



Local Government Energy Audit: Energy Audit Report



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Transportation Building

Lacey Township Board of Education
One Municipal Lane
Forked River, NJ 08731

March 16, 2018

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate savings are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC Energy Services (TRC) and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for certain measures and conditions, TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

Table of Contents

1	Executive Summary.....	1
1.1	Facility Summary	1
1.2	Your Cost Reduction Opportunities.....	1
	Energy Conservation Measures.....	1
	Energy Efficient Practices	3
	On-Site Generation Measures.....	3
1.3	Implementation Planning.....	3
2	Facility Information and Existing Conditions	5
2.1	Project Contacts	5
2.2	General Site Information.....	5
2.3	Building Occupancy	5
2.4	Building Envelope	5
2.5	On-Site Generation.....	6
2.6	Energy-Using Systems	6
	Lighting System	6
	Heating Ventilation and Air Conditioning (HVAC)	6
	Building Plug Load	6
2.7	Water-Using Systems	6
3	Site Energy Use and Costs.....	7
3.1	Total Cost of Energy	7
3.2	Electricity Usage	8
3.3	Natural Gas Usage	9
3.4	Benchmarking.....	10
3.5	Energy End-Use Breakdown	11
4	Energy Conservation Measures	12
4.1	Recommended ECMs	12
4.1.1	Lighting Upgrades.....	13
	ECM 1: Install LED Fixtures.....	13
	ECM 2: Retrofit Fixtures with LED Lamps.....	14
4.1.2	Lighting Control Measures	14
	ECM 3: Install Occupancy Sensor Lighting Controls	15
4.1.3	Gas-Fired Heating System Replacements.....	15
	ECM 4: Install Infrared Heaters	16
5	Energy Efficient Practices	17
	Reduce Air Leakage	17
	Close Doors and Windows	17
	Use Window Treatments/Coverings	17
	Perform Proper Lighting Maintenance.....	17
	Develop a Lighting Maintenance Schedule	17

Practice Proper Use of Thermostat Schedules and Temperature Resets	18
Clean Evaporator/Condenser Coils on AC Systems	18
Perform Proper Furnace Maintenance	18
Plug Load Controls.....	18
Replace Computer Monitors	18
Water Conservation	18
6 On-Site Generation Measures	19
6.1 Photovoltaic.....	19
6.2 Combined Heat and Power	20
7 Demand Response	21
8 Project Funding / Incentives	22
8.1 SmartStart	23
8.2 Direct Install	24
8.3 Energy Savings Improvement Program	24
9 Energy Purchasing and Procurement Strategies	26
9.1 Retail Electric Supply Options.....	26
9.2 Retail Natural Gas Supply Options	26

Appendix A: Equipment Inventory & Recommendations

Appendix B: ENERGY STAR® Statement of Energy Performance

Table of Figures

Figure 1 – Previous 12 Month Utility Costs..... 2

Figure 2 – Potential Post-Implementation Costs 2

Figure 3 – Summary of Energy Reduction Opportunities 2

Figure 4 – Project Contacts 5

Figure 5 - Building Schedule..... 5

Figure 6 - Utility Summary 7

Figure 7 - Energy Cost Breakdown 7

Figure 8 -Electric Usage & Demand 8

Figure 9 -Electric Usage & Demand 8

Figure 10 -Natural Gas Usage 9

Figure 11 -Natural Gas Usage 9

Figure 12 - Energy Use Intensity Comparison – Existing Conditions..... 10

Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures 10

Figure 14 - Energy Balance (kBtu/SF, %) 11

Figure 15 – Summary of Recommended ECMs..... 12

Figure 16 – Summary of Lighting Upgrade ECMs..... 13

Figure 17 – Summary of Lighting Control ECMs 14

Figure 18 - Summary of Gas-Fired Heating Replacement ECMs..... 15

Figure 19 - Photovoltaic Screening 19

Figure 20 - Combined Heat and Power Screening 20

Figure 21 - ECM Incentive Program Eligibility 22

I EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBP) has sponsored this Local Government Energy Audit (LGEA) Report for Transportation Building. The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC, as part of a comprehensive effort to assist Lacey Township Board of Education in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

I.1 Facility Summary

The Transportation Building is a 2,754 square foot facility comprised of a single story building that houses the bus garage and administrative offices.

Interior lighting at the Transportation Building consists primarily of T8 and T12 fluorescent sources, which are inefficient as compared to currently available alternatives. Cooling and ventilation are provided to the office areas by relatively efficient split system air conditioning units. Heating is provided by gas fired unit heaters located in the bus garage and electric baseboard heaters in the office areas. A thorough description of the facility and our observations are located in Section 2.

I.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated four (4) measures which together represent an opportunity for Transportation Building to reduce annual energy costs by \$3,193 and annual greenhouse gas emissions by 29,675 lbs CO₂e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 7.6 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Transportation Building's annual energy use by 33%.

Figure 1 – Previous 12 Month Utility Costs

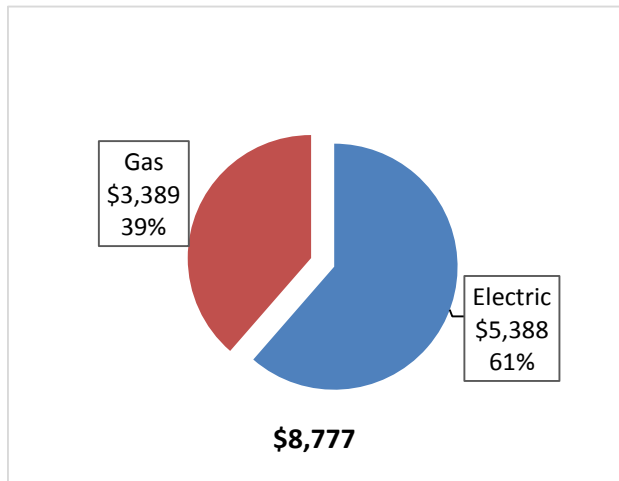
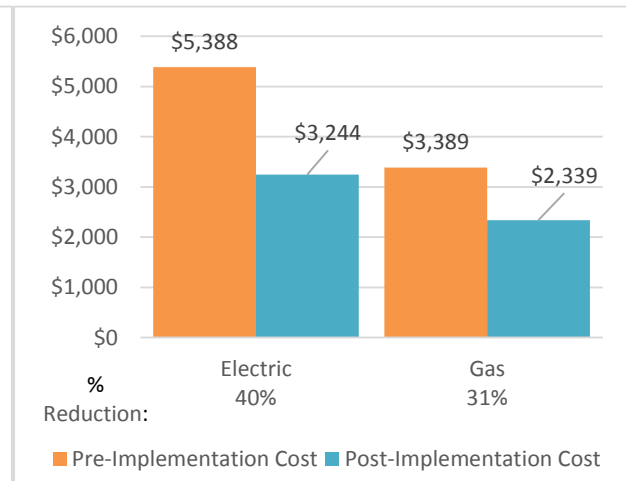


Figure 2 – Potential Post-Implementation Costs



A detailed description of the Transportation Building’s existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		15,383	3.5	0.0	\$2,031.23	\$14,685.04	\$315.00	\$14,370.04	7.1	15,491
ECM 1	Install LED Fixtures	14,435	3.2	0.0	\$1,906.12	\$14,104.79	\$220.00	\$13,884.79	7.3	14,536
ECM 2	Retrofit Fixtures with LED Lamps	948	0.3	0.0	\$125.11	\$580.25	\$95.00	\$485.25	3.9	954
Lighting Control Measures		852	0.2	0.0	\$112.54	\$1,274.00	\$185.00	\$1,089.00	9.7	858
ECM 3	Install Occupancy Sensor Lighting Controls	852	0.2	0.0	\$112.54	\$1,274.00	\$185.00	\$1,089.00	9.7	858
Gas Heating (HVAC/Process) Replacement		0	0.0	113.8	\$1,049.46	\$9,348.73	\$600.00	\$8,748.73	8.3	13,327
ECM 4	Install Low-Intensity Infrared Heating	0	0.0	113.8	\$1,049.46	\$9,348.73	\$600.00	\$8,748.73	8.3	13,327
TOTALS		16,235	3.7	113.8	\$3,193.24	\$25,307.77	\$1,100.00	\$24,207.77	7.6	29,675

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

Energy Efficient Practices

TRC also identified 11 low cost or no cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at the Transportation Building include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Perform Proper Furnace Maintenance
- Install Plug Load Controls
- Replace Computer Monitors
- Water Conservation

For details on these Energy Efficient Practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for the Transportation Building. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures. For details on our evaluation and on-site generation potential, please refer to Section 6.

I.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart
- Direct Install

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive

estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated Direct Install contractor and, in most cases, they will perform the installation work.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Patrick S. DeGeorge	Business Administrator	pdegeorge@laceyschools.org	(609) 971-2000 x 1001
TRC Energy Services			
Smruti Srinivasan	Auditor	SSrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 22, 2017, TRC performed an energy audit at the Transportation Building located in Forked River, New Jersey. TRC’s team met with David Klink to review the facility operations and help focus our investigation on specific energy-using systems.

The Transportation Building is a 2,754 square foot facility comprised of a single story building that houses the bus garage and a few administrative offices. The building was constructed in 1987.



2.3 Building Occupancy

The facility is in use Monday through Friday year round.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Transportation	Weekday	5:30AM - 6:00PM
Transportation	Weekend	None

2.4 Building Envelope

The Transportation Building shell is constructed of corrugated metal and supported by steel framing. Ceiling, walls, and rollup doors are all insulated.

2.5 On-Site Generation

The Transportation Building does not currently have any on-site electric generation capacity. The building power requirements are relatively small and the facility does not have the ability to utilize waste heat, therefore, distributed generation measures have not been recommended for this site.

2.6 Energy-Using Systems

Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment

Lighting System

Interior lighting at the facility is primarily provided by a mixture of 32-Watt linear fluorescent T8 lamps with electronic ballasts in combination with less efficient T12 lamps operated by magnetic ballasts. Eight-foot lamps are single-pin, high output (800 ma) lamps. These fixtures are typically difficult and expensive to retrofit. A few compact fluorescent and incandescent lamps were observed; exit sign lighting is provided by LED sources. Interior lighting control is provided by manually operated switches.

Exterior lighting consists primarily of building mounted metal halide wall pack fixtures controlled to operate only during non-daylight hours.

Heating Ventilation and Air Conditioning (HVAC)

Offices are served by three (3) residential sized split system air conditioning systems with a capacity of 2.5 tons each. The systems provide cooling and ventilation to the office areas during periods of cooling operation.

Heating for the bus garage is provided by two (2) suspended 200 MBh Reznor warm air unit heaters, providing heating and recirculation during periods of heating operation. Heating for the office areas is provided by six (6) electric baseboard heaters.

Heating and cooling are controlled separately. The district should be aware of the possibility for simultaneous heating and cooling and consider interlocking the thermostatic controls by installing a simple control system.

Building Plug Load

The facility has a few desktop computers with LCD monitors. Additional plug load includes several copiers, printers, and other office equipment. Equipment includes facilities for preparation of lunch, including refrigerator and microwave.

The bus garage includes a 7.5 hp compressor which runs as needed. Other equipment includes a lift and motorized rollup doors. This equipment operates infrequently.

2.7 Water-Using Systems

There are two (2) restrooms. A sampling of restrooms found that all of the faucets are rated for 2.2 gallons per minute (gpm) or higher. Additionally, there is one (1) kitchen sink fixture. Due to the relatively low occupancy and use patterns of this facility, the associated domestic water use is estimated to be relatively minimal.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the “typical” energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

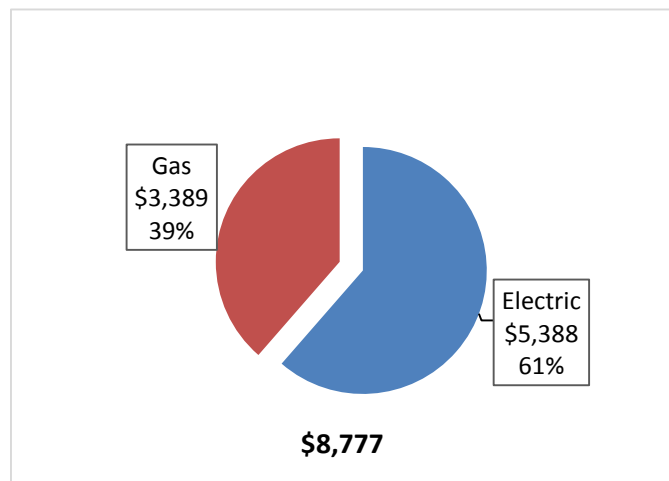
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Transportation Building		
Fuel	Usage	Cost
Electricity	40,803 kWh	\$5,388
Natural Gas	3,675 Therms	\$3,389
Total		\$8,777

The current annual energy cost for this facility is \$8,777 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was \$0.132/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

The “spike” portrayed for December 2015 energy use was based on an estimate of use, corrected the following month by an actual meter reading. The consumption pattern for December 2015 and January 2016 are likely similar. The lack of seasonal deviation may be partially due to the use of electrical baseboard heaters, which contribute to the winter load.

Figure 8 -Electric Usage & Demand

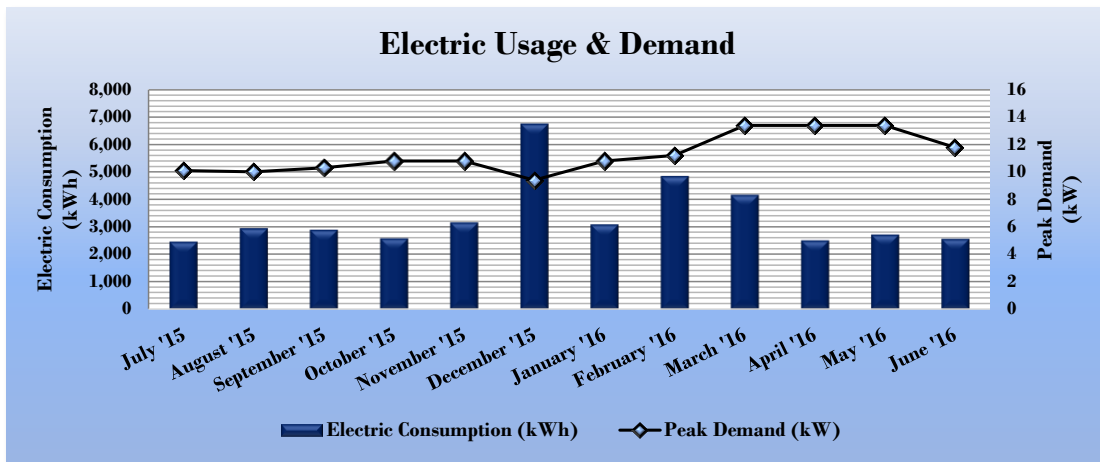


Figure 9 -Electric Usage & Demand

Summary Electric Billing Data for Transportation Building					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/24/15	30	2,461	10	\$5	\$312
8/25/15	29	2,951	10	\$5	\$360
9/24/15	32	2,893	10	\$5	\$353
10/23/15	30	2,581	11	\$5	\$117
11/23/15	32	3,161	11	\$5	\$397
12/28/15	30	6,751	9	\$5	\$770
1/26/16	33	3,086	11	\$5	\$573
2/24/16	29	4,847	11	\$7	\$586
3/24/16	29	4,165	13	\$19	\$524
4/22/16	29	2,506	13	\$9	\$715
5/23/16	29	2,724	13	\$9	\$338
6/22/16	32	2,565	12	\$11	\$328
Totals	364	40,691	13.4	\$90	\$5,373
Annual	365	40,803	13.4	\$91	\$5,388

3.3 Natural Gas Usage

Natural gas is provided by New Jersey Natural Gas. The average gas cost for the past 12 months is \$0.922/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

The gas use indicates seasonal variation due to winter heating. There is no gas use in the summer because there is no additional gas fired equipment.

Figure 10 -Natural Gas Usage

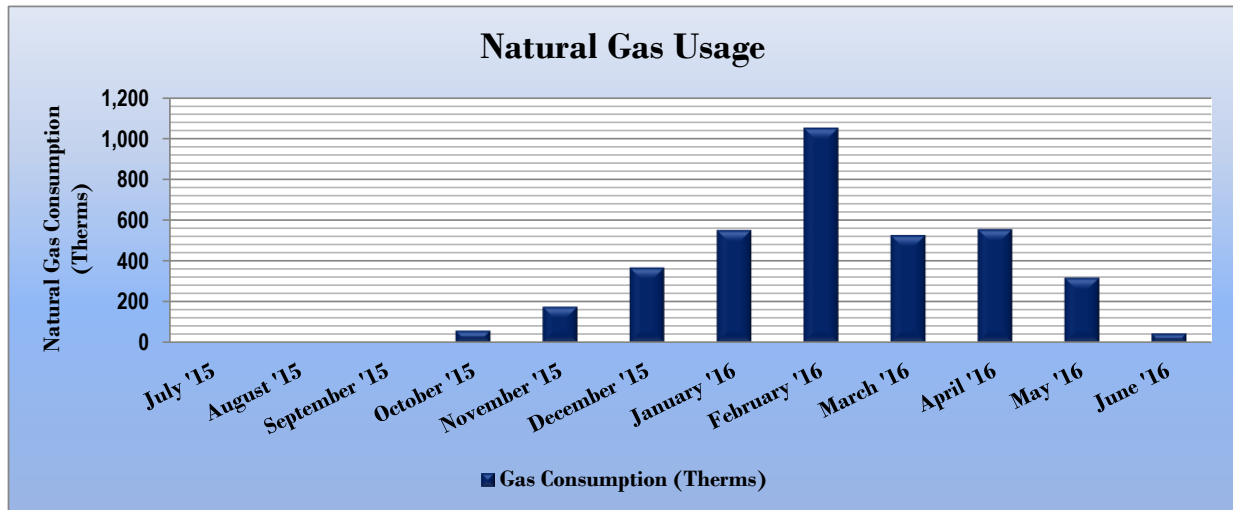


Figure 11 -Natural Gas Usage

Gas Billing Data for Transportation Building 114658173037			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
7/16/15	28	1	\$26
8/13/15	28	0	\$25
9/5/15	23	0	\$25
10/8/15	33	57	\$73
11/11/15	34	175	\$170
12/14/15	33	367	\$333
1/14/16	31	551	\$489
2/16/16	33	1,052	\$911
3/9/16	22	526	\$463
4/12/16	34	555	\$492
5/11/16	29	317	\$292
6/14/16	34	44	\$62
Totals	362	3,645	\$3,361
Annual	365	3,675	\$3,389

3.4 Benchmarking

This facility was benchmarked using Portfolio Manager, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager analyzes your building’s consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® Score for select building types.

The EUI is a measure of a facility’s energy consumption per square foot, and it is the standard metric for comparing buildings’ energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of “site energy” and “source energy.” Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Transportation Building	National Median Building Type: Garage
Source Energy Use Intensity (kBtu/ft ²)	298.9	123.1
Site Energy Use Intensity (kBtu/ft ²)	184.0	78.8

Implementation of all recommended measures in this report would improve the building’s estimated EUI significantly, as shown in the table below:

Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Transportation Building	National Median Building Type: Garage
Source Energy Use Intensity (kBtu/ft ²)	192.3	123.1
Site Energy Use Intensity (kBtu/ft ²)	122.6	78.8

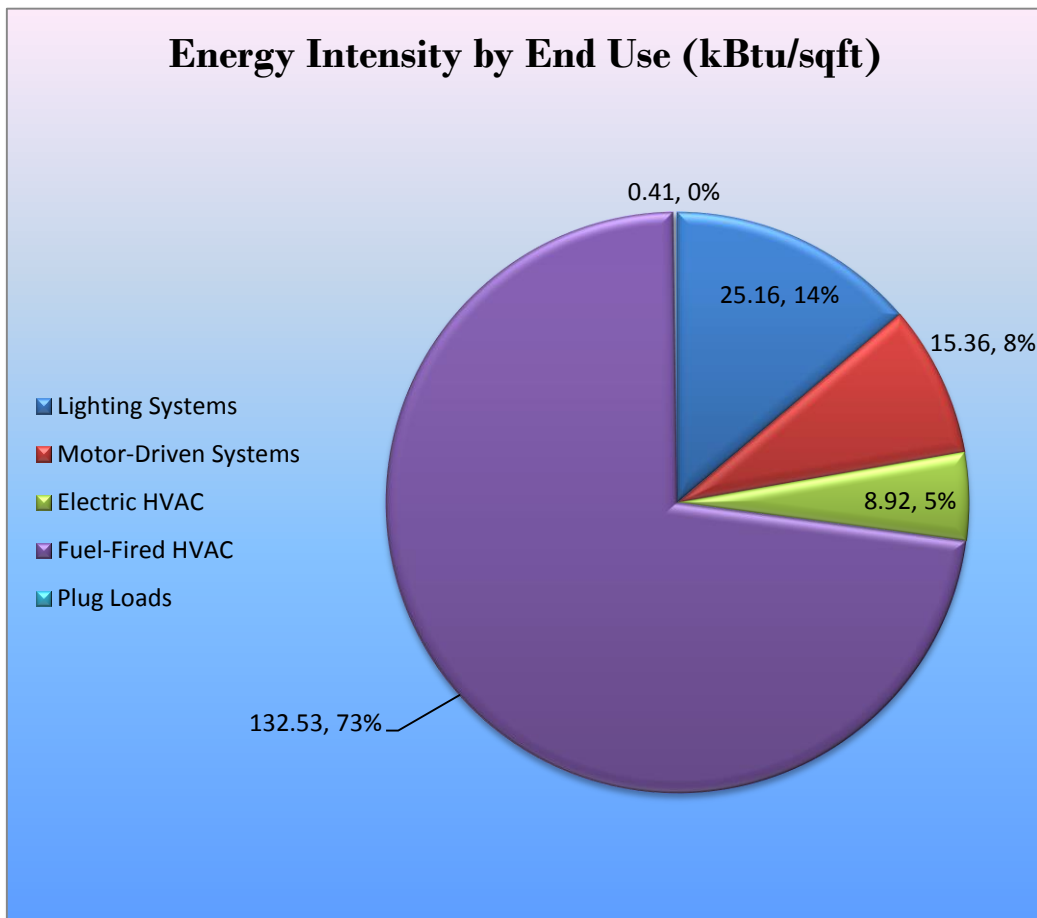
Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building’s energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. Your building is not one of the building categories that are eligible to receive a score.

A Portfolio Manager Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR® Statement of Energy Performance.

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 14 - Energy Balance (kBtu/SF, %)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Transportation Building regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		15,383	3.5	0.0	\$2,031.23	\$14,685.04	\$315.00	\$14,370.04	7.1	15,491
ECM 1	Install LED Fixtures	14,435	3.2	0.0	\$1,906.12	\$14,104.79	\$220.00	\$13,884.79	7.3	14,536
ECM 2	Retrofit Fixtures with LED Lamps	948	0.3	0.0	\$125.11	\$580.25	\$95.00	\$485.25	3.9	954
Lighting Control Measures		852	0.2	0.0	\$112.54	\$1,274.00	\$185.00	\$1,089.00	9.7	858
ECM 3	Install Occupancy Sensor Lighting Controls	852	0.2	0.0	\$112.54	\$1,274.00	\$185.00	\$1,089.00	9.7	858
Gas Heating (HVAC/Process) Replacement		0	0.0	113.8	\$1,049.46	\$9,348.73	\$600.00	\$8,748.73	8.3	13,327
ECM 4	Install Low-Intensity Infrared Heating	0	0.0	113.8	\$1,049.46	\$9,348.73	\$600.00	\$8,748.73	8.3	13,327
TOTALS		16,235	3.7	113.8	\$3,193.24	\$25,307.77	\$1,100.00	\$24,207.77	7.6	29,675

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

4.1.1 Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		15,383	3.5	0.0	\$2,031.23	\$14,685.04	\$315.00	\$14,370.04	7.1	15,491
ECM 1	Install LED Fixtures	14,435	3.2	0.0	\$1,906.12	\$14,104.79	\$220.00	\$13,884.79	7.3	14,536
ECM 2	Retrofit Fixtures with LED Lamps	948	0.3	0.0	\$125.11	\$580.25	\$95.00	\$485.25	3.9	954

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	7,348	2.0	0.0	\$970.25	\$7,200.00	\$0.00	\$7,200.00	7.4	7,399
Exterior	7,088	1.2	0.0	\$935.87	\$6,904.79	\$220.00	\$6,684.79	7.1	7,137

Measure Description

We recommend replacing existing interior lighting fixtures containing T12 fluorescent lamps with new high performance LED light fixtures. We also recommend replacing exterior wall mounted metal halide fixtures with LED sources. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube and more than 10 times longer than many incandescent lamps.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	948	0.3	0.0	\$125.11	\$580.25	\$95.00	\$485.25	3.9	954
Exterior	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.0	0

Measure Description

We recommend retrofitting existing T8 fluorescent and incandescent fixtures with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube and more than 10 times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Lighting Control Measures	852	0.2	0.0	\$112.54	\$1,274.00	\$185.00	\$1,089.00	9.7	858
ECM 3 Install Occupancy Sensor Lighting Controls	852	0.2	0.0	\$112.54	\$1,274.00	\$185.00	\$1,089.00	9.7	858

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
852	0.2	0.0	\$112.54	\$1,274.00	\$185.00	\$1,089.00	9.7	858

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in offices and in the work bay. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

4.1.3 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 18 below.

Figure 18 - Summary of Gas-Fired Heating Replacement ECMs

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement	0	0.0	113.8	\$1,049.46	\$9,348.73	\$600.00	\$8,748.73	8.3	13,327
ECM 4 Install Low-Intensity Infrared Heating	0	0.0	113.8	\$1,049.46	\$9,348.73	\$600.00	\$8,748.73	8.3	13,327

ECM 4: Install Infrared Heaters

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
0	0.0	113.8	\$1,049.46	\$9,348.73	\$600.00	\$8,748.73	8.3	13,327

Measure Description

We recommend replacing forced air heating equipment with low-intensity infrared heating units (the flame is enclosed rather than an open flame on a ceramic or metal surface). Forced air furnaces heat all of the air in the space served, which is inefficient for large volume spaces with relatively few occupants, areas with high ceilings, or areas with high outside air infiltration. Infrared heaters heat object surfaces directly, including the occupants of the space, rather than heating large volumes of air. So, occupants feel comfortable, but energy costs are significantly reduced. Infrared heaters also heat the floor which then re-radiates the heat. As a result, infrared heaters are more effective and efficient at maintaining occupant comfort for certain space types.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Reduce Air Leakage

Air leakage, or infiltration, occurs when outside air enters a building uncontrollably through cracks and openings. Properly sealing such cracks and openings can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. This includes caulking or installing weather stripping around leaky doors and windows allowing for better control of indoor air quality through controlled ventilation.

Close Doors and Windows

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Use Window Treatments/Coverings

A substantial amount of heat gain can occur through uncovered or untreated windows, especially older single pane windows and east or west-facing windows. Treatments such as high-reflectivity films or covering windows with shades or shutters can reduce solar heat gain and, consequently, cooling load and can reduce internal heat loss and the associated heating load.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20% - 60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6 – 12 months.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Practice Proper Use of Thermostat Schedules and Temperature Resets

Ensure thermostats are correctly set back. By employing proper set back temperatures and schedules, facility heating and cooling costs can be reduced dramatically during periods of low or no occupancy. As such, thermostats should be programmed for a setback of 5-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced further by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Perform Proper Furnace Maintenance

Preventative furnace maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should include tasks such as checking for gas / carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

Plug Load Controls

There are a variety of ways to limit the energy use of plug loads including increasing occupant awareness, removing under-utilized equipment, installing hardware controls, and using software controls. Some control steps to take are to enable the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips. For additional information refer to "Plug Load Best Practices Guide" <http://www.advancedbuildings.net/plug-load-best-practices-guide-offices>.

Replace Computer Monitors

Replacing old computer monitors or displays with efficient monitors will reduce energy use. ENERGY STAR® rated monitors have specific requirements for on mode power consumption as well as idle and sleep mode power. According to the ENERGY STAR® website monitors that have earned the ENERGY STAR® label are 25% more efficient than standard monitors.

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (<http://www3.epa.gov/watersense/products>) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

6 ON-SITE GENERATION MEASURES

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey’s Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State’s electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

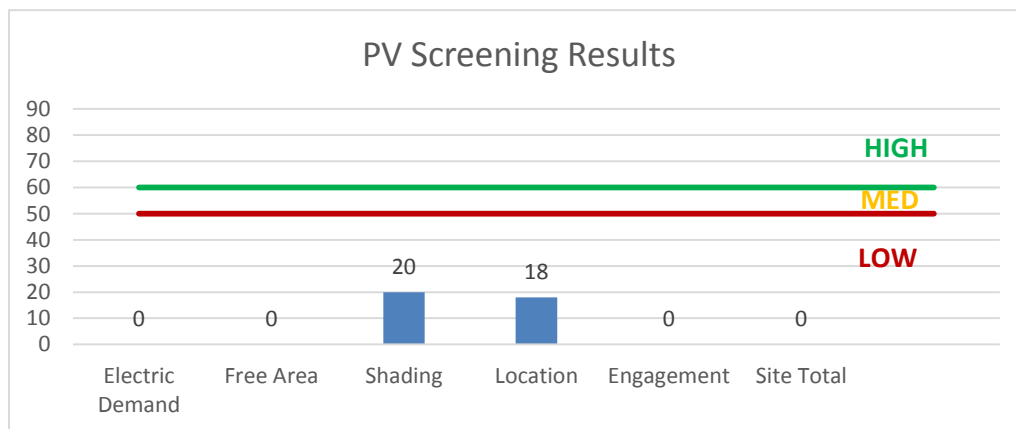
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility’s electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

A preliminary screening based on the facility’s electric demand, size and location of free area, and shading elements shows that the facility has a Low potential for installing a PV array.

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.

Figure 19 - Photovoltaic Screening



6.2 Combined Heat and Power

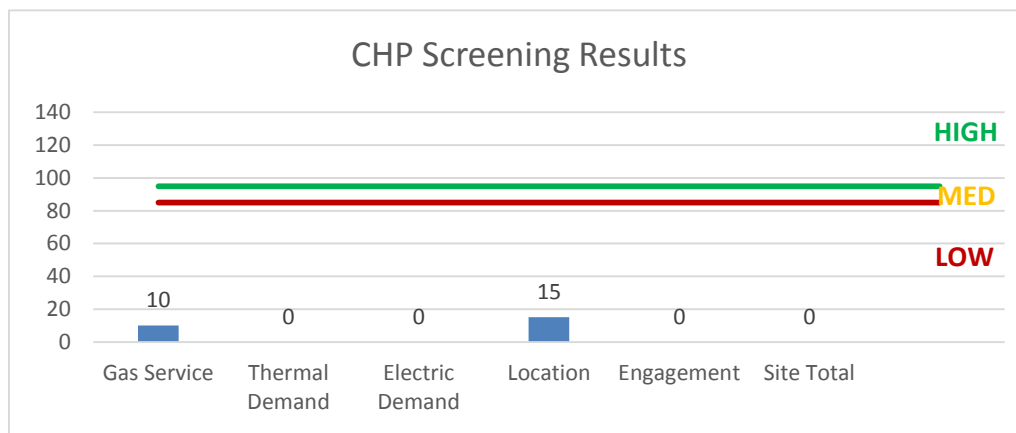
Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Low and infrequent thermal load is the most significant factor contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

Figure 20 - Combined Heat and Power Screening



7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically, an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats, so that air conditioning units run less frequently, or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (<http://www.pjm.com/markets-and-operations/demand-response/csps.aspx>). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (<http://www.pjm.com/training/training%20material.aspx>), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

The Transportation Building has a very low electrical load. In our opinion, the facility does not appear to meet the minimum requirements for participation in a DR program.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey’s Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 21 for a list of the eligible programs identified for each recommended ECM.

Figure 21 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	Direct Install
ECM 1	Install LED Fixtures	X	X
ECM 2	Retrofit Fixtures with LED Lamps	X	X
ECM 3	Install Occupancy Sensor Lighting Controls	X	X
ECM 4	Install Low-Intensity Infrared Heating	X	X

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a “whole-building” energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey’s largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity’s annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers

Electric Unitary HVAC

Gas Cooling

Gas Heating

Gas Water Heating

Ground Source Heat Pumps

Lighting

Lighting Controls

Refrigeration Doors

Refrigeration Controls

Refrigerator/Freezer Motors

Food Service Equipment

Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom Measure incentives are calculated at \$0.16/kWh and \$1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less.) Program incentives are capped at \$500,000 per electric account and \$500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

Detailed program descriptions, instructions for applying and applications can be found at: www.njcleanenergy.com/SSB.

8.2 Direct Install

Overview

Direct Install is a turnkey program available to existing small to medium-sized facilities with a peak electric demand that does not exceed 200 kW for a recent 12-month period. You will work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to \$125,000 per project. Direct Install participants will also be held to a fiscal year cap of \$250,000 per entity.

How to Participate

To participate in the Direct Install program, you will need to contact the participating contractor who the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Since Direct Install offers a free assessment of eligible measures, Direct Install is also available to small businesses and other commercial facilities too that may not be eligible for the more detailed facility audits provided by LGEA.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

8.3 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs can be leveraged to help further reduce the total project cost of eligible measures.

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

- (1) Use an Energy Services Company or "ESCO."
- (2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
- (3) Use a hybrid approach of the two options described above where the ESCO is utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the Energy Savings Plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by

the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e. non-utility) energy supplier.

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,600	Fixture Replacement	Yes	1	LED - Fixtures: Ambient 1x4 Fixture	Occupancy Sensor	30	1,820	0.05	197	0.0	\$25.99	\$476.00	\$20.00	17.54
Office	6	Linear Fluorescent - T12HO: 8' T12HO (110W) - 2L	Wall Switch	252	2,600	Fixture Replacement	Yes	6	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,820	1.08	3,887	0.0	\$513.25	\$2,276.00	\$20.00	4.40
Office	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Work Bay	10	Linear Fluorescent - T12: 4' T12 (40W) - 2L	None	88	2,600	Fixture Replacement	Yes	10	LED - Fixtures: Ambient 1x4 Fixture	Occupancy Sensor	30	1,820	0.55	1,968	0.0	\$259.92	\$4,140.00	\$70.00	15.66
Work Bay	3	Linear Fluorescent - T12HO: 8' T12HO (110W) - 2L	None	252	2,600	Fixture Replacement	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	45	1,820	0.54	1,943	0.0	\$256.63	\$1,350.00	\$35.00	5.12
Work Bay	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	2,600	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	None	29	2,600	0.03	97	0.0	\$12.80	\$58.50	\$10.00	3.79
Work Bay	2	Compact Fluorescent: 18 Watt CFL	None	18	2,600	None	No	2	Compact Fluorescent: 18 Watt CFL	None	18	2,600	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Work Bay	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Lav	1	Incandescent 60W INC	Wall Switch	60	1,300	Relamp	No	1	LED Screw-In Lamps: Screw in A lamp	Wall Switch	9	1,300	0.04	75	0.0	\$9.89	\$53.75	\$5.00	4.93
Hall	4	Compact Fluorescent: 18 Watt CFL	None	18	2,600	None	No	4	Compact Fluorescent: 18 Watt CFL	None	18	2,600	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.14	490	0.0	\$64.71	\$350.00	\$60.00	4.48
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.14	490	0.0	\$64.71	\$350.00	\$60.00	4.48
Office	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Bldg Exterior	4	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,380	Fixture Replacement	No	4	LED - Fixtures: Porch (Wall Mounted)	Daylight Dimming	86	4,380	0.68	4,138	0.0	\$546.36	\$2,998.80	\$20.00	5.45
Parking Poles	2	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	160	4,380	0.48	2,950	0.0	\$389.51	\$3,905.99	\$200.00	9.51
Parking Poles	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	146	4,380	None	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	146	4,380	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Motor Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
		Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Garage	Doors	2	Other	1.0	70.0%	No	130	No	70.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Garage	Lift	1	Other	1.0	70.0%	No	130	No	70.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Garage	Air Compressor	1	Air Compressor	7.5	70.0%	No	1,752	No	70.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Offices	Offices	3	Supply Fan	0.2	70.0%	No	1,611	No	70.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Electric HVAC Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis							
		System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Various	Offices	3	Split-System AC	2.50		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Fuel Heating Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions				Proposed Conditions						Energy Impact & Financial Analysis					
		System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Garage Area	Garage	2	Warm Air Unit Heater	200.00	Yes	2	Infrared Unit Heater	200.00	93.00%	Et	0.00	0	113.8	\$1,049.46	\$9,348.73	\$600.00	8.34

Plug Load Inventory

Location	Existing Conditions			
	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Transportation	3	Computer	75.0	No
Transportation	1	Laptop	40.0	Yes

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

Transportation Building

Primary Property Type: Mixed Use Property
 Gross Floor Area (ft²): 2,754
 Built: 1970

For Year Ending: June 30, 2016
 Date Generated: June 13, 2017

ENERGY STAR® Score¹

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 Transportation Building One Municipal Way Forked River, New Jersey 08731	Property Owner _____ () - _____	Primary Contact _____ () - _____
Property ID: 5921056		

Energy Consumption and Energy Use Intensity (EUI)				
Site EUI 174.2 kBtu/ft ²	Annual Energy by Fuel		National Median Comparison	
	Electric - Grid (kBtu)	115,231 (24%)	National Median Site EUI (kBtu/ft ²)	79.3
	Natural Gas (kBtu)	354,465 (76%)	National Median Source EUI (kBtu/ft ²)	123.1
Source EUI 270.3 kBtu/ft ²			% Diff from National Median Source EUI	120%
		Annual Emissions		
		Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	33	

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)