MONMOUTH COUNTY

CHILD ADVOCACY CENTER

500 KOZLOSKI ROAD
FREEHOLD, NJ 07728

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:	South Jersey Energy

Natural Gas Utility Provider:	NJ Natural Gas
Utility Rate Structure:	General Service Large
Third Party Supplier:	N/A

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: JCP&L
Rate: General Service Secondary 3 Phase JC_GS3_01D
Meter No: G35535620
Account No: 100-069-927-117
Third Party Utility Provider: South Jersey Energy
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Jan-12	9,200	27.6	$1,191
Feb-12	11,120	36.9	$1,410
Mar-12	10,400	31.1	$1,261
Apr-12	8,080	25.0	$1,024
May-12	8,480	25.4	$1,082
Jun-12	9,040	28.0	$1,179
Jul-12	9,840	29.5	$1,270
Aug-12	10,240	30.7	$1,319
Sep-12	8,560	26.5	$1,105
Oct-12	9,920	29.7	$1,249
Nov-12	7,520	23.3	$963
Dec-12	10,000	29.9	$1,224
Totals	**112,400**	**36.9 Max**	**$14,278**

AVERAGE DEMAND **28.6 KW average**
AVERAGE RATE **$0.127** **$/kWh**

Figure 1
Electricity Usage Profile

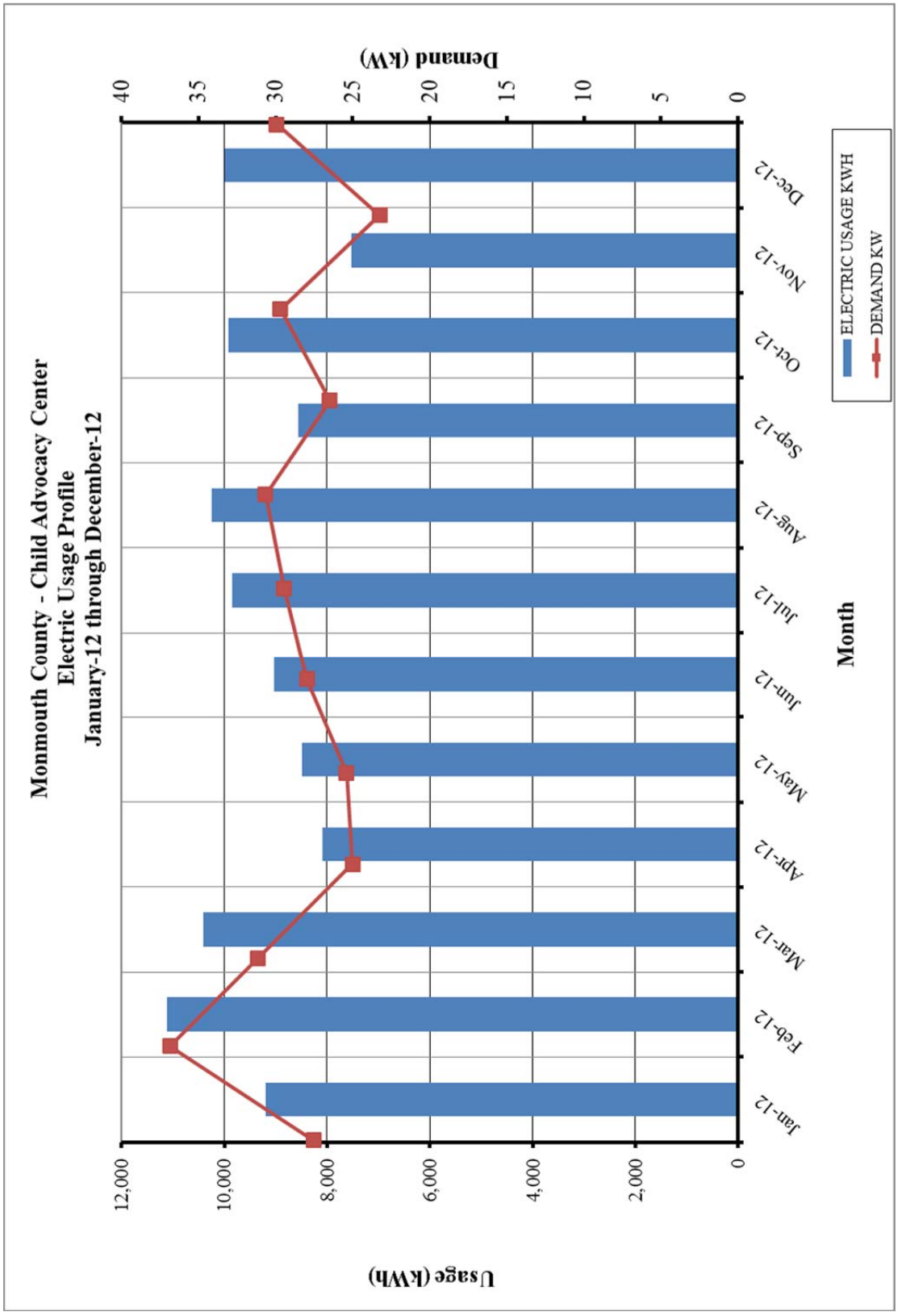
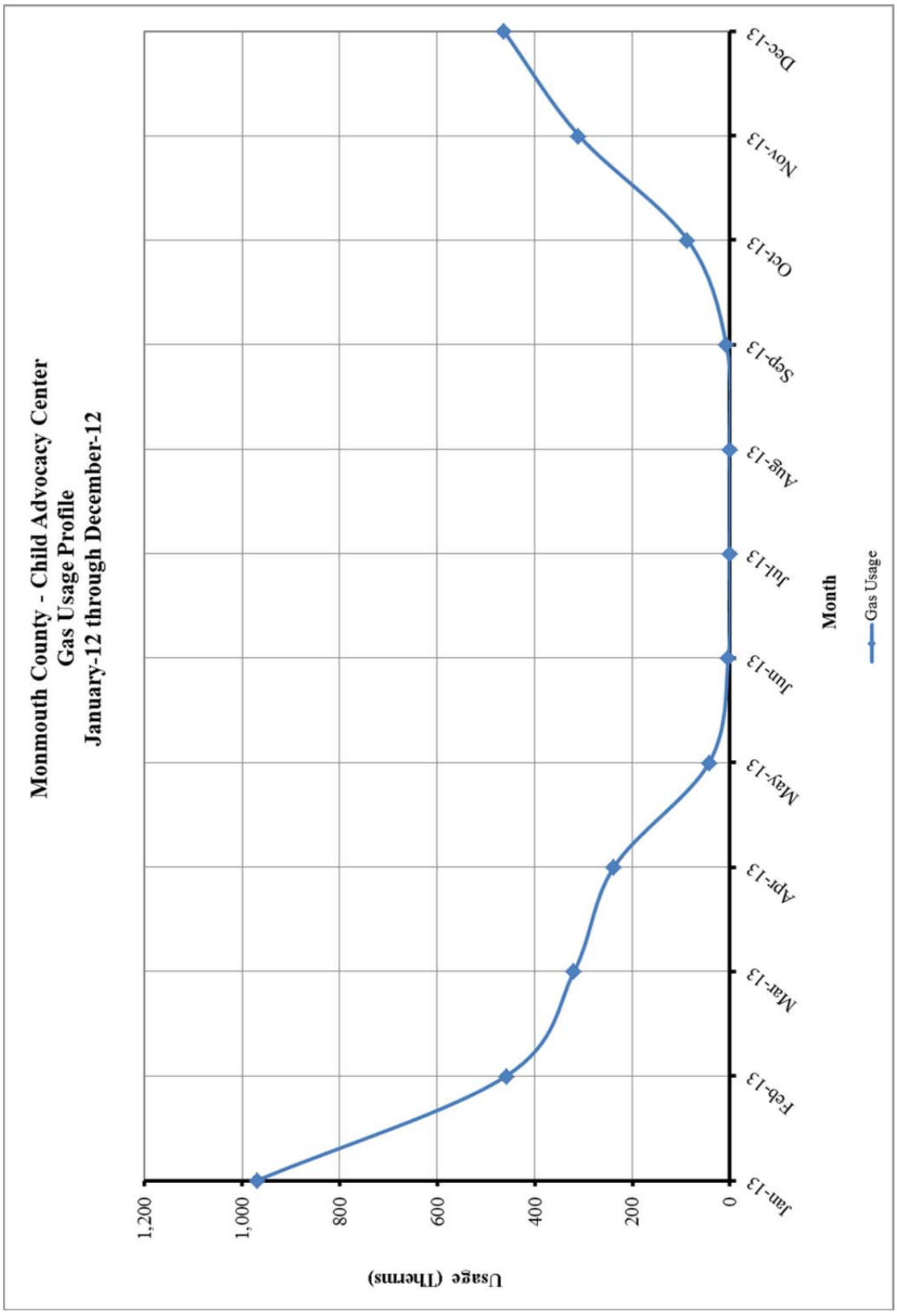


Table 2
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider: NJ Natural Gas		
Rate: GSL		
Meter No: 00871626		
Account No: 22-0012-3597-66		
Third Party Utility Provider: -		
TPS Meter No: -		
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Jan-13	968.69	$698.53
Feb-13	458.01	$363.69
Mar-13	319.35	$316.22
Apr-13	237.62	$284.88
May-13	42.27	$71.23
Jun-13	3.17	$28.47
Jul-13	0.00	$25.00
Aug-13	0.00	$25.00
Sep-13	7.47	$33.17
Oct-13	86.89	$121.69
Nov-13	309.92	$380.88
Dec-13	463.92	$550.08
TOTALS	**2,897.31**	**$2,898.84**
AVERAGE RATE:	**$1.00**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY ENERGY USE INDEX (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. Building Benchmarking data is collected and analyzed within the Commercial Building Energy Consumption Survey (CBECS), performed by the Energy and Information Administration (EIA). Building data is grouped by function types and tabulated, from which a median site and source energy intensity is determined. The national median or PEER Group Comparable in this instance is the middle value of the national population meaning half the buildings use more energy, and half use less. The PEER Group EUI allows us to compare the relative efficiency of the audited building to that of an average building with the same or similar primary function (i.e. group type).

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

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

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

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

Table 3
Energy Use Index Summary

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	112,400.0			383,734	3.140	1,204,924
NATURAL GAS		2,897.3		289,731	1.050	304,218
TOTAL				673,465		1,509,141

*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document.

	AUDITED BUILDING		**PEER COMPARISON**	
BUILDING TYPE	Office		CBECS-Office	
BUILDING AREA	5,500	SQUARE FEET		
BUILDING SITE EUI	*122.45*	kBtu/SF/YR	*67.30*	kBtu/SF/YR
BUILDING SOURCE EUI	*274.39*	kBtu/SF/YR	*148.10*	kBtu/SF/YR

85%	Less Efficient than PEER Comparison

III. FACILITY DESCRIPTION

The Child Advocacy Center is located at 500 Kozloski Road in Freehold, New Jersey. This 5,500 SF facility was built in 2008 with no additions. The building is a single-story facility with a partial basement. The facility is mostly comprised of offices and open office space, conference rooms, interview rooms, a work room, large meeting room, lobby/waiting area, waiting rooms, file storage, restrooms, and basement mechanical/electrical areas.

Occupancy Profile

The typical hours of operation for the facility are Monday through Friday between 9 am and 5:30 pm. There are 2 employees that normally occupy the facility.

Building Envelope

Exterior walls for the building are masonry brick faced with a concrete block construction. The windows throughout the facility are in very good condition. Typical windows are double pane, 1/4" with aluminum frames. The roof construction on the flat portion is a rubber membrane over 3 inches of polystyrene and metal decking. The pitched roof section of the building is shingles over a vapor barrier with R-23 batt insulation between the wood rafters.

HVAC Systems

The Child Advocacy Center is heated by a combination of hot water, modular, condensing units that serve air handling units with hot water coils. Hot water is supplied to the perimeter baseboard fin-tube radiators and these hot water coils by two (2) Weil-McLain Ultra-155 gas-fired water boilers rated at 155 MBH input for heating and a thermal efficiency of approximately 90%.

Heating hot water is circulated to various hot water coils and fin-tube radiators via two (2) Bell & Gossett Model Series 60 in-line ceiling hung pumps in the boiler room rated at 90 GPM at 40 feet of total head. The boiler circulation pumps are two (2) 1/8 HP, Bell & Gossett Model NRF-33 in-line pumps rated at 20 GPM at 15 feet of total head. The restrooms have electric cabinet heaters while the basement mechanical rooms have hot water unit heaters.

Cooling for the Child Advocacy Center is provided by eight (8) split air handling units hung above the ceiling and outdoor air-cooled condensing units. The air handling units contain both hot water coils and direct expansion (DX) coils. These units range in size from 20.5 MBH to 83.4 MBH of cooling with heating capacities from 17.8 MBH to 88 MBH. The eight (8) air-cooled condensing units range in size from 1 ½ tons to 6 tons of cooling with all units having an energy efficiency of 13 SEER. There is one condensing unit dedicated to each of the air handling units.

A Liebert split air conditioning unit (AC-1) serves the data closet with the air-cooled condensing unit outdoors on a pad.

Exhaust System

Intake/exhaust air louvers are located at the soffits around the building and exhaust/ventilate the restrooms, meeting room, waiting rooms, etc. and provide fresh air to the eight (8) air handling units.

HVAC System Controls

The heating and cooling is controlled by various standalone thermostats throughout the facility.

The Weil-McLain heating hot water boilers are controlled by a tekmar® 265 boiler control panel.

Domestic Hot Water

There is a Bradford White Model M-1-30L6DS electric water heater in the restroom closet that provides domestic hot water for the facility. This unit has a 30-gallon storage tank and 4 kW of electric elements.

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

IV. 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.

V. 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	Interior Lighting Upgrades	$15,462	$991	15.6	-3.9%
ECM #2	Lighting Controls	$1,110	$98	11.3	32.4%
ECM #3	Exterior Lighting Upgrades	$580	$71	8.2	83.6%
ECM #4	Water Conservation	$90	$179	0.5	1888.9%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	19.2 kW PV System	$101,347	$6,069	16.7	-10.2%

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)	WATER (GALLONS)
ECM #1	Interior Lighting Upgrades	3.30	7,805	0
ECM #2	Lighting Controls	0.00	773	0
ECM #3	Exterior Lighting Upgrades	0.14	560	0
ECM #4	Water Conservation	0.0	889	10,200
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	19.2 kW PV System	19.2	21,791	0

Table 3
ECM Emissions Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	GREENHOUSE GAS EMISSIONS REDUCTION		
		CO_2 EMISSIONS (LBS)	NO_X EMISSIONS (LBS)	SO_2 EMISSIONS (LBS)
ECM #1	Interior Lighting Upgrades	11,864	22	51
ECM #2	Lighting Controls	1,175	2	5
ECM #3	Exterior Lighting Upgrades	851	2	4
ECM #4	Water Conservation	1,351	2	6

Notes: A. Emissions Reduction based on NJCEP published factors for electric & gas.

Table 4
Facility Project Summary

FACILITY PROJECT SUMMARY TABLE					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Interior Lighting Upgrades	$991	$16,062	$600	$15,462	15.6
Lighting Controls	$98	$1,250	$140	$1,110	11.3
Exterior Lighting Upgrades	$71	$580	$0	$580	8.2
Water Conservation	$179	$90	$0	$90	0.5
Total Project	**$1,339**	**$17,982**	**$740**	**$17,242**	**12.9**

Note the measure totals in this table do not take into account interactive effects of measures; see Method of Analysis Section III in Executive Report for further explanation.

This project does not qualify for additional incentives through the Pay for Performance Program; please see the Installation Funding Options section for additional program options.

ECM #1: Lighting Upgrade

Description:

The majority of the interior lighting throughout the Child Advocacy Center is provided with fluorescent fixtures with older generation, 32W T8 lamps with electronic ballasts. Additionally, there are several areas that still contain compact fluorescents and metal halide lamps. These fixtures can be replaced and retrofit with new LED type fixtures and lamps.

This ECM includes replacing and retrofitting the interior lighting with new LED type lamps and fixtures. It is recommended the County consult with a professional engineer prior to retrofitting or replacing fixtures to ensure code required minimum light levels will be met.

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.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	**SAVINGS**
Electric Demand Savings (kW)	3.3
Electric Usage Savings (kWh)	7,805
Electric Cost Savings ($)	$991

No maintenance cost savings were estimated for this measure.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$16,062
NJ Smart Start Equipment Incentive ($):	$600
Net Installation Cost ($):	$15,462
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$991
Total Yearly Savings ($/Yr):	$991
Estimated ECM Lifetime (Yr):	15
Simple Payback	15.6
Simple Lifetime ROI	-3.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$14,865
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($3,631.51)

ECM #2: Lighting Controls Upgrade

Description:

Some of the lights in the Child Advocacy Center 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.

This ECM includes installation of ceiling or switch mount sensors for the Child Advocacy Center. 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:

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

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

LIGHTING CONTROLS SAVINGS SUMMARY	
DESCRIPTION	**SAVINGS**
Electric Usage Savings (kWh)	773
Electric Cost Savings ($)	$98

Rebates and Incentives:

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

Smart Start Incentive
= (# Wall mount sensors × $20 per sensor)
+ (# Ceiling mount sensors × $35 per sensor)

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,250
NJ Smart Start Equipment Incentive ($):	$140
Net Installation Cost ($):	$1,110
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$98
Total Yearly Savings ($/Yr):	$98
Estimated ECM Lifetime (Yr):	15
Simple Payback	11.3
Simple Lifetime ROI	32.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,470
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	$59.92

ECM #3: Lighting Upgrade – Exterior Lighting

Description:

The exterior lighting at the Child Advocacy Center is currently lit by compact fluorescent fixtures. The exterior would be better served with more efficient LED lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient LED lighting system that includes LED lamps and fixtures for the existing exterior lighting.

This ECM would replace the existing exterior lamps and fixtures with equivalent LED lamps and fixtures.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix** that outlines the proposed retrofits, costs, savings, and payback periods.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	**SAVINGS**
Electric Demand Savings (kW)	0.1
Electric Usage Savings (kWh)	560
Electric Cost Savings ($)	$71

No maintenance cost savings were estimated for this measure.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$580
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$580
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$71
Total Yearly Savings ($/Yr):	$71
Estimated ECM Lifetime (Yr):	15
Simple Payback	8.2
Simple Lifetime ROI	83.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,065
Internal Rate of Return (IRR)	9%
Net Present Value (NPV)	$267.59

ECM #4: Water Conservation

Description:

The Child Advocacy Center utilizes standard plumbing fixtures. The typical water faucet consumption only meets the minimum federal required standard for water efficiency. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

This ECM includes the retrofitting of the existing faucets within the facility with new low flow aerators.

Energy Savings Calculations:

Faucets:

$$\text{Water Usage} = \text{Occupancy}\left(\frac{\text{Days}}{\text{yr}}\right) \times \frac{\text{Uses}}{\text{Day}} \times \text{Duration}\left(\frac{\text{min}}{\text{Use}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Min}}\right)$$

$$\text{Electric Cost (kWh)} = \text{Faucet Water Consumption (Gallons)} \times \frac{8.33\,\text{lbs}}{\text{Gal}} \times \Delta T(70F) \times \frac{\text{kWh}}{3{,}413\,\text{BTU}}$$

$$\text{Electric Usage } (kWh) = \text{Faucet Water Usage (Gal)} \times 8.33\frac{\text{lbs}}{\text{Gal}} \times \text{Specific Heat (1)} \times \Delta\text{T(70°F)} \times \frac{kWh}{3{,}413\ \text{Btu}} \times \frac{1}{\text{HWH Efficiency}}$$

LOW FLOW WATER SAVING DEVICES			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Quantity of Sinks	3	3	
Flow Rate (GPM)	2.2	0.5	1.7
Device Usage (min per day)	10	10	
Facility Operation (days / year)	200	200	
Heat Content of Water (Btu/gal/°F)	8.33	8.33	
Temperature Rise (°F)	70.0	70.0	
Efficiency of Heating System (%)	98%	98%	
Conversion Factor for Electric	3413	3413	
Electric Rate ($/kWh)	$0.127	$0.127	
Water Rate ($/1000gal)	$6.460	$6.460	
ENERGY SAVINGS CALCULATIONS			
Electric Usage (kWh)	1,151	262	889
Water Usage (gallons)	13,200	3,000	10,200
Energy Cost ($)	$231	$53	$179
COMMENTS:	Heating Savings based on 50% Hot Cold Mix.		

The cost for installation and materials is based on 3 faucet aerators. There are no Smart Start rebates for installation of low flow plumbing fixtures.

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$90
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$90
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$179
Total Yearly Savings ($/Yr):	$179
Estimated ECM Lifetime (Yr):	10
Simple Payback	0.5
Simple Lifetime ROI	1888.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,790
Internal Rate of Return (IRR)	199%
Net Present Value (NPV)	$1,436.91

REM #1: 19.2 kW Solar System

Description:

The Child Advocacy Center has available parking lot space that could accommodate solar arrays. Based on the available area a 19.2 kilowatt solar array could be installed. The array will produce approximately 21,791 kilowatt-hours annually that will reduce the overall electric usage of the facility by 19%.

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	
Installation Cost ($):	$101,347
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$101,347
Maintenance Savings ($/Yr):	$3,301
Energy Savings ($/Yr):	$2,767
Total Yearly Savings ($/Yr):	$6,069
Estimated ECM Lifetime (Yr):	25
Simple Payback	16.7
Simple Lifetime ROI	49.7%
Simple Lifetime Maintenance Savings	$82,535
Simple Lifetime Savings	$151,722
Internal Rate of Return (IRR)	3.4%
Net Present Value (NPV)	$4,331.17

VI. 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.

F. Replace any old CRT Monitors with LED/LCD Type Monitors, which can draw as much as a quarter the power of an equivalent CRT monitor.

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Monmouth County - Child Advocacy Center

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY														
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Interior Lighting Upgrades	$11,962	$4,100	$600	$15,462	$991	$0	$991	15	$14,865	$0	-3.9%	15.6	-0.49%	($3,631.51)
ECM #2	Lighting Controls	$750	$500	$140	$1,110	$98	$0	$98	15	$1,470	$0	32.4%	11.3	3.74%	$59.92
ECM #3	Exterior Lighting Upgrades	$380	$200	$0	$580	$71	$0	$71	15	$1,065	$0	83.6%	8.2	8.77%	$267.59
ECM #4	Water Conservation	$60	$30	$0	$90	$179	$0	$179	10	$1,790	$0	1888.9%	0.5	198.89%	$1,436.91
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	19.2 kW PV System	$101,347	$0	$0	$101,347	$2,767	$3,301	$6,069	15	$91,033	$49,521	-10.2%	16.7	-1.31%	($28,897.20)

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 from July 1, 2014 to June 30, 2015:

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 - $450 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 ≥ 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 ≥ 20 hp	$60 per VFD rated hp
Rotary Screw Air Compressors ≥ 25 hp	$5,250 to $12,500 per drive
Centrifugal Fan Applications on Constant Volume HVAC Systems	$80 per VFD rated hp, maximum $6,000 per drive
Cooling Towers ≥ 10 hp	$60 per VFD rated hp
Boiler Fans ≥ 5 HP	$65 to $155 per hp
Boiler Feed Water Pumps ≥ 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 ≤ 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

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
HID ≥ 100w Replace with new induction fixture. (must be 30% less watts/fixture than HID system)	$70 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 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 Architectural Flood and Spot Luminaires	$50 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	$30 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 Linear Ambient Luminaires (Indirect, Indirect/Direct, Direct/Indirect, Direct)	2’ Fixtures - $20/fixture 3’ Fixtures - $30/fixture 4’ Fixtures - $45/fixture 6’ Fixtures - $60/fixture 8’ Fixtures - $75/fixture
LED Stairwell and Passageway Luminaires	$40 per fixture
LED Bollard Fixtures	$50 per fixture
Luminaires for Ambient Lighting of Interior Commercial Spaces (1x4, 2x2, 2x4)	$50 per fixture
LED Fuel Pump Canopy	$100 per fixture
LED Screw-based & Pin-based (PAR, MR, BR, R) Standards (A-Style) and Decorative Lamps	$5 per lamp for R/PAR20,MR/PAR16,Globe,Candelabra or Misc $10 per lamp for LED R/BR/PAR 30, R/BR/PAR 38-40, A-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 (Existing Facilities Only)	$20 per control
Remote Mounted (Existing Facilities Only)	$35 per control
Daylight Dimming Controls	$45 per fixture controlled
Occupancy Based hi-low Dimming Control	$35 per fixture controlled
Occupancy Sensor Remote Mounted	$35 per control

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

Food Service Equipment

Combination Oven/Steamer (Electric)	$1,000/oven
Combination Oven/Steamer (Natural Gas)	$750/oven
Convection Oven (Electric)	$350/oven
Convection Oven (Natural Gas)	$500/oven
Rack Oven (Natural Gas)	$1,000/single oven, $2,000/double oven
Conveyor Oven (Natural Gas)	$500/small deck $750/large deck
Fryer (Electric)	$250/vat
Fryer (Natural Gas)	$749/vat
Large Vat Fryer (Electric)	$200/vat
Large Vat Fryer (Natural Gas)	$500/vat
Griddle (Electric)	$300/griddle
Griddle (Natural Gas)	$125/griddle
Steam Cooker (Electric)	$1,250/steamer
Steam Cooker (Natural Gas)	$2,000/steamer
Insulated Holding Cabinets	$200 to $300/unit
Glass Door Refrigerators	$75 to $150/unit
Solid Door Refrigerators	$50 to $200/unit
Glass Door Freezers	$200 to $1,000/unit
Solid Door Freezers	$100 to $600/unit
Ice Machines	$50 to $500/unit
Dishwashers	$400 to $1,500/unit

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

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Child Advocacy Center

Primary Property Function: Office
Gross Floor Area (ft²): 6,010
Built: 2009

For Year Ending: January 31, 2012
Date Generated: November 26, 2014

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Child Advocacy Center 5000 Kozloski Road Freehold, New Jersey 07728	Monmouth County One East Main Street Freehold, NJ 07728 (____)____-_____	Linda Brennen One East Main Street Freehold, NJ 07728 732-431-7460 linda.brennen@co.monmouth.nj.us

Property ID: 3390926

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
98.7 kBtu/ft²

Source EUI
224.1 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	246,561 (42%)
Electric - Grid (kBtu)	346,386 (58%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	70.5
National Median Source EUI (kBtu/ft²)	160.2
% Diff from National Median Source EUI	40%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	60

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Child Advocacy Center

Split System Units

Tag	CU-1	CU-2	CU-3
Unit Type	Air-Cooled Condensing Unit	Air-Cooled Condensing Unit	Air-Cooled Condensing Unit
Qty	1	1	1
Location	Outside on Pad	Outside on Pad	Outside on Pad
Area Served	MDT Meeting Room	Lobby/Waiting/Corridor	Waiting/MDT Coord.
Manufacturer	Trane XB 13	Trane XB 13	Trane XB 13
Model #	2TTA3060	2TTA3048	2TTA3048
Serial #	7385S714F	8024YLW4F	8021Y5P4F
Cooling Type	DX, HCFC-22	DX, HCFC-22	DX, HCFC-22
Cooling Capacity	6 Tons	4 Tons	4 Tons
Cooling Efficiency (SEER/EER)	13 SEER	13 SEER	13 SEER
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	Electric	Electric	Electric
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

Split System Uni

Tag	CU-4	CU-5	CU-6
Unit Type	Air-Cooled Condensing Unit	Air-Cooled Condensing Unit	Air-Cooled Condensing Unit
Qty	1	1	1
Location	Outside on Pad	Outside on Pad	Outside on Pad
Area Served	Large Waiting Room	Forensic Interview Rooms	Corridor/Restrooms
Manufacturer	Trane XB 13	Trane XB 13	Trane XB 13
Model #	2TTA3048	2TTA3048	2TTA3036
Serial #	8021Y4H4F	8024YMU4F	7402LGT3F
Cooling Type	DX, HCFC-22	DX, HCFC-22	DX, HCFC-22
Cooling Capacity	4 Tons	4 Tons	3 Tons
Cooling Efficiency (SEER/EER)	13 SEER	13 SEER	13 SEER
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	Electric	Electric	Electric
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

Split System Uni

Tag	CU-7	CU-8	CU-9
Unit Type	Air-Cooled Condensing Unit	Air-Cooled Condensing Unit	Air-Cooled Condensing Unit
Qty	1	1	1
Location	Outside on Pad	Outside on Pad	Outside on Pad
Area Served	Work Room	Director's Office	Data Room
Manufacturer	Trane XB 13	Trane XB 13	Liebert
Model #	2TTA3036	2TTB3018	-
Serial #	8013PL03F	8031N7J3F	-
Cooling Type	DX, HCFC-22	DX, HCFC-22	-
Cooling Capacity	3 Tons	1 1/2 Tons	-
Cooling Efficiency (SEER/EER)	13 SEER	13 SEER	-
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	Electric	Electric	Electric
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Child Advocacy Center

AIR HANDLER UNITS

Tag	AHU-1	AHU-2	AHU-3
Unit Type	Air Handler Unit	Air Handler Unit	Air Handler Unit
Qty	1	1	1
Location	Mechanical Room	Mechanical Room	Ceiling
Area Served	MDT Meeting Room	Back Corridor	Director Offices
Manufacturer	Trane	Trane	Trane
Model #	BCVC072	BCVC054	BCVC054
Serial #	T07M82205	T07M82204	T07M82204
Cooling Type	DX Coil	DX Coil	DX Coil
Cooling Capacity (Tons)	6 Tons	4 Tons	4 Tons
Cooling Efficiency (EER)	N/A	N/A	N/A
Heating Type	Hot Water	Hot Water	Hot Water
Heating Capacity (MBH)	88	66	66
Cooling Capacity (MBH)	83.4	72.0	72.0
Supply Fan (HP)	1/2	1/2	1/2
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

AIR HANDLER UN

Tag	AHU-4	AHU-5	AHU-6
Unit Type	Air Handler Unit	Air Handler Unit	Air Handler Unit
Qty	1	1	1
Location	Ceiling	Ceiling	Ceiling
Area Served	Restrooms & Forensic Interview Rms	Lobby & Admin/Clerical	Forensic Interview Rm, Work Rm & Detective Rm
Manufacturer	Trane	Trane	Trane
Model #	BCVC054	BCVC054	BCV036
Serial #	T07M82204	T07M82204	T07M82204
Cooling Type	DX Coil	DX Coil	DX Coil
Cooling Capacity (Tons)	4 Tons	4 Tons	3 Tons
Cooling Efficiency (EER)	N/A	N/A	N/A
Heating Type	Hot Water	Hot Water	Hot Water
Heating Capacity (MBH)	66	66	45.5
Cooling Capacity (MBH)	72.0	72.0	51.3
Supply Fan (HP)	1/2	1/2	1/2
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

AIR HANDLER UN

Tag	AHU-7	AHU-8
Unit Type	Air Handler Unit	Air Handler Unit
Qty	1	1
Location	Ceiling	Ceiling
Area Served	MDT Coord., Entrnace Vestibule & Conf. Rm.	Waiting Rooms
Manufacturer	Trane	Trane
Model #	BCV036	BCV018
Serial #	T07M82204	T07M82204
Cooling Type	DX Coil	DX Coil
Cooling Capacity (Tons)	3 Tons	1 1/2 Tons
Cooling Efficiency (EER)	N/A	N/A
Heating Type	Hot Water	Hot Water
Heating Capacity (MBH)	45.5	17.8
Cooling Capacity (MBH)	51.3	20.5
Supply Fan (HP)	1/2	1/3
Approx Age	6	6
ASHRAE Service Life	15	15
Remaining Life	9	9
Comments		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Child Advocacy Center

Boilers

Tag	B-1 and B-2	
Unit Type	Modular, Condensing Boiler	
Qty	2	
Location	Mechanical Room	
Area Served	Hot Water Loop	
Manufacturer	Weil McLain Ultra	
Model #	155 CT High Efficiency	
Serial #	-	
Input Capacity (Btu/Hr)	155 MBH	
Rated Output Capacity (Btu/Hr)	139 MBH	
Approx. Efficiency %	89.6%	
Fuel	Natural Gas	
Approx Age	6	
ASHRAE Service Life	20	
Remaining Life	14	
Comments	tekmar Boiler Control 265	
Note: "N/A" = Not Applicable. "-" = Info Not Available		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Child Advocacy Center

Pumps

Tag	BP-1 & BP-2	P-1 & P-2
Unit Type	Boiler Circulation Pumps	HW Loop Pumps
Qty	2	2
Location	Mech Rm	Ceiling of Mech Rm
Area Served	Boiler Hot Water Loop	Bldg. Hot Water Loop
Manufacturer	Bell & Gossett	Bell & Gossett
Model #	NRF-33	Series 60 3x7
Serial #	-	-
Horse Power	125 Watts	2
Flow	20 GPM at 15 FTDH	90 GPM at 40 FTHD
Motor Info	-	Bell & Gossett - 48Y Frame / DP Encl.
Electrical Power	460/3/60	460/3/60
RPM	1750	1750
Motor Efficiency %	-	-
Approx Age	6	6
ASHRAE Service Life	20	20
Remaining Life	14	14
Comments		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Child Advocacy Center

Unit Heater

Tag	CUH-1 & CUH-2	UH-1 & UH-2
Unit Type	Electric Cabinet Heater	Hot Water Unit Heater
Qty	2	2
Location	Restroom	Mechanical Room 1 & 2
Area Served	Restrooms	Mechanical Room 1 & 2
Manufacturer	-	-
Model #	-	-
Serial #	-	-
Input Capacity (MBH)	-	-
CFM	-	-
Fuel	Electric	Hot Water
Approx. Efficiency %	98.0%	90.0%
Approx Age	6	6
ASHRAE Service Life	13	13
Remaining Life	7	7
Comments		

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

APPENDIX E

CEG Project #: 1C14167
Facility Name: Child Advocacy Center
Address: 500 Kozloski Road
City, State, Zip Freehold, NJ 07728

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	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	Meeting Room	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	4	0.25	645	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	4	0.12	322	0.12	322	$41	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	0.5	20.0%	64	$8
2		2600	2-Lamp 18w CFL Pin Based Recessed Hi-Hat	2	36	15	0.54	1,404	Re-Lamp	Install 8w LED Pin Based	2	16	15	0.24	624	0.30	780	$99	4	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	0.5	20.0%	125	$16
2	Meeting Room Storage	400	2-Lamp 18w CFL Pin Based Recessed Hi-Hat	2	36	2	0.07	29	Re-Lamp	Install 8w LED Pin Based	2	16	2	0.03	13	0.04	16	$2	0	No New Controls	0	0.0%	0	$0
2	Gallery	2600	2-Lamp 18w CFL Pin Based Recessed Hi-Hat	2	36	6	0.22	562	Re-Lamp	Install 8w LED Pin Based	2	16	6	0.10	250	0.12	312	$40	1	Existing Occupancy Controls	0	20.0%	50	$6
1	Corridor	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	5	0.31	806	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	5	0.16	403	0.16	403	$51	0	No New Controls	0	0.0%	0	$0
1	Forensic Interview 1	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	2	0.12	322	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	2	0.06	161	0.06	161	$20	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	32	$4
1	Forensic Interview 2	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	2	0.12	322	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	2	0.06	161	0.06	161	$20	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	32	$4
1	Forensic Interview 3	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	2	0.12	322	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	2	0.06	161	0.06	161	$20	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	32	$4
1	Closet	400	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	1	0.06	25	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	1	0.03	12	0.03	12	$2	0	No New Controls	0	0.0%	0	$0
1	Unisex Lavatory	1200	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	1	0.06	74	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	1	0.03	37	0.03	37	$5	0	No New Controls	0	0.0%	0	$0
1	Family Lavatory	1200	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	1	0.06	74	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	1	0.03	37	0.03	37	$5	0	No New Controls	0	0.0%	0	$0
1	Waiting	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	4	0.25	645	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	4	0.12	322	0.12	322	$41	0	No New Controls	0	0.0%	0	$0
5	Lobby/Waiting	2600	4' 1-Lamp 32w T8 Electronic Recessed Parabolic Lens	1	32	16	0.51	1,331	Bypass Ballast & Install LED Tube Lamp	Install 18w 4' LED Tube Lamp	1	18	16	0.29	749	0.22	582	$74	0	No New Controls	0	0.0%	0	$0
2		2600	2-Lamp 18w CFL Pin Based Recessed Hi-Hat	2	36	9	0.32	842	Re-Lamp	Install 8w LED Pin Based	2	16	9	0.14	374	0.18	468	$59	0	No New Controls	0	0.0%	0	$0
1		2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	2	0.12	322	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	2	0.06	161	0.06	161	$20	0	No New Controls	0	0.0%	0	$0
1	Vestibule	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	1	0.06	161	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	1	0.03	81	0.03	81	$10	0	No New Controls	0	0.0%	0	$0

			EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT							RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS					
Fixture Reference #	Location	Average Burn Hours	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, $
2	Closet	400	2-Lamp 18w CFL Pin Based Recessed Hi-Hat	2	36	1	0.04	14	Re-Lamp	Install 8w LED Pin Based	2	16	1	0.02	6	0.02	8	$1	0	No New Controls	0	0.0%	0	$0
1	Reception	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	2	0.12	322	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	2	0.06	161	0.06	161	$20	0	No New Controls	0	0.0%	0	$0
1	Work Room	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	4	0.25	645	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	4	0.12	322	0.12	322	$41	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	64	$8
1	Case Manager	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	3	0.19	484	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	3	0.09	242	0.09	242	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	48	$6
1	Case Manager	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	4	0.25	645	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	4	0.12	322	0.12	322	$41	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	64	$8
1	Director	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	5	0.31	806	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	5	0.16	403	0.16	403	$51	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	81	$10
1	Conference Room	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	3	0.19	484	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	3	0.09	242	0.09	242	$31	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	48	$6
2		2600	2-Lamp 18w CFL Pin Based Recessed Hi-Hat	2	36	6	0.22	562	Re-Lamp	Install 8w LED Pin Based	2	16	6	0.10	250	0.12	312	$40	6	Dual Technology Occupancy Sensor - Switch Mnt.	0.5	20.0%	50	$6
1	Coordinator	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	5	0.31	806	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	5	0.16	403	0.16	403	$51	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	81	$10
1	Waiting	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	4	0.25	645	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	4	0.12	322	0.12	322	$41	0	No New Controls	0	0.0%	0	$0
1	Admin / Clerical	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	4	0.25	645	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	4	0.12	322	0.12	322	$41	0	No New Controls	0	0.0%	0	$0
1	Waiting / Corridor	2600	2x2 2-Lamp T8 U 32w Recessed Prismatic	2	62	6	0.37	967	LED Retrofit Kit	Install Philips LED Evo 2x2 Retroft Kit	1	31	6	0.19	484	0.19	484	$61	0	No New Controls	0	0.0%	0	$0
2		2600	2-Lamp 18w CFL Pin Based Recessed Hi-Hat	2	36	3	0.11	281	Re-Lamp	Install 8w LED Pin Based	2	16	3	0.05	125	0.06	156	$20	0	No New Controls	0	0.0%	0	$0
4	Stairs to Basement	400	70w MH Wall Mount	1	92	1	0.09	37	Bypass Ballast & Install LED Lamp	Install 20w LED Corn-cob lamp	1	20	1	0.02	8	0.07	29	$4	0	No New Controls	0	0.0%	0	$0
3	Basement Mech	400	1x4 2-Lamp 32w T8 Surface Wrap	2	62	8	0.50	198	Replace Fixture	50w LED Surface Mount Prismatic Wrap	1	50	8	0.40	160	0.10	38	$5	0	No New Controls	0	0.0%	0	$0
3	Boiler Room	400	1x4 2-Lamp 32w T8 Surface Wrap	2	62	4	0.25	99	Replace Fixture	50w LED Surface Mount Prismatic Wrap	1	50	4	0.20	80	0.05	19	$2	0	No New Controls	0	0.0%	0	$0
6	Exterior	4000	Outdoor 23w CFL Recessed Hi-Hat	1	23	20	0.46	1,840	Re-Lamp	Install 8w LED Pin Based	1	16	20	0.32	1,280	0.14	560	$71	0	No New Controls	0	0.0%	0	$0
	TOTAL					**156**	**7**	**17,367**					**156**	**4**	**9,002**	**3**	**8,365**	**$1,062**			**10**	**3**	**773**	**$98**

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
Child Advocacy Center	1800	SHARP ND-240QCJ	80	17.5	1,403	19.20	21,791	15.6	3,352	13.68

= Proposed PV Roof Layout

= Proposed PV Parking Layout

Notes:

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

Project Name: LGEA Solar PV Project - Child Advocacy Center
Location: Freehold, New Jersey
Description: Photovoltaic System 100% Financing - 15 year

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$101,347
Annual kWh Production	21,791
Annual Energy Cost Reduction	$2,767
Average Annual SREC Revenue	$3,301

Simple Payback: **16.70** Years

Life Cycle Cost Analysis

Analysis Period (years):	15	Financing %:	100%
Discount Rate:	3%	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.127**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	6.00%	Average SREC Value ($/kWh)	$0.152

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	21,791	$2,767	$0	$5,448	$5,964	$4,299	($2,048)	($2,048)
2	$0	21,682	$2,850	$0	$5,421	$5,699	$4,564	($1,992)	($4,039)
3	$0	21,574	$2,936	$0	$5,393	$5,417	$4,845	($1,933)	($5,973)
4	$0	21,466	$3,024	$0	$4,293	$5,118	$5,144	($2,945)	($8,918)
5	$0	21,358	$3,115	$220	$4,272	$4,801	$5,462	($3,096)	($12,014)
6	$0	21,252	$3,208	$219	$4,250	$4,464	$5,798	($3,023)	($15,037)
7	$0	21,145	$3,304	$218	$3,172	$4,107	$6,156	($4,004)	($19,041)
8	$0	21,040	$3,404	$217	$3,156	$3,727	$6,536	($3,920)	($22,961)
9	$0	20,934	$3,506	$216	$3,140	$3,324	$6,939	($3,832)	($26,794)
10	$0	20,830	$3,611	$215	$2,083	$2,896	$7,367	($4,783)	($31,577)
11	$0	20,726	$3,719	$213	$2,073	$2,441	$7,821	($4,684)	($36,261)
12	$0	20,622	$3,831	$212	$2,062	$1,959	$8,304	($4,582)	($40,844)
13	$0	20,519	$3,946	$211	$1,026	$1,447	$8,816	($5,502)	($46,346)
14	$0	20,416	$4,064	$210	$1,021	$903	$9,360	($5,388)	($51,734)
15	$0	20,314	$4,186	$209	$1,016	$326	$9,937	($5,270)	($57,004)
	Totals:	315,669	$51,472	$2,360	$47,825	$52,593	$101,347	($57,004)	($380,592)

Net Present Value (NPV) **($41,074)**

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	19.2 kW
DC to AC Derate Factor:	0.810
AC Rating:	15.6 kW
Array Type:	Fixed Tilt
Array Tilt:	7.5°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	11.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	2.29	1091	122.19
2	3.07	1345	150.64
3	3.99	1913	214.26
4	4.79	2146	240.35
5	5.68	2569	287.73
6	5.94	2518	282.02
7	5.76	2494	279.33
8	5.34	2298	257.38
9	4.57	1956	219.07
10	3.51	1585	177.52
11	2.26	996	111.55
12	1.92	883	98.90
Year	4.10	21791	2440.59

Output Hourly Performance Data

About the Hourly Performance Data

Output Results as Text

Saving Text from a Browser