JACKSON TOWNSHIP
MUNICIPAL COMPLEX

95 WEST VETERANS HIGHWAY
JACKSON, NJ 08527

FACILITY ENERGY REPORT

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I. HISTORIC ENERGY CONSUMPTION/COST

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.

Electric Utility Provider:	Jersey Central Power & Lighting
Electric Utility Rate Structure:	General Service Secondary
Third Party Supplier:	Liberty Power

Natural Gas Utility Provider:	New Jersey Natural Gas
Utility Rate Structure:	Basic General Service (BGS)
Third Party Supplier:	PEPCO

The electric usage profile represents the actual electrical usage for the facility. 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 within each facility report shows the actual natural gas energy usage for the facility. 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.

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider: Jersey Central Power & Lighting			
Rate: General Service Secondary			
Meter No: S07033301			
Account # 100015458456			
Third Party Utility Provider: Liberty Power			
TPS Meter / Acct No: S07043525/4995226248			
MONTH OF USE	**CONSUMPTION KWH**	**DEMAND KW**	**TOTAL BILL**
Dec-10	27,360	67.7	$3,567
Jan-11	22,720	77.0	$3,565
Feb-11	28,000	82.9	$3,143
Mar-11	13,200	82.9	$2,669
Apr-11	17,760	89.3	$2,524
May-11	16,960	71.4	$2,257
Jun-11	21,120	102.2	$2,565
Jul-11	38,720	125.9	$3,063
Aug-11	31,520	130.1	$2,712
Sep-11	16,320	118.9	$1,870
Oct-11	14,720	93.1	$1,897
Nov-11	21,600	67.7	$2,751
Totals	**270,000**	**130.1 Max**	**$32,584**
	AVERAGE DEMAND	**92.4 KW average**	
	AVERAGE RATE	**$0.121 $/kWh**	

Note: Third Party Supply charges for the Municipal Complex for highlighted months are estimated due to incomplete billing information.

Figure 1
Electricity Usage Profile

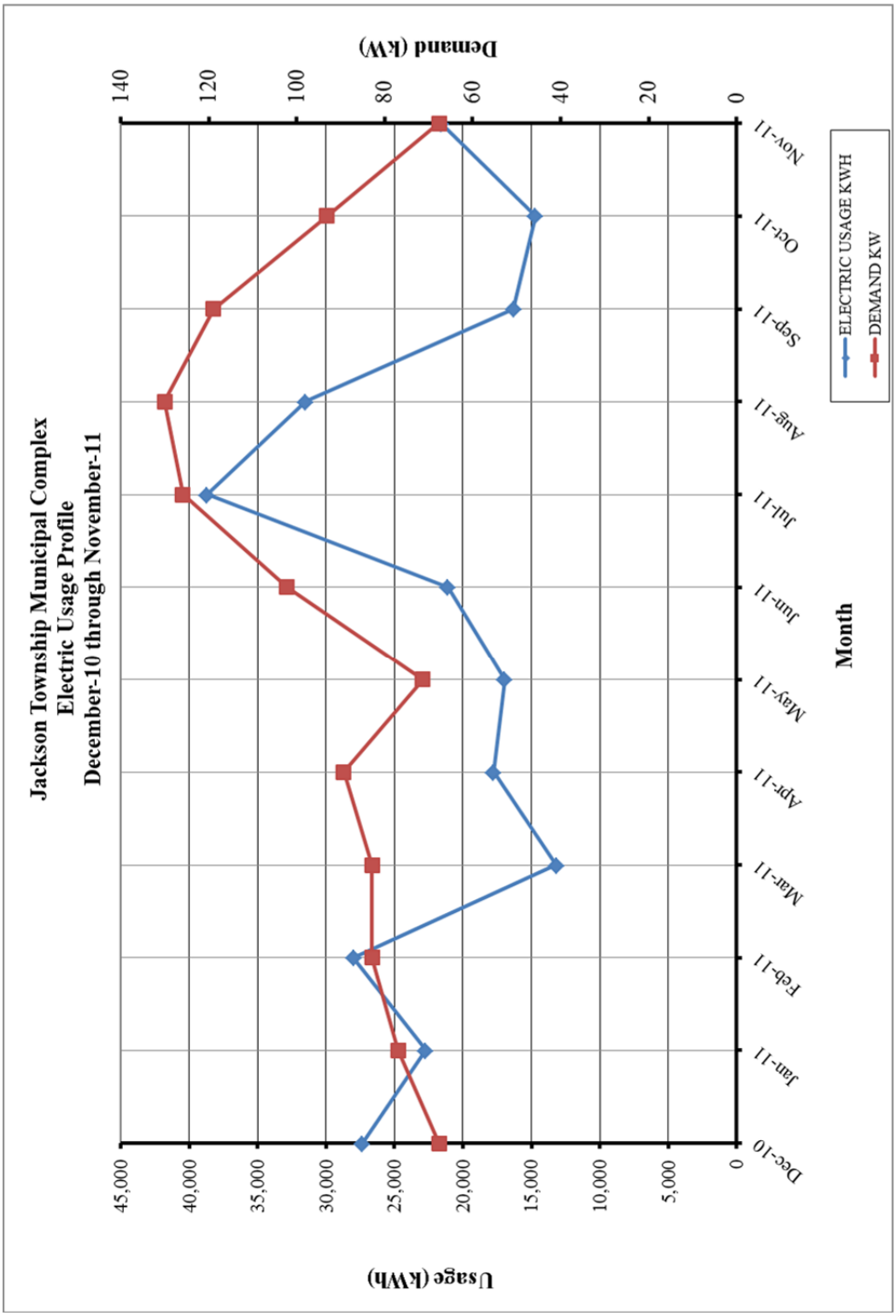
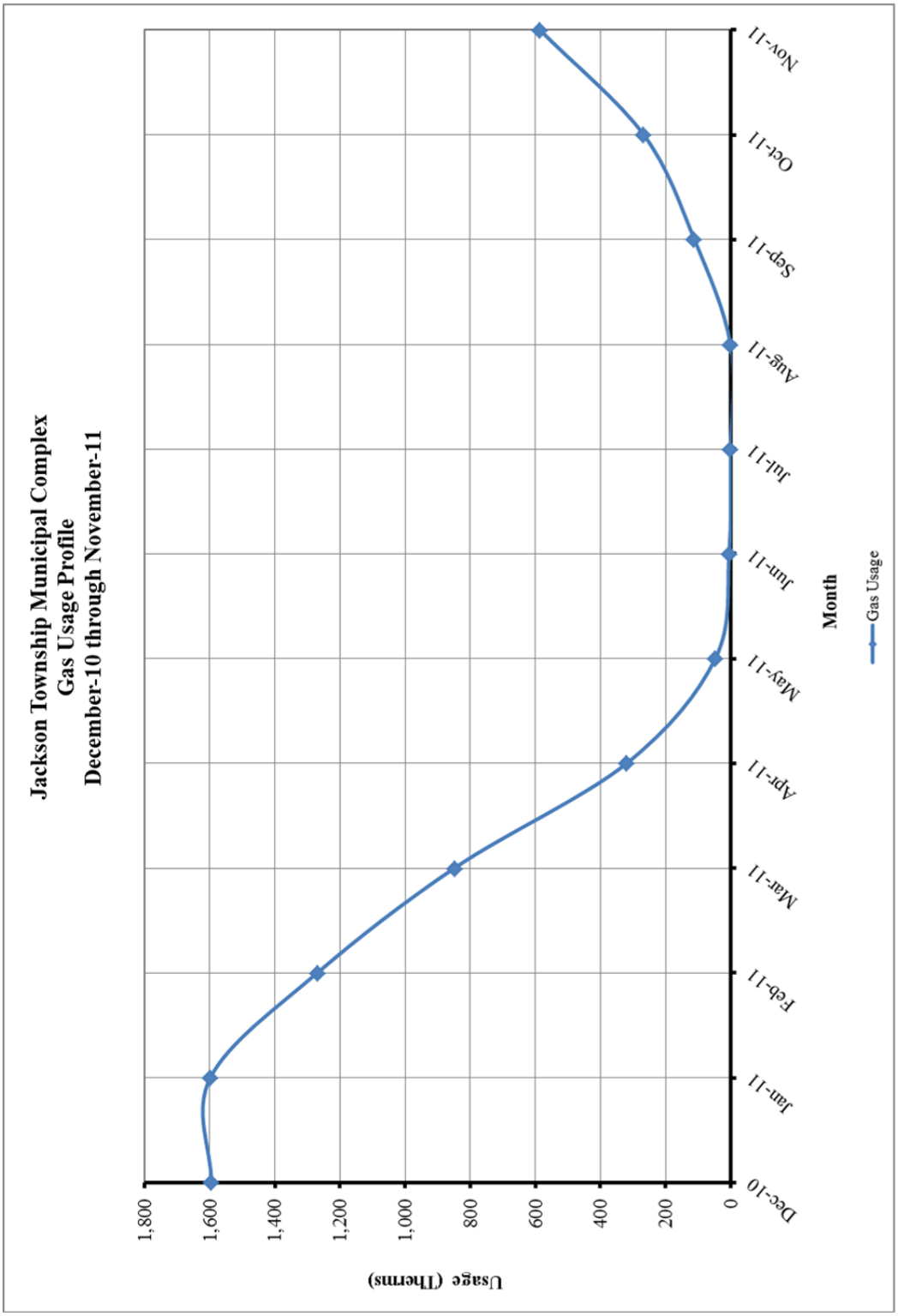


Table 4
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	New Jersey Natural Gas	
Rate:	BGS	
Meter No:	601423	
Account Number	22-0007-9982-48	
Third Party Utility Provider:	Pepco Energy Services	
TPS Account No:	43472468011	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Dec-10	1,595.00	$2,032.27
Jan-11	1,598.00	$2,852.96
Feb-11	1,269.00	$2,229.64
Mar-11	848.00	$1,465.26
Apr-11	319.00	$764.31
May-11	47.00	$376.66
Jun-11	5.00	$142.59
Jul-11	0.00	$186.42
Aug-11	1.00	$269.89
Sep-11	112.00	$184.09
Oct-11	268.00	$508.04
Nov-11	587.00	$745.97
TOTALS	**6,649.00**	**$11,758.10**
AVERAGE RATE:	**$1.77**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Jackson Township Municipal Building is located on 95 West Veterans Highway in Jackson, New Jersey. The 17,950 SF Municipal Building was built in 1989 with a major HVAC and roof replacement renovation in 2002. The building is a single story facility comprised of office space, conference rooms, restrooms, court room, and mechanical penthouse.

Occupancy Profile

The typical hours of operation for the building are Monday thru Friday between 8:00 am and 7:00 pm, and the meeting space is used from 8:00 am to 11:00 pm Monday thru Thursday.

Building Envelope

Exterior walls for the building are masonry brick construction. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout are double pane, operable, ¼" tinted glass with aluminum frames. Blinds are utilized throughout the office area of 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 original building had a flat roof; however in 2002 a standing seam metal roof was constructed above, creating a mechanical penthouse above the existing roof.

HVAC Systems

The building is conditioned by three 2002 vintage Trane Climate Changer model air handlers with direct expansion cooling and natural gas fired duct furnaces. Unit #1 conditions the west half of the building, Unit #2 conditions the east half, and Unit #3 conditions the court room. The duct furnaces are located downstream of the air handler on the supply air duct, the units are rated at 350 MBH, 350 MBH, and 250 MBH and are 80% efficient. The condensing units are Trane Model RAUCC and are located at grade on the east and west sides of the building rated at 25 tons, 30 tons, and 20 tons, respectively.

Additionally there is a EMI 1 ton mini split system that provides supplemental cooling to the IT office.

Exhaust System

Air is exhausted from the toilet rooms through the ducted inline exhaust fans that discharge to the outdoors. The penthouse exhaust fan is temperature controlled.

HVAC System Controls

The HVAC system is controlled through a Trane Tracer Summit System with a touch panel display system. The system has occupied/unoccupied scheduling capability. The air handlers are also fitted with enthalpy economizer controls.

Domestic Hot Water

Domestic hot water for the restrooms is provided by one (1) State Electric hot water boiler rated at 4500 watts with 30 gallons of storage. Additionally a mop sink is served hot water by one tank-less Waiwela 1440 watt electric boiler. Each heater is located in close proximity to the point of use.

Lighting

Refer to the **Investment Grade lighting Audit Appendix** for a detailed list of the lighting throughout the facility and estimated operating hours per space.

III. 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.

IV. ENERGY CONSERVATION MEASURES

Energy Conservation Measures are developed specifically for this facility. The energy savings and calculations are highly dependent on the information received from the site survey and interviews with operations personnel. The assumptions and calculations should be reviewed by the owner to ensure accurate representation of this facility. The following ECMs were analyzed:

Table 1
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrade	$8,610	$1,423	6.1	147.9%
ECM #2	Lighting Controls Upgrade	$1,820	$943	1.9	677.2%
ECM #3	Vending Miser Controls	$258	$338	0.8	1865.1%
ECM #4	Occupancy Controlled Power Strips	$4,050	$408	9.9	51.1%
ECM #5	NEMA Premium Motors for AHUs	$6,222	$264	23.6	-36.4%
ECM #6	VSD for AHU's	$20,803	$2,177	9.6	57.0%
ECM #7	Demand Control Ventilation	$85,296	$1,234	69.1	-78.3%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	19.04 KW PV Solar System	$110,969	$12,013	9.2	62.4%
Notes:	A. Cost takes into consideration applicable NJ Smart StartTM incentives.				
	B. Savings takes into consideration applicable maintenance savings.				

Table 2
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrade	4.1	11,756	0
ECM #2	Lighting Controls Upgrade	3	7,791	0
ECM #3	Vending Miser Controls	0.0	2,797	0
ECM #4	Occupancy Controlled Power Strips	0.0	3,375	0
ECM #5	NEMA Premium Motors for AHUs	1.4	2,185	0
ECM #6	VSD for AHU's	0.0	17,995	0
ECM #7	Demand Control Ventilation	0.0	2,795	506
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	19.04 KW PV Solar System	19.0	23,713	0

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrade	$1,423	$9,760	$1,150	$8,610	6.1
Lighting Controls Upgrade	$943	$2,350	$530	$1,820	1.9
Vending Miser Controls	$338	$258	$0	$258	0.8
Occupancy Controlled Power Strips	$408	$4,050	$0	$4,050	9.9
NEMA Premium Motors for AHUs	$264	$6,502	$280	$6,222	23.6
VSD for AHU's	$2,177	$20,803	$0	$20,803	9.6
~~Demand Control Ventilation~~	~~$1,234~~	~~$85,296~~	~~$0~~	~~$85,296~~	~~69.1~~
Design / Construction Extras (15%)		$6,558		*$6,558*	
Total Project	**$5,553**	**$50,281**	**$1,960**	**$48,321**	**8.7**

ECMs that are not included in total project are marked with strike-through font.

Design / Construction Extras is shown as an additional cost for the facility project summary. This cost is included to estimate the costs associated with construction management fees for a larger combined project.

ECM #1: Lighting Upgrade

Description:

Jackson Township Municipal Complex is mostly lit by T-8 fixtures with electronic ballasts although there are still some T-12 fixtures throughout the facility. Improved fluorescent lamps and ballasts are available as direct replacements for the existing lamps and ballasts. A simple retrofit of the existing fixture can provide substantial savings. For example, a conventional drop-ceiling lay in fixture with four, 4-foot lamps (34 Watt lamps with magnetic ballast) has a total wattage of 144 Watts per fixture. By using T-8 lamps and electronic ballasts, the total wattage would be reduced to 86 Watts. The light levels would increase by about 15% and the light quality would increase by 35%.

This ECM includes retrofitting each of the existing T-12 fluorescent lamp and magnetic ballast fixtures with T-8 lamps and high-power electronic ballasts. High efficiency electronic ballasts reduce overall wattage while maintaining the existing lumen levels of the various rooms. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need approximately 33% less lamps replaced per year for each one for one fixture replaced.

Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

Rebates and Incentives:

From the **NJ Smart Start Incentive Appendix**, the retrofit of a T-12 fixture to a T-5 or T-8 fixture or the retrofit of existing 32 watt T-8 system to reduced wattage (28w/25w 4') warrants the following incentive: $10 per fixture.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$9,760
NJ Smart Start Equipment Incentive ($):	$1,150
Net Installation Cost ($):	$8,610
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,423
Total Yearly Savings ($/Yr):	$1,423
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.1
Simple Lifetime ROI	147.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$21,345
Internal Rate of Return (IRR)	14%
Net Present Value (NPV)	$8,377.68

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

Some of the lights in the Municipal Complex are left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas.

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:

- Occupancy Sensors for Lighting Control 20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 20% of the total light energy controlled by occupancy sensors and daylight sensors (The majority of the savings is expected to be after school hours when rooms are left with lights on)

This ECM includes installation of ceiling or switch mount sensors for individual offices, large bathrooms, and larger spaces. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent. The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

$$\text{Energy Savings} = (\%\ \text{Savings} \times \text{Controlled Light Energy}\ (\text{kWh/Yr}))$$

$$\text{Savings.} = \text{Energy Savings}\ (\text{kWh}) \times \text{Ave Elec Cost}\left(\frac{\$}{\text{kWh}}\right)$$

Incentives:

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

Occupancy Sensor Fixture Mounted (existing facility only) = $20 per sensor
Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$2,350
NJ Smart Start Equipment Incentive ($):	$530
Net Installation Cost ($):	$1,820
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$943
Total Yearly Savings ($/Yr):	$943
Estimated ECM Lifetime (Yr):	15
Simple Payback	1.9
Simple Lifetime ROI	677.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$14,145
Internal Rate of Return (IRR)	52%
Net Present Value (NPV)	$9,437.47

ECM #3: Vending Miser Controls

Description:

The Jackson Township Municipal Complex currently utilizes vending machines in select areas within the building. Vending machines are common within waiting areas or lobbies which can be in use for a limited time during the day. The installation of the Vending Miser system will help reduce the operating hours of vending machines.

Cold beverage machines regularly operate inefficiently trying to maintain a constant cool temperature within the machine and snack machines with no cooling usually have lights that operate 24/7. The VendingMiser® system incorporates innovative energy-saving technology into a small plug-and-play device that in conjunction with a passive infrared sensor regulate the operation of the cold beverage and snack machines based on occupancy and room temperature. This ECM approximates the installation of two of these control systems, one for the snack machine and one for the cold beverage machine.

Energy Savings Calculations:

See **Vending Miser Appendix** for calculation methods and analysis.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$258
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$258
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$338
Total Yearly Savings ($/Yr):	$338
Estimated ECM Lifetime (Yr):	15
Simple Payback	0.8
Simple Lifetime ROI	1865.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$5,070
Internal Rate of Return (IRR)	131%
Net Present Value (NPV)	$3,777.02

ECM #4: Occupancy Controlled Power Strips

Description:

Plug loads in buildings are increasingly becoming a majority share of electrical consumption annually, as HVAC and lighting technologies are becoming more efficient and more energy is being utilized other equipment. The Jackson Township Municipal Complex has approximately 48 computers used by staff during the survey it was noted that many of these computers were on and operating while no one was using the work station. To reduce idle power draw load from the computer and peripheral equipment while not in use, Concord Engineering recommends the installation of Watt Stopper IDP-3050 occupancy controlled power strip. The power strip has the same features of a typical strip except it is fitted with an infrared occupancy sensor. The sensor reads when an occupant is using their workstation and insures all equipment is fully powered, however when an occupant is not present the strip shuts power off to devices plugged into the control outlets of the strip. Installing these power strips could substantially reduce energy waste due to plugged in equipment. The intent of this ECM is to provide control of ancillary devices such as computer monitors, speakers, printers, phone charges, task lights, and etc. that can be shut off by the control outlets when the user is not present.

Energy Savings Calculations:

The manufacturer has estimated that typical savings for their power strip can save 75 kilowatt-hours per work station or more.

POWER STRIP SAVINGS CALCULATIONS	
ECM INPUTS	
Number of Computers	45
Power Strip Information	
Manufacturer	Watt Stopper
Model	IDP-3050
Savings per Workstation (kWh/yr)	75
Electric Cost ($/kWh)	$0.121
Total Electric Savings, kWh	3,375
Total Cost Savings	$408.38

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,050
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$4,050
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$408
Total Yearly Savings ($/Yr):	$408
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.9
Simple Lifetime ROI	51.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$6,120
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$820.68

ECM #5: Install NEMA Premium® Efficiency Motors AHU's

Description:

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. Due to the fact that many motors in air handling units operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The Municipal Complex has a number of air handling unit motors that are candidates to be replaced with NEMA Premium® efficiency motors. The motors are connected to the three air handling units throughout the building. The units are located in separate penthouse areas of the complex, which provide warm and cool air to the spaces they serve. The current motors operate with efficiencies below 90%, and most are approaching the end of their useful service life.

The units currently have Trane controls which are located on the units and based on a site survey these units are assumed to be in operation almost 12 hours a day during building occupancy. The motor operating hours were estimated with this in mind, and using the building occupancy for the year which is approximately 12 months.

This energy conservation measure replaces the existing lower efficiency electric motors with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today. The energy savings and payback are subject to change based on the pool filtration usage during the year. An implementation summary of the motor is provided below.

IMPLEMENTATION SUMMARY					
EQMT ID	**FUNCTION**	**MOTOR HP**	**HOURS OF OPERATION**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**
AHU - 1	Air Handling Unit Fan Motor	7.5	4,300	86.5%	91.7%
AHU - 2	Air Handling Unit Fan Motor	7.5	4,300	88.5%	91.7%
AHU - 3	Air Handling Unit Fan Motor	10	4,300	82.5%	92.4%

Energy Savings Calculations:

$$\text{Electric usage, kWh} = \frac{\text{HP} \times \text{LF} \times 0.746 \times \text{Hours of Operation}}{\text{Motor Efficiency}}$$

where, HP = Motor Nameplate Horsepower Rating

LF = Load Factor Motor Efficiency = Motor Nameplate Efficiency

$$\text{Electric Usage Savings, kWh} = \text{Electric Usage}_{\text{Existing}} - \text{Electric Usage}_{\text{Proposed}}$$

$$\text{Electric cost savings} = \text{Electric Usage Savings} \times \text{Electric Rate} \left(\frac{\$}{\text{kWh}}\right)$$

The calculations were carried out and the results are tabulated in the table below:

PREMIUM EFFICIENCY MOTOR CALCULATIONS							
EQMT ID	**MOTOR HP**	**LOAD FACTOR**	**EXISTING EFFICIENCY**	**NEMA PREMIUM EFFICIENCY**	**POWER SAVINGS kW**	**ENERGY SAVINGS kWH**	**COST SAVINGS**
AHU - 1	7.5	90%	86.5%	91.7%	0.33	584	$71
AHU - 2	7.5	90%	88.5%	91.7%	0.20	584	$71
AHU - 3	10	90%	82.5%	92.4%	0.87	1,018	$123
TOTAL					**1.4**	**2,185**	**$264**

Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	**NJ SMART START INCENTIVE**
1	$50
1.5	$50
2	$60
3	$60
5	$60
7.5	$90
10	$100
15	$115
20	$125
25	$130
30	$150
40	$180

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	**MOTOR POWER HP**	**INSTALLED COST**	**SMART START INCENTIVE**	**NET COST**	**TOTAL SAVINGS**	**SIMPLE PAYBACK**
AHU - 1	7.5	$1,971	$90	$1,881	$71	26.6
AHU - 2	7.5	$1,971	$90	$1,881	$71	26.6
AHU - 3	10	$2,560	$100	$2,460	$123	20.0
TOTAL		**$6,502**	**$280**	**$6,222**	**$264**	**23.5**

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$6,502
NJ Smart Start Equipment Incentive ($):	$280
Net Installation Cost ($):	$6,222
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$264
Total Yearly Savings ($/Yr):	$264
Estimated ECM Lifetime (Yr):	15
Simple Payback	23.6
Simple Lifetime ROI	-36.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$3,960
Internal Rate of Return (IRR)	-5%
Net Present Value (NPV)	($3,070.39)

ECM #6: Variable Speed Drive for Air Handling Units

Description:

The existing air handling units supply heated and tempered air to the three zones of the Municipal Complex. It was noted at the time of survey that many of the air grilles were not properly cleaned and had excessive amounts of dust surrounding the terminal. In order to correct this problem and reduce the energy consumption of the supply fan a variable speed drive should be installed on the units. The drive will be controlled off a duct mounted static pressure sensor.

Energy Savings Calculations:

Variable Speed Drive (VSD) savings were calculated with an Excel Spreadsheet using the Affinity Laws (see **Appendix G**). It was assumed that the fan operates continuously for 3,000 hours per year as suggested by the schedule provided by the owner. The percentage of load for the fan was considered to be at 80% load for 65% of the time, 90% load for 20% of the time, and 100% load for 15% of the time.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$20,803
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$20,803
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,177
Total Yearly Savings ($/Yr):	$2,177
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.6
Simple Lifetime ROI	57.0%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$32,655
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$5,185.88

ECM #7: Demand Controlled Ventilation

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 boiler and DX systems.

Indoor air handling units for the three zones provide heating and air conditioning to the entire Municipal Complex. When operating, these units provide minimum amount of outside air to the space. 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.

This ECM includes the installation of CO_2 sensors integrated into a demand control ventilation system, for the units mentioned above. 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 vary depending on the room type.

The components required for the demand control ventilation system installation include CO2 sensors, control wiring, electrical wiring, and programming. Each occupied zone would require minimum one CO_2 sensor installed to monitor occupancy levels.

IMPLEMENTATION SUMMARY									
INPUTS	**Service**	**Min # of CO2 SENSORS**	**HVAC Unit**	**Cooling Capaity, Tons**	**Cooling Efficiency, EER**	**Heating Capacity, MBH**	**Heating Efficency, AFUE%**	**HX Effectiveness, Summer**	**HX Effectiveness, Winter**
DCV-1	Meeting Room	4	Trane	30.0	11.30	250	79.4%	75.9%	76.9%
DCV-2	Zone 1	4	Trane	25.0	11.10	350	79.4%	75.9%	76.9%
DCV-3	Zone 2	4	Trane	25.0	11.10	350	79.4%	75.9%	76.9%
Total		**12**		**80**		**950**			

Energy Savings Calculations:

$$\text{Cooling EnergyUsage} = \frac{\text{Cooling(Tons)} \times 12{,}000\left(\frac{\text{Btu}}{\text{Ton hr}}\right) \times \text{Annual Full Load Cooling Hrs.}}{1000\left(\frac{\text{Wh}}{\text{kWh}}\right) \times \text{EER}\left(\frac{\text{Btu}}{\text{Wh}}\right)}$$

$$\text{EnergySavings} = \text{CoolingEnergy(kwh)} \times 15\%$$

$$\text{Cooling Cost} = \text{Energy Usage(kWh)} \times \text{Ave Electric Cost}\left(\frac{\$}{\text{kWh}}\right)$$

$$\text{Heating Energy (Therms)} = \frac{\text{Heating Capacity}\left(\frac{\text{Btu}}{\text{Hr.}}\right) \times \text{HDD(Day °F)} \times 12\left(\frac{\text{Hr.}}{\text{Day}}\right)}{65(°\text{F}) \times \text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right) \times \text{Heating Efficiency (\%)}}$$

$$\text{Heating Cost} = \text{Heating Energy(Therms)} \times \text{Ave Fuel Cost}\left(\frac{\$}{\text{Therms}}\right)$$

The following tables represent the rooftop units which will be used to install demand control ventilation.

Energy Savings = 15%

DEMAND CONTROLLED VENTILATION	
ECM INPUTS	**DCV**
Equipment	Meeting Room, Zone 1,2
Total Cooling Capacity, Tons	80
Weighted Average Efficiency (EER)	11.18
Annual Full Load Cooling Hours	900
Total Heating Capacity, MBh	950
Weighted Average Heating Efficiency (Gas)	76.9%
Heating Degree Days (65°F)	5336
Energy Recovery Weighted Average Summer Effectivness	0.759
Energy Recovery Weighted Average Winter Effectivness	0.769
Energy Savings	15.0%
Elec Cost ($/kWh)	$0.121
Natural Gas Cost ($/Therm)	$1.77
ENERGY SAVINGS	
ECM RESULTS	**DCV**
Cooling Energy Consumption, kWh	18,633
Heating Energy (Therms)	3,373
Cooling Energy Savings kWh	2,795
Heating Energy Savings (Therms)	506
Electric Energy Cost Savings ($)	$338
Total Gas Cost Savings ($)	$896
Total Cost Savings ($)	$1,234
COMMENTS:	HDD estimated based on McGuire AFB, NJ

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$85,296
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$85,296
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,234
Total Yearly Savings ($/Yr):	$1,234
Estimated ECM Lifetime (Yr):	15
Simple Payback	69.1
Simple Lifetime ROI	-78.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$18,510
Internal Rate of Return (IRR)	-15%
Net Present Value (NPV)	($70,564.59)

V. 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. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

F. Ensure outside air dampers are functioning properly and only open during occupied mode.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Jackson Township - Municipal Complex

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)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^{n_i}}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^{n_i}}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrade	$9,760	$0	$1,150	$8,610	$1,423	$0	$1,423	15	$21,345	$0	147.9%	6.1	14.30%	$8,377.68
ECM #2	Lighting Controls Upgrade	$2,350	$0	$530	$1,820	$943	$0	$943	15	$14,145	$0	677.2%	1.9	51.71%	$9,437.47
ECM #3	Vending Miser Controls	$258	$0	$0	$258	$338	$0	$338	15	$5,070	$0	1865.1%	0.8	131.01%	$3,777.02
ECM #4	Occupancy Controlled Power Strips	$4,050	$0	$0	$4,050	$408	$0	$408	15	$6,120	$0	51.1%	9.9	5.67%	$820.68
ECM #5	NEMA Premium Motors for AHUs	$6,502	$0	$280	$6,222	$264	$0	$264	15	$3,960	$0	-36.4%	23.6	-5.18%	($3,070.39)
ECM #6	VSD for AHU's	$8,263	$12,540	$0	$20,803	$2,177	$0	$2,177	15	$32,655	$0	57.0%	9.6	6.25%	$5,185.88
ECM #7	Demand Control Ventilation	$56,400	$28,896	$0	$85,296	$1,234	$0	$1,234	15	$18,510	$0	-78.3%	69.1	-14.94%	($70,564.59)
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	19.04 KW PV Solar System	$110,969	$0	$0	$110,969	$2,869	$9,144	$12,013	15	$180,195	$137,160	62.4%	9.2	6.78%	$32,441.41

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* .

APPENDIX B

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 15, 2011:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

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 - $92 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2007

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%

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per VFD rated hp
Compressors	$5,250 to $12,500 per drive
Cooling Towers ≥ 10 hp	$60 per VFD rated hp

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons, 0.67 energy factor or better	$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

Prescriptive Lighting

Retro fit of T12 to T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities	$25 per fixture (1-4 lamps)
Replacement of incandescent with screw-in PAR 38 or PAR 30 (CFL) bulb	$7 per bulb
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 Including Parking Lot	$25 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $200 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

Prescriptive Lighting - LED

LED New Exit Sign Fixture Existing Facility < 75 kw Existing Facility > 75 kw	 $20 per fixture $10 per fixture
LED Display Case Lighting	$30 per display case
LED Shelf-Mtd. Display & Task Lights	$15 per linear foot
LED Portable Desk Lamp	$20 per fixture
LED Wall-wash Lights	$30 per fixture
LED Recessed Down Lights	$35 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	$175 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	$175 per fixture
LED Outdoor Wall-Mounted Area Luminaries	$100 per fixture
LED Parking Garage Luminaries	$100 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	$50 per fixture
LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs.	$150 per fixture
LED High-Bay-Aisle Lighting	$150 per fixture
LED Bollard Fixtures	$50 per fixture
LED Linear Panels (2x2 Troffers only)	$100 per fixture
LED Fuel Pump Canopy	$100 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

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

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2007 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%

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Jackson Township - Municipal Complex

Building ID: 2962061
For 12-month Period Ending: November 30, 2011[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: January 10, 2012

Facility
Jackson Township - Municipal Complex
95 Veterans Highway
Jackson, NJ 08527

Facility Owner
Jackson Township
95 Veterans Highway
Jackson, NJ 08527

Primary Contact for this Facility
Daniel Burke
95 Veterans Highway
Jackson, NJ 08527

Year Built: 1995
Gross Floor Area (ft²): 17,950

Energy Performance Rating[2] (1-100) 12

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,399,466
Natural Gas (kBtu)[4]	664,900
Total Energy (kBtu)	2,064,366

Energy Intensity[4]

Site (kBtu/ft²/yr)	115
Source (kBtu/ft²/yr)	299

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	234

Electric Distribution Utility
Jersey Central Power & Light Co [FirstEnergy Corp]

National Median Comparison

National Median Site EUI	72
National Median Source EUI	188
% Difference from National Median Source EUI	59%
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[5] **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 South Burnt Mill Road
Voorhees, NJ 08043

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. Values represent energy intensity, annualized to a 12-month period.
5. 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) or a Registered Architect (RA) 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 or RA 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	Jackson Township - Municipal Complex	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	95 Veterans Highway, Jackson, NJ 08527	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 a hospital (general medical and surgical)) nor can they be submitted as representing only a portion of a building		☐
Jackson Township - Municipal Complex (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	17,950 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	50	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 5.3 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	50	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: Jersey Central Power & Light Co [FirstEnergy Corp]

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
11/01/2011	11/30/2011	31,360.00
10/01/2011	10/31/2011	21,640.00
09/01/2011	09/30/2011	26,440.00
08/01/2011	08/31/2011	41,640.00
07/01/2011	07/31/2011	52,840.00
06/01/2011	06/30/2011	38,360.00
05/01/2011	05/31/2011	31,680.00
04/01/2011	04/30/2011	38,080.00
03/01/2011	03/31/2011	23,400.00
02/01/2011	02/28/2011	38,280.00
01/01/2011	01/31/2011	28,720.00
12/01/2010	12/31/2010	37,720.00
Electric Jackson Municipal Consumption (kWh (thousand Watt-hours))		**410,160.00**
Electric Jackson Municipal Consumption (kBtu (thousand Btu))		**1,399,465.92**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,399,465.92**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
11/01/2011	11/30/2011	587.00
10/01/2011	10/31/2011	268.00
09/01/2011	09/30/2011	112.00
08/01/2011	08/31/2011	1.00
07/01/2011	07/31/2011	0.00
06/01/2011	06/30/2011	5.00
05/01/2011	05/31/2011	47.00
04/01/2011	04/30/2011	319.00
03/01/2011	03/31/2011	848.00
02/01/2011	02/28/2011	1,269.00

01/01/2011	01/31/2011	1,598.00
12/01/2010	12/31/2010	1,595.00
Gas Consumption (therms)		**6,649.00**
Gas Consumption (kBtu (thousand Btu))		**664,900.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**664,900.00**
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 PE or RA 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
Jackson Township - Municipal Complex
95 Veterans Highway
Jackson, NJ 08527

Facility Owner
Jackson Township
95 Veterans Highway
Jackson, NJ 08527

Primary Contact for this Facility
Daniel Burke
95 Veterans Highway
Jackson, NJ 08527

General Information

Jackson Township - Municipal Complex	
Gross Floor Area Excluding Parking: (ft^2)	17,950
Year Built	1995
For 12-month Evaluation Period Ending Date:	November 30, 2011

Facility Space Use Summary

Jackson Township - Municipal Complex	
Space Type	Office
Gross Floor Area(ft^2)	17,950
Weekly operating hours	40
Workers on Main Shift	50
Number of PCs	50
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 11/30/2011)	**Baseline** (Ending Date 11/30/2011)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	12	12	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	115	115	53	N/A	72
Source (kBtu/ft^2)	299	299	139	N/A	188
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/$ft^2$/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	234	234	109	N/A	147
$kgCO_2e/ft^2$/year	13	13	6	N/A	8

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

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

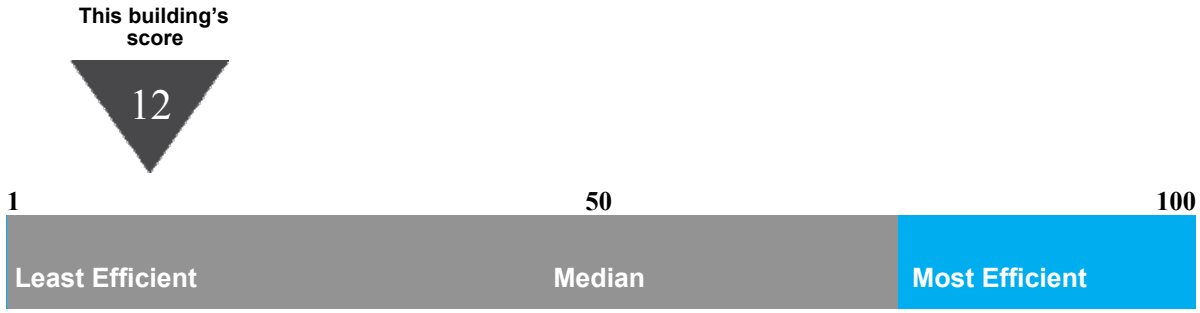
Statement of Energy Performance

2011

Jackson Township - Municipal Complex
95 Veterans Highway
Jackson, NJ 08527

Portfolio Manager Building ID: 2962061

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 299 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending November 2011

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: 01/10/2012

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Jackson Township - Municipal Complex

AC Units

Tag	AC-1	CU-1,3	CU-2
Unit Type	Split System	Air Cooled Condensing Units	Air Cooled Condensing Units
Qty	1	2	1
Location	Outside	Outside	Outside
Area Served	IT Office	Indoor Air Handling Units	Indoor Air Handling Units
Manufacturer	EMI	Trane	Trane
Model #	SCC12DM0000AA0A	RAUCC25EBV03ABDF00010	RAUCC30EBV03ABDF00010
Serial #	1-02-F-9909-23	C02E04652	C02E04651
Cooling Type	DX, R-22	DX, R-22	DX, R-22
Cooling Capacity (Tons)	1 Ton	25 Tons	30 Tons
Cooling Efficiency (SEER/EER)	10 EER / 10.5 SEER	11.1 EER	11.3 EER
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	10	10	10
ASHRAE Service Life	15	15	15
Remaining Life	5	5	5
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Jackson Township - Municipal Complex

AHUs

Tag	AHU-1/DF-1	AHU-2/DF-2
Unit Type	Air Handling Unit	Air Handling Unit
Qty	1	1
Location	Penthouse	Penthouse
Area Served	Zone 1	Zone 2
Manufacturer	TRANE	TRANE
Model #	MCCA017GAZOABA	MCCA017GAZOABA
Serial #	K02F85925	K02F85932
Cooling Type	DX	DX
Cooling Capacity (Tons)	Size 17, 8400 CFM	Size 17, 8400 CFM
Cooling Efficiency (SEER/EER)	-	-
Heating Type	GAS	GAS
Heating Input (MBH)	350	350
Efficiency	80%	80%
Fuel	GAS	GAS
Approx Age	10	10
ASHRAE Service Life	15	15
Remaining Life	5	5
Comments	DF-1 M/N - GMSD030	DF-2 M/N - GMSD025

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

AHUs

Tag	AHU-3/DF-3		
Unit Type	Air Handling Unit		
Qty	1		
Location	Penthouse		
Area Served	MTG RM		
Manufacturer	TRANE		
Model #	MCCB012UAOCOUB		
Serial #	L02E39546		
Cooling Type	DX		
Cooling Capacity (Tons)	Size 12, 6150 CFM		
Cooling Efficiency (SEER/EER)	-		
Heating Type	GAS		
Heating Input (MBH)	250		
Efficiency	80%		
Fuel	GAS		
Approx Age	10		
ASHRAE Service Life	15		
Remaining Life	5		
Comments	DF-3 M/N - GMSD025		

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Jackson Township - Municipal Complex

Domestic Water Heaters

Tag	HWH-1	HWH-2	
Unit Type	Domestic Hot Water Heater	Domestic Tankless Heater	
Qty	1	1	
Location	Mech Room	Janitor Closet	
Area Served	BATHROOMS	MOP SINK	
Manufacturer	STATE		
Model #	P63020LS	WM-4.0	
Serial #	A0440109B		
Size (Gallons)	30 Gallons	4 Gallons	
Input Capacity (MBH/KW)	4.5KW	1440W	
Recovery (Gal/Hr)	-	-	
Efficiency %	100%	100%	
Fuel	ELEC/240V	ELEC/120V	
Approx Age	10	10	
ASHRAE Service Life	12	12	
Remaining Life	2	2	
Comments			

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Jackson Township - Municipal Complex

Fan Motors

Tag			
Unit Type	Air Handling Unit Fan Motor	Air Handling Unit Fan Motor	
Qty	2	1	
Location	AHU-1	AHU-2	
Area Served	AHU-1	AHU-2	
Manufacturer	A.O. Smith	A.O. Smith	
Model #	-	-	
Serial #	-	-	
Horse Power	7.5 HP	10 HP	
Flow	-	-	
Motor Info	A.O. Smith	A.O. Smith	
Electrical Power	200/60/3	200/60/3	
RPM	1725 RPM	1725 RPM	
Motor Efficiency %	89.5%	89.5%	
Approx Age	10	10	
ASHRAE Service Life	20	20	
Remaining Life	10	10	
Comments	No VFD	No VFD	

Note:
"N/A" = Not Applicable.
"-" = Info Not Available

APPENDIX E

Investment Grade Lighting Audit

CEG Job #: 9C11039
Project: Jackson Township LGEA
95 West Veterans Highway
Jackson, NJ 08527
Bldg. Sq. Ft. 17,950

Jackson Municipal Complex

KWH COST: $0.121

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	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
1	Meeting Room	1000	32	2	15w CFL Direct/Indirect Pendant	30	0.96	960.0	$116.16	32	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
2		1000	89	1	15w CFL Ceiling High Hat	15	1.34	1,335.0	$161.54	89	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
3		1000	20	2	15w CFL Direct/Indirect Wall Mount	30	0.60	600.0	$72.60	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
6	Hallway	3600	8	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	30	0.24	864.0	$104.54	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4		3600	28	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.41	8,668.8	$1,048.92	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
2	Janitor Closet	500	1	1	15w CFL Ceiling High Hat	15	0.02	7.5	$0.91	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Purchasing	3000	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	1,032.0	$124.87	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Computer Tech	3000	8	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.69	2,064.0	$249.74	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Engineering Office	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$162.33	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	IT Closet	500	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	43.0	$5.20	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Copy Room	3000	5	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1,290.0	$156.09	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
4	Finance	3000	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.38	4,128.0	$499.49	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Tax Collector	3000	30	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	2.34	7,020.0	$849.42	30	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	1.50	4500	$544.50	$80.00	$2,400.00	0.84	2520	$304.92	7.87

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	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
5	IT Closet Server	500	2	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.16	78.0	$9.44	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	50	$6.05	$80.00	$160.00	0.06	28	$3.39	47.23
5	Clerks Office	3000	12	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.94	2,808.0	$339.77	12	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.60	1800	$217.80	$80.00	$960.00	0.34	1008	$121.97	7.87
5	Vault	250	1	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.08	19.5	$2.36	1	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.05	12.5	$1.51	$80.00	$80.00	0.03	7	$0.85	94.45
5	Admin	3000	5	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.39	1,170.0	$141.57	5	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.25	750	$90.75	$80.00	$400.00	0.14	420	$50.82	7.87
2		3000	1	1	15w CFL Ceiling High Hat	15	0.02	45.0	$5.45	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Mayor	2600	4	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.31	811.2	$98.16	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$62.92	$80.00	$320.00	0.11	291.2	$35.24	9.08
4	Bathroom	2000	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	172.0	$20.81	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
9		2000	1	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Wall MNt., Acylic Lens	32	0.03	64.0	$7.74	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Conference Room	2000	6	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.47	936.0	$113.26	6	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.30	600	$72.60	$80.00	$480.00	0.17	336	$40.66	11.81
7	Office 1	3000	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642.0	$77.68	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Office 2	3000	2	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.16	468.0	$56.63	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	300	$36.30	$80.00	$160.00	0.06	168	$20.33	7.87
7	Office 3	3000	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642.0	$77.68	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
7	Hallway	3600	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	770.4	$93.22	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Council Room	3000	6	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.47	1,404.0	$169.88	6	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.30	900	$108.90	$80.00	$480.00	0.17	504	$60.98	7.87

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	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
10	Mens Room	2000	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	372.0	$45.01	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
5	Office	3000	4	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.31	936.0	$113.26	4	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.20	600	$72.60	$80.00	$320.00	0.11	336	$40.66	7.87
5	Lunch Room	3000	6	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.47	1,404.0	$169.88	6	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.30	900	$108.90	$80.00	$480.00	0.17	504	$60.98	7.87
12	Womens Room	2000	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.23	468.0	$56.63	3	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.17	348	$42.11	$100.00	$300.00	0.06	120	$14.52	20.66
5		3000	9	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.70	2,106.0	$254.83	9	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.45	1350	$163.35	$80.00	$720.00	0.25	756	$91.48	7.87
11		3000	22	3	2x4, 3-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	127	2.79	8,382.0	$1,014.22	22	2	2 Lamp, 32w T8, Elect. Ballast, Specular Reflector; retrofit	58	1.28	3828	$463.19	$100.00	$2,200.00	1.52	4554	$551.03	3.99
12		3000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	234.0	$28.31	1	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.06	174	$21.05	$100.00	$100.00	0.02	60	$7.26	13.77
12	Display Cases	3600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	561.6	$67.95	2	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.12	417.6	$50.53	$100.00	$200.00	0.04	144	$17.42	11.48
	Totals		204	75				50,953	$6,165	204	32			6.0	17,050	$2,063		$9,760	4.1	11,756	$1,423	6.86

CEG Job #: 9C11039
Project: Jackson Township LGEA
Address: 95 West Veterans Highway
Jackson, NJ 08527
Building SF: 17,950

Jackson Municipal Complex

KWH COST: $0.121

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
1	Meeting Room	1000	32	2	15w CFL Direct/Indirect Pendant	30	0.96	960	116.16	32	0	No Change	30	0.96	0%	960	$116.16	FALSE	$0.00	0.00	0	$0.00	0.00
2		1000	89	1	15w CFL Ceiling High Hat	15	1.335	1335	161.535	89	0	No Change	15	1.34	0%	1335	$161.54	FALSE	$0.00	0.00	0	$0.00	0.00
3		1000	20	2	15w CFL Direct/Indirect Wall Mount	30	0.6	600	72.6	20	0	No Change	30	0.60	0%	600	$72.60	FALSE	$0.00	0.00	0	$0.00	0.00
6	Hallway	3600	8	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	30	0.24	864	104.544	8	0	No Change	30	0.24	0%	864	$104.54	FALSE	$0.00	0.00	0	$0.00	0.00
4		3600	28	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.408	8668.8	1048.9248	28	0	No Change	86	2.41	0%	8668.8	$1,048.92	FALSE	$0.00	0.00	0	$0.00	0.00
2	Janitor Closet	500	1	1	15w CFL Ceiling High Hat	15	0.015	7.5	0.9075	1	0	No Change	15	0.02	0%	7.5	$0.91	FALSE	$0.00	0.00	0	$0.00	0.00
4	Purchasing	3000	4	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.344	1032	124.872	4	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.28	20%	825.6	$99.90	$160.00	$160.00	0.07	206.4	$24.97	6.41
4	Computer Tech	3000	8	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.688	2064	249.744	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.55	20%	1651.2	$199.80	$75.00	$75.00	0.14	412.8	$49.95	1.50
4	Engineering Office	2600	6	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.516	1341.6	162.3336	6	2	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1073.28	$129.87	$75.00	$150.00	0.10	268.32	$32.47	4.62
4	IT Closet	500	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.086	43	5.203	1	0	No Change	86	0.09	0%	43	$5.20	FALSE	$0.00	0.00	0	$0.00	0.00
4	Copy Room	3000	5	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1290	156.09	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.34	20%	1032	$124.87	$75.00	$75.00	0.09	258	$31.22	2.40
4	Finance	3000	16	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.376	4128	499.488	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	3302.4	$399.59	$160.00	$160.00	0.28	825.6	$99.90	1.60
5	Tax Collector	3000	30	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	2.34	7020	849.42	30	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	1.87	20%	5616	$679.54	$160.00	$160.00	0.47	1404	$169.88	0.94
5	IT Closet Server	500	2	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.156	78	9.438	2	0	No Change	78	0.16	0%	78	$9.44	FALSE	$0.00	0.00	0	$0.00	0.00
5	Clerks Office	3000	12	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.936	2808	339.768	12	1	Dual Technology Occupancy Sensor - Switch Mnt.	78	0.75	20%	2246.4	$271.81	$75.00	$75.00	0.19	561.6	$67.95	1.10

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
5	Vault	250	1	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.078	19.5	2.3595	1	0	No Change	78	0.08	0%	19.5	$2.36	FALSE	$0.00	0.00	0	$0.00	0.00
5	Admin	3000	5	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.39	1170	141.57	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	78	0.31	20%	936	$113.26	$75.00	$75.00	0.08	234	$28.31	2.65
2		3000	1	1	15w CFL Ceiling High Hat	15	0.015	45	5.445	1	0	No Change	15	0.02	0%	45	$5.45	FALSE	$0.00	0.00	0	$0.00	0.00
5	Mayor	2600	4	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.312	811.2	98.1552	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	78	0.25	20%	648.96	$78.52	$75.00	$75.00	0.06	162.24	$19.63	3.82
4	Bathroom	2000	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.086	172	20.812	1	0	No Change	86	0.09	0%	172	$20.81	FALSE	$0.00	0.00	0	$0.00	0.00
9		2000	1	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Wall MNt., Acylic Lens	32	0.032	64	7.744	1	0	No Change	32	0.03	0%	64	$7.74	FALSE	$0.00	0.00	0	$0.00	0.00
5	Conference Room	2000	6	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.468	936	113.256	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	0.37	20%	748.8	$90.60	$160.00	$160.00	0.09	187.2	$22.65	7.06
7	Office 1	3000	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.214	642	77.682	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	107	0.17	20%	513.6	$62.15	$75.00	$75.00	0.04	128.4	$15.54	4.83
5	Office 2	3000	2	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.156	468	56.628	2	0	No Change	78	0.16	0%	468	$56.63	FALSE	$0.00	0.00	0	$0.00	0.00
7	Office 3	3000	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.214	642	77.682	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	107	0.17	20%	513.6	$62.15	$75.00	$75.00	0.04	128.4	$15.54	4.83
7	Hallway	3600	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.214	770.4	93.2184	2	0	No Change	107	0.21	0%	770.4	$93.22	FALSE	$0.00	0.00	0	$0.00	0.00
5	Council Room	3000	6	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.468	1404	169.884	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	0.37	20%	1123.2	$135.91	$160.00	$160.00	0.09	280.8	$33.98	4.71
10	Mens Room	2000	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.186	372	45.012	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.15	20%	297.6	$36.01	$160.00	$160.00	0.04	74.4	$9.00	17.77
5	Office	3000	4	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.312	936	113.256	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	78	0.25	20%	748.8	$90.60	$75.00	$75.00	0.06	187.2	$22.65	3.31
5	Lunch Room	3000	6	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.468	1404	169.884	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	0.37	20%	1123.2	$135.91	$160.00	$160.00	0.09	280.8	$33.98	4.71
12	Womens Room	2000	3	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.234	468	56.628	3	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	0.19	20%	374.4	$45.30	$160.00	$160.00	0.05	93.6	$11.33	14.13

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
5		3000	9	2	2x4, 2-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	78	0.702	2106	254.826	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	78	0.56	20%	1684.8	$203.86	$160.00	$160.00	0.14	421.2	$50.97	3.14
11	0	3000	22	3	2x4, 3-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	127	2.794	8382	1014.222	22	1	Dual Technology Occupancy Sensor - Remote Mnt.	127	2.24	20%	6705.6	$811.38	$160.00	$160.00	0.56	1676.4	$202.84	0.79
12		3000	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.078	234	28.314	1	0	No Change	78	0.08	0%	234	$28.31	FALSE	$0.00	0.00	0	$0.00	0.00
12	Display Cases	3600	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.156	561.6	67.9536	2	0	No Change	78	0.16	0%	561.6	$67.95	FALSE	$0.00	0.00	0	$0.00	0.00
	Totals		204	75			20.0	53,847.6	$6,516	345	20			17.3		46,056.2	$5,572.81		$2,350	2.68	7,791	$943	2.49

APPENDIX F

Location Description	Area (Sq FT)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Total KW_{AC}	Panel Weight (41.9 lbs)	W/SQFT
Jackson Municipal Complex	2000	SHARP NU-U235F2	81	17.5	1,421	19.04	23,713	15.4	3,394	13.40

.= Proposed PV Layout

Notes:

1. Estimated kWH based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

Project Name: LGEA Solar PV Project - Jackson Municipal Building
Location: 98 West Veterans Highway, Jackson, NJ
Description: Photovoltaic System 100% Financing - 15 year

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$110,969
Annual kWh Production	23,713
Annual Energy Cost Reduction	$2,869
Average Annual SREC Revenue	$9,144

Simple Payback: **9.24** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.121**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/kWh) $0.386

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$0	0	0	0	$0	0	0	0	0
1	$0	23,713	$2,869	$0	$13,042	$6,530	$4,707	$4,674	$4,674
2	$0	23,594	$2,955	$0	$12,977	$6,240	$4,997	$4,695	$9,370
3	$0	23,476	$3,044	$0	$11,738	$5,932	$5,305	$3,545	$12,915
4	$0	23,359	$3,135	$0	$10,512	$5,604	$5,633	$2,410	$15,325
5	$0	23,242	$3,229	$239	$10,459	$5,257	$5,980	$2,212	$17,537
6	$0	23,126	$3,326	$238	$10,407	$4,888	$6,349	$2,258	$19,795
7	$0	23,010	$3,426	$237	$9,204	$4,496	$6,741	$1,156	$20,951
8	$0	22,895	$3,529	$236	$9,158	$4,081	$7,156	$1,214	$22,165
9	$0	22,781	$3,635	$235	$7,973	$3,639	$7,598	$136	$22,301
10	$0	22,667	$3,744	$233	$7,933	$3,171	$8,066	$207	$22,508
11	$0	22,554	$3,856	$232	$6,766	$2,673	$8,564	($847)	$21,661
12	$0	22,441	$3,972	$231	$6,732	$2,145	$9,092	($764)	$20,897
13	$0	22,329	$4,091	$230	$5,582	$1,584	$9,653	($1,794)	$19,103
14	$0	22,217	$4,214	$229	$5,554	$989	$10,248	($1,698)	$17,405
15	$0	22,106	$4,340	$228	$4,421	$357	$10,880	($2,703)	$14,701
	Totals:	343,511	$53,365	$2,568	$132,460	$57,587	$110,969	$14,701	$261,305

Net Present Value (NPV) **$14,227**

APPENDIX G

JACKSON MUNICIPAL AIR HANDLING UNITS SUPPLY FAN VARIABLE SPEED DRIVE

Assumptions: 3,000 Hours of Operation

kWh = HP * 0.75(Conversion Factor) * Hours of Op / Motor Efficiency * 0.75 (Load Factor)

kWh = HP * (%Full Load)^3 * 0.75(Conversion Factor) * Hours of Op at Load/ Motor Efficiency

$0.1210 per kWh

Location	Equipt ID	Motor Manufacturer	Horse Power	RPM	Frame Type	V/PH/HZ	CFM	Static, in. wg.	Hours/ Year	Existing Efficiency	Existing kWh Annual	Existing Electric Cost, $	Proposed Efficiency		% Full Load	% Run Hours at Load	Hours/yr at Load	Load kWh Annual	Proposed Electric Cost, $	Material Cost, $	Labor Cost, $	Total Cost, $	Annual kWh Savings	Annual Electric Savings, $	Simple Payback, years
Penthouse	AHU-1	AO Smith	7.5	1750	254T	200/3/60	8,400	1.25	3,000	89.50%	14,141	$1,711	91.00%	-	see below	100.00%	3,000	8,743	$1,058	$7,512	$11,400	$20,803	17,995	2,177	9.55
Penthouse	AHU-2	AO Smith	7.5	1750	254T	200/3/60	8,400	1.25	3,000	89.50%	14,141	$1,711	91.00%	-	see below	100.00%	3,000	8,743	$1,058						
Penthouse	AHU-3	AO Smith	10	1750	254T	200/3/60	6,150	1.25	3,000	89.50%	18,855	$2,281	91.00%	-	see below	100.00%	3,000	11,657	1,410						
														Calcs	100.00%	15.00%	450	2,086	$252						
															90.00%	20.00%	600	2,028	$245						
															80.00%	65.00%	1,950	4,629	$560						
															70.00%	0.00%	0	0	$0						
															60.00%	0.00%	0	0	$0						
															50.00%	0.00%	0	0	$0						
															40.00%	0.00%	0	0	$0						
															30.00%	0.00%	0	0	$0						
														Calcs	100.00%	15.00%	450	2781.593407	$336.57						
															90.00%	20.00%	600	2703.708791	327.1487637						
															80.00%	65.00%	1950	6171.428571	746.7428571						
															70.00%	0.00%	0	0	0						
															60.00%	0.00%	0	0	0						
															50.00%	0.00%	0	0	0						
															40.00%	0.00%	0	0	0						
															30.00%	0.00%	0	0	0						