LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR: **PASSAIC COUNTY**
NEW ADMINISTRATION BUILDING

401 GRAND ST.
PATERSON, NJ, 07505

ATTN: TIMOTHY CUNNINGHAM, ESQ.
DEPUTY COUNTY ADMINISTRATOR

PREPARED BY: **CONCORD ENGINEERING GROUP**
520 S. BURNT MILL ROAD
VOORHEES, NJ 08043
TELEPHONE: (856) 427-0200
FACSIMILE: (856) 427-6529
WWW.CEG-INC.NET

CEG CONTACT: **JOHN A. MARCHIAFAVA, P.E., CGD**
PROJECT MANAGER
EMAIL: JMARCHIAFAVA@CEG-INC.NET

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TABLE OF CONTENTS

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I. EXECUTIVE SUMMARY

This report presents the findings of the energy audit conducted for:

Passaic County
New Administration Building
401 Grand St.
Paterson, NJ, 07505

Municipal Contact Person: Timothy Cunningham, Esq.
Facility Contact Person: Jack Nigro

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	$ 472,253
Natural Gas	$ 111,599
Total	$ 583,852

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is ± 20%. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Boiler Replacement	$161,400	$17,622	9.2	63.8%
ECM #2	Premium Motors	$14,976	$1,792	8.4	79.5%
ECM #3	Install Centrifugal Chiller	$505,000	$49,897	10.1	48.2%
ECM #4	Demand Controlled Ventilation	$20,000	$5,092	3.9	281.9%
ECM #5	Energy Recovery Wheel	$148,000	$21,536	6.9	118.3%

The estimated demand and energy savings for each ECM and REM is shown below in Table 2. The descriptions in this table correspond to the ECM's and REM's listed in Table 1.

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Boiler Replacement	0	0	9,730
ECM #2	Premium Motors	4.5	11,342	0
ECM #3	Install Centrifugal Chiller	108	299,093	0
ECM #4	Demand Controlled Ventilation	0.0	7,215	2,184
ECM #5	Energy Recovery Wheel	0.0	27,527	9,495

Concord Engineering Group (CEG) recommends proceeding with the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. The following Energy Conservation Measures are recommended for the facility:

- **ECM #1:** Boiler Replacement
- **ECM #2:** Premium Motors
- **ECM #4:** Demand Controlled Ventilation
- **ECM #5:** Energy Recovery Wheel

Although ECM #3 does not provide a payback less than 10 years, it is recommended to proceed with the installation of new water cooled centrifugal chiller with a cooling tower.

In addition to the ECMs, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECMs listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building:

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on entrance doors.
3. Clean all light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
5. Check and confirm time-clocks in the building especially for exhaust fans and make sure all the pins are in place and working properly.

The Passaic County New Administration Building is an efficiently setup building with updated equipment and controls. The major HVAC equipment in the building is controlled via Building Automation System including all the VAV boxes. Therefore, CEG focused on more aggressive energy conservation measures for this building.

The two cast iron hot water boilers in this building are functioning properly and maintained well. However, there is a tremendous potential for energy savings by replacing these boilers with more compact, high efficiency condensing boilers. The payback for this ECM is slightly less than 10 years and should be considered eventually when replacing the boilers in the future.

The major cooling for this building is achieved with three (3) large air cooled chillers. Air cooled chillers consume nearly twice as much energy as water cooled chillers. The Passaic County should consider replacing these chillers with a chiller plant to be installed on the roof of the building. ECM #3 discusses this option in detail.
The atrium in this facility is the single largest zone in the building. The atrium is conditioned with a dedicated air handling unit with constant outside air percentage. Since atrium is a single zone, it is a great candidate for demand controlled ventilation. ECM #4 discusses this technology in detail.

Three of the large air handling units in this building provides air conditioning to the east and west side of the building as well as the 9th floor. These systems also receive 15% constant outside air and cannot be coupled with demand controlled ventilation. However, these three air handling units are good candidates for an energy recovery system. CEG recommends modifying the air handling unit supply and exhaust sides in order to retrofit an energy recovery wheel. An energy recovery wheel recoups the sensible and latent energy in the exhaust stream and transfers it to the outside makeup air. This technology and energy savings potential is discussed in the ECM #5 of this report.

Although there is an available roof space on the New Administration Building to install an array of photovoltaic solar panels, the penthouse structure on the roof creates a shading effect on the roof surface and drastically limits the annual electric production of a possible system. Therefore, a solar photovoltaic system is not recommended for this Building. CEG also reviewed other renewable energy options and summarized in the Renewable Energy Measures section of this report.

II. INTRODUCTION

The comprehensive energy audit covers the 209,000 square foot Passaic County New Administration Building, which includes county and state offices, hearing rooms and courthouse.

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the building. The utility information allows for analysis of the building's operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

The Energy Use Index (EUI) is established for the building. Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. Through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECMs). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECMs.

It is pertinent to note, that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECMs. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

ECMs are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment costs to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ Smart Start Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The costs and savings are applied and a simple payback, simple lifetime savings, and simple return on investment are calculated. See below for calculation methods:

ECM Calculation Equations:

$$Simple\ Payback = \left(\frac{Net\ Cost}{Yearly\ Savings} \right)$$

$$Simple\ Lifetime\ Savings = \left(Yearly\ Savings \times ECM\ Lifetime \right)$$

$$Simple\ Lifetime\ ROI = \frac{(Simple\ Lifetime\ Savings - Net\ Cost)}{Net\ Cost}$$

$$Lifetime\ Ma\,\mathrm{int}\,enance\ Savings = \left(Yearly\ Ma\,\mathrm{int}\,enance\ Savings \times ECM\ Lifetime \right)$$

$$Internal\ Rate\ of\ \mathrm{Re}\,turn = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + IRR)^n} \right)$$

$$Net\ \mathrm{Pr}\,esent\ Value = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + DR)^n} \right)$$

Net Present Value calculations based on Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

The electric usage profile represents the actual electrical usage for the facility. Public Service Electric and Gas (PSE&G) provides electricity to the facility under their LPLS rate structure. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile shows the actual natural gas energy usage for the facility. Public Service Electric and Gas (PSE&G) provides natural gas to the facility under the LVG rate structure. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

The third party commodity provider Woodruff is responsible for providing the supply of gas to the building. Commodity (Supply) and delivery is billed separately for each respective utility service.

Description	Average
Electricity	15.8¢ / kWh
Natural Gas	$1.81 / Therm

Table 3
Electricity Billing Data

ELECTRIC USAGE SUMMARY	
Utility Provider:	PSEG
Rate:	LPLS
Meter No:	778014211
Customer ID No:	3114995314
Third Party Utility Provider:	-
TPS Meter / Acct No:	-

MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Jan-08	216,612	880.2	$26,176
Feb-08	207,307	880.2	$25,498
Mar-08	190,802	880.2	$24,712
Apr-08	223,050	880.2	$28,322
May-08	271,643	866.8	$43,860
Jun-08	321,177	862.7	$60,156
Jul-08	353,325	862.7	$64,790
Aug-08	342,669	862.7	$63,313
Sep-08	260,718	862.7	$43,578
Oct-08	224,659	862.7	$34,249
Nov-08	202,021	862.7	$30,761
Dec-08	169,924	860.3	$26,836
Totals	**2,983,907**	**880.2 Max**	**$472,253**

AVERAGE DEMAND	**868.7**	**KW average**
AVERAGE RATE	**$0.158**	**$/kWh**

Figure 1
Electricity Usage Profile
401 Grand St.
Jan-Dec 2008

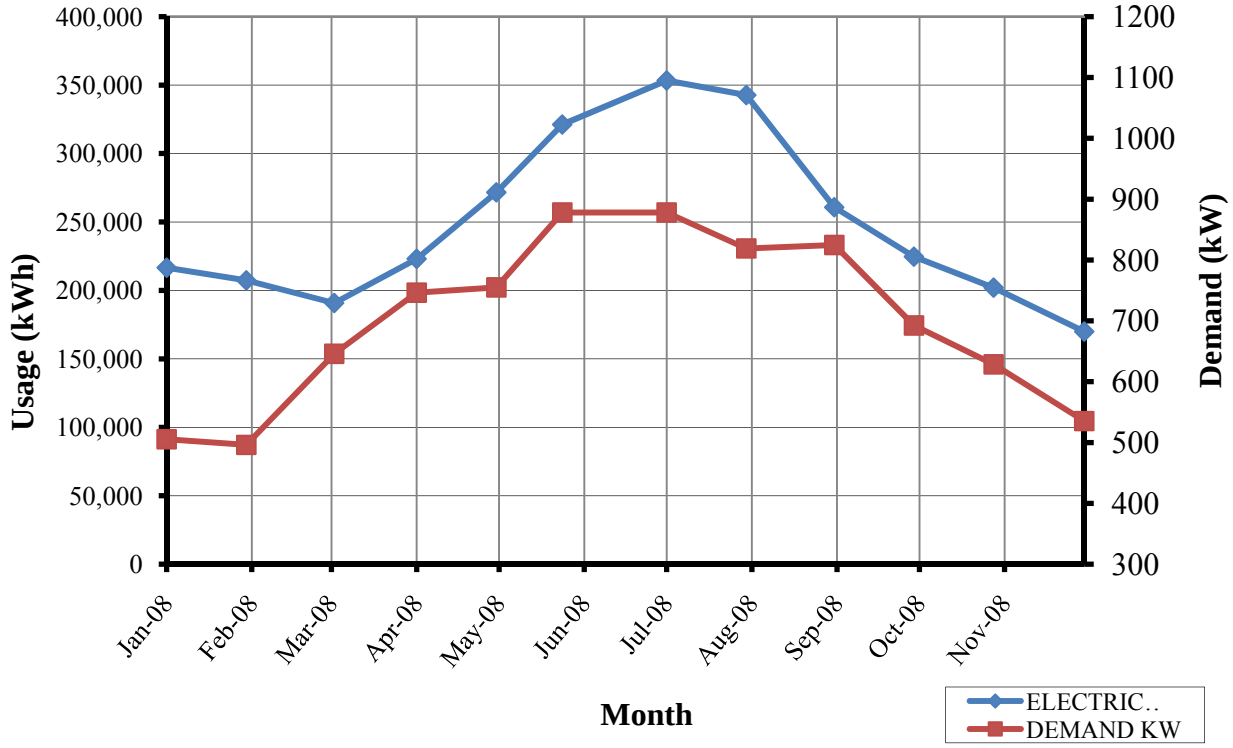
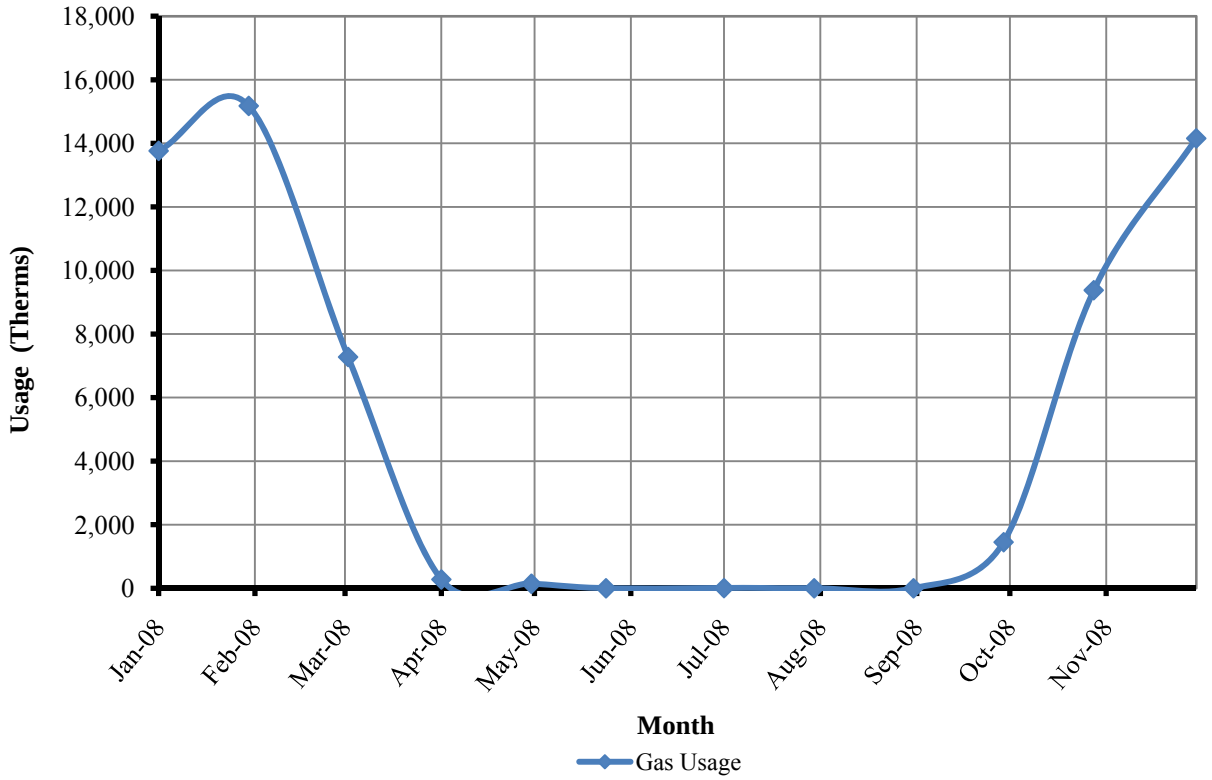


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSEG	
Rate:	LVG	
Meter No:	1810030	
Point of Delivery ID:	3114995314	
Third Party Utility Provider:	Woodroof	
TPS Meter No:	506-507	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jan-08	13,761.00	$31,267.77
Feb-08	15,176.40	$24,772.91
Mar-08	7,276.14	$21,065.72
Apr-08	279.00	$8,841.26
May-08	144.05	$457.62
Jun-08	0.00	$273.59
Jul-08	7.29	$92.59
Aug-08	0.00	$101.08
Sep-08	0.00	$91.89
Oct-08	1,452.16	$2,516.76
Nov-08	9,376.35	$5,731.53
Dec-08	14,153.00	$16,386.63
TOTALS	**61,625.38**	**$111,599.35**
AVERAGE RATE:	**$1.81**	**$/THERM**

Figure 2
Natural Gas Usage Profile
401 Grand St.
Jan - Dec 2008



B. Energy Use Index (EUI)

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

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

$$Building\ Site\ EUI = \frac{(Electric\ Usage\ in\ kBtu + Gas\ Usage\ in\ kBtu)}{Building\ Square\ Footage}$$

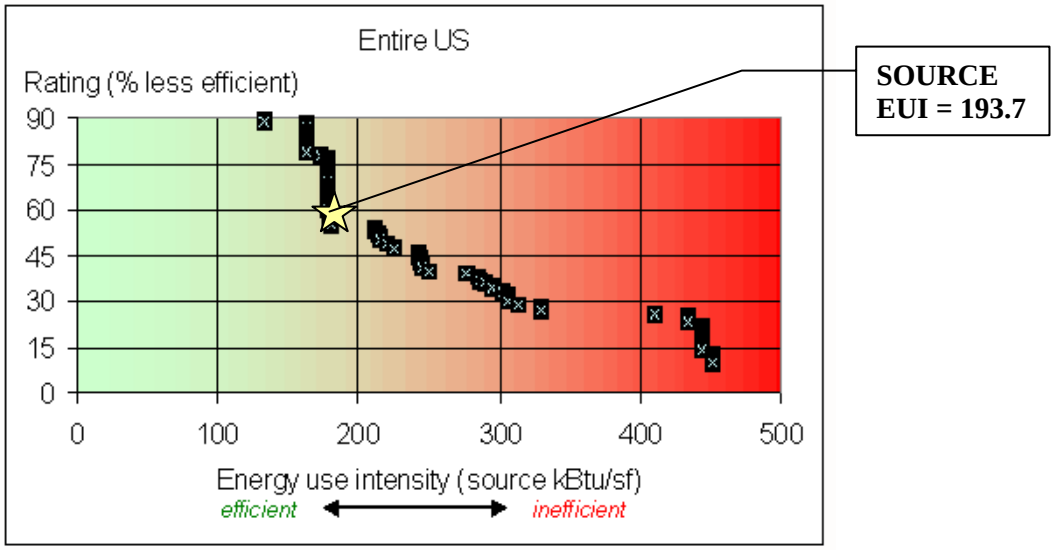
$$Building\ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ X\ SS\ Ratio + Gas\ Usage\ in\ kBtu\ X\ SS\ Ratio)}{Building\ Square\ Footage}$$

Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	2983907.0			10,187,058	3.340	34,024,775
NATURAL GAS		61625.4		6,162,538	1.047	6,452,177
FUEL OIL			0.0	0	1.010	0
PROPANE			0.0	0	1.010	0
TOTAL				16,349,596		40,476,952
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		209,000	SQUARE FEET			
BUILDING SITE EUI		*78.23*	kBtu/SF/YR			
BUILDING SOURCE EUI		*193.67*	kBtu/SF/YR			

Figure 3 below depicts a national EUI grading for the source use of *Public Order and Safety Buildings*.

Figure 3
Source Energy Use Intensity Distributions: Public Order Buildings



C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows tracking and assessment of energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and emphasis is being placed on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than $10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. It is vital that local government municipalities assess facility energy usage, benchmark energy usage utilizing Portfolio Manager, set priorities and goals to lessen energy usage and move forward with priorities and goals.

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login

User Name: passaiccounty
Password: lgeaceg2009

Security Question: What city were you born in?
Security Answer: paterson

The utility bills and other information gathered during the energy audit process are entered into the Portfolio Manager. The following is a summary of the results for the facility:

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
New Administration Bldg	74	50

Refer to **Statement of Energy Performance Appendix** for the detailed energy summary.

V. FACILITY DESCRIPTION

The Passaic County New Administration Building is a 9 story facility with a basement and a penthouse mechanical room. Exterior walls are sinter block construction with insulation and black marble façade. The amount of insulation within the walls could not be verified. The windows throughout the facility are in good condition and appear to be well maintained. Typical windows throughout the facility are double pane, ¼" tinted glass with insulated, non-operable aluminum frames. Blinds are utilized through the facility for occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat gain in the summer. The roof of this building is constructed of a built-up roof with rubber membrane and light color stone covering, where the rooftop HVAC equipment is located. The amount of insulation below the roofing is unknown. The building was built in 1994 with no additions since the original construction.

The facility houses the county and state offices, hearing rooms and courthouse. The first seven (7) floors of the building are occupied by the county and state agencies while the 8th and the 9th floor is occupied solely by the state judicial offices. A significant portion of the basement of the building is set up for parking. The boiler room and a storage area are also in the basement of the building. The penthouse of the building houses mostly the HVAC equipment.

The typical occupied hours for this facility are between 7:00 am and 4:30 pm. The county offices on the 6th and 7th floors occasionally stay open till 11 PM. The facility is closed on Saturdays and Sundays. The HVAC systems in the building will operate at occupied mode between the hours of 6:00 AM and 6:00 PM during the weekdays. The HVAC systems will stay in unoccupied mode during nights and weekends.

HVAC Systems

The New Administration Building cooling is achieved via three electric driven screw chillers made by Trane. The Trane chillers are 170 Ton RTAA units from 1990. The units are air cooled, 2-compressor chillers using R22 refrigerant. Load control of this chiller is achieved via staging of the two compressors. Trane RTAA units are located on the roof of the building serving the air handling unit in the penthouse mechanical room.

The heating for the building is achieved via two (2) Weil McLean Cast Iron boilers in the basement. The boilers burn natural gas and they are approximately 18 years old. The original nameplates of the boilers are missing. The boilers are coupled with Industrial Combustion Modulating Burners, which are rated at 5,600 MBH input each.

The boilers are sized to provide heating hot water for the perimeter baseboard heaters, hot water coils in air handling units, unit heaters in the utility areas and the parking garage via a total of eight (8) hot water circulators. Six of the hot water circulators feed the perimeter baseboard heaters while two of the circulators feed the baseboard heaters in the parking garage ceiling and the unit heaters. The boilers are maintained well and reported to be reliable.

The building is primarily conditioned by four (4) central variable air volume (VAV) air handling units (AHU) made by Trane. The AHUs serve the VAV boxes in the building. The AHU-1 feeds the west side of the building and it is a cooling-only unit. The unit is equipped with a 60 HP centrifugal supply fan and a 15 HP axial return fan. Supply fan motor is a NEMA premium efficiency motor on a Variable Speed Drive.

AHU-2 feeds the east side of the building and it is a cooling-only unit as well. The unit is equipped with a 75 HP centrifugal supply fan. Supply fan motor is a NEMA premium efficiency motor on a Variable Speed Drive.

AHU-3 serves to the 9th floor of the building. It is equipped with hot and chilled water coils. The unit has a 20 HP supply fan, which is on a Variable Speed Drive.

AHU-4 serves to the atrium area. This unit is also equipped with hot and chilled water coils. The unit is equipped with a 20 HP centrifugal supply fan and a 15 HP axial return fan. Supply fan motor is a NEMA premium efficiency motor on a Variable Speed Drive. Return fan is equipped with variable blade pitch controls.

AHU-5 is a small supplemental heating only unit serving the Franklin Roosevelt Meeting Room. This is because the perimeter of this office does not have hot water baseboard.

AHU-6 feeds the 7th and the 8th floors. It is a cooling only unit equipped with a 25 HP centrifugal supply fan and a 10 HP centrifugal return fan. Supply fan motor is a NEMA premium efficiency motor on a Variable Speed Drive. Return fan is equipped with variable pitch controls.

All of the air handling units supply conditioned air to the corresponding zones through VAV boxes and a combination of linear and round diffusers.

The system includes terminal variable air volume (VAV) boxes for office zoning. VAV boxes are equipped with direct digital controls (DDC) through the central energy management system. Local thermostats can override each VAV box's airflow to regulate space temperature. Conditioned air is distributed to the offices through ductwork to ceiling and sidewall diffusers.

Perimeter heating of the building is achieved via fin-tube perimeter baseboard heaters. There are four (4) active heating zones for the building based on building side. Since the parking garage underneath the first floor has minimal heating, an additional strip of fin-tube baseboard hot water heaters are installed in the garage plenum to supplement heating for the first floor. A separate glycol-water loop serves this area interfacing with the boiler loop through a heat exchanger.

Entrance doorways are heated via four (4) cabinet style hot water unit ventilators. Basement storage areas, parking garage and 9th floor penthouse mechanical room are heated via hot water unit heaters.

Exhaust System

Air is exhausted from the toilet rooms, atrium and garage through the roof exhausters. The room exhaust fans are operated on time-clocks based on the facility occupancy schedule.

HVAC System Controls

The HVAC systems within the facility are controlled via a central, Direct Digital Control (DDC), web-based Building Management System (BMS) made by Automated Logics. The building management system currently controls most of the HVAC systems. The boilers, chillers, air handling units, pumps and the VAV boxes are monitored and controlled through the system. The system has full access and override capability over the VAV boxes' and corresponding zone temperatures. Hot water supply temperature of the boilers is re-set based on outside air. The boilers are started and stopped manually by the boiler operators. The boiler operator checks the weather and decides to keep the boilers and pumps running based on the outside air temperature. The BMS currently does not control the lighting systems in the building. The lights in the building are turned off by the boiler operator manually after the cleaning crew is complete.

Domestic Hot Water

Domestic hot water for the restrooms and office lounge is provided by small (~5 gallon) electric hot water heaters under the sink or in a closet in the corresponding areas throughout the space.

Lighting

The lighting systems in the New Administration Building are up-to-date and efficient. Typical lighting throughout the building is fluorescent light fixtures with T-8 lamps and digital ballasts. Common areas in the atrium are lit with 50W and 70W metal halide light fixtures. Offices, courtrooms, bathrooms are lit with 40W PL lights with electronic ballasts.

VI. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

VII. ENERGY CONSERVATION MEASURES

ECM #1: Boiler Plant Upgrade

Description:

Heating is provided to the facility by two Weil McLain older, standard sectional hot water boilers. The boilers' net rated output capacities are estimated to be 5,600 MBh each with an estimated combustion efficiency of 80% for heating, when new. The boilers are over 20 years old. Although the units have not surpassed its expected useful service life of thirty-five (35) years, substantial energy savings will be realized through the replacement. Based on discussion with the personnel, one boiler has enough capacity to supply hot water to the building during most of the year.

CEG recommends replacing one of the two boilers with two (2), 3,000 MBh high efficiency condensing hot water boilers. Condensing boilers can substantially improve the operating efficiency of the heating system of the building. A condensing boiler's peak efficiency tops out at 99% depending on return water temperature. The natural gas to water efficiency for a 3,000 MBh boiler with digital burner controls is approximately 95% over its operating range and with the advanced controls and high turn down ratio. This energy conservation measure will replace one (1) of the two (2) the gas fired boiler serving the facility with (2) condensing boilers. Calculation is based on the following equipment: Aerco BMK-3.0LN, condensing boiler or equivalent. The remaining boiler can be utilized as a backup for the new boiler set.

Energy Savings Calculations:

Annual gas consumption data for the boiler plant is gathered in order to calculate the estimated heat output of the existing boilers.

Month of Use	Total Gas Consumption, Therms	Domestic Hot Water Usage, Therms	Gas used by the boilers, Therms
Jan-08	13,761	0	13,761
Feb-08	15,176	0	15,176
Mar-08	7,276	0	7,276
Apr-08	279	0	279
May-08	144	0	144
Jun-08	0	0	0
Jul-08	7	0	7
Aug-08	0	0	0
Sep-08	0	0	0
Oct-08	1,452	0	1,452
Nov-08	9,376	0	9,376
Dec-08	14,153	0	14,153
TOTALS	**61,625**	**0**	**61,625**

It is confirmed that the boilers are used for space heating only and do not provide domestic hot water heating.

The annual gas consumption is used in a reverse calculation in the below equations to obtain proposed annual gas consumption based on improved efficiency. Calculations are summarized in a table below.

Annual Output, MMBTU

$$= \frac{\text{Consumption (Therms)} \times 100{,}000 \frac{\text{BTU}}{\text{Therm}} \times \text{ Current Boiler Effc}}{1{,}000{,}000}$$

$$\text{Proposed Gas Consumption, Therms} = \frac{\textbf{Annual Output (MMBTU)} \times 1{,}000{,}000}{100{,}000 \frac{\text{BTU}}{\text{Therm}} \times \text{ New Boiler Efficiency}}$$

The total installed cost of two (2) new 3,000 MBh boilers and the new boiler control panels including interfacing with the sequencing panels is $161,400. (Pricing estimate includes the cost of engineering, permitting, commissioning, measurement & verification of the energy savings and a small contingency)

Month of Use	Gas used by the boilers, Therms	Annual Output at 80% Efficiency (Million-BTUs)	Gas Consumption if Efficiency =95% (Therms)	Energy Savings, Therms	Cost Savings @ $1.81/Therm
Jan-08	13,761	110,088	11,588	2,173	$3,935
Feb-08	15,176	121,411	12,780	2,396	$4,340
Mar-08	7,276	58,209	6,127	1,149	$2,081
Apr-08	279	2,232	235	44	$80
May-08	144	1,152	121	23	$41
Jun-08	0	0	0	0	$0
Jul-08	7	58	6	1	$2
Aug-08	0	0	0	0	$0
Sep-08	0	0	0	0	$0
Oct-08	1,452	11,617	1,223	229	$415
Nov-08	9,376	75,011	7,896	1,480	$2,681
Dec-08	14,153	113,224	11,918	2,235	$4,047
TOTALS	**61,625**	**493,003**	**51,895**	**9,730**	**$17,622**

Energy Savings Summary:

ECM #1- ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$161,400
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$161,400
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$17,622
Total Yearly Savings ($/Yr):	$17,622
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.2
Simple Lifetime ROI	63.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$264,330
Internal Rate of Return (IRR)	7%
Net Present Value (NPV)	$48,970.29

ECM #2: Install NEMA Premium® Efficient Motors

Description:

Most of the motors driving pumps and fans in this facility are NEMA premium efficiency motors. There are only a few pumps and fans utilizing standard or lower efficiency motors. One of these motors is the supply fan motor of the AHU-6. This air handling unit is a variable volume system driven with a variable speed fan. In addition, four (4) chilled water pumps and one (1) of the hot water circulation pump motors in the basement are driven by standard efficiency motors. Replacing these motor with NEMA premium efficiency motors will generate energy savings. The improved efficiency of the NEMA Premium® efficient motors is primarily due to better designs with use of better materials to reduce losses. Surprisingly, the electricity used to power a motor represents 95 % of its total lifetime operating cost. Because many motors operate year round, even small increases in efficiency can yield substantial energy and dollar savings.

This energy conservation measure would replace the motors equal to or greater than 5 HP with NEMA Premium® Efficient Motors. NEMA Premium® is the most efficient motor designation in the marketplace today. The energy & cost savings were calculated for the fan/pump motors in this facility that are greater than or equal to 5 HP and have standard efficiency ratings.

Energy Savings Calculations:

For Example: 10 HP Supply Air Fan Motor in CWP-1 with the following:

Existing Motor Efficiency = 84%
Annual Hours of Operations = 3000
1 HP = 0.746 Watt
Load Factor = 80%
Cost of electricity = $0.158/kWh

New NEMA Premium® Motor Efficiency = 91.7%

Existing 20 HP Motor Operating Cost

$$= \frac{Motor\ HP \times 0.746 \frac{kW}{HP} \times LoadFactor\ \times Hours\ of\ Operation \times Cost\ of\ Electric}{Motor\ Efficiency\ \times Power\ Factor}$$

$$= \frac{10 \times 0.746 \times 80\%\ \times 3000 \times \$0.158}{84\%\ \times 90\%} = \$3{,}742\ /Year$$

New NEMA Premium® Efficiency Motor Operating Cost =

$$= \frac{10\ \times 0.746 \times 80\%\ \times 3000 \times \$0.158}{91.7\%\ \times 90\%} = \$3{,}428\ /Year$$

Savings = $3,742 - $3,428 = $314/Year

Installed Cost of a 10 HP NEMA Premium® Efficiency Motor = $3,081 minus the SmartStart Building® incentive of $100 is $2,478.

Below is the summary energy savings:

Unit #	Motor HP	Standard Motor Efficiency %	Annual Consumption kWh	Premium Motor Efficiency %	Annual Consumption kWh	Annual Savings kWh	Demand Saving, kW
P-7	5	81.50%	12,204	89.50%	11,114	1,091	0.4
CWP-1	10	84.00%	23,683	91.70%	21,694	1,989	0.7
CWP-2	10	84.00%	23,683	91.70%	21,694	1,989	0.7
CWP-3	10	84.00%	23,683	91.70%	21,694	1,989	0.7
CWP-4	10	84.00%	23,683	91.70%	21,694	1,989	0.7
AHU-6	25	88.50%	42,147	93.60%	39,850	2,296	1.1
Total			**149,082**		**137,740**	**11,342**	**4.5**

Below is the summary of cost savings and financial performance of this ECM.

Unit #	Energy Cost Savings	Equipment Cost	Total Cost	NJ SmartStart Incentives	Net Cost	Payback Term
P-7	$172	$450	$1,925	$0	$1,925	11.2
CWP-1	$314	$800	$2,578	$100	$2,478	7.9
CWP-2	$314	$800	$2,578	$100	$2,478	7.9
CWP-3	$314	$800	$2,578	$100	$2,478	7.9
CWP-4	$314	$800	$2,578	$100	$2,478	7.9
AHU-6	$363	$1,125	$3,269	$130	$3,139	8.7
Total	**$1,792**	**$4,775**	**$15,506**	**$530**	**$14,976**	**8.4**

- Total cost includes labor, 15% engineering and design + 25% for retrofit work+ 15% controls OH&P+ 5% Commissioning+5% M&V
- Savings calculations based on current operation schedule at constant speed
- AHU-6 fan motor load factor is assumed 60% because of VFD
- Currently there are no NJ SmartStart incentive for replacing hot water pump motors

Energy Savings Summary:

The following table outlines the summary of energy savings for this facility:

ECM #2- ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$15,506
NJ Smart Start Equipment Incentive ($):	$530
Net Installation Cost ($):	$14,976
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,792
Total Yearly Savings ($/Yr):	$1,792
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.4
Simple Lifetime ROI	79.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$26,880
Internal Rate of Return (IRR)	8%
Net Present Value (NPV)	$6,416.78

ECM #3: Install Water Cooled Centrifugal Chiller

Description:

The Passaic County New Administration Building cooling is achieved via air cooled Trane screw chillers. The chillers are approximately 20 years old and in fair condition. Estimated efficiency of the chillers are 1.3 kW/Ton at full load capacity. Current high efficiency air cooled chillers operate at efficiencies as low as 1.0 KW/Ton. However, typical high efficiency water cooled centrifugal chillers efficiencies can be as low as 0.5 kW/Ton.

CEG recommends replacing three air cooled chillers with a centrifugal water cooled chiller with variable speed drive. The ECM would require installation of a cooling tower and fabrication or extension of additional penthouse space on the roof of the building. The owner should have a Professional Engineer verify heating and cooling loads, structural capacity of the building prior to moving forward.

Energy Savings Calculations:

Existing Chillers

Current EER of the chillers:	9.2
Corresponding Efficiency	1.3 kW/Ton
Current Capacity of Each Chiller	166 Tons
Total Capacity	498 Tons

Proposed System

Water cooled Centrifugal Chiller with Variable Speed Compressor

Chiller Efficiency	0.5 kW/Ton
Capacity	500 Tons
Total Full Load Cooling Hours	800 Hours

The proposed chiller efficiency does not include additional power requirements due to condenser water pumping and cooling tower fan operation. Energy required by cooling tower operation is calculated below.

Estimated Condenser Water Loop Head		25 ft
Estimated Condenser Water Flow	(3 GPM/Ton)	1500 GPM

$$\text{Condenser Pump Horsepower} = \frac{\text{Pump Head (ft)} \times \text{Flow (GPM)}}{3960 \times \text{Pump Efficiency}}$$

$$\text{Pump Horsepower} = \frac{25\text{ ft} \times 1500\text{ GPM}}{3960 \times 70\%} = 14\text{ HP}$$

$$\text{Motor Power (kW)} = \frac{\text{Pump HP} \times 0.746\text{ kW/HP}}{\text{Motor Efficiency}} = \frac{14\text{ HP} \times 0.746\text{ kW/HP}}{90\%} = 11\text{ kW}$$

Estimated Cooling Tower Fan HP 20 HP (15 kW)

Total Power required for chiller operation
= Compressor power (0.5kW/Ton) + Pump & Fan Power

$$= 500 \text{ Tons } \times 0.5 \frac{\text{kW}}{\text{Ton}} + 11 \text{ kW} + 14 \text{ kW } = 276 \text{ kW}$$

Overall Proposed Efficiency =276 kW / 500 Ton = 0.55 kW/Ton

Energy Savings Calculations:

$$\text{Energy Savings} = \text{Cooling(Tons)} \times (\text{Current efficiency}, \frac{\text{kW}}{\text{Ton}} - \text{New Efficiency}, \frac{\text{kW}}{\text{Ton}})$$

$$\text{Energy Savings} = 498 \text{ Tons} \times \left(1.3 \frac{\text{kW}}{\text{Ton}} - 0.5 \frac{\text{kW}}{\text{Ton}}\right) \times \text{Full Load Hours}$$

$$\text{Energy Savings} = 498 \text{ Tons} \times \left(1.3 \frac{\text{kW}}{\text{Ton}} - 0.5 \frac{\text{kW}}{\text{Ton}}\right) \times 800 \text{ Hours} = 299{,}000 \text{ kWh}$$

$$\text{Demand Savings} = 498 \text{ Tons} \times \left(1.3 \frac{\text{kW}}{\text{Ton}} - 0.5 \frac{\text{kW}}{\text{Ton}}\right) = 374 \text{ kW}$$

$$\text{Cooling Cost Savings } = 299{,}000 \text{ kWh} \times \frac{\$0.158}{\text{kWh}} = \$47{,}250$$

Makeup Water:

Average Makeup Water: 3.2 Gallons / Ton-Hr

$$\text{Makeup Water Required} = 3.2 \frac{\text{Gallons}}{\text{Ton}-\text{Hr}} \times 500 \text{ Tons } \times 800 \frac{\text{Hours}}{\text{Yr}} = 1{,}280{,}000 \text{ Gallons/Yr}$$

Average Cost of Water = \$3/1000 Gallons

Annual Cost of Makeup Water = \$3,840

Demand Savings:

Quantifying demand savings generated by large equipment changes is often challenging. Below method is utilized to calculate demand savings.

Current Summer Peak Demand: 878 kW
Current Winter Peak Demand: 496 kW (Chillers are OFF during winter)

It is assumed that new summer peak demand will be equal to winter peak demand plus the maximum power requirement of the new chiller plant.

Maximum Power required by the proposed chiller 498 Tons $= 498 \times 0.55 \frac{kW}{Ton} = 274\ kW$

New Summer Peak Demand = Winter Peak demand (kW) + Chiller Max Power (kW)
New Summer Peak Demand = 496 + 274 = 770 kW

Summer Demand Savings = 878 kW – 770 kW = 108 kW

Summer Demand Savings = Demand Reduction (kW) x Approximate Demand Charge ($/kW)

Estimated Current Demand Charge is $10/kW

Summer Demand Savings = 108 kW x $10/kW = $1,080/Month (for 6 months)

Summer Demand Savings = $6,480/Year

Cost of Installation:

Estimated installation cost for a water cooled chiller, a cooling tower, piping and penthouse extension to cover new equipment is estimated to be 470,000 ($340,000 Materials).

Energy Savings Summary:

ECM #3- ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$470,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$470,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$49,897
Total Yearly Savings ($/Yr):	$49,897
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.4
Simple Lifetime ROI	59.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$748,455
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$125,667.15

ECM#4 -Demand Controlled Ventilation (DCV)

Demand Controlled Ventilation (DCV) is a means to provide active, zone level control of ventilation for spaces within a facility. The basic premise behind DCV is monitoring indoor CO2 levels versus outdoor CO2 levels in order to provide proper ventilation to the spaces within the facility as well as saving costly dollars treating unconditioned ventilation air. Carbon dioxide ventilation control or demand controlled ventilation (DCV) allows for the measurement and control of outside air ventilation levels to a target cfm/person ventilation rate in the space (i.e., 15 cfm/person) based on the number of people in the space. It is a direct measure of ventilation effectiveness and is a method whereby buildings can regain active and automatic zone level ventilation control, without having to open windows. The fixed ventilation approach depends on a set-it-and-forget-it methodology that is completely unresponsive to changes in the way spaces are utilized/occupied or how equipment is maintained. A DCV system utilizes various control algorithms to maintain a base ventilation rate. The system monitors space CO2 levels and the algorithm automatically adjusts the outdoor and return air dampers to provide the quantity of outdoor air to maintain the required CO2 level in the space. System designs are normally designed for maximum occupancy and the ventilation rates are designed for this (maximum) occupancy. In areas where occupancy swings are prevalent there is ample opportunity to reduce outdoor air quantity to satisfy the needs of the actual number of occupants present. By installing the DCV controls, energy savings are realized by the reduced quantities of outdoor air that do not require heating and cooling energy from the steam and chilled water plants.

One of the Air Handling Units (AHU-4) feeds the atrium space of the New Administration Building. The atrium space is one of the single HVAC zones in the building. The outside air is set to a fixed 15% damper position on the unit. The outside air volume is typically based on the maximum occupancy of the space conditioned. When a given space is not fully occupied the outside air quantity delivered to the space is greater than the amount needed for adequate ventilation. The atrium is directly connected to the entrance area, which fresh air enters as the employees and the visitors enter and exit the building.

This ECM includes the installation of CO_2 sensors integrated into a demand control ventilation system, for the air handling unit (AHU-4). This system allows the air handling unit to respond to changes in occupancy and therefore reduce the amount of outside air that has to be conditioned. Outside air accounts for a large portion of the energy consumption in the HVAC system, especially in high occupancy spaces. The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Demand Control Ventilation - 10% - 15%.

Energy savings achieved through "Demand Control Ventilation" average 10%-15%. Savings resulting from the implementation of this ECM for energy management controls are estimated to be 15% of the total HVAC energy cost for this system.

The components included to install a demand control ventilation system include controllers, software programming, CO_2 sensors and a variable frequency drive for the 5 HP atrium exhaust fan. Two CO_2 sensors should be installed to monitor occupancy levels at two far ends of the atrium. The atrium exhaust fan speed should be modulated based on interior static pressure such that it should maintain a slight positive pressure within the atrium.

Energy Savings Calculations:

Below is a summary of the air handling unit #4 (AHU-4)

Flow:	20,000 CFM
Heating Coil Capacity:	= 481,000 BTU/Hr
Cooling Coil Capacity:	= 636,000 BTU/Hr
Average Cost of Gas	= $1.81/Therm
Average Heating System Efficiency	= 75%
Full Load Cooling Hrs.	= 800 hrs/yr.
Total Cooling Equipment EER	= 8 EER
Average Cost of Electricity	= $0.158/kWh

Heating Savings Calculations

$$Heating\ Energy\ Used = \frac{H_L \times HDD \times Hrs}{\Delta t \times Eff \times V}$$

Where:

HDD = number of Heating Degree Days as Specified Base Temperature
(Warm Air $HDD_{65^\circ F}$ = 5,007, Newark International Airport, NJ)
Hrs = Hours per Day

Δt = Design temperature difference, º F (Warm Air = 70 º F)

Eff = Efficiency of Energy Utilization (Existing Gas Boiler = 0.75)

V = Heating value of fuel, BTU/Therm (Natural Gas = 100,000 Btu = 1 Therm)

Estimated Energy Consumption of Blower Coils:

$$Heating\ Energy\ Used = \frac{(636{,}000\,Btu/h) \times (5{,}007^\circ F) \times 24h}{70^\circ F \times 75\% \times 100{,}000\,BTU/Therm} = 14{,}557\ Therms/Year$$

$$Savings = HeatingInput(Therms) \times 15\% Savings \times AveCost(\$/Therm)$$

$$Savings = 14{,}557\,(Therm) \times 15\% \times 1.81\,(\$/Therm) = \$3{,}952/Year$$

Cooling Savings Calculations

$$Est\ Cool\ Cons. = \frac{\text{Cool Load}\left(\frac{\text{Btu}}{\text{Hr}}\right) \times \text{Full Load Cooling Hrs.}}{\text{Ave Energy Efficiency Ratio}\left(\frac{\text{Btu}}{\text{Wh}}\right) \times 1000\left(\frac{\text{Wh}}{\text{kWh}}\right)}$$

$$Est\ Cool\ Cons. = \frac{481{,}000\left(\frac{Btu}{Hr}\right) \times 800\ Hrs.}{8\left(\frac{Btu}{Wh}\right) \times 1000\left(\frac{Wh}{kWh}\right)} = 48{,}100\,(kWh)$$

$$Savings = Cool\ Cons.(kWh) \times 15\%\ Savings \times Ave\ Elec\ Cost\left(\frac{\$}{kWh}\right)$$

$$Savings. = 48{,}100\,(kWh) \times 15\% \times 0.158\left(\frac{\$}{kWh}\right) = \$1{,}140$$

Total ECM Savings = $3,952 + $1,140 = $5,092

There are currently no Smart Start® *Incentives* available for a Demand Control Ventilation System.

Cost of Demand Controlled Ventilation

Estimated cost of implementing DCV into the existing Building Management System is $20,000.

Energy Savings Summary:

ECM #4- ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$20,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$20,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,092
Total Yearly Savings ($/Yr):	$5,092
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.9
Simple Lifetime ROI	281.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$76,380
Internal Rate of Return (IRR)	25%
Net Present Value (NPV)	$40,787.97

ECM #5: Install Energy Recovery Ventilation

Description:

Energy Recovery Ventilation is an energy recovery process in HVAC systems where the energy in the exhausted air is recovered via a sort of heat and mass transfer equipment. One of the typical equipments used for this application is an Energy Recovery Wheel. Energy Recovery Wheels are rotary air-to-air heat exchangers. A type of the energy recovery wheels where the heat transfer medium also provides mass transfer (mainly moisture) is called enthalpy wheel. Enthalpy wheels recover the energy in the exhaust air stream and transfer it to the fresh air make up system.

Three (3) of the air handling units, AHU-1, AHU-2 and AHU-3 in the Passaic County New Administration Building are built up systems and they are most suitable for this application since they supply conditioned air for multiple types of offices zones and not suitable for demand controlled ventilation. AHU-4 is covered in another ECM with Demand Controlled Ventilation, which is a less costly energy conservation measure. AHU-5 does not have outside air and AHU-6 is a packaged air conditioning unit.

CEG recommends installing Enthalpy Wheels for three of the air handling units. The ECM would require building a ductwork to the supply and exhaust louvers of the air handling units and installation of additional fans at the inlet and exhaust of each wheel for generated pressure drop.

The owner should have a Professional Engineer verify heating and cooling loads, structural capacity of the building prior to moving forward.

Energy Savings Calculations:

Calculations are based on energy content of the exhausted air. Total exhaust air volume is calculated in order to calculate energy required to condition the make-up air in the heating and cooling season. Then 60% of the energy is assumed to be recovered.

AHU – 1: Heating Energy Savings

Total Air Flow	50,500 CFM
Outside Air	15%
Outside Air Flow	7575 CFM (Wheel is sized for this flow)
Maximum Temperature Lift (Max DT)	60°F (70°F inside - 10°F outside)
Heating Degree Days	5007°F
Heating System Efficiency, η	75%

$$\text{Maximum Heat Load} = \text{Total CFM} \times 1.08 \times \text{Max DT}$$

$$\text{Maximum Heat Load} = 7{,}575\ \text{CFM} \times 1.08 \times 60°\text{F} = 490{,}860\ \text{BTU/Hr}$$

$$\text{Seasonal Heating Usage, Therms} = \frac{\text{Max Heat Load } \times \text{HDD} \times \frac{\text{Hr}}{\text{Day}}}{\text{Max DT } \times 100{,}000 \frac{\text{BTU}}{\text{Hr} - \text{Therm}} \times \eta}$$

$$\text{Seasonal Heating Usage, Therms} = \frac{490{,}860 \frac{\text{BTU}}{\text{Hr}} \times 5007°\text{F} \times \frac{12 \text{ Hr}}{\text{Day}}}{60°\text{F} \times 100{,}000 \frac{\text{BTU}}{\text{Hr} - \text{Therm}} \times 75\%}$$

= 6554 Therms/Year

Cost of Gas = $1.81/Therm
Total Cost of Make-up air Heating = Cost of Gas x Total Usage
= 6554 Therms/Year x $1.81/Therm
= $11,863

Energy Savings = 60%
Heating Energy Savings = 3932 Therms
Heating Cost Savings = $7,118

AHU – 1: Cooling Energy Savings

Total Energy Efficiency of the
Cooling System (EER) = 8.5
Outide Air Flow = 7,575 CFM
Maximum Enthalpy Difference = 15 kBtu/lb (Between outside air and conditioned air)

$$\text{Maximum Cooling Load} = \text{Total CFM} \times 4.5 \times \text{Max DH}$$

$$\text{Maximum Cooling Load} = 7{,}575 \text{ CFM} \times 4.5 \times 15 = 511{,}313 \text{ BTU/Hr}$$

= 43 Tons

Full Load Cooling Hours = 800 Hours

$$\text{Seasonal Cooling Energy Used, kWh} = \frac{\text{Maximum Load}, \frac{\text{BTU}}{\text{Hr}} \times \text{Full Load Hours}}{\text{Efficiency(EER)} \times 1{,}000}$$

$$\text{Seasonal Cooling Energy Used, kWh} = 48{,}124 \text{ kWh}$$

Cost of Electricity = $0.158

Total Cost of Make-up air Cooling = Cost of Electricity x Total Usage
Total Cost of Make-up air Cooling = 48,124 kWh /Year x $0.158/kWh
= $7,604

Estimated Cooling Energy Savings = 60%
Cooling Energy Savings = 28,874 kWh
Cooling Cost Savings = $4,562

AHU – 1: Cost of Additional Fan Operation

Additional energy drop created due to energy wheel operation in the make-up air and exhaust system:

Estimated pressure drop (exhaust) =2" wg (created by inserting the wheel in the air stream)
Estimated pressure drop (Make-up) =2" wg

$$\text{Fan Horsepower to recover pressure drop} = \frac{\text{Flow (CFM)} \times \text{PressureDrop (inWg)}}{6356 \times \text{Pump Efficiency} \times \text{Motor Efficiency}}$$

$$\text{Fan Horsepower to recover pressure drop} = \frac{7{,}575\ \text{(CFM)} \times 2\ \text{(inWg)}}{6356 \times 70\% \times 85\%} = 4.0\ \text{HP}$$

Total Fan Power = Supply Fan + Return Fan = 2 x 4 HP = 8 HP

Total Fan Power = 8.01 HP * 0.746 kW/Hr = 5.98 kW

Fan Hours of Operation= 3,000 Hours

Fan Energy = 5.98 kW x 3000 Hours = 17,931 kWh

Total Cost of Fan Operation = Cost of Electricity x Total Usage

= 17,931 kWh /Year x $0.158/kWh

Total Cost of Fan Operation = $2,833

AHU – 1: Net Energy Savings

Net Energy Savings = Heating Cost Savings + Cooling Cost Savings - Cost of Fan Operation

= $7,118 + $4,562 - $2,833

= $8,847

AHU – 1: Cost of Installation

Estimated cost of installation of an 8,000 CFM Enthalpy wheel with necessary ductwork is $53,200

Summary of Calculations:

Similar Calculations are carried out for AHU-2 and AHU-3 and below table is tabulated based on the results.

Summary of Energy Savings					
Unit	**Total Flow**	**OA%**	**Heating Savings, Therms**	**Cooling Savings, kWh**	**Fan Energy, kWh**
AHU-1	50,500	15%	3,932	28,874	17,931
AHU-2	50,732	15%	4,024	29,007	17,013
AHU-3	19,411	15%	1,540	11,099	6,509
Total	**120,643**		**9,495**	**68,979**	**41,453**

Summary of Cost Savings & Payback					
Unit	**Energy Savings, Therms**	**Energy Savings, kWh**	**Energy Cost Savings**	**Cost of Installation**	**Payback Years**
AHU-1	3,932	0,943	$8,847	$53,200	6
AHU-2	4,024	11,994	$9,178	$53,200	5.8
AHU-3	1,540	4,589	$3,512	$41,600	11.8
Total	**9,495**	**27,527**	**$21,536**	**$148,000**	**6.9**

Energy Savings Summary:

ECM #5- ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$148,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$148,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$21,536
Total Yearly Savings ($/Yr):	$21,536
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.9
Simple Lifetime ROI	118.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$323,040
Internal Rate of Return (IRR)	12%
Net Present Value (NPV)	$109,095.37

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the County utilizing renewable technologies and concluded that there is not a potential for solar energy or wind energy at the New Administration Building. The following are the conclusions that have been drawn:

- *Solar Energy Analysis*: After review of potential available roof space it was determined that a solar system installation would not be technically and economically feasible to the owner. Because of the large mechanical penthouse located on the roof and other equipment, a large portion of the roof is shaded throughout the day making solar an unattractive option in those areas. There is a small portion of the roof available without shading, however a system of such a small size would provide little net benefit to the owner.

- *Wind Energy Analysis*: Based on CEG's review of the applicability of wind energy for the facility; the low average wind speed, proximity to residential neighborhoods, and limited site space make the New Administration Building a poor candidate for wind energy production.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. The Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profile for January 2008 through December 2008.

Electricity:

This facility houses the county and state offices, hearing rooms and courthouse. The typical occupied hours for this facility are between 7:00 am and 4:30 pm. The county offices on the 6th and 7th floors occasionally stay open till 11 PM. The facility is closed on Saturdays and Sundays. The HVAC systems in the building will operate at occupied mode between the hours of 6:00 AM and 6:00 PM during the weekdays. The HVAC systems will stay in unoccupied mode in the nights and weekends.

The Electric Usage Profile demonstrates a typical electric profile. The summer (April – September) demonstrates an increased bell curve, that is consistent summertime usage associated with a cooling (air conditioning) load. In this facility the cooling load is provided by (3) three electric driven chillers manufactured by Trane. The units have a capacity of 170 tons. Domestic hot-water is supplied by small electric water heaters under the sink or in closets. This facility utilizes the Delivery service (LPLS), and its Commodity service (BGS) from Public Service Electric and Gas Company (PSE&G). A base-load shaping is important because a flat consumption profile will yield more competitive pricing when shopping for a Third Party Supplier (TPS).

Natural Gas:

The Natural Gas Usage Profile demonstrates a typical heating load (November –March), and complimentary cooling load (April –October). Consequently there is a clear separation between summer and winter loads consistent with Wholesale Energy Pricing. Heating loads carry a much higher average cost because of the higher demand for natural gas during the winter. In this facility the primary heating is provided by hot water via (2) two Weil McLane cast iron boilers. The boilers use natural gas a primary source of fuel. The boilers are sized to provide heating hot water for the perimeter baseboard heaters, hot water coils in the air handling units, unit heaters in the utility area and parking garages via a total of (8) eight hot water circulators. Entrance doorways are heated via (4) four cabinet style hot water unit ventilators.

This facility utilizes the Delivery service (LVG) from Public Service Electric and Gas (PSE&G) while it receives its Commodity service from Woodruff Energy, a Third Party Supplier (TPS).

Tariff Analysis:

Electricity:

This facility receives electrical service through Public Service Electric and Gas Company (PSE&G) on a LPLS (Large Power Lighting Service) rate schedule.
The LPLS utility tariff is for delivery service for general purposes at secondary distribution voltages where the customers measured peak demand exceeds 150 kW in any given month and also at primary distribution voltages. Customers may either purchase electric supply from a Third Party Supplier (TPS) of from PSE&G's Basic Generation Service default service as detailed in the rate schedule. The rate schedule has a Delivery Charge; Distribution kW and kWh Charge, Societal Benefits Charge, Non-utility Generation Charge, Securitization Charge, System Control Charge, Customer Account Services Charge, Standby Fee, Base Rate Distribution Adjustment Charge, Solar Pilot Recovery Charge and RGGI Charge. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). This facility also receives Commodity service from the Basic Generation Service from PSE&G (Public Service Electric & Gas Company).
A flat load profile will allow for a more competitive energy price when shopping for an "alternate energy source".

Natural Gas:

This facility receives natural gas service through Public Service Electric and Gas Company on a LVG (Large Volume Gas) rate class, when not receiving commodity by a Third Party Supplier. This utility tariff is for firm delivery service for general purposes. This rate schedule has a Delivery Charge, Balancing Charge, Societal Benefits Charge, Realignment Adjustment Charge, Margin Adjustment Charge, RGGI Charge and Customer Account Service Charge. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). It is pertinent to note, should the TPS not deliver, the customer may receive service from PSE&G under Emergency Sales Service. Emergency Sales Service carries an extremely high penalty cost of service.
"Firm" Delivery service has to do with the level of reliability of service. Much like the telecom industry, the natural gas pipelines were deregulated in the 1990's and the space or capacity was brokered off. Today capacity (basis/transportation) is still traded. The level of service was broken into levels of deliverability. Firm service is the most reliable delivery service. This service should not be interrupted.
Imbalances occur when Third Party Suppliers are used to supply natural gas, full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility. It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used. Otherwise, imbalances can occur, jeopardizing economics and scheduling.
From review of the information this facility is utilizing the services of a Third Party Supplier, Woodruff Energy for natural gas service.
It should be noted that there was not a Woodruff Energy Contract available for review.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities. CEG's observation is seen in electricity and natural gas costs. Passaic Counties "weighted average price-to-compare" per kWh (kilowatt hour) for all buildings is $.1327/kWh (kWh is the common unit of electric measure).

The "price to compare" is for electricity is defined as the price that would be compared to the equivalent utility price extracting the utility transmission and distribution costs (wires charges). This would be a market based price that would be supplied by a Third Party Supplier (TPS) or an alternative supplier.

The average "price-to-compare" per decatherm for natural gas is $13.11/dth (Dth is the common unit of measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The County could see significant savings if it were to take advantage of these current market prices quickly, before energy costs increase. Based on last year's historical consumption (January 2008 through December 2008) and current electric rates, The County would see an improvement of over $200,000 or 20% annually. Note: Savings were calculated using Passaic County's Average Annual Consumption of 7,570,505 kWh's and a variance of approximately $.03/kWh, and utilizing a fixed one-year flat commodity contract). Passaic County should aggregate its entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a "managed approach". CEG recommends the use of any energy advisor to guide The County through this process.

CEG's secondary recommendation coincides with the natural gas costs and the contract with Woodruff Energy. CEG has recognized that while The County is utilizing a Third Party Supplier (TPS) for natural gas supply, prices can be improved. Based on contractual pricing provided by The County and analysis performed, this demonstrates that pricing can be improved by over 30% or $90,000 annually. Note: The Average "price-to-compare" as supplied by Woodruff Energy is $13.11 / Dth (Dth the common unit of measure).
The "price-to-compare" for natural gas is the wellhead price (from producer), plus pipeline transportation (basis) all the way to the respective utility. This is said to be delivered to the utility City-Gate. In this case it is Public Service Electric & Gas Company. The utility will add its fee for delivery, to the "price-to-compare".

CEG recommends that The County of Passaic schedule a meeting with their current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that might be available. Through its meeting with the Local Distribution Company (LDC), The County will learn more about the competitive supply process. You can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. The County should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the data to manage ongoing demand-side management projects. Furthermore, CEG recommends paying attention to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, The

County should also ask the utility representative about alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier.

Finally, if the County frequently changes its supplier for energy (natural gas), it needs to closely monitor balancing, particularly when the contract is close to termination.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the facility owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.

ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party's work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.

iv. *Pay For Performance* – The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings that were audited as part of the NJ Clean Energy's Local Government Energy Audit Program. The facility's participation in the program is assisted by an approved program partner. An "Energy Reduction Plan" is created with the facility and approved partner to shown at least 15% reduction in the building's current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

1. *Energy Reduction Plan* – Upon completion of an energy reduction plan by an approved program partner, the incentive will grant $0.10 per square foot between $5,000 and $50,000, and not to exceed 50% of the facility's annual energy expense. (Benchmark #1 is not provided in addition to the local government energy audit program incentive.)

2. *Project Implementation* – Upon installation of the recommended measures along with the "Substantial Completion Construction Report," the incentive will grant savings per KWH or Therm based on the program's rates. Minimum saving must be 15%. (Example $0.11 / kWh for 15% savings, $0.12/ kWh for 17% savings, … and $1.10 / Therm for 15% savings, $1.20 / Therm for 17% saving, …) Increased incentives result from projected savings above 15%.

3. *Measurement and Verification* – Upon verification 12 months after implementation of all recommended measures, that actual savings have been achieved, based on a completed verification report, the incentive will grant additional savings per kWh or Therm based on the program's rates. Minimum savings must be 15%. (Example $0.07 / kWh for 15% savings, $0.08/ kWh for 17% savings, … and $0.70 / Therm for 15% savings, $0.80 / Therm for 17% saving, …) Increased incentives result from verified savings above 15%.

v. *Direct Install Program* – The New Jersey Clean Energy's Direct Install Program is a state funded program that targets small commercial and industrial facilities with peak demand of less than 200 kW. This turnkey program is aimed at providing owners a seamless, comprehensive process for analysis, equipment replacement and financial incentives to reduce consumption, lower utility costs and improve profitability. The program covers up to 80% of the cost for eligible upgrades including lighting, lighting controls, refrigeration, HVAC, motors, variable speed drives, natural gas and food service. Participating contractors (refer to www.njcleanenergy.com) conduct energy assessments in addition to your standard local government energy audit and install the cost-effective measures.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

XI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

E. Confirm that outside air economizers on the air handling units are functioning properly to take advantage of free cooling and avoid excess outside air during occupied periods.

F. Check and confirm time-clocks in the building especially for exhaust fans and make sure all the pins are in place and working properly.

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Passaic County - New Administration Building (401 Grand St.)

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Boiler Replacement	$161,400	$0	$0	$161,400	$17,622	$0	$17,622	15	$264,330	$0	63.8%	9.2	6.91%	$48,970.29
ECM #2	Premium Motors	$4,775	$10,731	$530	$14,976	$1,792	$0	$1,792	15	$26,880	$0	79.5%	8.4	8.39%	$6,416.78
ECM #3	Install Centrifugal Chiller	$340,000	$165,000	$0	$505,000	$49,897	$0	$49,897	15	$748,455	$0	48.2%	10.1	5.38%	$90,667.15
ECM #4	Demand Controlled Ventilation	$10,000	$10,000	$0	$20,000	$5,092	$0	$5,092	15	$76,380	$0	281.9%	3.9	24.51%	$40,787.97
ECM #5	Energy Recovery Wheel	$74,000	$74,000	$0	$148,000	$21,536	$0	$21,536	15	$323,040	$0	118.3%	6.9	11.83%	$109,095.37

Notes: 1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
2) The variable DR in the NPV equation stands for Discount Rate
3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period* .

Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February, 2010:

Electric Chillers

Water-Cooled Chillers	$12 - $170 per ton
Air-Cooled Chillers	$8 - $52 per ton

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 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 Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2004

Ground Source Heat Pumps

Closed Loop & Open Loop	$450 per ton, EER ≥ 16 $600 per ton, EER ≥ 18 $750 per ton, EER ≥ 20

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit, AFUE ≥ 92%

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
Gas-Fired Booster Water Heaters	$17 - $35 per MBH
Gas Fired Tankless Water Heaters	$300 per unit

Premium Motors

Three-Phase Motors	$45 - $700 per motor
Fractional HP Motors Electronic Communicated Motors (replacing shaded pole motors in refrigerator/freezer cases)	$40 per electronic communicated motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$15 per fixture (1-4 lamps)
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	$10 per fixture
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	$70 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	$42 per 5 foot $65 per 6 foot

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled
Daylight Dimming - office	$50 per fixture controlled

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	$0.16 KWh and $1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
New Administration Building

Building ID: 1956881
For 12-month Period Ending: September 30, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: January 06, 2010

Facility
New Administration Building
401 Grand St.
Paterson , NJ 07505

Facility Owner
Concord Engineering Group
520 S. Burnt Mill Rd.
Voorhees, NJ 08043

Primary Contact for this Facility
Michael Fischette
520 S. Burnt Mill Rd.
Voorhees, NJ 08543

Year Built: 1994
Gross Floor Area (ft²): 209,000

Energy Performance Rating[2] (1-100) 74

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	9,195,026
Natural Gas (kBtu)[4]	7,913,886
Total Energy (kBtu)	17,108,912

Energy Intensity[5]

Site (kBtu/ft²/yr)	82
Source (kBtu/ft²/yr)	187

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	1,821

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	110
National Average Source EUI	250
% Difference from National Average Source EUI	-25%
Building Type	Office

Stamp of Certifying Professional

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

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Certifying Professional
Michael Fischette
520 S. Burnt Mill Rd.
Voorhees, NJ 08543

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	New Administration Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	401 Grand St., Paterson , NJ 07505	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Office (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	209,000 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Weekly operating hours	40 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	481 (Default)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	460 (Default)	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: 778014211 (Electric) (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
08/09/2009	09/08/2009	271,842.00
07/09/2009	08/08/2009	265,826.00
06/09/2009	07/08/2009	227,070.00
05/09/2009	06/08/2009	227,070.00
04/09/2009	05/08/2009	211,095.00
03/09/2009	04/08/2009	238,914.00
02/09/2009	03/08/2009	169,427.00
01/09/2009	02/08/2009	207,804.00
12/09/2008	01/08/2009	169,924.00
11/09/2008	12/08/2008	202,021.00
10/09/2008	11/08/2008	224,659.00
778014211 (Electric) Consumption (kWh (thousand Watt-hours))		**2,415,652.00**
778014211 (Electric) Consumption (kBtu (thousand Btu))		**8,242,204.62**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**8,242,204.62**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 1810030 (Gas) (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
08/09/2009	09/08/2009	0.00
07/09/2009	08/08/2009	0.00
06/09/2009	07/08/2009	1,123.00
05/09/2009	06/08/2009	1,123.00
04/09/2009	05/08/2009	4,546.35
03/09/2009	04/08/2009	13,044.00
02/09/2009	03/08/2009	16,037.00
01/09/2009	02/08/2009	18,284.00
12/09/2008	01/08/2009	14,153.00
11/09/2008	12/08/2008	9,376.35
10/09/2008	11/08/2008	1,452.16

1810030 (Gas) Consumption (therms)	**79,138.86**
1810030 (Gas) Consumption (kBtu (thousand Btu))	**7,913,886.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**7,913,886.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
New Administration Building
401 Grand St.
Paterson , NJ 07505

Facility Owner
Concord Engineering Group
520 S. Burnt Mill Rd.
Voorhees, NJ 08043

Primary Contact for this Facility
Michael Fischette
520 S. Burnt Mill Rd.
Voorhees, NJ 08543

General Information

New Administration Building	
Gross Floor Area Excluding Parking: (ft^2)	209,000
Year Built	1994
For 12-month Evaluation Period Ending Date:	September 30, 2009

Facility Space Use Summary

Office	
Space Type	Office
Gross Floor Area(ft^2)	209,000
Weekly operating hours	40
Workers on Main Shift[d]	481
Number of PCs[d]	460
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 09/30/2009)	**Baseline** (Ending Date 01/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	74	72	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	82	80	81	N/A	110
Source (kBtu/ft^2)	187	195	185	N/A	250
Energy Cost					
$/year	$ 128,126.22	$ 541,230.78	$ 127,030.59	N/A	$ 171,747.99
$/$ft^2$/year	$ 0.61	$ 2.59	$ 0.60	N/A	$ 0.82
Greenhouse Gas Emissions					
$MtCO_2e$/year	1,821	1,893	1,805	N/A	2,441
$kgCO_2e/ft^2$/year	9	9	9	N/A	12

More than 50% of your building is defined as Office. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.

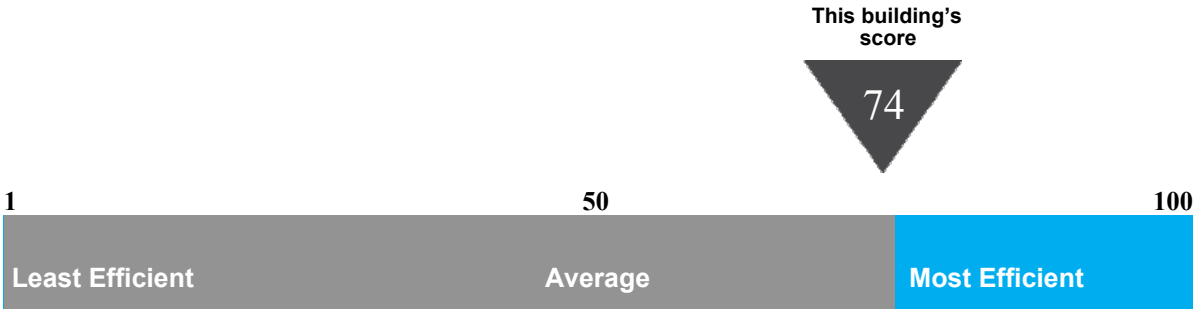
Statement of Energy Performance

2009

New Administration Building
401 Grand St.
Paterson , NJ 07505

Portfolio Manager Building ID: 1956881

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 187 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending September 2009

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 01/06/2010

MAJOR EQUIPMENT LIST

Passaic County

New Administration Building - 401 Grand St.

Liquid Chiller

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Nominal Tons	Service	EWT	LWT	GPM	Efficiency - EER	Volt / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
CH-1	Roof	AHUs	Trane	1	RTAA1704XC 01A1D0BDE	-	166	Periodical Services	55	42	330	9.2	460/3	20	20	0	Air cooled screw chillers
CH-2	Roof	AHUs	Trane	1	RTAA1704XC 01A1D0BDE	-	166	Periodical Services	55	42	330	9.2	460/3	20	20	0	1.3 kW/Ton
CH-3	Roof	AHUs	Trane	1	RTAA1704XC 01A1D0BDE	U92K11355	166	Periodical Services	55	42	330	9.2	460/3	20	20	0	

Boiler

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Input (MBh)	Output (MBh)	Net IBR	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
B1	Basement	AHUs and HW baseboard	Weil-McLean	1	H1394WF	4330	3480	3026	80%	Natural Gas	25	30	5	Boilers do not have name plates. Age of the boilers estimated. Boiler information received from HVAC schedules
B2	Basement	AHUs and HW baseboard	Weil-McLean	1	H1394WF	4330	3480	3026	80%	Natural Gas	25	30	5	

Boiler - Burner

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (MBh)	Efficiency (%)	Fuel	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
Burner-1	Boiler-1	Boiler-1	Industrial Combustion Inc.	1	33003-2	MPG-54	5600	-	Natural Gas	18	30	5	Modulating burners. 2HP Motors
Burner-2	Boiler-2	Boiler-2		1	33003-2	MPG-54	5600	-	Natural Gas	18	30	5	

Pumps

Tag	Location	Area Served	Manufacturer	Qty.	HP	RPM	GPM	Pumping Head (Feet)	Frame Size	Volts / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	
P-1	Basement	North Perimeter HW	BG	1	3	1730	-	-	-	460/3	10	10	0	
P-2	Basement	East Perimeter HW	BG	1	3	1730	-	-	-	460/3	10	10	0	
P-3	Basement	South Perimeter HW	BG	1	2	1730	-	-	-	460/3	10	10	0	
P-4	Basement	West Perimeter HW	BG	1	2	1730	-	-	-	460/3	10	10	0	
P-5	Basement	Perimeter HW	BG	1	2	1730	-	-	-	460/3	10	10	0	
P-6	Basement	Perimeter HW	BG	1	2	1730	-	-	-	460/3	10	10	0	
P-7	Basement	Basement Loop Supply	BG	1	5	1735	80	80	184JM	460/3	10	10	0	Motor Efcy = 81.5%
P-8	Basement	Basement Loop Return	BG	1	2	1740	80	35	145JM	460/3	10	10	0	
CWP-1	9th Floor MER	AHUs	BG	1	10	1720	330	-	215T	460/3	10	10	0	Motor Efcy = 84%
CWP-2	9th Floor MER	AHUs	BG	1	10	1720	330	-	215T	460/3	10	10	0	Motor Efcy = 84%
CWP-3	9th Floor MER	AHUs	BG	1	10	1720	330	-	215T	460/3	10	10	0	Motor Efcy = 84%
CWP-4	9th Floor MER	AHUs	BG	1	10	1720	330	-	215T	460/3	10	10	0	Motor Efcy = 84%

Instant Hot Water Heaters

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Input (W)	Recovery (gal/h)	Capacity (gal)	Efficiency (%)	Volts/Phase	Amps	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
DHW	Bathrooms and Kitchenettes	Within	-	20			1000		5	100%	120			10	15	Each bathroom and kitchenette has a small 5 Gallon under the sink hot water heater.

Heat Exchanger

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Surface Area Sqft	Capacity MBh	Flow (HW Side)	Flow (Glycol Side)	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
HX	Basement	Basement Unit Heaters	ITT B&G	1	P14-32-TKTL	-	-	750000	77.4	79	18	24	6	For the glycol loop in the basement parking garage. (30% Glycol)

Air Handling Units

Tag	Location	Area Served	Manufacturer	Qty	Model #	Serial #	Flow - CFM	Outside Air Percent	Cooling/Heating Coil	Cooling / Heating Capacity MBh	Supply Fan HP	Supply Fan Motor Efficiency	Return Fan HP	Return Fan Motor Efficiency	Volts / Phase	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
AHU-1	9th Floor MER	West Side of the building	Trane	1	Climate Changer, 86E	K92J50050	50500	15%	CW only	1965 / -	60	94.5%	15	90.2%	460/3	18	20	2	Centrifugal Supply Fan, Axial Return Fan
AHU-2	9th Floor MER	East Side of the building	Trane	1	Climate Changer, 86E	K92J50051	50732	15%	CW only	2067 / -	75	95.0%	-	-	460/3	18	20	2	
AHU-3	9th Floor MER	9th floor	Trane	1	Climate Changer 35D	K92J42109	19411	15%	CW/HW	900 / 481	20	93.0%			460/3	18	20	2	Centrifugal Supply Fan, Axial Return Fan
AHU-4	9th Floor MER	Atrium Area	Trane	1	Climate Changer 35D	K92J42110	20000	15%	CW/HW	636 / 481	20	93.6%	15	90.2%	460/3	18	20	2	Centrifugal Supply Fan, Axial Return Fan
AHU-5	3rd Floor	Freeholders Room	Trane	1	BWHA-850	-	2000	0%	HW only	- / 97	1/2	-		-	460/3	18	20	2	Unit provides heat only.
AHU-6	Roof	7th and 8th Floors	McQuay	1	RAH047CLW	FB0U0603 00133 02	20000	11%	CW only	707 / -	25	Standard	10	-	460/3	18	20	2	

VAV Boxes

Tag	Manufacturer	Model	Nominal Flow CFM	Qty	Reheat (kW)	Notes
CU-03	Trane	VCCD-300	300	25	-	VAV Boxes controlled via Building Management System
CU-06	Trane	VCCD-600	600	25	-	//
CU-11	Trane	VCCD-1100	1100	25	-	//
CU-17	Trane	VCCD-1700	1700	25	-	//
CU-24	Trane	VCCD-2400	2400	25	-	//
CD-03	Trane	VTCD-300	300	25	-	//
CD-06	Trane	VTCD-600	600	25	-	//
CD-11	Trane	VTCD-1100	1100	25	-	//
CD-06E	Trane	VCED-600	600	25	2	//
CD-17E	Trane	VCED-1700	1700	25	8	//
CD-24E	Trane	VCED-2400	2400	25	8	//

Number of each VAV unit type estimated.

Unit Heaters (UH), Cabinet Heaters (CH), Convectors (C)

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Heating Type	Heating Capacity (MBH)	CFM	RPM / HP	GPM	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
UH	Basement	Parking Garage	Vulcan	4	HV-060	5615503001C	HW	43.6	900	-	-	5	15	10	
UH	9th Floor MER	MER	Trane	7	UHSA-0605-8C-AAC	492H09731	HW	14 - 50			2 - 5	15	15	0	
CH	Lobby	Lobby	Trane	1	N46AO-12	-	HW	86.8	1200		7	15	15	0	
C-1	-	-	Sterling	1	FWG-A630	-	HW	6.6	-	-		15	15	0	

Fin Tube Radiation

Tag	Location	Manufacturer	Model #	Rows	Fins per foot	Capacity BTU/Ft	Tube Size	Enclosure Hight	Mounted Height	Notes
A	Wall to wall	Sterling	VB-AREI-24	1	32	1010	1-1/4"	25"	Floor	Perimeter heating
B	Wall to wall	Sterling	VB-AREI-24	1	50	1440	1-1/4"	25"	Floor	
C	Wall to wall	Sterling	VB-AR-14	1	32	950	1-1/4"	15"	18" High	

Exhaust Fans

Tag	Location	Area Served	Manufacturer	Qty.	Model #	Serial #	Fan HP	Fan RPM	Volts / Phase	Drive	Approx. Age	ASHRAE Service Life	Remaining Life	Notes
EF-1	Roof	Toilet Exhaust	Penn	1	RB-30	-	1	520	460/3	Belt	20	20	0	Information gathered from HVAC Schedules
EF-2	Roof	Atrium Smoke	Penn	1	JB-48	-	5	355	460/3	Belt	20	20	0	
EF-3	Roof	Atrium Smoke	Penn	1	XQ-82	-	1/12	1750	115	Direct	20	20	0	
EF-4	Roof	Atrium Smoke	Penn	1	XT-94	-	1/12	1140	115	Direct	20	20	0	
EF-5	Garage	Garage Exhaust	Penn	1	BC-36	-	1.5	820	460/3	Belt	20	20	0	
EF-6	Space	Electrical Closet	Penn	1	AW-35	-	1/6	900	115	Belt	20	20	0	
EF-7	Space	Evidence Room	Penn	1	AW-20	-	1/20	860	115	Direct	20	20	0	
EF-8	Roof	Smoke Ex	Penn	1	Z-15	-	1	1050	208/1	Direct	20	20	0	

CEG Job #: **9C09122**
Project: County of Passaic
Address: 401 Grand St.
Passaic, NJ 07505
Building SF: 209,000

"401 Grand"

KWH COST: $0.164

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING											PROPOSED LIGHTING								SAVINGS			
CEG Type	Room No.	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
50		1st Floor Lobby - Corridors	8500	68	1	50w MH Recessed Down Light	72	4.90	41,616.0	$6,825.02	68	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.90	41616	$6,825.02	0.00
30	123	Board of Elections	3120	51	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	6.43	20,049.1	$3,288.06	51	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	6.43	20049.12	$3,288.06	0.00
30	130	County clerk	3120	28	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.53	11,007.4	$1,805.21	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.53	11007.36	$1,805.21	0.00
3.21			3120	1	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.08	255.8	$41.96	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.08	255.84	$41.96	0.00
30	113	County Clerk	3120	46	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	5.80	18,083.5	$2,965.70	46	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.80	18083.52	$2,965.70	0.00
3.21			3120	11	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.90	2,814.2	$461.54	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.90	2814.24	$461.54	0.00
50	113	Lunch Room	3120	6	1	50w MH Recessed Down Light	72	0.43	1,347.8	$221.05	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.43	1347.84	$221.05	0.00
30	108	Mail Room	3120	6	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.76	2,358.7	$386.83	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.76	2358.72	$386.83	0.00
30	105	Hearing room	3120	15	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.89	5,896.8	$967.08	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.89	5896.8	$967.08	0.00
30	103	PCIA	3120	20	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	2.52	7,862.4	$1,289.43	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	2.52	7862.4	$1,289.43	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00

70		2nd Floor Corridor	8500	36	1	70w MH Recessed Down Light	90	3.24	27,540.0	$4,516.56	36	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.24	27540	$4,516.56	0.00
50			8500	68	1	50w MH Recessed Down Light	72	4.90	41,616.0	$6,825.02	68	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.90	41616	$6,825.02	0.00
50	220	Freeholders Meeting Room	3120	32	1	50w MH Recessed Down Light	72	2.30	7,188.5	$1,178.91	32	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	2.30	7188.48	$1,178.91	0.00
70			3120	20	1	70w MH Recessed Down Light	90	1.80	5,616.0	$921.02	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.80	5616	$921.02	0.00
30	223	Freeholders	3120	45	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	5.67	17,690.4	$2,901.23	45	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.67	17690.4	$2,901.23	0.00
30	214	County Counsel	3120	66	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	8.32	25,945.9	$4,255.13	66	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	8.32	25945.92	$4,255.13	0.00
30	205	County Administrator	3120	38	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	4.79	14,938.6	$2,449.92	38	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.79	14938.56	$2,449.92	0.00
3.21			3120	1	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.08	255.8	$41.96	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.08	255.84	$41.96	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
70		3rd Floor Corridor	8500	36	1	70w MH Recessed Down Light	90	3.24	27,540.0	$4,516.56	36	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.24	27540	$4,516.56	0.00
50			8500	68	1	50w MH Recessed Down Light	72	4.90	41,616.0	$6,825.02	68	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.90	41616	$6,825.02	0.00
50		3rd Floor Connector Bridge	8500	18	1	50w MH Recessed Down Light	72	1.30	11,016.0	$1,806.62	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.30	11016	$1,806.62	0.00
30		Jury Asembly Room	3120	54	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	6.80	21,228.5	$3,481.47	54	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	6.80	21228.48	$3,481.47	0.00
30		Courtroom	3120	62	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	7.81	24,373.4	$3,997.24	62	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	7.81	24373.44	$3,997.24	0.00
30		Courtroom	3120	58	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	7.31	22,801.0	$3,739.36	58	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	7.31	22800.96	$3,739.36	0.00

30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
70		4th Floor Corridor	8500	36	1	70w MH Recessed Down Light	90	3.24	27,540.0	$4,516.56	36	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.24	27540	$4,516.56	0.00
50			8500	68	1	50w MH Recessed Down Light	72	4.90	41,616.0	$6,825.02	68	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.90	41616	$6,825.02	0.00
30	433	Finance	3120	43	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	5.42	16,904.2	$2,772.28	43	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.42	16904.16	$2,772.28	0.00
30	439	Finance Dept.	3120	50	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	6.30	19,656.0	$3,223.58	50	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	6.30	19656	$3,223.58	0.00
8.21			3120	3	2	2x2 2 Lamp, 32w T8 Utube, Elect. Ballast, Recessed, Prismatic	58	0.17	542.9	$89.03	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.17	542.88	$89.03	0.00
30	417	Humane Services	3120	65	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	8.19	25,552.8	$4,190.66	65	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	8.19	25552.8	$4,190.66	0.00
30	404	Humane Services	3120	51	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	6.43	20,049.1	$3,288.06	51	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	6.43	20049.12	$3,288.06	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
70		5st Floor Corridor	8500	36	1	70w MH Recessed Down Light	90	3.24	27,540.0	$4,516.56	36	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.24	27540	$4,516.56	0.00
50			8500	68	1	50w MH Recessed Down Light	72	4.90	0.0	$0.00	68	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.90	0	$0.00	0.00
30	524	Engineering	3120	66	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	8.32	25,945.9	$4,255.13	66	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	8.32	25945.92	$4,255.13	0.00
3.21			3120	6	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.49	1,535.0	$251.75	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.49	1535.04	$251.75	0.00
30	532	Self Insurance	3120	16	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	2.02	6,289.9	$1,031.55	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	2.02	6289.92	$1,031.55	0.00

30	517	County Adjuster	3120	20	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	2.52	7,862.4	$1,289.43	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	2.52	7862.4	$1,289.43	0.00
30	514	Computer Room	4800	8	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.01	4,838.4	$793.50	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.01	4838.4	$793.50	0.00
30	513	Municipal Division	3120	14	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.76	5,503.7	$902.60	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.76	5503.68	$902.60	0.00
30	512	Confrence Room	3120	6	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.76	2,358.7	$386.83	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.76	2358.72	$386.83	0.00
30	511	Youth Services Division	3120	54	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	6.80	21,228.5	$3,481.47	54	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	6.80	21228.48	$3,481.47	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
50		6th Floor Corridor	8500	68	1	50w MH Recessed Down Light	72	4.90	41,616.0	$6,825.02	68	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.90	41616	$6,825.02	0.00
30		Computer Room	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Grand Jury Unit	3120	30	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.78	11,793.6	$1,934.15	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.78	11793.6	$1,934.15	0.00
30		Appelate Division	3120	46	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	5.80	18,083.5	$2,965.70	46	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.80	18083.52	$2,965.70	0.00
30		Domestic Violence Unit	3120	38	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	4.79	14,938.6	$2,449.92	38	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.79	14938.56	$2,449.92	0.00
30		Office	3120	6	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.76	2,358.7	$386.83	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.76	2358.72	$386.83	0.00
30		Lunch Room	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00

30		Grand Jury Unit	3120	20	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	2.52	7,862.4	$1,289.43	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	2.52	7862.4	$1,289.43	0.00
30		Office of Victim Advocacy	3120	57	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	7.18	22,407.8	$3,674.89	57	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	7.18	22407.84	$3,674.89	0.00
3.21			3120	3	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.25	767.5	$125.87	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.25	767.52	$125.87	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
50		7th Floor Corridor	8500	78	1	50w MH Recessed Down Light	72	5.62	47,736.0	$7,828.70	78	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.62	47736	$7,828.70	0.00
30		Chief Clerk	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Trial Section	3120	100	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	12.60	39,312.0	$6,447.17	100	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	12.60	39312	$6,447.17	0.00
50		Lunch Room	3120	6	1	50w MH Recessed Down Light	72	0.43	1,347.8	$221.05	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.43	1347.84	$221.05	0.00
30		Clerical in Docket	3120	6	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.76	2,358.7	$386.83	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.76	2358.72	$386.83	0.00
30		Docket Section	3120	15	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.89	5,896.8	$967.08	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.89	5896.8	$967.08	0.00
30		Court Squad	3120	32	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	4.03	12,579.8	$2,063.09	32	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	4.03	12579.84	$2,063.09	0.00
30		Prosecutor	3120	30	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.78	11,793.6	$1,934.15	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.78	11793.6	$1,934.15	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00

30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
50		8th Floor Corridor	8500	78	1	50w MH Recessed Down Light	72	5.62	47,736.0	$7,828.70	78	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.62	47736	$7,828.70	0.00
30	812	Intake Unit	3120	9	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.13	3,538.1	$580.25	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.13	3538.08	$580.25	0.00
30	819	Family Division Administration	3120	22	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	2.77	8,648.6	$1,418.38	22	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	2.77	8648.64	$1,418.38	0.00
30	825	Domestic Violence Unit	3120	27	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.40	10,614.2	$1,740.74	27	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.40	10614.24	$1,740.74	0.00
30	826	Hearing Officers	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30	827	Children in Court Unit	3120	14	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.76	5,503.7	$902.60	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.76	5503.68	$902.60	0.00
30	830	Mediation/Drug Court	3120	30	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.78	11,793.6	$1,934.15	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.78	11793.6	$1,934.15	0.00
3.21			3120	3	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.25	767.5	$125.87	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.25	767.52	$125.87	0.00
30	840	Diversion - Conferencing	3120	11	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.39	4,324.3	$709.19	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.39	4324.32	$709.19	0.00
30	842	Training Room	3120	9	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	1.13	3,538.1	$580.25	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	1.13	3538.08	$580.25	0.00
30	847	Processing	3120	60	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	7.56	23,587.2	$3,868.30	60	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	7.56	23587.2	$3,868.30	0.00
3.21			3120	2	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.16	511.7	$83.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.16	511.68	$83.92	0.00
30	801	Motions Supervisor	3120	80	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	10.08	31,449.6	$5,157.73	80	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	10.08	31449.6	$5,157.73	0.00

3.21			3120	2	3	2x4 3 Lamp, 32w T8, Elect. Ballast, Recessed, Prismatic	82	0.16	511.7	$83.92	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.16	511.68	$83.92	0.00
30	810	Dissolution Intake Unit	3120	6	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.76	2,358.7	$386.83	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.76	2358.72	$386.83	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
50		9th Floor Corridor	8500	78	1	50w MH Recessed Down Light	72	5.62	47,736.0	$7,828.70	78	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.62	47736	$7,828.70	0.00
30		Courtroom	3120	42	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	5.29	16,511.0	$2,707.81	42	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.29	16511.04	$2,707.81	0.00
30		Court Offices	3120	26	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.28	10,221.1	$1,676.26	26	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.28	10221.12	$1,676.26	0.00
30		Courtroom	3120	42	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	5.29	16,511.0	$2,707.81	42	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.29	16511.04	$2,707.81	0.00
30		Court Offices	3120	30	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.78	11,793.6	$1,934.15	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.78	11793.6	$1,934.15	0.00
30		Courtroom	3120	44	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	5.54	17,297.3	$2,836.75	44	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	5.54	17297.28	$2,836.75	0.00
30		Court Offices	3120	30	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	3.78	11,793.6	$1,934.15	30	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	3.78	11793.6	$1,934.15	0.00
30		Men's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
30		Women's Restroom	3120	4	3	2x2, 3 Lamp, 40w PL, Elect. Ballast, Recessed Mnt, Parabolic Diffuser w/Prismatic Lens	126	0.50	1,572.5	$257.89	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.50	1572.48	$257.89	0.00
		Totals		2732	260			298.83	1,217,816	$199,721.77	2732	0			0.00	0	$0.00		$0.00	298.83	1217816	$199,721.77	0.00

NOTES: 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.
2. Lamp totals only include T-12 tube replacment calculations