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Local Government Energy Program
Energy audit report
Final; 2/1/2010

For

Child Care Center
Raritan Valley Community College
North Branch, NJ 08876

Project Number: LGEA05

TABLE OF CONTENTS

INTRODUCTION

On April 21st, 22nd, 23rd & 24th, 2009; Steven Winter Associates, Inc. (SWA) performed an energy audit and assessment of the Raritan Valley Community College (RVCC) buildings located in North Branch, NJ. PDR Associates, SWA's subcontractor for this project, assessed the HVAC, the existing Combined Heat and Power plant and renewable energy systems and provided recommendations for improvement of these systems. Current conditions and energy-related information was collected in order to analyze and facilitate the implementation of energy conservation measures for the building.

Energy data collected in the field was imported into the eQUEST energy conservation software to generate a baseline model of the building. SWA simulated the installation of energy improvement measures on the baseline model of the building. Energy saving calculations and projected economics are automated and served as the basis for our conclusions.

There are eleven separate buildings that were evaluated for this energy audit; Somerset Hall, Hunterdon Hall, East Building/Planetarium, College Center, Physical Education Building, Library/Theater, Conference Center (ATCC), Science Building, West Building, Arts Building and also the Child Care Center (CCC) buildings. The buildings were built at different times as the college expanded. Each building is unique in area and also building construction.

Only CCC and Arts building have their individual electric meters; other buildings are connected to the main campus electric meter. Science building has its own gas meter; other buildings that use gas are connected to the main campus gas meter. The campus has a district cooling and heating plant that serves chilled water and hot water to various buildings connected to the campus loop; ATCC, Science building, Arts building, and CCC are not connected to this loop. The gas to the boiler providing hot water to the loop is metered separately. The central plant is also equipped with a cogenerator, the gas for which is metered separately. Hence, there are three main gas meters in the campus that are directly or indirectly connected to the eleven buildings: Main campus gas meter, Boiler plant gas meter, and Cogen gas meter.

The present report is for the CCC building only.

The CCC building houses the child care center for members of the RVCC community. The building consists of 5,500 square feet and is fully conditioned. The building is operated on weekdays only between the hours of 7am and 6pm.

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

EXECUTIVE SUMMARY

The energy audit performed by SWA encompasses eleven buildings of various ages and constructions. A report has been generated for each building in order to fully document the existing conditions and recommended Energy Conservation Measures (ECMs). Based on the field visits performed by Steven Winter Associates (SWA) staff on April 21st, 22nd, 23rd and 24th, 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 and 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.

The Childcare Center at RVCC contains a separate meter for electricity but shares a common gas meter with the main campus gas meter. In the most recent year (March 2008-February 2009), the Childcare Center building consumed approximately 56,492 kWh or $10,025.13 worth of electricity. The total amount of gas recorded by the three main gas meters in the campus was 392,183 therms or $534,089.63 worth of natural gas. Since the CCC building is not metered separately for gas, SWA estimated the amount of gas consumed by this building alone, directly or indirectly, on a pro-rata basis by its square footage. The CCC building consumed 508 therms of gas during this period at a total cost of $970.49

SWA benchmarked the CCC building as part of the RVCC campus as a using the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The Portfolio Manager is not currently capable of generating a benchmark score for the building to compare on a national average since the building is part of a campus. The Portfolio Manager is capable of generating a site energy use intensity number using the 12 months prior to February 2009 as a baseline year. The site energy use intensity for the RVCC campus is 184 kBtu/sq.ft/year. After energy efficiency improvements are made, future utility bills can be added to the Portfolio Manager and the site energy use intensity of a different time period can be compared to the current year baseline to show changes in energy consumption over time.

SWA recommends a total of 3 Energy Conservation Measures (ECMs) for the CCC building. The total investment cost for these ECMs is **$30,833**. The total investment cost for these ECMs if maximum incentives are achieved is **$26,813.** SWA estimates a first year savings of **$2,189** with a simple payback of **14.1 years**. SWA estimates that implementing the recommended ECMs will reduce the carbon footprint of the Child Care Center by **19,984 lbs of CO_2** annually**.** Additionally, SWA recommends installing a 5kW PV system on the building roof. Please ECM#4 for more details.

There are various incentives that the CCC building could apply for that could also help lower the cost of installing the ECMs. SWA recommends that the CCC building applies 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. RVCC should consider applying to the New Jersey Clean Energy Pay-for-Performance Program. Additional details are available in the SWA document "Energy Audit Report Summary" for all buildings. There are also prescriptive measure incentives that would pay RVCC up to $3,720 for lighting upgrades and up to $300 for replacing the existing boiler with a new, condensing-type boiler. The total amount of incentives available for the Child Care Center is **$4,020** and the total investment cost if all the incentives are paid to their maximum amount is **$26,813**.

Currently, the New Jersey Office of Clean Energy offers a Renewable Energy Incentive that would pay $5,000 for the installation of a 5kW photovoltaic system. There is also an incentive that issues a Solar

Renewable Energy Certificate for every 1000kWh (1MWh) of electricity generated that can be sold or traded for the current market rate of electricity. Renewable energy measures require application approval and negotiations with the utility and proof of performance. There is also a utility-sponsored loan program through PSE&G that would allow the building to pay for the installation of a PV system through a loan issued by PSE&G. RVCC should check with JCP&L if they offer similar rebates and help for renewable energy measures.

The following table summarizes the proposed Energy Conservation Measures (ECM) according to the economic relevance (excludes Renewable energy measures and capital improvements):

ECM Table without Incentives

		Installed Cost		1st year energy savings									Lifetime		
ECM#	ECM description	Estimated $	Source	Electric Savings (kWh)	Unit	Natural Gas Savings (therms)	Unit	Demand	Unit	$ Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
1	Weather-strip exterior doors	$ 220	RSMeans	-	kWh	68	therms	0.0	kW	$ 110	2.0	10	$ 930	32.3%	750
2	Replace interior lighting	$ 21,441	RSMeans	8,588	kWh	-	therms	1.0	kW	$ 1,511	14.2	20	$ 22,077	0.1%	15,377
3	Replace existing boiler	$ 9,172	Estimate	-	kWh	350	therms	0.0	kW	$ 567	16.2	32	$ 11,252	0.7%	3,858
Total	**Total Scope of Work**	**$ 30,833**	**-**	**8,588**	**-**	**418**		**1.0**	**-**	**$ 2,189**	**14.1**		**$ 34,259**		**19,984**

ECM Table including Incentives

		Installed Cost		1st year energy savings									Lifetime		
ECM#	ECM description	Estimated $	Source	Electric Savings (kWh)	Unit	Natural Gas Savings (therms)		Demand	Unit	$ Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
1	Weather-strip exterior doors	$ 220	RSMeans	-	kWh	68	therms	0.0	kW	$ 110	2.0	10	$ 930	32.3%	750
2	Replace interior lighting	$ 17,721	RSMeans	8,588	kWh	-	therms	1.0	kW	$ 1,511	11.7	20	$ 22,077	1.2%	15,377
3	Replace existing boiler	$ 8,872	Estimate	-	kWh	350	therms	0.0	kW	$ 567	15.6	32	$ 11,252	0.8%	3,858
Total	**Total Scope of Work**	**$ 26,813**	**-**	**8,588**	**-**	**418**		**1.0**	**-**	**$ 2,189**	**12.3**		**$ 34,259**		**19,984**

Definitions:

SPP: Simple Payback (years)

LoM: Life of Measure (years)

ROI: Return on Investment (%)

Assumptions:

Discount rate: 3.2% per DOE FEMP guidelines

Energy price escalation rate: 0% per DOE FEMP guidelines

1. HISTORIC ENERGY CONSUMPTION

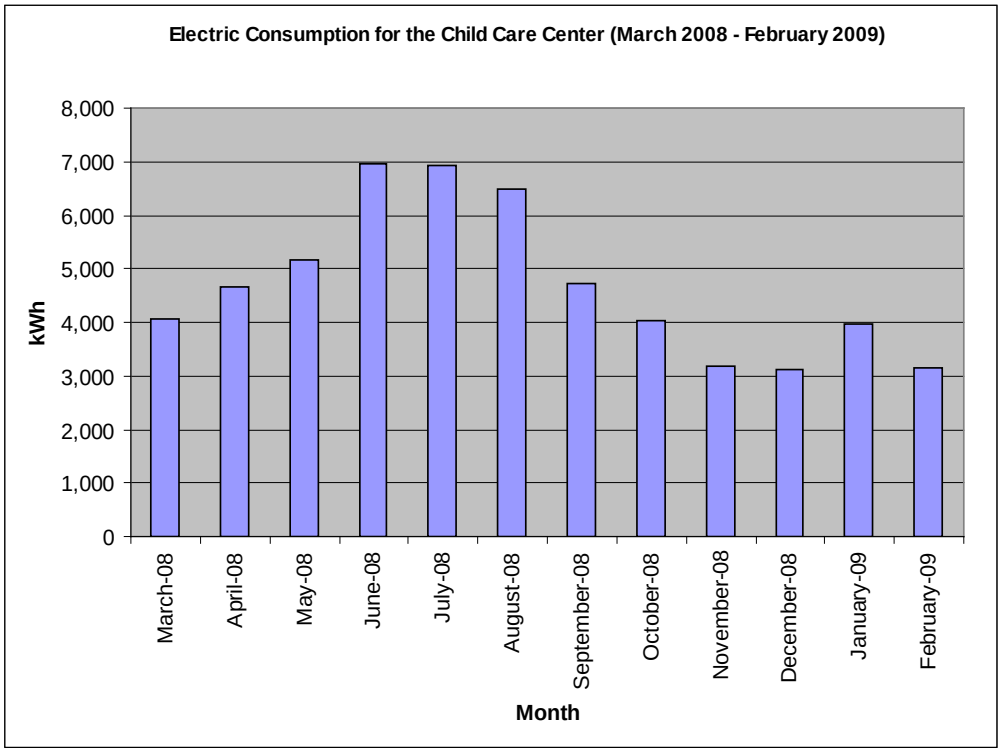
1.1. Energy usage and cost analysis

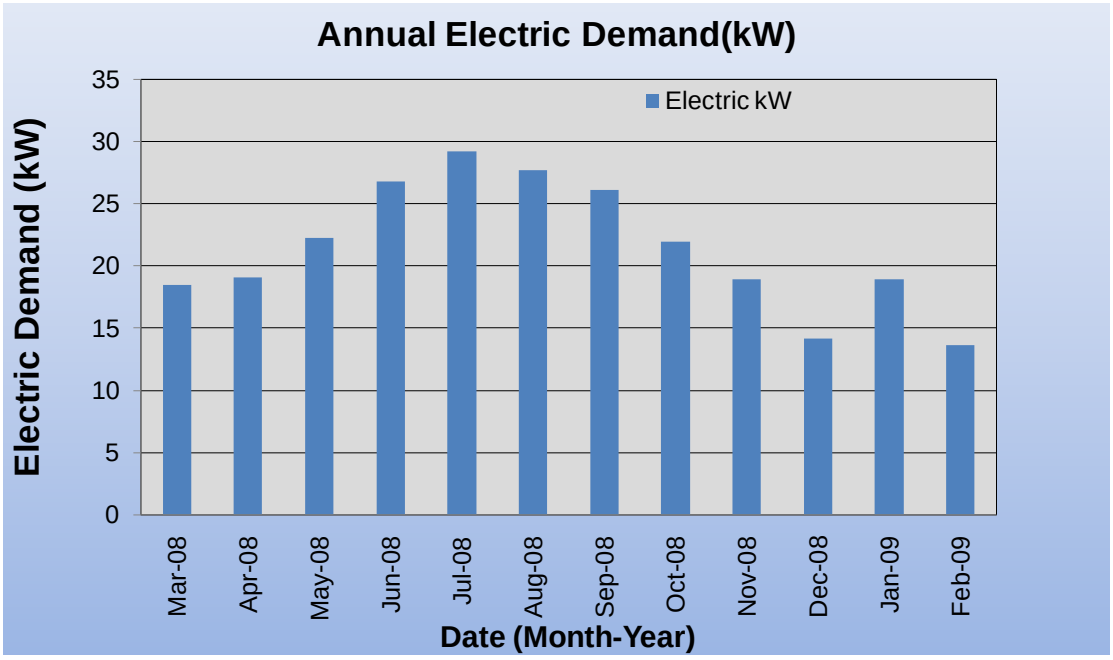
SWA analyzed utility bills from March 2008 through February 2009 that were received from Raritan Valley Community College.

Electricity – The CCC building has one electric meter for all incoming electricity supply. The building currently buys electricity from JCP&L at **an average rate of $.176/kWh** based on the previous 12 months worth of utility bills. The building purchased **approximately 59,492 kWh or $10,025.13 worth of electricity** in the previous year. The data also reflected that demand peaked at 29.2 kW in July. The building currently uses a tariff that does not charge for electric demand separately.

Natural Gas – The CCC building is included on the campus main gas meter. The Campus buys natural gas for its three main meters mentioned above from a third-party Energy Service Company (ESCO) via PSE&G at **an average aggregated rate of $1.36/therm** based on the previous 12 months worth of utility bills. The three gas meters purchased **approximately 392,183 therms or $534,361.90 worth of natural gas** in the previous year. Since the building is not metered separately for gas, SWA estimated the amount of gas consumed by CCC building alone on pro-rata basis of its square footage. The Child Care Center building consumed 508 therms of gas during this period at a total cost of $970.49.

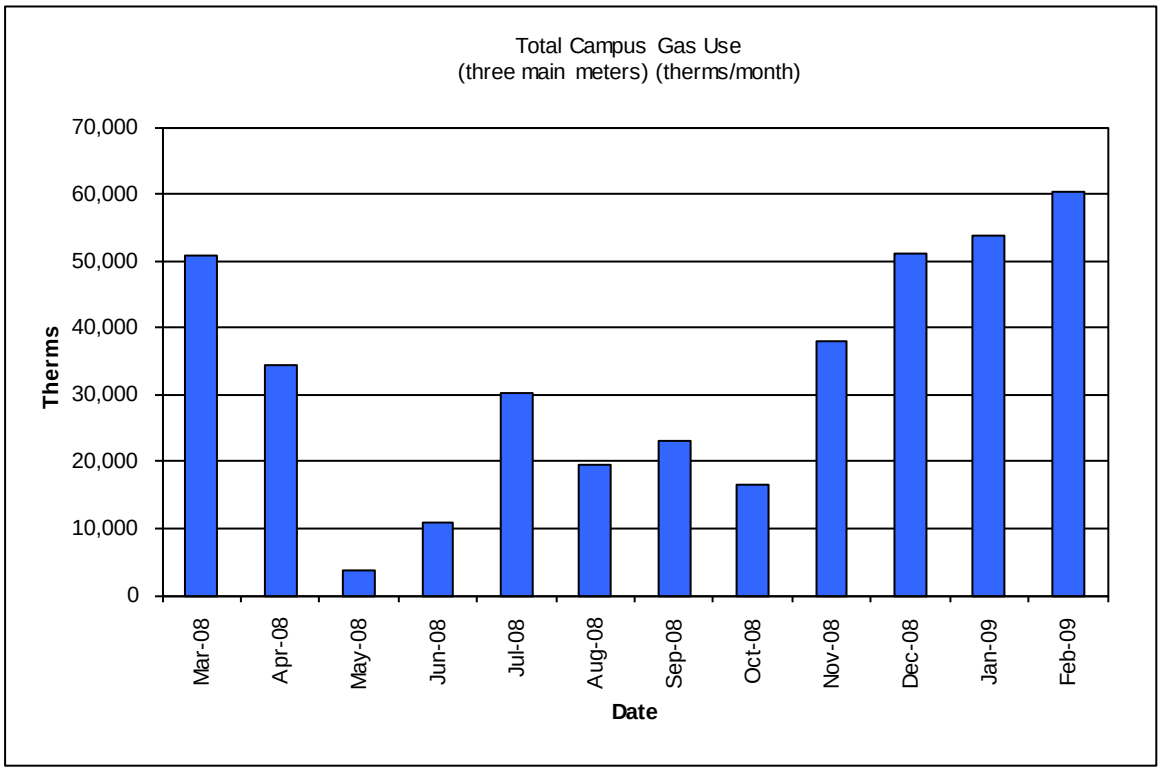
The following chart shows electricity usage (kWh) and electricity demand (kW) for the CCC building based on utility bills for the 12 month period of March 2008 – February 2009.



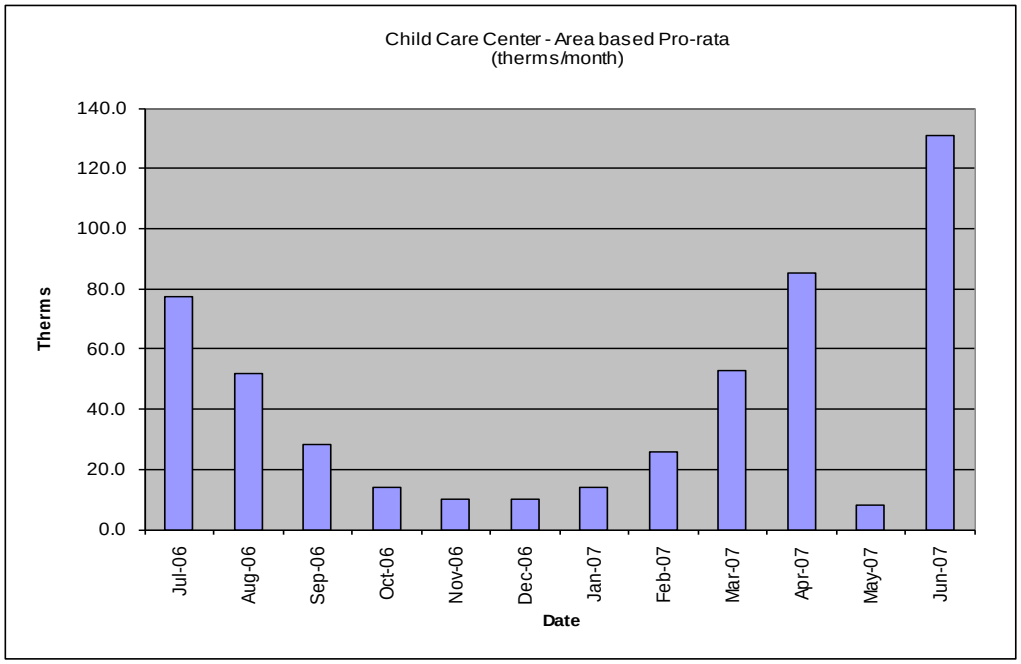


In the above chart, the electricity shows increased usage as expected during the summer months. This increase in electrical consumption is caused by the increased cooling load demanded by the building.

The following chart shows natural gas usage for the Main Campus meter based on utility bills for the 12 month period of March 2008 – February 2009.



Since the Childcare Center is not metered separately for gas, SWA estimated the amount of gas consumed by the Childcare Center alone on pro-rate basis by square footage of various spaces for the 12 month period of March 2008 – February 2009, as follows:



1.2. Utility rates

The CCC building currently buys electricity from JCP&L at the general service rate. The general service rate is a typical rate where customers pay for electricity based on kWh usage and they currently are not charged separate demand charges. Electricity was billed at an average rate of **$0.176/kWh**. A natural gas rate could not be determined for the Child Care Center since it is not directly metered. The Campus gas meters that provide natural gas service, directly or indirectly, to the CCC building currently pay an average aggregated rate of approximately of **$1.36/therm** based on the previous 12 months of utility bills.

1.3. Energy benchmarking

The CCC building information and utility data were entered into the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* energy benchmarking system. The building data could be documented; however, a performance score could not be generated since the building shares a meter as part of the campus. The Energy Star Portfolio Manager currently is not capable of generating a benchmark score for certain building types such as college campuses.

SWA has created a Portfolio Manager account for RVCC to access the information, which can be accessed at: https://www.energystar.gov/istar/pmpam/

```
Username:RaritanValleyCC
Password: RARITANVCC
```

SWA is also sharing the Portfolio Manager information with TRC Energy Services.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Raritan VCC

Building ID: 1762814
For 12-month Period Ending: February 28, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: June 16, 2009

Facility
Raritan VCC
118 Lamington Road
Branchburg, NJ 08876

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1960
Gross Floor Area (ft²): 423,900

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]	
Electricity (kBtu)	29,225,895
Natural Gas (kBtu)[4]	48,850,300
Total Energy (kBtu)	78,076,195

Energy Intensity[5]	
Site (kBtu/ft²/yr)	184
Source (kBtu/ft²/yr)	351

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	7,129

Electric Distribution Utility
Jersey Central Power & Lt Co

National Average Comparison	
National Average Site EUI	76
National Average Source EUI	170
% Difference from National Average Source EUI	106%
Building Type	College/University (Campus-Level)

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

EPA Form 5900-16

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The Child Care Center is approximately 20 years old and currently houses the daycare program that is available to the RVCC community. The building is one-story with a total floor area of 5,500 square feet. The building contains mostly classroom type rooms with the addition of a small kitchen and an office area for the teachers.

2.2. Building occupancy profiles

The peak occupancy for the CCC is approximately 90 persons at any given time during weekdays. The building is typically occupied from 7am to 6pm on weekdays only, throughout the entire year.

2.3. Building envelope

2.3.1. Exterior walls

The exterior walls consist of 4" face bricks. There are 6" metal studs spaced 16" on center located on the inside of the exterior wall with 6" of R-19 fiberglass batt insulation between each metal stud. During the site visit and data collection period, SWA performed an infrared scan of the exterior walls. Due to an outside temperature of approximately 66ºF, an accurate infrared scan could not be obtained. Typically, a good infrared scan requires a temperature difference of 20ºF between the outside (ambient) temperature and indoor temperature. The heating season when the ambient temperature is much cooler than the indoor temperature is the best time to obtain an accurate infrared scan.

SWA evaluated adding insulation to the exterior walls of the building in order to reduce thermal losses through the building envelope, but the cost of implementing this measure would be prohibitive. If RVCC decides to do any type of capital improvement to the exterior shell of a building, insulation with a high-effective R-value is always recommended to reduce the load of the heating and cooling systems.

2.3.2. Roof

There is a cupola located on the center portion of the roof. The cupola is a square that is 20' long with a roof angle of 14 degrees. The peak of the cupola is at an elevation of approximately 24'. The lower portion of the roof ascends from the exterior wall of the base building to the exterior wall of the base building at an angle of 14 degrees as well. The roof line is formed from 2" by 14" wooden trusses on end spaced 16" on center apart. These trusses are insulated with R-30 foil face insulation. The surface of the roof is comprised of light gray asphalt shingles. According to building maintenance staff, the roof of the CCC is slated to be replaced within the next year. SWA recommends that when the roof is replaced, a well-insulated roof is installed with an Energy Star reflective surface to cut down on solar heat gain.

2.3.3. Base

The building's base is 4" concrete slab-on grade. There were no reported problems with water penetration or moisture.

2.3.4. Windows

The building contains wood-framed windows with double-pane glass. SWA conducted tests on the window panes and was not able to determine if a low-e film coating existed on these windows or not. SWA assumes that the windows have no effective low-e coating. Currently, the CCC building uses horizontal blinds to alter the amount of natural light that is allowed to enter each room. Replacement of windows is not cost effective but SWA recommends that whenever windows are to be replaced, to make sure that the most energy efficient windows are always installed and properly air-sealed.

2.3.5. Exterior doors

The exterior doors of the building were observed to have the original weather-stripping which is no longer performing as intended. SWA recommends that the exterior doors of the building, especially the vestibule located at the main entrance, is weather-stripped in order to decrease the amount of conditioned are that is lost around each door. SWA also recommends checking the weather-stripping of each door on a regular basis and replacing any broken seals immediately. Tight seals around the door will help ensure that the building is kept tight and insulated over time.

2.3.6. Building air tightness

The CCC building was observed to be a relatively tight building with the exception of the exterior doors. There were no major observed deficiencies of air tightness within the building.

2.4. HVAC systems

2.4.1. Heating

The CCC building is not connected to the existing campus-wide chilled water/hot water loop. Also, the possibility of connecting this building to the campus loop is remote because it is located far from the chilled water/hot water loop of the Campus Cogeneration plant. A building-wide existing radiant floor heating system has been disabled due to bad leakage and is not currently operating. After the abandonment of radiant floor heating, the old gas-fired hot water boiler is used to supply hot water to three ceiling-mounted, HW/DX fan coil units that provide space heating for the entire building. This boiler is estimated to have an input of 175 MBtuh. The current boiler is no longer performing as efficiently as designed due to the age of the equipment. SWA estimates that the existing boiler is now 80% efficient and could be replaced with newer, condensing type boilers with efficiencies reaching 95%. As connecting to the main campus loop is not cost-effective, SWA recommends replacing the existing boiler with a more efficient, condensing model boiler plant. For the current scope of work, SWA has estimated the costs and associated savings for upgrading to a condensing boiler.

2.4.2. Cooling

Currently, a YORK PLUS vertical fan coil unit in the mechanical room is supplying ducted cool air to the building spaces, with the condensing unit located outside of the building. Additionally, there are 3 direct expansion indoor fan coil units served by condensing units locate outside the building for other zones.

2.4.3. Ventilation

The building uses HW/DX fan coil units for heating as well as a vertical fan coil unit with condenser to condition the air inside of the building. These units draw fresh air and mix it with conditioned building air to provide ventilation. (See section 2.4.1 Heating).

2.4.4. Domestic Hot Water

Domestic Hot Water is provided by the natural gas direct-fired hot water boiler. The boiler has an approximate input of 120 MBtuh.

More efficient hot water appliances such as faucet aerators and efficient DHW heaters save energy through reduced energy consumption for water heating and money; through reducing water and sewer bills. Energy savings appliances bearing the ENERGY STAR label should be selected to ensure efficiency performance. No appliances were accessed during this audit.

2.5. Electrical systems

2.5.1. Lighting

Interior Lighting – The CCC building consists of all older 4' linear T12 fluorescent lighting with magnetic ballasts. Based on measurements of lighting levels that were measured for each space, there are no vastly over-lit areas. SWA recommends replacing all T12 lighting including magnetic ballasts with T8 lighting and electronic ballasts. See attached lighting schedule for a complete inventory of lighting throughout the building and estimated power consumption.

Exit Lights – The building has all 5W LED exit signs installed. There is not a more cost effective option for exit lights available at this time.

Exterior Lighting – The exterior lighting was surveyed during the building audit. SWA has deemed it not cost effective to replace exterior lighting at this time. All exterior lighting is controlled by a timer located in the boiler room. There is no need for any immediate upgrade of lighting or timer; however, SWA recommends that the building maintenance adjust the timer at least twice per year in order to make sure that the timer stays current with Daylight Savings Time.

2.5.2. Appliances and process

SWA has surveyed all appliances installed at the CCC building and have deemed that it would not be cost effective to replace any appliances at this time. SWA recommends that the most energy efficient options are always chosen whenever any appliances including computers, dispatch radio equipment, refrigerators, etc. are purchased.

2.5.3. Elevators

The CCC building is a one-story building and therefore has no elevator installed.

2.5.4. Others electrical systems

There are currently no other electrical systems installed at this building.

3. EQUIPMENT LIST

Building System	Description	Location	Model#	Fuel	Space served	Year Equip Installed	Remaining useful life %
Heating	Hot water boiler - sealed combustion unit; i/p 175MBH, o/p 153 MBH; 87.0 AFUE	Mechanical room 109	Weil Mclain, Model GU-6 series 4, S/N N/A	Gas	Zone 1,2,&3 hot water to ceiling units	1993	20%
Heating	DHW - 40 gallons tank, direct vent, i/p 40MBH	Mechanical room 109	State Industries, State Turbo, Model SR840NADS6-JNC, S/N L89779849	Gas	Whole building	1993	0%
HVAC	Heating and cooling furnace for zone 4; split cooling - CU located outdoors on grade; 5 ton cooling capacity; heating capacity n/a	Mechanical room 109	York Plus; Model G/UA060SA; S/N ELAS308595	Elec and Gas	Zone 4	1993	20%
HVAC	Three ceiling mounted HW/DX cooling fan coils; 208/230V, 1ph, 60Hz; 3/4hp motor - only 1 unit accessible and noted; all 3 told were identical	Ceiling space of zones 1,2, 3	York, Model N2AH020A06C, S/N EGAS215986	Elec.	Zone 1,2,3 respectively	1993	0%
Cooling	Condensing Unit AC-4, 208/230V, 60 Hz, 1ph, R22, LRA150, 5 ton	Outdoor on grade	York, Model H1DA060S0B; S/N EE9M140114	Elec.	Zone 4	1993	0%
Cooling	Condensing Unit AC-3, 208/230V, 60 Hz, 1ph, R22, MCA25, 4 ton	Outdoor on grade	Trane, Model 2TTB30481000AA, S/N 809556J4F	Elec.	Zone 1	2008	95%
Cooling	Condensing Unit AC-1, 208/230V, 60 Hz, 1ph, R22, LRA150, 5 ton	Outdoor on grade	York, Model H1DA060S0B; S/N EE9M140105	Elec.	Zone 2	1993	0%
Cooling	Condensing Unit AC-2, 208/230V, 60 Hz, 1ph, R22, MCA25, 4 ton	Outdoor on grade	Trane, Model 2TTB30481000AA, S/N 8314PDE4F	Elec.	Zone 3	2008	95%
Electrical	Transformer owned by JCP&L; 75kVA, 240V/120V, 1 Ph;	Outdoor on grade	Nameplate N/A	Elec.	Child care building	2008	95%

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

Summary table

ECM#	Description
1	Weather-strip exterior doors; weather-stripping will decrease the amount of conditioned air that is lost between the exterior door and frame.
2	Replace interior lighting; replace interior lighting according to attached lighting schedule.
3	Replace existing boiler with newer condensing style boiler; replace existing boiler with 95% efficient condensing hot water boiler.
4	Install 5kW photovoltaic system

ECM#1: *Weather-strip exterior doors*

Description:

On the day of the site visit, SWA observed that exterior door weather-stripping was beginning to deteriorate. Doors and vestibules should be observed annually for deficient weather-stripping and replaced as needed. The weather-stripping observed at the CCC building still formed a seal but is starting to deteriorate beyond maximum efficient conditions. SWA recommends replacing this weather-stripping.

Installation cost:

Estimated installed cost: $220
Source of cost estimate: RS *Means*

Economics (without incentives):

Annual Savings						Lifetime		Annual Carbon Reduction (lbs of CO2)
Electric Savings (kWh)	Natural Gas Savings (therms)	Demand (kW)	Dollar Savings/year	SPP	LoM	Cost Savings	ROI	
-	68	0.0	$ 110	2.0	10	$ 930	32.3%	750

Economics (with incentives):

Annual Savings						Lifetime		Annual Carbon Reduction (lbs of CO2)
Electric Savings (kWh)	Natural Gas Savings (therms)	Demand (kW)	Dollar Savings/year	SPP	LoM	Cost Savings	ROI	
-	68	0.0	$ 110	2.0	10	$ 930	32.3%	750

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit and using the billing analysis. SWA calculated savings using eQUEST and assuming that infiltration would be reduce by 5% on any wall that included an exterior door that needed weather-stripping.

Rebates/financial incentives:

This measure does not qualify for a rebate or other financial incentive 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: *Replace interior lighting*

Description:

On the day of the site visit, SWA observed that most of the interior lighting installed at the Child Care Center consisted of 4' linear T12 fixtures with magnetic ballasts. Lighting consumes a large amount of electrical load and the most efficient lighting should always be purchased. SWA recommends replacing all existing T12 fluorescent bulbs with higher efficiency T8 bulbs as well as replacing all magnetic ballasts with electronic ballasts.

SWA considered adding occupancy sensors to the building for energy savings; however, it was determined that this building is not a good candidate for two reasons – one, it is a heavily used building throughout the day, and two, the last person leaving the building switches off all lights and locks the building. Hence, occupancy sensors are not proposed for this building.

Installation cost:

Estimated installed cost: $21,441
Source of cost estimate: RS *Means*

Economics (without incentives):

Annual Savings						Lifetime		
Electric Savings (kWh)	Natural Gas Savings (therms)	Demand (kW)	Dollar Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
8,588	-	1.0	$ 1,511	14.2	20	$ 22,077	0.1%	15,377

Economics (with incentives):

Annual Savings						Lifetime		
Electric Savings (kWh)	Natural Gas Savings (therms)	Demand (kW)	Dollar Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
8,588	-	1.0	$ 1,511	11.7	20	$ 22,077	1.2%	15,377

Assumptions: Savings are based on replacing entire lighting fixture including ballasts and lamps. SWA assumes that a 30% wattage reduction will occur when the ballast and lamps are both replaced. RS Means was used to estimate a price for the entire lighting retrofit. Prices are assuming that lighting retrofits will be performed in-house and an additional 10% cost savings by retrofitting all lighting fixtures for the CCC building at the same time.

Rebates/financial incentives:

NJ Clean Energy – NJ SmartStart Prescriptive Lighting Incentive, Incentive based on installing T5 or T8 lamps with electronic ballasts in existing facilities ($10-$30 per fixture, depending on quantity of lamps). Maximum incentive amount $3,720.

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: *Replace existing boiler*

Description:

Since the radiant floor heating system has been abandoned, the original gas fired hot water boiler is supplying hot water to three fan coil units that provide space heating for the child care center. This boiler is 20 years old and is no longer performing efficiently. SWA estimates that the efficiency of the current boiler is around 80%. Newer condensing model boilers can reach up to 95% and will cost much less to operate.

Installation cost:

Estimated installed cost: $9,172
Source of cost estimate: Similar project

Economics (without incentives):

Annual Savings						Lifetime		
Electric Savings (kWh)	Natural Gas Savings (therms)	Demand (kW)	Dollar Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
-	350	0.0	$ 567	16.2	32	$ 11,252	0.7%	3,858

Economics (with incentives):

Annual Savings						Lifetime		
Electric Savings (kWh)	Natural Gas Savings (therms)	Demand (kW)	Dollar Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
-	350	0.0	$ 567	15.6	32	$ 11,252	0.8%	3,858

Assumptions: SWA assumes thermal savings based on heating loads calculated using eQUEST modeling and by conducting the billing analysis. SWA assumes that existing boiler efficiency is 80% and assumes that a newer type, condensing boiler with a 95% efficiency will be installed.

Rebates/financial incentives:

NJ Clean Energy – NJ SmartStart Building Equipment Incentive, Incentive is for Gas Heating appliances <300 MBH ($300 per unit). Maximum incentive amount is $300 for replacement of the gas-fired hot water boiler.

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: *Install 5kW PV system*

Description:

Currently, the Child Care Center 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 RVCC further review installing a 5kW 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. Utilities provide the ability to buy SRECs at $600 / MWh or best market offer.

There are limited locations for a 5kW PV installation on the building roof, which is pitched. 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 5kW system needs approximately 41 panels which would take up 435 square feet. The installation of a renewable Solar Photovoltaic power generating system could serve as a good educational tool and exhibit for the community.

Although other buildings in the campus are restricted or limited to deploy renewable energy, Child Care Center is unique. It is separately metered and can be net metered independently from the central cogeneration system. Hence, SWA has proposed a 5 kW PV renewable energy system for this building.

Installation cost:
Estimated installed cost: $37,500 (estimated labor costs, $15,000)
Source of cost estimate: Similar projects
Total incentives estimated: $5,000 and $3,400 SREC's yearly

Economics (with incentives):

Annual Savings						Lifetime		
Electric Savings (kWh)	Natural Gas Savings (therms)	Demand (kW)	Dollar Savings/year	SPP	LoM	Cost Savings	ROI	Annual Carbon Reduction (lbs of CO2)
5,672	-	5.0	$4,322	7.5	25	$ 75,262	12%	7,771

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 $5,000.

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. $3,000 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

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are currently no existing renewable energy systems.

5.2. Solar Photovoltaic

Please see ECM#4 above.

5.3. Solar Thermal Collectors

Solar thermal collectors are not cost effective for this project and would not be recommended due to the low amount of domestic hot water use throughout the building.

5.4. Combined Heat and Power

CHP is already installed on the campus.

5.5. Geothermal

Geothermal is not applicable for the CCC building because it would not be cost effective to change to a geothermal system.

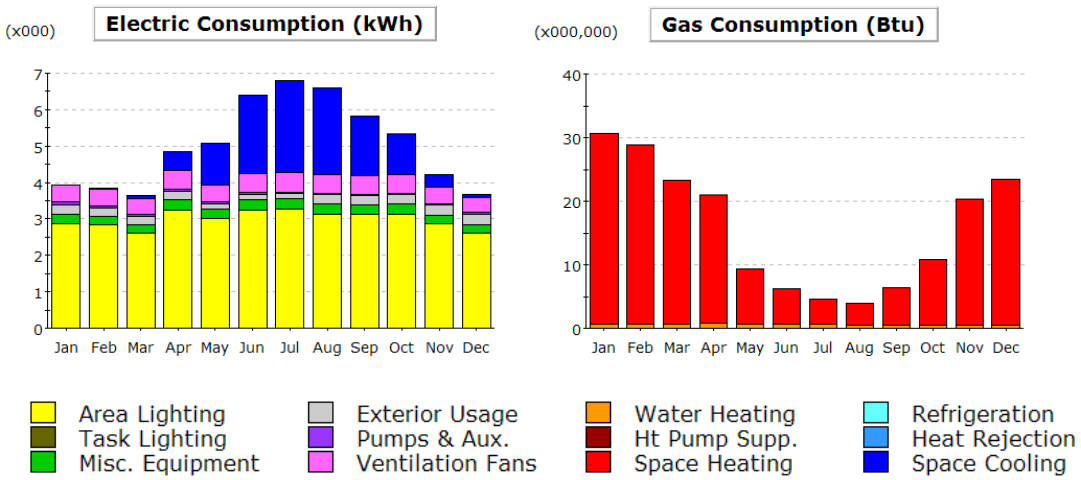
5.6. Wind

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

6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Load profiles

In 2007, a power survey was conducted at the CCC building by Trace Electrical Services and Testing. The survey was conducted by installing power recording meters for seven days at various buildings on campus. The CCC center was surveyed from September 25th, 2007 through October 2nd, 2007. The results of the test revealed that the CCC had a peak demand of 28.301 kW at 2:53pm on September 25th, 2007. Over the seven-day period, there was a cumulative power usage of 1.3259 MWh or approximately 189.414 kWh per day. Below is a chart that shows the electric consumption as well as natural gas consumption for the CCC building based on electric bills received from RVCC.



6.2. Tariff analysis

The CCC building currently buys electricity from JCP&L and gas through the main campus meter from the PSE&G at the general service rate. The general service rate is a typical rate where customers pay for natural gas and electricity based on usage. This rate is best suited for this building. Natural gas is purchased for the main campus meter from an ESCO and is provided through PSE&G at a general service rate. The general service rate for natural gas charges a market-rate price based on usage and the RVCC billing does not breakdown demand costs. 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 heating months when natural gas is used by the rooftop air-handling units.

Electricity is purchased for the CCC building from JCP&L at a general service rate. The general service rate for electricity charges a market-rate price based on usage and the RVCC billing does not breakdown demand costs. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year.

6.3. Energy Procurement strategies

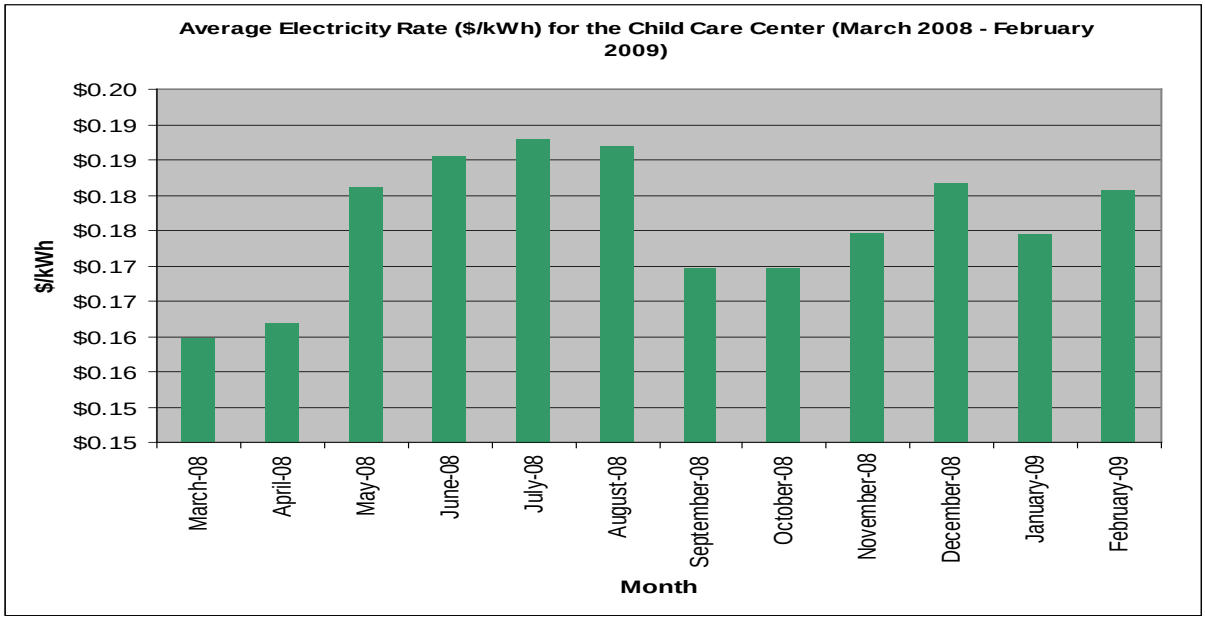
The CCC receives natural gas from the main campus meter which already uses an Energy Services Company (ESCO) that acts as a third party energy supplier. Electricity is received from a separate meter directly from JCP&L and no ESCO is used. SWA analyzed the utility rate for electricity over the previous 12 months. Electric bill analysis shows fluctuations of 13% over the most recent 12 month period. SWA determined that electricity prices fluctuate less than 20% throughout the entire year. Some of these fluctuations may have been caused by adjustments between estimated and actual meter readings; others may be due to unusually high and escalating energy costs in 2008. The average estimated NJ commercial utility rates for electric and gas are $0.150/kWh and $1.550/therm respectively. The CCC building annual utility costs are $1,551.33 higher for electric and $182.7 higher for natural gas for a total of $1,734.03 higher, when compared to the average estimated NJ commercial utility rates.

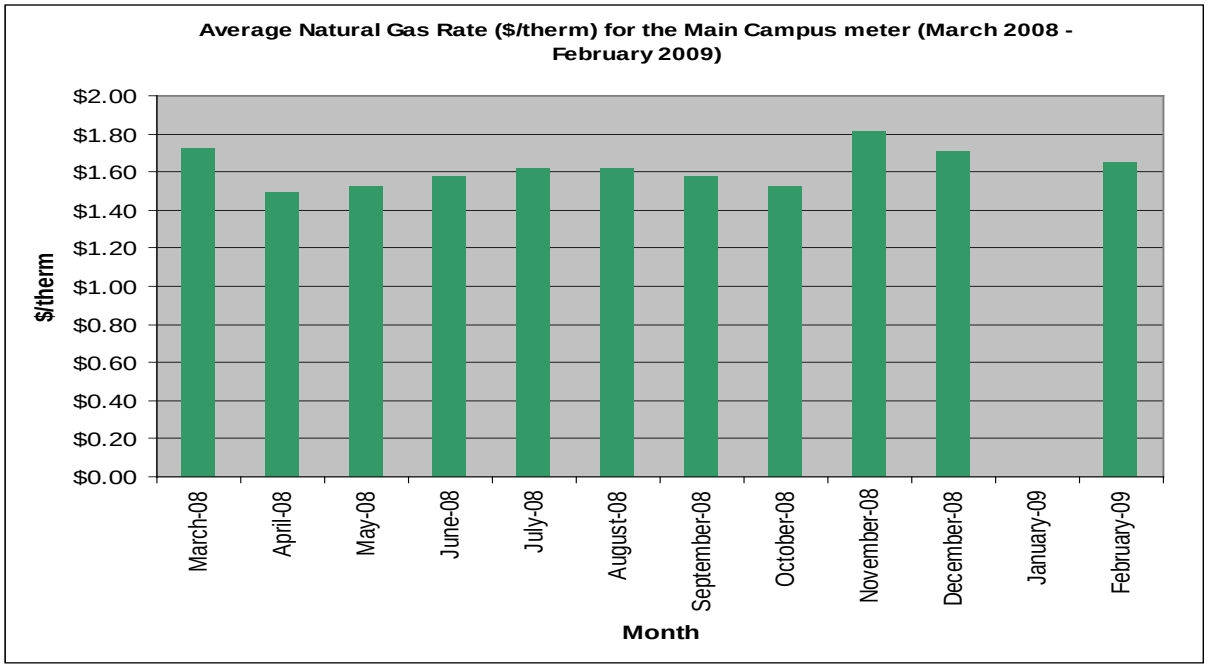
SWA recommends that the RVCC further explore opportunities of purchasing both natural gas and electricity from ESCOs in order to reduce rate fluctuation and ultimately reduce the annual cost of energy for the campus. Appendix C contains a complete list of third party energy suppliers for the

service area.

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

RVCC is already enrolled in a Demand Response Program and Emergency Programs through a contract agreement with Enernoc. Prior to any curtailment or emergency events, temperature setpoints are decreased by a couple of degrees to "boost" the building thermal loads. This system allows RVCC to receive additional revenues from these energy programs without any disruption in occupants comfort.





7. METHOD OF ANALYSIS

7.1. Assumptions and tools

Energy modeling tool: eQUEST V3.6
Cost estimates: RS Means 2009 (Facilities Maintenance & Repair Cost Data)
RS Means 2009 (Building Construction Cost Data)
RS Means 2009 (Mechanical Cost Data)
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

Existing Lighting Conditions												
#	Building	Location in Building	Measured Lighting Level in Footcandles	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Watts/ Lamp	Hrs/ Day	Energy Use (Watt hours/day)	Controls	Total Power (Watts)
1	Childcare Center	Entry 100	52	4' linear T12	magnetic	2	2	40	11	1760	Switch	160
2	Childcare Center	Office 103	30	4' linear T12	magnetic	8	2	40	11	7040	Switch	640
3	Childcare Center	Entry 101	40	4' linear T12	magnetic	7	2	40	11	6160	Switch	560
4	Childcare Center	Office 102	36	4' linear T12	magnetic	8	2	40	11	7040	Switch	640
5	Childcare Center	Classroom 115	63	4' linear T12	magnetic	2	2	40	11	1760	Switch	160
6	Childcare Center	Classroom 115	63	4' linear T12	magnetic	2	3	40	11	2640	Switch	240
7	Childcare Center	Classroom 115	63	LED Exit Sign	-	1	1	5	24	120	None	5
8	Childcare Center	Restroom 121	15	4' linear T12	magnetic	1	1	40	4	160	Switch	40
9	Childcare Center	Restroom 122	15	4' linear T12	magnetic	1	1	40	4	160	Switch	40
10	Childcare Center	Classroom 120	36	4' linear T12	magnetic	2	2	40	11	1760	Switch	160
11	Childcare Center	Restroom 119	15	4' linear T12	magnetic	1	1	40	4	160	Switch	40
12	Childcare Center	Restroom 118	15	4' linear T12	magnetic	1	1	40	4	160	Switch	40
13	Childcare Center	Classroom 116	72	4' linear T12	magnetic	20	2	40	11	17600	Switch	1600
14	Childcare Center	Classroom 116	72	4' linear T12	magnetic	10	3	40	11	13200	Switch	1200
15	Childcare Center	Storage 113	21	4' linear T12	magnetic	3	1	40	2	240	Switch	120
16	Childcare Center	Classroom 117	52	4' linear T12	magnetic	21	3	40	11	27720	Switch	2520
17	Childcare Center	Classroom 117	52	LED Exit Sign	-	1	1	5	24	120	None	5
18	Childcare Center	Classroom 111	30	4' linear T12	magnetic	8	3	40	11	10560	Switch	960
19	Childcare Center	Classroom 111	30	LED Exit Sign	-	1	1	5	24	120	None	5
20	Childcare Center	Kitchen 112	56	4' linear T12	magnetic	4	2	40	11	3520	Switch	320
21	Childcare Center	Kitchen 112 - under-cabinet lighting	56	4' linear T12	magnetic	4	1	40	2	320	Switch	160
22	Childcare Center	Room 155	17	4' linear T12	magnetic	1	1	40	1	40	Switch	40
23	Childcare Center	Restroom 110	15	4' linear T12	magnetic	1	1	40	4	160	Switch	40
24	Childcare Center	Utility Room 109	36	4' linear T12	magnetic	3	1	40	1	120	Switch	120
25	Childcare Center	Hallway 104	27	4' linear T12	magnetic	8	2	40	11	7040	Switch	640
26	Childcare Center	Storage 108	34	4' linear T12	magnetic	4	1	40	1	160	Switch	160
27	Childcare Center	Restroom 106	14	4' linear T12	magnetic	1	1	40	4	160	Switch	40
28	Childcare Center	Closet 105	12	4' linear T12	magnetic	1	1	40	1	40	Switch	40
29	Childcare Center	Exterior Lighting	-	20W CFL bulbs	-	21	2	20	13	10920	Timer	840

Totals		
Existing Usage (kWh/year)		44,150
Proposed Usage (kWh/year)		36,144
Existing Est. Cost ($/year)	$	7,770.47
Proposed Est. Cost ($/year)		6,433.59
Total kWh savings		8,007
Total $ Savings	$	1,409.17

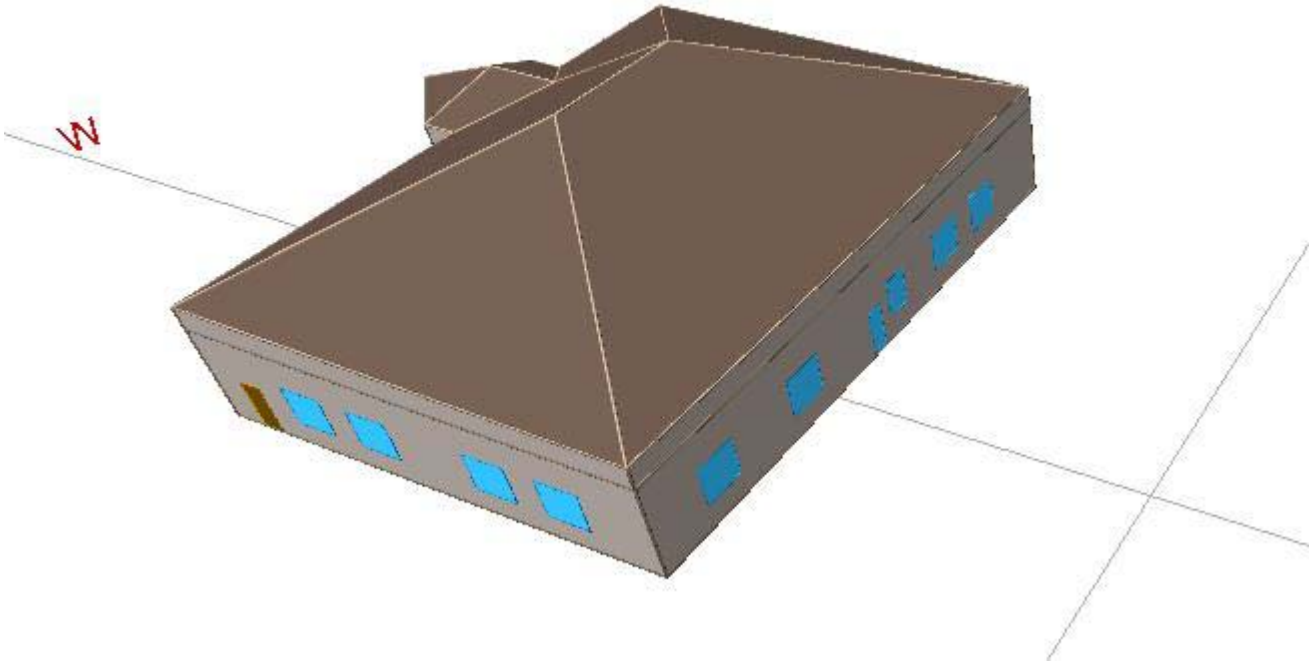
Interior Lighting Total Watts	10695	watts
Interior Lighting (W/sqft)	1.94	W/sqft
Exterior Lighting Total Watts	840	watts
Exterior Lighting (W/sqft)	0.15	W/sqft

Recommended Lighting											
#	Building	Location in Building	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Watts/ Lamp	Hrs/ Day	Energy Use (Watt hours/day)	Controls	Total Power (Watts)
1	Childcare Center	Entry 100	4' linear T8	electronic	2	2	32	11	1232	Switch	112
2	Childcare Center	Office 103	4' linear T8	electronic	8	2	32	11	4928	Switch	448
3	Childcare Center	Entry 101	4' linear T8	electronic	7	2	32	11	4312	Switch	392
4	Childcare Center	Office 102	4' linear T8	electronic	8	2	32	11	4928	Switch	448
5	Childcare Center	Classroom 115	4' linear T8	electronic	2	2	32	11	1232	Switch	112
6	Childcare Center	Classroom 115	4' linear T8	electronic	2	3	32	11	1848	Switch	168
7	Childcare Center	Classroom 115	LED Exit Sign	-	1	1	5	24	120	None	5
8	Childcare Center	Restroom 121	4' linear T8	electronic	1	1	32	4	112	Switch	28
9	Childcare Center	Restroom 122	4' linear T8	electronic	1	1	32	4	112	Switch	28
10	Childcare Center	Classroom 120	4' linear T8	electronic	2	2	32	11	1232	Switch	112
11	Childcare Center	Restroom 119	4' linear T8	electronic	1	1	32	4	112	Switch	28
12	Childcare Center	Restroom 118	4' linear T8	electronic	1	1	32	4	112	Switch	28
13	Childcare Center	Classroom 116	4' linear T8	electronic	20	2	32	11	12320	Switch	1120
14	Childcare Center	Classroom 116	4' linear T8	electronic	10	3	32	11	9240	Switch	840
15	Childcare Center	Storage 113	4' linear T8	electronic	3	1	32	2	168	Switch	84
16	Childcare Center	Classroom 117	4' linear T8	electronic	21	3	32	11	19404	Switch	1764
17	Childcare Center	Classroom 117	LED Exit Sign	-	1	1	5	24	120	None	5
18	Childcare Center	Classroom 111	4' linear T8	electronic	8	3	32	11	7392	Switch	672
19	Childcare Center	Classroom 111	LED Exit Sign	-	1	1	5	24	120	None	5
20	Childcare Center	Kitchen 112	4' linear T8	electronic	4	2	32	11	2464	Switch	224
21	Childcare Center	Kitchen 112 - under-cabinet lighting	4' linear T8	electronic	4	1	32	2	224	Switch	112
22	Childcare Center	Room 155	4' linear T8	electronic	1	1	32	1	28	Switch	28
23	Childcare Center	Restroom 110	4' linear T8	electronic	1	1	32	4	112	Switch	28
24	Childcare Center	Utility Room 109	4' linear T8	electronic	3	1	32	1	84	Switch	84
25	Childcare Center	Hallway 104	4' linear T8	electronic	8	2	32	11	4928	Switch	448
26	Childcare Center	Storage 108	4' linear T8	electronic	4	1	32	1	112	Switch	112
27	Childcare Center	Restroom 106	4' linear T8	electronic	1	1	32	4	112	Switch	28
28	Childcare Center	Closet 105	4' linear T8	electronic	1	1	32	1	28	Switch	28
29	Childcare Center	Exterior Lighting	20W CFL bulbs	-	21	2	20	13	10920	Timer	840

Proposed Totals		
Existing Usage (kWh/year)		31,571
Proposed Usage (kWh/year)		22,983
Existing Est. Cost ($/year)	$	5,556.42
Proposed Est. Cost ($/year)		4,044.94
Total kWh savings		8,588
Total $ Savings	$	1,511.48

Interior Lighting Total Watts	7491	watts
Interior Lighting (W/sqft)	1.36	W/sqft
Exterior Lighting Total Watts	840	watts
Exterior Lighting (W/sqft)	0.15	W/sqft

Appendix B: eQUEST model



Appendix C: Third Party Energy Suppliers (ESCOs)
http://www.state.nj.us/bpu/commercial/shopping.html

JCP&L ELECTRICAL SERVICE TERRITORY Last Updated: 06/15/09		
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095 (800) 437-7872 www.hess.com	**BOC Energy Services, Inc.** 1135 Mountain Avenue Murray Hill, NJ 011374 (800) 247-2644 www.boc.com	**Commerce Energy, Inc.** 4400 Route 9 South, Suite 100 Freehold, NJ 07728 (800) 556-84113 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 Corp.** 300 Madison Avenue Morristown, NJ 0113113 (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	**Strategic Energy, LLC** 55 Madison Avenue, Suite 400 Morristown, NJ 011360 (888) 925-9115, www.sel.com
Liberty Power Holdings, LLC Park 80 West, Plaza II, Suite 200 Saddle Brook, NJ 07663 (866) 769-31139 www.libertypowercorp.com	**Pepco Energy Services, Inc.** 112 Main St. Lebanon, NJ 08833 (800) ENERGY-9 (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 The Mac-Cali Building 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) 800-756-3749 www.south jerseyenergy.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 080113 (856) 273-9995 www.ugienergyservices.com	**American Powernet Management, LP** 437 North Grove St. Berlin, NJ 08009 (800) 437-7872 www.hess.com	**ConEdison Solutions** Cherry Tree, Corporate Center 1135 State Highway 38 Cherry Hill, NJ 08002 (888) 625-0955 www.conedsolutions.com
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450 212-1138-3124 www.creditsuisse.com	**Sprague Energy Corp.** 12 Ridge Road Chatham Township NJ 011328 (800) 225-1560 www.spragueenergy.com	

PSE&G NATURAL GAS SERVICE TERRITORY Last Updated: 06/15/09		
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109 800-6BUYGAS (6-289427) www.cooperativenet.com	**Direct Energy Services, LLP** 120 Wood Avenue, Suite 611 Iselin, NJ 08830 866-547-2722 www.directenergy.com	**Dominion Retail, Inc.** 395 Highway 170 - Suite 125 Lakewood, NJ 08701 866-275-4240 http://retail.dom.com
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701 800-805-8586 www.gesc.com	**UGI Energy Services, Inc. d/b/a GASMARK** 704 East Main Street, Suite 1 Moorestown, NJ 080113 856-273-9995 www.ugienergyservices.com	**Great Eastern Energy** 116 Village Riva, Suite 200 Princeton, NJ 08540 888-651-4121 www.greateastern.com
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095 800-437-7872 www.hess.com	**Hudson Energy Services, LLC** 871 Route 17 South Ridgewood, NJ 07450 877- Hudson 9 www.hudsonenergyservices.com	**Intelligent Energy** 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024 800-724-1880 www.intelligentenergy.org
Keil & Sons 1 Bergen Blvd. Fairview, NJ 07002 1-877-Systrum www.systrumenergy@aol.com	**Metromedia Energy, Inc.** 6 Industrial Way Eatontown, NJ 07724 877-750-7046 www.metromediaenergy.com	**Metro Energy Group, LLC** 14 Washington Place Hackensack, NJ 07601 888-113-Metro www.metroenergy.com
MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 088327 800-375-1277 www.mxenergy.com	**NATGASCO (Mitchell Supreme)** 1132 Freeman Street Orange, NJ 07050 800-840-4GAS 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 - Office 105 Cherry Hill, NJ 08002 800-281-2000 www.pplenergyplus.com	**Sempra Energy Solutions** The Mac-Cali Building 581 Main Street, 8th fl. Woodbridge, NJ 07095 877-273-6772 800-2 SEMPRA www.semprasolutions.com	**South Jersey Energy Company** One South Jersey Plaza, Route 54 Folsom, NJ 08037 800-756-3749 www.sjindustries.com/sje.htm
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 011328 800-225-1560 www.spragueenergy.com	**Stuyvesant Energy LLC** 10 West Ivy Lane, Suite 4 Englewood, NJ 07631 800-646-64113 www.stuyfuel.com	**Woodruff Energy** 73 Water Street Bridgeton, NJ 08302 800-5113-1121 www.woodruffenergy.com