MORRIS COUNTY VOCATIONAL SCHOOL DISTRICT
BUILDING 4
400 East Main Street, Denville, NJ 07834

LOCAL GOVERNMENT ENERGY AUDIT PROGRAM
FOR
NEW JERSEY
BOARD OF PUBLIC UTILITIES

October 2014

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CHA PROJECT NO. 28950

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REPORT DISCLAIMER

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within ±20%, and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the building was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing staff and spot measurements taken in the field.

List of Common Energy Audit Abbreviations

- A/C – Air Conditioning
- AHS – Air Handling Unit
- BMS – Building Management System
- Btu – British thermal unit
- CDW – Condenser Water
- CFM – Cubic feet per minute
- CHW – Chilled Water
- DCV – Demand Control Ventilation
- DDC – Direct Digital Control
- DHW – Domestic Hot Water
- DX – Direct Expansion
- EER – Energy Efficiency Ratio
- EF – Exhaust Fan
- EUI – Energy Use Intensity
- Gal – Gallon
- GPD – Gallons per day
- GPF – Gallons Per Flush
- GPH – Gallons per hour
- GPM – Gallons per minute
- GPS – Gallons per second
- HHW – Heating Hot Water
- HID – High Intensity Discharge
- HP – Horsepower
- HRU – Heat Recovery Unit
- HVAC – Heating, Ventilation, Air Conditioning
- HX – Heat Exchanger
- kbtu/mbtu – One thousand (1,000) Btu
- kW – Kilowatt (1,000 watts)
- kWh – Kilowatt-hours
- LED – Light Emitting Diode
- mbh – Thousand Btu per hour
- mmbtu – One million (1,000,000) Btu
- OCC – Occupancy Sensor
- PSI – Pounds per square inch
- RTU – Rooftop Unit
- SBC – System Benefits Charge
- SF – Square foot
- UH – Unit Heater
- V – Volts
- VAV – Variable Air Volume
- VSD – Variable Speed Drive
- W – Watt

1.0 EXECUTIVE SUMMARY

This report summarizes the energy audit performed by CHA for Morris County Vocational School District's Building 4 in connection with the New Jersey Board of Public Utilities (NJBPU) Local Government Energy Audit (LGEA) Program. The purpose of this report is to identify energy savings opportunities associated with major energy consumers and inefficient practices. Low-cost and no-cost are also identified during the study. This report details the results of the energy audit conducted for the building listed below:

Building Name	Address	Square Feet	Construction Date
Building 4	400 E Main St, Denville, NJ 07834	79,925	1984

The potential total annual energy and cost savings for the recommended energy conservation measures (ECM) identified in the survey are shown below:

Electric Savings (kWh)	NG Savings (therms)	Total Savings ($)	Payback (years)
311,295	21,713	62,532	62.2

Each individual measure's annual savings are dependent on that measure alone, there are no interactive effects calculated. There are three options shown for Lighting ECM savings; only one option can be chosen. Incentives shown (if any) are based only on the SmartStart Incentive Program. Other NJBPU or local utility incentives may also be available/ applicable and are discussed in Section 6.0.

Each measure recommended by CHA typically has a stand-alone simple payback period of 15 years or less. However, if the owner choses to pursue an Energy Savings Improvement Plan (ESIP), high payback measures could be bundled with lower payback measures which ultimately can result in a payback which is favorable for an ESIP project to proceed. Occasionally, we will recommend an ECM that has a longer payback period, based on the need to replace that piece(s) of equipment due to its age, such as a boiler for example.

The following table provides a detailed summary of each ECM for the building surveyed, including costs, savings, SmartStart incentives and payback.

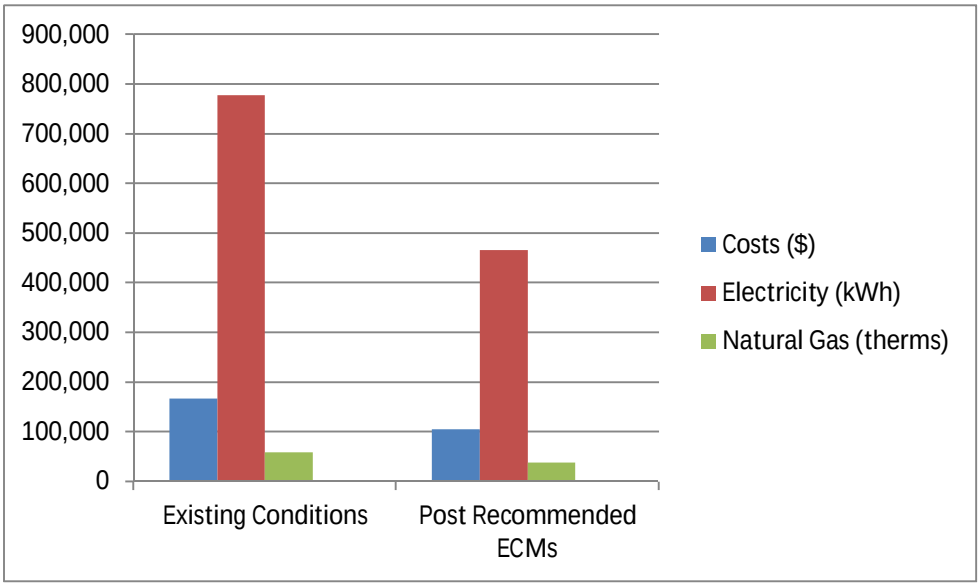
Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
1	Replace Windows	737,802	9,145	80.7	0	80.7	Y
2	Replace Door Seals	4,609	1,371	3.4	0	3.4	Y
3	Install Roof Insulation	2,499,714	16,759	149.2	0	149.2	Y
4	Replace RTUs	125,400	2,946	42.6	1,950	41.9	Y
5	Replace H&V Units	79,812	1,810	44.1	0	44.1	Y
6	Condensing DHW Heater	33,791	860	39.3	400	38.8	Y
7	Install Infrared Heaters to Replace Gas-Fired Unit Heaters	55,456	1,402	39.6	3,000	37.4	Y
8	Replace Electric Kitchen Equipment with Natural Gas	100,652	5,491	18.3	3,498	17.7	Y
9	Computer Network Controller	1,776	615	2.9	0	2.9	Y
10	Install Low Flow Plumbing Fixtures	42,185	944	44.7	0	44.7	Y
L1	Lighting Replacements / Upgrades	247,262	19,435	12.7	40,350	10.6	N
L2	Install Lighting Controls (Add Occupancy Sensors)	11,610	5,528	2.1	1,505	1.8	N
L3	Lighting Replacements with Controls (Occupancy Sensors)	258,872	21,189	12.2	41,855	10.2	Y
	Total**	3,940,069	62,532	63	50,703	62	
	Total (Recommended)	3,940,069	62,532	63	50,703	62	

* Incentive shown is per the New Jersey SmartStart Program.
** These ECMs are not included in the Total, as they are alternate measures not recommended.

If Morris County Vocational School District implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	168,048	105,417	37%
Electricity (kWh)	777,920	466,625	40%
Natural Gas (therms)	59,725	38,012	36%
Site EUI (kbtu/SF/Yr)	107.9	67.5	



2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

The following is a summary of building information related to HVAC, plumbing, building envelope, lighting, kitchen equipment and domestic hot water systems as observed during CHAs site visit. See appendix B for detailed information on mechanical equipment, including capacities, model numbers and age. See appendix F for some representative photos of some of the existing conditions observed while onsite.

Building Name: Building 4
Gross Floor Area: 79,925
Number of Floors: 1
Year Built: 1984
Additions: None

Description of Spaces: Votech Shops, science and culinary arts classrooms, offices, cafeteria, kitchen, computer lab, storage rooms, toilet rooms and a mechanical room.
Description of Occupancy: This building houses classroom spaces for secondary or high school level and post-secondary/adult vocational and technical education.
Number of Computers: The school has approximately 72 desktop computers.
Building Usage: The secondary school hours of operation are 8:15 AM – 3:00 PM Monday through Friday, with various post-secondary activities until 6:00 PM. Custodians are in the building until 11:00 each night. In general the occupied hours are considered 80 hours per week, 10 months per year

Building Envelope

Construction Materials: Steel framed concrete masonry unit (CMU) exterior walls
Façade: Brick and metal exterior fascia
Roof: Metal roof decking with minimal insulation, dark colored rolled asphalt. The roof appeared to be in fair condition, and an ECM for the installation of roof insulation is included.
Windows: Single pane aluminum frame windows. The windows appeared to be in poor condition, and an ECM for window replacement is included.
Exterior Doors: Single and double pane full window doors with aluminum frames. The door sweeps and seals appeared to be in poor condition and an ECM for door seal replacement is included.

Heating Ventilation & Air Conditioning (HVAC) Systems

HVAC Equipment: Heating hot water serving hot water coils in unit ventilators, cabinet heaters and heating and ventilating (H&V) units is provided by two Patterson Kelley boilers that were recently installed. Hot water is pumped through the boilers by (2) 1.5 HP primary boiler pumps and (2) 7.5 HP secondary heating loop pumps. These pumps are all new and have premium efficiency motors. Based on the capabilities of the new boilers and their controllers, it is assumed that these boilers provide hot water on a reset schedule based on outside air temperature.

Heating and ventilation for the shop classrooms is provided by original 1985 Trane H&V units. These units each have a hot water heating coil and a 1 HP supply fan motor. These units are in poor condition and have reached the end of their useful life. An ECM is included that evaluates the savings associated with this installation of new H+V units.

Exhaust: The auto body shops have several large paint booths that utilize 3 HP exhaust fans to remove paint fumes from the building. Each of the two shops also have a natural gas-fired, roof mounted make-up air (MUA) unit providing 100% outside air to replace the air exhausted by the paint booth exhaust fans. It is assumed that these units provide heating at an estimated 78% efficiency. These MUA units also appear to be original to building construction and have reached the end of their useful life.

The welding classroom has (8) additional Airflow Incorporation filtered exhaust fans to remove toxic fumes from the classroom associated with the welding process. These exhaust fans are ducted to approximately 30 moveable exhaust arms that serve each of the welding booths. This fume exhaust system is fairly new and in good condition.

The chemistry and biology labs and culinary arts classroom/kitchen area are each served by a Des Champs roof mounted heat recovery unit which utilizes a plate style heat recovery coil to reclaim some of the heat from the exhausted air from the spaces. These units heat and cool the spaces served to space set points controlled by the DDC system. These units are in good condition.

The chemistry and biology classrooms each have a dedicated packaged DX Trane RTU having natural gas heat. These units were manufactured in 2003 and are in good condition.

The culinary arts general spaces and the rest of the northeast wing of the building including the corridor and guidance offices are heated by a packaged DX Trane RTU. This unit is in poor condition and has reached the end of its useful life.

The guidance office has supplemental air conditioning provided by another cooling only Trane DX RTU. This unit was manufactured in 1999 and was not in operation during the day of the field visit. It is assumed that this unit is in poor enough condition to necessitate replacement.

An ECM has been included that evaluates the energy savings associated with the replacement of RTUs that have reached the end of their useful life.

Controls Systems

This building is being upgraded with a new campus-wide BAS control system. The spaces are currently heated to 72°F occupied and 60°F unoccupied, and cooled to 76°F occupied and 85°F unoccupied. It is assumed that this new controls system will serve the needs of the facility and will operate effectively once installation is completed, therefore no ECMs related to temperature controls are being considered.

Domestic Hot Water Systems

Domestic hot water (DHW) is generated by an AO Smith burkay copper coil boiler that is paired with a 200 gallon storage tank. This DHW system maintains 140°F hot water temperature in the tank at an estimated efficiency of 78%. The system is old and has reached the end of its useful life. This system serves lavatories, dishwashing sinks and showers in the building.

An ECM has been included to replace the existing DHW boiler and storage tank with a new high efficiency tank type condensing DHW heater.

Kitchen Equipment

The kitchen in Building 4 contains both natural gas and electric cooking appliances. All of the combination oven/range units are natural gas-fired and are in good condition. There are a total of (6) cooking appliances that are electric which consist of; (2) fryers and (4) warming ovens.

There are also several commercial and residential sized mixers used within the kitchen that are in good condition.

In general, the equipment located in the kitchen and cafeteria is in good condition. Although the equipment appears to be operating properly, an ECM has been included to replace the afforementioned electric cooking equipment with natural gas cooking equipment to provide for a utility cost reduction.

Plug Load

This school has computers with LCD monitors copiers, residential appliances (microwave, refrigerator), printers, and portable electric heaters (personal) which contribute to the plug load in the building. The installation of computer network power control software has been included as an ECM to reduce the plug loads in the building.

Plumbing Systems

The plumbing fixtures in this building are all original to building construction (1984). The water closets consume an estimated 3.0 gallons per flush (GPF) each, the urinals consume an estimated 2.0 gallons per flush and the faucets flow 2.0 gallons per minute.

An ECM is included to evaluate the water savings potential of installing low- flow water closets, urinals and faucet aerators.

Lighting Systems

The lighting consists primarily of T-12 linear fluorescent and compact fluorescent fixtures with several incandescent bulbs used in closets. Some of the more recently renovated spaces such as the science classrooms and labs have T-8 linear fluorescent fixtures. All of the older lighting systems are manually controlled by wall mounted switches. The science classrooms and labs all have occupancy sensors to allow for automatic lighting control. Although the T-8 fixtures are newer and more efficient than the T-12 fixtures, the whole building lighting is still inefficient by today's standards and can be improved upon.

Three lighting ECMs have been included which include adding occupancy sensors to the existing lighting, replacement of the T-12 and T-8 lighting with LED lighting and a third ECM that evaluates the effect of occupancy sensors used with the LED lighting upgrades.

3.0 UTILITIES

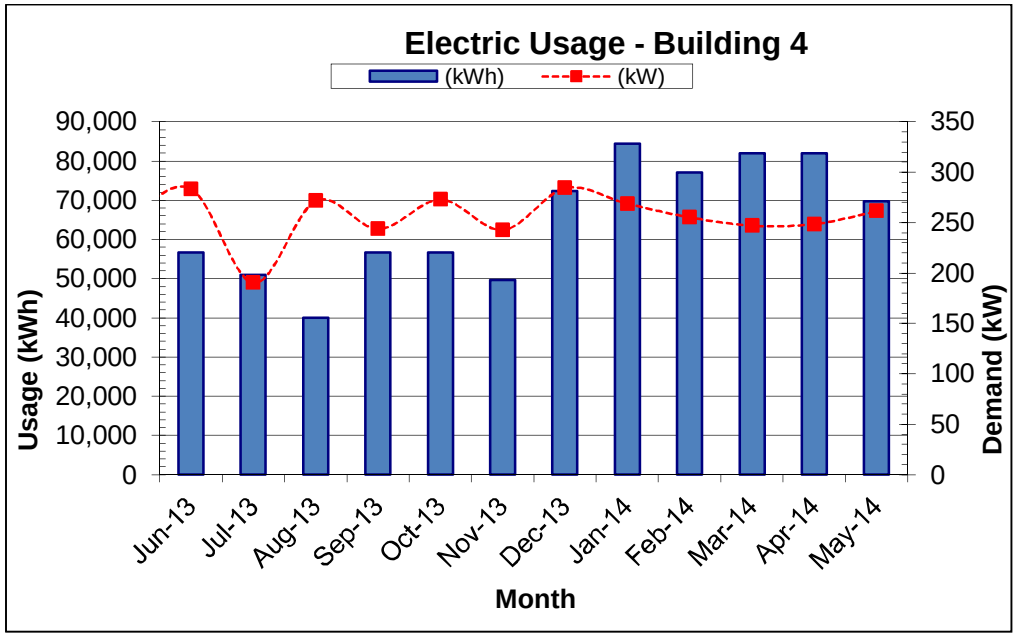
Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas
Deliverer	JCP&L	New Jersey Natural Gas
Supplier	Direct Energy Bunsiness, LLC	New Jersey Natural Gas

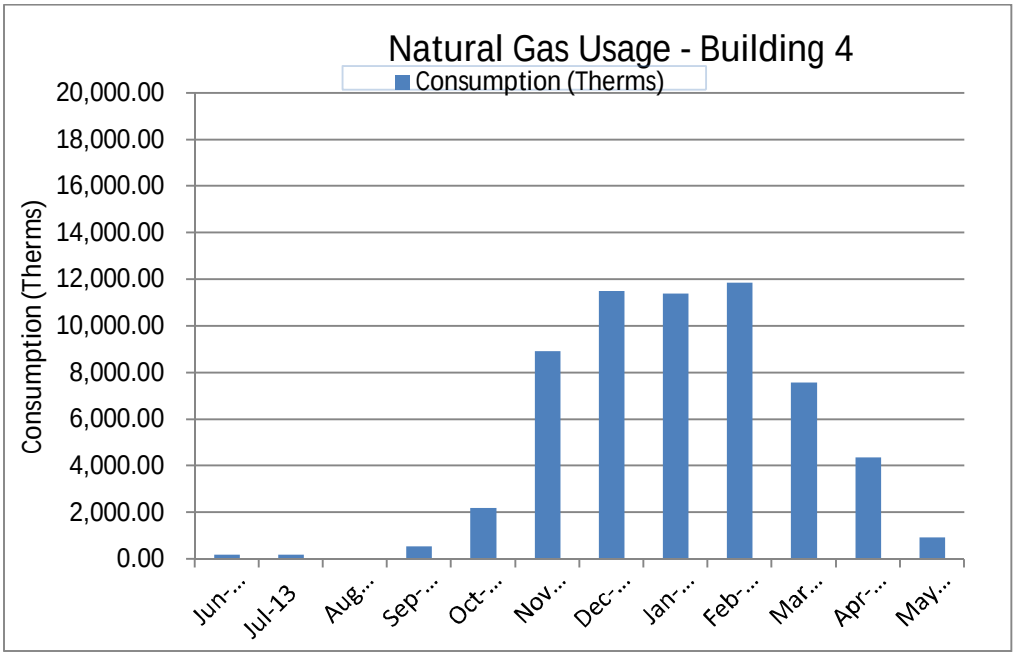
For the 12-month period ending in May 2014, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	777,920	kWh
Annual Cost	95,001	$
Blended Unit Rate	0.122	$/kWh
Supply Rate	0.097	$/kWh
Demand Rate	3.05	$/kW
Peak Demand	284.7	kW
Natural Gas		
Annual Consumption	59,725	Therms
Annual Cost	73,047	$
Unit Rate	1.223	$/therm

Blended Rate: Average rate charged determined by the annual cost / annual usage
Supply Rate: Actual rate charged for electricity usage in kWh (based on most recent electric bill)
Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)



Based on the increased usage during the regular school year, it appears that plug loads from the shops and classrooms may be the primary electrical consumers in the winter months. This is a non-typical load profile for a school.



The natural gas consumption presented in the graph above is typical of a school building with peak consumption occurring during the winter months when the heating load is at it's highest. From the graph, the consumption during the summer is predominantly used for domestic water heating as the building is not being heated.

In addition, domestic water and sewer services are provided by the Township of Denville at $9.00/1000 gal.

See Appendix A for utility analysis.

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. The supply portion is open to competition, and customers can shop around for the best price for their energy suppliers. The electric and natural gas distribution utilities will still deliver the gas/ electric supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing the energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of the service.

Comparison of Utility Rates to NJ State Average Rates*				Recommended to Shop for Third Party Supplier?
Utility	Units	School Average Rate	NJ Average Rate	
Electricity	$/kWh	$0.12	$0.13	N
Natural Gas	$/Therm	$1.22	$0.96	N
Fuel Oil	$/Gal	NA	$3.62	NA

* Per U.S. Energy Information Administration (2013 data – Electricity and Natural Gas, 2012 data – Fuel Oil)

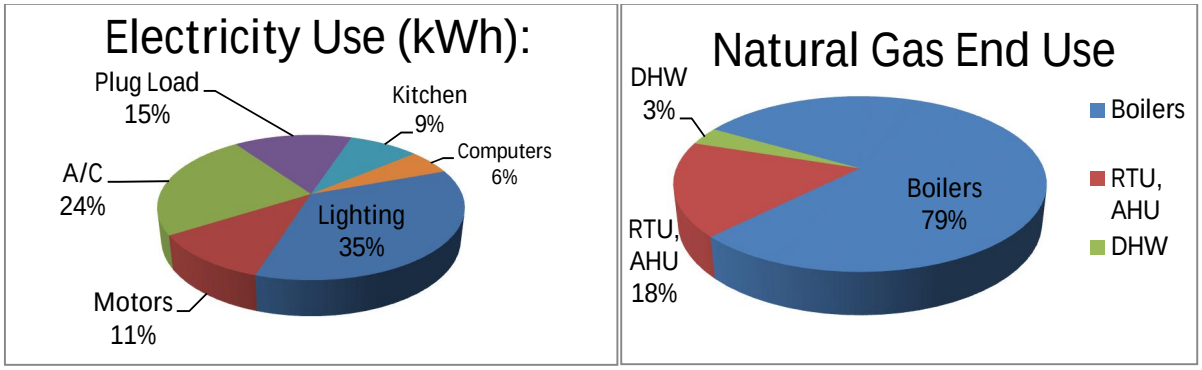
Additional information on selecting a third party energy supplier is available here:

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

See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

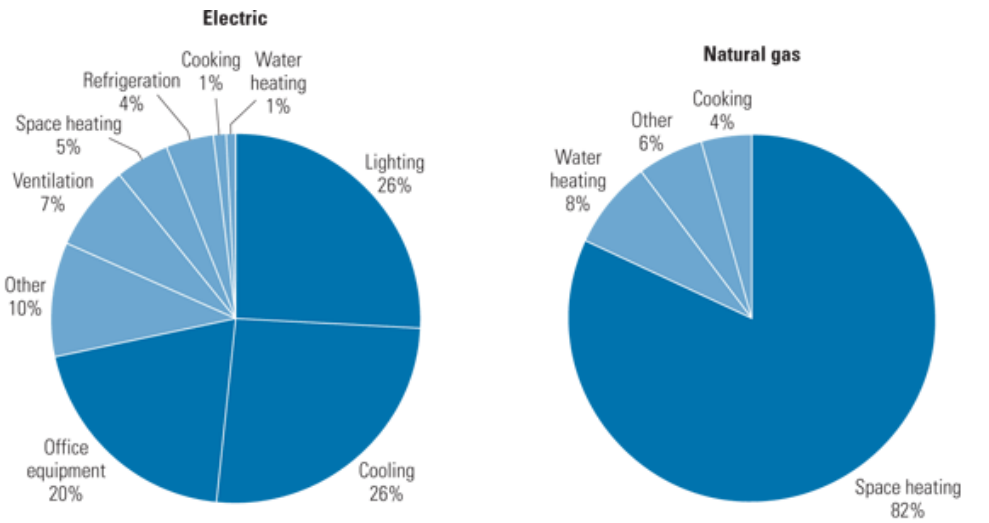
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.

Site End-Use Utility Profile



Most of the electricity consumed by educational facilities is used to for lighting, cooling, and plug loads such as computers and copiers; most of the natural gas is used for space heating. Each school's energy profile is different, and the following charts represent typical utility profiles for K-12 schools per U.S. Department of Energy.

Typical End-Use Utility Profile for Educational Facilities



Courtesy: E SOURCE; from Commercial Building Energy Consumption Survey, 1999 data

4.0 BENCHMARKING

The EPA Portfolio Manager benchmarking tool provides a site and source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft^2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed measures, the Energy Star rating will increase.

The site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity, such as natural gas or oil; or as secondary energy, which is the product created from a raw fuel such as electricity or district steam. To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, Portfolio Manager uses the convention of source EUIs. The source energy also accounts for losses incurred in production, storage, transmission, and delivery of energy to the site, which provide an equivalent measure for various types of buildings with differing energy sources. The results of the benchmarking are contained in the table below.

Site EUI kBtu/ft^2/yr	Source EUI (kBtu/ft^2/yr)	Energy Star Rating (1-100)
107.9	182.7	21

The school has a below average Energy Star Rating Score (50 being the median score), and as such by implementing the measures discussed in this report, it is expected that the EUI can be further reduced and the Energy Star Rating further increased. Additional EPA Portfolio Manager data found in Appendix G.

5.0 ENERGY CONSERVATION MEASURES

The following types of energy savings opportunities are identified in this section of the report:

- Energy conservation measures (ECMs) are energy savings recommendations that typically require a financial investment. For these areas of opportunity, CHA prepared detailed calculations, as summarized in this section and in Appendix C. In general, additional savings may exist from reductions in maintenance activities associated with new equipment or better controls; however for conservatism, maintenance savings are not accounted for in this report; instead the only savings which are reported are those derived directly from reductions in energy which can be tracked by the utility bills.

- Operational and Maintenance measures (O&M) consist of low- or no-cost operational opportunities, which if implemented would have positive impacts on overall building operation, comfort levels, and/or energy usage. There are no estimated savings, costs or paybacks associated with the O&M measures included as part of this study.

Energy savings were quantified in the form of:

- electrical usage (kWh=Kilowatt-hour),
- electrical demand (kW=kilowatts),
- natural gas (therms=100,000 Btu),
- propane gas (gallons=91,650 Btu),
- fuel oil (gallons =138,700 Btu), and
- water (kgal=1,000 gallons).

These recommendations are influenced by the time period that it takes for a proposed project to "break even" referred to as "Simple Payback". Simple payback is calculated by dividing the estimated cost of implementing the ECM by the energy cost savings (in dollars) of that ECM.

Another financial indicator of the performance of a particular ECM is the Return on Investment or ROI, which represents the benefit (annual savings over the life of a project) of an investment divided by the cost of the investment. The result is expressed as a percentage or ratio.

Two other financial analyses included in this report are Internal Rate of Return (IRR) and Net Present Value (NPV). Internal Rate of Return is the discount rate at which the present value of a project costs equals the present value of the project savings. Net Present Value is the difference between present value of an investment's future net cash flows and the initial investment. If the NPV equals "0", the project would equate to investing the same amount of dollars at the desired rate. NPV is sometimes referred to as Net Present Worth. These values are provided in the Summary Tab in Appendix C.

5.1 ECM-1 Replace Windows

The existing windows are original 1985 vintage and utilize single pane glazing and aluminum frames. It is proposed to replace all of the windows at this building with new aluminum framed windows having double pane glazing and low-e coating. The new windows will reduce overall heat gain/loss and infiltration which will reduce the overall loads on the heating and cooling systems. Energy savings in the form of electricity and natural gas will result from these reduced heating and cooling loads.

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

ECM-1 Replace Windows

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
737,802	0	3,999	7,079	0	9,145	(0.7)	0	80.7	80.7

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended as it was requested by the school district.

5.2 ECM-2 Replace Door Seals

The exterior doors have deteriorating sweeps and seals which allow for excessive building infiltration/exfiltration and increased heating and cooling loads. It is proposed to install new door sweeps and seals on all of the exterior doors to reduce this infiltration/exfiltration. Energy savings in the form of electricity and natural gas will result from this reduction of heating and cooling loads.

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

ECM-2 Replace Door Seals

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
4,609	0	1,553	967	0	1,371	3.5	0	3.4	3.4

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended

5.3 ECM-3 Roof Replacement/Insulation Improvement

The roof is in poor condition and is nearing the end of its useful life. In addition to the poor condition, this roof has only minimal insulation. It is proposed to replace the existing rolled asphalt roof with an EPDM rubber membrane roof and install 3" of additional roof

insulation. Energy savings in the form of electricity and natural gas will result from increased insulation of the roof which will reduce the heating and cooling loads.

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

ECM-3 Roof Replacement/Insulation Improvement

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
2,499,714	0	3,493	13,355	0	16,759	(0.8)	0	149.2	149.2

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended as it was requested by the school district.

5.4 ECM-4 Replace RTUs

There are approximately (7) packaged rooftop units (RTUs) that serve this building that are nearing the end of their useful life. Four of these units utilize natural gas for heating and direct expansion (DX) refrigeration for cooling. Two of the units are make-up air units providing only heat and ventilation to the spaces. One unit is a cooling only DX rooftop unit. It is assumed that the average cooling energy efficiency rating (EER) of the cooling units is approximately 10 based on their age, and the heating efficiency is approximately 78% based on manufacturer ratings. It is proposed to replace these RTUs with new high efficiency equivalents which have an expected cooling EER of 18 and heating efficiency of 80%. Electrical and natural gas savings will result from improved efficiency ratings of the new units.

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

ECM-4 Replace RTUs

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
125,400	10.4	17,493	711	0	2,946	(0.6)	1,950	42.6	41.9

* Qualifies for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended as the equipment has reached the end of its useful life.

5.5 ECM-5 Replace Trane H&V units

The existing heating and ventilating (H&V) units serving the classroom spaces are original to the building and have reached the end of their useful life. Although the only energy consumed by these units is electrical energy consumed by the supply fan motors, it is proposed to replace these units with new equivalent sized H&V units having premium efficiency motors. Energy savings in the form of electricity will result from newer high efficiency motors.

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

ECM-5 Replace Trane H&V Units

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
79,812	0	14,835	0	0	1,810	(0.7)	0	44.1	44.1

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended as the equipment has reached the end of its useful life, and it was requested by the school district.

5.6 ECM-6 Install Infrared Heaters to Replace Gas-Fired Unit Heaters

The shop classroom areas all have natural gas-fired unit heaters to supplement the H&V unit heating capacity. These unit heaters are in poor condition and appear to be original to building construction. Unit heaters heat the spaces somewhat inefficiently as they heat the air in the space. Due to the fact that the areas served have large overhead garage doors that are frequently left open, heating the space requires a high amount of natural gas consumption because the unit heaters must heat a large volume of outside air. It is proposed to replace these unit heaters with natural gas-fired infrared heaters. Infrared heaters heat objects under them as opposed to the air in the space and are considered to have a higher heating effectiveness per ASHRAE. Natural gas savings results in improved heating effectiveness and combustion efficiency of the infrared heaters as compared to the existing unit heaters.

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

ECM-6 Install Infrared Heaters to Replace Gas-Fired Unit Heaters

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
55,456	0	0	1,147	0	1,402	(0.6)	3000	39.6	37.4

* Incentive based on the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended

5.7 ECM-7 Condensing Domestic Hot Water Heater

The existing domestic hot water system consists of an AO Smith boiler serving an 200 gallon storage tank. This system has reached the end of its useful life, and its overall system efficiency can be improved. It is proposed to replace this water heater with a natural gas-fired condensing water heater of slightly less storage capacity. Condensing water heaters operate at efficiencies above 96% year-round due to the low supply water

temperature to the heaters. Natural gas savings will result from improved overall system efficiency.

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

ECM-7 Condensing Domestic Hot Water Heater

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
33,791	0	0	703	0	860	(0.4)	400	39.3	38.8

* Incentive based on the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended as the existing water heater has reached the end of its useful life.

5.8 ECM-8 Replace Electric Kitchen Equipment with Natural Gas

There are currently (2) fryers and (4) warming ovens in the kitchen that utilize electricity for cooking or warming food. Although this equipment is in good condition, it is expensive to use them due to the high price of electricity. It is proposed to replace this electric kitchen equipment with natural gas-fired units with the same cooking and/or storage capacity. Cost savings will result from the lower cost of natural gas.

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

ECM-8 Replace Electric Kitchen Equipment with Natural Gas

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
100,652	0	68,400	(2,334)	0	5,491	0.4	3,498	18.3	18.3

* Incentive based on the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended as it was requested by the school district.

5.9 ECM-9 Computer Network Controller

There are approximately 72 desktop computers used in classrooms and computer rooms in the building. These computers are generally left on when the spaces are unoccupied. Although there are sleep and/or hibernate functions built into the computers, there is more advanced computer network control software which will allow for the units to reduce standby electrical energy consumption even further when the computers are not in use. Electrical energy savings will result from lower standby power draw of the computers during unoccupied hours.

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

ECM-9 Computer Network Controller

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
1,776	0	5,040	0	0	615	4.2	0	2.9	2.9

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended

5.10 ECM-10 Install Low Flow Plumbing Fixtures

The plumbing fixtures in this building are older high flow fixtures. The water savings associated from replacing existing high flow fixtures with low-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the estimate usage of each fixture, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 Gals/flush toilets, 0.125 gal/flush urinals, and 0.5 gpm aerators will conserve water which will result in lower annual water and sewer charges.

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

ECM-10 Install Low Flow Plumbing Fixtures

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
42,185	0	0	85	93	944	(0.3)	0	44.7	44.7

* Does not qualify for Incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended as it was requested by the school district.

5.11 Lighting ECMs

5.11.1 ECM-L1 Lighting Replacement / Upgrades

The existing lighting system consists of mostly T12 linear fluorescent fixtures which is an inefficient lighting system by todays standards. Recent technological improvements in light emitting diode (LED) technologies have driven down the initial costs making it a viable option for installation.

Overall energy consumption can be reduced by replacing inefficient bulbs and linear fluorescent bulbs with more efficient LED technology. To compute the annual savings for this ECM, the energy consumption of the current lighting fixtures was established and compared to the proposed fixture power requirement with the same annual hours of operation. The difference between the existing and proposed annual energy consumption was the energy savings. These calculations are based on 1 to 1 replacements of the fixtures, and do not take into account lumen output requirements for a given space. A

more comprehensive engineering study should be performed to determine correct lighting levels.

Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C and summarized below:

ECM-L1 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
247,262	58.2	178,400	0	19,435	0.4	40,350	12.7	10.6

* LED retrofits must go through the "custom" measures incentive option under New Jersey SmartStart Program. There are no "prescriptive" incentives for LED retrofits. Projects must achieve a minimum of 75,000 kWh annual savings to qualify for "custom" incentives. See section 6.0 for other incentive opportunities

This measure is not recommended in lieu of ECM L3.

5.11.2 ECM-L2 Install Lighting Controls (Occupancy Sensors)

Presently, all interior lighting fixtures are controlled by wall mounted switches. Review of the comprehensive lighting survey determined that lighting in some areas could benefit from installation of occupancy sensors to turn off lights when they are unoccupied.

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in Section 5.7.1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

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

ECM-L2 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
11,610	0	45,309	0	5,528	6.1	1,505	2.1	1.8

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM L3.

5.11.3 ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

This measure is a combination of ECM-L1 and ECM-L2; recommending replace/upgrade the current lighting fixtures to more efficient ones and installing occupancy sensors on the new lights. Interactive effects of the higher efficiency lights and occupancy sensors lead the energy and cost savings for this measure to not be cumulative or equivalent to the sum of replacing the lighting fixtures alone and installing occupancy sensors without the

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

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
258,872	58.2	196,482	0	21,189	0.5	41,855	12.2	10.2

* LED retrofits must go through the "custom" measures incentive option under New Jersey SmartStart Program. There are no "prescriptive" incentives for LED retrofits. Projects must achieve a minimum of 75,000 kWh annual savings to qualify for "custom" incentives. See section 6.0 for other incentive opportunities

This measure is recommended.

5.12 Additional O&M Opportunities

This list of operations and maintenance (O&M) - type measures represent low-cost or no-cost opportunities, which if implemented will have a positive impact on the overall building operations, comfort and/or energy consumption. The recommended O&M measures for this building are as follows:

- Replace H&V Unit and RTU filters at least twice a year
- Purchase ENERGY STAR® Appliances
- Disconnect unnecessary or unused small appliances and electronics when not in use to reduce phantom loads
- Train custodians to turn off lights and set HVAC temperatures to minimum levels when rooms are unoccupied
- Develop an Energy Master Plan to measure and track energy performance
- Educate students and staff about how their behavior affects energy use. Create student energy patrols to monitor and inform administration when energy is being wasted.
- During the winter, Custodians should ensure all windows are closed as part of cleaning routine

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

The following sections give detailed information on available incentive programs including New Jersey Smart Start, Direct Install, New Jersey Pay for Performance (P4P) and Energy Savings Improvement Plan (ESIP). If the School District wishes to and is eligible to participate in the Energy Savings Improvement Plan (ESIP) program and/or the Pay for Performance Incentive Program (P4P), it cannot participate in either the Smart Start or Direct Install Programs. Refer to Appendix D for more information on the Smart Start program.

6.1.1 New Jersey Smart Start Program

For this energy audit, The New Jersey Smart Start Incentives are used in the energy savings calculations, where applicable. This program is intended for medium and large energy users and provides incentives for:

- Electric Chillers
- Gas Chillers
- Gas Heating
- Unitary HVAC
- Ground Source Heat Pumps
- Variable frequency Drives/ motors
- Refrigeration
- Prescriptive and performance lighting and lighting controls

The equipment is procured using a typical bid- build method, installed and paid for and then the incentives are reimbursed to the owner.

Refer to Appendix D for more information on the Smart Start program.

6.1.2 Direct Install Program

The Direct Install Program applies to smaller facilities that have a peak electrical demand of 200 kW or less in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric utility companies.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can reduce the implementation cost of energy conservation projects.

The Direct Install program has specific HVAC equipment and lighting requirements and is generally applicable only to smaller package HVAC units, small boilers and lighting retrofits.

The program pays a maximum amount of $75,000 per building, and up to $250,000 per customer per year. Installations must be completed by an approved Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this energy audit. The incentive is reimbursed to the Owner upon successful replacement and payment of the equipment.

The building qualifies for this program because its electrical demand is less than the maximum peak electrical demand of 200 kW for the last 12 month period.

Refer to Appendix D for more information on this program.

6.1.3 New Jersey Pay For Performance Program (P4P)

This building may be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed to offset the cost of energy conservation projects for facilities that pay the Societal Benefits Charge (SBC) and whose demand (kW) in any of the preceding 12 months exceeds 100 kW. This demand minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations and *is not applicable to public schools*. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). Additionally, the overall return on investment (ROI) must exceed 10%. If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP). The ERP must include a detailed energy audit of the desired ECMs, energy savings calculations (using building modeling software) and inputting of all utility bills into the EPA Portfolio Manager website.

- Incentive Amount: $0.05/SF
- Minimum incentive: $5,000
- Maximum Incentive: $50,000 or 50% of Facility annual energy cost

The standard incentive pays $0.10 per square foot, up to a maximum of $50,000, not to exceed 50% of facility annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional $0.05 per square foot, up to a maximum of $25,000, rather than the standard incentive noted above. The ERP must be completed by a Certified Energy Manager (CEM) and submitted along with the project application.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved.

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved.

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved.

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved.

Combining Incentives #2 and #3 will provide a total of $0.18/ kWh and $1.8/therm not to exceed 50% of total project cost. Additional Incentives for #2 and #3 are increased by $0.005/kWh and $0.05/therm for each percentage increase above the 15% minimum target to 20%, calculated with the EPA Portfolio Manager benchmarking tool, not to exceed 50% of total project cost.

For the purpose of demonstrating the eligibility of the ECM's to meet the minimum savings requirement of 15% annual savings and 10% ROI for the Pay for Performance Program, all ECM's identified in this report have been included in the incentive calculations. The results for the building are shown in Appendix C, with more detailed program information in Appendix D.

6.1.4 Energy Savings Improvement Plan

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use "energy savings obligations" (ESO) to pay for the capital costs of energy improvements to their facilities. ESIP loans have a maximum loan term of 15 year. ESOs are not considered "new general obligation debt" of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds

or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities. The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Refer to Appendix D for more information on this program.

6.1.5 Renewable Energy Incentive Program

The Renewable Energy Incentive Program (REIP) is part of New Jersey's efforts to reach its Energy Master Plan goals of striving to use 30 percent of electricity from renewable sources by 2020.

Incentives for sustainable bio-power projects and for energy storage projects are currently under development, with competitive solicitations for each of those technologies expected to begin in the first quarter of 2014. The wind program is currently on hold.

New solar projects are no longer eligible for REIP incentives, but can register for Solar Renewable Energy Certificates (SRECs) through the SREC Registration Program (SRP).

7.0 ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

The building was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. However due to insufficient roof space a photovoltaic solar array is not feasible.

7.1.2 Solar Thermal Hot Water Generation

Active solar thermal systems use solar collectors to gather the sun's energy to heat a fluid. An absorber in the collector (usually black colored piping) converts the sun's energy into heat. The heat is transferred to circulating water, antifreeze, or air for immediate use or is storage for later utilization. Applications for active solar thermal energy include supplementing domestic hot water, heating swimming pools, space heating or preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted at the same angle as the site's latitude, to maximize the amount of solar radiation collected on a yearly basis.

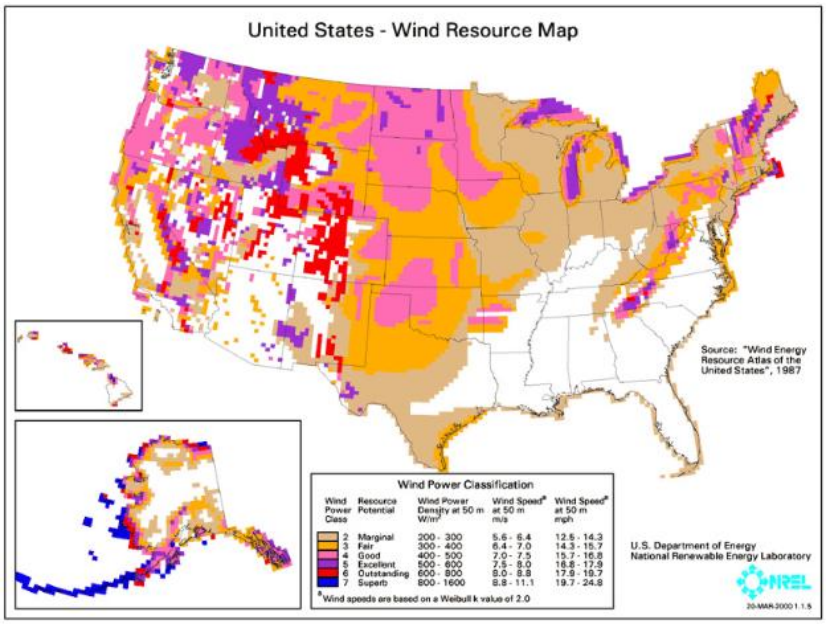
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping). The most practical system would transfer the heat from the panels to thermal storage tanks and then use the pre-heated water for domestic hot water production. DHW is presently produced by natural gas fired water heaters and, therefore, this measure would offer natural gas utility savings. Unfortunately, the amount of domestic hot water that is currently used by this school is very small. Installing a solar domestic hot water system is not recommended due to the limited amount of domestic hot water presently consumed by the school.

This measure is not recommended due to the relatively low domestic hot water usage.

7.2 Wind Powered Turbines

Wind power is the conversion of kinetic energy from wind into mechanical power that is used to drive a generator which creates electricity by means of a wind turbine. A wind turbine consists of rotor and blades connected to a gearbox and generator that are mounted onto a tower. Newer wind turbines also use advanced technology to generate electricity at a variety of frequencies depending on the wind speed, convert it to DC and then back to AC before sending it to the grid. Wind turbines range from 50 – 750 kW for utility scale turbines down to below 50 kW for residential use. On a scale of 1 (the lowest) to 7 (the highest), Class 3 and above (wind speeds of 13 mph or greater) are generally considered "good wind resource" according to the Wind Energy Development

Programmatic EIS Information Center hosted by the Bureau of Land Management. According to the map below, published by NREL, Newark, NJ is classified as Class 1 at 50m, meaning the city would not be a good candidate for wind power.



This measure is not recommended due to the location of the school.

7.3 Combined Heat and Power Plant

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

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The building has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter; however thermal usage during the summer months does not exist. Thermal energy produced by the CHP plant in the warmer months will be wasted. An absorption chiller could be installed to utilize the heat to produce chilled water; however, there is no chilled water distribution system in the building. CHP is not recommended due to the building's limited summer thermal demand.

This measure is not recommended due to the absence of year-round thermal loads which are needed for efficiency CHP operation.

7.4 Demand Response Curtailment

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

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

The school district already participates in a demand response program.

8.0 CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for Building Name.

The following projects should be considered for implementation:

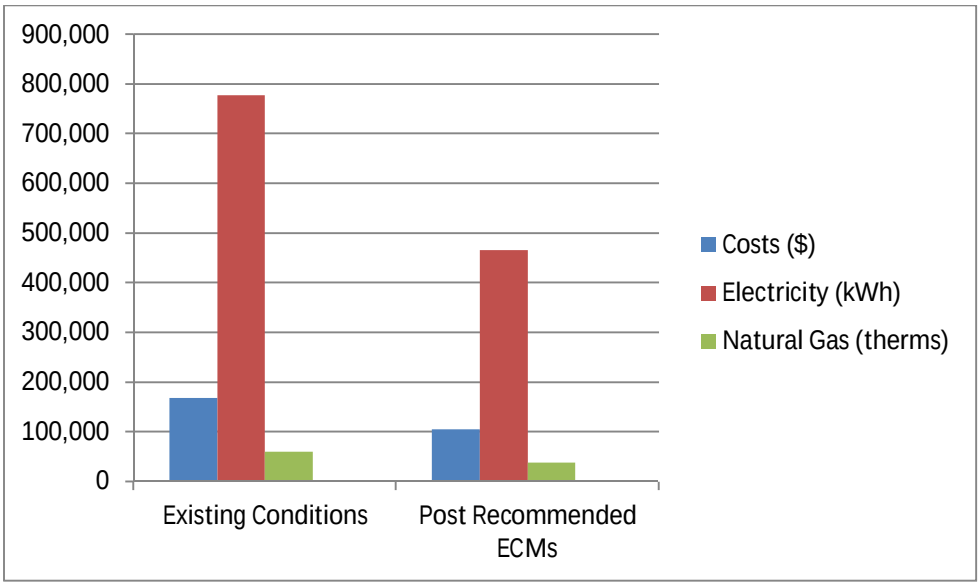
- Replace Windows
- Replace Door Seals
- Install Roof Insulation
- Replace RTUs
- Replace H&V Units
- Condensing DHW Heater
- Install Infrared Heaters to Replace Gas-Fired Unit Heaters
- Replace Electric Kitchen Equipment with Natural Gas
- Computer Network Controller
- Install Low Flow Plumbing Fixtures
- Lighting Replacements with Controls (Occupancy Sensors)

The potential annual energy and cost savings for the recommended ECMs are shown in the following table.

Electric Savings (kWh)	Natural Gas Savings (therms)	Total Savings ($)	Payback (years)
311,295	21,713	62,532	62.2

If Morris County Vocational School District implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	168,048	105,417	37%
Electricity (kWh)	777,920	466,625	40%
Natural Gas (therms)	59,725	38,012	36%
Site EUI (kbtu/SF/Yr)	107.9	67.5	



Next Steps: This energy audit has identified several areas of potential energy savings. Morris County Vocational School District can use this information to pursue incentives offered by the NJBPU's NJ Clean Energy Program. Additional meetings will be scheduled with Morris County Vocational School District staff members to review possible options.

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Morris County Vocational Technical School District
Building 4
400 East Main Street, Denville, NJ 07834

Annual Utilities
12-month Summary

Electric		
Annual Usage	777,920	kWh/yr
Annual Cost	95,001	$
Blended Rate	0.122	$/kWh
Consumption Rate	0.097	$/kWh
Demand Rate	3.05	$/kW
Peak Demand	284.7	kW
Min. Demand	190.6	kW
Avg. Demand	259.0	kW
Natural Gas		
Annual Usage	59,725	Therms/yr
Annual Cost	73,047	$
Rate	1.223	$/therm
Water		
Annual Usage	820	kgals/yr
Annual Cost	7,252	$
Rate	8.843	$/gallon

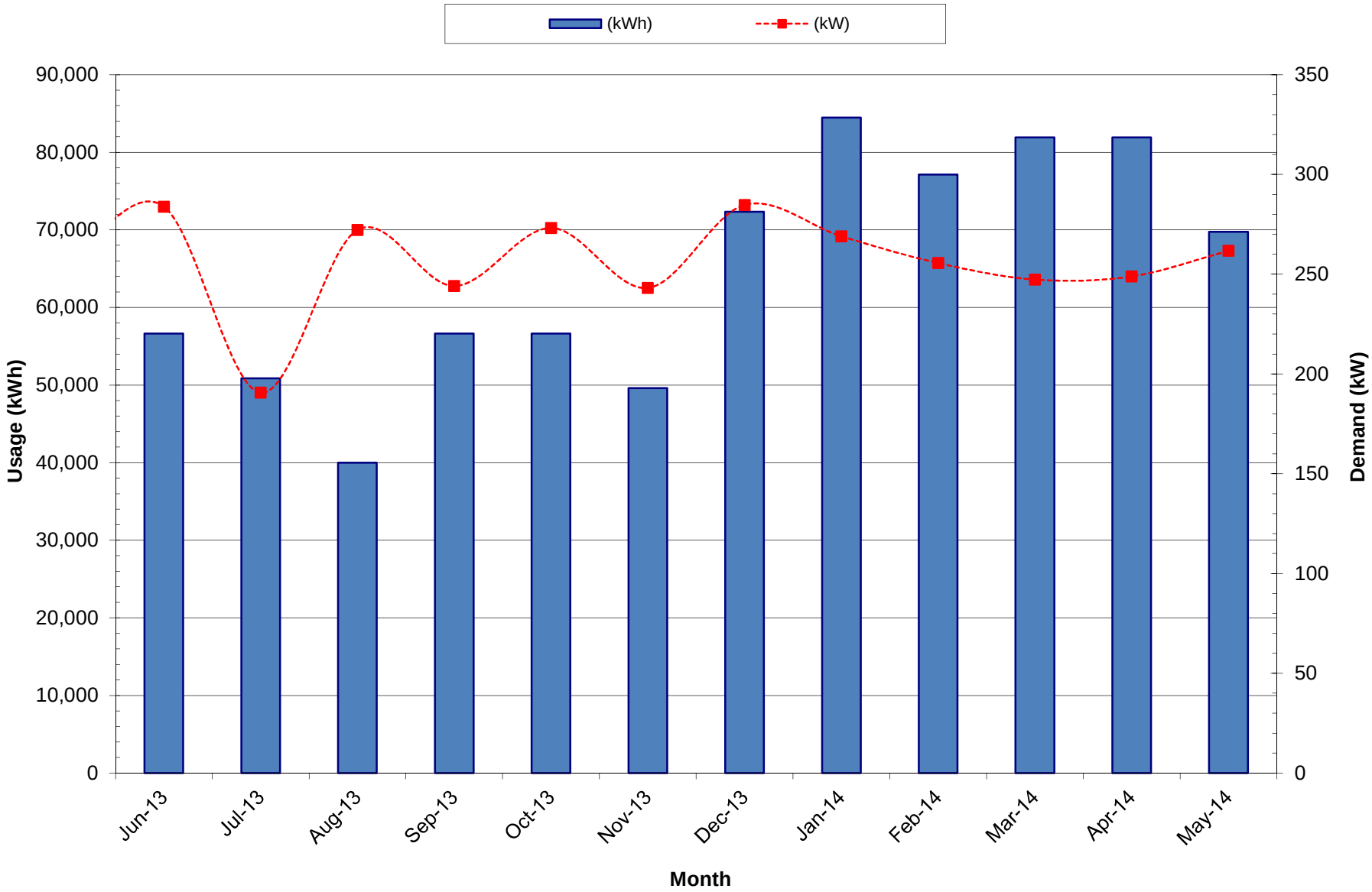
Building 4
400 East Main Street, Denville, NJ 07834

For Service at:
Account No.: **100000077766** **Delivery -** JCP & L
Meter No.: **G28236135** **Supplier -** Direct Energy Business, LLC
Electric Service

			Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
Month	Consump. (kWh)	Demand (kW)	Delivery ($)	Supplier ($)	Total ($)	Consumption ($)	Demand ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
May-12	15,680	279.3	10,283.11		10,283.11	8,344.77	1,938.34	0.66	0.53	6.94
June-12	57,280	286.3	9,114.40		9,114.40	7,127.48	1,986.92	0.16	0.12	6.94
July-12	50,880	190.6	7,661.57		7,661.57	6,338.81	1,322.76	0.15	0.12	6.94
August-12	40,000	272.2	2,618.48	3,196.00	5,814.48	3,925.41	1,889.07	0.15	0.10	6.94
September-12	56,640	244.1	2,582.26	4,525.54	7,107.80	5,528.47	1,579.33	0.13	0.10	6.47
October-12	79,360	291.1	3,316.44		3,316.44	1,433.02	1,883.42	0.04	0.02	6.47
November-12	43,520	243.1	2,387.64		2,387.64	814.78	1,572.86	0.05	0.02	6.47
December-12	81,920	284.7	3,290.86		3,290.86	1,448.85	1,842.01	0.04	0.02	6.47
January-13	77,120	264.9	3,051.82		3,051.82	1,337.92	1,713.90	0.04	0.02	6.47
February-13	72,640	270.6	3,014.71		3,014.71	1,263.93	1,750.78	0.04	0.02	6.47
March-13	68,480	245.0	2,780.37		2,780.37	1,195.22	1,585.15	0.04	0.02	6.47
April-13	78,400	268.1	3,093.68		3,093.68	1,359.07	1,734.61	0.04	0.02	6.47
May-13	68,800	261.7	3,021.32	5,497.12	8,518.44	6,702.24	1,816.20	0.12	0.10	6.94
June-13	56,640	283.8	2,973.83	4,525.54	7,499.37	5,529.80	1,969.57	0.13	0.10	6.94
July-13	50,880	190.6	2,231.90	4,065.31	6,297.21	4,974.45	1,322.76	0.12	0.10	6.94
August-13	40,000	272.2	2,618.48	3,196.00	5,814.48	3,925.41	1,889.07	0.15	0.10	6.94
September-13	56,640	244.1	2,582.26	4,525.54	7,107.80	5,528.47	1,579.33	0.13	0.10	6.47
October-13	56,640	273.2	2,162.48	4,525.24	6,687.72	5,509.32	1,178.40	0.12	0.10	4.31
November-13	49,600	243.1	2,461.27	3,963.04	6,424.31	4,851.45	1,572.86	0.13	0.10	6.47
December-13	72,320	284.7	3,079.45	5,778.37	8,857.82	7,015.81	1,842.01	0.12	0.10	6.47
January-14	84,480	269.0	3,084.88	6,749.95	9,834.83	8,094.40	1,740.43	0.12	0.10	6.47
February-14	77,120	255.6	2,886.61	6,161.89	9,048.50	7,394.77	1,653.73	0.12	0.10	6.47
March-14	81,920	247.3	2,905.67	6,545.41	9,451.08	7,851.05	1,600.03	0.12	0.10	6.47
April-14	81,920	248.9	2,916.02	6,545.41	9,461.43	7,851.05	1,610.38	0.12	0.10	6.47
May-14	69,760	261.7	2,942.18	5,573.82	8,516.00	6,699.80	1,816.20	0.12	0.10	6.94
Total (All)	**1,568,640**	**291.10**	**$89,061.69**	**$75,374.18**	**$164,435.87**	**$122,045.75**	**$42,390.12**	**$0.10**	**$0.08**	**$6.55**
Total (last 12-months)	**777,920**	**284.70**	**$32,845.03**	**$62,155.52**	**$95,000.55**	**$75,225.78**	**$19,774.77**	**$0.122**	**$0.097**	**$3.05**
Notes	1	2	3	4	5	6	7	8	9	10

1.) Number of kWh of electric energy used per month
2.) Number of kW of power measured
3.) Electric charges from Delivery provider
4.) Electric charges from Supply provider
5.) Total charges (Delivery + Supplier)
6.) Charges based on the number of kWh of electric energy used
7.) Charges based on the number of kW of power measured
8.) Total Charges ($) / Consumption (kWh)
9.) Consumption Charges ($) / Consumption (kWh)
10.) Demand Charges ($) / Demand (kW)

Electric Usage - Building 4

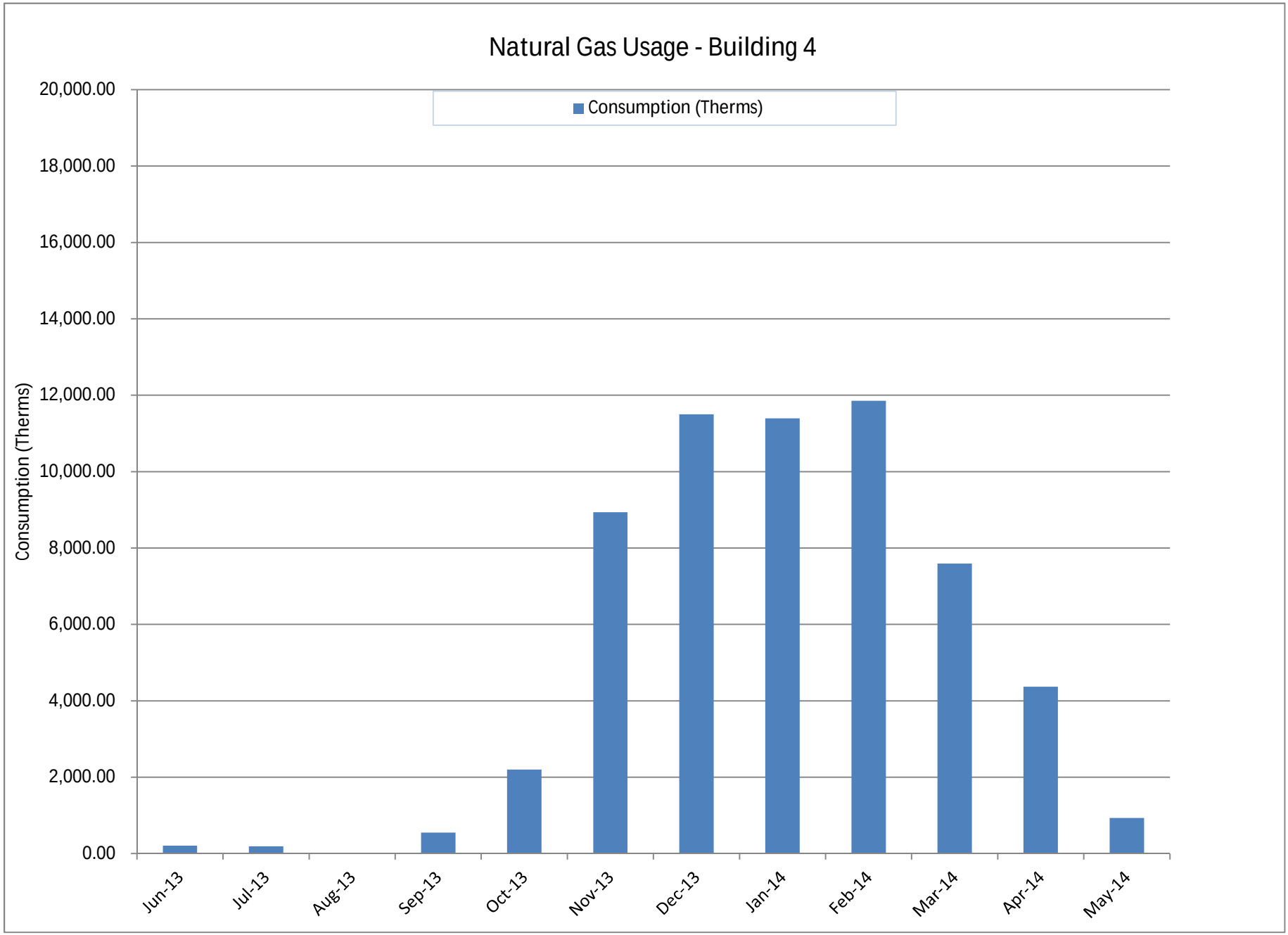


Utility Data -Building 4.xlsx
Electric Graph

Building 4
400 East Main Street, Denville, NJ 07834

For Service at: 400 East Main Street, Denville, NJ 07834
Account No.: 181287882518
Meter No: 892550
Natural Gas Service **Delivery -** New Jersey Natural Gas
Supplier - New Jersey Natural Gas

		Charges		Unit Costs	
Month	Consumption (Therms)	Delivery ($)	Total ($)	Delivery ($/Therm)	Total ($/Therm)
June-12	151.90	$ 865.34			
July-12	358.76	$ 2,217.59			
August-12	208.86	$ 1,315.51	$ 1,315.51	$ 6.299	$ 6.299
September-12	374.44	$ 1,440.04	$ 1,440.04	$ 3.846	$ 3.846
October-12	2,543.04	$ 3,342.49	$ 3,342.49	$ 1.314	$ 1.314
November-12	13,159.22	$ 13,143.56	$ 13,143.56	$ 0.999	$ 0.999
December-12	13,659.67	$ 13,842.99	$ 13,842.99	$ 1.013	$ 1.013
January-13	10,217.36	$ 10,517.14	$ 10,517.14	$ 1.029	$ 1.029
February-13	18,157.04	$ 17,655.41	$ 17,655.41	$ 0.972	$ 0.972
March-13	7,413.61	$ 7,904.75	$ 7,904.75	$ 1.066	$ 1.066
April-13	9,664.56	$ 10,390.71	$ 10,390.71	$ 1.075	$ 1.075
May-13	1,189.18	$ 2,320.26	$ 2,320.26	$ 1.951	$ 1.951
June-13	209.89	$ 1,348.88	$ 1,348.88	$ 6.427	$ 6.427
July-13	191.13	$ -	$ -	$ -	$ -
August-13	0.00	$ 2,053.21	$ 2,053.21	$ -	$ -
September-13	551.12	$ 1,667.37	$ 1,667.37	$ 3.025	$ 3.025
October-13	2,199.26	$ 2,986.78	$ 2,986.78	$ 1.358	$ 1.358
November-13	8,935.88	$ 9,723.72	$ 9,723.72	$ 1.088	$ 1.088
December-13	11,499.65	$ 12,037.28	$ 12,037.28	$ 1.047	$ 1.047
January-14	11,393.37	$ 12,108.74	$ 12,108.74	$ 1.063	$ 1.063
February-14	11,854.84	$ 12,849.77	$ 12,849.77	$ 1.084	$ 1.084
March-14	7,590.44	$ 9,591.87	$ 9,591.87	$ 1.264	$ 1.264
April-14	4,369.01	$ 6,524.78	$ 6,524.78	$ 1.493	$ 1.493
May-14	930.73	$ 2,154.97	$ 2,154.97	$ 2.315	$ 2.315
Total (12 Months)	**59,725**		**$ 73,047.37**		**$ 1.223**


Natural Gas Usage - Building 4
Consumption (Therms)
20,000.00
18,000.00
16,000.00
14,000.00
12,000.00
10,000.00
8,000.00
6,000.00
4,000.00
2,000.00
0.00
Consumption (Therms)
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14
Feb-14
Mar-14
Apr-14
May-14

JCP&L SERVICE TERRITORY
Last Updated: 9/04/14

***CUSTOMER CLASS** - R – RESIDENTIAL C – COMMERCIAL I –INDUSTRIAL

Supplier	Telephone & Web Site	*Customer Class
Abest Power & Gas of NJ, LLC 202 Smith Street Perth Amboy, NJ 08861	(888) 987-6937 www.AbestPower.com	**R/C/I** **ACTIVE**
AEP Energy, Inc. 309 Fellowship Road, Fl.2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	**R/C/I** **ACTIVE**
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877) 30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C** **ACTIVE**
American Powernet Management 437 Grove Street Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	**C/I** **ACTIVE**
AP Gas & Electric, (NJ) LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apgellc.com	**R/C/I** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(201) 384-5552 www.astralenergyllc.com	**R/C/I** **ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateasternenergy.com	**C/I** **ACTIVE**
Blue Pilot Energy, LLC 197 State Rte. 18 South Ste. 3000 East Brunswick, NJ 08816	(800)-451-6956 www.bluepilotenergy.com	**R/C** **ACTIVE**
Brick Standard, LLC 235 Hudson Street Suite 1 Hoboken, NJ 07030	(201)706-8101 www.standardalternative.com	**C/I** **ACTIVE**

Champion Energy Services, LLC 1200 Route 22 East Bridgewater, NJ 08807	(888) 653-0093 www.championenergyservices.com	**R/C/I** **ACTIVE**
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	888-565-4490 www.4choiceenergy.com	**R/C** **ACTIVE**
Choice Energy Services Retail, LP 30 Montgomery Street Suite 1410 Jersey City, NJ 07032	(888) 341-6370 www.choiceenergyservices.com	**R/C/I** **ACTIVE**
Clearview Electric, Inc. 1744 Lexington Avenue Pennsauken, NJ 08110	(888) CLR-VIEW (800) 746- 4702 www.clearviewenergy.com	**R/C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	**R/C** **ACTIVE**
Community Energy Inc. 51 Sandbrook Headquarters Road Stockton, NJ 08559	(866)946-3123 www.communityenergyinc.com	**R/C/I** **ACTIVE**
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	**C/I** **ACTIVE**
ConocoPhillips Company 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 646-4427 www.conocophillips.com	**C/I** **ACTIVE**
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.constellation.com	**R/C/I** **ACTIVE**
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	**R** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(888) 925-9115 http://www.business.directenergy.com/	**C/I** **ACTIVE**

Direct Energy Business Marketing, LLC 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	**C/I** **INACTIVE**
Direct Energy Small Business, LLC (fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 464-4377 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, NJ 08002	(800) 282-3331 www.discountenergygroup.com	**R/C** **ACTIVE**
Dominion Retail, Inc. d/b/a Dominion Energy Solutions 395 Route 70 West, Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.dom.com/products	**R/C** **ACTIVE**
DTE Energy Supply, Inc. One Gateway Center, Suite 2600 Newark, NJ 07102	(877) 332-2450 www.dtesupply.com	**C/I** **ACTIVE**
Energy Plus Holdings LLC 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	**R/C** **ACTIVE**
Energy.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855) 243-7270 www.energy.me	**R/C/I** **ACTIVE**
Ethical Electric Benefit Co. d/b/a Ethical Electric 100 Overlook Center, 2nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	**R/C** **ACTIVE**
FirstEnergy Solutions Corp. 150 West State Street Trenton, NJ 08608	(866) 625-7318 www.fes.com	**C/I** **ACTIVE**

Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	**R/C/I** **ACTIVE**
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08819	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I** **ACTIVE**
GDF Suez Retail Energy Solutions LLC d/b/a THINK ENERGY 333 Thornall St. Sixth Floor Edison, NJ 08819	1-866-252-0078 www.mythinkenergy.com	**R/C/I** **ACTIVE**
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	(888) 452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	(800) 542-0778 www.globalp.com	**R/C/I** **ACTIVE**
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	**C/I** **ACTIVE**
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(877) 887-6866 www.idtenergy.com	**R/C** **ACTIVE**
Independence Energy Group, LLC 211 Carnegie Center Princeton, NJ 08540	(877) 235-6708 www.chooseindependence.com	**R/C** **ACTIVE**
Inspire Energy Holdings LLC 923 Haddonfield Road 3rd Fl. Building B2 Cherry Hill, NJ 08002	(866) 403-2620 www.inspireenergy.com	**R/C/I**
Integrys Energy Services, Inc. 33 Wood Ave, South, Suite	(800) 536-0151 www.integrysenergy.com	**C/I** **ACTIVE**

610 Iselin, NJ 08830		
Liberty Power Delaware, LLC3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Liberty Power Holdings, LLC 3000 Atrium Way Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	**R/C/I** **ACTIVE**
MP2 Energy NJ, LLC 111 River Street, Suite 1204 Hoboken, NJ 07030	(877) 238-5343 www.mp2energy.com	**R/C/I** **ACTIVE**
NATGASCO, Inc. (Supreme Energy, Inc.) 532 Freeman St. Orange, NJ 07050	(800) 840-4427 www.supremeenergyinc.com	**R/C** **ACTIVE**
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	**R/C/I** **ACTIVE**
New Jersey Gas & Electric 10 North Park Place Suite 420 Morristown, NJ 07960	(866) 568-0290 www.NJGandE.com	**R/C/I** **ACTIVE**
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
Nordic Energy Services, LLC 50 Tice Boulevard, Suite 340 Woodcliff Lake, NJ 07677	(877) 808-1027 www.nordiceenergy.us.com	**R/C/I** **ACTIVE**

North American Power and Gas, LLC 222 Ridgedale Ave. Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 535-6340 www.entrustenergy.com	**R/C/I** **ACTIVE**
Oasis Power, LLC d/b/a Oasis Energy 11152 Westheimer, Suite 901 Houston, TX 77042	(800)324-3046 www.oasisenergy.com	**R/C** **ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Park Power, LLC 1200 South Church St. Suite 23 Mount Laurel, NJ 08054	856-778-0079 www.parkpower.com	**R/C/I** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
Power Management Co., LLC d/b/a PMC Lightsavers Limited Liability Company 1600 Moseley Road Victor, NY 14564	(585) 249-1360 www.powermanagementco.com	**C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
PPL EnergyPlus Retail, LLC 788 Shrewsbury Avenue, Suite 220 Tinton Falls, NJ 07724	(732) 741-0505 – 2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Progressive Energy Consulting, LLC PO Box 4582 Wayne, New Jersey 07474	(917) 837-7400 Progressivenrg@optionline.net	**R/C/I** **ACTIVE**

Prospect Resources, Inc. 208 W. State Street Trenton, NJ 08608-1002	(847) 673-1959 www.prospectresources.com	**C** **ACTIVE**
Public Power & Utility of New Jersey, LLC One International Blvd, Suite 400 Mahwah, NJ 07495	(888) 354-4415 www.ppandu.com	**R/C/I** **ACTIVE**
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com	**R/C/I** **ACTIVE**
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	**R/C/I** **ACTIVE**
Residents Energy, LLC **550 Broad Street** **Newark, NJ 07102**	(888) 828-7374 www.residentsenergy.com	**R/C**
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	(888) 625-6760 www.majorenergy.com	**R/C/I** **ACTIVE**
SIMEC, LLC 116 Village Blvd. Suite 200 Princeton, NJ 08540	(917) 620-0249 www.simecenergy.com	**R/C/I** **ACTIVE**
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	(800) 695-0666 www.sjnaturalgas.com	**C** **ACTIVE**
SmartEnergy Holdings, LLC 100 Overlook Center 2nd Floor Princeton, NJ 08540	(800) 443-4440 www.smartenergy.com	**R/C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza Route 54 Folsom, NJ 08037	(800) 800-266-6020 www.southjerseyenergy.com	**R/C/I** **ACTIVE**
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082 www.sperianenergy.com	**R/C/I** **ACTIVE**

Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	**R/C/I** **ACTIVE**
Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	**R/C** **ACTIVE**
Summit Energy Service, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	**C/I** **ACTIVE**
Texas Retail Energy LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663 Attn: Chris Hendrix	(866) 532-0761 texasretailenergy.com	**C/I** **ACTIVE**
TransCanada Power Marketing Ltd. 190 Middlesex Essex Turnpike, Suite 200 Iselin, NJ 08830	(877) MEGAWAT www.transcanada.com/powermarketing	**C/I** **ACTIVE**
TriEagle Energy, LP 90 Washington Valley Rd Bedminster, NJ 07921	(877) 933-2453 www.trieagleenergy.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. dba UGI Energy Link 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 427-8545 www.ugienergylinks.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 2001 Route 46 Waterview Plaza Suite 301 Parsippany, NJ 07054	(800) 388-3862 www.lowcostpower.com	**R/C** **ACTIVE**
Viridian Energy 2001 Route 46 Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	**R/C/I** **ACTIVE**
XOOM Energy New Jersey, LLC 744 Broad Street. 16th Floor Newark, NJ 07102	(888) 997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**

YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

NJ NATURAL GAS CO. SERVICE TERRITORY
Last Updated: 10/24/12

***CUSTOMER CLASS** - R – RESIDENTIAL C – COMMERCIAL I – INDUSTRIAL

Supplier	Telephone & Web Site	*Customer Class
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	855-553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	201-384-5552 www.astralenergyllc.com	**R/C/I** **ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	**C/I** **ACTIVE**
Clearview Electric Inc. **d/b/a Clearview Gas** 1744 Lexington Ave. Pennsauken, New Jersey 08110	800-746-4720 www.clearviewenergy.com	**R/C** **ACTIVE**
Colonial Energy, Inc. 83 Harding Road Wyckoff, NJ 07481	845-429-3229 www.colonialgroupinc.com	**C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07746	(888) 817-8572 www.commerceenergy.com	**R** **ACTIVE**
Compass Energy Services, Inc. 1085 Morris Avenue, Suite 150 Union, NJ 07083	866-867-8328 908-638-6605 www.compassenergy.net	**C/I** **ACTIVE**
ConocoPhillips Company 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-646-4427 www.conocophillips.com	**C/I** **ACTIVE**
Constellation NewEnergy-Gas Division, LLC 900A lake Street, Suite 2 Ramsey, NJ 07466	800-900-1982 www.constellation.com	**C/I** **ACTIVE**
Consolidated Edison Solutions, Inc. Cherry Tree Corporate Center 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-665-0955 www.conedsolutions.com	**C/I** **ACTIVE**

Core Energy Inc. 37 West 55th Street Suite 200 Ocean City, NJ 08226	877-329-3495 www.core-energy.net	**R/C** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	888-925-9115 www.directenergy.com	**C/I** **ACTIVE**
Direct Energy Services, LLP 120 Wood Avenue, Suite 611 Iselin, NJ 08830	866-547-2722 www.directenergy.com	**R/C/I** **INACTIVE**
Dominion Retail, Inc. **d/b/a Dominion Energy Solutions** 395 Route #70 West, Suite 125 Lakewood, NJ 08701	866-645-9802 www.dom.com/products	**R/C** **ACTIVE**
Energy Plus Natural Gas LP 309 Fellowship Road, East Gate Center, Suite 200 Mt. Laurel, NJ 08054	877-866-9193 www.energypluscompany.com	**R/I** **ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	800-805-8586 www.gesc.com	**R/C/I** **ACTIVE**
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	800-542-0778 www.globalp.com	**C/I** **ACTIVE**
Greenlight Energy 330 Hudson Street, Suite 4 Hoboken, NJ 07030	718-204-7467 www.greenlightenergy.us	**C** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	**R/C** **ACTIVE**
UGI Energy Services, Inc. **d/b/a/ GASMARK** 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	**C/I** **ACTIVE**
Hess Small Business Services, LLC One Hess Plaza Woodbridge, NJ 07095	888-494-4377 www.hessenergy.com	**C/I** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, New Jersey 07102	973-438-4380 www.idtenergy.com	**R/C** **ACTIVE**

Integrys Energy Services-Natural Gas, LLC 99 Wood Avenue South Suite #802 Iselin, NJ 08830	(800) 536-0151 www.integrysenergy.com	**C/I** **ACTIVE**
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	800-927-9794 www.intelligentenergy.org	**R/C/I** **ACTIVE**
Keil & Sons, Inc. **d/b/a Systrum Energy** 1 Bergen Blvd. Fairview, NJ 07022	1-877-797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	888-779-7255 www.mecny.com	**R/C/I** **ACTIVE**
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	800-828-9427 www.metromediaenergy.com	**C** **ACTIVE**
MxEnergy, Inc. 900 Lake Street Ramsey, NJ 07446	800-785-4374 www.mxenergy.com	**R/C/I** **ACTIVE**
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	800-840-4GAS www.natgasco.com	**C** **ACTIVE**
New Energy Services LLC 101 Neptune Avenue Deal, NJ 07723	800-660-3643 www.newenergyservicesllc.com	**R/C/I** **ACTIVE**
New Jersey Gas & Electric 1 Bridge Plaza, Fl. 2 Fort Lee, NJ 07024	866-568-0290 www.NJGandE.com	**R/C** **ACTIVE**
North American Power & Gas, LLC d/b/a North American Power 197 Route 18 South Ste. 3000 East Brunswick, NJ 08816	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
Palmco Energy NJ, LLC One Greentree Centre 10,000 Lincoln Drive East Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**

Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	800-363-7499 www.pepco-services.com	**C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road - Office 105 Cherry Hill, NJ 08002	800-281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Respond Power LLC 10 Recency CT Lakewood, NJ 08701	877-973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	**C/I** **ACTIVE**
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	**C/I** **ACTIVE**
Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	877-797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(973) 494-8097 www.streamenergy.net	**R/C** **ACTIVE**
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	800-388-3862 www.lowcostpower.com	**R** **ACTIVE**
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	800-557-1121 www.woodruffenergy.com	**R/C/I** **ACTIVE**
Woodruff Energy US LLC 73 Water Street, P.O. Box 777 Bridgeton, NJ 08302	856-455-1111 800-557-1121 www.woodruffenergy.com	**C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	888-997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

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APPENDIX B

Equipment Inventory

CHA Project # 28950
Morris County Vocational School District

Description	Building #	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size	Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.	Current year	Years Old	NJ Protocols life expectancy
Unit Ventilator	4	1	No Nameplate	No Nameplate	No Nameplate	Unit Vent with Heating Hot Water Coil	Unknown	NA	Room 401A	Room 401A	2001	2		2014	13	15
H&V Unit; HV-7	4	1	Trane	No Nameplate	KB6-M482A	H&V Unit/ HHW Coil	1 HP SF	NA	Room 401	Room 401	1984	-15		2014	30	15
Unit Heater	4	2	No Nameplate	No Nameplate	No Nameplate	Unit Heater/Natural Gas	Estimated 50 MBH	NA	Room 401	Room 401	1984	-15		2014	30	15
H&V Unit; HV-6	4	1	Trane	No Nameplate	KB6-M482A	H&V Unit/ HHW Coil	1 HP SF	NA	Room 402	Room 402	1984	-15		2014	30	15
Unit Heater	4	1	No Nameplate	No Nameplate	No Nameplate	Unit Heater/Natural Gas	Estimated 50 MBH	NA	Room 402	Room 402	1984	-15		2014	30	15
H&V Unit; HV-5	4	1	Trane	No Nameplate	KB6-M482A	H&V Unit/ HHW Coil	1 HP SF	NA	Room 403	Room 403	1984	-15		2014	30	15
H&V Unit; HV-4	4	1	Trane	No Nameplate	KB6-M482A	H&V Unit/ HHW Coil	1 HP SF	NA	Room 403	Room 404	1984	-15		2014	30	15
Unit Heater	4	2	No Nameplate	No Nameplate	No Nameplate	Unit Heater/Natural Gas	Estimated 50 MBH	NA	Room 403	Room 403	1984	-15		2014	30	15
Unit Heater	4	2	No Nameplate	No Nameplate	No Nameplate	Unit Heater/Natural Gas	Estimated 50 MBH	NA	Room 404	Room 404	1984	-15		2014	30	15
Paint Booth Exhaust	4	2	JBI Spray Booths	No Nameplate	No Nameplate	Exhaust Fan	3 HP	NA	Room 403	Room 403	1984	-15		2014	30	15
Paint Booth Exhaust	4	2	JBI Spray Booths	No Nameplate	No Nameplate	Exhaust Fan	3 HP	NA	Room 404	Room 404	1984	-15		2014	30	15
H&V Unit; HV-3	4	1	Trane	No Nameplate	KB6-M482A	H&V Unit/ HHW Coil	1 HP SF	NA	Room 405	Room 405	1984	-15		2014	30	15
Unit Heater	4	2	No Nameplate	No Nameplate	No Nameplate	Unit Heater/Natural Gas	Estimated 50 MBH	NA	Room 405	Room 405	1984	-15		2014	30	15
H&V Unit; HV-2	4	1	Trane	No Nameplate	KB6-M482A	H&V Unit/ HHW Coil	1 HP SF	NA	Room 408	Room 408	1984	-15		2014	30	15
Weld Booth Exhaust	4	8	Airflow Systems, Inc.	DC5	6DC0066	Dust Drawer Exhaust Fan	Unknown	NA	Room 408	Welding Booth Exhaust	2001	2		2014	13	15
RTU-1	4	1	Rupp	DCU-25	D2593-88	100% OA Makeup Air Unit	175 MBH/ 20,000 CFM	78%	Roof	Room 403	1984	-15		2014	30	15
RTU-2	4	1	Rupp	DCU-25	D2593-89	100% OA Makeup Air Unit	175 MBH/ 20,000 CFM	78%	Roof	Room 404	1984	-15		2014	30	15
HVAC-2	4	1	Trane	SAHC02040B	J83A70102	Packaged DX RTU with Gas Heat	7.5 Ton/120 MBH	10 EER/ 80%	Roof	Room 406 & 407	1984	-15		2014	30	15
RTU-5	4	1	Des Champs	PV.MZP-8703-PVR	47117	Packaged DX HRU with Gas Heat & Plate Heat Exchanger	15 Tons/160.0 MBH/ 3,100 SCFM	12.1 EER/ 80%	Roof	Chemistry Lab 410	2003	4		2014	11	15
ACCU	4	1	Trane	TTA150B300EA	3302N	Air Cooled Condensing Unit	15 Tons	12.1 EER	Roof	RTU-5	2003	4		2014	11	15
RTU-4	4	1	Des Champs	PV.MZP-8703-PVR	47118	Packaged DX HRU with Gas Heat & Plate Heat Exchanger	15 Tons/160.0 MBH/ 3,100 SCFM	12.1 EER/ 80%	Roof	Biology Lab 412A	2003	4		2014	11	15
ACCU	4	1	Trane	TTA150B300EA	Not Accessible	Air Cooled Condensing Unit	15 Tons	12.1 EER	Roof	RTU-5	2003	4		2014	11	15
RTU-7	4	1	Trane	YHC060A3RMA16	337101871L	Packaged DX RTU with Gas Heat	5 Tons/120 MBH	12 EER/ 80%	Roof	Chemistry Classroom 417	2003	4		2014	11	15
RTU-8	4	1	Trane	YHC092A3RMA13	337101912L	Packaged DX RTU with Gas Heat	7.5 Tons/150 MBH	11 EER/ 80%	Roof	Biology Classroom 418	2003	4		2014	11	15
HVAC-1	4	1	Tane	SAH005040A43	J83A70101	Packaged DX RTU with Gas Heat	5 Tons/100 MBH	10 EER/ 80%	Roof	Culinary Arts Corridor	1984	-15		2014	30	15
HRU-1	4	1	Des Champs	PV.MZP-8703-PVR	27841	Packaged DX HRU with Gas Heat & Plate Heat Exchanger	15 Tons/160.0 MBH/ 3,100 SCFM	12.1 EER/ 80%	Roof	Culinary Arts Kitchen/Café	2003	4		2014	11	15
AC-4	4	1	Trane	TCH049C400BD	P32103411D	DX Cooling only RTU	4 Tons	10 EER	Roof	Guidance Office	1999	0		2014	15	15
Boiler	4	1	Patterson Kelley	Mach C-3000	K928-13-9560	Heating Hot Water Boiler	3000 MBH	95%	Boiler Room	Building Heat	2013	24		2014	1	25
Boiler	4	1	Patterson Kelley	Thermific N3000-MFD	GY30-13-37155	Heating Hot Water Boiler	3000 MBH	88%	Boiler Room	Building Heat	2013	24		2014	1	25
Boiler Pumps	4	1	B&G/Baldor	Super E Motor	36J875Y524E7	Boiler Primary Pump	1.5 HP	87.50%	Boiler Room	Boiler Water Circulation	2013	14		2014	1	15
HHW Pumps	4	2	B&G/Baldor	EM3311T	37F614S520G1	Heating Hot Water Pump	7.5 HP	91%	Boiler Room	Heating Hot Water Loop	2013	14		2014	1	15
DHW Boiler	4	1	AO Smith	Burkay BC-670-892	892C9112862	Domestic Hot Water Boiler	670 MBH	80%	Boiler Room	Domestic Hot Water	1989	0		2014	25	25
DHW Storage Tank	4	1	Not Accessible	Not Accessible	Not Accessible	DHW Storage Tank	200 Gallons	NA	Boiler Room	Domestic Hot Water	1989	0		2014	25	25

Morris County Vocational Technical School LGEA - Building 4
CHA Project No. 28950
Existing Lighting & Audit Input

Cost of Electricity: **$0.100** **$/kWh**
$3.05 **$/kW**

			EXISTING CONDITIONS								Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	Retrofit control device	Notes
4LED	Hallways	Hallways	54	2B 34 R F 2 (u) (MAG)	FU2EE	72	3.89	SW	2280	8,865	NONE	
54LED	401A Classroom	Classrooms	8	B 34 C F 2 (MAG)	F42EE	72	0.58	SW	3200	1,843	C-OCC	
54LED	401A Classroom	Classrooms	8	B 34 C F 2 (MAG)	F42EE	72	0.58	SW	3200	1,843	C-OCC	
146LED	401 Auto Class	Classrooms	15	High Bay MH 400	MH400/1	458	6.87	SW	3200	21,984	NONE	
54LED	401 Auto Class Office/Tool Storage	Classrooms	6	B 34 C F 2 (MAG)	F42EE	72	0.43	SW	3200	1,382	C-OCC	
54LED	401 Auto Class Locker/Restroom	Restrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	401 Auto Class Storage	Classrooms	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	3200	230	NONE	
54LED	401 Auto Class Tool Storage	Classrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	3200	461	NONE	
54LED	Nurse Exam Room	Office	4	B 34 C F 2 (MAG)	F42EE	72	0.29	SW	3000	864	NONE	
117	Nurse Exam Room	Office	2	CF 23	CFS23/1	23	0.05	SW	3000	138	NONE	
247LED	Nurse Office	Office	4	T 40 R F 3 (MAG)	F43SE	136	0.54	SW	3000	1,632	C-OCC	
146LED	402A Classroom	Classrooms	8	High Bay MH 400	MH400/1	458	3.66	SW	3200	11,725	C-OCC	
54LED	402A Classroom	Classrooms	8	B 34 C F 2 (MAG)	F42EE	72	0.58	SW	3200	1,843	C-OCC	
54LED	402 Auto Class	Classrooms	15	B 34 C F 2 (MAG)	F42EE	72	1.08	SW	3200	3,456	NONE	
54LED	402 Auto Class Office/Tool Storage	Classrooms	6	B 34 C F 2 (MAG)	F42EE	72	0.43	SW	3200	1,382	C-OCC	
54LED	402 Auto Class Locker/Restroom	Restrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	402 Auto Class Storage	Classrooms	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	3200	230	NONE	
54LED	402 Auto Class Tool Storage	Classrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	3200	461	NONE	
54LED	Boiler Room	Mechanical Room	5	B 34 C F 2 (MAG)	F42EE	72	0.36	SW	1000	360	NONE	
54LED	Electrical Room	Mechanical Room	5	B 34 C F 2 (MAG)	F42EE	72	0.36	SW	1000	360	NONE	
54LED	Phone Room	Mechanical Room	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	Storage	Storage Areas	5	B 34 C F 2 (MAG)	F42EE	72	0.36	SW	1000	360	NONE	
146LED	403 Class	Classrooms	13	High Bay MH 400	MH400/1	458	5.95	SW	3200	19,053	C-OCC	
54LED	403 Class Mezzanine	Storage Areas	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	1000	216	NONE	
71	403 Paint Storage	Storage Areas	2	I 60	I60/1	60	0.12	SW	1000	120	NONE	
54LED	403 Storage	Storage Areas	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	403 Locker/Restroom	Restrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	403 Tool Storage	Classrooms	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	3200	691	NONE	
54LED	403A Class	Classrooms	12	B 34 C F 2 (MAG)	F42EE	72	0.86	SW	3200	2,765	C-OCC	
54LED	Computer Storage	Storage Areas	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	Storage	Storage Areas	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	1000	216	NONE	
54LED	407 Media/Library	Classrooms	42	B 34 C F 2 (MAG)	F42EE	72	3.02	SW	3200	9,677	C-OCC	
54LED	407 Storage	Storage Areas	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	407 Faculty Restroom	Restrooms	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	C-OCC	
54LED	407 Office	Office	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	3000	432	C-OCC	
71	407 Office Restroom	Restrooms	1	I 60	I60/1	60	0.06	SW	1000	60	C-OCC	
54LED	407 Conference Room	Classrooms	5	B 34 C F 2 (MAG)	F42EE	72	0.36	SW	3200	1,152	C-OCC	
146LED	404 Auto Body	Classrooms	13	High Bay MH 400	MH400/1	458	5.95	SW	3200	19,053	NONE	
54LED	404 Auto Body	Classrooms	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	3200	691	NONE	
71	404 Auto Body	Classrooms	2	I 60	I60/1	60	0.12	SW	3200	384	NONE	
54LED	404 Auto Body	Classrooms	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	3200	230	NONE	
54LED	404 Auto Body	Classrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	3200	461	NONE	
54LED	404 Auto Body	Classrooms	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	3200	691	NONE	
54LED	404 Auto Body	Classrooms	12	B 34 C F 2 (MAG)	F42EE	72	0.86	SW	3200	2,765	NONE	
54LED	405a	Classrooms	8	B 34 C F 2 (MAG)	F42EE	72	0.58	SW	3200	1,843	C-OCC	
54LED	405a	Classrooms	8	B 34 C F 2 (MAG)	F42EE	72	0.58	SW	3200	1,843	C-OCC	
146LED	405 Classroom	Classrooms	18	High Bay MH 400	MH400/1	458	8.24	SW	3200	26,381	NONE	
54LED	405 Storage/Restroom	Restrooms	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	1000	216	NONE	
71	405 Storage/Restroom	Restrooms	1	I 60	I60/1	60	0.06	SW	1000	60	NONE	
54LED	405 Locker/Restroom	Restrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	405 Storage	Storage Areas	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	405 Tool Storage	Storage Areas	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	405 Mezzanine	Storage Areas	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	1000	216	NONE	
54LED	406 Classroom	Classrooms	6	B 34 C F 2 (MAG)	F42EE	72	0.43	SW	3200	1,382	C-OCC	
54LED	406 Classroom	Classrooms	16	B 34 C F 2 (MAG)	F42EE	72	1.15	SW	3200	3,686	C-OCC	
54LED	406 Classroom	Classrooms	16	B 34 C F 2 (MAG)	F42EE	72	1.15	SW	3200	3,686	C-OCC	
54LED	406 Classroom	Classrooms	16	B 34 C F 2 (MAG)	F42EE	72	1.15	SW	3200	3,686	C-OCC	
54LED	406 Boys Restroom	Restrooms	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	406 Girls Restroom	Restrooms	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	406 Storage	Storage Areas	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	406 Storage	Storage Areas	4	B 34 C F 2 (MAG)	F42EE	72	0.29	SW	1000	288	NONE	
146LED	408 Welding Class	Classrooms	15	High Bay MH 400	MH400/1	458	6.87	SW	3200	21,984	NONE	
54LED	408 Welding Booths	Classrooms	30	B 34 C F 2 (MAG)	F42EE	72	2.16	SW	3200	6,912	NONE	
54LED	408 Tool Storage	Classrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	3200	461	NONE	
54LED	408 Storage	Storage Areas	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	409A Classroom	Classrooms	8	B 34 C F 2 (MAG)	F42EE	72	0.58	SW	3200	1,843	C-OCC	
54LED	409A Classroom	Classrooms	8	B 34 C F 2 (MAG)	F42EE	72	0.58	SW	3200	1,843	C-OCC	
218LED	410 Chemistry	Classrooms	30	W 32 P F 3 (ELE)	F43ILL/2	90	2.70	SW	3200	8,640	C-OCC	
55LED	411 Special Education	Classrooms	7	2T 17 R F 3 (ELE)	F23ILL	47	0.33	SW	3200	1,053	C-OCC	
247LED	421 Faculty Lounge	Office	9	T 40 R F 3 (MAG)	F43SE	136	1.22	SW	3000	3,672	C-OCC	
218LED	412 Biology	Classrooms	11	W 32 P F 3 (ELE)	F43ILL/2	90	0.99	SW	3200	3,168	C-OCC	

Morris County Vocational Technical School LGEA - Building 4
CHA Project No. 28950
Existing Lighting & Audit Input

Cost of Electricity: **$0.100** **$/kWh**
$3.05 **$/kW**

			EXISTING CONDITIONS									Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	Retrofit control device	Notes
218LED	412A Biology	Classrooms	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.08	SW	3200	3,456	C-OCC	
218LED	412B	Classrooms	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.08	SW	3200	3,456	C-OCC	
54LED	413 Classroom	Classrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	3200	461	C-OCC	
247LED	414 Classroom	Classrooms	15	T 40 R F 3 (MAG)	F43SE	136	2.04	SW	3200	6,528	C-OCC	
247LED	414 Classroom	Classrooms	10	T 40 R F 3 (MAG)	F43SE	136	1.36	SW	3200	4,352	C-OCC	
247LED	414 Classroom	Classrooms	13	T 40 R F 3 (MAG)	F43SE	136	1.77	SW	3200	5,658	C-OCC	
28	414 Boys Restroom	Restrooms	1	CR 32 C F 1	FC12/1	31	0.03	SW	1000	31	NONE	
54LED	414A Computer Lab	Classrooms	12	B 34 C F 2 (MAG)	F42EE	72	0.86	SW	3200	2,765	C-OCC	
54LED	414A Storage	Storage Areas	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
54LED	414A Storage	Storage Areas	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	Rear Hall Mens Restroom	Restrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
218LED	417 Classroom	Classrooms	18	W 32 P F 3 (ELE)	F43ILL/2	90	1.62	SW	3200	5,184	C-OCC	
54LED	417 Storage	Storage Areas	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	1000	144	NONE	
54LED	415 Culinary Arts	Classrooms	38	B 34 C F 2 (MAG)	F42EE	72	2.74	SW	3200	8,755	NONE	
54LED	415 Pantry Room	Storage Areas	1	B 34 C F 2 (MAG)	F42EE	72	0.07	SW	1000	72	NONE	
247LED	415 Office	Office	2	T 40 R F 3 (MAG)	F43SE	136	0.27	SW	3000	816	C-OCC	
54LED	415 Dishwashing Room	Classrooms	2	B 34 C F 2 (MAG)	F42EE	72	0.14	SW	3200	461	NONE	
54LED	415 Boys Locker/Restroom	Restrooms	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	1000	216	NONE	
54LED	415 Girls Locker/Restroom	Restrooms	3	B 34 C F 2 (MAG)	F42EE	72	0.22	SW	1000	216	NONE	
247LED	Culinary Arts Cafeteria	Classrooms	16	T 40 R F 3 (MAG)	F43SE	136	2.18	SW	3200	6,963	C-OCC	
218LED	418 Classroom	Classrooms	32	W 32 P F 3 (ELE)	F43ILL/2	90	2.88	SW	3200	9,216	C-OCC	
254LED	Guidance Office	Office	5	CFQ26/2	CFQ26/2	66	0.33	SW	3000	990	C-OCC	
254LED	Guidance Office	Office	2	CFQ26/2	CFQ26/2	66	0.13	SW	3000	396	C-OCC	
254LED	Guidance Office	Office	3	CFQ26/2	CFQ26/2	66	0.20	SW	3000	594	C-OCC	
254LED	Guidance Office	Office	3	CFQ26/2	CFQ26/2	66	0.20	SW	3000	594	C-OCC	
254LED	Guidance Office	Office	3	CFQ26/2	CFQ26/2	66	0.20	SW	3000	594	C-OCC	
254LED	Guidance Office	Office	4	CFQ26/2	CFQ26/2	66	0.26	SW	3000	792	C-OCC	
117	Main Entrance	Hallways	6	CF 23	CFS23/1	23	0.14	SW	2280	315	NONE	
	Total		**746**				**91.05**			**275,838**		

APPENDIX C

ECM Calculations

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide	Building Area	Annual Utility Cost		
$ 0.122	$/kWh blended		0.000420205	79,925	Electric	Natural Gas	Fuel Oil
$ 0.097	$/kWh supply	777,920	0.000420205		$ 95,001	$ 73,047	$ -
$ 3.05	$/kW	284.7	0				
$ 1.22	$/Therm	59,725	0.00533471				
$ 9.00	$/kgals	6,000	0				
$ -	$/Gal	-					

Building 4

Recommend? Y or N		Item	Savings kW	kWh	therms	No. 2 Oil gal	Water kgal	$	Cost	Simple Payback	Life Expectancy	Equivalent CO2 (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings kW	kWh	therms	kgal/yr	$	ROI	NPV	IRR
Y	ECM-1	Replace Windows	0.0	3,999	7,079	0	0	9,145	$ 737,802	80.7	25	39.4	$ -	N	80.7	0.0	99,979	176,964	0	$ 228,624	(0.7)	($578,559)	-7.5%
Y	ECM-2	Replace Door Seals	0.0	1,553	967	0	0	1,371	$ 4,609	3.4	15	5.8	$ -	N	3.4	0.0	23,291	14,498	0	$ 20,572	3.5	$11,763	29.1%
Y	ECM-3	Roof Replacement/Insulation Improvement	0.0	3,493	13,355	0	0	16,759	$ 2,499,714	149.2	25	72.7	$ -	N	149.2	0.0	87,327	333,875	0	$ 418,983	(0.8)	($2,207,882)	-10.7%
Y	ECM-4	Replace RTUs	10.4	17,493	711	0	0	2,946	$ 125,400	42.6	15	11.1	$ 1,950	N	41.9	155.4	262,392	10,671	0	$ 50,752	(0.6)	($88,279)	-10.7%
Y	ECM-5	Replace H&V Units	0.0	14,835	0	0	0	1,810	$ 79,812	44.1	15.0	6.2	$ -	N	44.1	0.0	222,528	0	0	$ 27,148	(0.7)	($58,205)	-11.2%
Y	ECM-6	Condensing DHW Heater	0.0	0	703	0	0	860	$ 33,791	39.3	25.0	3.8	$ 400	N	38.8	0.0	0	17,585	0	$ 21,507	(0.4)	($18,411)	-3.1%
Y	ECM-7	Install Infrared Heaters to Replace Gas-Fired Unit Heaters	0.0	0	1,147	0	0	1,402	$ 55,456	39.6	15.0	6.1	$ 3,000	N	37.4	0.0	0	17,198	0	$ 21,033	(0.6)	($35,717)	-9.7%
Y	ECM-8	Replace Electric Kitchen Equipment with Natural Gas	0.0	68,400	(2,334)	0	0	5,491	$ 100,652	18.3	25.0	16.3	$ 3,498	N	17.7	0.0	1,710,000	(58,345)	0	$ 137,264	0.4	($1,546)	2.9%
Y	ECM-9	Computer Network Controller	0.0	5,040	0	0	0	615	$ 1,776	2.9	15.0	2.1	$ -	N	2.9	0.0	75,600	0	0	$ 9,223	4.193883	$5,565	34.2%
Y	ECM-10	Install Low Flow Plumbing Fixtures	0.0	0	85	0	93	944	$ 42,185	44.7	30.0	0.5	$ -	N	44.7	0.0	0	2,558	2,799	$ 28,317	(0.3)	($23,684)	-2.4%
N	ECM-L1	Lighting Replacements / Upgrades	58.2	178,400	0	0	0	19,435	$ 247,262	12.7	15.0	75.0	$ 40,350	N	10.6	873.0	2,676,000	0	0	$ 358,424	0.4	$25,101	4.6%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	45,309	0	0	0	5,528	$ 11,610	2.1	15.0	19.0	$ 1,505	N	1.8	0.0	679,635	0	0	$ 82,915	6.1	$55,884	54.6%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	58.2	196,482	0	0	0	21,189	$ 258,872	12.2	15.0	82.6	$ 41,855	N	10.2	873.0	2,947,230	0	0	$ 391,514	0.5	$35,934	5.2%
		Total (Not Including ECM L1, L2)	**68.6**	**311,295**	**21,713**	**0**	**93**	**$ 62,532**	**$ 3,940,069**	**63.0**	**20.0**	**247**	**$ 50,703**		**62.2**	**1,028**	**5,428,347**	**515,004**	**2,799**	**$ 1,354,937**	**(0.7)**	**($2,959,041)**	**-9.0%**
		Recommended Measures (highlighted green above)	**68.6**	**311,295**	**21,713**	**0**	**93**	**$ 62,532**	**$ 3,940,069**	**63.0**	**20.0**	**247**	**$ 50,703**	**0**	**62.2**	**1,028**	**5,428,347**	**515,004**	**2,799**	**$ 1,354,937**	**(0.7)**	**($2,959,041)**	**-9.0%**
		% of Existing	**24%**	**40.02%**	**36.35%**	**0.00%**	**1.55%**																

	City:	Newark, NJ				
	Occupied Hours/Week	75	75	75	75	50
		Building Operating Hours	Auditorium Occupied Hours	Gymnasium Occupied Hours	Library Occupied Hours	Classrooms Occupied Hours
Temp	Enthalpy ft (Btu/lb)	Bin Hours				
102.5						
97.5	35.4	6	3	3	3	2
92.5	37.4	31	14	14	14	9
87.5	35.0	131	58	58	58	39
82.5	33.0	500	223	223	223	149
77.5	31.5	620	277	277	277	185
72.5	29.9	664	296	296	296	198
67.5	27.2	854	381	381	381	254
62.5	24.0	927	414	414	414	276
57.5	20.3	600	268	268	268	179
52.5	18.2	730	326	326	326	217
47.5	16.0	491	219	219	219	146
42.5	14.5	656	293	293	293	195
37.5	12.5	1,023	457	457	457	304
32.5	10.5	734	328	328	328	218
27.5	8.7	334	149	149	149	99
22.5	7.0	252	113	113	113	75
17.5	5.4	125	56	56	56	37
12.5	3.7	47	21	21	21	14
7.5	2.1	34	15	15	15	10
2.5	1.3	1	0	0	0	0
-2.5						
-7.5						

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

Heating System Efficiency	80%
Cooling Eff (kW/ton)	1.2

Heating		
Hours	4,427	Hrs
Weighted Avg	40	F
Avg	28	F

Cooling		
Hours	4,333	Hrs
Weighted Avg	68	F
Avg	78	F

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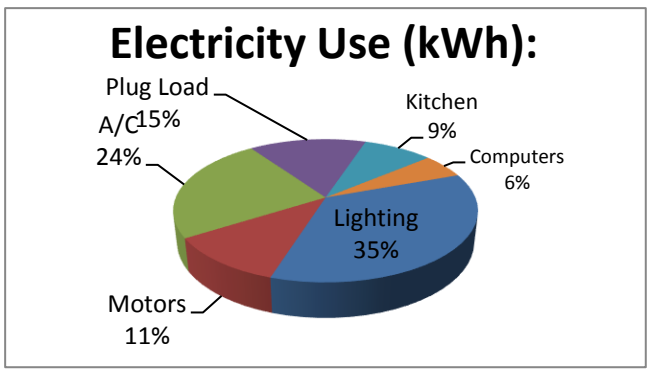
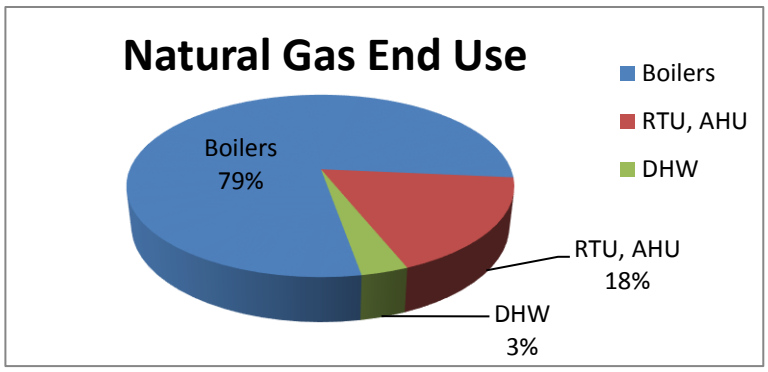
Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
777,920	Total	Based on utility analysis	
275,838	Lighting	From Lighting Calculations	0.354584019
86,680	Motors	Estimated	0.111425476
188,486	A/C	See Window AC Calculation	0.242294195
115,316	Plug Load	Estimated	0.148236828
68,400	Kitchen	Estimated	0.087926779
43,200	Computers	Estimated	0.055532703
Natural Gas Use (Therms):		**Notes/Comments:**	
59,725	Total	Based on utility analysis	
57,325	Boilers	Therms/SF x Square Feet Served	0.959815823
12,635	RTU, AHU	Based on utility analysis	0.211558825
2,400	DHW	Based on utility analysis	0.040184177





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Note: pricing is for energy calculations only -do not use for procurement

ECM-1: Window Replacement

Existing: Windows are not properly sealed and have a high heat gain/loss rate (U Value). This can lead to increased energy consumption due to infiltration/exfiltration and heat gain/loss.
Proposed: Replace single pane windows with new double pane windows to reduce heat gain/loss and infiltration/exfiltration

Linear Feet of window Edge	3,058.0 LF	Cooling System Efficiency	1.2 kW/ton	Heating System Efficiency	80%			
Area of window glass	3,995.0 SF	Ex Occupied Clng Temp.	72 *F	Heating On Temp.	55 *F			
Existing Infiltration Factor	**0.25 cfm/LF**	Ex Unoccupied Clng Temp.	72 *F	Ex Occupied Htg Temp.	72 *F			
Proposed Infiltration Factor	**0.10 cfm/LF**	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb	Ex Unoccupied Htg Temp.	72 *F			
Existing U Value	**1.13 Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb	Electricity	$ 0.122 $/kWh			
Proposed U Value	**0.45 Btuh/SF/°F**			Natural Gas	$ 1.22 $/therm			

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Window Infiltration & Heat Load BTUH	Window Infiltration & Heat Load BTUH	Window Infiltration & Heat Load BTUH	Window Infiltration & Heat Load BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy Therms	Proposed Heating Energy Therms
A		B	C	D	E	F	G	H	I	J	K	L
102.5	50.1	0	0	0	-215,437	-215,437	-85,931	-85,931	0	0	0	0
97.5	42.5	6	2	4	-166,720	-166,720	-66,484	-66,484	100	40	0	0
92.5	39.5	45	16	29	-133,827	-133,827	-53,367	-53,367	602	240	0	0
87.5	36.6	146	52	94	-101,279	-101,279	-40,388	-40,388	1479	590	0	0
82.5	34.0	298	106	192	-69,762	-69,762	-27,821	-27,821	2080	829	0	0
77.5	31.6	476	170	306	-38,934	-38,934	-15,530	-15,530	1854	740	0	0
72.5	29.2	662	237	426	-8,106	-8,106	-3,238	-3,238	537	214	0	0
67.5	27.0	740	264	476	0	0	0	0	0	0	0	0
62.5	24.5	765	273	492	0	0	0	0	0	0	0	0
57.5	21.4	733	262	471	0	0	0	0	0	0	0	0
52.5	18.7	668	239	430	104,130	104,130	41,496	41,496	0	0	870	347
47.5	16.2	659	235	424	130,830	130,830	52,136	52,136	0	0	1,078	430
42.5	14.4	685	245	441	157,530	157,530	62,776	62,776	0	0	1,349	538
37.5	12.6	739	264	475	184,230	184,230	73,416	73,416	0	0	1,703	678
32.5	10.7	717	256	461	210,930	210,930	84,057	84,057	0	0	1,891	754
27.5	8.6	543	194	349	237,630	237,630	94,697	94,697	0	0	1,614	643
22.5	6.8	318	114	205	264,330	264,330	105,337	105,337	0	0	1,051	419
17.5	5.5	245	88	158	291,031	291,031	115,977	115,977	0	0	892	355
12.5	4.1	156	56	100	317,731	317,731	126,617	126,617	0	0	620	247
7.5	2.6	92	33	59	344,431	344,431	137,257	137,257	0	0	396	158
2.5	1.0	36	13	23	371,131	371,131	147,897	147,897	0	0	167	67
-2.5	0.0	19	7	12	397,831	397,831	158,537	158,537	0	0	95	38
-7.5	-1.5	8	3	5	424,531	424,531	169,177	169,177	0	0	42	17
TOTALS		**8,760**	**3,129**	**5,631**					6653	2654	**11,768**	**4,690**

Existing Window Infiltration	**765**	**cfm**	
Existing Window Heat Transfer	**4,514**	**Btuh/°F**	
Proposed Window Infiltration	**306**	**cfm**	
Proposed Window Heat Transfer	**1,798**	**Btuh/°F**	

Savings	**7,079**	**Therms**	**$**	**8,657**
	3,999	**kWh**	**$**	**488**
			$	**9,145**

Window ID	Location	Quantity	Width (ft)	Height (ft)	Linear Feet (LF)	Area (SF)	Infiltration Rate (CFM/LF)	U Value (Btuh/SF/°F)	Infiltration (CFM)	Heat Transfer (Btuh/°F)
1	Exterior Wall	64	8	5	1664.0	2560.0	0.25	1.13	416.0	2892.8
2	Exterior Wall	82	3.5	5	1394.0	1435.0	0.25	1.13	348.5	1621.6
Total		**146**	**11.5**	**10**	**3,058.0**	**3,995.0**	**0.25**	**1.13**	**764.5**	**4514.4**

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-1: Window Replacement - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
New Windows	3995	SF	$ 65	$ 65	$ -	$ 266,686	$ 323,555	$ -	$ 590,241	RS Means 2012
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 590,241	Subtotal
$ 147,560	25% Contingency
$ 737,802	**Total**

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ECM-2: Install Door Seals

Description: This ECM evaluates the thermal and electrical savings associate with adding door seals and sweeps to prevent infiltration of cold (hot) outdoor air.

Heating System Efficiency	80%		Ex Occupied Clng Temp.	72	*F	Ex Occupied Htg Temp.	72	*F
Cooling System Efficiency	1.20	kW/ton	Ex Unoccupied Clng Temp.	72	*F	Ex Unoccupied Htg Temp.	72	*F
Linear Feet of Door Edge	400	LF	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.12	$/kWh
Existing Infiltration Factor*	1.5	cfm/LF	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Natural Gas	$ 1.22	$/therm
Proposed Infiltration Factor*	0.45	cfm/LF						

*Infiltration Factor per Carrier Handbook of Air Conditioning System Design based on average door seal gap calculated below.

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy therms	Proposed Heating Energy therms
A		B	C	D	E	F	G	H	I	J	K	L
102.5	0.0	0	0	0	74,250	74,250	22,275	22,275	0	0	0	0
97.5	35.4	6	3	3	-21,350	-21,350	-6,405	-6,405	13	4	0	0
92.5	37.4	31	14	17	-26,735	-26,735	-8,021	-8,021	83	25	0	0
87.5	35.0	131	58	73	-20,209	-20,209	-6,063	-6,063	265	79	0	0
82.5	33.0	500	223	277	-14,977	-14,977	-4,493	-4,493	749	225	0	0
77.5	31.5	620	277	343	-10,929	-10,929	-3,279	-3,279	678	203	0	0
72.5	29.9	664	296	368	-6,496	-6,496	-1,949	-1,949	431	129	0	0
67.5	27.2	854	381	473	2,916	2,916	875	875	0	0	31	9
62.5	24.0	927	414	513	6,156	6,156	1,847	1,847	0	0	71	21
57.5	20.3	600	268	332	9,396	9,396	2,819	2,819	0	0	70	21
52.5	18.2	730	326	404	12,636	12,636	3,791	3,791	0	0	115	35
47.5	16.0	491	219	272	15,876	15,876	4,763	4,763	0	0	97	29
42.5	14.5	656	293	363	19,116	19,116	5,735	5,735	0	0	157	47
37.5	12.5	1,023	457	566	22,356	22,356	6,707	6,707	0	0	286	86
32.5	10.5	734	328	406	25,596	25,596	7,679	7,679	0	0	235	70
27.5	8.7	334	149	185	28,836	28,836	8,651	8,651	0	0	120	36
22.5	7.0	252	113	140	32,076	32,076	9,623	9,623	0	0	101	30
17.5	5.4	125	56	69	35,316	35,316	10,595	10,595	0	0	55	17
12.5	3.7	47	21	26	38,556	38,556	11,567	11,567	0	0	23	7
7.5	2.1	34	15	19	41,796	41,796	12,539	12,539	0	0	18	5
2.5	1.3	1	0	1	45,036	45,036	13,511	13,511	0	0	1	0
-2.5	0.0	0	0	0	48,276	48,276	14,483	14,483	0	0	0	0
-7.5	0.0	0	0	0	51,516	51,516	15,455	15,455	0	0	0	0
TOTALS		**8,760**	**3,911**	**4,849**					**2,218**	**665**	**1,381**	**414**

Existing Door Infiltration	**600**	**cfm**	**Savings**	**967**	**therms**	**$ 1,182**
Existing Unoccupied Door Infiltration	**600**	**cfm**		**1,553**	**kWh**	**$ 189**
Proposed Door Infiltration	**180**	**cfm**				**$ 1,371**
Proposed Unoccupied Door Infiltration	**180**	**cfm**				

Door	Width (ft)	Height (ft)	Linear Feet (LF)	gap (in)	gap location	LF of gap	% door w/ gap	Average gap for door (in)
1	3	7	20	0.125	all sides	20	100%	0.125
2	3	7	20	0.125	all sides	20	100%	0.125
3	3	7	20	0.125	all sides	20	100%	0.125
4	3	7	20	0.125	all sides	20	100%	0.125
5	3	7	20	0.125	all sides	20	100%	0.125
6	3	7	20	0.125	all sides	20	100%	0.125
7	3	7	20	0.125	all sides	20	100%	0.125
8	3	7	20	0.125	all sides	20	100%	0.125
9	3	7	20	0.125	all sides	20	100%	0.125
10	3	7	20	0.125	all sides	20	100%	0.125
11	3	7	20	0.125	all sides	20	100%	0.125
12	3	7	20	0.125	all sides	20	100%	0.125
13	3	7	20	0.125	all sides	20	100%	0.125
14	3	7	20	0.125	all sides	20	100%	0.125
15	3	7	20	0.125	all sides	20	100%	0.125
16	3	7	20	0.125	all sides	20	100%	0.125
17	3	7	20	0.125	all sides	20	100%	0.125
18	3	7	20	0.125	all sides	20	100%	0.125
19	3	7	20	0.125	all sides	20	100%	0.125
20	3	7	20	0.125	all sides	20	100%	0.125
Total	**60**	**140**	**400**	**0.125**		**400**	**100%**	**0.125**

Note: Doors labeled 'a', 'b', etc. are a part of the same door assembly.

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ECM-2: Install Door Seals - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Door Weatherization Seals & Sweeps	20	EA	$ 40	$ 115	$ -	$ 822	$ 2,866	$ -	$ 3,687	RS Means 2012
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 3,687	Subtotal
$ 922	25% Contingency
$ 4,609	**Total**

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ECM-3 Install New Roof Having Additional Roof Insulation

Existing: The existing roof has minimal tapered insulation which results in increased energy consumption due to heat gain/loss.
Proposed: Install 3" of additional roof insulation when roof is repaired

Area of roof	79,925	SF	Cooling System Efficiency	1.20	kW/ton	Heating System Efficiency	80%	
Existing Infiltration Factor	**0.03**	**cfm/SF**	Ex Occupied Clng Temp.	72	*F	Heating On Point	55	*F
Proposed Infiltration Factor	**0.02**	**cfm/SF**	Ex Unoccupied Clng Temp.	72	*F	Ex Occupied Htg Temp.	72	*F
Existing U Value	**0.101**	**Btuh/SF/°F**	Cooling Occ Enthalpy Setpoint	28.26	Btu/lb	Ex Unoccupied Htg Temp.	72	*F
Proposed U Value	**0.050**	**Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.122	$/kWh
						Natural Gas	$ 1.22	$/Therm

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy Therms	Proposed Heating Energy Therms
A		B	C	D	E	F	G	H	I	J	K	L
102.5	41.1	0.0	0.0	0.0	-384,368	-392,569	-191,157	-195,257	0	0	0	0
97.5	40.8	1.0	1.0	0.0	-341,069	-349,270	-169,676	-173,776	34	17	0	0
92.5	41.7	7.0	7.0	0.0	-309,765	-317,966	-154,192	-158,292	217	108	0	0
87.5	39.3	45.0	45.0	0.0	-244,127	-252,328	-121,541	-125,642	1099	547	0	0
82.5	34.5	175.0	175.0	0.0	-151,514	-159,714	-75,403	-79,503	2651	1320	0	0
77.5	31.5	312.0	312.0	0.0	-79,211	-87,411	-39,420	-43,520	2471	1230	0	0
72.5	29.0	404.0	404.0	0.0	-11,946	-20,146	-5,956	-10,056	483	241	0	0
67.5	27.4	725.0	725.0	0.0	0	0	0	0	0	0	0	0
62.5	24.6	862.0	862.0	0.0	0	0	0	0	0	0	0	0
57.5	21.6	824.0	824.0	0.0	0	0	0	0	0	0	0	0
52.5	19.2	674.0	674.0	0.0	207,664	207,664	103,175	103,175	0	0	1,750	869
47.5	16.7	530.0	530.0	0.0	260,911	260,911	129,630	129,630	0	0	1,729	859
42.5	14.8	750.0	750.0	0.0	314,159	314,159	156,086	156,086	0	0	2,945	1,463
37.5	12.6	908.0	908.0	0.0	367,406	367,406	182,541	182,541	0	0	4,170	2,072
32.5	10.7	890.0	890.0	0.0	420,653	420,653	208,996	208,996	0	0	4,680	2,325
27.5	8.9	580.0	580.0	0.0	473,900	473,900	235,451	235,451	0	0	3,436	1,707
22.5	7.2	392.0	392.0	0.0	527,148	527,148	261,906	261,906	0	0	2,583	1,283
17.5	5.5	339.0	339.0	0.0	580,395	580,395	288,361	288,361	0	0	2,459	1,222
12.5	3.9	243.0	243.0	0.0	633,642	633,642	314,817	314,817	0	0	1,925	956
7.5	2.5	77.0	77.0	0.0	686,889	686,889	341,272	341,272	0	0	661	328
2.5	1.3	20.0	20.0	0.0	740,137	740,137	367,727	367,727	0	0	185	92
-2.5	0.5	2.0	2.0	0.0	793,384	793,384	394,182	394,182	0	0	20	10
-7.5	0.3	0.0	0.0	0.0	846,631	846,631	420,637	420,637	0	0	0	0
TOTALS		**8,760**	**8,760**	**0**					6955	3462	**26,542**	**13,187**

Existing Roof Infiltration	**2,398**	**cfm**
Existing Roof Heat Transfer	**8,060**	**Btuh/°F**
Proposed Roof Infiltration	**1,199**	**cfm**
Proposed Roof Heat Transfer	**3,996**	**Btuh/°F**

Savings	**13,355**	**Therm**	**$ 16,333**
	3,493	**kWh**	**$ 426**
			$ 16,759

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-3 Install New Roof Having Additional Roof Insulation - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Existing Roof Removal	79,925	SF	$ -	$ -	$ 2.25	$ -	$ -	$ 202,130	$ 202,130	RS Means 2012
3" Additional Rigid Tapered Insulation	79,925	SF	$ 0.98	$ 0.48	$ -	$ 80,441	$ 47,802	$ -	$ 128,243	RS Means 2012
EPDM Roof Membrane	79,925	SF	$ 12.00	$ 6.25	$ 0.69	$ 984,996	$ 622,416	$ 61,987	$ 1,669,398	RS Means 2012

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 1,999,771	Subtotal
$ 499,943	25% Contingency
$ 2,499,714	**Total**

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-4: Replace RTUs With More Efficient RTUs

Description: This ECM evaluates the energy savings associated with replacing older less efficient heating and cooling equipment with modern high efficiency unitary equipment havings the same capacity

Equipment Tag	Equipment Description	General Type	Cooling Capacity (Btu/h)	Heating Capacity (Btu/h)
RTU-1	RTU	HVAC	-	175,000
RTU-2	RTU	HVAC	-	175,000
HVAC-1	RTU	HVAC	90,000	120,000
HVAC-2	RTU	HVAC	60,000	100,000
AC-4	RTU	HVAC	48,000	-
RTU-7	RTU	HVAC	60,000	93,150
RTU-8	RTU	HVAC	90,000	150,000

Item	Value	Units	Formula/Comments	
Demand Rate	$ 3.05	/ kW		
Electricity Rate	$ 0.10	/kWh		
Natural Gas Rate	$ 1.22	/Therm		
FORMULA CONSTANTS				
Coincidence Factor	0.67		NJ Protocols	
Conversion	3.412	btu/kW		
COOLING - HVAC				
Cooling Capacity	348,000	btu/hr		btuh
Baseline EER	10.0		See Table Below	EERb
Proposed EER	18.0		Proposed Equipment	EERq
Equivalent Full Load Hours	1,131	hrs	NJ Protocols	
Demand Savings	10.36	kW		
Energy Savings	17,493	kWh		
HEATING - HVAC				
Heating Capacity	813,150	btu/h		
Baseline Heating Efficiency	78%		Based on age and condition of equipment	
Proposed Heating Efficiency	80%		Proposed Equipment	
Equivalent Full Load Hours	800	hrs	NJ Protocols	
Heating Savings	711.40	Therms		
SAVINGS				
Demand Savings	10.36	kW		
Natural Gas Energy Savings	711.40	Therms		
Electric Energy Savings	17,493	kWh		
Cost Savings	$ 2,946			

Savings calculation formulas are taken from NJ Protocols document for Electric HVAC Equipment

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-4: Replace RTUs With More Efficient RTUs - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Existing (19) RTUs demolition	7	EA		$ 575		$ -	$ 5,015	$ -	$ 5,015	RS Means 2012
(2) RTUs, 7.5 ton packaged units	2	EA	$ 7,650	$ 1,625		$ 15,713	$ 4,050	$ -	$ 19,763	RS Means 2012
(2) RTUs, 5.0 ton packaged units	2	EA	$ 4,975	$ 1,425		$ 10,219	$ 3,551	$ -	$ 13,770	RS Means 2012
(1) RTUs, 4.0 ton packaged units	1	EA	$ 4,250	$ 1,325		$ 4,365	$ 1,651	$ -	$ 6,016	RS Means 2012
(2) H&V RTUs, 175 MBH Gas Heat	2	EA	$ 11,400	$ 1,150		$ 23,416	$ 2,866	$ -	$ 26,281	RS Means 2012
- Reprogram DDC system for (7) RTUs	7	EA	$ 75	$ 300		$ 539	$ 2,617	$ -	$ 3,156	RS Means 2012
Crane Rental	1	LS	$ -	$ -	$ 5,000	$ -	$ -	$ 5,620	$ 5,620	
Electrical - misc.	1	LS	$ 5,000	$ 12,500		$ 5,135	$ 15,575	$ -	$ 20,710	RS Means 2012

$ 100,330	Subtotal
$ 25,083	25% Contingency
$ 125,400	**Total**

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-5: Replace Existing Trane Torrivent Units with New H&V Units

Description: This ECM evaluates the energy (electrical) savings associated with replacing existing Trane Torrivent H&V Units with New H&V units. Due to the fact that these units do not produce heating or cooling and only utilize a HHW coil fed by the boiler, the energy savings associated with this measure is only associated with replacing the existing supply fan motors that are each approximately (1) HP with premium efficiency motors.

Variable Inputs

Electric Rate	$0.12	**$/kWh**
Demand Rate	$0.10	**$/kW**

MOTOR SCHEDULE										Savings Factor		Existing Motor Energy		Proposed Motor Energy		Energy Savings	
Motor ID	Motor Type	Qty	HP	Total HP	Upgrade Motor	Load Factor	Existing Motor Eff.	New Motor Eff.	Annual Hours	Demand Savings Factor	Energy Savings Factor	Demand Energy (kW)	Electrical Energy (kWh)	Demand Energy (kW)	Electrical Energy (kWh)	Peak Demand Savings (kW)	Annual Energy Savings (kWh)
H&V unit Supply Fan	CHW/HW	7	1.0	7.0	N	0.75	80.0%	87.9%	4,427	0.201	0.580	4.9	21,670	0.9	6,835	4.0	14,835
															Total:	4.0	14,835.2
																$ 5	$ 1,810
																	$ 1,815

Savings calculation formulas are taken from NJ Protocols document for VFDs

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-5: Replace Existing Trane Torrivent Units with New H&V Units - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Existing H&V Unit Removal	7	ea	$ -	$ 279	$ -	$ -	$ 2,433	$ -	$ 2,433	RS Means 2012
New H&V Units	7	ea	$ 4,750	$ 890	$ -	$ 34,148	$ 7,763	$ -	$ 41,910	RS Means 2012
Electrical - misc.	7	ls	$ 1,500	$ 1,000	$ -	$ 10,784	$ 8,722	$ -	$ 19,506	RS Means 2012

$ 63,849	Subtotal
$ 15,962	25% Contingency
$ 79,812	**Total**

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-6: Replace Gas-Fired DHW Boiler with Condensing DHW heater

Description: This ECM evaluates the energy savings associated with replacing the existing standard efficiency DHW boiler and storage tank with a new high efficiency condensing natural gas fired DHW boiler and new indirect storage tanks. Natural Gas savings will result from improved overall system efficiency.

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	**200**	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	240,000	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	72%		Based on age and appearance
Total Annual Hot Water Demand (w/ standby losses)	172,800	MBTU/yr	
Existing Tank Size	200	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	˚F	Per building personnel
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	2.9	MBH	
Annual Standby Hot Water Load	25,441	MBTU/yr	
New Tank Size	120	Gallons	
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	˚F	
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	1.8	MBH	
Annual Standby Hot Water Load	15,513	MBTU/yr	
Total Annual Hot Water Demand	162,872	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		AO Smith Cyclone
Proposed Fuel Use	1,697	Therns	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$1.22	$/Therm	
Existing Operating Cost of DHW	$2,935	$/yr	
Proposed Operating Cost of DHW	$2,075	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	703	$860

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-6: Replace Gas-Fired DHW Boiler with Condensing DHW heater - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Gas-Fired DHW Heater Removal	1	LS		$ 575		$ -	$ 716	$ -	$ 716	RS Means 2012
Condensing DHW Boiler (Mach N Roll)	1	EA	$ 15,000	$ 5,000		$ 15,405	$ 6,230	$ -	$ 21,635	Vendor Pricing
Pump	1	EA	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	Vendor Pricing
Miscellaneous Electrical	1	LS	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	RS Means 2012
Venting Kit	1	EA	$ 450	$ 650		$ 462	$ 810	$ -	$ 1,272	RS Means 2012
Miscellaneous Piping and Valves	1	LS	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	RS Means 2012

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 27,033	Subtotal
$ 6,758	25% Contingency
$ 33,791	**Total**

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-7: Replace Unit Heaters with 2-Stage Infrared Heaters

EXISTING CONDITIONS		
Existing Unit Heater Total Natual Gas Usage	5,733	Therms
Existing Infrared Equipment Usage	389,810	Mbtu/yr
Proposed Heating Gas Usage	4,586	Therms
Total energy savings	1,147	Therms
Total cost savings	$1,402	

Assumptions

	$ 1.22	$/Therm
1	80%	Existing Unit heater operating efficiency
2	85%	Existing Unit Distribution Effectiveness
3	85%	Proposed infrared heater operational efficiency
4	100%	Proposed Unit Distribution Effectiveness
5	$2,250	New 2-Stage Infrared Heater
6	10	Number of existing unit heaters to be replaced

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-7: Replace Unit Heaters with 2-Stage Infrared Heaters - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Two-Stage Ceiling Mounted Radiant Heater	10	EA	$ 2,500	$ 1,500	INC	$ 25,675	$ 18,690	INC	$ 44,365	Grainger.com
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 44,365	Subtotal
$ 11,091	25% Contingency
$ 55,456	**Total**

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-8: Replace Electric Kitchen Equipment with Natural Gas Equipment

ECM Description Summary

A commercial cafeteria kitchen typically contains large equipment such as warming/convection ovens, and fryers. This equipment consumes large ammounts of electrical energy, and wiith the cost of electricity versus natural gas, it is worthwhile to consider replacing electric equipment with nagtural gas equipment. The assumption of this calculation is that the operating hours and electrical power consumption of the existing electrical equipment are replaced with newer, more efficient equipment using natural gas. The savings are compared to the cost of new gas kitchen equipment; the connection cost (if any) to the natural gas utility and piping in the building is not included.

Existing Fuel Electric
Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 0.12	/ kWh	from utility bill analysis
Proposed Fuel Cost	$ 1.22	/ Therm	from utility bill analysis
Kitchen Equipment			
- Commercial Warming Ovens	60.0	kW	Based on equipment nameplate data (4x units, 15 kW each)
- Total Equipment kW	60.0	**kW**	
Kitchen Annual Operating Hours	1,140	hours	6 hours per day x 5 days per week x 38 weeks per year
Baseline Equipment Efficiency	100%		
Baseline Annual Electric Use	68,400	**kWh**	
Baseline Annual Electric Cost	$ 8,345		
Proposed Equipment Efficiency	100%		
Proposed Fuel Use	2,334	**Therms**	Baseline Electric Use x 3,412 BTU/kWh / 100,000 BTU/Therm
Proposed Fuel Cost	$ 2,854		
Annual Savings	$ 5,491		
Natural Gas Equipment Project Cost	$ 100,652		
Simple Payback	18.3	Years	

*Note to engineer: Link savings back to summary sheet in appropriate column.

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-8: Replace Electric Kitchen Equipment with Natural Gas Equipment - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Electric Equipment Replacement	1	LS	$ -	$ 500		$ -	$ 623	$ -	$ 623	RS Means 2012
(4) Natural Gas-Fired Commercial Warming Ovens	4	EA	$ 12,000	$ 5,000		$ 49,296	$ 24,920	$ -	$ 74,216	Vendor Estimate
Miscellaneous NG Piping	1	LS	$ 2,500	$ 2,500		$ 2,568	$ 3,115	$ -	$ 5,683	RS Means 2012

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 80,522	Subtotal
$ 20,130	25% Contingency
$ 100,652	**Total**

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-9: Computer Network Controller Savings Calculations

Notes:

1. This ECM calculates the saving associated with the installation of a centralized computer management software installed on the client server that will cause the computers to hibernate and sleep during times of low or no usage.
2. Energy savings per computer are based on manuafactures historical information from previous installations
3. There are approximately 72 computers used in this building

Background Data Average Consumption and Savings Figures	kWh
Average Total Consumption per PC per Year	500-700
Average Energy and Cost Waste per PC per Year	350-450
Average savings per PC	70
Average savings per IMac	50

Number of PCs	72
Number of IMac's	0
Return on Investment Analysis	
	kWh
Annual Energy Savings	5,040
Total network controller software package cost	$1,776

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-9: Computer Network Controller Savings Calculations - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Computer Network Controller Software	1	LS	$ 625	$ 625	$ -	$ 642	$ 779	$ -	$ 1,421	Vendor Estimation
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 1,421	Subtotal
$ 355	25% Contingency
$ 1,776	**Total**

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-10: Replace urinals and flush valves with low flow

Description: This ECM evaluates the water savings associated with replacing/ upgrading urinals with 0.125 GPF urinals and or flush valves.

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$9.00	$ / kGal
Urinals in Building to be replaced	6	
Average Flushes / Urinal (per Day)	15	Based on # of occupants
Average Gallons / Flush	1.5	Gal

PROPOSED CONDITIONS		
Proposed Urinals to be Replaced	6	
Proposed Gallons / Flush	0.125	Gal
Proposed Material Cost of new urinal & valve	$1,200	RS Means 2012
Proposed Installation Cost of new urinal & valve	$1,000	RS Means 2012
Total cost of new urinals & valves		

SAVINGS		
Current Urinal Water Use	49.28	kGal / year
Proposed Urinal Water Use	4.11	kGal / year
Water Savings	45.17	kGal / year
Cost Savings	$407	/ year

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-10: Replace toilets and flush valves with low flow

Description: This ECM evaluates the water savings associated with repalcing/ upgrading toilets to 1.28 GPF fixtures and/or flush valves.

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$9.00	$ / kGal
Toilets in Building	7	
Average Flushes / Toilet (per Day)	15	Based on # of occupants
Average Gallons / Flush	2.5	Gal

PROPOSED CONDITIONS		
Proposed Toilets to be Replaced	7	
Proposed Gallons / Flush	1.28	Gal

SAVINGS		
Current Toilet Water Use	95.81	kGal / year
Proposed Toilet Water Use	49.06	kGal / year
Water Savings	46.76	kGal / year
Cost Savings	$421	/ year

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

ECM-10: Replace faucets with low flow

Description; This ECM evaluates the water savings resulting from replacing/ upgrading faucets to 0.5 gallon per minute flow

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$9.00	$ / kGal
Faucets in Building	2	
Average Uses / Faucet (per day)	15	Based on # of occupants
Average Time of Use	10.0	seconds
Average Flowrate	2.0	gpm

PROPOSED CONDITIONS		
Proposed Faucets to be Replaced	2	
Proposed Flowrate	0.5	gpm

HEATING SAVINGS		
Fuel Cost	$ 1.22	/Therm
Number of Faucets	2	
Hours per Day of Usage	0.5	hrs
Days per Year of Facility Usage	182	days
Average Flowrate	2.0	gpm
Proposed Flowrate	0.5	gpm
Heat Content of Water	8.33	Btu/gal/F
Temperature Difference (Intake and Output)	50	F
Water Heating Equipment Efficiency	80%	
Conversion Factor	100,000	Btu/Therm
SAVINGS		
Current Faucet Water Use	1.82	kGal / year
Proposed Faucet Water Use	0.46	kGal / year
Water Savings	1.37	kGal / year
Heating Savings	85	Therms
Cost Savings	$117	/ year

Savings calculation formulas are taken from NJ Protocols document for Faucet

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Replace Plumbing Fixtures with Low-Flow Equivalents - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Low-Flow Urinal	6	EA	$ 1,200	$ 1,000	$ -	$ 7,394	$ 7,476	$ -	$ 14,870	Vendor Estimate
Low-Flow Toilet	7	EA	$ 1,400	$ 1,000	$ -	$ 10,065	$ 8,722	$ -	$ 18,787	Vendor Estimate
Low-Flow Faucet	2	EA	$ 20	$ 20	$ -	$ 41	$ 50	$ -	$ 91	Vendor Estimate
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 33,748	Subtotal
$ 8,437	25% Contingency
$ 42,185	**Total**

Morris County Vocational Technical School District - LGEA
CHA Project Number: 28950
Building 4

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012.
Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.
At a minimum, all recommended measures were used for this calculation. To qualify for P4P incentives, the following P4P requirements must be

- At least 15% source energy savings
- No more than 50% savings from lighting measures
- Scope includes more than one measure
- Project has at least a 10% internal rate of return
- At least 50% of the source energy savings must come from investor-owned electricity and/or natural gas (note: exemption for fuel conversions)

Total Building Area (Square Feet)	79,925
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.05	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$95,001	$73,047
Existing Usage (from utility)	777,920	59,725
Proposed Savings	311,295	21,713
Existing Total MMBtus	8,628	
Proposed Savings MMBtus	3,234	
% Energy Reduction	**37.5%**	
Proposed Annual Savings	$62,532	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.25
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.25

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,000
Incentive #2	$34,242	$27,141	$61,384
Incentive #3	$34,242	$27,141	$61,384
Total All Incentives	**$68,485**	**$54,282**	**$127,767**

Total Project Cost	$3,940,069

		Allowable Incentive
% Incentives #1 of Utility Cost*	3.0%	$5,000
% Incentives #2 of Project Cost**	1.6%	$61,384
% Incentives #3 of Project Cost**	1.6%	$61,384
Total Eligible Incentives***	**$127,767**	
Project Cost w/ Incentives	$3,812,302	

Project Payback (years)	
w/o Incentives	w/ Incentives
63.0	61.0

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.

*** Maximum allowable amount of Incentive #1 is $50,000 if not funded by NJ BPU, and $25,000 if it is.
Maximum allowable amount of Incentive #2 & #3 is $1 million per gas account and $1 million per electric account; maximum 2 million per project

Morris County Vocational Technical School LGEA - Building 4
CHA Project No. 28950
ECM-L1 Lighting Replacements

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
4LED	Hallways	54	2B 34 R F 2 (u) (MAG)	FU2EE	72	3.9	SW	2280	8,865	54	2T 25 R LED	2RTLED	25	1.4	SW	2,280	3,078	5,787	2.5	$ 671.55	$ 10,935.00	$2,700	16.3	12.3
54LED	401A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	SW	3,200	1,024	819	0.3	$ 91.29	$ 2,253.60	$400	24.7	20.3
54LED	401A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	SW	3,200	1,024	819	0.3	$ 91.29	$ 2,253.60	$400	24.7	20.3
146LED	401 Auto Class	15	High Bay MH 400	MH400/1	458	6.9	SW	3200	21,984	15	BAYLED78W	BAYLED78W	93	1.4	SW	3,200	4,464	17,520	5.5	$ 1,952.39	$ 12,662.93	$1,500	6.5	5.7
54LED	401 Auto Class Office/Tool Storage	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382	6	STLED4	STLED4	40	0.2	SW	3,200	768	614	0.2	$ 68.47	$ 1,690.20	$300	24.7	20.3
54LED	401 Auto Class Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	401 Auto Class Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230	1	STLED4	STLED4	40	0.0	SW	3,200	128	102	0.0	$ 11.41	$ 281.70	$50	24.7	20.3
54LED	401 Auto Class Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	SW	3,200	256	205	0.1	$ 22.82	$ 563.40	$100	24.7	20.3
54LED	Nurse Exam Room	4	B 34 C F 2 (MAG)	F42EE	72	0.3	SW	3000	864	4	STLED4	STLED4	40	0.2	SW	3,000	480	384	0.1	$ 43.08	$ 1,126.80	$200	26.2	21.5
117	Nurse Exam Room	2	CF 23	CFS23/1	23	0.0	SW	3000	138	2	CF 23	CFS23/1	23	0.0	SW	3,000	138	-	0.0	$ -	$ -	$0		#DIV/0!
247LED	Nurse Office	4	T 40 R F 3 (MAG)	F43SE	136	0.5	SW	3000	1,632	4	T 38 R LED	RTLED38	38	0.2	SW	3,000	456	1,176	0.4	$ 131.95	$ 945.00	$200	7.2	5.6
146LED	402A Classroom	8	High Bay MH 400	MH400/1	458	3.7	SW	3200	11,725	8	BAYLED78W	BAYLED78W	93	0.7	SW	3,200	2,381	9,344	2.9	$ 1,041.27	$ 6,753.56	$800	6.5	5.7
54LED	402A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	SW	3,200	1,024	819	0.3	$ 91.29	$ 2,253.60	$400	24.7	20.3
54LED	402 Auto Class	15	B 34 C F 2 (MAG)	F42EE	72	1.1	SW	3200	3,456	15	STLED4	STLED4	40	0.6	SW	3,200	1,920	1,536	0.5	$ 171.17	$ 4,225.50	$750	24.7	20.3
54LED	402 Auto Class Office/Tool Storage	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382	6	STLED4	STLED4	40	0.2	SW	3,200	768	614	0.2	$ 68.47	$ 1,690.20	$300	24.7	20.3
54LED	402 Auto Class Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	402 Auto Class Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230	1	STLED4	STLED4	40	0.0	SW	3,200	128	102	0.0	$ 11.41	$ 281.70	$50	24.7	20.3
54LED	402 Auto Class Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	SW	3,200	256	205	0.1	$ 22.82	$ 563.40	$100	24.7	20.3
54LED	Boiler Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360	5	STLED4	STLED4	40	0.2	SW	1,000	200	160	0.2	$ 21.86	$ 1,408.50	$250	64.4	53.0
54LED	Electrical Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360	5	STLED4	STLED4	40	0.2	SW	1,000	200	160	0.2	$ 21.86	$ 1,408.50	$250	64.4	53.0
54LED	Phone Room	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	Storage	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360	5	STLED4	STLED4	40	0.2	SW	1,000	200	160	0.2	$ 21.86	$ 1,408.50	$250	64.4	53.0
146LED	403 Class	13	High Bay MH 400	MH400/1	458	6.0	SW	3200	19,053	13	BAYLED78W	BAYLED78W	93	1.2	SW	3,200	3,869	15,184	4.7	$ 1,692.07	$ 10,974.54	$1,300	6.5	5.7
54LED	403 Class Mezzanine	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	SW	1,000	120	96	0.1	$ 13.11	$ 845.10	$150	64.4	53.0
71	403 Paint Storage	2	I 60	I60/1	60	0.1	SW	1000	120	2	CF 26	CFQ26/1-L	27	0.1	SW	1,000	54	66	0.1	$ 9.02	$ 13.50	$0	1.5	1.5
54LED	403 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	403 Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	403 Tool Storage	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691	3	STLED4	STLED4	40	0.1	SW	3,200	384	307	0.1	$ 34.23	$ 845.10	$150	24.7	20.3
54LED	403A Class	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,765	12	STLED4	STLED4	40	0.5	SW	3,200	1,536	1,229	0.4	$ 136.93	$ 3,380.40	$600	24.7	20.3
54LED	Computer Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	Storage	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	SW	1,000	120	96	0.1	$ 13.11	$ 845.10	$150	64.4	53.0
54LED	407 Media/Library	42	B 34 C F 2 (MAG)	F42EE	72	3.0	SW	3200	9,677	42	STLED4	STLED4	40	1.7	SW	3,200	5,376	4,301	1.3	$ 479.27	$ 11,831.40	$2,100	24.7	20.3
54LED	407 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	407 Faculty Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	407 Office	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3000	432	2	STLED4	STLED4	40	0.1	SW	3,000	240	192	0.1	$ 21.54	$ 563.40	$100	26.2	21.5
71	407 Office Restroom	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 4.51	$ 6.75	$0	1.5	1.5
54LED	407 Conference Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,152	5	STLED4	STLED4	40	0.2	SW	3,200	640	512	0.2	$ 57.06	$ 1,408.50	$250	24.7	20.3
146LED	404 Auto Body	13	High Bay MH 400	MH400/1	458	6.0	SW	3200	19,053	13	BAYLED78W	BAYLED78W	93	1.2	SW	3,200	3,869	15,184	4.7	$ 1,692.07	$ 10,974.54	$1,300	6.5	5.7
54LED	404 Auto Body	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691	3	STLED4	STLED4	40	0.1	SW	3,200	384	307	0.1	$ 34.23	$ 845.10	$150	24.7	20.3
71	404 Auto Body	2	I 60	I60/1	60	0.1	SW	3200	384	2	CF 26	CFQ26/1-L	27	0.1	SW	3,200	173	211	0.1	$ 23.54	$ 13.50	$0	0.6	0.6
54LED	404 Auto Body	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230	1	STLED4	STLED4	40	0.0	SW	3,200	128	102	0.0	$ 11.41	$ 281.70	$50	24.7	20.3
54LED	404 Auto Body	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	SW	3,200	256	205	0.1	$ 22.82	$ 563.40	$100	24.7	20.3
54LED	404 Auto Body	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691	3	STLED4	STLED4	40	0.1	SW	3,200	384	307	0.1	$ 34.23	$ 845.10	$150	24.7	20.3
54LED	404 Auto Body	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,765	12	STLED4	STLED4	40	0.5	SW	3,200	1,536	1,229	0.4	$ 136.93	$ 3,380.40	$600	24.7	20.3
54LED	405a	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	SW	3,200	1,024	819	0.3	$ 91.29	$ 2,253.60	$400	24.7	20.3
54LED	405a	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	SW	3,200	1,024	819	0.3	$ 91.29	$ 2,253.60	$400	24.7	20.3
146LED	405 Classroom	18	High Bay MH 400	MH400/1	458	8.2	SW	3200	26,381	18	BAYLED78W	BAYLED78W	93	1.7	SW	3,200	5,357	21,024	6.6	$ 2,342.86	$ 15,195.52	$1,800	6.5	5.7
54LED	405 Storage/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	SW	1,000	120	96	0.1	$ 13.11	$ 845.10	$150	64.4	53.0
71	405 Storage/Restroom	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 4.51	$ 6.75	$0	1.5	1.5
54LED	405 Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	405 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	405 Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	405 Mezzanine	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	SW	1,000	120	96	0.1	$ 13.11	$ 845.10	$150	64.4	53.0
54LED	406 Classroom	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382	6	STLED4	STLED4	40	0.2	SW	3,200	768	614	0.2	$ 68.47	$ 1,690.20	$300	24.7	20.3
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686	16	STLED4	STLED4	40	0.6	SW	3,200	2,048	1,638	0.5	$ 182.58	$ 4,507.20	$800	24.7	20.3
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686	16	STLED4	STLED4	40	0.6	SW	3,200	2,048	1,638	0.5	$ 182.58	$ 4,507.20	$800	24.7	20.3
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686	16	STLED4	STLED4	40	0.6	SW	3,200	2,048	1,638	0.5	$ 182.58	$ 4,507.20	$800	24.7	20.3
54LED	406 Boys Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	406 Girls Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	406 Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	406 Storage	4	B 34 C F 2 (MAG)	F42EE	72	0.3	SW	1000	288	4	STLED4	STLED4	40	0.2	SW	1,000	160	128	0.1	$ 17.48	$ 1,126.80	$200	64.4	53.0
146LED	408 Welding Class	15	High Bay MH 400	MH400/1	458	6.9	SW	3200	21,984	15	BAYLED78W	BAYLED78W	93	1.4	SW	3,200	4,464	17,520	5.5	$ 1,952.39	$ 12,662.93	$1,500	6.5	5.7
54LED	408 Welding Booths	30	B 34 C F 2 (MAG)	F42EE	72	2.2	SW	3200	6,912	30	STLED4	STLED4	40	1.2	SW	3,200	3,840	3,072	1.0	$ 342.34	$ 8,451.00	$1,500	24.7	20.3
54LED	408 Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	SW	3,200	256	205	0.1	$ 22.82	$ 563.40	$100	24.7	20.3
54LED	408 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	409A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	SW	3,200	1,024	819	0.3	$ 91.29	$ 2,253.60	$400	24.7	20.3
54LED	409A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	SW	3,200	1,024	819	0.3	$ 91.29	$ 2,253.60	$400	24.7	20.3
218LED	410 Chemistry	30	W 32 P F 3 (ELE)	F43ILL/2	90	2.7	SW	3200	8,640	30	STLED4	STLED4	40	1.2	SW	3,200	3,840	4,800	1.5	$ 534.90	$ 8,451.00	$1,500	15.8	13.0
55LED	411 Special Education	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	3200	1,053	7	2T 25 R LED	2RTLED	25	0.2	SW	3,200	560	493	0.2	$ 54.92	$ 1,417.50	$350	25.8	19.4
247LED	421 Faculty Lounge	9	T 40 R F 3 (MAG)	F43SE	136	1.2	SW	3000	3,672	9	T 38 R LED	RTLED38	38	0.3	SW	3,000	1,026	2,646	0.9	$ 296.88	$ 2,126.25	$450	7.2	5.6
218LED	412 Biology	11	W 32 P F 3 (ELE)	F43ILL/2	90	1.0	SW	3200	3,168	11	STLED4	STLED4	40	0.4	SW	3,200	1,408	1,760	0.6	$ 196.13	$ 3,098.70	$550	15.8	13.0
218LED	412A Biology	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	SW	3200	3,456	12	STLED4	STLED4	40	0.5	SW	3,200	1,536	1,920	0.6	$ 213.96	$ 3,380.40	$600	15.8	13.0
218LED	412B	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	SW	3200	3,456	12	STLED4	STLED4	40	0.5	SW	3,200	1,536	1,920	0.6	$ 213.96	$ 3,380.40	$600	15.8	13.0
54LED	413 Classroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	SW	3,200	256	205	0.1	$ 22.82	$ 563.40	$100	24.7	20.3
247LED	414 Classroom	15	T 40 R F 3 (MAG)	F43SE	136	2.0	SW	3200	6,528	15	T 38 R LED	RTLED38	38	0.6	SW	3,200	1,824	4,704	1.5	$ 524.20	$ 3,543.75	$750	6.8	5.3
247LED	414 Classroom	10	T 40 R F 3 (MAG)	F43SE	136	1.4	SW	3200	4,352	10	T 38 R LED	RTLED38	38	0.4	SW	3,200	1,216	3,136	1.0	$ 349.47	$ 2,362.50	$500	6.8	5.3
247LED	414 Classroom	13	T 40 R F 3 (MAG)	F43SE	136	1.8	SW	3200	5,658	13	T 38 R LED	RTLED38	38	0.5	SW	3,200	1,581	4,077	1.3	$ 454.31	$ 3,071.25	$650	6.8	5.3
28	414 Boys Restroom	1	CR 32 C F 1	FC12/1	31	0.0	SW	1000	31	1	CR 32 C F 1	FC12/1	31	0.0	SW	1,000	31	-	0.0	$ -	$ -	$0		#DIV/0!
54LED	414A Computer Lab	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,765	12	STLED4	STLED4	40	0.5	SW	3,200	1,536	1,229	0.4	$ 136.93	$ 3,380.40	$600	24.7	20.3
54LED	414A Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
54LED	414A Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	Rear Hall Mens Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
218LED	417 Classroom	18	W 32 P F 3 (ELE)	F43ILL/2	90	1.6	SW	3200	5,184	18	STLED4	STLED4	40	0.7	SW	3,200	2,304	2,880	0.9	$ 320.94	$ 5,070.60	$900	15.8	13.0
54LED	417 Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	SW	1,000	80	64	0.1	$ 8.74	$ 563.40	$100	64.4	53.0
54LED	415 Culinary Arts	38	B 34 C F 2 (MAG)	F42EE	72	2.7	SW	3200	8,755	38	STLED4	STLED4	40	1.5	SW	3,200	4,864	3,891	1.2	$ 433.63	$ 10,704.60	$1,900	24.7	20.3
54LED	415 Pantry Room	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	SW	1,000	40	32	0.0	$ 4.37	$ 281.70	$50	64.4	53.0
247LED	415 Office	2	T 40 R F 3 (MAG)	F43SE	136	0.3	SW	3000	816	2	T 38 R LED	RTLED38	38	0.1	SW	3,000	228	588	0.2	$ 65.97	$ 472.50	$100	7.2	5.6
54LED	415 Dishwashing Room	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	SW	3,200	256	205	0.1	$ 22.82	$ 563.40	$100	24.7	20.3
54LED	415 Boys Locker/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	SW	1,000	120	96	0.1	$ 13.11	$ 845.10	$150	64.4	53.0
54LED	415 Girls Locker/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	SW	1,000	120	96	0.1	$ 13.11	$ 845.10	$150	64.4	53.0
247LED	Culinary Arts Cafeteria	16	T 40 R F 3 (MAG)	F43SE	136	2.2	SW	3200	6,963	16	T 38 R LED	RTLED38	38	0.6	SW	3,200	1,946	5,018	1.6	$ 559.15	$ 3,780.00	$800	6.8	5.3
218LED	418 Classroom	32	W 32 P F 3 (ELE)	F43ILL/2	90	2.9	SW	3200	9,216	32	STLED4	STLED4	40	1.3	SW	3,200	4,096	5,120	1.6	$ 570.56	$ 9,014.40	$1,600	15.8	13.0
254LED	Guidance Office	5	CFQ26/2	CFQ26/2	66	0.3	SW	3000	990	5	EVO35/10	EVO35/10	39	0.2	SW	3,000	585	405	0.1	$ 45.44	$ 2,193.75	$175	48.3	44.4
254LED	Guidance Office	2	CFQ26/2	CFQ26/2	66	0.1	SW	3000	396	2	EVO35/10	EVO35/10	39	0.1	SW	3,000	234	162	0.1	$ 18.18	$ 877.50	$70	48.3	44.4
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594	3	EVO35/10	EVO35/10	39	0.1	SW	3,000	351	243	0.1	$ 27.26	$ 1,316.25	$105	48.3	44.4
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594	3	EVO35/10	EVO35/10	39	0.1	SW	3,000	351	243	0.1	$ 27.26	$ 1,316.25	$105	48.3	44.4
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594	3	EVO35/10	EVO35/10	39	0.1	SW	3,000	351	243	0.1	$ 27.26	$ 1,316.25	$105	48.3	44.4
254LED	Guidance Office	4	CFQ26/2	CFQ26/2	66	0.3	SW	3000	792	4	EVO35/10	EVO35/10	39	0.2	SW	3,000	468	324	0.1	$ 36.35	$ 1,755.00	$140	48.3	44.4
117	Main Entrance	6	CF 23	CFS23/1	23	0.1	SW	2280	315	6	CF 23	CFS23/1	23	0.1	SW	2,280	315	-	0.0	$ -	$ -	$0		#DIV/0!
	Total	**746**				**91.1**			**275,838**	**746**			**4,133**	**32.9**			**97,438**	**178,400**	**58.2**	**$19,969**	**$247,262**	**$40,350**		
																	Demand Savings			**58.2**	**$2,129**			
																	kWh Savings			**178,400**	**$17,840**			
																	Total savings				**$19,969**		**12.4**	**10.4**

Morris County Vocational Technical School LGEA - Building 4
CHA Project No. 28950
ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	**Unique description of the location - Room number/Room name: Floor number (if applicable)**	**No. of fixtures before the retrofit**	**Lighting Fixture Code**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (Fixt No.)**	**Pre-inst. control device**	**Estimated annual hours for the usage group**	**(kW/space) * (Annual Hours)**	**No. of fixtures after the retrofit**	**"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (Number of Fixtures)**	**Retrofit control device**	**Estimated annual hours for the usage group**	**(kW/space) * (Annual Hours)**	**(Original Annual kWh) - (Retrofit Annual kWh)**	**(Original Annual kW) - (Retrofit Annual kW)**	**(kW Saved) * ($/kWh)**	**Cost for renovations to lighting system**		**Length of time for renovations cost to be recovered**	**Length of time for renovations cost to be recovered**
4LED	Hallways	54	2B 34 R F 2 (u) (MAG)	FU2EE	72	3.9	SW	2280	8,864.6	54	2B 34 R F 2 (u) (MAG)	FU2EE	72	3.9	NONE	2280	8,864.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	401A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843.2	8	B 34 C F 2 (MAG)	F42EE	72	0.6	C-OCC	2240	1,290.2	553.0	0.0	$53.64	$270.00	$35.00	5.0	4.4
54LED	401A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843.2	8	B 34 C F 2 (MAG)	F42EE	72	0.6	C-OCC	2240	1,290.2	553.0	0.0	$53.64	$270.00	$35.00	5.0	4.4
146LED	401 Auto Class	15	High Bay MH 400	MH400/1	458	6.9	SW	3200	21,984.0	15	High Bay MH 400	MH400/1	458	6.9	NONE	3200	21,984.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	401 Auto Class Office/Tool Storage	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382.4	6	B 34 C F 2 (MAG)	F42EE	72	0.4	C-OCC	2240	967.7	414.7	0.0	$40.23	$270.00	$35.00	6.7	5.8
54LED	401 Auto Class Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	401 Auto Class Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230.4	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	230.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	401 Auto Class Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	460.8	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	Nurse Exam Room	4	B 34 C F 2 (MAG)	F42EE	72	0.3	SW	3000	864.0	4	B 34 C F 2 (MAG)	F42EE	72	0.3	NONE	3000	864.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Nurse Exam Room	2	CF 23	CFS23/1	23	0.0	SW	3000	138.0	2	CF 23	CFS23/1	23	0.0	NONE	3000	138.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
247LED	Nurse Office	4	T 40 R F 3 (MAG)	F43SE	136	0.5	SW	3000	1,632.0	4	T 40 R F 3 (MAG)	F43SE	136	0.5	C-OCC	1500	816.0	816.0	0.0	$79.15	$270.00	$35.00	3.4	3.0
146LED	402A Classroom	8	High Bay MH 400	MH400/1	458	3.7	SW	3200	11,724.8	8	High Bay MH 400	MH400/1	458	3.7	C-OCC	2240	8,207.4	3,517.4	0.0	$341.19	$270.00	$35.00	0.8	0.7
54LED	402A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843.2	8	B 34 C F 2 (MAG)	F42EE	72	0.6	C-OCC	2240	1,290.2	553.0	0.0	$53.64	$270.00	$35.00	5.0	4.4
54LED	402 Auto Class	15	B 34 C F 2 (MAG)	F42EE	72	1.1	SW	3200	3,456.0	15	B 34 C F 2 (MAG)	F42EE	72	1.1	NONE	3200	3,456.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	402 Auto Class Office/Tool Storage	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382.4	6	B 34 C F 2 (MAG)	F42EE	72	0.4	C-OCC	2240	967.7	414.7	0.0	$40.23	$270.00	$35.00	6.7	5.8
54LED	402 Auto Class Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	402 Auto Class Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230.4	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	230.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	402 Auto Class Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	460.8	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	Boiler Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360.0	5	B 34 C F 2 (MAG)	F42EE	72	0.4	NONE	1000	360.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	Electrical Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360.0	5	B 34 C F 2 (MAG)	F42EE	72	0.4	NONE	1000	360.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	Phone Room	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	Storage	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360.0	5	B 34 C F 2 (MAG)	F42EE	72	0.4	NONE	1000	360.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
146LED	403 Class	13	High Bay MH 400	MH400/1	458	6.0	SW	3200	19,052.8	13	High Bay MH 400	MH400/1	458	6.0	C-OCC	2240	13,337.0	5,715.8	0.0	$554.44	$270.00	$35.00	0.5	0.4
54LED	403 Class Mezzanine	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216.0	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	1000	216.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	403 Paint Storage	2	I 60	I60/1	60	0.1	SW	1000	120.0	2	I 60	I60/1	60	0.1	NONE	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	403 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	403 Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	403 Tool Storage	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691.2	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	3200	691.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	403A Class	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,764.8	12	B 34 C F 2 (MAG)	F42EE	72	0.9	C-OCC	2240	1,935.4	829.4	0.0	$80.46	$270.00	$35.00	3.4	2.9
54LED	Computer Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	Storage	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216.0	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	1000	216.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	407 Media/Library	42	B 34 C F 2 (MAG)	F42EE	72	3.0	SW	3200	9,676.8	42	B 34 C F 2 (MAG)	F42EE	72	3.0	C-OCC	2240	6,773.8	2,903.0	0.0	$281.59	$270.00	$35.00	1.0	0.8
54LED	407 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	407 Faculty Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	C-OCC	700	50.4	21.6	0.0	$2.10	$270.00	$35.00	128.9	112.2
54LED	407 Office	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3000	432.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	C-OCC	1500	216.0	216.0	0.0	$20.95	$270.00	$35.00	12.9	11.2
71	407 Office Restroom	1	I 60	I60/1	60	0.1	SW	1000	60.0	1	I 60	I60/1	60	0.1	C-OCC	700	42.0	18.0	0.0	$1.75	$270.00	$35.00	154.6	134.6
54LED	407 Conference Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,152.0	5	B 34 C F 2 (MAG)	F42EE	72	0.4	C-OCC	2240	806.4	345.6	0.0	$33.52	$270.00	$35.00	8.1	7.0
146LED	404 Auto Body	13	High Bay MH 400	MH400/1	458	6.0	SW	3200	19,052.8	13	High Bay MH 400	MH400/1	458	6.0	NONE	3200	19,052.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	404 Auto Body	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691.2	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	3200	691.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	404 Auto Body	2	I 60	I60/1	60	0.1	SW	3200	384.0	2	I 60	I60/1	60	0.1	NONE	3200	384.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	404 Auto Body	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230.4	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	230.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	404 Auto Body	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	460.8	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	404 Auto Body	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691.2	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	3200	691.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	404 Auto Body	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,764.8	12	B 34 C F 2 (MAG)	F42EE	72	0.9	NONE	3200	2,764.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	405a	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843.2	8	B 34 C F 2 (MAG)	F42EE	72	0.6	C-OCC	2240	1,290.2	553.0	0.0	$53.64	$270.00	$35.00	5.0	4.4
54LED	405a	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843.2	8	B 34 C F 2 (MAG)	F42EE	72	0.6	C-OCC	2240	1,290.2	553.0	0.0	$53.64	$270.00	$35.00	5.0	4.4
146LED	405 Classroom	18	High Bay MH 400	MH400/1	458	8.2	SW	3200	26,380.8	18	High Bay MH 400	MH400/1	458	8.2	NONE	3200	26,380.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	405 Storage/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216.0	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	1000	216.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	405 Storage/Restroom	1	I 60	I60/1	60	0.1	SW	1000	60.0	1	I 60	I60/1	60	0.1	NONE	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	405 Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	405 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	405 Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	405 Mezzanine	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216.0	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	1000	216.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	406 Classroom	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382.4	6	B 34 C F 2 (MAG)	F42EE	72	0.4	C-OCC	2240	967.7	414.7	0.0	$40.23	$270.00	$35.00	6.7	5.8
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686.4	16	B 34 C F 2 (MAG)	F42EE	72	1.2	C-OCC	2240	2,580.5	1,105.9	0.0	$107.27	$270.00	$35.00	2.5	2.2
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686.4	16	B 34 C F 2 (MAG)	F42EE	72	1.2	C-OCC	2240	2,580.5	1,105.9	0.0	$107.27	$270.00	$35.00	2.5	2.2
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686.4	16	B 34 C F 2 (MAG)	F42EE	72	1.2	C-OCC	2240	2,580.5	1,105.9	0.0	$107.27	$270.00	$35.00	2.5	2.2
54LED	406 Boys Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	406 Girls Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	406 Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	406 Storage	4	B 34 C F 2 (MAG)	F42EE	72	0.3	SW	1000	288.0	4	B 34 C F 2 (MAG)	F42EE	72	0.3	NONE	1000	288.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
146LED	408 Welding Class	15	High Bay MH 400	MH400/1	458	6.9	SW	3200	21,984.0	15	High Bay MH 400	MH400/1	458	6.9	NONE	3200	21,984.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	408 Welding Booths	30	B 34 C F 2 (MAG)	F42EE	72	2.2	SW	3200	6,912.0	30	B 34 C F 2 (MAG)	F42EE	72	2.2	NONE	3200	6,912.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	408 Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	460.8	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	408 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	409A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843.2	8	B 34 C F 2 (MAG)	F42EE	72	0.6	C-OCC	2240	1,290.2	553.0	0.0	$53.64	$270.00	$35.00	5.0	4.4
54LED	409A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843.2	8	B 34 C F 2 (MAG)	F42EE	72	0.6	C-OCC	2240	1,290.2	553.0	0.0	$53.64	$270.00	$35.00	5.0	4.4
218LED	410 Chemistry	30	W 32 P F 3 (ELE)	F43ILL/2	90	2.7	SW	3200	8,640.0	30	W 32 P F 3 (ELE)	F43ILL/2	90	2.7	C-OCC	2240	6,048.0	2,592.0	0.0	$251.42	$270.00	$35.00	1.1	0.9
55LED	411 Special Education	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	3200	1,052.8	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	C-OCC	2240	737.0	315.8	0.0	$30.64	$270.00	$35.00	8.8	7.7
247LED	421 Faculty Lounge	9	T 40 R F 3 (MAG)	F43SE	136	1.2	SW	3000	3,672.0	9	T 40 R F 3 (MAG)	F43SE	136	1.2	C-OCC	1500	1,836.0	1,836.0	0.0	$178.09	$270.00	$35.00	1.5	1.3
218LED	412 Biology	11	W 32 P F 3 (ELE)	F43ILL/2	90	1.0	SW	3200	3,168.0	11	W 32 P F 3 (ELE)	F43ILL/2	90	1.0	C-OCC	2240	2,217.6	950.4	0.0	$92.19	$270.00	$35.00	2.9	2.5
218LED	412A Biology	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	SW	3200	3,456.0	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	2240	2,419.2	1,036.8	0.0	$100.57	$270.00	$35.00	2.7	2.3
218LED	412B	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	SW	3200	3,456.0	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	C-OCC	2240	2,419.2	1,036.8	0.0	$100.57	$270.00	$35.00	2.7	2.3
54LED	413 Classroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	460.8	2	B 34 C F 2 (MAG)	F42EE	72	0.1	C-OCC	2240	322.6	138.2	0.0	$13.41	$270.00	$35.00	20.1	17.5
247LED	414 Classroom	15	T 40 R F 3 (MAG)	F43SE	136	2.0	SW	3200	6,528.0	15	T 40 R F 3 (MAG)	F43SE	136	2.0	C-OCC	2240	4,569.6	1,958.4	0.0	$189.96	$270.00	$35.00	1.4	1.2
247LED	414 Classroom	10	T 40 R F 3 (MAG)	F43SE	136	1.4	SW	3200	4,352.0	10	T 40 R F 3 (MAG)	F43SE	136	1.4	C-OCC	2240	3,046.4	1,305.6	0.0	$126.64	$270.00	$35.00	2.1	1.9
247LED	414 Classroom	13	T 40 R F 3 (MAG)	F43SE	136	1.8	SW	3200	5,657.6	13	T 40 R F 3 (MAG)	F43SE	136	1.8	C-OCC	2240	3,960.3	1,697.3	0.0	$164.64	$270.00	$35.00	1.6	1.4
28	414 Boys Restroom	1	CR 32 C F 1	FC12/1	31	0.0	SW	1000	31.0	1	CR 32 C F 1	FC12/1	31	0.0	NONE	1000	31.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	414A Computer Lab	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,764.8	12	B 34 C F 2 (MAG)	F42EE	72	0.9	C-OCC	2240	1,935.4	829.4	0.0	$80.46	$270.00	$35.00	3.4	2.9
54LED	414A Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	414A Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	Rear Hall Mens Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
218LED	417 Classroom	18	W 32 P F 3 (ELE)	F43ILL/2	90	1.6	SW	3200	5,184.0	18	W 32 P F 3 (ELE)	F43ILL/2	90	1.6	C-OCC	2240	3,628.8	1,555.2	0.0	$150.85	$270.00	$35.00	1.8	1.6
54LED	417 Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	415 Culinary Arts	38	B 34 C F 2 (MAG)	F42EE	72	2.7	SW	3200	8,755.2	38	B 34 C F 2 (MAG)	F42EE	72	2.7	NONE	3200	8,755.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	415 Pantry Room	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
247LED	415 Office	2	T 40 R F 3 (MAG)	F43SE	136	0.3	SW	3000	816.0	2	T 40 R F 3 (MAG)	F43SE	136	0.3	C-OCC	1500	408.0	408.0	0.0	$39.58	$270.00	$35.00	6.8	5.9
54LED	415 Dishwashing Room	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	460.8	2	B 34 C F 2 (MAG)	F42EE	72	0.1	NONE	3200	460.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	415 Boys Locker/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216.0	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	1000	216.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
54LED	415 Girls Locker/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216.0	3	B 34 C F 2 (MAG)	F42EE	72	0.2	NONE	1000	216.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
247LED	Culinary Arts Cafeteria	16	T 40 R F 3 (MAG)	F43SE	136	2.2	SW	3200	6,963.2	16	T 40 R F 3 (MAG)	F43SE	136	2.2	C-OCC	2240	4,874.2	2,089.0	0.0	$202.63	$270.00	$35.00	1.3	1.2
218LED	418 Classroom	32	W 32 P F 3 (ELE)	F43ILL/2	90	2.9	SW	3200	9,216.0	32	W 32 P F 3 (ELE)	F43ILL/2	90	2.9	C-OCC	2240	6,451.2	2,764.8	0.0	$268.19	$270.00	$35.00	1.0	0.9
254LED	Guidance Office	5	CFQ26/2	CFQ26/2	66	0.3	SW	3000	990.0	5	CFQ26/2	CFQ26/2	66	0.3	C-OCC	1500	495.0	495.0	0.0	$48.02	$270.00	$35.00	5.6	4.9
254LED	Guidance Office	2	CFQ26/2	CFQ26/2	66	0.1	SW	3000	396.0	2	CFQ26/2	CFQ26/2	66	0.1	C-OCC	1500	198.0	198.0	0.0	$19.21	$270.00	$35.00	14.1	12.2
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594.0	3	CFQ26/2	CFQ26/2	66	0.2	C-OCC	1500	297.0	297.0	0.0	$28.81	$270.00	$35.00	9.4	8.2
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594.0	3	CFQ26/2	CFQ26/2	66	0.2	C-OCC	1500	297.0	297.0	0.0	$28.81	$270.00	$35.00	9.4	8.2
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594.0	3	CFQ26/2	CFQ26/2	66	0.2	C-OCC	1500	297.0	297.0	0.0	$28.81	$270.00	$35.00	9.4	8.2
254LED	Guidance Office	4	CFQ26/2	CFQ26/2	66	0.3	SW	3000	792.0	4	CFQ26/2	CFQ26/2	66	0.3	C-OCC	1500	396.0	396.0	0.0	$38.41	$270.00	$35.00	7.0	6.1
117	Main Entrance	6	CF 23	CFS23/1	23	0.1	SW	2280	314.6	6	CF 23	CFS23/1	23	0.1	NONE	2280	314.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
	Total	**746**				**91.1**			**275837.9**	**746.0**				**91.1**			**230528.5**	**45309.4**	**0.0**	**4395.0**	**11610.0**	**1505.0**		
																	Demand Savings			**0.0**	**$0**			
																	kWh Savings			**45,309**	**$5,528**			
																	Total Savings				**$5,528**		**2.1**	**1.8**

Morris County Vocational Technical School LGEA - Building 4
CHA Project No. 28950
ECM-L3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Annual kWh**	**Number of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	**Unique description of the location - Room number/Room name: Floor number (if applicable)**	**No. of fixtures before the retrofit**	**Lighting Fixture Code**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (Fixt No.)**	**Pre-inst. control device**	**Estimated daily hours for the usage group**	**(kW/space) * (Annual Hours)**	**No. of fixtures after the retrofit**	**Lighting Fixture Code**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (Number of Fixtures)**	**Retrofit control device**	**Estimated annual hours for the usage group**	**(kW/space) * (Annual Hours)**	**(Original Annual kWh) - (Retrofit Annual kWh)**	**(Original Annual kW) - (Retrofit Annual kW)**	**(kWh Saved) * ($/kWh)**	**Cost for renovations to lighting system**	**Prescriptive Lighting Measures**	**Length of time for renovations cost to be recovered**	**Length of time for renovations cost to be recovered**
4LED	Hallways	54	2B 34 R F 2 (u) (MAG)	FU2EE	72	3.9	SW	2280	8,865	54	2T 25 R LED	2RTLED	25	1.4	NONE	2,280	3,078	5,787	2.5	$ 654.19	$ 10,935.00	$ 2,700	16.7	12.6
54LED	401A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	C-OCC	2,240	717	1,126	0.3	$ 118.63	$ 2,523.60	$ 435	21.3	17.6
54LED	401A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	C-OCC	2,240	717	1,126	0.3	$ 118.63	$ 2,523.60	$ 435	21.3	17.6
146LED	401 Auto Class	15	High Bay MH 400	MH400/1	458	6.9	SW	3200	21,984	15	BAYLED78W	BAYLED78W	93	1.4	NONE	3,200	4,464	17,520	5.5	$ 1,899.83	$ 12,662.93	$ 1,500	6.7	5.9
54LED	401 Auto Class Office/Tool Storage	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382	6	STLED4	STLED4	40	0.2	C-OCC	2,240	538	845	0.2	$ 88.97	$ 1,960.20	$ 335	22.0	18.3
54LED	401 Auto Class Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	401 Auto Class Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230	1	STLED4	STLED4	40	0.0	NONE	3,200	128	102	0.0	$ 11.10	$ 281.70	$ 50	25.4	20.9
54LED	401 Auto Class Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	NONE	3,200	256	205	0.1	$ 22.21	$ 563.40	$ 100	25.4	20.9
54LED	Nurse Exam Room	4	B 34 C F 2 (MAG)	F42EE	72	0.3	SW	3000	864	4	STLED4	STLED4	40	0.2	NONE	3,000	480	384	0.1	$ 41.93	$ 1,126.80	$ 200	26.9	22.1
117	Nurse Exam Room	2	CF 23	CFS23/1	23	0.0	SW	3000	138	2	CF 23	CFS23/1	23	0.0	NONE	3,000	138	-	0.0	$ -	$ -	$ -		
247LED	Nurse Office	4	T 40 R F 3 (MAG)	F43SE	136	0.5	SW	3000	1,632	4	T 38 R LED	RTLED38	38	0.2	C-OCC	1,500	228	1,404	0.4	$ 150.54	$ 1,215.00	$ 235	8.1	6.5
146LED	402A Classroom	8	High Bay MH 400	MH400/1	458	3.7	SW	3200	11,725	8	BAYLED78W	BAYLED78W	93	0.7	C-OCC	2,240	1,667	10,058	2.9	$ 1,082.52	$ 7,023.56	$ 835	6.5	5.7
54LED	402A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	C-OCC	2,240	717	1,126	0.3	$ 118.63	$ 2,523.60	$ 435	21.3	17.6
54LED	402 Auto Class	15	B 34 C F 2 (MAG)	F42EE	72	1.1	SW	3200	3,456	15	STLED4	STLED4	40	0.6	NONE	3,200	1,920	1,536	0.5	$ 166.56	$ 4,225.50	$ 750	25.4	20.9
54LED	402 Auto Class Office/Tool Storage	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382	6	STLED4	STLED4	40	0.2	C-OCC	2,240	538	845	0.2	$ 88.97	$ 1,960.20	$ 335	22.0	18.3
54LED	402 Auto Class Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	402 Auto Class Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230	1	STLED4	STLED4	40	0.0	NONE	3,200	128	102	0.0	$ 11.10	$ 281.70	$ 50	25.4	20.9
54LED	402 Auto Class Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	NONE	3,200	256	205	0.1	$ 22.21	$ 563.40	$ 100	25.4	20.9
54LED	Boiler Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360	5	STLED4	STLED4	40	0.2	NONE	1,000	200	160	0.2	$ 21.38	$ 1,408.50	$ 250	65.9	54.2
54LED	Electrical Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360	5	STLED4	STLED4	40	0.2	NONE	1,000	200	160	0.2	$ 21.38	$ 1,408.50	$ 250	65.9	54.2
54LED	Phone Room	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	Storage	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	1000	360	5	STLED4	STLED4	40	0.2	NONE	1,000	200	160	0.2	$ 21.38	$ 1,408.50	$ 250	65.9	54.2
146LED	403 Class	13	High Bay MH 400	MH400/1	458	6.0	SW	3200	19,053	13	BAYLED78W	BAYLED78W	93	1.2	C-OCC	2,240	2,708	16,345	4.7	$ 1,759.10	$ 11,244.54	$ 1,335	6.4	5.6
54LED	403 Class Mezzanine	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	NONE	1,000	120	96	0.1	$ 12.83	$ 845.10	$ 150	65.9	54.2
71	403 Paint Storage	2	I 60	I60/1	60	0.1	SW	1000	120	2	CF 26	CFQ26/1-L	27	0.1	NONE	1,000	54	66	0.1	$ 8.82	$ 13.50	$ -	1.5	1.5
54LED	403 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	403 Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	403 Tool Storage	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691	3	STLED4	STLED4	40	0.1	NONE	3,200	384	307	0.1	$ 33.31	$ 845.10	$ 150	25.4	20.9
54LED	403A Class	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,765	12	STLED4	STLED4	40	0.5	C-OCC	2,240	1,075	1,690	0.4	$ 177.95	$ 3,650.40	$ 635	20.5	16.9
54LED	Computer Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	Storage	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	NONE	1,000	120	96	0.1	$ 12.83	$ 845.10	$ 150	65.9	54.2
54LED	407 Media/Library	42	B 34 C F 2 (MAG)	F42EE	72	3.0	SW	3200	9,677	42	STLED4	STLED4	40	1.7	C-OCC	2,240	3,763	5,914	1.3	$ 622.81	$ 12,101.40	$ 2,135	19.4	16.0
54LED	407 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	407 Faculty Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	C-OCC	700	28	44	0.0	$ 5.44	$ 551.70	$ 85	101.4	85.8
54LED	407 Office	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3000	432	2	STLED4	STLED4	40	0.1	C-OCC	1,500	120	312	0.1	$ 32.61	$ 833.40	$ 135	25.6	21.4
71	407 Office Restroom	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	C-OCC	700	19	41	0.0	$ 5.19	$ 276.75	$ 35	53.3	46.5
54LED	407 Conference Room	5	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,152	5	STLED4	STLED4	40	0.2	C-OCC	2,240	448	704	0.2	$ 74.14	$ 1,678.50	$ 285	22.6	18.8
146LED	404 Auto Body	13	High Bay MH 400	MH400/1	458	6.0	SW	3200	19,053	13	BAYLED78W	BAYLED78W	93	1.2	NONE	3,200	3,869	15,184	4.7	$ 1,646.52	$ 10,974.54	$ 1,300	6.7	5.9
54LED	404 Auto Body	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691	3	STLED4	STLED4	40	0.1	NONE	3,200	384	307	0.1	$ 33.31	$ 845.10	$ 150	25.4	20.9
71	404 Auto Body	2	I 60	I60/1	60	0.1	SW	3200	384	2	CF 26	CFQ26/1-L	27	0.1	NONE	3,200	173	211	0.1	$ 22.90	$ 13.50	$ -	0.6	0.6
54LED	404 Auto Body	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	230	1	STLED4	STLED4	40	0.0	NONE	3,200	128	102	0.0	$ 11.10	$ 281.70	$ 50	25.4	20.9
54LED	404 Auto Body	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	NONE	3,200	256	205	0.1	$ 22.21	$ 563.40	$ 100	25.4	20.9
54LED	404 Auto Body	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	3200	691	3	STLED4	STLED4	40	0.1	NONE	3,200	384	307	0.1	$ 33.31	$ 845.10	$ 150	25.4	20.9
54LED	404 Auto Body	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,765	12	STLED4	STLED4	40	0.5	NONE	3,200	1,536	1,229	0.4	$ 133.25	$ 3,380.40	$ 600	25.4	20.9
54LED	405a	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	C-OCC	2,240	717	1,126	0.3	$ 118.63	$ 2,523.60	$ 435	21.3	17.6
54LED	405a	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	C-OCC	2,240	717	1,126	0.3	$ 118.63	$ 2,523.60	$ 435	21.3	17.6
146LED	405 Classroom	18	High Bay MH 400	MH400/1	458	8.2	SW	3200	26,381	18	BAYLED78W	BAYLED78W	93	1.7	NONE	3,200	5,357	21,024	6.6	$ 2,279.79	$ 15,195.52	$ 1,800	6.7	5.9
54LED	405 Storage/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	NONE	1,000	120	96	0.1	$ 12.83	$ 845.10	$ 150	65.9	54.2
71	405 Storage/Restroom	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	NONE	1,000	27	33	0.0	$ 4.41	$ 6.75	$ -	1.5	1.5
54LED	405 Locker/Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	405 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	405 Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	405 Mezzanine	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	NONE	1,000	120	96	0.1	$ 12.83	$ 845.10	$ 150	65.9	54.2
54LED	406 Classroom	6	B 34 C F 2 (MAG)	F42EE	72	0.4	SW	3200	1,382	6	STLED4	STLED4	40	0.2	C-OCC	2,240	538	845	0.2	$ 88.97	$ 1,960.20	$ 335	22.0	18.3
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686	16	STLED4	STLED4	40	0.6	C-OCC	2,240	1,434	2,253	0.5	$ 237.26	$ 4,777.20	$ 835	20.1	16.6
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686	16	STLED4	STLED4	40	0.6	C-OCC	2,240	1,434	2,253	0.5	$ 237.26	$ 4,777.20	$ 835	20.1	16.6
54LED	406 Classroom	16	B 34 C F 2 (MAG)	F42EE	72	1.2	SW	3200	3,686	16	STLED4	STLED4	40	0.6	C-OCC	2,240	1,434	2,253	0.5	$ 237.26	$ 4,777.20	$ 835	20.1	16.6
54LED	406 Boys Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	406 Girls Restroom	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	406 Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	406 Storage	4	B 34 C F 2 (MAG)	F42EE	72	0.3	SW	1000	288	4	STLED4	STLED4	40	0.2	NONE	1,000	160	128	0.1	$ 17.10	$ 1,126.80	$ 200	65.9	54.2
146LED	408 Welding Class	15	High Bay MH 400	MH400/1	458	6.9	SW	3200	21,984	15	BAYLED78W	BAYLED78W	93	1.4	NONE	3,200	4,464	17,520	5.5	$ 1,899.83	$ 12,662.93	$ 1,500	6.7	5.9
54LED	408 Welding Booths	30	B 34 C F 2 (MAG)	F42EE	72	2.2	SW	3200	6,912	30	STLED4	STLED4	40	1.2	NONE	3,200	3,840	3,072	1.0	$ 333.12	$ 8,451.00	$ 1,500	25.4	20.9
54LED	408 Tool Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	NONE	3,200	256	205	0.1	$ 22.21	$ 563.40	$ 100	25.4	20.9
54LED	408 Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	409A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	C-OCC	2,240	717	1,126	0.3	$ 118.63	$ 2,523.60	$ 435	21.3	17.6
54LED	409A Classroom	8	B 34 C F 2 (MAG)	F42EE	72	0.6	SW	3200	1,843	8	STLED4	STLED4	40	0.3	C-OCC	2,240	717	1,126	0.3	$ 118.63	$ 2,523.60	$ 435	21.3	17.6
218LED	410 Chemistry	30	W 32 P F 3 (ELE)	F43ILL/2	90	2.7	SW	3200	8,640	30	STLED4	STLED4	40	1.2	C-OCC	2,240	2,688	5,952	1.5	$ 632.24	$ 8,721.00	$ 1,535	13.8	11.4
55LED	411 Special Education	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	3200	1,053	7	2T 25 R LED	2RTLED	25	0.2	C-OCC	2,240	392	661	0.2	$ 69.73	$ 1,687.50	$ 385	24.2	18.7
247LED	421 Faculty Lounge	9	T 40 R F 3 (MAG)	F43SE	136	1.2	SW	3000	3,672	9	T 38 R LED	RTLED38	38	0.3	C-OCC	1,500	513	3,159	0.9	$ 338.70	$ 2,396.25	$ 485	7.1	5.6
218LED	412 Biology	11	W 32 P F 3 (ELE)	F43ILL/2	90	1.0	SW	3200	3,168	11	STLED4	STLED4	40	0.4	C-OCC	2,240	986	2,182	0.6	$ 231.82	$ 3,368.70	$ 585	14.5	12.0
218LED	412A Biology	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	SW	3200	3,456	12	STLED4	STLED4	40	0.5	C-OCC	2,240	1,075	2,381	0.6	$ 252.90	$ 3,650.40	$ 635	14.4	11.9
218LED	412B	12	W 32 P F 3 (ELE)	F43ILL/2	90	1.1	SW	3200	3,456	12	STLED4	STLED4	40	0.5	C-OCC	2,240	1,075	2,381	0.6	$ 252.90	$ 3,650.40	$ 635	14.4	11.9
54LED	413 Classroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	C-OCC	2,240	179	282	0.1	$ 29.66	$ 833.40	$ 135	28.1	23.5
247LED	414 Classroom	15	T 40 R F 3 (MAG)	F43SE	136	2.0	SW	3200	6,528	15	T 38 R LED	RTLED38	38	0.6	C-OCC	2,240	1,277	5,251	1.5	$ 563.17	$ 3,813.75	$ 785	6.8	5.4
247LED	414 Classroom	10	T 40 R F 3 (MAG)	F43SE	136	1.4	SW	3200	4,352	10	T 38 R LED	RTLED38	38	0.4	C-OCC	2,240	851	3,501	1.0	$ 375.45	$ 2,632.50	$ 535	7.0	5.6
247LED	414 Classroom	13	T 40 R F 3 (MAG)	F43SE	136	1.8	SW	3200	5,658	13	T 38 R LED	RTLED38	38	0.5	C-OCC	2,240	1,107	4,551	1.3	$ 488.08	$ 3,341.25	$ 685	6.8	5.4
28	414 Boys Restroom	1	CR 32 C F 1	FC12/1	31	0.0	SW	1000	31	1	CR 32 C F 1	FC12/1	31	0.0	NONE	1,000	31	-	0.0	$ -	$ -	$ -		
54LED	414A Computer Lab	12	B 34 C F 2 (MAG)	F42EE	72	0.9	SW	3200	2,765	12	STLED4	STLED4	40	0.5	C-OCC	2,240	1,075	1,690	0.4	$ 177.95	$ 3,650.40	$ 635	20.5	16.9
54LED	414A Storage	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
54LED	414A Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	Rear Hall Mens Restroom	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
218LED	417 Classroom	18	W 32 P F 3 (ELE)	F43ILL/2	90	1.6	SW	3200	5,184	18	STLED4	STLED4	40	0.7	C-OCC	2,240	1,613	3,571	0.9	$ 379.35	$ 5,340.60	$ 935	14.1	11.6
54LED	417 Storage	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	STLED4	STLED4	40	0.1	NONE	1,000	80	64	0.1	$ 8.55	$ 563.40	$ 100	65.9	54.2
54LED	415 Culinary Arts	38	B 34 C F 2 (MAG)	F42EE	72	2.7	SW	3200	8,755	38	STLED4	STLED4	40	1.5	NONE	3,200	4,864	3,891	1.2	$ 421.95	$ 10,704.60	$ 1,900	25.4	20.9
54LED	415 Pantry Room	1	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	STLED4	STLED4	40	0.0	NONE	1,000	40	32	0.0	$ 4.28	$ 281.70	$ 50	65.9	54.2
247LED	415 Office	2	T 40 R F 3 (MAG)	F43SE	136	0.3	SW	3000	816	2	T 38 R LED	RTLED38	38	0.1	C-OCC	1,500	114	702	0.2	$ 75.27	$ 742.50	$ 135	9.9	8.1
54LED	415 Dishwashing Room	2	B 34 C F 2 (MAG)	F42EE	72	0.1	SW	3200	461	2	STLED4	STLED4	40	0.1	NONE	3,200	256	205	0.1	$ 22.21	$ 563.40	$ 100	25.4	20.9
54LED	415 Boys Locker/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	NONE	1,000	120	96	0.1	$ 12.83	$ 845.10	$ 150	65.9	54.2
54LED	415 Girls Locker/Restroom	3	B 34 C F 2 (MAG)	F42EE	72	0.2	SW	1000	216	3	STLED4	STLED4	40	0.1	NONE	1,000	120	96	0.1	$ 12.83	$ 845.10	$ 150	65.9	54.2
247LED	Culinary Arts Cafeteria	16	T 40 R F 3 (MAG)	F43SE	136	2.2	SW	3200	6,963	16	T 38 R LED	RTLED38	38	0.6	C-OCC	2,240	1,362	5,601	1.6	$ 600.71	$ 4,050.00	$ 835	6.7	5.4
218LED	418 Classroom	32	W 32 P F 3 (ELE)	F43ILL/2	90	2.9	SW	3200	9,216	32	STLED4	STLED4	40	1.3	C-OCC	2,240	2,867	6,349	1.6	$ 674.39	$ 9,284.40	$ 1,635	13.8	11.3
254LED	Guidance Office	5	CFQ26/2	CFQ26/2	66	0.3	SW	3000	990	5	EVO35/10	EVO35/10	39	0.2	C-OCC	1,500	293	698	0.1	$ 72.60	$ 2,463.75	$ 210	33.9	31.0
254LED	Guidance Office	2	CFQ26/2	CFQ26/2	66	0.1	SW	3000	396	2	EVO35/10	EVO35/10	39	0.1	C-OCC	1,500	117	279	0.1	$ 29.04	$ 1,147.50	$ 105	39.5	35.9
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594	3	EVO35/10	EVO35/10	39	0.1	C-OCC	1,500	176	419	0.1	$ 43.56	$ 1,586.25	$ 140	36.4	33.2
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594	3	EVO35/10	EVO35/10	39	0.1	C-OCC	1,500	176	419	0.1	$ 43.56	$ 1,586.25	$ 140	36.4	33.2
254LED	Guidance Office	3	CFQ26/2	CFQ26/2	66	0.2	SW	3000	594	3	EVO35/10	EVO35/10	39	0.1	C-OCC	1,500	176	419	0.1	$ 43.56	$ 1,586.25	$ 140	36.4	33.2
254LED	Guidance Office	4	CFQ26/2	CFQ26/2	66	0.3	SW	3000	792	4	EVO35/10	EVO35/10	39	0.2	C-OCC	1,500	234	558	0.1	$ 58.08	$ 2,025.00	$ 175	34.9	31.9
117	Main Entrance	6	CF 23	CFS23/1	23	0.1	SW	2280	315	6	CF 23	CFS23/1	23	0.1	NONE	2,280	315	-	0.0	$ -	$ -	$ -		
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
S	**Total**	**746**				**91.1**			**275,838**	**746**				**32.9**			**79,356**		**58.2**	**21,187**	**258,872**	**$41,855**		
S																	**Demand Savings**			**58.2**	**$2,129**			
S																	**kWh Savings**			**196,482**	**$19,059**			
S																	**Total Savings**				**$21,187**		**12.2**	**10.2**

APPENDIX D

New Jersey Board of Public Utilities Incentives

i. **Smart Start**

ii. **Direct Install**

iii. **Pay for Performance (P4P)**

iv. **Energy Savings Improvement Plan (ESIP)**

I. SMART START

NJ SmartStart Buildings

Program Overview

With New Jersey SmartStart Buildings ...

... A smart start now means better performance later! Whether you're starting a commer industrial project from the ground up, renovating existing space, or upgrading equipmen unique opportunities to upgrade the energy efficiency of the project.

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

New Jersey SmartStart Buildings can provide a range of support — at no cost to you — substantial energy savings, both now and for the future. Learn more about:

- Project Categories
- Custom Measures
- Incentives for Qualifying Equipment and Projects
- Program Terms and Conditions
- Find a Trade Ally

Please note: pre-approval is required for almost all energy efficiency incentives. T you must submit an application form (and applicable worksheets) and receive an approv from the program before any equipment is installed (click here for complete Terms and Upon receipt of an approval letter, you may proceed to install the equipment listed on yc approved application. Equipment installed prior to the date of the approval letter is not e an incentive. **Any customer and/or agent who purchases equipment prior to the re incentive approval letter does so at his/her own risk.**

Getting Started

Submit your project application form as soon as you know you will be doing a constructi or replacing/adding equipment.

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Apply for pre-approval by submitting an application for the type of equipment you have c install. The application should be accompanied by a related worksheet, where applicabl manufacturer's specification sheet (refer to the specific program requirements on the ba application for specs needed for your project) for the equipment you are planning to inst (Program representatives will review your application package and approve it, reject it, a advise you of upgrades in equipment that will save energy costs and/or increase your in

Support for Custom Energy-Efficiency Measures

Custom measures allows program participants the opportunity to receive an incentive fo energy-efficiency measures that are not on the prescriptive equipment Incentive list, but project/facility specific.

Incentives for Qualifying Equipment and Projects

Financial incentives are available for large and small projects. These incentives offset s maybe even all! — of the added cost to purchase qualifying energy-efficient equipment, provides significant long-term energy savings. Ranges of incentives are available for qu equipment (depending on type, size, and efficiency) in several categories.

Find out more about equipment incentives

For specific details on equipment requirements and financial incentives, including ince equipment not listed here, contact a program representative. Fiscal year financial incent be limited to a maximum of $500,000 per customer utility account and are available as f permits.

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COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

FOOD SERVICE EQUIPMENT

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

More reasons for a smart start on your next project!

New Jersey SmartStart Buildings provides **financial incentives for qualifying equipment**. These incentives were developed to help our customers offset some of the added cost to purchase qualifying energy-efficient equipment, which provides significant long-term energy savings. A wide range of incentives are available for qualifying equipment (depending on type, size and efficiency).

Listed below are the types of qualifying equipment and ranges of incentives. For details on equipment requirements and full listings of incentives, refer to the **online application forms**.

Please note that almost all equipment incentives require pre-approval before equipment is installed. (**click for exceptions**)To start the pre-approval process, submit an Equipment Application, and appropriate Equipment Worksheets, for the type types of equipment you are planning to install along with equipment specification sheets (refer to the specific program requirements on the back of the application for specificatic needed for your project) and a current utility bill(s).

In order to be eligible to receive financial incentives under this Program, Applicants mus receive electric and/or gas service from one of the regulated electric and/or gas utilities the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Electric Chillers

Water-cooled chillers ($12 - $170 per ton)
Air-cooled chillers ($8 - $52 per ton)

Gas Cooling

Gas absorption chillers ($185-$450 per ton)
Gas Engine-Driven Chillers (Calculated through Custom Measure F

PAST PROGRAMS

TOOLS AND RESOURCES

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Desiccant Systems ($1.00 per cfm - gas or electric)

Electric Unitary HVAC

Unitary AC and split systems ($73 - $92 per ton)
Air-to-air heat pumps ($73 - $92 per ton)
Water-source heat pumps ($81 per ton)
Packaged terminal AC & HP ($65 per ton)
Central DX AC Systems ($40 - $72 per ton)
Dual Enthalpy Economizer Controls ($250)
Occupancy Controlled Thermostats ($75 each)
A/C Economizing Controls ($85 - $170 each)

Ground Source Heat Pumps

Closed Loop ($450-750 per ton)

Gas Heating

Gas-fired boilers < 300 MBH ($300 per unit)
Gas-fired boilers ≥ 300 MBH - 1500 MBH ($1.75 per MBH)
Gas-fired boilers ≥ 1500 MBH - ≤ 4000 MBH ($1.00 per MBH)
Gas-fired boilers > 4000 MBH (Calculated through Custom Measur
Gas furnaces ($300-$400 per unit)
Gas infrared heaters - indoor only ($300 - $500 per unit)
Boiler economizing controls ($1,200 - $2,700 per unit)

Variable Frequency Drives

Variable air volume ($65 - $155 per hp)
Chilled-water pumps ($60 per hp)
Compressors ($5,250 to $12,500 per drive)

Natural Gas Water Heating

Gas water heaters ≤ 50 gallons ($50 per unit)
Gas-fired water heaters > 50 gallons ($1.00 - $2.00 per MBH)
Tankless water heaters replacing a free standing water heater > 82 energy factor ($300 per heater)
Gas-fired booster water heaters ($17 - $35 per MBH)

Premium Motors

Three-phase motors ($45 - $700 per motor) **(Incentive was discor effective March 1, 2013 except for buildings impacted by Hurri Sandy. Approved applications will have the standard timefram year from the program commitment date to complete the instal**

Refrigerator/Freezer Case Premium Efficiency Motors (ECM)

Fractional (< 1 HP) Electronic Commutated Motors (ECM) ($40 per for replacement of existing shaded-pole motor in refrigerated/freeze

Prescriptive Lighting

New Linear Fluorescent

- T-12, HID and Incandescent to T-5 and T-8 ($25 - $200 p fixture) **(Note: T12 replacements are only available for buildings impacted by Hurricane Sandy)**
- New Induction ($70 per replaced HID fixture)
- New LED
  - Screw-in/Plug-in ($10 - $20 per lamp)
  - Refrigerator/Freezer Case ($30 - $65 per fixture)
  - Outdoor pole/arm/wall-mounted luminaires ($100 - $175 p fixture)
  - Display case ($30 per case)
  - Shelf-mounted display and task ($15 per linear foot)
  - Wall-wash, desk, recessed ($20 - $35 per fixture)
  - Parking garage luminaires ($100 per fixture)
  - Track or Mono-Point directional ($50 per fixture)
  - Stairwell and Passageway luminaires ($40 per fixture)
  - High-Bay, Low-Bay ($150 per fixture)
  - Bollard ($50 per fixture)
  - luminaires for Ambient Lighting of Interior Commercial Spa *Linear panels ($50 per fixture)*
  - Fuel pump canopy ($100 per fixture)
  - LED retrofit kits (custom measures)
- New Pulse-Start Metal Hallide ($25 per fixture)
- Linear Fluorescent Retrofit ($10 - $20 per fixture)
- Induction Retrofit ($50 per retrofitted HID fixture)
- New Construction/Complete Renovation (performance-based)

Note: Incentives for T-12 to T-5 and T-8 lamps with electronic ballast in facilities ($10 per fixture, 1-4 lamps) and T-5/T-8 high bay fixtures ($16 - per fixture) were discontinued effective March 1, 2013 for T-12 retrofits replacements except for buildings impacted by Hurricane Sandy. Appr applications will have the standard timeframe of one year from the pro commitment date to complete the installation

Lighting Controls

- Occupancy Sensors
  - Wall mounted ($20 per control)
  - Remote mounted ($35 per control)
  - Daylight dimmers ($25 per fixture controlled, $50 per fixtu office applications only)
  - Occupancy controlled hi-low fluorescent controls ($25 per controlled)
- HID or Fluorescent Hi-Bay Controls
  - Occupancy hi-low ($35 per fixture controlled)
  - Daylight dimming ($45 per fixture controlled)

Refrigeration

- Covers and Doors
  - Energy-Efficient doors for open refrigerated doors/covers per door)
  - Aluminum Night Curtains for open refrigerated cases ($3.5 linear foot)
- Controls
  - Door Heater Control ($50 per control)
  - Electric Defrost Control ($50 per control)
  - Evaporator Fan Control ($75 per control)
  - Novelty Cooler Shutoff ($50 per control)

Food Service Equipment

Cooking
- Combination Electric Oven/Steamer ($1,000 per oven)
- Combination Gas Oven/Steamer ($750 per oven)
- Electric Convection Oven ($350 per oven)
- Gas Convection Oven ($500 per oven)
- Gas Rack Oven ($1,000 single, $2,000 double)
- Gas Conveyor Oven ($500 small deck, $750 large deck)
- Electric Fryer ($200 per vat)
- Gas Fryer ($749 per vat)
- Electric Large Vat Fryer ($200 per vat)
- Gas Large Vat Fryer ($500 per vat)
- Electric Griddle ($300 per griddle)
- Gas Griddle ($125 per griddle)
- Electric Steam Cooker ($1,250 per steamer)
- Gas Steam Cooker ($2,000 per steamer)

Holding
- Full Size Insulated Cabinets ($300 per cabinet)
- Three Quarter Size Insulated Cabinets ($250 per cabinet)
- Half Size Insulated Cabinets ($200 per cabinet)

Cooling
- Glass Door Refrigerators ($75 - $150 per unit)
- Solid Door Refrigerators ($50 - $200 per unit)
- Glass Door Freezers ($200 - $1,000 per unit)
- Solid Door Freezers ($100 - $600 per unit)
- Ice Machines ($50 - $500 per unit)

Cleaning
- Dishwashers ($400 - $1,500 per unit)

Other Equipment Incentives*

- Performance Lighting ($1.00 per watt per square foot below progra incentive threshold, currently 5% more energy efficient than ASHR/ 2007 for New Construction only.)
- Custom electric and gas equipment incentives (not prescriptive)

*Equipment incentives are calculated based on type, efficiency, size, and ap and are evaluated on a case-by-case basis. Contact us for details.

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

PARTICIPATION STEPS

PARTICIPATING CONTRACTORS

SUSTAINABLE JERSEY

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Direct Install

NEW JERSEY'S CLEAN ENERGY PROGRAM
DIRECT Install

Let us pay up to 70% of your energy efficiency upgrade.

Sometimes, the biggest challenge to improving energy efficiency is knowing where t and how to get through the process. Created specifically for existing small to mediun facilities, Direct Install is a turnkey solution that makes it easy and affordable to upgr high efficiency equipment. Direct Install is designed to cut your facility's energy costs replacing lighting, HVAC and other outdated operational equipment with energy effic alternatives. The program pays up to 70% of retrofit costs, dramatically improving yo payback on the project. There is a $125,000 incentive cap on each project.

ELIGIBILITY

Existing small to mid-sized commercial and industrial f with a peak electric demand that did not exceed 200 k any of the preceding 12 months are eligible to participa Direct Install. Applicants will submit the last 12 months electric utility bills indicating that they are below the de threshold and have occupied the building during that ti Buildings must be located in New Jersey and served b the state's public, regulated electric or natural gas utilit companies.

SYSTEMS & EQUIPMENT ADDRESSED BY THE PROGRAM

- Lighting
- Heating, Cooling & Ventilation (HVAC)
- Refrigeration
- Motors
- Natural Gas
- Variable Frequency Drives

Measures eligible for Direct Install are limited to specific equipment categories, type capacities. Boilers may not exceed 500,000 Btuh and furnaces may not exceed 140,

III. PAY FOR PERFORMANCE (P4P)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

EXISTING BUILDINGS

PARTICIPATION STEPS

APPLICATIONS AND FORMS

APPROVED PARTNERS

NEW CONSTRUCTION

FAQS

BECOME A PARTNER

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

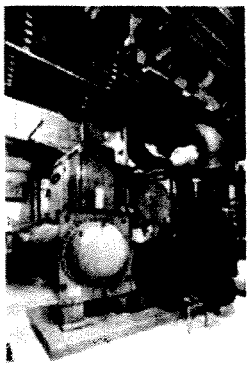
ENERGY BENCHMARKING

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facilit earn incentives that are directly linked to your savings. Pay for Performance relies on a program partners who provide technical services under direct you. Acting as your energy expert, your partner will develop a reduction plan for each project with a whole-building technica component of a traditional energy audit, a financial plan for fu energy efficient measures and a construction schedule for ins



Eligibility

Existing commercial, industrial and institutional buildings with demand over 100 kW for any of the preceding twelve months to participate including hotels and casinos, large office buildir family buildings, supermarkets, manufacturing facilities, scho shopping malls and restaurants. Buildings that fall into the fol customer classes are not required to meet the 100 kW dema to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-p affordable multifamily housing, and local governmental entities. Your energy reduction p define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manuf water treatment and datacenter building types whose annual energy consumption is hea weighted on process loads. Details are available in the high energy intensity section of t page.

ENERGY STAR Portfolio Manager

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

This rating system assesses building performance by tracking and scoring energy use ir facilities and comparing it to similar buildings. That can be a big help in locating opportu cost-justified energy efficiency upgrades. And, based on our findings, you may be invite participate in the Building Performance with ENERGY STAR initiative and receive speci recognition as an industry leader in energy efficiency.

Incentives

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

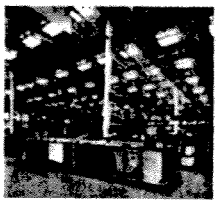
TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Pay for Performance incentives are awarded upon the satisfactory completion of three p milestones:

Incentive #1 - Submittal of complete energy reduction plan prepared by an app program partner - Contingent on moving forward, incentives will be between $5 $50,000 based on approximately $.10 per square foot, not to exceed 50% of th annual energy expense.



Incentive #2 - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be based on actual savings, provided that the minimum performance threshold of savings has been achieved.

A detailed Incentive Structure document is available on the applications and form

Steps to Participation

Click here for a step-by-step description of the program.

Home | Residential | Commercial & Industrial | Renewable Energy
About Us | Press Room | Library | FAQs | Calendar | Newsletters | Contact Us | Site

New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

BPU New Jersey Board of Public Utilities

PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2014 – June 30, 2015

Utility Serving Applicant: ☐ Atlantic City Electric ☐ Jersey Central Power & Light ☐ PSE&G
☐ New Jersey Natural Gas ☐ Elizabethtown Gas ☐ Rockland Electric Co. ☐ South Jersey Gas
☐ Other Electric Service Provider (please specify): _____
☐ Other Fuel Provider: _____ ☐ Oil: _____ ☐ Other (Please specify): _____

Instructions

1. Read the program material to determine project qualification.
2. Read the Participation Agreement and sign where indicated.
3. Fill out all applicable spaces on this form.
4. Provide a copy of the customer's company W-9 form.
5. Provide the most recent consecutive 12 month period of utility bills for the project for all accounts, organized in chronological order and separated by account. Utilize Utility Tool for applications with multiple accounts to organize data.
6. Provide brief description of facility, noting any special or unusual circumstances and/or site conditions.
7. Partner must submit the application package via e-mail, mail or fax DIRECTLY to the Market Manager – see back of this form.

Approval of this Application is not an approval of the project's scope of work. Scope of work is only approved upon approval of the Energy Reduction Plan. See application and program guidelines for more information.

Customer/Owner Information (payment will be made to entity entered here)

Company Name		Project Contact/Title	
Company Address	City	State	Zip
Phone/Fax	E-mail	Federal ID/SSN	

Partner Information

Company Name		Project Contact/Title	
Company Address	City	State	Zip
Phone	Fax	E-mail	

Project Information

Project Name			
Building Address	City	State	Zip
Utility Account Number(s): Electric		Gas	
* Note: Please use the back of this page for additional utility accounts if quantity exceeds space allotment.			
Annual Peak kW Demand	Building Type		Number of Buildings
Size of Building(s) (gross sq/ft)	Direct, Master or Sub Metered		

Funding

☐ Check the box if an Energy Savings Improvement Program (ESIP) will be a source of funding. ESIP allows government agencies to pay for energy related improvements using the value of the resulting energy savings.

Do you expect to receive funding under any other efficiency programs? ☐ No ☐ Yes If Yes, please specify below:

Utility Program #1 – Utility: _____ Program Name: _____
Utility Program #2 – Utility: _____ Program Name: _____
Federal Program #1 – Organization: _____ Program Name: _____
Federal Program #2 – Organization: _____ Program Name: _____
Other Program – Organization: _____ Program Name: _____

Additional Project information

Additional Utility Account(s)

Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number

Additional Comments:

Complete this application form and send it directly to the Commercial/Industrial Market Manager by e-mail, mail or fax.

New Jersey's Clean Energy Program
c/o TRC Energy Services-P4P
900 Route 9 North, Suite 404 • Woodbridge, NJ 07095

Phone: 866-657-6278 • Fax: 732-855-0422
E-mail: P4P@NJCleanEnergy.com

Visit our website: NJCleanEnergy.com/P4P

*Incentives/Requirements subject to change.

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

ADMINISTRATOR – New Jersey Board of Public Utilities (NJBPU)

APPLICATION PROCESS – The Program pays incentives in phases upon satisfactory completion of each of three Program milestones - approval of a complete Energy Reduction Plan, installation of all recommended measures per the Energy Reduction Plan, completion of Post-Construction Benchmarking Report (for incentive amounts, please refer to Incentive Amounts). In order to be eligible for Program Incentives,a Participating Customer or an agent authorized by a Customer, must submit to the Market Manager a properly completed application package – application form, Participating Customer's company W-9, twelve consecutive months of the project's utility bills and executed Participation Agreement. All components of the application package must be filled out completely, truthfully and accurately. This application package must be received on or before June 30, 2015 in order to be eligible for the Fiscal Year 2015 Incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. When approved, the Participating Customer will receive an approval letter from their Case Manager with the estimated authorized first incentive amount and the date by which the Energy Reduction Plan must be submitted. Upon receipt of the approval letter, the Participating Customer and Partner may proceed with work on the Energy Reduction Plan. The Market Manager or agent thereof reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the Energy Reduction Plan approval letter. Approval of this Application is not an approval of the project's scope of work. Scope of work is only approved upon approval of the Energy Reduction Plan. See application and program guidelines for more information.

CHANGES TO THE PROGRAM – The Program and Participation Agreements may be changed by the Market Manager at any time without notice. Approved applications, however, will be processed to completion under the agreements in effect at the time of the Market Manager's approval.

ELIGIBILITY - Program Incentives are available to existing commercial, industrial and certain multifamily buildings with peak kilowatt demand usage of more than 100 kW in any of the most recent preceding twelve months of utility bills and a customer of the New Jersey Utilities. Market Manager has the discretion to approve applications that fall below the 100 kW minimum by no more than 10%. If the Participant is a municipal electric company customer, and a customer of an investor-owned gas New Jersey Utility, only gas measures will be eligible for incentives under the Program. Similarly, if the Participant is an oil/propane customer and a customer of an investor-owned electric New Jersey Utility, only electricity measures will be eligible for incentives under the Program.

Equipment procured by participating Customer through another program offered by the New Jersey Utilities, as applicable, is not eligible for incentives through this Program. Customers who, from July 1, 2013 – June 30, 2014, have not contributed to the Societal benefits Charge of the applicable New Jersey Utility may not be eligible for incentives offered through this program.

ENDORSEMENT – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

ENERGY-EFFICIENT MEASURES – Any device eligible to receive a Program Incentive payment through the New Jersey's Clean Energy Commercial and Industrial Program. The total package of measures as presented in the Energy Reduction Plan must have at least a 10% internal rate of return (IRR).

ENERGY REDUCTION PLAN – A document created by the Participating Customer's selected Partner that defines several key aspects of the project including (but not limited to) existing conditions as a result of a whole-building technical analysis, benchmarking summaries, recommended measures, financing plan and implementation schedule.

ENERGY REDUCTION PLAN APPROVAL – After application approval, the Participating Customer and Partner must work together to finalize and submit an Energy Reduction Plan which incorporates a work scope that will achieve the minimum 15% reduction in source energy performance target in accordance with the Program rules and policies along with the Benchmarking Tool, modeling software file, a copy of the executed Partner and Participating Customer contract, an original copy of the executed Installation Agreement and a Request for Incentive #1 Payment form. All components of the submittal package must be filled out completely, truthfully and accurately. The Market Manager, agents thereof and/or the selected Partner must be provided reasonable access to the Participating Customer's facility, staff, tenants and/or others necessary to develop an Energy Reduction Plan that will achieve the minimum 15% performance target as well as the necessary utility billing data as dictated by the Program. The Energy Reduction Plan submittal package will be reviewed and must be approved by the Market Manager prior to payment of Incentive #1. Upon approval of the submittal package, the Customer will receive an Incentive #1 approval letter indicating the date by which all measures in the Energy Reduction Plan must be installed (no later than twelve months following the Energy Reduction Plan submittal approval date).

INCENTIVE AMOUNTS – Incentive #1 - $0.10 per square foot of the project with a maximum amount of $50,000 and minimum of $5,000, not to exceed 50% of the project's annual energy cost and contingent on installation of measures in the Energy Reduction Plan and receipt of a signed Installation Agreement. If installation does not commence within the required timeframe, Incentive #1 may be required to be returned to the program. In the event the project is cancelled and Incentive #1 is not returned, the project may reapply to the program in the future but another Incentive #1 will not be paid. Incentive #2 – 50% of the total performance-based incentive (combination of Incentives #2 and #3) calculated per Program's incentive structure; Incentive #3 – remaining amount based on the realized energy savings of the project. For customers that have successfully participated in the Local Government Energy Audit Program, Incentive #1 will be reduced by 50% to $0.05 per square foot up to $25,000. Actual Incentive #1 paid shall not be higher than 5% over the committed amount. Actual Incentive #2 paid shall not be higher than the committed amount, unless the Energy Reduction Plan has been resubmitted due to changes in the work scope. Actual Incentive #3 paid shall be higher or lower than the committed amount based on actual energy savings but shall not be greater than program Incentive Caps.

The Market Manager will provide incentives according to those described in this section or as modified upon notice to Participating Customer. All incentive payments are paid directly to the Participating Customer or the Participating Customer's designee as indicated on the application form. The Program is not bound to pay any incentive unless the submittal package associated with the incentive payment is approved by the Market Manager who reserves the sole discretion of approving or disapproving the submittal packages.

INCENTIVE CAP – Program Incentives #2 and #3 will be capped not to exceed 50% of the total actual project cost. Incentive #1 will be capped not to exceed 50% of the project's annual energy cost. The Market Manager reserves the right to limit the amount of the Program Incentives (Incentive #1, #2 and #3) to $1M per gas and electric account (limited to $2M per project) in a program year. Campus style facilities, which are mastered-metered, are subject to the annual incentive cap of $1 million per gas and electric account. The Participating Customer will also be subject to an annual Entity Cap of $4M (Definition of an Entity can be found in the Board Order Docket No. EO07030203).

INSTALLATION AGREEMENT – The Participating Customer must submit an executed Installation Agreement as part of the Request for Incentive #1 Form. By executing the Installation Agreement, the Customer agrees to install all of the measures in the Energy Reduction Plan, which are estimated to result in meeting or exceeding the minimum 15% performance target. The Customer agrees to the performance-based incentives (Incentives #2 & #3) as indicated in the document which are based on the results of the Energy Reduction Plan. Implementation of the measures must commence in the time period twelve months following the approval date of the Energy Reduction Plan. Failure to complete the installation of the measures in the Energy Reduction Plan may result in the repayment of Incentive #1. In the event the project is cancelled and Incentive #1 is not returned, the project may reapply to the program in the future but another Incentive #1 will not be paid.

LIMITATION OF LIABILITY – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against TRC Energy Services, the Market Manager, and the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual, and not joint and/or several.

The Market Manager's review and approval of the Energy Reduction Plan cannot be construed to be a determination as to performance, applicability, dollar savings, energy savings, or any other aspect of the proposed project. The Market Manager and Administrator offer no guarantee or warranty of performance of the project's equipment or system. The participant assumes full responsibility and liability for the installation of all equipment, including but not limited to design, specification, all permits, installation, maintenance, performance and financing. By participating in the program and accepting incentive dollars, you agree to hold harmless the Market Manager and Administrator and their respective staffs with respect to the Project

MARKET MANAGER – TRC Energy Services is responsible for managing the New Jersey Clean Energy Commercial & Industrial Programs.

MEASUREMENT & VERIFICATION APPROVAL – Twelve months subsequent to the Incentive #2 Payment Submittal package submission date, measurement and verification of the projected energy reduction will be conducted by the Participating Customer's Partner using the project's post-installation utility data (supplied by the Customer). The Participating Customer must work with their Partner to submit the Incentive #3 Payment Submittal, consisting of the Post-Construction Benchmarking Pay For Performance-Existing Buildings Report, Benchmarking Tool, and Request for Incentive #3 form. All components of the submittal package must be filled out

completely, truthfully and accurately. Upon review of the submittal package (by the Market Manager or agent thereof), the remaining 50% of the total performance-based incentive (Incentives #2 & #3) will be released to the Participating Customer. If the Post-Construction Benchmarking Report indicates that the project did not meet the minimum performance target, the post-installation completion period may be extended to up to twenty-four months subsequent to the Incentive Payment #2 package submission date. Upon approval of the submittal package, the Customer will receive an Incentive #3 Submittal approval letter indicating successful completion of the program.

NEW JERSEY UTILITIES – The investor-owned electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

PARTICIPATING CUSTOMERS – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

PARTICIPATING CUSTOMER'S CERTIFICATION – Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements per the Program Guidelines. Participating Customer certifies that he/she purchased and installed the equipment listed in the Energy Reduction Plan at their defined New Jersey project location.

PARTNER– An approved professional who provides technical building performance services to Participating Customers, acting as their "energy efficiency expert". Participating Customers are required to hire an approved Pay for Performance Partner to develop the Energy Reduction Plan and facilitate installation of the recommended package of Energy-Efficient Measures. Participants are required to enter into a contractual agreement with a selected Partner which outlines the set of minimum services the Partner will provide to the Participating Customer throughout the life of the project. It is strongly recommended that Participating Customers perform due diligence in selecting a Pay for Performance Partner. Fees charged by the Partner are not regulated by the Program and could vary between Partners.

PERFORMANCE-BASED INCENTIVES – The combination of Incentives #2 and #3, which are based on the projected and actual energy reduction performance of the project.

PERFORMANCE TARGET – A minimum of a 15% annual source energy savings performance target must be achieved in order to participate. The performance target is based on reducing the total energy consumption for the facility. No more than 50% of the total source energy savings may be derived from lighting measures. The total energy savings may not come from a single measure. A 4% performance target may be offered to customers whose annual energy consumption is heavily weighted to manufacturing and process loads. This approach will be reviewed on a case-by-case basis and must be pre-approved by the Market Manager. In order to be considered, the project must involve: A manufacturing facility, including such industries as plastics and packaging, chemicals, petrochemicals, metals, paper and pulp, transportation, biotechnology, pharmaceutical, food and beverage, mining and mineral processing, general manufacturing, equipment manufacturers and data centers; and manufacturing and/or process-related loads, including data center consumption, consume 50% or more of total facility energy consumption. No more than 50% of the total source energy savings may be derived from non-investor owned utilities or fuels.

POST-INSTALLATION APPROVAL – After the complete installation of all measures in the Energy Reduction Plan, the Customer and their Partner must finalize and submit the Incentive #2 Payment Submittal, consisting of the Installation Report, invoices, and Request for Incentive #2 Payment form. All components of the submittal package must be filled out completely, truthfully and accurately. Upon review of the submittal package and verification of the complete installation of all measures in the Energy Reduction Plan (via inspection by the Market Manager or agent thereof), 50% of the total performancebased incentive (Incentives #2 & #3) will be released to the Participating Customer. Upon approval of the submittal package, the Customer will receive an Incentive #2 approval letter indicating the date by which the post-installation Measurement & Verification phase began and will end (twelve months in length).

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing products or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time. Energy-Efficient Measures must be installed in buildings located within the service territory of one of the New Jersey Utilities (as defined by the Program) as designated on the Participating Customer's Pay for Performance application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program Guidelines. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease.

PRE-INSTALLED MEASURES - An Energy Reduction Plan must be approved by the program and an approval letter sent to the customer in order for incentives to be committed. Upon receipt of an Energy Reduction Plan, all project facilities must be preinspected. Measures installed prior to pre-inspection of the facility shall not be included as part of the ERP scope of work and will not be eligible for incentives. Measure installation undertaken prior to ERP approval, but after pre-inspection, is done at the customer's own risk. In the event that an Energy Reduction Plan is rejected by the program, the customer will not receive any incentives.

PRODUCT INSTALLATION OR EQUIPMENT INSTALLATION – Installation of the Energy-Efficient Measures.

Projects with a contract threshold of $15,444 are required to pay no less than prevailing wage rate to workers employed in the performance of any construction undertaken in connection with Board of Public Utilities financial assistance, or undertaken to fulfill any condition of receiving Board of Public Utilities financial assistance, including the performance of any contract to construct, renovate or otherwise prepare a facility, the operations of which are necessary for the receipt of Board of Public Utilities financial assistance. By submitting an application, or accepting program incentives, applicant agrees to adhere to New Jersey Prevailing Wage requirements, as applicable.

PROGRAM – New Jersey's Clean Energy Pay for Performance Program offered herein by the New Jersey Board of Public Utilities pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

PROGRAM GUIDELINES – See Pay for Performance Program Guidelines available from your Partner.

PROGRAM INCENTIVES – Refers to the amount or level of incentive that the Program provides to participating customers pursuant to the Program offered herein (see the description under "Incentive Amount" heading).

PROGRAM OFFER – The Program covers products purchased and/or services rendered on or after July 1, 2014. Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities.

PROJECT – A commercial, industrial or multifamily existing building with peak demand in excess of 100 kW in any of the most recent preceding twelve months of electric usage. Multifamily building(s) must be four (4) stories or greater or three (3) stories and under having central heating, cooling, or metering serving more than one building. The 100 kW requirement is waived for the following customer classes: hospitals, non-profits (as defined by section 501(c)(3) of the Internal Revenue Code), public colleges and universities, local government entities, including K-12 schools, and affordable multifamily customers (defined as low income, subsidized, HUD, etc.)

TAX CLEARANCE CERTIFICATION – Businesses must apply for and receive a Tax Clearance Certificate from the New Jersey Division of Taxation before they can receive any incentive, grant or other financial assistance from the Program.

TAX LIABILITY – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their federal tax identification number or social security number on the application form in addition to providing a copy of their W-9 form as part of the application package in order to receive a Program Incentive.

TERMINATION – New Jersey's Clean Energy Program reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

WARRANTIES – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/ SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

ACKNOWLEDGEMENT – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the Pay For Performance Program, including the release of electric and natural gas utility billing information, as well as make available to the public non-sensitive information. I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program. This arrangement supersedes all other communications and representations.

CUSTOMER'S SIGNATURE
PARTNER SIGNATURE
By signing, I certify that I have read, understand and agree to the Participation Agreement listed above.

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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Energy Savings Improvement Program

A new State law allows government agencies to make energy related improvements to t facilities and pay for the costs using the value of energy savings that result from the imp Under Chapter 4 of the Laws of 2009 (the law), the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to and reduce energy usage with minimal expenditure of new financial resources.

This Local Finance Notice outlines how local governments can develop and implement a their facilities. Below are two sample RFPs:

Local Government
School Districts (K-12)

All RFPs must be submitted to the Board for approval at ESIP@bpu.state.nj.us.

The Board also adopted protocols to measure energy savings:

Measuring Energy Savings
Procedures for Implementation

The ESIP approach may not be appropriate for all energy conservation and energy effic improvements. Local units should carefully consider all alternatives to develop an appro best meets their needs. Local units considering an ESIP should carefully review the Loc Notice, the law, and consult with qualified professionals to determine how they should a task.

The NJ Board of Public Utilities sponsored Sustainable Jersey in the creation of an ESIF Guidebook that explains how to implement the program. The guidebook also includes ca of successful projects and a list of helpful resources.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an ene as prescribed in P.L.2012 c.55.

ENERGY REDUCTION PLANS

If you have an ESIP plan that needs to be submitted to the Board of Public Utilities, plea to ESIP@bpu.state.nj.us. Please limit the file size to 3MB (or break it into smaller files).

Frankford Township School District
Northern Hunterdon-Voorhees Regional High School
Manalapan Township *(**180 MB** - Right Click, Save As)*

ESIP PROGRAM

Final version 42413

BPU RULES

1. Public Entity must decide if they will use an ESCO or DIY method or Hybrid thereof prior to issuing the RFP and the RFP must state the intended method. A change in the project procurement model after the RFP closing date will be cause for immediate rejection and disqualification of potential Clean Energy program incentives.

2. RFP procedures shall be adhered to as per the legislation, including the use of BPU approved forms. Any alteration of the forms, without prior approval from the BPU shall be grounds for rejection.

3. RFP must include copy of an audit (ASHRAE Level II w/Level III for lighting) and audit must be prepared by a firm classified by DPMC in the 036 discipline.

4. All firms, including professional services, whether using ESCO or DIY model, must be DPMC classified.

5. If an Architect is engaged by the public entity, the architectural fees are the responsibility of the public entity and must be paid directly to the firm. These fees may be included in the energy cost savings analysis and payback.

   ESCO's may contract directly with an architectural firm, in which case the architectural firm serves as a subcontractor to the ESCO and the project related service costs may be included within the project's economic model.

6. Public entity shall conduct pre-bid meetings and site visits per existing statutes.

   In the interest of open public bidding transparency, it is a requirement of the BPU that all proposers must attend the pre-proposal bid meeting.

7. There shall be no negative cash flow in any year of the program.
   section 7 (1)(a)
   > "the energy savings resulting from the program will be sufficient to cover the cost of the program's energy conservation measures."

8. SREC values are not permitted to be used in the energy cost savings calculations.

9. Capital cost avoidance values are not to be used in the energy savings calculations.

10. Operational and Maintenance (O&M) cost savings may be permitted in the cost savings calculations, but only with supporting documentation.

11. Blended utility rates shall not be permitted. Use the actual utility tariff or local contracted rates if there is a third party supplier.

    For the RFP proposals, the public entity shall define the utility rates in the RFP

APPENDIX E

Photovoltaic Analysis

12. Contracted third party utility rates may only be used for the term of the contract (5 yr. maximum) Subsequent years are to be projected at the utility tariff rates plus the annual BPU escalation rates.

13. Public entity shall conduct M&V (measurement and verification) at the one (1) year operational date and shall provide a copy of the M&V report to the Board of Public Utilities.

    For the RFP proposals, the ESCO shall provide the cost for the one (1) year M&V only. For comparative purposes, the one year M&V pricing shall be indicated on the proposal Form VI, under the "Annual Service Costs" column. Additional M&V costs are at the discretion of the local unit and are not to be included in the proposal.

14. The decisions made by BPU staff regarding compliance or other issues that arise in connection with the RFP procurement process shall be considered a final decision of the BPU. Any appeal will need to be through the New Jersey Superior Court, Appellate Division.

15. For the RFP proposals only, Demand Response (DR) revenues claimed by ESCO's can only be projected for a maximum period of three (3) years. DR revenue projections beyond three years will not be permitted. DR revenues must be included and presented under the "Energy Rebates/Incentives" column of FORM VI.

16. ESCO "fees" proposed during the RFP phase of the project cannot increase post-award. ESCO's are required to maintain the fee percentages through final contract negotiations and construction of the Board approved Energy Savings Plan

17. Public Bid openings shall be held on the due date of the proposal submissions. The public entity shall announce the name of the bidder and the total dollar amount. After award of a contract, all proposals received will be made available by the owner for public inspection

18. Rejection of bids by the public entity shall be conducted in accordance with the appropriate sections of the applicable legislation, as stated in Title 40A:11-13.2. Additionally all proposals must be returned to the respective ESCO's upon rejection.

19. Field changes that exceed 5% of the project cost require BPU approval.

20. Energy Savings Plans (ESP) that is dependent upon incentives from the Clean Energy Program must review the current program requirements, at the time of application, for each incentive to insure eligibility. If any program incentive is denied, resubmission of all ESIP related forms will be necessary to remain ESIP qualified.

APPENDIX F

Photos

1: Building Exterior


2: Existing Rooftop Units


3: Existing Domestic Hot Water Heater

4: Existing Kitchen Equipment

5: Existing Unit Heater

6. Existing Lighting

APPENDIX G

EPA Benchmarking Report

ENERGY STAR® Statement of Energy Performance

21

ENERGY STAR® Score[1]

Building 4

Primary Property Function: K-12 School
Gross Floor Area (ft²): 79,925
Built: 1984

For Year Ending: May 31, 2014
Date Generated: October 28, 2014

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
Building 4 400 East Main Street Denville, New Jersey 07834	Morris County Vocational School District 400 E Main Street Denville, NJ 07834 (____)____-_____	Mike Orlovsky 400 E Main Street Denville, NJ 07834 (518)453-3980 mdewein@chacompanies.com

Property ID: 4195906

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
107.9 kBtu/ft²

Source EUI
182.7 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	5,972,532 (69%)
Electric - Grid (kBtu)	2,654,263 (31%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	82.5
National Median Source EUI (kBtu/ft²)	139.8
% Diff from National Median Source EUI	31%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	672

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)