

**CLIFTON PUBLIC SCHOOLS
TRANSPORTATION BUILDING**

**94 SYLVAN AVENUE
CLIFTON, NEW JERSEY 07013**

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:	Public Service Electric & Gas
Electric Utility Rate Structure:	General Lighting & Power (GLP)
Third Party Supplier:	Champion Energy Services

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	General Service Gas (GSG)
Third Party Supplier:	Hess

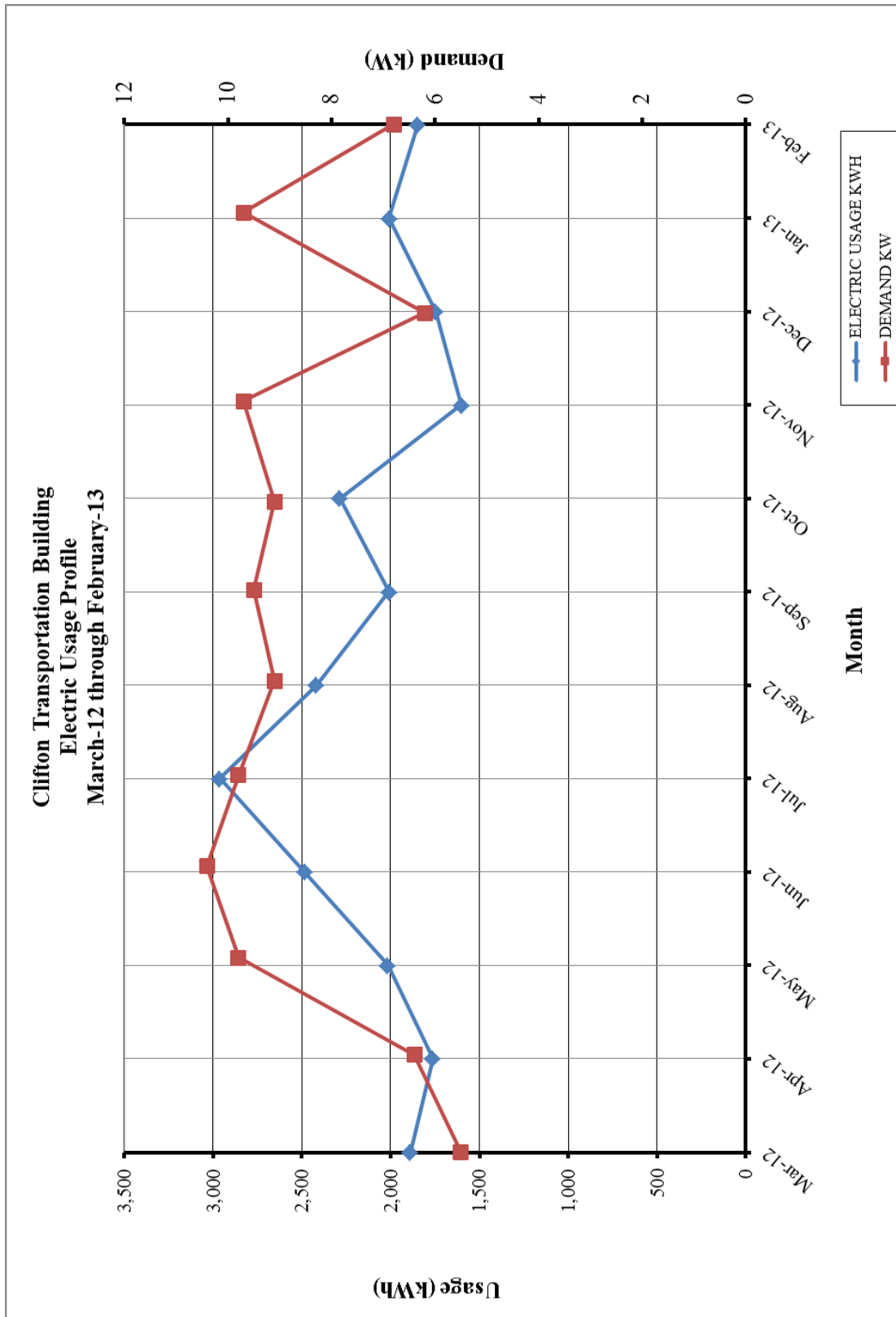
The electric usage profile represents the actual electrical usage for the facility. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts 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: PSEG			
Rate: GLP			
Meter No: 626006511			
Account No: 6667946018 / PE000008891840423036			
Third Party Utility Provider: Champion Energy Services LLC			
TPS Meter / Acct No: -			
MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Mar-12	1,890	5.5	\$88
Apr-12	1,764	6.4	\$88
May-12	2,016	9.8	\$345
Jun-12	2,484	10.4	\$408
Jul-12	2,964	9.8	\$455
Aug-12	2,418	9.1	\$385
Sep-12	2,010	9.5	\$257
Oct-12	2,286	9.1	\$284
Nov-12	1,602	9.7	\$214
Dec-12	1,746	6.2	\$214
Jan-13	2,010	9.7	\$267
Feb-13	1,848	6.8	\$234
Totals	25,038	10.4 Max	\$3,240
AVERAGE DEMAND		8.5 KW average	
AVERAGE RATE		\$0.129 \$/kWh	

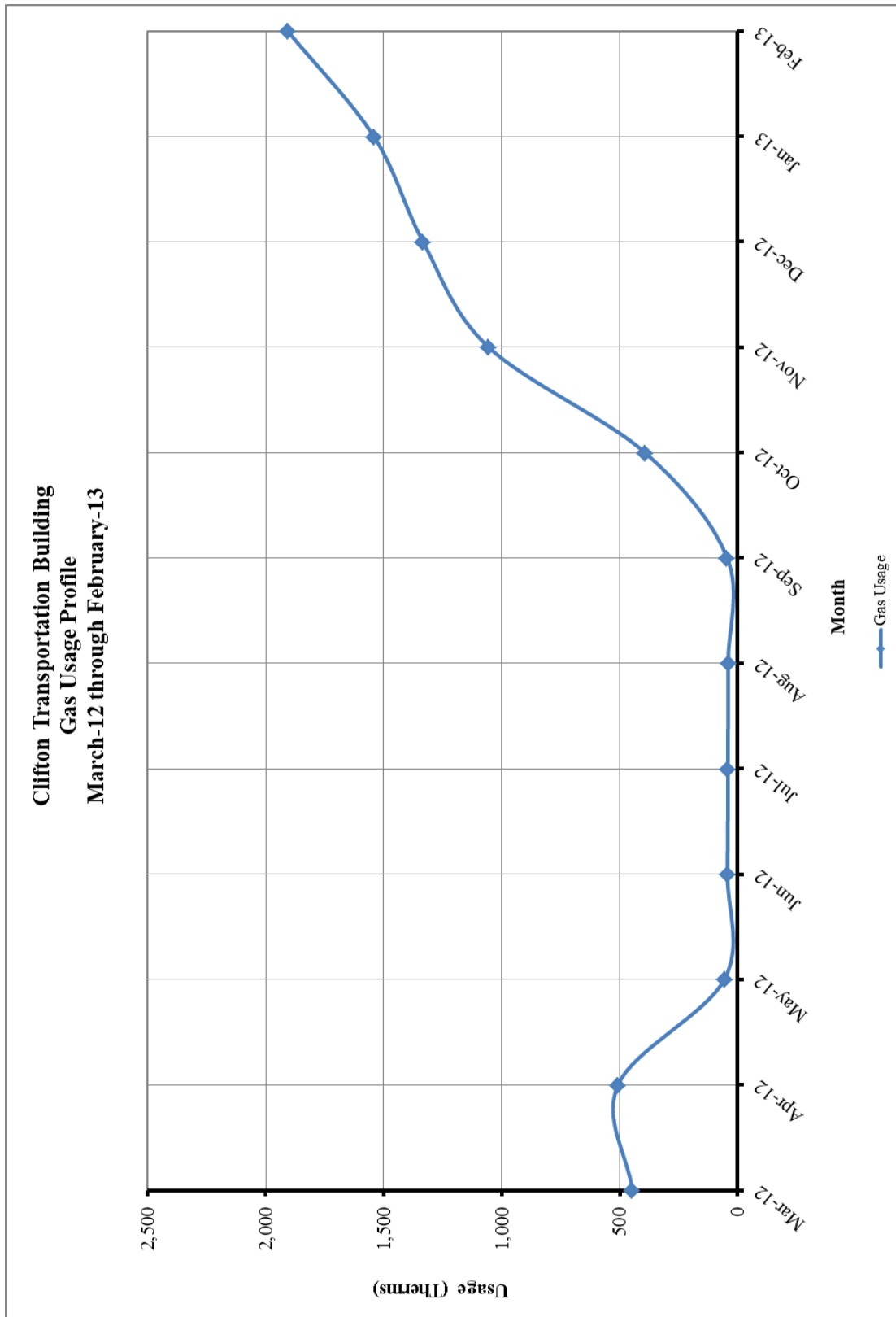
Figure 1
Electricity Usage Profile



**Table 4
Natural Gas Billing Data**

NATURAL GAS USAGE SUMMARY		
Utility Provider: PSEG		
Rate: GSG (HTG)		
Meter No: 1659783		
Account No: 6667946018		
Third Party Utility Provider: HESS		
TPS Meter No: 446575/446929		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Mar-12	446.60	\$445.06
Apr-12	507.50	\$362.00
May-12	56.50	\$40.10
Jun-12	43.90	\$35.76
Jul-12	42.00	\$37.10
Aug-12	40.90	\$37.26
Sep-12	45.10	\$38.56
Oct-12	394.80	\$371.74
Nov-12	1,057.50	\$1,071.40
Dec-12	1,334.40	\$1,383.66
Jan-13	1,542.80	\$1,561.76
Feb-13	1,908.70	\$1,922.68
TOTALS	7,420.70	\$7,307.08
AVERAGE RATE:	\$0.98	\$/THERM

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

The Clifton Transportation Building is located on 94 Sylvan Avenue in Clifton, New Jersey. The 3,024 SF Transportation Building was built in 1992 with no major additions. This facility contains several different buildings; main office building with attached garage and a separate set of garages. The main office building is two stories with a lounge on the lower level and offices on the second floor. The main garage attached to the office is where the majority of maintenance occurs. The adjacent garages are mostly used for storage.

Occupancy Profile

The typical hours of operation for the Transportation Building are Monday through Friday between 7:00 am and 4:00 pm. The building is mainly occupied during the early morning and early afternoon when bus drivers are present. The building is occupied at peak times with at most 50 people while during the off-peak hours the building may have as little as 5 people.

Building Envelope

Exterior walls for the Transportation Building are brick faced with a concrete block construction. The amount of insulation within the walls is unknown. The windows throughout the office building are in good condition and appear to be maintained. Typical windows throughout the building are double pane, operable, 1/4" clear glass with aluminum frames. The roof is a flat, EPDM rubber roof. The amount of insulation below the roof is unknown.

HVAC Systems

The Transportation Building's HVAC system consists of one hot water boiler, four gas-fired unit heaters and three window air conditioners for the office area.

The gas-fired hot water boiler has a rated input of 125 MBH and an output of 97 MBH. Manufactured by Utica with an efficiency of 80%, these boilers serve the baseboard heat which is run throughout the office building.

The main garage, one adjacent garage and the driver's lounge all have gas-fired unit heaters manufactured by Dayton and Janitrol. The main garage contains two Dayton unit heaters with an input capacity of 250 MBH and output capacity of 200 MBH. The Driver's area contains a Janitrol unit heater with an input capacity of 125 MBH and output capacity of 100 MBH. The adjacent garage contains a Janitrol unit heater with an input capacity of 100 MBH and output capacity of 80 MBH.

Exhaust System

Air is exhausted from the garage areas through roof exhausters or wall exhaust.

HVAC System Controls

The HVAC Systems within the building are controlled through thermostats with temperature control dials. The gas-fired unit heaters within the garage areas are set to maintain 65°F while the unit heater in the driver's area is set to 70°F. Since the driver's area has varying occupancy during the day, it is set to run from 6am to 9am and from 2pm to 3pm.

Domestic Hot Water

Domestic hot water for the restrooms is provided by one General Electric model GG30T6A domestic hot water heaters, with 30 gallons of storage and 32 MBH input capacity. This system was installed in 2000 and appears to be in fair condition.

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 - General	\$4,333	\$695	6.2	140.6%
ECM #2	Unit Heater Replacements	\$13,000	\$2,012	6.5	101.2%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	DESCRIPTION	NET INSTALLATION COST	ANNUAL SAVINGS	SIMPLE PAYBACK (Yrs)	SIMPLE LIFETIME ROI
REM #1	8.23 KW PV System	\$54,250	\$3,040	17.8	-15.9%
Notes:	A. Cost takes into consideration applicable NJ Smart Start TM 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 - General	3.7	5,388	-
ECM #2	Unit Heater Replacements	-	-	2,053
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	8.23 KW PV System	8.2	9,499	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 - General	\$695	\$4,603	\$270	\$4,333	6.2
Unit Heater Replacements	\$2,012	\$13,000	\$0	\$13,000	6.5
<i>Design / Construction Extras (15%)</i>		\$2,640		\$2,640	
Total Project	\$2,707	\$20,243	\$270	\$19,973	7.4

Note: ECM's with the strike-through font are not included in the ESIP.

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 – General

Description:

The majority of the interior lighting throughout Clifton Transportation Building is provided with fluorescent fixtures with older generation, 700 series and 741/ECO 32W T8 lamps and electronic ballasts. Although these T8 lamps are considered fairly efficient, further energy savings can be achieved by replacing the existing T8 lamps with new generation, 800 series 28W T8 lamps without compromising light output. Concord Engineering recommends that most of these fixtures remain unmodified due to the extensive costs which will be incurred if these fixtures are to be re-lamped and re-ballasted which results in a long payback period. For other areas that are over lit, Concord Engineering recommends that the fixture be retrofitted with new Super T-8 lamps/reflector, de-lamped to the appropriate light levels, and a new high-efficiency electronic ballast be installed. Finally, there are some fixtures, such as existing T12 fixtures, that can be retrofitted to the Super T-8 lamp and Ballast system along with a reflector that would produce an economical payback period.

The ECM includes replacement of any incandescent lamps with LED lamps. The retrofit of existing incandescent fixtures with 12.5 watt Endura Philips LED lamps will assist in reducing the facility's electric expenses.

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.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$4,603
NJ Smart Start Equipment Incentive (\$):	\$270
Net Installation Cost (\$):	\$4,333
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$695
Total Yearly Savings (\$/Yr):	\$695
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.2
Simple Lifetime ROI	140.6%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$10,425
Internal Rate of Return (IRR)	14%
Net Present Value (NPV)	\$3,963.86

ECM #2: Infra-Red Radiant Unit Heater Transportation

Description:

The Clifton Transportation Building (3,024 SF) has a driver's area and a garage containing three (3) gas fired unit heaters (total) mounted from the ceiling steel structure. Two unit heaters have 250 MBH input and 200 MBH output while one unit heater has a 125 MBH input and 100 MBH output. These unit heaters have surpassed their ASHRAE service life. These units are used to keep the garage and driver's area at 65°F in the wintertime.

This ECM would upgrade the public works garage by installing more efficient gas-fired, infrared tube heaters rated at 90% thermal efficiency. When compared to convective heating systems, Infrared heaters provide more efficient heating in large areas and warehouses because they only heat people and objects (not air). The installation will require venting and unit combustion air piping. Basis of design for replacement of the existing unit heaters with infrared tube heating is the Sterling SLR200 and SLR100 infrared heater or equivalent.

Energy Savings Calculations:

INFRA-RED RADIANT UNIT HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Unit Heaters	New Radiant Heating System	-
Existing Nat Gas (Therms)	6,159	-	-
Efficiency (%)	75%	90%	15%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	-
Equivalent Building Heat Usage (MMBTUs)	462	462	-
Ave. Gas Cost (\$/Therm)	0.98	0.98	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Natural Gas Usage (Therms)	6,159	4,106	2,053
Energy Cost (\$)	\$6,036	\$4,024	\$2,012
COMMENTS:			

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$13,000
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$13,000
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$2,012
Total Yearly Savings (\$/Yr):	\$2,012
Estimated ECM Lifetime (Yr):	13
Simple Payback	6.5
Simple Lifetime ROI	101.2%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$26,156
Internal Rate of Return (IRR)	12%
Net Present Value (NPV)	\$8,397.53

REM #1: 8.23 kW Solar System**Description:**

The Clifton Transportation Building has available roof space that could accommodate a significant amount of solar generation. Based on the available areas a 8.23 kilowatt solar array could be installed. The array will produce approximately 9,499 kilowatt-hours annually that will reduce the overall electric usage of the facility by 37.94%.

Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas. Financial results in table below are based on 100% financing of the system over a fifteen year period.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
System Size (KW_{DC}):	8.23
Electric Generation (KWH/Yr):	9,499
Installation Cost (\$):	\$54,250
SREC Revenue (\$/Yr):	\$1,815
Energy Savings (\$/Yr):	\$1,225
Total Yearly Savings (\$/Yr):	\$3,040
ECM Analysis Period (Yr):	15
Simple Payback (Yrs):	17.8
Analysis Period Electric Savings (\$):	\$22,791
Analysis Period SREC Revenue (\$):	\$26,294
Net Present Value (NPV)	(\$25,275.03)

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. While the District is already performing many of these functions through routine maintenance it is important to continue to address these items as they provide an energy savings benefit.

- A. Maintain all weather stripping on windows and doors.
- B. Clean all light fixtures to maximize light output.
- C. Turn off computers when not in use. Ensure computers are not running in screen saver mode.

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Clifton Public Schools – Transportation Building

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 Saving * 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	Lighting Upgrade - General	\$2,313	\$2,290	\$270	\$4,333	\$695	\$0	\$695	15	\$10,425	\$0	140.6%	6.2	13.70%	\$3,963.86
ECM #2	Unit Heater Replacements	\$3,000	\$10,000	\$0	\$13,000	\$2,012	\$0	\$2,012	13	\$26,156	\$0	101.2%	6.5	11.88%	\$8,397.53
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	8.23 KW PV System	\$54,250	\$0	\$0	\$54,250	\$1,225	\$1,815	\$3,040	15	\$45,607	\$27,227	-15.9%	17.8	-2.09%	(\$17,953.22)

- 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 11, 2013:

Electric Chillers

Water-Cooled Chillers	\$16 - \$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
A/C Economizing Controls	≤ 5 tons \$85/unit; >5 tons \$170/unit

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

Gas Fired Boilers < 300 MBH	\$2.00 per MBH, but not less than \$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	\$400 per unit, AFUE ≥ 95%
Boiler Economizing Controls	\$1,200 - \$2,700
Low Intensity Infrared Heating	\$300 - \$500 per unit

Ground Source Heat Pumps

Closed Loop	\$450 per ton, EER \geq 16
	\$600 per ton, EER \geq 18
	\$750 per ton, EER \geq 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 \geq 10 hp	\$60 per VFD rated hp
Boiler Fans \geq 5 HP	\$65 to \$155 per hp
Boiler Feed Water Pumps \geq 5 HP	\$60 to \$155 per hp
Commercial Kitchen Hood up to 50 HP	Retrofit \$55 – \$300 per hp New Hood \$55 - \$250 per hp

Natural Gas Water Heating

Gas Water Heaters \leq 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 (Expires 3/1/2013)	\$10 per fixture (1-4 lamps)
Replacement of T12 with new T-5 or T-8 Lamps w/Electronic Ballast in Existing Facilities (Expires 3/1/2013)	\$25 per fixture (1-4 lamps)
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
For retrofit of T-8 fixtures by permanent de-lamping & new reflectors (Electronic ballast replacement required)	\$15 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$200 per fixture
Metal Halide w/Pulse Start Including Parking Lot	\$25 per fixture
HID \geq 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture
HID \geq 100w Replacement with new HID \geq 100w	\$70 per fixture

Prescriptive Lighting - LED

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 (1x4, 2x2, 2x4 Troffers only)	\$100 per fixture
LED Fuel Pump Canopy	\$100 per fixture
LED Screw-based & Pin-based (PAR, MR, BR, R) Standards (A-Style) and Decorative Lamps	\$20 per lamp
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	\$30 per 4 foot \$42 per 5 foot \$65 per 6 foot
LED Retrofit Kits	To be evaluated through the customer measure path

Lighting Controls – Occupancy Sensors

Wall Mounted	\$20 per control
Remote Mounted	\$35 per control
Daylight Dimmers	\$25-\$50 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

Premium Motors

Three-Phase Motors (<i>Expires 3/1/2013</i>)	\$45 - \$700 per motor
Fractional HP Motors Electronic Commutated Motors (replacing shaded pole motors in refrigerator/freezer cases)	\$40 per electronic commutated motor

Refrigeration Doors/Covers

Energy-Efficient Doors/Covers for Installation on Open Refrigerated Cases	\$100 per door
Aluminum Night Curtains for Installation on Open Refrigerated Cases	\$3.50 per linear foot

Refrigeration Controls

Door Heater Controls	\$50 per control
Electric Defrost Controls	\$50 per control
Evaporator Fan Controls	\$75 per control
Novelty Cooler Shutoff	\$50 per control

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 an IRR of at least 10%.

APPENDIX C



STATEMENT OF ENERGY PERFORMANCE

20-Clifton BOE - Transportation Building

Building ID: 3477620
For 12-month Period Ending: February 28, 2013¹
Date SEP becomes ineligible: N/A

Date SEP Generated: April 11, 2013

Facility
 20-Clifton BOE - Transportation Building
 94 Sylvan Avenue
 Clifton, NJ 07013

Facility Owner
 Clifton BOE
 745 Clifton Avenue
 Clifton, NJ 07013

Primary Contact for this Facility
 Karen Perkins
 745 Clifton Avenue
 Clifton, NJ 07013

Year Built: 1970
Gross Floor Area (ft²): 3,024

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	85,465
Natural Gas (kBtu) ⁴	722,723
Total Energy (kBtu)	808,188

Energy Intensity⁴

Site (kBtu/ft ² /yr)	267
Source (kBtu/ft ² /yr)	345

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	51
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Electric Distribution Utility

Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	45
National Median Source EUI	96
% Difference from National Median Source EUI	259%
Building Type	Service (Vehicle Repair/Service, Postal Service)

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 Standards⁵ 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:

- 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.
- 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.
- Values represent energy consumption, annualized to a 12-month period.
- Values represent energy intensity, annualized to a 12-month period.
- 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	<input checked="" type="checkbox"/>
Building Name	20-Clifton BOE - Transportation Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
Type	Service (Vehicle Repair/Service, Postal Service)	Is this an accurate description of the space in question?		<input type="checkbox"/>
Location	94 Sylvan Avenue, Clifton, NJ 07013	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
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, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		<input type="checkbox"/>
Transportation (Other)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Gross Floor Area	3,024 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.		<input type="checkbox"/>
Number of PCs	3(Optional)	Is this the number of personal computers in the space?		<input type="checkbox"/>
Weekly operating hours	40Hours(Optional)	Is this the total number of hours per week that the 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.		<input type="checkbox"/>
Workers on Main Shift	5(Optional)	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.		<input type="checkbox"/>

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity		
Meter: electric (kWh (thousand Watt-hours)) Space(s): Entire Facility Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
01/05/2013	02/04/2013	2,010.00
12/05/2012	01/04/2013	1,746.00
11/05/2012	12/04/2012	1,602.00
10/05/2012	11/04/2012	2,286.00
09/05/2012	10/04/2012	2,010.00
08/05/2012	09/04/2012	2,418.00
07/05/2012	08/04/2012	2,964.00
06/05/2012	07/04/2012	2,484.00
05/05/2012	06/04/2012	2,016.00
04/05/2012	05/04/2012	1,764.00
03/05/2012	04/04/2012	1,890.00
electric Consumption (kWh (thousand Watt-hours))		23,190.00
electric Consumption (kBtu (thousand Btu))		79,124.28
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		79,124.28
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
Meter: gas (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
01/05/2013	02/04/2013	1,542.80
12/05/2012	01/04/2013	1,334.40
11/05/2012	12/04/2012	1,057.50
10/05/2012	11/04/2012	394.80
09/05/2012	10/04/2012	45.10
08/05/2012	09/04/2012	40.90
07/05/2012	08/04/2012	42.00
06/05/2012	07/04/2012	43.90
05/05/2012	06/04/2012	56.50
04/05/2012	05/04/2012	507.50
03/05/2012	04/04/2012	446.60

gas Consumption (therms)	5,512.00
gas Consumption (kBtu (thousand Btu))	551,200.00
Total Natural Gas Consumption (kBtu (thousand Btu))	551,200.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	<input type="checkbox"/>

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.	<input type="checkbox"/>

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.	<input type="checkbox"/>

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

20-Clifton BOE - Transportation Building
94 Sylvan Avenue
Clifton, NJ 07013

Facility Owner

Clifton BOE
745 Clifton Avenue
Clifton, NJ 07013

Primary Contact for this Facility

Karen Perkins
745 Clifton Avenue
Clifton, NJ 07013

General Information

20-Clifton BOE - Transportation Building	
Gross Floor Area Excluding Parking: (ft ²)	3,024
Year Built	1970
For 12-month Evaluation Period Ending Date:	February 28, 2013

Facility Space Use Summary

Transportation	
Space Type	Other - Service (Vehicle Repair/Service, Postal Service)
Gross Floor Area (ft ²)	3,024
Number of PCs °	3
Weekly operating hours °	40
Workers on Main Shift °	5

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 02/28/2013)	Baseline (Ending Date 02/28/2013)	Rating of 75	Target	National Median
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft ²)	267	267	0	N/A	45
Source (kBtu/ft ²)	345	345	0	N/A	96
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 ₂ e/year	51	51	0	N/A	9
kgCO ₂ e/ft ² /year	17	17	0	N/A	3

More than 50% of your building is defined as Service (Vehicle Repair/Service, Postal Service). This building is currently ineligible for a rating. Please note the National Median column represents the CBECS national median data for Service (Vehicle Repair/Service, Postal Service). This building uses 259% more energy per square foot than the CBECS national median for Service (Vehicle Repair/Service, Postal Service).

Notes:

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

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Transportation Building

AC Units

Tag			
Unit Type	Window AC		
Qty	3		
Location	Upstairs Office/ Downstairs Office		
Area Served	Upstairs Office/ Downstairs Office		
Manufacturer	Electrolux		
Model #	FAM156R1A		
Serial #	IK70104260		
Cooling Type	DX, R-22		
Cooling Capacity (Tons)	15,100 Btu/hr		
Cooling Efficiency (SEER/EER)	10.7 SEER		
Heating Type	N/A		
Heating Input (MBH)	N/A		
Efficiency	N/A		
Fuel	N/A		
Approx Age	6		
ASHRAE Service Life	15		
Remaining Life	9		
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Transportation Building

Boilers

Tag			
Unit Type	Gas Fired Boiler		
Qty	1		
Location	Small Boiler Room		
Area Served	Baseboard Heat		
Manufacturer	Utica		
Model #	125 AGB		
Serial #	1L 26620		
Input Capacity (Btu/Hr)	125,000		
Rated Output Capacity (Btu/Hr)	97,000		
Approx. Efficiency %	80.0%		
Fuel	Natural Gas		
Approx Age	31		
ASHRAE Service Life	24		
Remaining Life	(7)		
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Transportation Building

Domestic Water Heaters

Tag			
Unit Type	Gas Fired Domestic Hot Water Heater		
Qty	1		
Location	Small Boiler room		
Area Served	Domestic Loop		
Manufacturer	General Electric		
Model #	GG30T6A		
Serial #	GENG 1200H18759		
Size (Gallons)	30		
Input Capacity (MBH/KW)	32 MBH		
Recovery (Gal/Hr)	-		
Efficiency %	80%		
Fuel	Natural Gas		
Approx Age	13		
ASHRAE Service Life	12		
Remaining Life	(1)		
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

MAJOR EQUIPMENT LIST

Concord Engineering Group

Transportation Building

Unit Heater

Tag			
Unit Type	Gas Fired Unit Heater	Gas Fired Unit Heater	Gas Fired Unit Heater
Qty	2	1	1
Location	Main Garage	Driver's Area	Garage
Area Served	Main Garage	Driver's Area	Garage
Manufacturer	Dayton	Janitrol	Janitrol
Model #	3E234A	ABS 125-94	JCS100-55
Serial #	C8843078	1054G0382	125501874
Input Capacity (MBH)	250	125	100
Output Capacity (MBH)	200	100	80
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx. Efficiency %	80.0%	80.0%	80.0%
Approx Age	25	30	30
ASHRAE Service Life	13	13	13
Remaining Life	(12)	(17)	(17)
Comments			

Note:

"N/A" = Not Applicable.

"-" = Info Not Available

APPENDIX E

CEG Project #: 9C12066
 Facility Name: Transportation Building
 Address: 94 Sylvan Ave
 City, State, Zip: Clifton, NJ

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT								RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS				
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
1	Boiler Room	1200	60w Incandescent	1	60	1	0.06	72	Re-lamp	12.5w Endura Philips LED	1	12.5	1	0.01	15	0.05	57	\$7	0	No New Controls	0	0.0%	0	\$0
221.11	Upstairs Office Area	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	8	0.50	1,290	Existing To Remain	Existing To Remain	2	62	0	0.50	1,290	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
221.11	Office 1	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	8	0.50	1,290	Existing To Remain	Existing To Remain	2	62	0	0.50	1,290	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
221.11	Office 2	2600	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	4	0.25	645	Existing To Remain	Existing To Remain	2	62	0	0.25	645	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
217.21	Bathroom	1200	2x2, 1 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	1	18	1	0.02	22	Existing To Remain	Existing To Remain	1	18	0	0.02	22	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
1	Bathroom	1200	60w Incandescent	1	60	2	0.12	144	Re-lamp	12.5w Endura Philips LED	1	12.5	2	0.03	30	0.10	114	\$15	0	No New Controls	0	0.0%	0	\$0
242.21	Hallway	3000	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	2	0.22	654	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28841/XP/SL/SS/ECO3 Sylvania Ballast OHE2X32T8/UNV ISL-SC	3	72	2	0.14	432	0.07	222	\$29	0	No New Controls	0	0.0%	0	\$0
242.21	Downstairs Driver's Area	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	12	1.31	3,401	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28841/XP/SL/SS/ECO3 Sylvania Ballast OHE2X32T8/UNV ISL-SC	3	72	12	0.86	2,246	0.44	1,154	\$149	0	No New Controls	0	0.0%	0	\$0
221.11	Restroom	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	2	62	1	0.06	74	Existing To Remain	Existing To Remain	2	62	0	0.06	74	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
138.34	Garage 2	1200	8 Ft, 3 Lamp, 110w T12 HO, Magnetic Ballast, Pendant Mnt., No Lens	3	365	5	1.83	2,190	Re-Lamp / Re-Ballast	Two sets of 3, 4' T8 Lamps Mounted in Tandem w/ 2, 3 Lamp Ballasts Sylvania Lamp	6	144	5	0.72	864	1.11	1,326	\$171	0	No New Controls	0	0.0%	0	\$0
148.34	Garage 3	1200	8 Ft, 4 Lamp, 110w T12 HO, Magnetic Ballast, Pendant Mnt., No Lens	4	480	4	1.92	2,304	De-Lamp / Re-Lamp / Re-Ballast	Two sets of 3, 4' T8 Lamps Mounted in Tandem w/ 2, 3 Lamp Ballasts Sylvania Lamp	6	144	4	0.58	691	1.34	1,613	\$208	0	No New Controls	0	0.0%	0	\$0
221.34	Garage 4	1200	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	3	0.19	223	Existing To Remain	Existing To Remain	2	62	0	0.19	223	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
148.34	Garage 4	1200	8 Ft, 4 Lamp, 110w T12 HO, Magnetic Ballast, Pendant Mnt., No Lens	4	480	1	0.48	576	De-Lamp / Re-Lamp / Re-Ballast	Two sets of 3, 4' T8 Lamps Mounted in Tandem w/ 2, 3 Lamp Ballasts Sylvania Lamp	6	144	1	0.14	173	0.34	403	\$52	0	No New Controls	0	0.0%	0	\$0
1	Garage 4	1200	60w Incandescent	1	60	2	0.12	144	Re-lamp	12.5w Endura Philips LED	1	12.5	2	0.03	30	0.10	114	\$15	0	No New Controls	0	0.0%	0	\$0
242.21	Main Office	2600	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	4	109	4	0.44	1,134	De-lamp / Re-Lamp / Re-Ballast / Reflector	Sylvania Lamp FO28841/XP/SL/SS/ECO3 Sylvania Ballast OHE2X32T8/UNV ISL-SC	3	72	4	0.29	749	0.15	385	\$50	0	No New Controls	0	0.0%	0	\$0
221.34	Main Garage	4000	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	2	62	26	1.61	6,448	Existing To Remain	Existing To Remain	2	62	0	1.61	6,448	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
231.34	Main Garage Supply Area	4000	1x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens	3	86	4	0.34	1,376	Existing To Remain	Existing To Remain	3	86	0	0.34	1,376	0.00	0	\$0	0	No New Controls	0	0.0%	0	\$0
TOTAL						88	10	21,986				33	6	16,597	3.69	5,388	\$695			0	0	0	\$0	

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
Transportation Building	875	SHARP NU-U235F2	35	17.5	614	8.23	9,499	6.7	1,467	13.40



= Proposed Roof PV Layout

= Proposed Parking PV Layout

Notes:

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

Project Name: LGEA Solar PV Project - Transportation Building Location: Clifton, NJ Description: Photovoltaic System 100% Financing - 15 year										
Simple Payback Analysis										
		Photovoltaic System 100% Financing - 15 year								
Total Construction Cost		\$54,250								
Annual kWh Production		9,499								
Annual Energy Cost Reduction		\$1,225								
Average Annual SREC Revenue		\$1,815								
Simple Payback:		17.84								Years
Life Cycle Cost Analysis										
Analysis Period (years):		15				Financing %:		100%		
Discount Rate:		3%				Maintenance Escalation Rate:		3.0%		
Average Energy Cost (\$/kWh)		\$0.129				Energy Cost Escalation Rate:		3.0%		
Financing Rate:		6.00%				Average SREC Value (\$/kWh)		\$0.191		
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	9,499	\$1,225	\$0	\$2,375	\$3,192	\$2,301	(\$1,893)	(\$1,893)	
2	\$0	9,452	\$1,262	\$0	\$2,363	\$3,050	\$2,443	(\$1,869)	(\$3,762)	
3	\$0	9,404	\$1,300	\$0	\$2,351	\$2,900	\$2,594	(\$1,842)	(\$5,604)	
4	\$0	9,357	\$1,339	\$0	\$2,339	\$2,740	\$2,754	(\$1,815)	(\$7,420)	
5	\$0	9,310	\$1,379	\$96	\$2,328	\$2,570	\$2,924	(\$1,883)	(\$9,302)	
6	\$0	9,264	\$1,421	\$95	\$1,853	\$2,390	\$3,104	(\$2,316)	(\$11,618)	
7	\$0	9,218	\$1,463	\$95	\$1,844	\$2,198	\$3,295	(\$2,282)	(\$13,900)	
8	\$0	9,171	\$1,507	\$94	\$1,834	\$1,995	\$3,499	(\$2,247)	(\$16,146)	
9	\$0	9,126	\$1,552	\$94	\$1,825	\$1,779	\$3,714	(\$2,210)	(\$18,357)	
10	\$0	9,080	\$1,599	\$94	\$1,362	\$1,550	\$3,943	(\$2,626)	(\$20,983)	
11	\$0	9,035	\$1,647	\$93	\$1,355	\$1,307	\$4,187	(\$2,585)	(\$23,567)	
12	\$0	8,989	\$1,696	\$93	\$1,348	\$1,049	\$4,445	(\$2,542)	(\$26,109)	
13	\$0	8,944	\$1,747	\$92	\$1,342	\$775	\$4,719	(\$2,497)	(\$28,606)	
14	\$0	8,900	\$1,799	\$92	\$890	\$483	\$5,010	(\$2,896)	(\$31,502)	
15	\$0	8,855	\$1,853	\$91	\$886	\$174	\$5,319	(\$2,846)	(\$34,347)	
Totals:		137,604	\$22,791	\$1,029	\$26,294	\$28,153	\$54,250	(\$34,347)	(\$253,117)	
Net Present Value (NPV)								(\$25,275)		