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November 5th, 2012

FirstEnergy County and Local Government Audit Program
Energy Audit Final Report

For

State College Boro
Beaver Ave Parking Garage
200 West Beaver Ave
State College, Pa 16801

Introduction

On November 5th 2012, Premier Power Solutions, LLC (PPS) performed an energy audit and conditions assessment of the State College Boro Beaver Ave Parking Garage. This audit was conducted under the FirstEnergy County and Local Government Audit Program by Jason Greenblatt, who has 10 years experience in conducting commercial and residential energy audits.

Existing conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures (ECMs) for the building. Twelve months of building energy data was entered into ENERGY STAR Portfolio Manager so a baseline benchmark rating could be obtained for the building. PPS selected (5) appropriate ECMs, estimated the energy-savings for each ECM, the estimated cost to implement the measure along with a rebate if applicable and the simple payback for the ECM.

The Beaver Ave Parking Garage was built in 2005 and consists of 184,410 square feet of conditioned space and un-conditioned space. Ninety-five percent of the structure is unconditioned and no air conditioning exists. The original structure is brick-faced masonry construction. The roof construction is concrete between floor layered in K13 insulation and soundproofing. The top deck is open and no roof exists. The parking garage has double pane windows and door systems. The parking garage operates 168hours per week, 52 weeks per year and has a peak occupancy rate of 500 staff and garage users.

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.

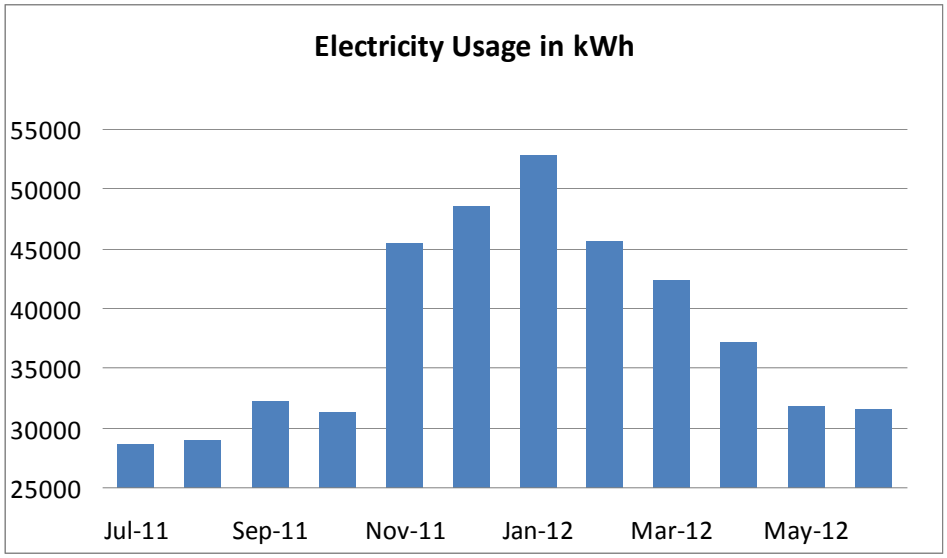
Energy Consumption

Energy usage and cost analysis

PPS analyzed utility bills for a 12-month period from West Penn Power for electricity and Columbia for natural gas.

Electricity - The State College Boro (Beaver Ave Parking Garage) presently purchases electricity (generation/transmission) from First Energy Solutions for an average of 6.40 cents per kWh and 2.58 cents per kWh for distribution from West Penn Power. The period of time analyzed for this audit was from July 2011 to July 2012. The Beaver Avenue Parking Garage used a total of 564,698 kWh over that 12-month period at a total cost of $50,709.88 (.0898 cents per kWh).
The following chart shows electricity usage for the parking garage based on utility bills from July 2011 through July 2012.

Beaver Ave Parking Garage Electric Usage

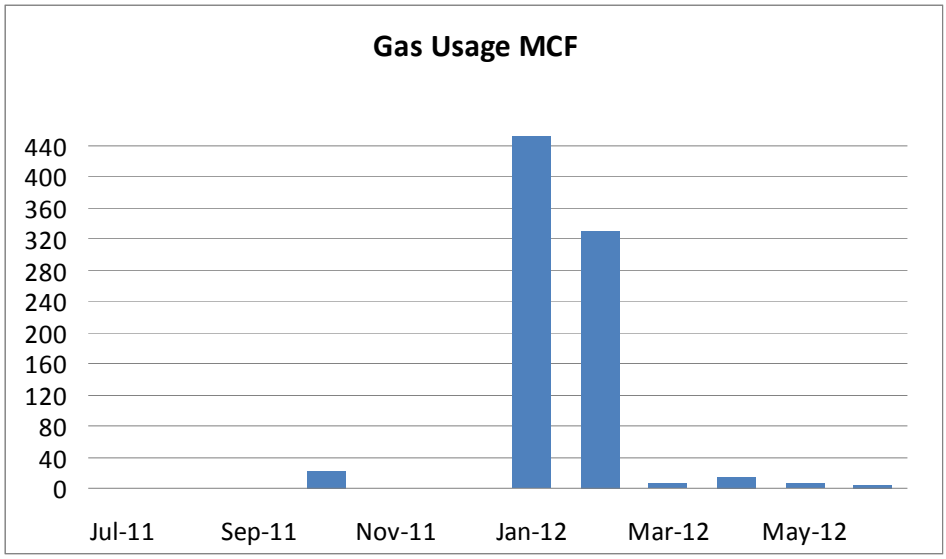


In the above chart, the electricity use is highest during the winter months due to operating the electric QMark heating units and the higher number of billing days in December and January.

Natural Gas – The Beaver Ave Parking Garage uses natural gas supplied and distributed by Columbia Gas for an average cost of $7.45/MCF. The garage used a total of 1,267 MCF's over the 12-month period from July 2011 thru July 2012 for a total cost of $9,439.15.

The following chart shows the natural gas use for the parking garage based on utility bills from July 2011 through July 2012.

Beaver Ave Parking Garage Gas Usage



In the above chart, the natural gas usage follows a heating trend as expected with the highest gas usage occurring January and February which corresponds with the highest Heating Degree Days (HDD) of the year.

Energy Benchmarking

The building information and utility data were entered into the U.S. Environmental Protection Agency's (EPA*) Energy Star Portfolio Manager* Energy benchmarking system. A rating of N/A was given to the building. The reason the garage was given a N/A rating was due to the fact that not a sufficient number of parking garages exists in the energy star program to benchmark against.

PPS has assisted State College Boro (Beaver Ave Parking Garage) in creating an *Energy Star Portfolio Manager* account which will allow the Boro to share the facility's information and allow future data to be added and tracked using the benchmarking tool.

Summary Energy Performance Report

Facilities included: Individually selected from main Portfolio
Located in: PA
Date Generated: 1/14/2012

Number of facilities: 1

	Year ending 5/2012
Total Floor space (sq. ft.)	184,410
Average Rating	N/A
Number of Facilities with a Rating	0
Number of Non-ratable Facilities*	1
Total Site Energy Use (kBtu)	2,855,047
Total Weather Normalized Source Energy Use (kBtu)	6,565,252
Average Weather Normalized Source Energy Intensity (kBtu/Sq. Ft.)	0
Average Site Energy Intensity (kBtu/Sq. Ft.)	0
Total Site Electric Use (kWh)	457,074
Total Site Natural Gas Use (Therms)	12,955
Average Actual Annual Source Energy Intensity (kBtu/Sq. Ft.)	0

*Non-ratable buildings are defined as buildings that currently are ineligible to receive the ENERGY STAR rating due to its operating characteristics and/or building type.

The *Summary Energy Performance Report* provides benchmarking information for both Source and Site Energy Use. Site Energy is the energy consumed by the building at the building site only. Source Energy includes the Site Energy Use as well as all of the losses to create and distribute the energy to the building. For electricity, it includes the energy, primarily in the form of coal, used by the electric power plants in the building's electric generation region to generate the electricity used by Beaver Ave Parking Garage as well as the transmission and distribution losses between the electric generation plant and the school. The Source Energy

for electricity in the West Penn Power region is 3.34 times higher than the Site Energy. Source Energy is used to calculate the building's Energy Star rating. The EPA has determined that Source Energy is the most comparable unit for evaluation purposes and overall global impact. The Source Energy is also used to calculate the building's carbon footprint which is available in *Portfolio Manager*.

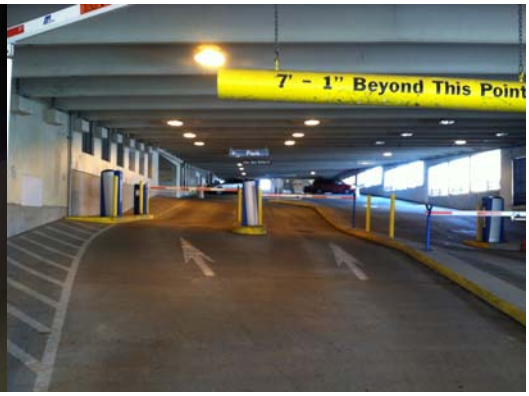
The *Summary Energy Performance Report also* provides information on the building's Energy Intensity. Energy Intensity is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. Energy intensity is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

The *Summary Energy Performance Report* shows the Total Site Energy Use for Beaver Ave Parking Garage as 2,855,047 kBTUs where "k" is 1000 BTUs. Compare that with the Total Weather-Normalized Source Energy Use of 6,565,252 kBTUs. Weather-normalized means that the energy use was corrected to account for annual temperature variations that deviate from the 20-year average temperature database for the region. This allows better comparisons of energy use from one year to the next.

Description of Base Systems & Facility Overview

Building Envelope- The exterior of the building is brick faced masonry construction with block walls. On the front portion of the garage double pane windows and doors exist to maximize building envelope efficiency. The rest of the parking garage is not enclosed and is un-conditioned.

Lighting – The lighting system is a combination of several types of lighting. In mechanical and restrooms 2 bulb T-8 fluorescent exists. The main lighting in the parking garage are 400 watt and 150 watt HPS with a supplementary down light reflector. Wall scones are in common areas and they are 2 bulb CFL's. The upper deck of the garage has 100 watt borough standard street lights mounted on a 14 foot pole.



2 bulb T-8 **150 & 400 watt HID**

HVAC – The boiler is a RayPak hydronic gas boiler which is 80% efficient. This boiler was installed in 2005 when the structure was built. Its primary use is to heat tubing in the side walk and ramp to ensure a non slip surface and create a safe traveling environment for patrons. Water is circulated with Armstrong pumps and no VFD exists. The conditioned spaces within the parking garage are heated with QMark forced air unit heaters. These heaters have an advanced pull-through air flow design that draws air across a heating element for more of an even air distribution and cooler element operation. Each unit has a 24 V control transformer that provides a safer and more accurate way of controlling temperature.

RayPak Boiler

Armstrong Circulating Pump

Dedicated Ventilation Systems – No dedicated ventilation system exists since the majorities of the building is unconditioned and open to the outside. All mechanical rooms and bathrooms are properly vented.

RayPak Boiler

Executive Summary

On November 5th 2012, Premier Power Solutions, LLC (PPS) performed an energy audit and conditions assessment of the State College Boro Beaver Avenue Parking Garage located in State College Pa. This audit was conducted under the FirstEnergy County and Local Government Audit Program by Jason Greenblatt who has ten years experience conducting commercial and residential audits.

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 State College Boro.

Existing conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures (ECMs) for the building. Twelve months of building energy data were entered into ENERGY STAR Portfolio Manager so a baseline benchmark rating could be obtained for the building.

(5) ECMs were selected for the Beaver Avenue Parking Garage:

- Install (4) occupancy sensors throughout the rest rooms, mechanical room and storage rooms to control lights being left on in the building unnecessarily. The estimated savings in electricity annually would be 16,819 kWh and save $1,510.35 dollars if occupancy sensors were installed throughout the parking garage. The cost to install the additional occupancy sensors would be $700 after Act 129 incentives. This project would have a simple payback of 5 months. These savings are based on the following assumptions. 192w x 4 sensors= 768watts x .001= 7.68kw x 2,190 hours (6hrs/dayx365 days) = 16,819 kWh x .0898 electricity rate= $ 1,510.35dollars saved.

- Retrofit existing (180) 400 watt metal halide lighting with high efficient 120 watt bi-level on/off sensor controls lighting induction fixtures. The estimated savings in electricity annually would be 110,376 kWh and save $9,911 dollars. This project would cost an estimated $76,500 have a simple payback of 7.7 years not including savings on bulb life. These savings are based on the following assumptions. 280w x 180 fixtures=50,400 watts x .001= 50.4kw x 2,190 hours (6hrs/dayx365 days) = 110,376 kWh x .0898 electricity rate= $9,911 dollars saved.

- Install 6 inches of spray foam insulation on the ceilings in the restrooms. This would achieve an R-30 and reduce the amount of heat needed to heat restrooms. The estimated savings in electricity would be $405.63 dollars and the cost of the project is estimated to be $980. The simple payback would be 2.6 years. The savings are based on the following assumptions 564,698 kWhx.02% for space heating= 11,293kWh total for space heating with a 40% reduction in electricity= 4,517kWh savedx.0898=$405.63 total dollars saved.

- Change 150 watt parking lot lights with high efficient 70 watt bi-level on/off sensor controls lighting induction fixtures. This project would cost $3,800 and save 23,360kWh equating to a $2,097 dollar savings. The payback on this project would be 1.81 years. These savings are based upon the following assumptions. 80 watts x 10 fixtures= 8,000 watts x.001= 8 kW x 2,920 hours= 23,360 kWh x .0898 cost per kWh= $2,097 dollars saved.

- Install variable frequency drives on circulating pumps. The use of variable drive frequency pumps would save approximately 15% in electricity consumption. The monetary savings for this project would be $760.60 and save 8,470kWh.The cost of the project is estimated at $3,500 dollars after Act 129 rebates. The simple payback of the project would be 4.6 years. These savings are based upon the following assumptions. 56,469kWh used for circulating pumps x 15% savings=8,470 kWh saved x .0898 electricity rate = $760.60 dollars saved.

Here is a summary list of the (5) ECMs that were selected for this building along with a description, expected life of the measure, annual energy and peak demand reduction, labor, material and total costs, Act 129 incentives and the simple payback .

Energy Conservation Measure #1

Occupancy Sensors – Lights left on in unoccupied rooms is a problem in any building. Based on a study of 35 classrooms as part of EPA's Green Lights Program, 63% of lighting energy is wasted in unoccupied classrooms. Occupancy sensors with a 20-minute timeout would achieve a 52% savings compared to uncontrolled lighting. The installation of 4 occupancy sensors, each controlling an average of 192 watts would provide an annual savings of 16,819 kWh with a dollar savings of $1,510.35. The cost of the project would be $700 and have a simple payback of 5 months.

Lights in Storage Room & Restrooms

Energy Conservation Measures #2:

Retro-fit existing 400watt HID fixtures to 120 watt Induction Lighting:

Most parking garages use high intensity discharge light sources that operate continuously regardless of lighting needs. These facilities typically do not employ energy savings control strategies such as daylighting or time clock scheduling, and no considerations are made for lighting control based occupancy. Garage lighting, designed to only a single static level, wastes energy and contributes to peak demand during the day. There has been a development in parking garage lighting that includes a bi-level light that integrates state of the art induction sources and occupancy-based dimming controls. This fixture automatically reduces power to 50% power on vacancy and increases to 100% power on occupancy using a fixture integrated occupancy sensor. Induction Lighting is a proven lighting technology that has been around for over 100 years. Due to recent advancements in Electronic Ballast/Generator technology, it has more recently become a viable option for the commercial and municipal markets. Induction Lighting has been utilized extensively for street lighting applications in Asia, Australia, and Europe, however with the recent initiatives to "GO GREEN", induction lighting technology is now emerging as the best choice for energy efficient lighting in North America. An Induction Lamp is similar to a fluorescent lamp in that mercury in a gas fill inside the bulb is excited; emitting UV radiation that in turn is converted into visible white light by the phosphor coating on the bulb. Fluorescent lamps, however, use electrodes inside the bulb to strike the arc and initiate the flow of current – each the arc is struck, the electrodes degrade a little, eventually causing the lamp to flicker and then fail. Induction Lamps differ in that they do not use internal electrodes, but use a high-frequency generator with a power coupler. The generator produces a radio frequency magnetic field to excite the gas fill. With no electrodes, the lamp lasts longer in fact, up to 100,000 hours, with the lamp producing 70% of its original light output at 60,000 hours. In other words, their rated life is 5-7 times longer than metal halide (7,500 to 20,000 hours at 10 hours/start) and about seven times longer than T12HO fluorescent (at 10 hours/start). This would save 110,376kWh which would equate to a $9,911 dollar savings. The cost of the project would be $76,500 and have a payback of 7.7 years not including bulb replacement.

400 watt HID Lights on all day

Energy Conservation Measure #3

Install 6inches of Polyurethane foam insulation on Restroom and Storage Room Ceilings:

Polyurethane foam provides a complete, seamless building envelope, creating a more comfortable indoor environment. Polyurethane foam seals cracks, crevices and seams giving you valuable protection from unmanaged air infiltration, drafts and damaging moisture accumulation. Proven more effective than conventional insulation products, Spray polyurethane insulation forms a seamless bond with building components to create a structurally sound, uniform, air-infiltration barrier. Polyurethane foam's unique physical properties perform in even the most extreme hot or cold climate. Because polyurethane foam is a closed cell insulation material delivering the highest R-value per inch, your heating and cooling equipment works more efficiently, uses less fuel and maintains consistent and uniform temperatures. Insulation is rated in terms of thermal resistance –R-value- which indicates the resistance to heat flow. 1.8-2 pound polyurethane foam has the highest R-value (6.5 per in.) of all readily available, cost effective insulations available in the market today. The cost of this project would be $980 dollars and save 4,517kWH. This would equate to a $405.63 dollar savings and have a simple payback of 2.6 years.

Ceiling in Storage room with QMark Electric Heater

Energy Conservation Measure #4:

Install Induction parking lot lights on upper deck:

The parking lot is lighted by (10) 150 watt high pressure sodium lights. The inherent problem with high pressure sodium is poor color rendition and visual acuity. To compensate for this problem, high wattages and higher foot-candle light levels are required to provide the same perceived light level as a whiter higher color rendition light. The other problem with the fixtures installed at the school is that they have a high degree of side glare and light trespass off the property. All of this light is wasted and does nothing to light the parking lot. The latest lighting technology to address these problems is induction lighting. This lighting provides a high color rendition white light that has a much higher perceived light level at the same foot-candles compared to HPS lighting. A scotopic-corrected light meter which corrects foot-candle levels to simulate the human eye would show that the white induction light is 2.65 times brighter to the human eye than HPS at the same photopic foot-candle reading. Each induction lamp within the fixture is focused to put all of the light generated on the parking lot without side glare or light trespass. This results in an induction lamp that can provide the same or greater visual light level with fewer watts of energy. Based on the lamps burning all night, the induction fixtures would save annually 23,360 kWh. This equates to a dollar savings of 2,097 and would have a payback of 1.81 years. This does not include maintenance cost savings which should be considerably less based on the 100,000 hour plus rated life which translates into 23 years.

Energy Conservation Measures #5
Install Variable Frequency Drives:

Single speed starting methods start motors abruptly, subjecting the motor to a high starting torque and to current surges that are up to ten times the full load current. Variable speed drives, on the other hand, gradually ramp the motor up to operating speeds to lessen mechanical and electrical stress, reducing maintenance and repair costs, and lowering electrical usage. Variable frequency drives enable pumps to accommodate fluctuating demand, running pumps at lower speeds and drawing less energy while still meeting the pumping needs. Energy cost savings can be significant because the torque required varies roughly with the square of the speed, and the horsepower required varies roughly with the square of the speed, resulting in a large reduction of horsepower for even a small reduction in speed. The motor will consume only 25% as much energy at 50% speed as it will at 100% speed. The annual kWh savings would be 8,470 and save $760.60 dollars. The simple payback would be 4.6 years.

Circulating Pumps

Audit

Data

&

Reports

Building Characteristics

Building Data	State College Boro (Beaver Ave Parking Garage)
Building ID	Beaver Ave Parking Garage
Date of Audit	11/5/12
Street Address	200 West Beaver Ave
City/State/Zip	State College, Pa 16801
Roof Accessible w/o Ladder, Y/N	No
Floor Plan Dwg Available, Y/N	Yes
Design Data	
Lat./Long	40 Deg47'3.90"N 77Deg 51'61.03"W
Elevation Above Sea Level	1163 Ft
Orientation of Building Front	Southwest
Design HDD/CDD (Base 65^0F)	5736/826
Current Ambient Temp/Humidity/CO_2 Level	41.2 Deg F/26.2 % R.H./542 PPM
ENERGY STAR Data	
Gross Floor Area, Sq. Ft.	184,410
% of Total Area Heated	10%
% of Total Area Cooled	0%
Open Weekends, Y/N	Yes
Number of PCs	1
Cooking Facilities, Y/N	No
No. of Walk-In Coolers/Freezers	0
Building Type, Based on 51% of Conditioned Space, Primary/Secondary/Admin/Other	Other/Parking Garage
Number of Conditioned Floors Above Grade	2
Number of Conditioned Floors Below Grade	0
Year of Construction, Based on 51%	2005
Building Description	
Roof Construction/Insulation/Area	N/A
Wall Construction/Insulation	Block/Brick Faced
Glazing Type - Sgl/Dbl Pane - Blinds	Double Pane/No Blinds
Glazing Area - % of Exposed Wall Area	10%
Ceiling or Open to Deck?	Open to Deck
Ceiling Height	12 Ft
General Lighting Type	HID

Type of Heating System	Gas Boiler
Type of Cooling System	N/A

Building Schedule

Preliminary Building Use	
Average Hours/Week	168
Average Weeks/Year	52
After Hours Cleaning Y/N	No

Overall Building Schedule #1

Building Schedule During Months of								
Days	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**	**Hol**
Hours Open	24	24	24	24	24	24	24	24
Hours Closed	0	0	0	0	0	0	0	
Peak No. of Occupants								

Overall Building Schedule #2

Building Schedule During Months of								
Days	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**	**Hol**
Hours Open								
Hours Closed								
Peak No. of Occupants								
Avg. No. of Occupants When Open								

Electric Utility Data

	Meter Read Dates		No.	Total	Peak	Peak	Total
	From	To	Days	KWh	KW	KVAR	$
1	7/1/12	7/31/2012	31	29,269	155.5		2,429.33
2	6/1/2012	6/30/2012	30	31,624	157.7		2,624.79
3	5/1/2012	5/31/2012	31	31,879	157.7		2,645.96
4	4/1/2012	4/30/2012	30	37,153	208.3		3,083.70
5	3/1/2012	3/31/2012	31	42,382	233.3		3,513.22
6	2/1/2012	2/28/2012	28	45,600	240.8		3,784.80
7	1/1/2012	1/31/2012	31	52,820	145.4		4,384.06
8	12/1/2011	12/31/2011	31	48,530	160.5		4,027.99
9	11/1/2011	11/30/2011	30	45,444	230.8		3,771.85
10	10/1/2011	10/31/2011	31	31,254	157.2		2,594.08
11	9/1/2011	9/30/2011	30	32,298	166.6		2,680.73
12	8/1/2011	8/31/2011	31	29,038	155.5		2,410.15
13	7/1/2011	7/31/2011	31	28,657	167.5		2,378.53
14	6/1/2011	6/30/2011	30	32,019	160.6		2,657.58
15	5/1/2011	5/31/2011	31	46,731	221.2		3,878.67
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							

30							
		Totals	**457**	**564698**		**0**	**46865.44**

Natural Gas Utility Data

	Meter Read Dates		No.	Total	"E" If	Total
	From	To	Days	MCF	Estimate	$
1	7/1/12	7/31/2012	31	3		
2	6/1/2012	6/30/2012	30	5		
3	5/1/2012	5/31/2012	31	7		
4	4/1/2012	4/30/2012	30	14		
5	3/1/2012	3/31/2012	31	6		
6	2/1/2012	2/28/2012	28	331		
7	1/1/2012	1/31/2012	31	452		
8	12/1/2011	12/31/2011	31	0		
9	11/1/2011	11/30/2011	30	0		
10	10/1/2011	10/31/2011	31	22		
11	9/1/2011	9/30/2011	30	0		
12	8/1/2011	8/31/2011	31	0		
13	7/1/2011	7/31/2011	31	0		
14	6/1/2011	6/30/2011	30	91		
15	5/1/2011	5/31/2011	31	336		
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						

30						
		Totals	**457**	**1267**		**0**

Types of Energy-Using HVAC Equipment

Building ID	State College Boro (Beaver Ave Parking Garage)
Primary Cooling	
Centrifugal Chiller	No
Reciprocating Chiller	No
Screw Chiller	No
Absorption Chiller	No
Package DX	No
Window Units	No
Air Cooled Heat Rejection	No
Water Cooled Heat Rejection	No
Primary Heating	
Hot Water Boiler	Yes
Steam Boiler	No
Furnace Gas Forced Air	No
Ground Source Heat Pump	No
Air Source Heat Pump	No
Recirculating Water Source Heat Pump	No
AHU/Terminal Systems	
Single Zone	Yes
Multi-Zone	No
Dual Duct	No
Variable Air Volume	No
Reheat	No
Fan Coil Units	No
Unit Ventilators	No
Packaged Terminal Air Conditioners	No
Steam/Hot Water Radiators/Convectors	No
Above System(s) w/Economizer	No
Dedicated Outdoor Air System	No
Other	
Cogeneration	No
Energy Monitoring and Control System	No
On-site Generation	No
Energy Recovery	No
Humidifiers/Dehumidifiers	No
Swimming Pool Heaters/Dehumidifiers	No
Other (Define)	No
Exhaust Systems	
Fume Hoods, Constant Volume	No
Fume Hoods, VAV	No
Kitchen Hoods	No
Restroom	No

Locker Room	No
General	No

Utility Service Audit Form

Electric Utility	
Electric Utility Company	**West Penn Power**
Account Number	**12912012476153**
Generation and Transmission Supplier	**First Energy Solutions**
Service Voltage	**480/277**
MDP Size in Amps	800/1200
Meter Location	Back Side of Bldg
Meter Number	N/A
Power Factor Penalty	N/A
Secondary Transformer KVA/Temp Rating	N/A
Annual KWh	564,698
Annual Peak Demand	233.3
Annual Load Factor	0.2763
Building Electrical Efficiency, KWh/Sq Ft/Yr	3.06

Natural Gas Utility	
Natural Gas Utility	Columbia
Account Number	N/A
Commodity Supplier	Columbia
Meter Capacity, CFH	1,000 @1/2" 2,200@ 2"
Meter Location	Back Of Bldg
Meter Number	2000
Annual Natural Gas Usage, CCF	1,267
Building Gas Usage Efficiency, kBTU/SF/Yr	0.00687

Building Energy Utilization Index, kBTU/SF/Yr	

Current Environmental Conditions

Building ID	State College Boro (Beaver Ave Parking Garag			
Date -	11/5/2012			
Control of Indoor Air Pollutants	**Yes/No**			
Cooking Hoods to Code & Functional	N/A			
Restroom Exhausts to Code & Functional	Yes			
Mechanical Room Exhaust to Code & Functional	Yes			
Combustion Equipment Properly Vented?	Yes			
Ventilation Verification via CO^2 Readings in PPM	**Low**	**High**	**Avg**	
Outside Ambient	404	410	407	
Thermal Conditions				
Control Mode	Cooling	Heating		
Average Temp/Humidity Readings	DB^0F	WB^0F	%RH	DP^0f
Outside Ambient		42	35%	36
Illumination				
Average Light Levels in Foot-Candles	Horiz	Vert		

Building Space Types

Building ID	State College Boro (Beaver Ave Parking Garage)
Offices	Yes
Bathrooms	Yes
Computer	No
Laboratories & Science Facilities	No
Administrative Areas	No
Gymnasium	No
Libraries	No
Auditorium	No
Home Economics Room	No
Cafeteria	No
Kitchen	No
Auto Repair Shop	No
Wood/Metal Shops	No
Locker Rooms	No
Ice Rink	No
Natatorium	No
School Store	No

Space Function and System Summary

Space Data	State College Boro (Beaver Ave PG)	State College Boro (Beaver Ave Parking Garage)
Space ID	Beaver Ave Parking Garage	Beaver Ave Parking Garage
Function Type	Lobby	Restrooms
Floor Area, Sq Ft	800 Sq Ft	503 Sq Ft
Space Usage		
Hours/ Week	168	168
Weeks/Year	52	52
Lighting		
Quantity/Type	(8) Hanging Light Fixtures	4Ft 2bulb T-8
Condition	New	New
% Lamps Out	0	0
Spacing	10 Ft	4 Ft
Light Level, FC	61.2	54.3
Bi-Level Switching	No	No
Occupancy Sensor	No	No
Daylight Control	No	Yes
BMS Control	No	Yes
LED Exit Sign(s)	Yes	Yes
HVAC Type		
Primary Cooling		
Primary Heating	20 Hot Water Boiler	22 Furnace
Condition	New	Good
Room Control	No	No
Room Temp Setting	No	No
BMS Control	Yes	Yes
Room Temp	63.6 Deg F	773.5 Deg F
Humidity	28.40%	27.50%
CO_2 Level	620 PPM	630 PPM
Glazing		
Number/Size	8	None
Type	Double Pane	N/A
Orientation	North	N/A
Condition	Good	N/A
Seals	Good	N/A
Shading	No	N/A

Air Distribution System

Air Handler Unit ID	State College Boro (Beaver Ave Parking Garage)
Manufacturer	N/A
Model	N/A
Type	N/A
Condition	N/A
Fan	
Type	N/A
Total CFM	N/A
Outside Air Temperature	N/A
Supply Temperature	N/A
Capacity Modulation Type	N/A
Chiller Control	
Occupied/Unoccupied	N/A
Time Schedule	N/A
Outside Air Temperature	N/A
Supply Temperature	N/A
Capacity Modulation Type	N/A
AHU Control	
Fan Control	N/A
Supply Air Temperature	N/A
Capacity Modulation Type	N/A
Ventilation Control	N/A
Damper, Fixed/Motorized	N/A
CO^2 Monitoring	No
Occupied/Unoccupied	No
Fan On/Off/Auto	Yes
Ventilation On/Off	No
Temperature Setback/Setup	Yes
Ductwork	
Sealing	No
Lining/Insulation	No
Condition	New

Exhaust Fans	N/A

Central Chiller Cooling System

Chiller		
Chiller ID	N/A	
Manufacturer	N/A	
Model	N/A	
Type	N/A	
Capacity, Tons	N/A	
Refrigerant	N/A	
Full Load, EER/COP	N/A	
IPLV, EER/COP	N/A	
Flow Rate, GPM	N/A	
Hot Water EWT/LWT	N/A	
Condition	N/A	
Chilled Water Pumps		
Pump ID	N/A	
Type	N/A	
Motor HP	N/A	
Condition	N/A	
Heat Rejection Unit		
Unit ID	N/A	
Manufacturer	N/A	
Model	N/A	
Type	N/A	
Fan HP	N/A	
Control Type	N/A	
Condition	N/A	
Cooling Tower Pumps		
Pump ID	N/A	
Type	N/A	
Motor HP	N/A	
Condition	N/A	
Distribution Piping		
Piping Material	N/A	
Insulation	N/A	
Overall Condition	N/A	

Central Heating System

Furnace		
Furnace ID	504235505	
Manufacturer	RayPak	
Model	H9-1262A	
Type	Gas Boiler	
Gas Forced Air	No	
Input, MBH	1,260,000	
Output, MBH	1,058,000	
Furnace Efficiency, %	84%	
Steam Operating Pressure, PSIG	160	
Hot Water EWT/LWT	60/115	
Condition	Good	
Pumps		
Pump ID	ASG	
Manufacturer	Armstrong	
Model	N/A	
Type		
Motor HP	7.5	
Condition	Good	
Distribution Piping		
Piping Material	Steel	
Insulation	Yes	
Steam Traps	No	
Overall Condition	Good	
Maintenance		
Inspection Frequency	Yearly	
Water Treatment	N/A	
Air/Fuel Ratio Optimization	N/A	

Rooftop HVAC Unit

Unit ID		
Conditioned Space	**N/A**	
Manufacturer	N/A	
Model	N/A	
Capacity, Tons	N/A	
Overall Condition of Unit	N/A	
Main Fan & Motor		
Fan Motor HP	N/A	
Drive Type	N/A	
Fan Type	N/A	
Total Airflow, CFM	N/A	
Cooling		
Capacity Total, MBH	N/A	
Capacity Sensible, MBH	N/A	
EER/SEER	N/A	
Refrigerant Type	N/A	
Heating		
Heating Input, MBH	N/A	
Heating Output, MBH	N/A	
Heating Efficiency	N/A	
Filters		
Type	N/A	
Cond. of Filters	N/A	
Outside Air		
Outside Air, CFM	N/A	
Damper Type	N/A	
Damper Control	N/A	

Unit Heaters

Unit Heater ID				
Location	Restrooms	Mechanical Room	Storage	
Manufacturer	Qmark	Qmark	QMArk	
Model	MUH Series	MUH Series	MUH Series	
Type	Forced Air	Forced Air	Forced Air	
Volts	208/240	208/240	208/240	
CFM	350	350	350	
Heating Efficiency	85%	85%	85%	
Control Type	24V	24V	24V	
Condition	New	New	New	

Central Building Management System

Unit ID	State College Boro (Beaver Ave Parking Garage)
Manufacturer	N/A
Model	N/A
Version	N/A
Remote Access	N/A
Boiler Control	
Occupied/Unoccupied	No
Time Schedule	Yes
Outside Air Temperature	55Deg
Supply Temperature	N/A
Hot Water Reset	N/A
Capacity Modulation Type	N/A
Chiller Control	
Occupied/Unoccupied	N/A
Time Schedule	N/A
Outside Air Temperature	N/A
Supply Temperature	N/A
Capacity Modulation Type	N/A
Chilled Water Reset	N/A
AHU Control	
Fan Control	N/A
Supply Air Temperature	N/A
Capacity Modulation Type	N/A
Ventilation Control	N/A
Damper, Fixed/Motorized	N/A
CO^2 Monitoring	N/A
Occupied/Unoccupied	N/A
Fan On/Off/Auto	N/A
Ventilation On/Off	N/A
Temperature Setback/Setup	N/A
Scheduling and Monitoring	
Indoor Lighting	No
Outdoor Lighting	Yes

Unit Heaters	Yes
Exhaust Fans	No