	**51**	**0**	**51**
28	GF	Body Shop (103)	Parabolic	E	4'T8	60	2	32	S	12	193	6	3,846	9,727	N/A	Parabolic	4'T8	E	S	60	2	32	12	193	6	3,846	9,727	0	0	0
29	**GF**	**Body Shop (104)**	**Exit Sign**	**N**	**Fl.**	**2**	**1**	**15**	**N**	**24**	**193**	**2**	**32**	**157**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**2**	**1**	**5**	**24**	**193**	**1**	**11**	**56**	**102**	**0**	**102**
30	**GF**	**Body Shop**	**Screw-in**	**N**	**Inc**	**2**	**1**	**100**	**S**	**12**	**193**	**0**	**200**	**463**	**CFL**	**Screw-in**	**CFL**	**N**	**S**	**2**	**1**	**35**	**12**	**193**	**0**	**70**	**162**	**301**	**0**	**301**
31	GF	Spray Booth	Parabolic	E	3'T8	20	4	25	S	12	193	6	2,006	4,910	N/A	Parabolic	3'T8	E	S	20	4	25	12	193	6	2,006	4,910	0	0	0
32	**GF**	**Spray Booth Storage**	**Parabolic**	**E**	**3'T8**	**3**	**4**	**25**	**S**	**12**	**193**	**6**	**306**	**736**	**C**	**Parabolic**	**3'T8**	**E**	**OS**	**3**	**4**	**25**	**9**	**193**	**6**	**306**	**552**	**0**	**184**	**184**
33	GF	Welding Rm	Parabolic	E	4'T8	13	3	32	S	12	193	10	1,258	3,191	N/A	Parabolic	4'T8	E	S	13	3	32	12	193	10	1,258	3,191	0	0	0
34	GF	Detail Shop	Parabolic	E	4'T8	8	2	32	S	12	193	6	518	1,297	N/A	Parabolic	4'T8	E	S	8	2	32	12	193	6	518	1,297	0	0	0
35	GF	Hallway	2'U-shape	E	T8 U	9	2	40	S	12	261	8	728	2,481	N/A	2'U-shape	T8 U	E	S	9	2	40	12	261	8	728	2,481	0	0	0
36	**GF**	**Hallway**	**Exit Sign**	**N**	**Fl.**	**3**	**1**	**15**	**N**	**24**	**261**	**2**	**47**	**319**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**3**	**1**	**5**	**24**	**261**	**1**	**16**	**113**	**207**	**0**	**207**
37	GF	Hallway	Parabolic	E	4'T8	12	2	32	S	12	261	6	774	2,631	N/A	Parabolic	4'T8	E	S	12	2	32	12	261	6	774	2,631	0	0	0
38	GF	Mechanical Rm (106)	Parabolic	E	4'T8	2	2	32	S	12	193	6	134	324	N/A	Parabolic	4'T8	E	S	2	2	32	12	193	6	134	324	0	0	0
39	GF	Classroom (111)	Screw-in	E	CFL	6	3	26	MS	12	193	0	468	1,084	N/A	Screw-in	CFL	E	MS	6	3	26	12	193	0	468	1,084	0	0	0
40	GF	Bathroom Men	Screw-in	E	CFL	1	1	26	S	12	193	0	26	60	N/A	Screw-in	CFL	E	S	1	1	26	12	193	0	26	60	0	0	0

41	GF	Bathroom Men	Parabolic	E	4'T8	5	2	32	S	12	193	6	326	811	N/A	Parabolic	4'T8	E	S	5	2	32	12	193	6	326	811	0	0	0
42	GF	Bathroom Women	Parabolic	E	4'T8	5	2	32	S	12	193	6	326	811	N/A	Parabolic	4'T8	E	S	5	2	32	12	193	6	326	811	0	0	0
43	GF	Bathroom Women	Screw-in	E	CFL	1	1	26	S	12	193	0	26	60	N/A	Screw-in	CFL	E	S	1	1	26	12	193	0	26	60	0	0	0
44	GF	Hallway	Parabolic	E	4'T8	4	2	32	S	12	261	6	262	877	N/A	Parabolic	4'T8	E	S	4	2	32	12	261	6	262	877	0	0	0
45	**GF**	**Hallway**	**Exit Sign**	**N**	**FI.**	**1**	**1**	**15**	**N**	**24**	**261**	**2**	**17**	**106**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**1**	**1**	**5**	**24**	**261**	**1**	**6**	**38**	**69**	**0**	**69**
46	GF	Encl. Breezeway	Screw-in	N	CFL	2	1	26	S	12	261	0	52	163	N/A	Screw-in	CFL	N	S	2	1	26	12	261	0	52	163	0	0	0
47	**GF**	**Encl. Breezeway**	**Exit Sign**	**N**	**FI.**	**1**	**1**	**15**	**N**	**24**	**261**	**2**	**17**	**106**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**1**	**1**	**5**	**24**	**261**	**1**	**6**	**38**	**69**	**0**	**69**
48	GF	Cafeteria	Screw-in	N	CFL	10	1	26	S	12	193	0	260	602	N/A	Screw-in	CFL	N	S	10	1	26	12	193	0	260	602	0	0	0
49	**GF**	**Cafeteria**	**Screw-in**	**N**	**CFL**	**26**	**2**	**26**	**S**	**12**	**193**	**0**	**1,352**	**3,131**	**C**	**Screw-in**	**CFL**	**N**	**OS**	**26**	**2**	**26**	**9**	**193**	**0**	**1,352**	**2,348**	**0**	**783**	**783**
50	**GF**	**Cafeteria**	**Exit Sign**	**N**	**FI.**	**2**	**1**	**15**	**N**	**24**	**193**	**2**	**32**	**157**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**2**	**1**	**5**	**24**	**193**	**1**	**11**	**56**	**102**	**0**	**102**
51	**GF**	**Cafeteria**	**2'U-shape**	**E**	**T8 U**	**3**	**3**	**40**	**S**	**12**	**193**	**8**	**368**	**889**	**N/A**	**2'U-shape**	**T8 U**	**E**	**OS**	**3**	**3**	**40**	**9**	**193**	**8**	**368**	**667**	**0**	**222**	**222**
52	GF	Bathroom Men	Parabolic	E	4'T8	2	2	32	MSw	3	193	6	134	81	N/A	Parabolic	4'T8	E	MSw	2	2	32	3	193	6	134	81	0	0	0
53	GF	Bathroom Women	Parabolic	E	4'T8	2	2	32	MSw	3	193	6	134	81	N/A	Parabolic	4'T8	E	MSw	2	2	32	3	193	6	134	81	0	0	0
54	GF	Classroom (125)	2'U-shape	E	T8 U	9	3	40	S	12	193	8	1,088	2,668	N/A	2'U-shape	T8 U	E	S	9	3	40	12	193	8	1,088	2,668	0	0	0
55	**GF**	**Classroom**	**HID**	**N**	**MH**	**4**	**1**	**75**	**S**	**12**	**193**	**16**	**316**	**843**	**PSMH**	**HID**	**PSMH**	**N**	**S**	**4**	**1**	**50**	**12**	**193**	**14**	**214**	**593**	**250**	**0**	**250**
56	GF	Kitchen	Parabolic	E	4'T8	24	2	32	S	12	193	6	1,542	3,891	N/A	Parabolic	4'T8	E	S	24	2	32	12	193	6	1,542	3,891	0	0	0
57	**GF**	**Kitchen**	**Exit Sign**	**N**	**FI.**	**2**	**1**	**15**	**N**	**24**	**193**	**2**	**32**	**157**	**LEDex**	**Exit Sign**	**LED**	**N**	**N**	**2**	**1**	**5**	**24**	**193**	**1**	**11**	**56**	**102**	**0**	**102**
58	GF	Utility Rm 1 (128)	Parabolic	E	4'T8	1	2	32	MSw	2	193	6	70	27	N/A	Parabolic	4'T8	E	MSw	1	2	32	2	193	6	70	27	0	0	0
59	GF	Utility Rm 2 (130)	Parabolic	E	4'T8	1	2	32	MSw	2	193	6	70	27	N/A	Parabolic	4'T8	E	MSw	1	2	32	2	193	6	70	27	0	0	0
60	GF	Bathroom	Parabolic	E	4'T8	1	1	32	S	12	261	3	35	110	N/A	Parabolic	4'T8	E	S	1	1	32	12	261	3	35	110	0	0	0
61	GF	Admin. Office (131)	Parabolic	E	4'T8	2	3	32	S	12	261	10	202	664	N/A	Parabolic	4'T8	E	S	2	3	32	12	261	10	202	664	0	0	0
74	Ext	Entrance	Screw-in	N	CFL	4	2	26	T	12	365	0	208	911	N/A	Screw-in	CFL	N	T	4	2	26	12	365	0	208	911	0	0	0
75	**Ext**	**Parking area**	**HID**	**N**	**MH**	**11**	**1**	**400**	**T**	**12**	**365**	**100**	**4,500**	**24,090**	**PSMH**	**HID**	**PSMH**	**N**	**T**	**11**	**1**	**275**	**12**	**365**	**64**	**3,089**	**16,333**	**7,757**	**0**	**7,757**
76	Ext	Exterior lighting	Screw-in	N	CFL	5	1	26	T	12	365	0	130	569	N/A	Screw-in	CFL	N	T	5	1	26	12	365	0	130	569	0	0	0
Totals:						**465**	**119**	**2422**					**36,407**	**106,234**						**465**	**119**	**1,937**				**34,239**	**90,939**	**9,954**	**5,342**	**15,295**

Rows Highlighed Yellow Indicate an Energy Conservation Measure is recommended for that space

Appendix B: Third Party Energy Suppliers (ESCOs)

http://www.state.nj.us/bpu/commercial/shopping.html

Third Party Electric Suppliers for JCPL Service Territory	Telephone & Web Site
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
BOC Energy Services, Inc. 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.boc.com
Commerce Energy, Inc. 4400 Route 9 South, Suite 100 Freehold, NJ 07728	(800) 556-8457 www.commerceenergy.com
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07926	(800) 977-0500 www.fes.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com
Liberty Power Delaware, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-3799 www.libertypowercorp.com
Liberty Power Holdings, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(800) 363-7499 www.libertypowercorp.com
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Suez Energy Resources NA, Inc. 333 Thornall Street, 6th Floor Edison, NJ 08837	(888) 644-1014 www.suezenergyresources.com
UGI Energy Services, Inc. 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com

Third Party Gas Suppliers for Elizabethtown Gas Co. Service Territory	Telephone & Web Site
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109	(800) 628-9427 www.cooperativenet.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com
UGI Energy Services, Inc. 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com
Great Eastern Energy 116 Village Riva, Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateastern.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	(800) 724-1880 www.intelligentenergy.org
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	(877) 750-7046 www.metromediaenergy.com
MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 08837	(800) 375-1277 www.mxenergy.com
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	(800) 840-4427 www.natgasco.com
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	(800) 557-1121 www.woodruffenergy.com