Teaneck Board of Education
May 28, 2010

Final Energy Audit Report

CDM

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May 26, 2010

Mr. Anthony D'Angelo, AIA, CEFM
Director of Facilities & Grounds
Teaneck Public Schools
1315 Taft Road
Teaneck, NJ 07666

Subject: Final Energy Audit Report for Teaneck Public Schools

Dear Mr. D'Angelo:

Please find attached an electronic copy of our final report detailing the findings and recommendations of CDM's energy audit for Teaneck Public Schools. An electronic copy of this report has also been provided to TRC for their record.

Very truly yours,

Matthew T. Goss, P.E., C.E.M., C.E.A., LEED®AP
Project Manager
CDM

c: Ted Schlette (CDM)
Colleen Kling (TRC)

Enclosure

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Executive Summary

As part of an initiative to reduce energy cost and consumption, the Teaneck Board of Education (BOE) has secured the services of Camp Dresser and McKee (CDM) to perform an energy audit at their school facilities in an effort to develop comprehensive Energy Conservation and Retrofit Measures (ECRMs).

CDM's energy audit team visited the facilities on February 9-12, 2010. As a result of the site visits and evaluation of the historical energy usage of the facilities, CDM was successful in identifying opportunities for energy savings measures.

CDM has also evaluated the potential for renewable energy technologies to be implemented at the school facilities to offset the electrical energy usage. Specifically, the use of solar electric photovoltaic panels and wind turbines were investigated.

In addition to identifying ECRMs and the potential for on-site energy generation, an alternate third party supplier was contacted in an effort to identify further energy cost savings available for Teaneck BOE. This is discussed further in Section 5. Additionally, there is potential for Teaneck BOE to make money by participation in a Demand Response Program, as discussed in Section 5.2.

Not all ECRMs identified as a result of the energy audit are recommended. ECRMs must be economically feasible to be recommended for implementation. The feasibility of each ECRM was measured through a simple payback analysis. The simple payback period was determined after establishing Engineer's Opinion of Probable Construction Cost estimates, O&M estimates, projected annual energy savings estimates, and the potential value of New Jersey Clean Energy rebates, or Renewable Energy Credits, if applicable. Generally, ECRMs with a payback period of 20 years or less are recommended, unless other various factors need to be factored into the decision process.

Historical Energy Usage

The following table, Table ES-1, summarizes the historical energy usage at each of the Board's facilities as presented in Section 3. These values can serve as a bench-marking tool, along with the building profiles that have been established through the EPA's Portfolio Manager Program, to quantify the reduction in electrical energy, natural gas usage, and oil usage following the implementation of the recommended ECRMs.

Table ES-1: Summary of Annual Energy Usage & Cost

	Electrical Energy Use (kWH)	Peak Summer Demand (kW)	Peak Winter Demand (kW)	Fuel Use for Entire Building (therms)	Fuel Use for Entire Building (gallons oil)	Cost for Electric Service ($/kWh)	Cost for Fuel ($/therm)	Cost for Fuel ($/gallon)
Benjamin Franklin Middle School	887,410	259	275	8,062	29,621	$0.1541	$1.26	$2.31
Bryant Elementary	293,440	102	90	136	36,107	$0.1730	$2.41	$2.32
Eugene Fields Administration Building	177,150	65	41	622	8,759	$0.1848	$1.42	$2.30
Hawthorne Elementary School	402,380	122	128	41,796	-	$0.1849	$1.25	-
Lowell Elementary School	298,450	106	92	463	27,018	$0.1876	$1.40	$2.36
Teaneck High School	1,962,270	618	501	130,184	86,701	$0.1589	$1.08	$3.33
Teaneck High School - Scoreboard	5,355	141	75	-	-	$1.0889	-	-
Teaneck High School - Athletic Field Lighting	5,698	78	71	-	-	$2.1980	-	-
Thomas Jefferson Middle School	762,720	239	246	7,628	41,516	$0.1781	$1.24	$2.40
Whittier Elementary School	386,100	126	113	306	28,959	$0.1867	$1.60	$2.37

Building Lighting and HVAC System ECRMs

The following table, Table ES-2, presents the ranking of recommended ECRMs identified for the building lighting and HVAC systems based on the simple payback analysis.

Additional ECRMs associated were identified and evaluated, as discussed in Sections 2 and 4; however, were not recommended due to longer payback periods. This table includes the Engineer's Opinion of Probable Construction Cost, projected annual energy cost savings, projected annual energy usage savings, and total simple payback period for each recommended ECRM. The ECRMs are ranked based on payback period.

Table ES-2[1]
Ranking of Energy Savings Measures for Building Lighting and HVAC Systems

Overall Ranking (Based on Simple Payback)	Site	Total Cost	Anticipated Annual Energy Savings	Annual Fiscal Savings[2]	Simple Payback (Years)
1	Teaneck High School (separate DHW Heater)	$5,240	1,300 therms	$9,977	0.5
2	Teaneck High School - Press Box Lighting	$107.8	7.1 kWh	$78.02	1.4
3	Benjamin Franklin Middle School (Boiler Replacement)	$98,127	12,192.9 therms	$33,837	2.9
4	Thomas Jefferson Middle School(Boiler Replacement)	$147,190	14,203.4 therms	$48,667	3.1
5	Bryant Elementary School (DDC BMS)	$40,915	3,322 gal oil; 21,038 kWh	$11,347	3.6
6	Whittier Elementary School (DDC BMS)	$47,539	3,122 gal oil; 20,063 kWh	$10,742	4.4
7	Teaneck High School (VFD)	$76,123	-3,522 gal oil; 173,640 kWh	$15,863	4.8
8	Bryant Elementary School Lighting	$96,319	89,811.3 kWh	$18,291.8	5.3
9	Hawthorne Elementary School (DDC BMS)	$42,584	4,297 therms; 13,276 kWh	$7,580	5.6
10	Eugene Field Administration Building (DDC BMS)	$21,456	911 gal oil; 10,212 kWh	$3,777	5.7
11	Lowell Elementary School (DDC BMS)	$40,629	2,064 gal oil; 11,932 kWh	$7,109	5.7
12	Whittier Elementary School Lighting	$108,502.9	16,811 kWh	$18,477.9	5.9
13	Eugene Fields Administration Building Lighting	$56,146.5	7,891.9 kWh	$8,665.7	6.5
14	Teaneck High School Lighting	$142,903.3	20,173.5 kWh	$21,750.8	6.6
15	Benjamin Franklin Middle School Lighting	$390,818.7	45,923.7 kWh	$52,545.9	7.4
16	Thomas Jefferson Middle School Lighting	$213,303.3	25,879.3 kWh	$27,889.1	7.6
17	Bryant Elementary School (Boiler Replacement)	$175,165	6987.7 therms	$20,871	8.4
18	Lowell Elementary School Lighting	$74,288.8	7,634.3 kWh	$8,355	8.9
19	Hawthorne Elementary School Lighting	$103,835.2	10,015.5 kWh	$11,218	9.3
20	Hawthorne Elementary School (Boiler Replacement)	$175,165	12,991.1 therms	$17,739	9.9
21	Lowell Elementary School (Boiler Replacement)	$216,990	8,554.1 therms	$21,871	9.9
22	Eugene Field Administration	$98,127	1,884.5	$7,017	14.0

Overall Ranking (Based on Simple Payback)	Site	Total Cost	Anticipated Annual Energy Savings	Annual Fiscal Savings[3]	Simple Payback (Years)
Table ES-2[1] Ranking of Energy Savings Measures for Building Lighting and HVAC Systems					
	Building (Boiler Replacement)		therms		
23	Whittier Elementary School (Boiler Replacement)	$216,990	3506.8 therms	$11,170	19.4
24	Hawthorne Elementary School (AHU Replacement)	$16,963	268 therms; 2,098 kWh	$681	24.9
25	Teaneck High School (AHU Replacement)	$126,848	1,336 therms; 12,696 kWh	$3,460	36.7

1. 'Total Cost' takes into account any applicable rebates.
2. Savings assume all building heat provided by natural gas and/or oil, at current aggregate rate per unit of fuel
3. 'Annual Fiscal Savings' takes into account maintenance costs.

Renewable Energy ECRMs

Solar Energy

Section 4.3 of the report provides for an economic evaluation of a solar energy system recommended to be installed at eight (8) of the Board's facilities. The evaluation covered the economic feasibility of the Board installing a solar energy system under a typical construction contract and to assume full responsibility of the operation of such a system.

Based on a simple payback model, summarized in Table ES-3, it would benefit the Board to further investigate the installation of a solar energy system at eight (8) buildings. This is primarily based on the initial upfront capital investment required for a solar energy system installation and the 12.1 year payback period. This payback period may justify installing the solar energy system. Other options, such as Power Purchase Agreements, are potentially available as well to help finance the project. Solar technology is constantly changing and will most likely continue to lower in price.

Two major factors influencing the project financial evaluation is the variance of the prevailing energy market conditions and Solar Renewable Energy Credit (SREC) rates, with the largest impact to the payback model being the SREC credit pricing. For the payback model, conservative estimates of the SREC's market value over a 15 year period were assumed, as discussed in Section 4.3.

Table ES-3 includes a simple payback analysis for the installation of a solar energy system at the identified Board buildings.

Table ES-3: Simple Payback Analysis for Solar Energy Systems

Parameter	Solar
Estimated Budgetary Project Cost	$16,571,045
1st Year Production	2,035,334 kWh
Annual Electric Savings	$291,903.8
Annual Estimated SREC Revenue	$1,078,023
Project Simple Payback	**12.1 Years**

Wind Power Generation

Section 4.3.3 of the report provides for an economic evaluation of a wind turbine energy system recommended to be installed at eight (8) of the Teaneck School District facilities. The evaluation covered the economic feasibility of furnishing and installing a wind turbine energy system under a typical construction contract and to assume full responsibility of the operation of such a system.

CDM completed a preliminary desktop wind power production analysis and has concluded that an additional on-site feasibility study is warranted and recommended. Such a feasibility study would include the installation of a wind test rig to measure actual wind conditions as observed on-site.

Wind power as a renewable energy source also qualifies for Renewable Energy Certificates (REC's). The prevailing energy market, REIP and REC's comprise the major factors influencing a wind turbine energy system installation. Other options, such as government bonds or a Power Purchase Agreement, are potentially available and can assist with the financing of this project.

Table ES-4 includes a typical simple payback analysis for the installation of a wind turbine energy system located at several of the Teaneck Board of Education facilities. Refer to Appendix K for a more detailed wind energy financing spreadsheet.

Table ES-4: Ranking of Energy Savings Measures Summary – Wind Turbine Energy System

Parameter	Wind Turbine (Minimum Site Wind Speed – 9.01 mph)	Wind Turbine (Maximum Site Wind Speed – 13.82 mph)	Wind Turbine (Average Site Wind Speed – 11.2 mph)
Engineer's Opinion of Probable Cost	$21,895	$21,895	$21,895
Renewable Energy Incentive Program**	-$12,214	-$21,895	-$20,304

Table ES-4: Ranking of Energy Savings Measures Summary – Wind Turbine Energy System			
Parameter	Wind Turbine (Minimum Site Wind Speed – 9.01 mph)	Wind Turbine (Maximum Site Wind Speed – 13.02 mph)	Wind Turbine (Average Site Wind Speed – 11.2 mph)
Total Cost	$9,681	$0	$1,591
1st Year Production	3,817 kWh	8,316 kWh	6,345 kWh
Annual Estimated Electric Savings	$643.2	$1,401.2	$1,069.1
Annual Estimated REC Revenue	$95	$208	$159
Project Simple Payback	**13.1 Years**	**0 Years**	**1.3 Years**

** REIP incentive is calculated for only the first year and is applied as a deduction.

Recommended ECRMs

Table ES-5 summarizes the Total Engineer's Opinion of Probable Construction Cost, annual energy savings, projected annual energy and O&M cost savings and the payback period based on the implementation of all of the above recommended ECRMs.

Table ES-5: Recommended ECRMs[1]			
Total Engineer's Opinion of Probable Construction Cost	Projected Annual Energy Savings (kWh, therms, or gal oil)	Projected Annual Fiscal Savings	Simple Payback Period (years)
$2,732,277	332,783 kWh 67,821.5 therms 5,897 gal oil	$398,758	6.7

1. Does not include energy savings associated with Solar Energy System or Wind Power Generation.

Section 1 Introduction

1.1 General

As part of an initiative to reduce energy cost and consumption, the Teaneck Board of Education has secured the services of Camp Dresser and McKee (CDM) to perform an energy audit at the District's eight (8) school buildings in an effort to develop comprehensive energy conservation initiatives.

The performance of an Energy Audit requires a coordinated phased approach to identify, evaluate and recommend energy conservation and retrofit measures (ECRM). The various phases conducted under this Energy Audit included the following:

- Gather preliminary data on all facilities;
- Facility inspection;
- Identify and evaluate potential ECRMs;
- Develop the energy audit report.

Figure 1-1 is a schematic representation of the phases utilized by CDM to prepare the Energy Audit Report.

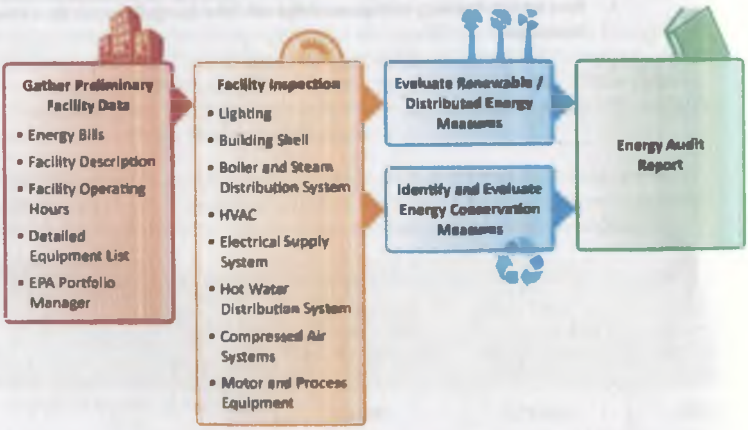


Figure 1-1: Energy Audit Phases

1.2 Background

The eight (8) schools that were included in the energy audit for the Teaneck Board of Education were Benjamin Franklin Middle School, Bryant Elementary School, Eugene Field Administration Building, Hawthorne Elementary School, Lowell Elementary School, Teaneck High School, Thomas Jefferson Middle School, and Whittier Elementary School.

The Benjamin Franklin Middle School is a 100,202 ft^2 building that was originally built in 1957. The school is utilized for middle school classes, grades 5 through 8, occupied by 575 students and approximately 105 faculty and staff members. The school is occupied by students from 6 am to approximately 4 pm during the week, with custodial coverage until 12 am. The school is closed on the weekends except for special events and is open during the summer for school classes and camps.

The Bryant Elementary School is a 47,438 ft^2 building that was originally built in 1926. The school is utilized for grades Pre K and K, occupied by 386 students and approximately 76 faculty and staff members. The school is occupied from 6 am to approximately 4 pm during the week, but is closed on the weekends and during the summer except for summer school classes and camps.

The Eugene Field Administration Building is a 24,877 ft^2 building that was originally built in 1955. The building is utilized for administration office space and is occupied by approximately 47 employees. The building is occupied from 6 am to approximately 4 pm during the week, is closed on the weekends, and opens during the summer for summer school classes and camps.

The Hawthorne Elementary School is a 49,373 ft^2 building that was originally built in 1925. The school is utilized for elementary school classes, grades 1 through 4, occupied by 342 students and approximately 60 faculty and staff members. The school is occupied from 6 am to approximately 4 pm during the week, but is closed on the weekends and during the summer except for summer school classes and camps.

The Lowell Elementary School is a 47,106 ft^2 building that was originally built in 1934. The school is utilized for elementary school classes, grades 1 through 4, occupied by 305 students and approximately 61 faculty and staff members. The school is occupied from 6 am to approximately 4 pm during the week, is closed on the weekends and opens during the summer for summer school classes and camps.

The Teaneck High School is a 215,808 ft^2 building that was originally built in 1927. The school is utilized for high school classes, grades 9 through 12, occupied by 1,410 students and approximately 187 faculty and staff members. The school is occupied from 6 am to approximately 8 pm during the week, and is open on the weekends and the summer for special events, summer school classes, and administrative purposes.

The Thomas Jefferson Middle School is a 105,216 ft² building that was originally built in 1958. The school is utilized for middle school classes, grades 5 through 8, occupied by 627 students and approximately 55 faculty and staff members. The school is occupied from 6 am to approximately 4 pm during the week, but is closed on the weekends and during the summer except for summer school classes and camps.

The Whittier Elementary School is a 55,118 ft² building that was originally built in 1921. The school is utilized for elementary school classes, grades 1 through 4, occupied by 402 students and approximately 55 faculty and staff members. The school is occupied from 6 am to approximately 4 pm during the week, but is closed on the weekends and during the summer except for administrative personnel.

1.3 Purpose and Scope

The objective of the energy audit is to identify energy conservation and retrofit measures to reduce energy usage and to develop an economic basis to financially validate the planning and implementation of identified energy conservation and retrofit measures.

Due to the rising costs of power and the desire to minimize dependence on foreign oil supplies, energy consumption is taking a higher priority across the nation. Significant energy savings may be available with retrofits to the buildings' envelopes, heating, cooling, and lighting systems. It should be noted that the magnitude of energy savings available is not only dependent on the type of heating, lighting or insulation systems that are in use, but also on the age and condition of the equipment and the capital available to implement major changes.

The purpose of this energy audit is to identify the various critical building comfort systems within the buildings that are major consumers of electrical energy and are clear candidates for energy savings measures. In addition, the potential for alternative energy systems to be installed at each building was evaluated and presented herein.

Section 2
Facility Description

2.1 Benjamin Franklin Middle School

2.1.1 Description of Building Envelope


Deteriorating Foam Roof

The walls of the Benjamin Franklin Middle School consist of brick and mortar facade, and finished interior. The newer portions of the roofing system consist of fully adhered EPDM membrane over flat roof deck; older roof sections consist of sprayed foam insulation with light gray gravel finish over a flat roof deck. There was evidence of leakage and in general deterioration of the older foam system.

The windows throughout the building are double-paned. The majority of exterior doors are FRP doors. FRP doors are highly recommended from an energy efficiency perspective. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability, as the doors will not expand or contract with changing climate. Weather stripping on these doors appeared to be in poor condition and in need of replacement.

It was determined that the building envelope is in good condition and is currently providing a fair level of insulation. It is recommended that a qualified roofing contractor evaluate the system, including the structural capacity of the building frame, and repair or replace the existing roofing system with an EPDM membrane roofing system. A roof replacement will be costly; therefore, the system analysis, including the structural integrity of the building, may warrant the application of an elastomeric waterproof roof coating system to rectify any leaks and improve the level of insulation that the current roof is providing.

It is also recommended that a white thermal barrier coating be considered. This coating works to reduce the surface temperature of the roof by reflecting the UV rays, and provides insulation for the interior of the building reducing the heating and cooling loads.

2.1.2 Description of Building HVAC

Two oil-fired cast iron steam boilers located in the boiler room provide heat for the entire building. The steam from the boilers is fed through a heat exchanger to produce hot water that is then circulated to fan coil unit ventilators in each classroom. DX air handling units located throughout the building, including the roof provide heating, cooling, or both to the zones they serve.

Ductless split system and through-the-wall air conditioning units provide cooling for the computer lab, server room, nurse's office, main office, administration area, principal's office, media center, operation and maintenance office, windowless classrooms, guidance rooms, technology rooms, mail room, reading room, teacher's break room and a few other classrooms.

Domestic hot water for this building is produced by a gas fired water heater.

2.1.3 Description of Building Lighting

The Benjamin Franklin Middle School existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.2 Bryant Elementary School

2.2.1 Description of Building Envelope

The walls of the Bryant Elementary School consist of brick and mortar façade or Exterior Insulated Finish System (EIFS) with finished interior. The existing roofing system consists of fully adhered EPDM membrane over flat roof that is 13 years old, and slate shingles over pitched roof decks that are 70 years old.

The windows throughout the building are double-paned windows. The majority of exterior doors are FRP doors. FRP doors are highly recommended from an energy efficiency perspective. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability, as the doors will not expand or contract with changing climate. Weather stripping on these doors appeared to be in poor condition and in need of replacement. There was also gapping noted between the door and door frame allowing for air to infiltrate into the building. Door replacement should be considered on main entrance doors.

2.2.2 Description of Building HVAC

Two oil-fired cast iron steam boilers located in the boiler room provide heat for the entire building. The steam from the boilers is fed through a heat exchanger to produce hot water for space heating. This water is circulated through the unit ventilators in some of the classrooms. One DX air handling unit located on the roof and another located at grade provide cooled outdoor air throughout the building. An older portion of the building employs steam heating with either unit ventilators or two-pipe steam radiator units.

Ductless split system and through the wall air conditioning units provide cooling for the nurse's office, some interior classrooms, special services room, server room, speech therapy room, child therapy room, principal's office, main office, and teacher's lounge.

Domestic hot water for this building is produced from a 50 gallon and a 40 gallon electric water heater.

2.2.3 Description of Building Lighting

The Bryant Elementary School existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.3 Eugene Field Administration Building

2.3.1 Description of Building Envelope

The walls of the Eugene Field Administration Building are composite cavity walls consisting of brick and mortar facade, cavity and concrete masonry CMU back-up blocks and finished interiors in some location. The exterior walls appear to be in good condition. The existing roofing system consists of sprayed foam with gray aggregate that is approximately 16 years old. At the time of the audit, CDM was informed that the roof was scheduled for replacement this summer, but is on hold pending budget considerations.

The windows throughout the building are single and double-paned windows. The majority of exterior doors are FRP doors. FRP doors are highly recommended from an energy efficiency perspective. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability, as the doors will not expand or contract with changing climate. Weather stripping on these doors appeared to be in poor condition and in need of replacement. There was also gapping noted between the door and door frame allowing for air to infiltrate into the building.

2.3.2 Description of Building HVAC

Two oil-fired cast iron steam boilers located in the boiler room provide heat for the entire building. The steam from the boilers is fed through a heat exchanger to produce hot water for space heating. This water is then circulated through unit ventilators in each classroom.

Two air handling units located in the gym. Each is equipped with a DX cooling coil section and hot water coil section to provide heated and cooled air to the gym. These air handling units also provide outside air for ventilation.

Ductless split system and through the wall air conditioning units provide cooling for all rooms within the buildings.

Domestic hot water for this building is produced from a 50 gallon natural gas-fired water heater.

2.3.3 Description of Building Lighting

The Eugene Field Administration Building existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.4 Hawthorne Elementary School

2.4.1 Description of Building Envelope

The walls of the Hawthorn Elementary School consist of brick and mortar facade, and finished interior. The existing roofing system consists of fully adhered EPDM membrane over flat roof that is approximately 13 years old, asbestos composite shingles over pitched roof decks that are 70 years old, and sprayed foam with aggregate surfacing that is 16 years old. No pooling was observed, but existing shingled pitched roof appeared to be in poor condition.

The windows throughout the building are double-paned windows.

It was also noted that Hawthorn Elementary School has a number of window AC units. It is recommended that the air conditioning sleeves be checked for a tight seal and if the AC units are left in place through the winter, AC covers should be purchased and installed. It was noted during the audit that the AC units serving the office are covered during the winter. An outdoor AC cover covers the top and sides of the unit to stop drafts. Window and through-wall AC covers are UV resistant, water repellent PVC vinyl with elasticized corners and straps for a tight fit. Outdoor or indoor AC covers can also be customized to meet the District's needs. A standard outdoor AC cover can cost around $15. The impact on the overall building heating load will be minimal; however, there will be a direct impact on the occupants comfort.

Example of an Outdoor AC Cover

2.4.2 Description of Building HVAC

Two natural gas-fired cast iron steam boilers located in the boiler room provide heat for the entire building. The steam from the boilers is fed through a heat exchanger to produce hot water for space heating. This water is then circulated through unit ventilators in some of the classrooms. Two DX air handling units located on the roof and one located in the cafeteria. These air handling units provide heated and cooled air throughout the building. These air handling units also provide the building with outside air for ventilation. An older portion of the building employs steam heating with either unit ventilators or two-pipe steam radiator units.

Ductless split system and through the wall air conditioning units provide cooling for the principal's office, server closet, teacher's lounge, child study room, nurse's office, and room 11.

Domestic hot water for this building is produced from an 80 gallon electric hot water heater.

2.4.3 Description of Building Lighting

The Hawthorne Elementary School existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.5 Lowell Elementary School

2.5.1 Description of Building Envelope

The walls of the Lowell Elementary School are composite cavity walls consisting of brick and mortar facade, cavity and concrete masonry CMU back-up blocks and finished interiors in some locations. The exterior walls appear to be in good condition. The roofing system consists of hot tar built up roof with white granular finish and asphalt shingles over pitched roof decks. At the time of the audit, CDM was informed that the flat roof was replaced within the past year, while the asphalt shingles are about 6 years old.

The windows throughout the building are double-paned. The majority of the exterior doors are FRP doors.

It was determined that the building envelope is in good condition and is currently providing a high level of insulation. As such, any modifications to the insulation system would not prove to be cost effective from an energy savings stand-point.

2.5.2 Description of Building HVAC

Two oil-fired cast iron steam boilers located in the boiler room provide heat for the entire building. The steam from the boilers is fed through a heat exchanger to produce hot water for space heating. This water is then circulated through unit ventilators in some of the classrooms. One DX air handling unit located on the roof and two located in the building provide cooled outdoor air throughout the building. An older portion of the building employs steam heating with either unit ventilators or two-pipe steam radiator units.

Ductless split system and through the wall air conditioning units provide cooling for the principal's office, main office, special education rooms, library, server closet, computer room, and nurse's office.

Domestic hot water for this building is produced from a 40 gallon natural gas fired water heater.

2.5.3 Description of Building Lighting

The Lowell Elementary School existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.6 Teaneck High School

2.6.1 Description of Building Envelope

The walls of the Teaneck High School are composite cavity walls consisting of brick and mortar facade, and finished interior. The existing roofing system is about 16 years old and consists of sprayed foam roofing with light gray gravel finish over a flat roof deck. There was evidence of leakage and in general deterioration of the existing system.

The windows throughout the building are double and single paned. The majority of exterior doors are FRP doors. FRP doors are highly recommended from an energy efficiency perspective. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability, as the doors will not expand or contract with changing climate. Weather stripping on these doors appeared to be in poor condition and in need of replacement.


High School Foam Roof Deterioration

It was determined that the building envelope is in fair condition. It is recommended that a qualified roofing contractor evaluate the system, including the structural capacity of the building frame, and repair or replace the existing roofing system with an EPDM membrane roofing system. A roof replacement will be costly; therefore, the system analysis including the structural integrity of the building may warrant the application of an elastomeric waterproof roof coating system to rectify any leaks and improve the level of insulation that the current roof is providing.

2.6.2 Description of Building HVAC

Two oil-fired cast iron steam boilers located in the boiler room provide serve as a heat source for the building. The boilers are dual-fueled and thus have the ability to be fired with natural gas-fired or fuel oil. These boilers operate throughout the year. The steam from the boilers serves a number of purposes. A portion of the steam is fed through a hot water heat exchanger for space heating. This water is circulated through unit ventilators in each classroom. Another portion of the steam serves a separate double wall heat exchanger to generate domestic hot water.

The steam also energizes a single-stage absorption liquid chiller located in the boiler room, which generates chilled water for building cooling. The aforementioned unit ventilators use this chilled water to cool the spaces they are located in. The chiller is typically in operation only during peak conditions in the summer months. A couple of separate screw chillers, located adjacent to the boiler room, are responsible for the majority of the summer cooling load. Air handling units equipped with a DX cooling and hot water coil heating sections are located throughout the building, including the roof. These air handling units provide heating, cooling, or both to the zones they serve.

Ductless split system and through the wall air conditioning units provide cooling for the server closet, main office, principal's office, nurse's office, technical closet, administrative office, and technician's room.

2.6.3 Description of Building Lighting

The Teaneck High School existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.7 Thomas Jefferson Middle School

2.7.1 Description of Building Envelope

The majority of the walls of the Thomas Jefferson Middle School are composite cavity walls consisting of brick and mortar facade, cavity and concrete masonry CMU back-up blocks with interior finishes. The majority of the roofing system consists of hot tar built up roof with white granular finish over a flat roof deck. This system was installed in two phases within the past two years.

The windows throughout the building are double-paned. The majority of the exterior doors are FRP doors.

It was determined that the building envelope is in good condition and is currently providing a high level of insulation. As such, any modifications to the insulation system would not prove to be cost effective from an energy savings stand-point.

2.7.2 Description of Building HVAC

Two oil-fired cast iron steam boilers located in the boiler room provide heat for the entire building. The steam from the boilers is fed through a heat exchanger to produce hot water for space heating. This water is then circulated through unit ventilators in each classroom. Air handling units located throughout the building provide heating and cooling, to the zones they serve. These air handling units have DX cooling coils and hot-water heating coils.

Ductless split system and through the wall air conditioning units provide cooling for the child guidance room, main office, principal's office, server closet, nurse's office, teacher's lounge, and basement computer room.

Unit heaters provide heat for the corridor adjacent to the boiler room and the kitchen office.

Domestic hot water for this building is produced from a 199 MBH gas-fired water heater located in the boiler room.

2.7.3 Description of Building Lighting

The Thomas Jefferson Middle School existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.8 Whittier Elementary School

2.8.1 Description of Building Envelope

The majority of the walls of the Whittier Elementary School are composite cavity walls consisting of brick and mortar facade, cavity and concrete masonry CMU back-up blocks with interior finishes. The majority of the existing roofing system consists of hot tar built up roof with white granular finish and asphalt shingles over pitched roof decks. This system was installed within the past year. The existing (center) portion consists of fully adhered EPDM membrane over flat roof.

The windows throughout the building are double-paned windows. The majority of exterior doors are FRP doors. FRP doors are highly recommended from an energy efficiency perspective. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability, as the doors will not expand or contract with changing climate. Weather stripping on these doors appeared to be in poor condition and in need of replacement.

It was determined that the building envelope is in good condition and is currently providing a high level of insulation. As such, any modifications to the insulation system would not prove to be cost effective from an energy savings stand-point.

2.8.2 Description of Building HVAC

Two oil-fired cast iron steam boilers, located in the boiler room, provide heat for the entire building. Steam from the boilers is fed through a heat exchanger to produce hot water for space heating. This water is then circulated through unit ventilators in each classroom. An older portion of the building employs steam heating with either unit ventilators or two-pipe steam radiator units.

Ductless split system and through the wall air conditioning units provide cooling for the cafeteria, elevator, basement lunch room, main office, principal's office, computer room, child study room, and nurse's office.

Domestic hot water for this building is produced from a 50 gallon natural gas-fired water heater and an 80 gallon electric water heater.

2.8.3 Description of Building Lighting

The Whittier Elementary School existing lighting system consists of 1X4 (1, and 2 lamp), 1X8 (2 lamp), 2X2 (2 lamp), and 2X4 (2, 3, and 4 lamp) T12 linear fluorescent fixtures with magnetic ballasts, 1X4 (2 lamp) T8 linear fluorescent fixtures with electronic ballasts, metal halide fixtures, incandescent fixtures, and CFL fixtures. See Section 4 for a more detailed description.

2.9 Teaneck High School Athletic Field Lighting, Scoreboard, and Well Pump

2.9.1 Description of Press Box Building HVAC

An electric unit heater provides heat for the press box when needed.

2.9.2 Description of Press Box Building Lighting

The existing lighting system in the Press Box consists of incandescent fixtures and CFL fixtures. See Section 4 for a more detailed description.

2.9.3 Description of Athletic Field Lighting

The Athletic Field lighting system consists of four lighting towers, each containing 21 1000 Watt Metal Halide fixtures. See Section 4 for a more detailed description.

2.9.4 Description of Scoreboard

The scoreboard is manufactured by the Fairtron Corporation. Additional information pertaining to the scoreboard was unavailable because equipment tags were missing.

2.9.5 Description of Well Pump

Information on the existing well pump was unavailable.

2.10 Miscellaneous Equipment

The classrooms throughout Teaneck contain computers, printers, TVs and overhead projectors. In addition, the schools also have tech centers and libraries with 20 or more computers in each.

It is recommended that the Board consider implementing the standardized use of Smart Strips. Computer peripherals, such as monitors, printers or scanners, continue to use energy even after they are shut off, which adds up over time. The Smart Strip power strips offer surge protection and the ability to monitor the current on a single 'control' outlet. When the computer that is plugged into that single outlet is shut down the Smart Strip shuts off all of the other peripherals on the power strip. This is discussed further in Section 4.4.

The schools also have office areas and nurse's offices that contain copiers, microwaves, refrigerators, vending machines, soda machines and coffee makers.

The schools kitchens contain a number of appliances including convection ovens, refrigerators, electric warming tables and cabinets and walk-in refrigerators and freezers.

It is recommended that the District implement the standardized use of Energy Star appliances, as the need arises. All of the copiers that were noted during the audit were Energy Star copiers. Energy Star refrigerators and freezers, for example, use up to 40% less energy than models built in 2001. Energy Star appliances will not only reduce the District's utility bills, but will also outperform standard appliances, due to the improved design and advanced technologies.

Section 3
Baseline Energy Use

3.1 Utility Data Analysis

The first step in the energy audit process is the compilation and quantification of the facility's current and historical energy usage and associated utility costs. It is important to establish the existing patterns of electric, gas, and oil usage in order to be able to identify areas in which energy consumption can be reduced.

For this study, the monthly oil, gas, and electric bills per facility were analyzed and unit costs of energy were obtained. The unit cost of energy, as determined from the information provided by the Board of Education, was utilized in determining the feasibility of switching from one energy source to another or reducing the demand on that particular source of energy to create annual cost savings for the Board of Education.

3.1.1 Electric Charges

It is important to understand how the utility companies charge for the service. The majority of the energy consumed is electric, as a result of both indoor and outdoor lighting, heating, ventilating and air-conditioning equipment. Electricity is charged by three basic components: electrical consumption (kWH), electrical demand (kW) and power factor (kVAR) (reactive power). The cost for electrical consumption is similar to the cost for fuel oil. The monthly consumption appears on the utility bill as kWH consumed per month with a cost figure associated with it. The service connections are either billed on a flat rate or time of day rates per kWH.

Electrical demand can be as much as 50 percent or more of the electric bill. The maximum demand (kW value) during the billing period is multiplied by the demand cost factor and the result is added to the electric bill. It is often possible to decrease the electric bill by 15 - 25 percent by reducing the demand, while still using the same amount of energy.

The power factor (reactive power) is the power required to energize electric and magnetic fields that result in the production of real power. Power factor is important because transmission and distribution systems must be designed and built to manage the need for real power as well as the reactive power component (the total power). If the power factor is low, then the total power required can be greater than 50 percent or more than the real power alone. The power factor charge is a penalty for having a low power factor. This penalty does not affect the Board.

The other parts of the electric bill are the supply charges, delivery charges, system benefits, transmission revenue adjustments, state and municipality tariff surcharges and sales taxes, which cannot be avoided.

PSE&G is the current supplier and distributor of electric energy for the Teaneck Board of Education.

3.1.2 Natural Gas Charges

PSE&G is the current supplier and distributor of natural gas for the school facilities. The school facilities are charged for the cost of the natural gas, a delivery charge and a customer charge, which covers gas administration charges.

3.1.3 Oil Charges

Allied Oil LLC and Rachles/Michele's Oil Company are the current suppliers and distributors of oil for the school facilities. The school facilities are charged for oil by the gallon.

3.2 Facility Results

3.2.1 Benjamin Franklin Middle School

Electric power for the Benjamin Franklin Middle School Building is fed from one General Secondary Service three phase line from PSE&G. The Benjamin Franklin Middle School also has generation supplied by South Jersey Energy. Figure 3.2-1 illustrates the average monthly total energy consumption from January 2008 through December 2009. For example, for the month of October, the bar graph represents average energy consumption for October 2008 and October 2009. This same graphical representation approach has been carried through for all months and is typical for all graphs presented in this Section. Electrical usage has been averaged by month for the above referenced time period to portray a more encompassing monthly usage trend.

From this graph, it can be determined that the average annual electrical consumption for the Benjamin Franklin Middle School is approximately 71,421 kWh / month. An unexpected peak in electrical consumption in October should be investigated further by the Board. Lowering the electrical consumption in October could result in significant energy cost savings.

Figure 3.2-1: Benjamin Franklin Middle School Electrical Usage

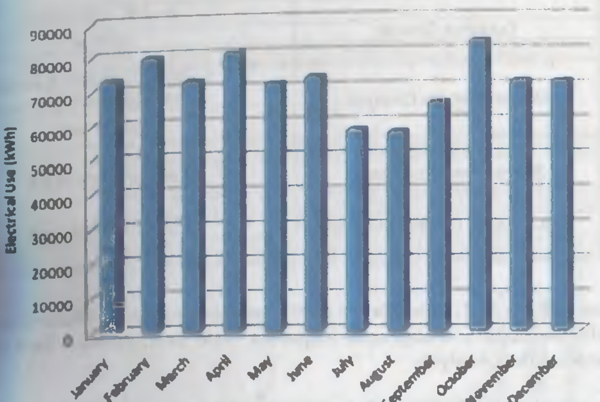
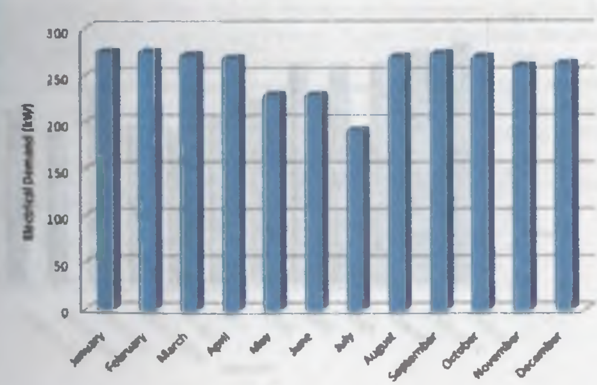


Figure 3.2-2 illustrates the average monthly demand load for the Benjamin Franklin Middle School from January 2008 through December 2009.

Figure 3.2-2: Benjamin Franklin Middle School Maximum Monthly Demand



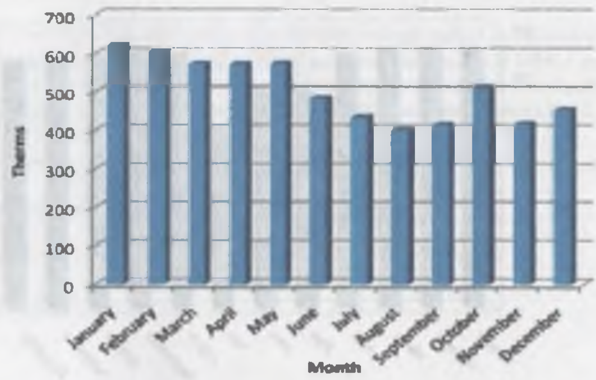
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 4200067818
Customer Charge:	$374.60
Delivery Service Charges:	$0.005101024/kWh On-Peak $0.005100[illegible]/kWh Off-Peak
	$3.247/kW
Societal Benefits Charge:	$0.007[illegible]060/kWh
Securitization Transition Charge:	$0.010[illegible]3844/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

The gas usage for the Benjamin Franklin Middle School is metered at one location. The monthly average gas consumption from July 2007 through December 2009 at the school is illustrated in Figure 3.2-3.

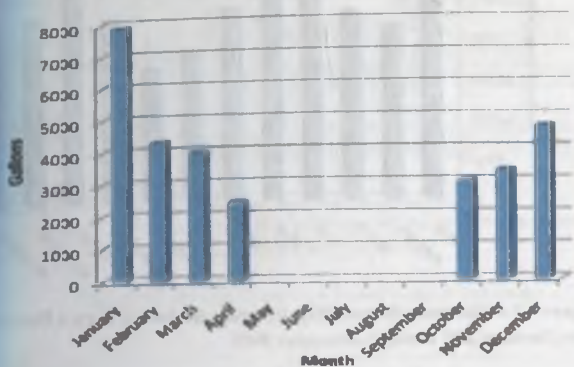
Figure 3.2-3: Benjamin Franklin Middle School Natural Gas Usage



For more information on the Benjamin Franklin Middle School's gas usage, refer to Section 4.3.

The oil usage for the Benjamin Franklin Middle School is metered at one location. The monthly average oil consumption from November 2007 through December 2009 at the school is illustrated in Figure 3.2-4.

Figure 3.2-4: Benjamin Franklin Middle School Oil Usage



3.2.2 Bryant Elementary School

Electric power for the Bryant Elementary School is fed from one General Secondary Service three phase line from PSE&G. The Bryant Elementary School also has generation supplied by South Jersey Energy. Figure 3.2-5 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Bryant Elementary School is approximately 24,453 kWh / month. Unexpected peaks in electrical consumption in April and October, and electrical demand in May should be investigated further by the Board. Lowering the electrical consumption in April and October and the electrical demand in May could result in significant energy cost savings.

Figure 3.2-5: Bryant Elementary School Electrical Usage

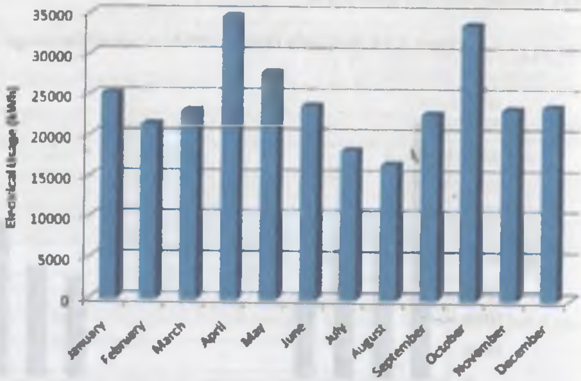
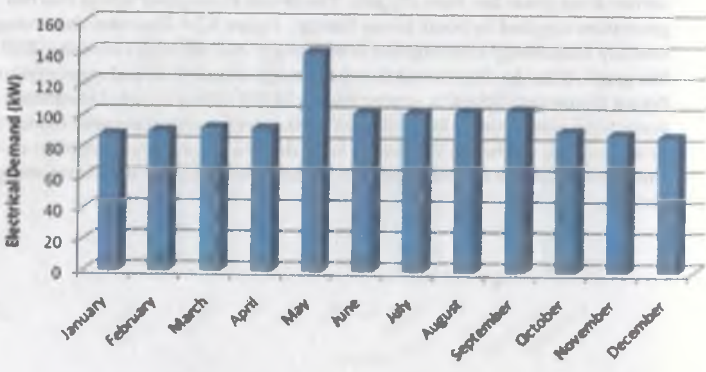


Figure 3.2-6 illustrates the monthly demand load for the Bryant Elementary School from January 2008 through December 2009.

Figure 3.2-6: Bryant Elementary School Maximum Monthly Demand



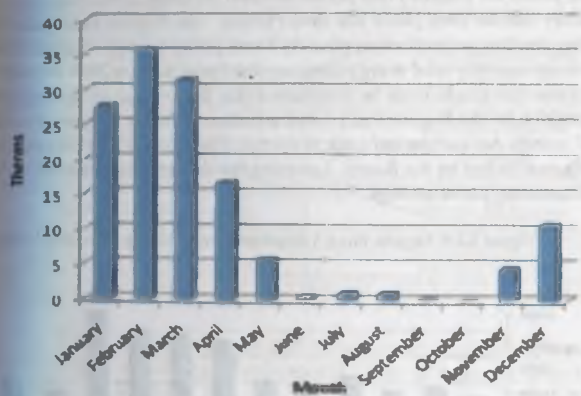
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 6882867166
Customer Charge:	$10.12
Delivery Service Charges:	$0.008990181/kWh
	$3.92/kW
Societal Benefits Charge:	$0.00758976/kWh
Securitization Transition Charge:	$0.010353852/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

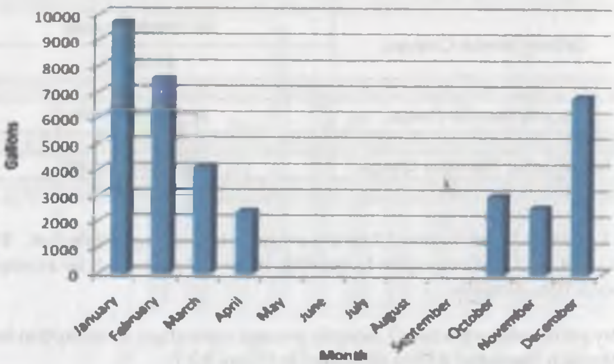
The Bryant Elementary School's monthly average natural gas consumption from July 2007 through December 2009 is illustrated in Figure 3.2-7.

Figure 3.2-7: Bryant Elementary School Natural Gas Usage



The oil usage for the Bryant Elementary School is metered at one location. The monthly average oil consumption from November 2007 through December 2009 at the school is illustrated in Figure 3.2-8.

Figure 3.2-8: Bryant Elementary School Oil Usage



3.2.3 Eugene Field Administration Building

Electric power for Eugene Field Administration Building is fed from one General Secondary Service three phase line from PSE&G. The Eugene Field Administration Building also has generation supplied by South Jersey Energy. Figure 3.2-9 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Eugene Field Administration Building is approximately 28,670 kWh / month. An unexpected peak in electrical demand in May should be investigated further by the Board. Lowering the demand in May could result in significant energy cost savings.

Figure 3.2-9: Eugene Field Administration Building Electrical Usage

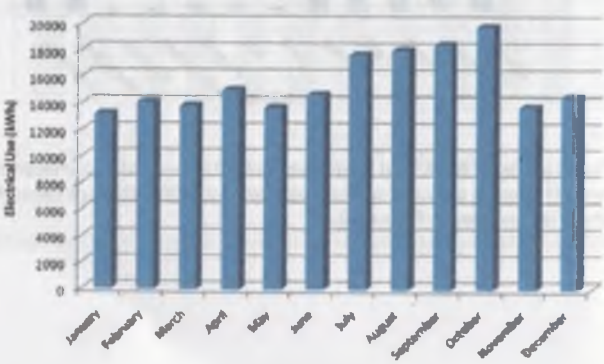
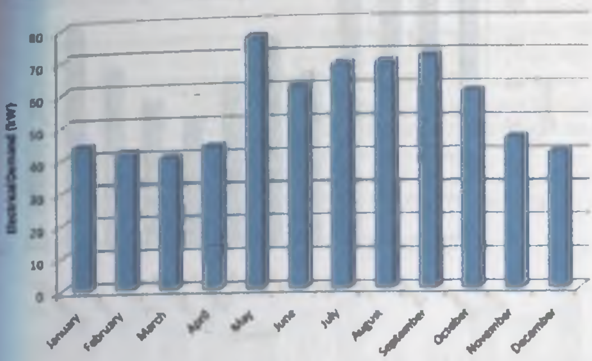


Figure 3.2-10 illustrates the monthly demand load for the Eugene Field Administration Building from January 2008 through December 2009.

Figure 3.2-10: Eugene Field Administration Building Maximum Monthly Demand



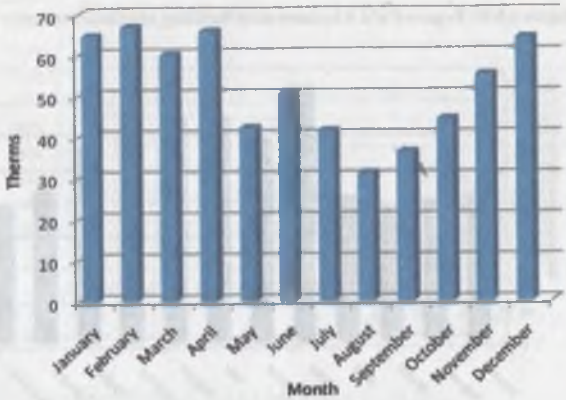
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 6642121902
Customer Charge:	$4.27
Delivery Service Charges:	$0.008990092/kWh
	$3.92/kW
Societal Benefits Charge:	$0.007568294/kWh
Securitization Transition Charge:	$0.010353857/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

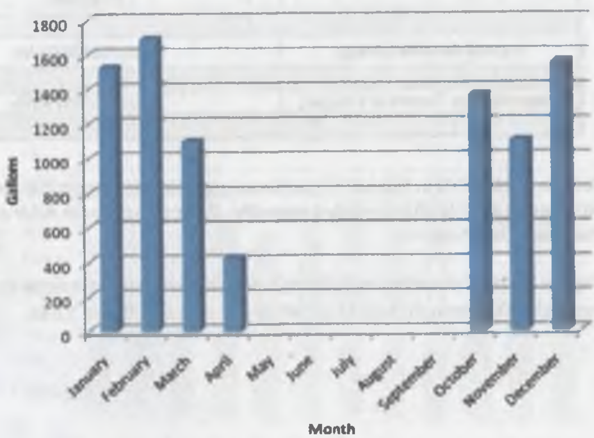
Eugene Field Administration Building's monthly average natural gas consumption from July 2007 through December 2009 is illustrated in Figure 3.2-11.

Figure 3.2-11: Eugene Field Administration Building Natural Gas Usage



The oil usage for the Eugene Field Administration Building is metered at one location. The monthly average oil consumption from November 2007 through December 2009 at the school is illustrated in Figure 3.2-12.

Figure 3.2-12: Eugene Field Administration Building Oil Usage



3.2.4 Hawthorne Elementary School

Electric power for the Hawthorne Elementary School is fed from one General Secondary Service line from PSE&G. The Hawthorne Elementary School also has generation supplied by South Jersey Energy. Figure 3.2-13 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Hawthorne Elementary School is approximately 32,470 kWh / month. An unexpected peak in electrical demand in May should be investigated further by the Board. Lowering the demand in May could result in significant energy cost savings.

Figure 3.2-13: Hawthorne Elementary School Electrical Usage

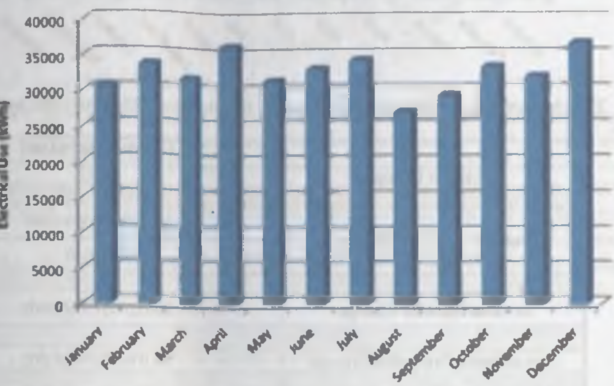
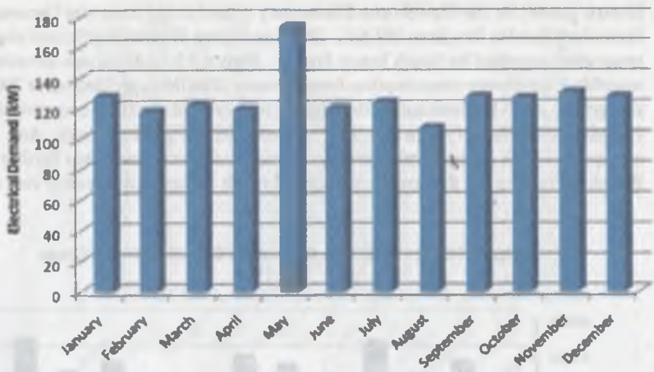


Figure 3.2-14 illustrates the monthly demand load for the Hawthorne Elementary School from January 2008 through December 2009.

Figure 3.2-14: Hawthorne Elementary School Maximum Monthly Demand



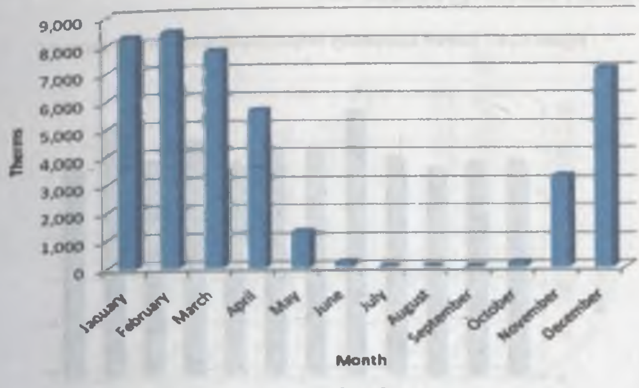
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 6756264303
Customer Charge:	$4.27
Delivery Service Charges:	$0.006990096/kWh
	$3.92/kW
Societal Benefits Charge:	$0.007567912/kWh
Securitization Transition Charge:	$0.010353990/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Hawthorne Elementary School's monthly average natural gas consumption from July 2007 through December 2009 is illustrated in Figure 3.2-15.

Figure 3.2-15: Hawthorne Elementary School Natural Gas Usage



3.2.5 Lowell Elementary School

Electric power for the Lowell Elementary School is fed from one General Secondary Service three phase line from PSE&G. The Lowell Elementary School also has generation supplied by South Jersey Energy. Figure 3.2-16 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Lowell Elementary School is approximately 23,971 kWh / month. An unexpected peak in electrical consumption in electrical demand in May should be investigated further by the Board. Lowering the electrical demand in May could result in significant energy cost savings.

Figure 3.2-16: Lowell Elementary School Electrical Usage

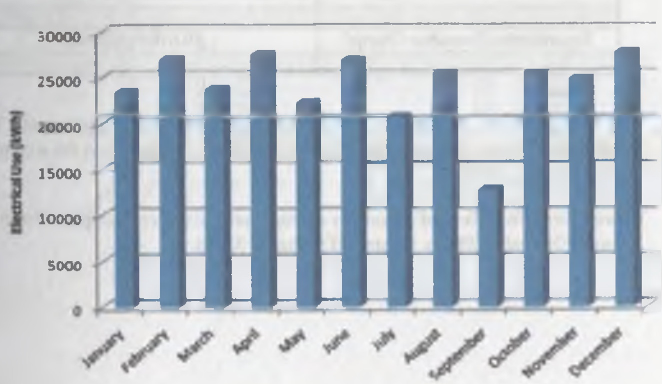


Figure 3.2-17 illustrates the monthly demand load for the Lowell Elementary School from January 2008 through December 2009.

Figure 3.2-17: Lowell Elementary School Maximum Monthly Demand

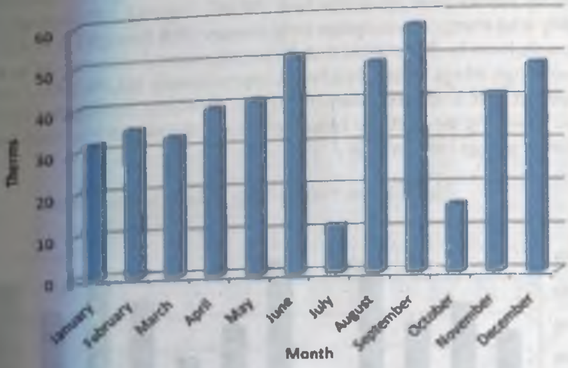
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 6590052301
Customer Charge:	$4.27
Delivery Service Charges:	$0.008946429/kWh (First 2240) $0.008990017/kWh (After 2240)
	$3.92/kW
Societal Benefits Charge:	$0.007568038/kWh
Securitization Transition Charge:	$0.010354035/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

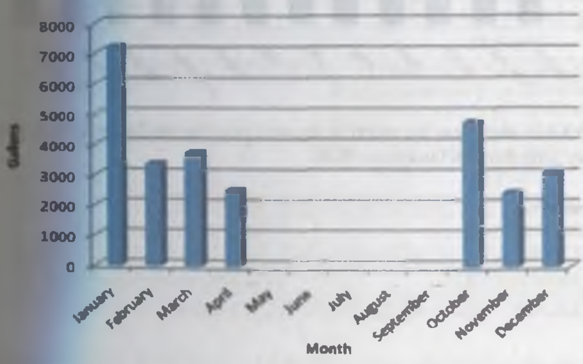
Lowell Elementary School's monthly average natural gas consumption from July 2007 through December 2009 is illustrated in Figure 3.2-18.

Figure 3.2-18: Lowell Elementary School Natural Gas Usage



The oil usage for the Lowell Elementary School is metered at one location. The monthly average oil consumption from November 2007 through December 2009 at the school is illustrated in Figure 3.2-19.

Figure 3.2-19: Lowell Elementary School Oil Usage



3.2.6 Teaneck High School - Main Building

Electric power for the Teaneck High School - Main Building is fed from one General Secondary Service three phase line from PSE&G. Figure 3.2-20 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Teaneck High School - Main Building is approximately 163,786 kWh / month. An unexpected peak in electrical demand in May should be investigated further by the Board. Lowering the electrical consumption and demand in May could result in significant energy cost savings.

Figure 3.2-20: Teaneck High School Electrical Usage

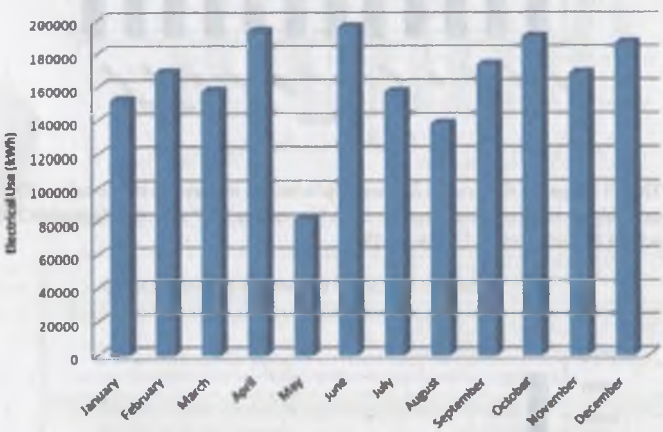
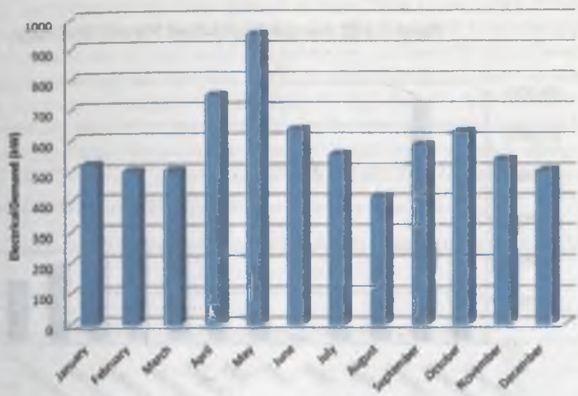


Figure 3.2-21 illustrates the monthly demand load for the Teaneck High School from January 2008 through December 2009.

Figure 3.2-21: Teaneck High School Maximum Monthly Demand



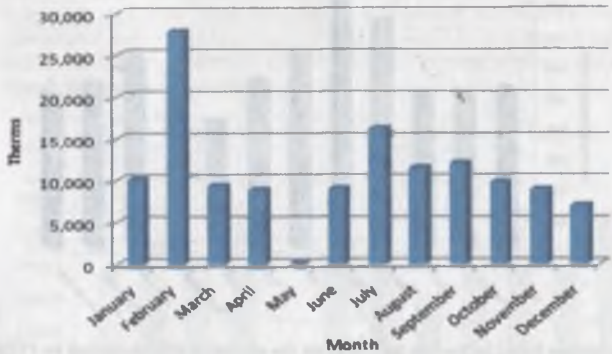
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 4200312018
Customer Charge:	$374.60
Basic Generation Service:	$0.10389401/kWh (First 72519 kWh On Peak) $0.10314687/kWh (First 32340 kWh On Peak) $0.07437209/kWh (First 38995 kWh Off Peak) $0.07362508/kWh (First 22725 kWh Off Peak)
	$6.80/kW
Delivery Service Charges:	$0.00505946/kWh (First 72519 kWh On Peak) $0.00510084/kWh (First 32340 kWh On Peak) $0.00505902/kWh (First 38995 kWh Off Peak) $0.00510357/kWh (First 22725 kWh Off Peak)
	$3.25/kW
Societal Benefits Charge:	$0.007568001/kWh
Securitization Transition Charge:	$0.10354006/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

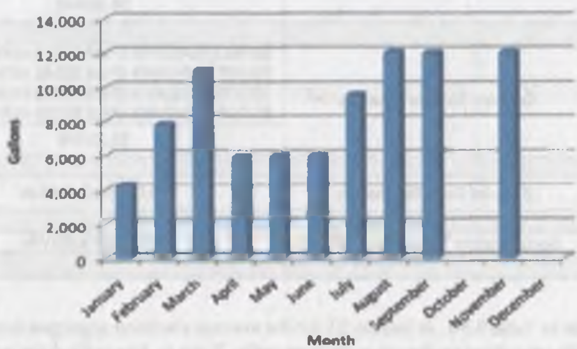
Teaneck High School's monthly average natural gas consumption from July 2007 through December 2009 is illustrated in Figure 3.2-22.

Figure 3.2-22: Teaneck High School Natural Gas Usage



The oil usage for the High School is metered at one location. The monthly oil consumption from January 2008 through December 2008 at the school is illustrated in Figure 3.2-23.

Figure 3.2-23: Teaneck High School Oil Usage



3.2.7 Teaneck High School - Athletic Field Lighting

Electric power for the Teaneck High School - Athletic Field Lighting is fed from one General Secondary Service three phase line from PSE&G. The Teaneck High School - Athletic Field Lighting also has generation supplied by South Jersey Energy. Figure 3.2-24 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Teaneck High School - Athletic Field Lighting is approximately 486 kWh / month. A peak in electrical usage and demand from September to December can be attributed to the fall sports program, along with shorter daylight hours. The unexpected spike in electrical demand in July should be investigated by the School District.

Figure 3.2-24: Teaneck High School - Athletic Field Lighting Electrical Usage

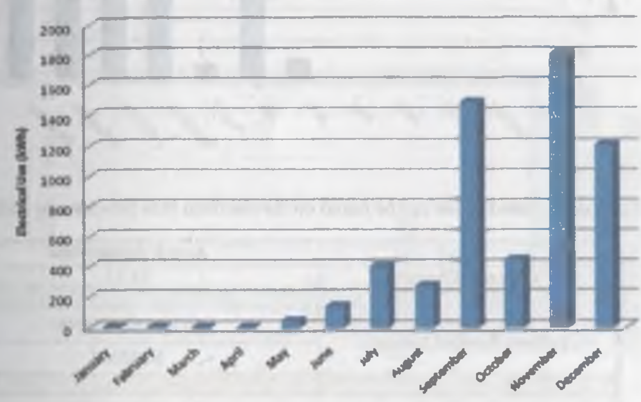
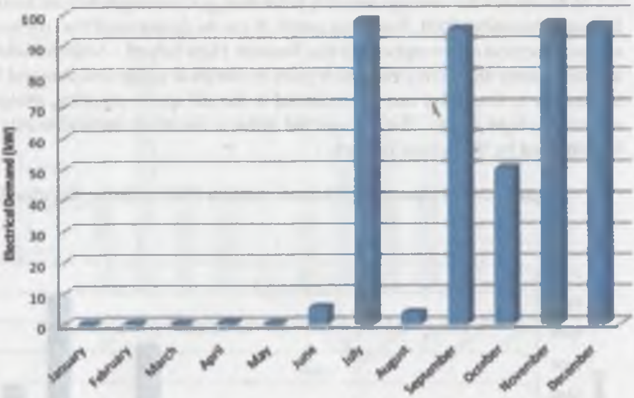


Figure 3.2-25 illustrates the monthly demand load for the Teaneck High School - Athletic Field Lighting from January 2008 through December 2009.

Figure 3.2-25: Teaneck High School - Athletic Field Lighting Maximum Monthly Demand



The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 6580617094
Customer Charge:	$4.27
Delivery Service Charges:	$0.008990854/kWh
	$3.92/kW
Societal Benefits Charge:	$0.007587073/kWh
Securitization Transition Charge:	$0.010353659/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

3.2.8 Teaneck High School - Scoreboard

Electric power for the Teaneck High School - Scoreboard is fed from one General Secondary Service three phase line from PSE&G. Figure 3.2-26 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Teaneck High School is approximately 441 kWh / month. An unexpected peak in electrical demand in June and July should be investigated further by the Board. A peak in electrical usage and demand from September to November can be attributed to the fall sports program, along with shorter daylight hours. The unexpected spike in electrical demand in June and July should be investigated by the School District.

Figure 3.2-26: Teaneck High School - Scoreboard Electrical Usage

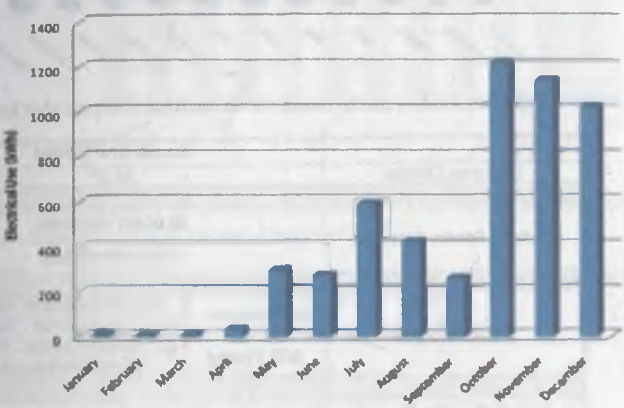
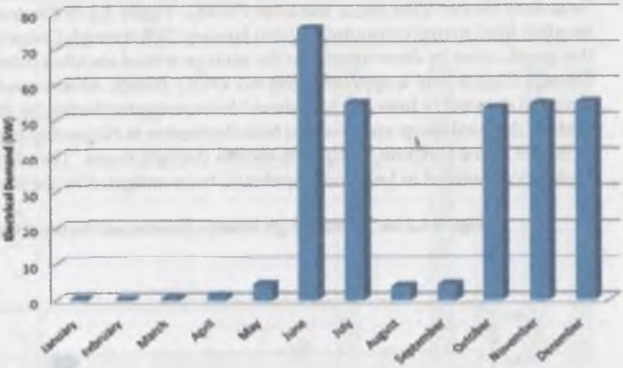


Figure 3.2-27 illustrates the monthly demand load for the Teaneck High School - Scoreboard from January 2008 through December 2009.

Figure 3.2-27: Teaneck High School - Scoreboard Maximum Monthly Demand



The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 6747639304	
Customer Charge:	$4.27	
Delivery Service Charges:	$0.008971963/kWh	
	$3.920560748/kW	
Supply Charges:	BGS Capacity	$5.123639960/kW - Generation
		$1.673790776/kW - Transmission
	BGS Energy	$0.088695652/kWh - First 69 kWh
		$0.089473684/kWh - Next
Societal Benefits Charge:	$0.007570093/kWh	
Securitization Transition Charge:	$0.010373832/kWh	

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

3.2.9 Thomas Jefferson Middle School

Electric power for Thomas Jefferson Middle School is fed from one General Secondary Service three phase line from PSE&G. The Thomas Jefferson Middle School also has generation supplied by South Jersey Energy. Figure 3.2-28 illustrates the average monthly total energy consumption from July 2007 through March 2009. From this graph, it can be determined that the average annual electrical consumption for the Thomas Jefferson Middle School is approximately 64,967 kWh / month.

Figure 3.2-28: Thomas Jefferson Middle School Electrical Usage

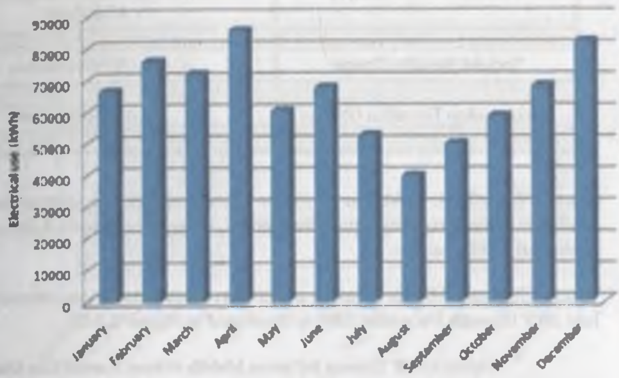
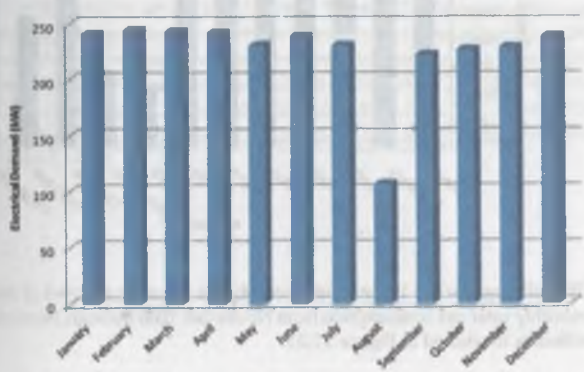


Figure 3.2-29 illustrates the monthly demand load for the Thomas Jefferson Middle School from January 2008 through December 2009.

Figure 3.2-29: Thomas Jefferson Middle School Maximum Monthly Demand



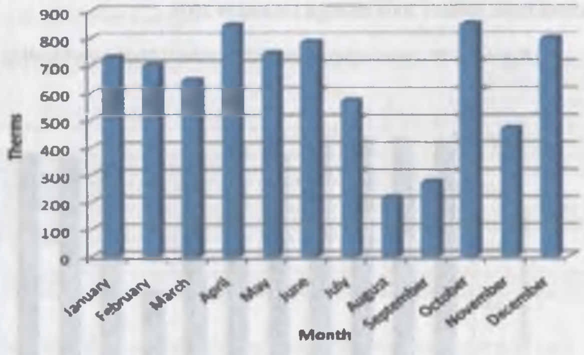
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 4200398818
Customer Charge:	$449.52
Delivery Service Charges:	$0.005100995/kWh (First 58320) $0.005100962/kWh (After 31200)
	$3.896/kW
Societal Benefits Charge:	$0.007568029/kWh
Securitization Transition Charge:	$0.010353999/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

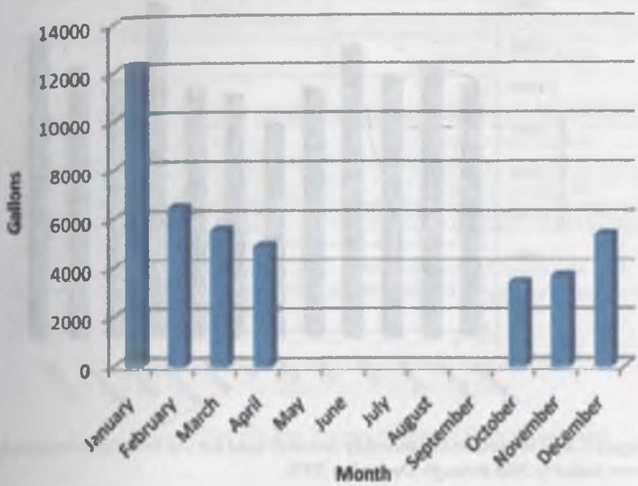
Thomas Jefferson Middle School's monthly average natural gas consumption from July 2007 through December 2009 is illustrated in Figure 3.2-30.

Figure 3.2-30: Thomas Jefferson Middle School Natural Gas Usage



The oil usage for the Thomas Jefferson Middle School is metered at one location. The monthly total gas consumption from November 2008 through December 2009 at the school is illustrated in Figure 3.2-31.

Figure 3.2-31: Thomas Jefferson Middle School Oil Usage



3.2.10 Whittier Elementary School

Electric power for the Whittier Elementary School is fed from one General Secondary Service three phase line from PSE&G. The Whittier Elementary School also has generation supplied by South Jersey Energy. Figure 3.2-32 illustrates the average monthly total energy consumption from January 2008 through December 2009. From this graph, it can be determined that the average annual electrical consumption for the Whittier Elementary School is approximately 31,406 kWh / month. Unexpected peaks in electrical consumption in electrical demand in May should be investigated further by the Board. Lowering the electrical demand in May could result in significant energy cost savings.

Figure 3.2-32: Whittier Elementary School Electrical Usage

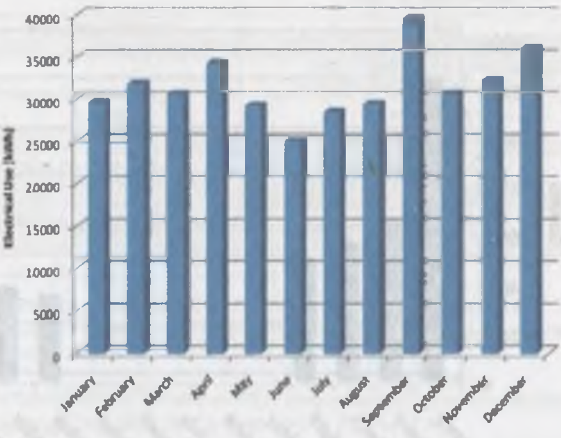
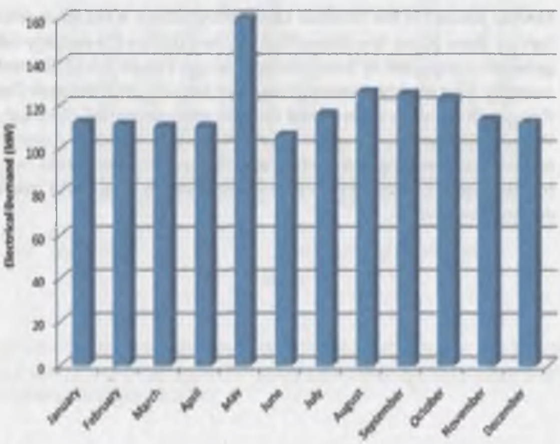


Figure 3.2-33 illustrates the monthly demand load for the Whittier Elementary School from January 2008 through December 2009.

Figure 3.2-33: Whittier Elementary School Maximum Monthly Demand



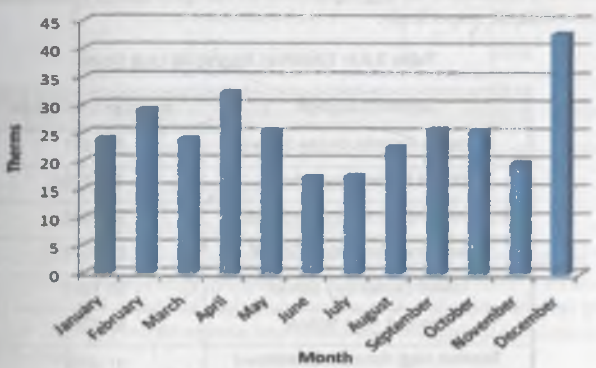
The charges listed below can be found on the electrical bills provided by PSE&G.

	Acct #: 6612801603
Customer Charge:	$4.27
Delivery Service Charges:	$0.008990051/kWh
	$3.92/kW
Societal Benefits Charge:	$0.007568112/kWh
Securitization Transition Charge:	$0.010354082/kWh

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

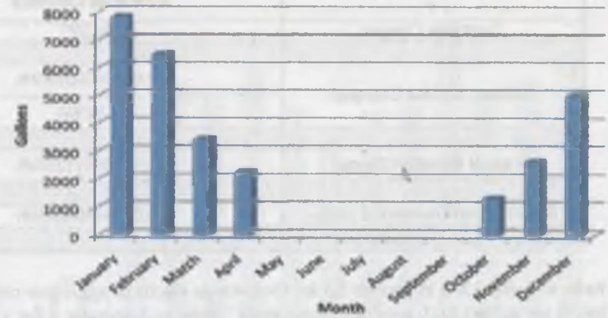
Whittier Elementary School's monthly average natural gas consumption from July 2007 through December 2009 is illustrated in Figure 3.2-34.

Figure 3.2-34: Whittier Elementary School Natural Gas Usage



The oil usage for the Whittier Elementary School is metered at one location. The monthly total gas consumption from July 2008 through October 2009 at the school is illustrated in Figure 3.2-35.

Figure 3.2-35: Whittier Elementary School Oil Usage



3.3 Aggregate Costs

For the purposes of computing energy savings for all identified energy conservation and retrofit measures, aggregate unit costs for electrical energy and fuel, in terms of cost/kWH and cost/therm, were determined for each service location and utilized in the simple payback analyses discussed in subsequent sections. The aggregate unit cost accounts for all distribution and supply charges for each location. Table 3.3-1 and Table 3.3-2 summarize the aggregate costs for electrical energy consumption and therms utilized, respectively.

Table 3.3-1: Electrical Aggregate Unit Costs

Service Location	Aggregate $ / kW-hr
Benjamin Franklin Middle School	$0.1541
Bryant Elementary School	$0.1730
Eugene Field Administration Building	$0.1648
Hawthorne Elementary School	$0.1648
Lowell Elementary School	$0.1876
Teaneck High School	$0.1589
Teaneck High School - Scoreboard	$1.0689
Teaneck High School - Athletic Field Lights	$2.1980
Thomas Jefferson Middle School	$0.1781
Whittier Elementary School	$0.1667

Table 3.3-2: Natural Gas Aggregate Unit Costs

Service Location	Aggregate $ / therm
Benjamin Franklin Middle School	$1.26
Bryant Elementary School	$2.41
Eugene Field Administration Building	$1.42
Hawthorne Elementary School	$1.25
Lowell Elementary School	$1.40
Teaneck High School	$1.08
Thomas Jefferson Middle School	$1.24
Whittier Elementary School	$1.60

Table 3.3-3: Oil Aggregate Unit Costs

Service Location	Aggregate $ / gallon
Benjamin Franklin Middle School	$2.31
Bryant Elementary School	$2.32
Eugene Field Administration Building	$2.30
Lowell Elementary School	$2.36
Teaneck High School	$3.33
Thomas Jefferson Middle School	$2.40
Whittier Elementary School	$2.37

3.4 Portfolio Manager

3.4.1 Portfolio Manager Overview

Portfolio Manager is an interactive energy management tool that allows Teaneck BOE to track and assess energy consumption at the school facilities in a secure online environment. Portfolio Manager can help Teaneck BOE set investment priorities, verify efficiency improvements, and receive EPA recognition for superior energy performance.

3.4.2 Energy Performance Rating

For many facilities, you can rate their energy performance on a scale of 1–100 relative to similar facilities nationwide. Your facility is *not* compared to the other facilities entered into Portfolio Manager to determine your ENERGY STAR rating. Instead, statistically representative models are used to compare your facility against similar facilities from a national survey conducted by the Department of Energy's Energy

Information Administration. This national survey, known as the Commercial Building Energy Consumption Survey (CBECS), is conducted every four years, and gathers data on building characteristics and energy use from thousands of facilities across the United States. Your facility's peer group of comparison is those facilities in the CBECS survey that have similar facility and operating characteristics. A rating of 50 indicates that the facility, from an energy consumption standpoint, performs better than 50% of all similar facilities nationwide, while a rating of 75 indicates that the facility performs better than 75% of all similar facilities nationwide.

3.4.3 Portfolio Manager Account Information

A Portfolio Manager account has been established for Teaneck Board of Education, which includes a profile for the eight (8) buildings. Information entered into this Portfolio Manager Facility profile, including electrical energy consumption and natural gas consumption has been used to establish a performance baseline.

It is recommended that the information be updated each month to track the buildings' energy usage. Only Eugene Field Administration Building was eligible for an energy star label and rating. At the time of the audit the Administration Building received a rating of 82. This information would have to be confirmed in order to apply for an energy star label.

Appendix B contains the Statement of Energy Performance developed for the Administration Building and a Portfolio Manager Reference sheet.

The following website link, username and password shall be used to access the Portfolio Manager account and building profiles that has been established for the Board:

https://www.energystar.gov/istar/pmpam/

USERNAME: Teaneck1

PASSWORD: EnergyStar

Section 4
Energy Conservation and Retrofit Measures (ECRM)

4.1 Building Lighting Systems

4.1.1 Benjamin Franklin Middle School

It is recommended that the existing lighting system at the Benjamin Franklin Middle School, as discussed in Section 2.1.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-1 below.

Table 4.1-1 Benjamin Franklin Middle School Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 83.7 kW, 276,772 kWh and $42,650

Exterior Lighting: 4.2 kW, 21,242 kWh and $3,273

The following table, Table 4.1-2, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Benjamin Franklin Middle School. Included in this simplified payback analysis summary table is the 'Annual Return on Investment' (AROI) values. This value is a performance measure used to evaluate the efficiency of an investment and is calculated using the following equation:

$$AROI = \frac{AECS + OCS}{NET\ ECM\ Cost} - \frac{1}{Lifetime}$$

Where OCS = Operating Cost Savings, and AECS = Annual Energy Cost Savings.

Also included in the table are net present values for each option. The NPV calculates the present value of an investment's future cash flows based on the time value of money, which is accounted for by a discount rate (DR) (assume bond rate of 3%). NPV is calculated using the following equation:

$$NPV = \sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$$

Where Cn=Annual cash flow, and N = number of years.

The IRR expresses an annual rate that results in a break-even point for the investment. If the BOE is currently experiencing a lower return on their capital than the IRR, the project is financially advantageous. This measure also allows the BOE to compare ECM's against each other to determine the most appealing choices.

$$IRR \rightarrow 0 = \sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$$

Where Cn=Annual cash flow, and N = number of years.

The lifetime energy savings represents the cumulative energy savings over the assumed life of the ECM.

Table 4.1-2
Benjamin Franklin Middle School Lighting System Improvements***

	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$329,261.5	$82,692.2	$411,953.7
New Jersey SmartStart Rebate	-$21,135*	-$0*	-$21,135*
Total Cost	$308,126.5	$82,692.2	$390,818.7
Annual Energy Savings	$42,650.3	$3,273.4	$45,923.7
Annual Maintenance Cost Savings (AMCS)	$6,576	$46.49	$6,622.1
Simple Payback	**6.3 years**	**24.9 years**	**7.4 years**
Annual Return on Investment (AROI)	9.31%	-2.65%	6.76%
Lifetime Energy Savings (15 years)**	$793,249.3	$60,881.7	$854,131
Internal Rate of Return (IRR)	16.44%	-3.25%	13.17%
Net Present Value (NPV)	$408,756.1	-$34,344.3	$374,411.8

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.2 Bryant Elementary School

It is recommended that the existing lighting system at the Bryant Elementary School, as discussed in Section 2.2.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-3 below.

Table 4.1-3 Bryant Elementary School Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 25.9 kW, 87,307.4 kWh and $15,103.5

Exterior Lighting: 0.5 kW, 2,503.9 kWh and $433.2

The following table, Table 4.1-4, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Bryant Elementary School.

Table 4.1-4 Bryant Elementary School Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$99,705.7	$19,843.3	$119,549
New Jersey SmartStart Rebate	-$23,230*	-$0*	-$23,230*
Total Cost	$76,475.7	$19,843.3	$96,319
Annual Energy Savings	$15,103.5	$433.2	$15,536.6
Annual Maintenance Cost Savings (AMCS)	$2,713.1	$42.05	$2,755.2
Simple Payback	**4.3 years**	**41.8 years**	**5.3 years**
Annual Return on Investment (AROI)	16.63%	-4.27%	12.32%
Lifetime Energy Savings (15 years)**	$280,908.7	$8,057	$288,964
Internal Rate of Return (IRR)	25.02%	-8.31%	20.09%
Net Present Value (NPV)	$182,989.9	-$12,922.2	$170,066.3

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.3 Eugene Field Administration Building

It is recommended that the existing lighting system at the Eugene Field Administration Building, as discussed in Section 2.3.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-5 below.

Table 4.1-5 Eugene Field Administration Building Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 12.4 kW, 39,955.7 kWh and $6,586.3

Exterior Lighting: 1.6 kW, 7,920.5 kWh and $1,305.6

The following table, Table 4.1-6, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Eugene Field Administration Building.

Table 4.1-6

Eugene Field Administration Building Lighting System Improvements***

	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$45,476.8	$14,794.8	$60,271.5
New Jersey SmartStart Rebate	-$4,125*	-$0*	-$4,125*
Total Cost	$41,351.8	$14,794.8	$56,146.5
Annual Energy Savings	$6,586.3	$1,305.6	$7,891.9
Annual Maintenance Cost Savings (AMCS)	$748.29	$25.51	$773.8
Simple Payback	**5.6 years**	**11.1 years**	**6.5 years**
Annual Return on Investment (AROI)	11.07%	2.33%	8.77%
Lifetime Energy Savings (15 years)**	$122,498	$24,282	$146,780.8
Internal Rate of Return (IRR)	18.60%	6.69%	15.76%
Net Present Value (NPV)	$65,462.6	$4,590.3	$70,053

* Additional Incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.4 Hawthorne Elementary School

It is recommended that the existing lighting system at the Hawthorne Elementary School, as discussed in Section 2.4.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-7 below.

Table 4.1-7
Hawthorne Elementary School Lighting System Improvements

Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 16.8 kW, 56,096.5 kWh and $9,248.8

Exterior Lighting: 0.9 kW, 4,650.1 kWh and $766.7

The following table, Table 4.1-8, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Hawthorne Elementary School.

Table 4.1-8
Hawthorne Elementary School Lighting System Improvements***

	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$71,618.4	$36,851.8	$108,470.2
New Jersey SmartStart Rebate	-$4,635*	-$0*	-$4,635*
Total Cost	$66,983.4	$36,851.8	$103,835.2
Annual Energy Savings	$9,248.8	$766.7	$10,015.5
Annual Maintenance Cost Savings (AMCS)	$1,191	$9.49	$1,200.5

Table 4.1-8
Hawthorne Elementary School Lighting System Improvements***

Simple Payback	**6.4 years**	**47.5 years**	**9.3 years**
Annual Return on Investment (AROI)	8.92%	-4.56%	4.14%
Lifetime Energy Savings (15 years)**	$172,018	$14,259.8	$186,277.4
Internal Rate of Return (IRR)	15.95%	NA	9.47%
Net Present Value (NPV)	$85,052.5	-$25,548.1	$59,504.5

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.5 Lowell Elementary School

It is recommended that the existing lighting system at Lowell Elementary School, as discussed in Section 2.5.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-9 below.

Table 4.1-9
Lowell Elementary School Lighting System Improvements

Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 10.0 kW, 34,828.5 kWh and $6,534.3

Exterior Lighting: 1.4 kW, 6,929.2 kWh and $1,300

The following table, Table 4.1-10, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Lowell Elementary School.

Table 4.1-10
Lowell Elementary School Lighting System Improvements***

	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$44,335.4	$33,663.4	$77,998.8
New Jersey SmartStart Rebate	-$3,710*	-$0*	-$3,710*
Total Cost	$40,625.4	$33,663.4	$74,288.8
Annual Energy Savings	$6,534.3	$1,300	$7,834.3
Annual Maintenance Cost Savings (AMCS)	$505.5	$15.2	$520.7
Simple Payback	**5.8 years**	**25.6 years**	**9.9 years**
Annual Return on Investment (AROI)	10.66%	-2.76%	4.58%
Lifetime Energy Savings (15 years)**	$121,530.9	$24,179	$145,709.5
Internal Rate of Return (IRR)	16.10%	-3.53%	10.12%
Net Present Value (NPV)	$61,895.2	-$14,509.7	$47,385.7

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.6 Teaneck High School

It is recommended that the existing lighting system at the Teaneck High School, as discussed in Section 2.6.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-11 below.

Table 4.1-11 Teaneck High School Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 38.4kW, 120,609.7 kWh and $19,168.1

Exterior Lighting: 1.2 kW, 6,326.2 kWh and $1,005.4

The following table, Table 4.1-12, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Teaneck High School.

Table 4.1-12 Teaneck High School Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$122,876.8	$31,876.6	$154,753.3
New Jersey SmartStart Rebate	-$11,850*	-$0*	-$11,850*
Total Cost	$111,026.8	$31,876.6	$142,903.3
Annual Energy Savings	$19,168.1	$1,005.4	$20,173.5
Annual Maintenance Cost Savings (AMCS)	$1,452.6	$124.7	$1,577.3
Simple Payback	**5.4 years**	**28.2 years**	**6.6 years**
Annual Return on Investment (AROI)	11.91%	-3.12%	8.65%
Lifetime Energy Savings (15 years)**	$356,505.8	$18,699.4	$375,205.2
Internal Rate of Return (IRR)	19.60%	-4.54%	15.46%
Net Present Value (NPV)	$189,274.8	-$15,418.7	$173,856.4

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.7 Thomas Jefferson Middle School

It is recommended that the existing lighting system at the Thomas Jefferson Middle School, as discussed in Section 2.7.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-13 below.

Table 4.1-13
Thomas Jefferson Middle School Lighting System Improvements

Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 41.5 kW, 138,055.2 kWh and $24,587.2

Exterior Lighting: 1.2 kW, 6,132 kWh and $1,092.1

The following table, Table 4.1-14, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Thomas Jefferson Middle School.

Table 4.1-14 Thomas Jefferson Middle School Lighting System Improvements***			
	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$203,239.5	$25,798.8	$229,038.3
New Jersey SmartStart Rebate	-$15,735*	-$0*	-$15,735*
Total Cost	$187,504.5	$25,798.8	$213,303.3
Annual Energy Savings	$24,587.2	$1,092.1	$25,679.3
Annual Maintenance Cost Savings (AMCS)	$2,203.7	$6.13	$2,209.8
Simple Payback	**7.0 years**	**23.5 years**	**7.6 years**
Annual Return on Investment (AROI)	7.62%	-2.41%	6.41%
Lifetime Energy Savings (15 years)**	$457,295.2	$20,311.9	$477,607.1
Internal Rate of Return (IRR)	14.28%	-2.62%	12.67%
Net Present Value (NPV)	$202,653.7	-$9,805.2	$192,848.5

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.8 Whittier Elementary School

It is recommended that the existing lighting system at the Whittier Elementary School, as discussed in Section 2.8.3, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-15 below.

Table 4.1-15 Whittier Elementary School Lighting System Improvements	
Interior Lighting	High Performance T8 Retrofits, Incandescent to Compact Fluorescent Conversion, Occupancy Sensors
Exterior Lighting	LED Retrofit of Exterior Fixtures

The strategies included in this section focus on maximizing energy savings and maintaining or exceeding existing lighting levels, while also maintaining the existing look of each fixture; therefore, proposed lamp styles remain consistent with existing lamp styles. Please refer to Appendix D for a line-by-line proposed detailed lighting upgrades list.

The annual energy savings for the two options is as follows:

Interior Lighting: 28.3 kW, 99,436.8 kWh and $16,572.5

Exterior Lighting: 0.3 kW, 1,430.8 kWh and $238.5

The following table, Table 4.1-16, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Whittier Elementary School.

Table 4.1-16
Whittier Elementary School Lighting System Improvements***

	Interior Lighting	Exterior Lighting	Total
Engineer's Opinion of Probable Cost	$104,823.9	$11,339	$116,162.9
New Jersey SmartStart Rebate	-$7,660*	-$0*	-$7,660*
Total Cost	$97,163.9	$11,339	$108,502.9
Annual Energy Savings	$16,572.5	$238.5	$16,811.0
Annual Maintenance Cost Savings (AMCS)	$1,624.1	$42.87	$1,666.9
Simple Payback	**5.3 years**	**40.3 years**	**5.9 years**
Annual Return on Investment (AROI)	12.06%	-4.19%	10.36%
Lifetime Energy Savings (15 years)**	$308,230.5	$4,435.8	$312,666.3
Internal Rate of Return (IRR)	19.78%	-7.98%	17.74%
Net Present Value (NPV)	$167,834.6	-$7,241.4	$160,593

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.1.9 Athletic Field Lighting & Scoreboard

CDM evaluated the athletic field lighting and has determined that minimal energy savings can be achieved, because the Teaneck BOE already limits the use of the lighting system to athletic events. The scoreboard lighting was also evaluated and the same conclusion has been reached. The minimal energy savings for both the athletic field lighting and the scoreboard would result in an extended payback period greater than 20 years, and therefore CDM does not recommend and ECRMs related to the athletic field lighting and the scoreboard.

4.1.10 Teaneck High School - Press Box

It is recommended that the existing lighting system at the Teaneck High School - Press Box, as discussed in Section 2.9.2, be upgraded to high efficiency standards to create lighting uniformity throughout the building. In general, the recommended lighting upgrade project, as presented in Appendix D, involves replacing existing inefficient bulbs, and installing new energy-efficient luminaries to the existing lighting systems. Two options have also been proposed in Appendix D for interior and exterior lighting, and are listed in Table 4.1-17 below.

Table 4.1-17 Teaneck High School - Press Box Lighting System Improvements	
Interior Lighting	Incandescent to Compact Fluorescent Conversion

The annual energy savings for the two options is as follows:

Interior Lighting: 0.1 kW, 7.1 kWh and $7.5

The following table, Table 4.1-18, summarizes a simple payback analysis assuming the implementation of all recommended lighting system improvements at the Teaneck High School - Press Box.

Table 4.1-18 Teaneck High School - Press Box Lighting System Improvements***	
	Total
Engineer's Opinion of Probable Cost	$107.8
New Jersey SmartStart Rebate	-$0*
Total Cost	$107.8
Annual Energy Savings	$7.5
Annual Maintenance Cost Savings (AMCS)	$70.52

Table 4.1-18 Teaneck High School - Press Box Lighting System Improvements***	
Simple Payback	**1.4 years**
Annual Return on Investment (AROI)	65.71%
Lifetime Energy Savings (15 years)**	$139.5
Internal Rate of Return (IRR)	75.35%
Net Present Value (NPV)	$1,028.4

* Additional incentives, based on eligibility, are available through the New Jersey SmartStart Program, see Appendix G.
**3% yearly inflation on electricity costs.
***See Appendix H & I for ECRM Financial Analyses.

It should be noted that the Annual Energy Savings assume the annual hours per year of operation as outlined under the columns entitled "Proposed Operational Hours without Sensors" and "Proposed Operational Hours with Sensors" in Appendix D.

4.2 HVAC Systems

The goal of this section is to present any heating and cooling energy reduction and cost saving measures that may also be cost beneficial. Where possible, measures will be presented with a life-cycle cost analysis. This analysis displays a payback period based on weighing the capital cost of the measure against predicted annual fiscal savings. To do this, the buildings have been modeled as accurately as possible to predict energy usage for space heating and cooling, as well as domestic hot water use.

Each building is modeled using software called eQuest, a Department of Energy-sponsored energy modeling program, to establish a baseline space heating and cooling energy usage. Climate data from Freehold, NJ was used for analyses. From this, the model may be calibrated, using historical utility bills, to predict the impact of theoretical energy savings measures.

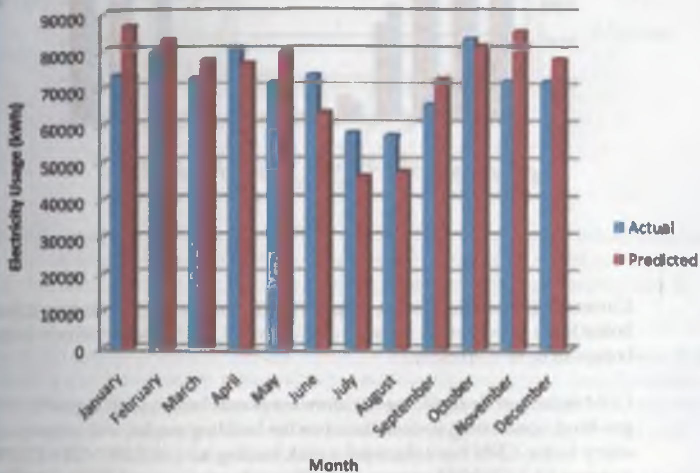
Once annual energy savings from a particular measure have been predicted and the initial capital cost has been estimated, payback periods may be approximated. Equipment cost estimate calculations are provided in Appendix H.

Dual-fuel boilers, which burn both natural gas and light fuel oil, offer the Board of Education flexibility of choice. The cost and availability of each fuel may fluctuate. However, at this time the highest efficiency dual-fuel boilers, which are commercially available, are rated at about 86%. Smaller residential boilers are now able to operate on low-sulfur diesel fuel in the condensing temperature range, but they are not available in the larger capacities required for buildings such as schools. An impractical number of these smaller boilers would be required to adequately serve large buildings. Hence, CDM's recommendation for condensing boilers is restricted to natural gas-fired units, which operate at a 91+% efficiency. Natural gas is also significantly cheaper and easier to maintain than fuel oil, which makes it a more favorable option.

4.2.1 Benjamin Franklin Middle School

A model of Benjamin Franklin Middle School was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009 and oil bills from November 2007 to December 2009. Figure 4.2-1 below compares actual monthly electricity usage, with those predicted by the eQuest model.

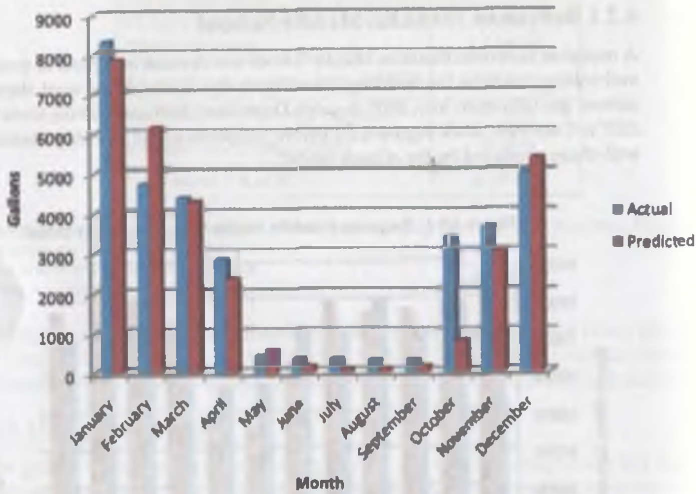
Figure 4.2-1: Benjamin Franklin Middle School Electricity Usage



Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-2 below compares the school's actual monthly oil usage to model-predicted oil use. Actual oil usage accounts not only for the gallons of oil consumed per month, but also for the gallons of oil represented by the monthly natural gas consumption.

Figure 4.2-2: Benjamin Franklin Middle School Oil Usage

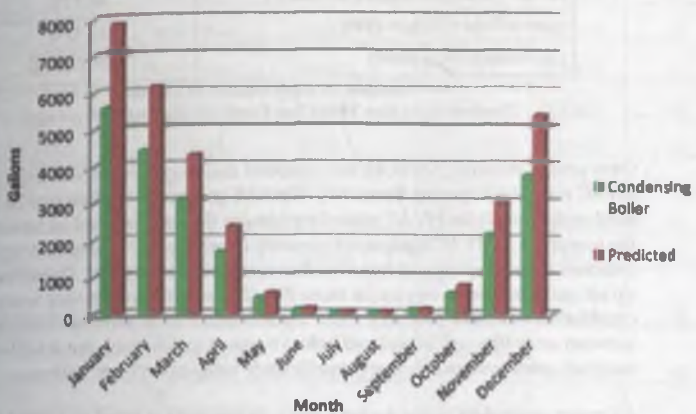


Currently, the heating system utilizes two (2) Smith Cast Iron Sectional boilers. Each boiler has a gross-output capacity of 4,517 MBH. CDM conservatively estimates these boilers to be 80% efficient.

CDM recommends replacing the aforementioned boilers with high-efficiency, natural gas-fired, condensing boilers. Based on the building model, and accounting for a 25% safety factor, CDM has calculated a peak heating load of 5,000 MBH. CDM anticipates that two (2) 3,000 MBH output, high-efficiency condensing boilers should adequately heat the school.

Figure 4.2-3 compares current gas usage with predicted gas usage resulting from a switch to high-efficiency, condensing boilers. Condensing boilers are modeled with a full-load efficiency of ~91.5% and return water temperature of 100°F.

Figure 4.2-3: Benjamin Franklin Middle School – Boiler Upgrade - Oil Usage



Fiscal savings from such an upgrade are then identified in Table 4.2-1 below. Lifetime savings calculations for all ECRM's may be found in Appendix I. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of typical firetube boilers. CDM estimates a firetube boiler system will typically cost around $3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around $2,000 per year. Therefore, replacing the existing boiler system with a condensing boiler system should result in an operation and maintenance cost savings of $1,500 per year.

Table 4.2-1: Benjamin Franklin Middle School Boiler Upgrade Payback	
Current Annual Oil Cost for Existing Boilers	$70,967
Predicted Annual Gas Cost for Condensing Boilers	$38,830
Total Annual Savings	$32,137
Initial Capital Cost of Upgrade	$104,127
Incentives**	$6,000
Cost of Upgrade	$98,127
Simple Payback	**2.9**
Lifetime Energy Savings (24 years)*	$1,142,363.47

Table 4.2-1: Benjamin Franklin Middle School Boiler Upgrade Payback	
Annual Maintenance Cost Savings (AMCS)	$1,500
Annual Return on Investment (AROI)	30.11%
Internal Rate of Return (IRR)	37.12%
Net Present Value (NPV)	$676,099.86

*Assumes 3% yearly inflation on fuel costs

**Incentives, per New Jersey Clean Energy Program, are $1.00 per MBH

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.2-2 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Where equipment ages were not found on the equipment tags, they have been estimated based on the unit appearance or approximate renovation dates. In some cases, service locations may have been estimated based on unit proximity. Additionally, in cases where a unit's manufacturer and/or model could not be determined due to an unreadable, faded, destroyed, or lost tag, manufacturer and model number information has been represented as "unknown".

Table 4.2-2 Benjamin Franklin Middle School HVAC Equipment Service Lives

Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)
ACC	Lobby/High Roof	Computer Lab	Friedrich	Model MR30C3F	SEER 18	~5
ACC	Gym/Cafeteria Roof	Server Classroom	Friedrich	Model MR30C3F	SEER 18	~5
ACC	Gym/Cafeteria Roof	Nurse's Office	Friedrich	Same 2 ton unit as above	SEER 18	~5
ACC	Gym/Cafeteria Roof	Office/Admin area	Trane	Model 2TTR2024A1000AA	Unknown	~5
ACC	Gym/Cafeteria Roof	Cafeteria	Trane	Model 2TTR2042B1000AA	Unknown	~5

ACC	Gym/Cafeteria Roof	Cafeteria	Trane	Model 2TTR2042B10 0GAA	Unknown	~5	20
ACC	Gym/Cafeteria Roof	Media Center	Friedrich	Model MR30C3E	SEER 18	~5	20
ACC	Gym/Cafeteria Roof	Media Center	Friedrich	Model MR30C3E	SEER 18	~5	20
ACC	Gym/Cafeteria Roof	Media Center	Friedrich	Model MR30C3E	SEER 18	~5	20
ACC	Gym/Cafeteria Roof	Media Center	Friedrich	Model MR30C3E	SEER 18	~5	20
ACC	O&M Office	O&M Office	Carrier	Model 38CKC040300	Unknown	~5	20
ACC	Gym/Cafeteria Roof	Gym	Bohn	Model BET015H2C	Unknown	~5	20
ACC	Other	Tech 308	Friedrich	Model SL36L30A-C	SEER 18	~5	20
ACC	Other	Tech 307	Friedrich	Model SL36L30A-C	SEER 18	~5	20
ACC	Guidance Rooms	Guidance Rooms	Trane	Model 2TTR2024A10 0GAA	Unknown	~5	20
ACC	Main Office/Windowless Classrooms	Main Office/windowless classrooms	Trane	Model 2TTR2048A10 0GAA	Unknown	~5	20
ACC	Main Office/Windowless Classrooms	Main Office/windowless classrooms	Trane	Model 2TTR2042B10 0GAA	Unknown	~5	20
ACC	Main Office/Windowless Classrooms	Main Office/windowless classrooms	Trane	Model 2TTR2024A10 0GAA	Unknown	~5	20
AHU	Fan Room 1	Basement	Trane	Model MCCB006UA0 C0UA	~80%	~7	20
AHU	Fan Room 2	Basement	Trane	Model MCCB010UA0 C0UA	~80%	~7	20
AHU	O&M next to Conf Room	Basement	Trane	Model MCCB006UA0 C0UA	~80%	~7	20
AHU	O&M next to Conf Room	Basement	Trane	Model MCCB006UA0 C0UA	~80%	~7	20
AHU	Roof above Boiler Room	1st/2nd floor Toilets	Intellipak/ Trane	Model SLHFC40E44 G6C59D1D01 A0CE0G0KL0 0RT006600	~80%	~7	20
AHU	Gym/Cafeteria Roof	Gym/Cafeteria	unknown	Unknown	~80%	~7	20
AHU	Gym/Cafeteria Roof	Gym/Cafeteria	Trane	unknown	~80%	~7	20
AHU	Gym/Cafeteria Roof	Gym/Cafeteria	Trane	Model TSGA017U0B 000000A00A2 70	~80%	~7	20
AHU	Gym/Cafeteria Roof	Kitchen	Trane	Model TSCA006U0B 0C A00A117	~80%	7	20
AHU	Gym	Gym	Trane	Heating (large)	~80%	~7	20

AHU	Gym	Gym	Trane	Heating (large)	~80%	~7
AHU	Girls/Boys Locker Rooms	Locker Rooms	Trane	Smaller	~80%	~7
AHU	Girls/Boys Locker Rooms	Locker Rooms	Trane	Smaller	~80%	~7
Boiler	boiler room	All rooms	Smith	28A Series	80%	>20
Boiler	boiler room	All rooms	Smith	28A Series	80%	>20
EF	Roof above Boiler Room	Auditorium	Loren Cook	Model 180C7B	Unknown	~5
EF	Roof above Boiler Room	2nd floor Toilets	Dayton	Model 4YY20	Unknown	~5
EF	Auditorium Roof	Auditorium	Loren Cook	Model 135C4B	Unknown	~5
EF	Auditorium Roof	Auditorium	Chelsea	Model R0K50	Unknown	~5
EF	Auditorium Roof	Auditorium	Chelsea	Model R6K30	Unknown	~5
EF	Lobby/High Roof	Auditorium	Loren Cook	Model 100C2B	Unknown	~5
EF	Lobby/High Roof	Toilet Rooms	Loren Cook	ACE Model 135C4B	Unknown	~5
EF	Lobby/High Roof	Classroom	Loren Cook	Model 100 C2B	Unknown	8
EF	Lobby/High Roof	Classroom	Loren Cook	Model 100C2B	Unknown	~5
EF	Lobby/High Roof	Classroom	Dayton	Model 4YY18	Unknown	~5
EF	Lobby/High Roof	Classroom	Loren Cook	Model 150C6B	Unknown	~5
EF	Music Room Roof	Classroom	Carnes	Model VEBK18P1A2 UA205PC1	Unknown	~5
EF	Music Room Roof	Classroom	Loren Cook	Model 100C2B	Unknown	~5
EF	General Hallway Roof	Classroom	Loren Cook	Model 135C5B	Unknown	~5
EF	Gym/Cafeteria Roof	Classroom	Loren Cook	Model 180C8B	Unknown	~5
EF	Gym/Cafeteria Roof	Classroom	Dayton	Model 3GY706	Unknown	~5
EF	Gym/Cafeteria Roof	Classroom	Loren Cook	Model 270C7B	Unknown	~5
EF	Gym/Cafeteria Roof	Classroom	Loren Cook	Model 270C7B	Unknown	~5
Pump	Boiler Room	Circulation	Baldor	M2531T	Unknown	~10
Pump	Boiler Room	Circulation	Baldor	M2531T	Unknown	~10
Pump	Boiler Room	Sump	Well	H358	Unknown	~5
Pump	Boiler Room	Sump	AO Smith	H358	Unknown	~5
Pump	Boiler Room	Circulation	Robbins & Myers	Unknown	Unknown	~15
Pump	Boiler Room	Circulation	Unknown	P55CSS-1246	Unknown	~10

Pump	Boiler Room	Circulation	Unknown	P55CSS-1246	Unknown	~10	20
Pump	Boiler Room	Circulation	Grundfos	P/N 52722363	Unknown	~10	20
Wall ACU	Other	Classroom 304A	Unknown	Older 3 ton unit	Unknown	>15	10
Wall ACU	Other	Classroom 304	unknown	Older "real old" 2 ton unit	Unknown	>15	10
Wall ACU	Other	Mailroom	Air Temp	2 ton unit	Unknown	~10	10
Wall ACU	Other	Reading Room	Air Temp	2 ton unit	Unknown	~10	10
Wall ACU	Other	Teacher's Break Room near Cafeteria	Air Temp	3 ton unit	Unknown	~10	10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-3 below.

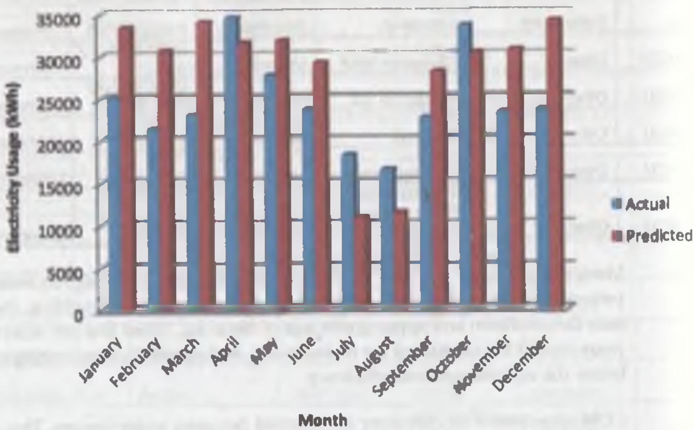
Table 4.2-3 Benjamin Franklin Middle School Domestic Water Heaters

Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Observed Condition
Boiler Room	AO Smith	Unknown	Unknown	Electric	Unknown	Poor

4.2.2 Bryant Elementary School

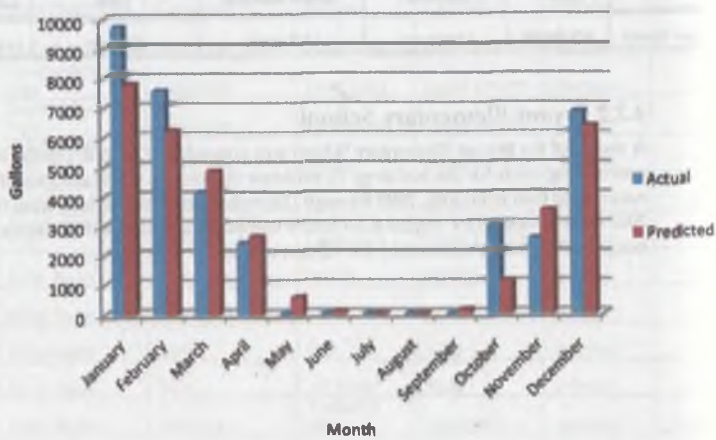
A model of the Bryant Elementary School was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009 and oil bills from November 2007 to December 2009. Figure 4.2-4 below compares actual monthly electricity usages, with those predicted by the eQuest model.

Figure 4.2-4: Bryant Elementary School Electricity Usage



Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-5 below compares the school's actual monthly oil usage to model-predicted oil use. Actual oil usage accounts not only for the gallons of oil consumed per month, but also for the gallons of oil represented by the monthly natural gas consumption.



Currently the HVAC systems at the Bryant Elementary School are controlled independently, by room thermostats. It is recommended that a direct digital control (DDC) building management system (BMS) be implemented. A system like this would monitor and control all HVAC equipment, allowing maintenance staff to operate systems and adjust climate control in real time to maximize comfort, while minimizing unnecessary heating and cooling.

Typically implementation of a BMS will save the owner 5-15% of the energy devoted to HVAC. As all systems are currently independently monitored and controlled, CDM conservatively estimates that implementing a DDC BMS will allow the school to save, on average, 10% of the energy being used for HVAC. Table 4.2-4 demonstrates the potential payback from such an implementation.

Table 4.2-4: Bryant Elementary School DDC BMS Payback	
Predicted Annual Savings (Gallons Oil)	3,322
Annual Savings (Oil)	$7,708
Predicted Annual Savings (kWh)	21,038
Annual Savings (Electricity)	$3,640
Total Annual Savings	$11,347
Initial Capital Cost of Upgrade	$40,915
Incentives**	$0
Cost of Upgrade	$40,915
Annual Maintenance Cost Savings (AMCS)	$0
Simple Payback	**3.6**
Lifetime Energy Savings (15 years)*	$211,044.62
Annual Return on Investment (AROI)	21.07%
Internal Rate of Return (IRR)	29.88%
Net Present Value (NPV)	$124,334.44

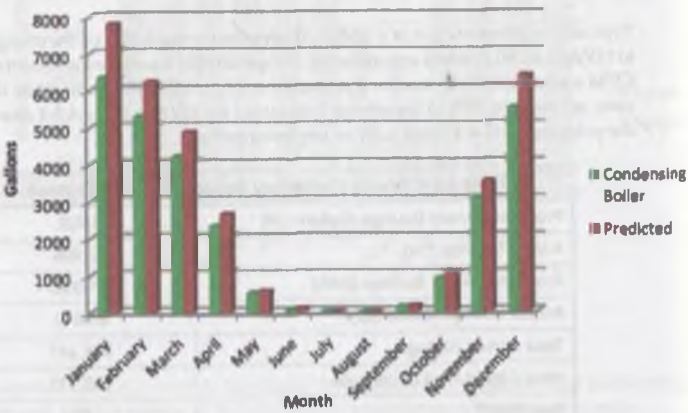
*Assumes 3% yearly inflation on oil and electricity costs
**No Incentives found for this upgrade

Currently, the heating system utilizes two (2) Smith Cast Iron Sectional boilers. Each boiler has a gross-output capacity of 2903 MBH. CDM conservatively estimates these boilers to be 80% efficient.

CDM recommends replacing these boilers with high-efficiency, natural-gas fired, condensing boilers. Based on the building model, and accounting for a 25% safety factor, anticipates that two (2) 3,000 MBH output, high-efficiency condensing boilers should adequately heat the school. In this upgrade, the existing steam heating system would be retrofitted for hot water use. Steam traps would be replaced with hot water control valves, condensate piping would be scheduled for demolition, and new hot water return piping and insulation would be installed.

Figure 4.2-6 compares current gas usage with predicted gas usage resulting from a switch to high-efficiency, condensing boilers. Condensing boilers are modeled with a full-load efficiency of ~91.5% and return water temperature of 100°F.

Figure 4.2-6: Bryant Elementary School – Boiler Upgrade - Oil Usage



Fiscal savings from such an upgrade are then identified in Table 4.2-5 below. The aggregate cost of natural gas calculated from the utility data for this school is not representative of typical natural gas costs relative to other schools, because the school is still expensed for service and distribution charges despite using very little gas. As such, the cost of natural gas per therm used to calculate fiscal savings is the average of the aggregate costs for all eight buildings. Lifetime savings calculations for all ECRM's may be found in Appendix I. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of typical firetube boilers. CDM estimates a firetube boiler system will typically cost around $3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around $2,000 per year. Therefore, replacing the existing boiler system with a condensing boiler system should result in an operation and maintenance cost savings of $1,500 per year.

Table 4.2-6: Bryant Elementary School Boiler Upgrade Payback	
Current Annual Oil Cost for Existing Boilers	$77,076
Predicted Annual Gas Cost for Condensing Boilers	$57,704

Table 4.2-5: Bryant Elementary School Boiler Upgrade Payback	
Total Annual Savings	$19,371
Initial Capital Cost of Upgrade	$181,165
Incentives**	$6,000
Cost of Upgrade	$175,165
Simple Payback	**8.4**
Lifetime Energy Savings (24 years)*	$702,687.20
Annual Maintenance Cost Savings (AMCS)	$1,500
Annual Return on Investment (AROI)	7.75%
Internal Rate of Return (IRR)	13.65%
Net Present Value (NPV)	$301,609.52

*Assumes 3% yearly inflation on fuel costs
**Incentives, per New Jersey Clean Energy Program, are $1.00 per MBH

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.2-6 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-6 Bryant Elementary School HVAC Equipment Service Lives							
Description (Tag ID)	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
ACC	Roof - Nurse's office	Nurse's Office	Trane	TTR018D100A0	Unknown	~7	20
ACC	Roof	Interior Classroom	Friedrich	MR24C3F	SEER 18	~5	20
ACC	Roof	Special Services	Friedrich	MR12C1F	SEER 18	~5	20
ACC	Roof	Special Services	Friedrich	MR12C1F	SEER 18	~5	20
ACC	Roof	Special Services	Friedrich	MR12C1F	SEER 18	~5	20

Table 4.2-6 Bryant Elementary School HVAC Equipment Service Lives

Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
ACC	Roof - Server Room	Server Room	Davion	outdoor: MAKA-024JAX; indoor: MBHA-14J00NUAA	Unknown	~7	20
ACC	Roof	Speech Therapy	Friedrich	MR12Y1F	SEER 18	~5	20
ACC	Other	Principal's Office	Friedrich	outdoor: MR18Y3E; indoor: MW18Y3E	SEER 18	~5	20
ACC	Other	Main Office	Friedrich	outdoor: MR24C3E; indoor: MW24C3E	SEER 18	~5	20
AHU	Other	General Building	Trane	MCCA012MAG0A0A0DD0AA00…	~80%	13	20
Boiler	Boiler Room	Boiler Room	HB Smith	M45L Mills Boiler	~80%	>20	25
Boiler	Boiler Room	Boiler Room	HB Smith	M45L Mills Boiler	~80%	>20	25
EF	Roof	Unknown	PVC	DX 7B	Unknown	~7	20
EF	roof- lower, above classroom	Unknown	PVC	DX 9B	Unknown	~7	20
EF	Roof – Cafeteria	Cafeteria	PVC	DX15B	Unknown	~7	20
EF	Roof – Cafeteria	Cafeteria	PVC	DX9B	Unknown	~7	20
EF	Roof - Nurse's office	Nurse's Office	PVC	DX 7B	Unknown	~7	20
EF	Roof - Nurse's office	Nurse's Office	PVC	DX 7B	Unknown	~7	20
EF	Roof - Nurse's office	Nurse's Office	PVC	DX 7B	Unknown	~7	20
MAU	Roof – Cafeteria	Cafeteria	Trane	RAUCC20EBM13D	~75%	~7	20
Pump	Boiler Room	Circulation	Taco	P63CZC-3020	Unknown	~7	20
Pump	Boiler Room	Circulation	Taco	P63CZC-3020	Unknown	~7	20
Pump	Boiler Room	Sump	Unknown	unknown	Unknown	~5	1[illegible]
Wall ACU	Other	Nurse's Office	Friedrich	KS15L10-A	Unknown	~5	10
Wall AC	Other	Room 15 - Child Therapy	Friedrich	MR24Y3F	Unknown	~5	10
Wall ACU	Other	Room 33	Whirlpool	ACQ082XA0	Unknown	~7	10
Wall ACU	Other	Room 33	Whirlpool	ACQ082XA0	Unknown	~7	10
Wall ACU	Other	Teacher's Lounge	GE	Unknown	Unknown	older	10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-7 below.

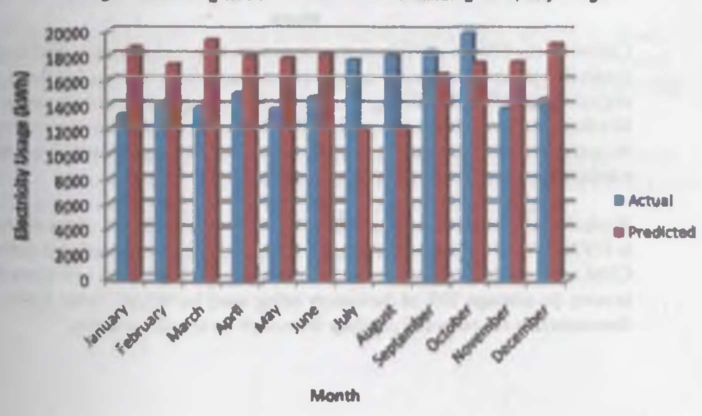
Table 4.2-7 Bryant Elementary School Domestic Water Heaters

Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Observed Condition
Boiler Room	Rheem	50	1PZ75	Electric	4500 W	Good
Roof Access - room adjacent to [illegible]	Rudd Evondean	40	ELD40-B	Electric	6000 W	Good

4.2.3 Eugene Field Administration Building

A model of the Eugene Field Administration Building was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009 and oil bills from November 2007 to December 2009. Figure 4.2-7 below compares actual monthly electricity usages, with those predicted by the eQuest model.

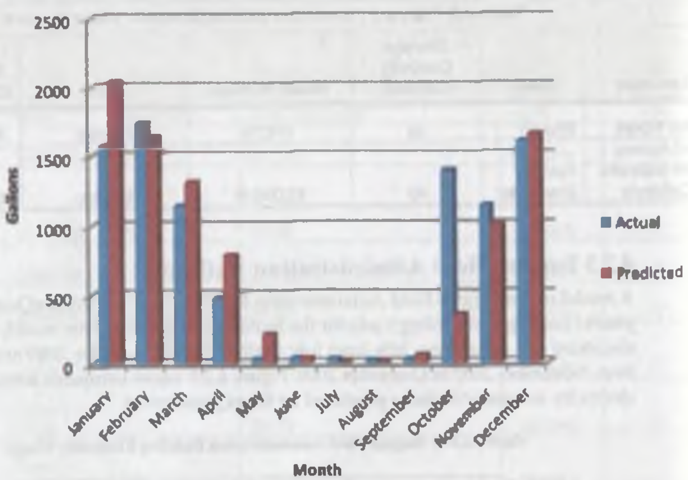
Figure 4.2-7: Eugene Field Administration Building Electricity Usage



Local spikes in the summer could be attributed to summer session activities or increased occupancy due to administrative preparation for the next school year. Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-8 below compares the school's actual monthly oil usage to model-predicted oil use. Actual oil usage accounts not only for the gallons of oil consumed per month, but also for the gallons of oil represented by the monthly natural gas consumption.

Figure 4.2-8: Eugene Field Administration Building Oil Usage



Currently the HVAC systems at the Eugene Field Administration Building are controlled independently, by room thermostats. It is recommended that a direct digital control (DDC) building management system (BMS) be implemented. A system like this would monitor and control all HVAC equipment, allowing maintenance staff to operate systems and adjust climate control in real time to maximize comfort, while minimizing unnecessary heating and cooling.

Typically implementation of a BMS will save the owner 5-15% of the energy devoted to HVAC. As all systems are currently independently monitored and controlled, CDM conservatively estimates that implementing a DDC BMS will allow the building to save, on average, 10% of the energy being used for HVAC. Table 4.2-8 demonstrates the potential payback from such an implementation.

Table 4.2-8: Eugene Field Administration Building DDC BMS Payback	
Predicted Annual Savings (Gallons Oil)	911
Annual Savings (Oil)	$2,095
Predicted Annual Savings (kWh)	10,212
Annual Savings (Electricity)	$1,683
Total Annual Savings	$3,777
Initial Capital Cost of Upgrade	$21,456
Incentives**	$0
Cost of Upgrade	$21,456
Annual Maintenance Cost Savings (AMCS)	$0
Simple Payback	**5.7**
Lifetime Energy Savings (15 years)*	$70,256.14
Annual Return on Investment (AROI)	10.94%
Internal Rate of Return (IRR)	18.44%
Net Present Value (NPV)	$33,554.74

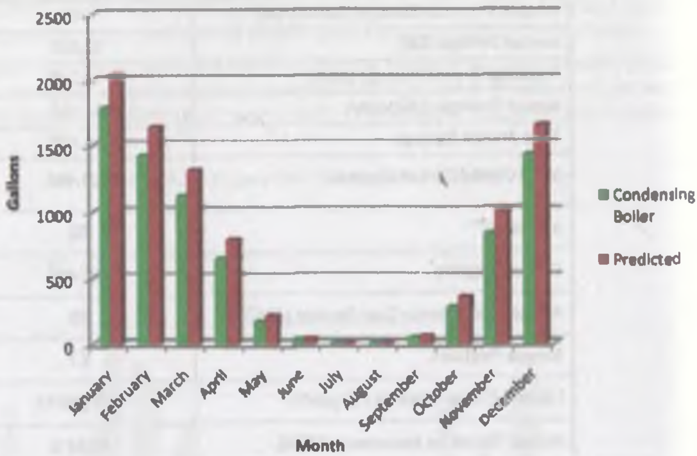
*Assumes 3% yearly inflation on oil and electricity costs
**No Incentives found for this upgrade

Currently, the heating system utilizes two (2) Smith Cast Iron Sectional boilers. Each boiler has a gross-output capacity of 1827 MBH. CDM conservatively estimates these boilers to be 80% efficient.

CDM recommends replacing these boilers with high-efficiency, natural gas-fired, condensing boilers. Based on the building model, and accounting for a 25% safety factor, CDM anticipates that two (2) 3,000 MBH output, high-efficiency condensing boilers should adequately heat the school.

Figure 4.2-9 compares current gas usage with predicted gas usage resulting from a switch to high-efficiency, condensing boilers. Condensing boilers are modeled with a full-load efficiency of ~91.5% and return water temperature of 100°F.

Figure 4.2-9: Eugene Field Administration Building – Boiler Upgrade – Oil Usage



Fiscal savings from such an upgrade are then identified in Table 4.2-9 below. Lifetime savings calculations for all ECRM's may be found in Appendix I. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of typical firetube boilers. CDM estimates a firetube boiler system will typically cost around $3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around $2,000 per year. Therefore, replacing the existing boiler system with a condensing boiler system should result in an operation and maintenance cost savings of $1,500 per year.

Table 4.2-9: Eugene Field Administration Building Boiler Upgrade Payback	
Current Annual Oil Cost for Existing Boilers	$20,945
Predicted Annual Gas Cost for Condensing Boilers	$15,428
Total Annual Savings	$5,517
Initial Capital Cost of Upgrade	$104,127
Incentives**	$6,000
Cost of Upgrade	$98,127
Simple Payback	**14.0**

Table 4.2-9: Eugene Field Administration Building Boiler Upgrade Payback	
Lifetime Energy Savings (24 years)*	$225,935.69
Annual Maintenance Cost Savings (AMCS)	$1,500
Annual Return on Investment (AROI)	2.98%
Internal Rate of Return (IRR)	7.18%
Net Present Value (NPV)	$55,831.30

*Assumes 3% yearly inflation on fuel costs
**Incentives, per New Jersey Clean Energy Program, are $1.00 per MBH

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.2-10 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-10 Eugene Field Administration Building HVAC Equipment Service Lives

Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
ACC	Meeting Room	Meeting Room	Friedrich	MW24C3E/MR24C3E	SEER 18	~5	20
ACC	Meeting room	Meeting room	York	CA81-25E	Unknown	~7	20
ACC	Secretary's Office	Secretary's Office	Friedrich	MW18C3E/MR18C3E	SEER 18	~5	20
ACC	Superintendent	Superintendent	Friedrich	MW30C3F/MR30C3F	SEER 18	~5	20
ACC	Assistant Superintendent	Assistant Superintendent	Friedrich	MW18C3E/MR18C3E	SEER 18	~5	20
ACC	David Bicofsky's Office	David Bicofsky's Office	Friedrich	MW24C3F/MR24C3F	SEER 18	~5	20
ACC	Admin Assistants	Admin Assistants	Friedrich	MW30C3F/MR30C3F	SEER 18	~5	20
ACC	Room 4A	Room 4A	Friedrich	MW18C3E/MR18C3E	SEER 18	~5	20
ACC	Room 4A	Room 4A	Friedrich	MW18C3E/MR18C3E	SEER 18	~5	20

Table 4.2-10 Eugene Field Administration Building HVAC Equipment Service Lives							
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
ACC	Christine Flanagan's Office	Christine Flanagan's Office	Friedrich	MW12C1E/M R12C1E	SEER 18	~5	20
ACC	Christine Flanagan's Office	Christine Flanagan's Office	Friedrich	MW12C1E/M R12C1E	SEER 18	~5	20
ACC	Christine Flanagan's Office	Christine Flanagan's Office	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Deidre's Office	Deidre's Office	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Deidre's Office	Deidre's Office	Friedrich	MW12C1E/M R12C1E	SEER 18	~5	20
ACC	Deidre's Office	Deidre's Office	Friedrich	MW18C3E/M R18C3E	SEER 18	~5	20
ACC	Deidre's Office	Deidre's Office	Friedrich	MW24C3F/M R24C3F	SEER 18	~5	20
ACC	Room 5- Staff Development	Room 5- Staff Development	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 5- Staff Development	Room 5- Staff Development	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 7- Special Services	Room 7- Special Services	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 7- Special Services	Room 7- Special Services	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 7- Special Services	Room 7- Special Services	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 20 - Transportation	Room 20 - Transportation	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 20 - Transportation	Room 20 - Transportation	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 20 - Transportation	Room 20 - Transportation	Friedrich	MW24C3E/M R24C3E	SEER 18	~5	20
ACC	Room 20 - Transportation	Room 20 - Transportation	Friedrich	MW18Y3F/M R18Y3F	SEER 18	~5	20
ACC	Room off Office Spaces	Room off Office Spaces	Friedrich	MW18Y3F/M R18Y3F	SEER 18	~5	20
ACC	Roof	Unknown	Unitary Products Group	FTFP060H06G		~7	20
ACC	Director of Students	Director of Students	Friedrich	MW12C1F/M R12C1F	SEER 18	~5	20
ACC	Director of Students	Director of Students	Friedrich	MW12C1F/M R12C1F	SEER 18	~5	20
ACC	Classroom 21	Classroom 21	Friedrich	MW24C3F/M R24C3F	SEER 18	~5	20
Boiler	Boiler Room	Bldg dist	HB Smith	28A-6	~80%	>20	25
Boiler	Boiler Room	Bldg dist	HB Smith	28A-6	~80%	>20	25
MAU	Gym	Gym	Carrier/Baldor	Unknown	~80%	~7	20

Table 4.2-10 Eugene Field Administration Building HVAC Equipment Service Lives							
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
MAU	Gym	Gym	Carrier/Baldor	Unknown	~80%	~7	20
Pump	Boiler Room	Circulation	Unknown	EVE145TTD R5352AB	Unknown	~10	20
Pump	Boiler Room	Circulation	Unknown	EVE145TTD R5352AB	Unknown	~10	20
Pump	Boiler Room	Circulation	Unknown	EVE145TTD R5352AB	Unknown	~10	20
Pump	Boiler Room	Fuel oil	Dayton	5K447C	Unknown	~10	20
Pump	Boiler Room	Fuel oil	Dayton	5K447C	Unknown	~10	20
Pump	Boiler Room	Circulation	Bell and Gossett	HV C10	Unknown	~10	20
Wall ACU	Faculty Room	Faculty Room	Unknown	Unknown	Unknown	~7	10
Wall ACU	Office (Gym)	Office (Gym)	GE	AMD10ABM1	Unknown	~7	10
Wall ACU	Secretary's Office	Secretary's Office	Trane	Unknown	Unknown	~7	10
Wall ACU	David Bicofsky's Office	David Bicofsky's Office	GE	Unknown	Unknown	~7	10
Wall ACU	Admin Assistants	Admin Assistants	GE	ABM22DAR	Unknown	~7	10
Wall ACU	Outer Large Admin	Outer Large Admin	EMI	Unknown	Unknown	~7	10
Wall ACU	Director's Office	Director's Office	GE	Unknown	Unknown	~7	10
Wall ACU	Server Room	Server Room	GE	Unknown	Unknown	~10	10
Wall ACU	Server Room	Server Room	GE	Unknown	Unknown	~10	10
Wall ACU	Classroom 25	Classroom 25	GE	Unknown	Unknown	~10	10
Wall ACU	Classroom 25	Classroom 25	Kenmore	Unknown	Unknown	~10	10
Wall ACU	Classroom 23	Classroom 23	Friedrich	Unknown	Unknown	~10	10
Wall ACU	Room 21 A & 21 B	Room 21 A & 21 B	Unknown	Unknown	Unknown	~10	10
Wall ACU	Room 21 A & 21 B	Room 21 A & 21 B	Unknown	Unknown	Unknown	~10	10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-11 below.

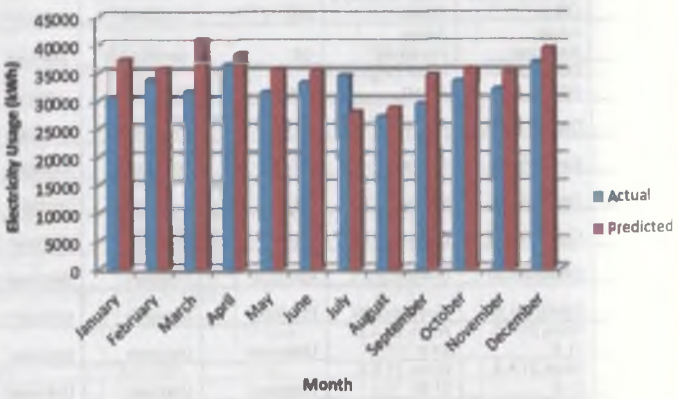
Table 4.2-11 Eugene Field Administration Building Domestic Water Heaters

Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Obs Cond
Boiler Room	Rheem	50	41V50	Gas fired	40 MBH	Go

4.2.4 Hawthorne Elementary School

A model of the Hawthorne Elementary School was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009. Figure 4.2-10 below compares actual monthly electricity usages, with those predicted by the eQuest model.

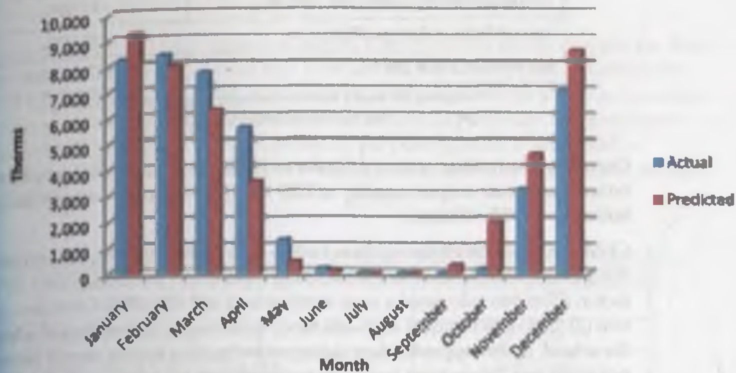
Figure 4.2-10: Hawthorne Elementary School Electricity Usage



Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-11 below compares the school's actual monthly natural gas usage to model-predicted natural gas use.

Figure 4.2-11: Hawthorne Elementary School Natural Gas Usage



Currently the HVAC systems at the Hawthorne Elementary School are controlled independently, by room thermostats. It is recommended that a direct digital control (DDC) building management system (BMS) be implemented. A system like this would monitor and control all HVAC equipment, allowing maintenance staff to operate systems and adjust climate control in real time to maximize comfort, while minimizing unnecessary heating and cooling.

Typically implementation of a BMS will save the owner 5-15% of the energy devoted to HVAC. As all systems are currently independently monitored and controlled, CDM conservatively estimates that implementing a DDC BMS will allow the school to save, on average, 10% of the energy being used for HVAC. Table 4.2-12 demonstrates the potential payback from such an implementation.

Table 4.2-12: Hawthorne Elementary School DDC BMS Payback	
Predicted Annual Savings (Therms)	4,297
Annual Savings (Natural Gas)	$5,371
Predicted Annual Savings (kWh)	13,276
Annual Savings (Electricity)	$2,189
Total Annual Savings	$7,560
Initial Capital Cost of Upgrade	$42,584
Incentives**	$0
Cost of Upgrade	$42,584
Annual Maintenance Cost Savings (AMCS)	$0
Simple Payback	**5.6**
Lifetime Energy Savings (15 years)*	$140,607.09

Table 4.2-12: Hawthorne Elementary School DDC BMS Payback	
Annual Return on Investment (AROI)	11.09%
Internal Rate of Return (IRR)	18.62%
Net Present Value (NPV)	$67,512.33

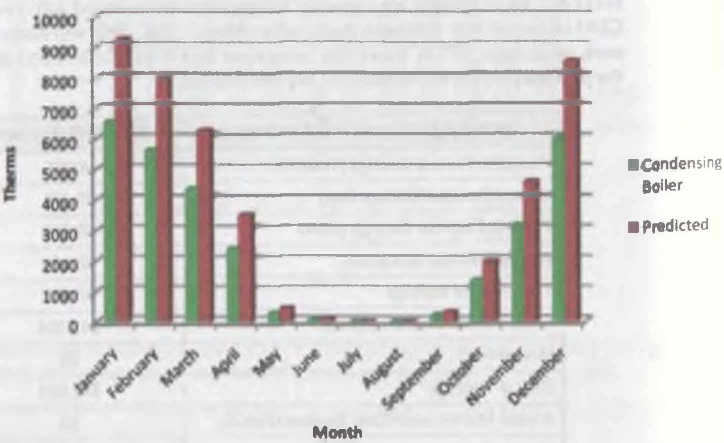
*Assumes 3% yearly inflation on natural gas and electricity costs
**No Incentives found for this upgrade

Currently, the heating system utilizes two (2) Smith Cast Iron Sectional boilers. Each boiler has a gross-output capacity of 2289 MBH. CDM conservatively estimates these boilers to be 75% efficient.

CDM recommends replacing these boilers with high-efficiency, natural gas-fired, condensing boilers. Based on the building model, and accounting for a 25% safety factor, CDM has calculated a peak heating load of 2,400 MBH. CDM anticipates that two (2) 3,000 MBH output, high-efficiency condensing boilers should adequately heat the school. In this upgrade, the existing steam heating system would be retrofitted for hot water use. Steam traps would be replaced with hot water control valves, condensate piping would be scheduled for demolition, and new hot water return piping and insulation would be installed.

Figure 4.2-12 compares current gas usage with predicted gas usage resulting from a switch to high-efficiency, condensing boilers. Condensing boilers are modeled with a full-load efficiency of ~92% and return water temperature of 100°F.

Figure 4.2-12: Hawthorne Elementary School – Boiler Upgrade – Natural Gas Usage



Fiscal savings from such an upgrade are then identified in Table 4.2-13 below. Lifetime savings calculations for all ECRM's may be found in Appendix I. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of typical firetube boilers. CDM estimates a firetube boiler system will typically cost around $3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around $2,000 per year. Therefore, replacing the existing boiler system with a condensing boiler system should result in an operation and maintenance cost savings of $1,500 per year.

Table 4.2-13: Hawthorne Elementary School Boiler Upgrade Payback	
Predicted Annual Savings (Therms)	12,991
Total Annual Savings	$18,239
Initial Capital Cost of Upgrade	$181,165
Incentives**	$6,000
Cost of Upgrade	$175,165
Simple Payback	**9.9**
Lifetime Energy Savings (24 years)*	$595,048.01
Annual Maintenance Cost Savings (AMCS)	$1,500
Annual Return on Investment (AROI)	5.98%
Internal Rate of Return (IRR)	11.46%
Net Present Value (NPV)	$228,620.39

*Assumes 3% yearly inflation on natural gas costs
**Incentives, per New Jersey Clean Energy Program, are $1.00 per MBH

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.2-14 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-14 Hawthorne Elementary School HVAC Equipment Service Lives							
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
ACC	Roof	Principal's Office	Friedrich	MR24C3F	SEER 18	~5	[illegible]
ACC	Roof	Server Closet	Friedrich	MR24C3F	SEER 18	~5	[illegible]
ACC	Roof	Principal's Office	Friedrich	MR30C3F	SEER 18	~5	[illegible]
ACC	Left Roof	Interior	Trane	RAUC020EBM13D	Unknown	~7	[illegible]
AHU	Library Roof	Interior	Trane	SACA-501-A	Unknown	>20	[illegible]
AHU	Computer Lab Roof	Interior	Trane	SACA-501-A	Unknown	>20	[illegible]
AHU	Roof	Interior	Unknown	Unknown	Unknown	~15	[illegible]
AHU	Roof	Interior	Unknown	Unknown	Unknown	~15	[illegible]
Boiler	Boiler Room	Interior	HB Smith	Unknown	~75%	~25	[illegible]
Boiler	Boiler Room	Interior	HB Smith	Unknown	~75%	~25	[illegible]
EF	Roof	Interior	PVC	DX13B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX13B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX16B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX16B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX7B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX7B	Unknown	~7	[illegible]
EF	Classroom Roof	Interior	Unknown	Unknown	Unknown	~20	[illegible]
EF	Classroom Roof	Interior	Unknown	Unknown	Unknown	~20	[illegible]
EF	Roof	Restroom	PVC	DX13B	Unknown	~7	[illegible]
EF	Roof	Restroom	PVC	DX16B	Unknown	~7	[illegible]
EF	Roof	Restroom	PVC	DX7B	Unknown	~7	[illegible]
EF	Roof	Restroom	PVC	DX18B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	DX16B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	DX9B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	DX7B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	CM10	Unknown	~7	[illegible]

Table 4.2-14 Hawthorne Elementary School HVAC Equipment Service Lives							
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
EF	Roof	Cafeteria	Trane	MCCA012BBG0 A)DA0…	Unknown	14	20
Pump (P-1)	Boiler Room	Circulation	Emerson	P63CZ8-3019	Unknown	~10	20
Pump (P-2)	Boiler Room	Circulation	Marathon	DQJ 56T17D5333B	Unknown	~10	20
Wall ACU	Teachers Lounge	Teachers Lounge	GE	AVM24DCR1	Unknown	~10	10
Wall ACU	Room 11 Child Study	Room 11 Child Study	GE	Unknown	Unknown	~10	10
Wall ACU	Nurse's Office	Nurse's Office	GE	Unknown	Unknown	~10	10
Wall ACU	Room 14	Room 14	GE	AVM18DAV1	Unknown	~10	10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

It can be seen that several of the rooftop units have either exceeded or are close to exceeding their ASHRAE expected service lives. Consequently, it can be assumed that these units are not performing at their rated efficiencies. The two Trane units on the library and media center roof are 5 ton units that are in need of immediate replacement. Table 4.2-15 demonstrates the anticipated combined savings resulting from upgrading to similarly sized modern units, with higher cooling and heating efficiencies.

Table 4.2-15: Hawthorne Elementary School RTU Replacement Payback	
Predicted Annual Savings (therms)	268
Predicted Annual Savings (kwh)	2098
Total Annual Savings	$681
Initial Capital Cost of Upgrade	$17,753
Incentives**	$790
Cost of Upgrade	$16,963
Simple Payback	**24.9**
Lifetime Energy Savings (24 years)*	$23,444.43
Annual Maintenance Cost Savings (AMCS)	$0

Table 4.2-14 Hawthorne Elementary School HVAC Equipment Service Lives							
Description [Tag ID]	**Unit Location**	**Service Location**	**Manufacturer**	**Model**	**Estimated Efficiency**	**Estimated Age (Years)**	[illegible]
ACC	Roof	Principal's Office	Friedrich	MR24C3F	SEER 18	~5	[illegible]
ACC	Roof	Server Closet	Friedrich	MR24C3F	SEER 18	~5	[illegible]
ACC	Roof	Principal's Office	Friedrich	MR30C3F	SEER 18	~5	[illegible]
ACC	Left Roof	Interior	Trane	RAUC020EBM13D	Unknown	~7	[illegible]
AHU	Library Roof	Interior	Trane	SACA-501-A	Unknown	>20	[illegible]
AHU	Computer Lab Roof	Interior	Trane	SACA-501-A	Unknown	>20	[illegible]
AHU	Roof	Interior	Unknown	Unknown	Unknown	~15	[illegible]
AHU	Roof	Interior	Unknown	Unknown	Unknown	~15	[illegible]
Boiler	Boiler Room	Interior	HB Smith	Unknown	~75%	~25	[illegible]
Boiler	Boiler Room	Interior	HB Smith	Unknown	~75%	~25	[illegible]
EF	Roof	Interior	PVC	DX13B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX13B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX10B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX10B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX7B	Unknown	~7	[illegible]
EF	Roof	Interior	PVC	DX7B	Unknown	~7	[illegible]
EF	Classroom Roof	Interior	Unknown	Unknown	Unknown	~20	[illegible]
EF	Classroom Roof	Interior	Unknown	Unknown	Unknown	~20	[illegible]
EF	Roof	Restroom	PVC	DX13B	Unknown	~7	[illegible]
EF	Roof	Restroom	PVC	DX10B	Unknown	~7	[illegible]
EF	Roof	Restroom	PVC	DX7B	Unknown	~7	[illegible]
EF	Roof	Restroom	PVC	DX10B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	DX10B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	DX9B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	DX7B	Unknown	~7	[illegible]
EF	Roof	Cafeteria	PVC	CM16	Unknown	~7	[illegible]

Table 4.2-14 Hawthorne Elementary School HVAC Equipment Service Lives							
Description (Tag ID)	**Unit Location**	**Service Location**	**Manufacturer**	**Model**	**Estimated Efficiency**	**Estimated Age (Years)**	**ASHRAE Expected Life (Years)**
RTU	Roof	Cafeteria	Trane	MCCA012BBG0 A)DA0	Unknown	14	20
Pump (P-1)	Boiler Room	Circulation	Emerson	P63C2B-3019	Unknown	~10	20
Pump (P-2)	Boiler Room	Circulation	Marathon	DQJ 56T17D6333B	Unknown	~10	20
Wall ACU	Teachers Lounge	Teachers Lounge	GE	AVM24DCR1	Unknown	~10	10
Wall ACU	Room 11 Child Study	Room 11 Child Study	GE	Unknown	Unknown	~10	10
Wall ACU	Nurse's Office	Nurse's Office	GE	Unknown	Unknown	~10	10
Wall ACU	Room 14	Room 14	GE	AVM18DAV1	Unknown	~10	10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

It can be seen that several of the rooftop units have either exceeded or are close to exceeding their ASHRAE expected service lives. Consequently, it can be assumed that these units are not performing at their rated efficiencies. The two Trane units on the library and media center roof are 5 ton units that are in need of immediate replacement. Table 4.2-15 demonstrates the anticipated combined savings resulting from upgrading to similarly sized modern units, with higher cooling and heating efficiencies.

Table 4.2-15: Hawthorne Elementary School RTU Replacement Payback	
Predicted Annual Savings (therms)	268
Predicted Annual Savings (kwh)	2998
Total Annual Savings	$681
Initial Capital Cost of Upgrade	$17,753
Incentives**	$790
Cost of Upgrade	$16,963
Simple Payback	**24.8**
Lifetime Energy Savings (24 years)*	$23,444.43
Annual Maintenance Cost Savings (AMCS)	$0

Table 4.2-15: Hawthorne Elementary School RTU Replacement Payback	
Annual Return on Investment (AROI)	(-0.15%)
Internal Rate of Return (IRR)	(2.46%)
Net Present Value (NPV)	($1,096.17)

*Assumes 3% yearly inflation on electricity costs
**Incentives, per New Jersey Smart Start Program, $79/Ton

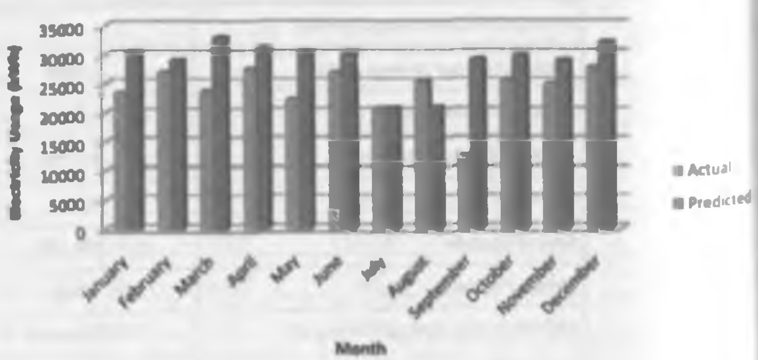
CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-16 below.

Table 4.2-16 Hawthorne Elementary School Domestic Water Heaters						
Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Obse Cond
Boiler Room	Rheem	80	81V80DA	Electric	4500 kW	Good

4.2.5 Lowell Elementary School

A model of the Lowell Elementary School was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009 and oil bills from November 2007 to December 2009. Figure 4.2-13 below compares actual monthly electricity usages, with those predicted by the eQuest model.

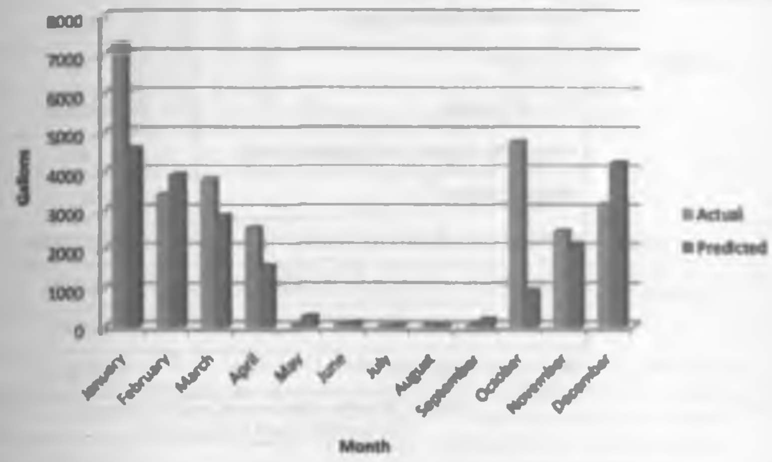
Figure 4.2-13: Lowell Elementary School Electricity Usage



Local spikes in the summer could be attributed to summer session activities or increased occupancy due to preparation for the next school year. Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-14 below compares the school's actual monthly oil usage to model-predicted oil use. Actual oil usage accounts not only for the gallons of oil consumed per month, but also for the gallons of oil represented by the monthly natural gas consumption.

Figure 4.2-14: Lowell Elementary School Oil Usage



Currently the HVAC systems at the Lowell Elementary School are controlled independently, by room thermostats. It is recommended that a direct digital control (DDC) building management system (BMS) be implemented. A system like this would monitor and control all HVAC equipment, allowing maintenance staff to operate systems and adjust climate control in real time to maximize comfort, while minimizing unnecessary heating and cooling.

Typically implementation of a BMS will save the owner 5-15% of the energy devoted to HVAC. As all systems are currently independently monitored and controlled, CDM conservatively estimates that implementing a DDC BMS will allow the school to save, on average, 10% of the energy being used for HVAC. Table 4.2-17 demonstrates the potential payback from such an implementation.

Table 4.2-18: Lowell Elementary School Boiler Upgrade Payback	
Internal Rate of Return (IRR)	11.44%
Net Present Value (NPV)	$283,080.23

*Assumes 3% yearly inflation on fuel costs

**Incentives, per New Jersey Clean Energy Program, are $1.00 per MBH

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.2-19 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-19 Lowell Elementary School HVAC Equipment Service Lives

Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	[illegible] Exp[illegible] (Yea[illegible])
ACC	Grade	Principal/Main Office	Friedrich	MR30C3E	SEER 18	~5	20
ACC	Grade	Principal/main office	Friedrich	MR30C3E	SEER 18	~5	20
ACC	Roof	Interior rooms (Special Ed)	International Comfort Products	ACS030A2C1 FBA030GC1	Unknown	~10	20
ACC	Roof	Library	Intercity Products Corps.	CA5548VHD2 CBA048HB2	Unknown	~10	20
ACC	Roof	Library	Intercity Products Corps.	CA5548VHD2 CBA048HB2	Unknown	~10	20
ACC	Roof	Server Closet	Friedrich	outdoor: MR12C1F indoor: MW12C1F	SEER 18	~5	20
ACC	Roof	Computer Room	Intercity Products Corps.	CA5536VHD2 CBA036HB2	Unknown	~10	20
ACC	Roof	Computer Room	Intercity Products Corps.	CA5536VHD2 CBA036HB2	Unknown	~10	20
ACC	Roof	Interior room	Friedrich	P-12	SEER 18	~5	20

Table 4.2-18 Lowell Elementary School HVAC Equipment Service Lives							
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
AHU	Roof	Cafeteria	McQuay	ALP019D	Unknown	~15	20
AHU	Room 228	Room 228	McQuay	BSCSISL114DH	Unknown	~15	20
Boiler	Boiler Room	Bldg Dist	HB Smith	28A-7	~80%	>20	25
Boiler	Boiler Room	Bldg Dist	HB Smith	28A-S/W-07	~80%	>20	25
EF	Roof	Restroom	Loren Cook	160PR 16PR	Unknown	~5	20
EF	Roof	Interior	Carnes	VTB18P1A1NA15SPCX	Unknown	~5	20
EF	Roof	Interior	Carnes	VTBK24S1C15SPCX	Unknown	~5	20
EF	Roof	Interior	Carnes	VTBK21R1C1NA15SPCX	Unknown	~5	20
EF	Roof	Interior	Carnes	VEBK10L1A1NA15APCX	Unknown	~5	20
EF	Roof	Restroom/Locker Room	Unknown	Unknown	Unknown	~20	20
EF	Roof	Restroom/Locker Room	Unknown	Unknown	Unknown	~20	20
EF	Roof	Restroom/Locker Room	Unknown	Unknown	Unknown	~20	20
EF	Roof	Restroom/Locker Room	Unknown	Unknown	Unknown	~20	20
EF	Roof	Restroom/Locker Room	Unknown	Unknown	Unknown	~20	20
EF	Roof	Kitchen	Carnes	VEBK08L1A1NA15APCX	Unknown	~7	20
EF	Low Roof	Interior	Carnes	Unknown	Unknown	~7	20
EF	Low Roof	Interior	Carnes	Unknown	Unknown	~7	20
EF	Low Roof	Interior	Carnes	Unknown	Unknown	~7	20
EF	Gym Roof	Gym	Loren Cook	80PR 8PR	Unknown	~7	20
EF	Gym Roof	Gym	Loren Cook	160PR 16PR	Unknown	~7	20
EF	Roof	Classroom	Carnes	VEBK08L1A1NA15APCX	Unknown	~7	20
EF	Roof	Cafeteria	Carnes	VWDK08F3A1NA15SPX	Unknown	~5	20
EF	Roof	Cafeteria	Carnes	VEBK301A1NA15SPCX	Unknown	~5	20
EF	Roof	Unknown	Carnes	V1BK15L1A1NL20...GX	Unknown	~5	20
EF	Roof	Unknown	Carnes	V1BK12K3A1NL20...GX	Unknown	~7	20

Table 4.2-19 Lowell Elementary School HVAC Equipment Service Lives						
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)
Pump	Boiler Room	Circulation	Baldor	M3218T	Unknown	~10
Pump	Boiler Room	Circulation	Baldor	M3218T	Unknown	~10
Pump	Boiler Room	Feed Water	Baldor	Unknown	Unknown	~10
Pump	Boiler Room	Feed Water	Baldor	Unknown	Unknown	~10
Pump	Boiler Room	Circulation	Baldor	VM3158	Unknown	~10
Pump	Boiler Room	Sump	Unknown	8-135311-03	Unknown	~5
Pump	Boiler Room	Sump	Unknown	8-135311-03	Unknown	~5
wall ACU	Nurse's Office	Nurse's Office	Carrier	Unknown	Unknown	~7
wall ACU	Nurse's Office	Nurse's Office	Friedrich	Unknown	Unknown	~7
wall ACU	Room 120	Room 120	Hot Point	Unknown	Unknown	~10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

It may be seen that some air handling units have likely exceeded their ASHRAE expected service lives. CDM recommends replacing these units as soon as financially feasible to ensure minimal downtime and mitigate increasing maintenance costs. However, CDM anticipates minimal energy savings from replacements as the units primarily utilize hot and chilled water coils and therefore do not have rated efficiencies that may be improved.

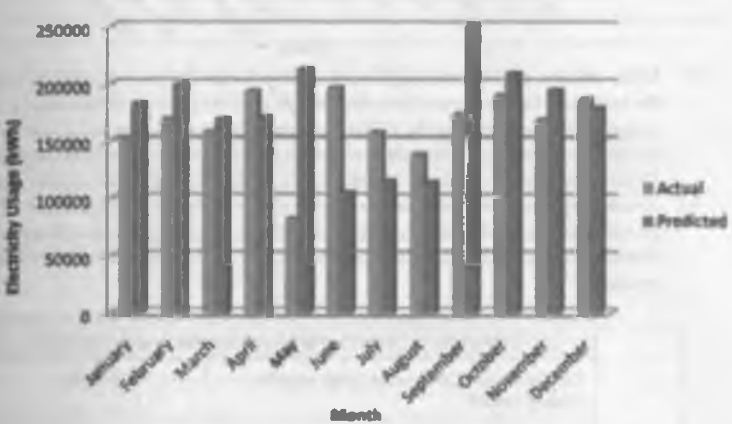
CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-20 below.

Table 4.2-20 Lowell Elementary School Domestic Water Heaters						
Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Observed Condition
Boiler Room	AO Smith	40 gal	FBG 40 242	Gas-fired	32 MBH	Good

4.2.6 Teaneck High School

A model of the Teaneck High School was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009 and oil bills from January 2008 to December 2008. Figure 4.2-16 below compares actual monthly electricity usages, with those predicted by the eQuest model.

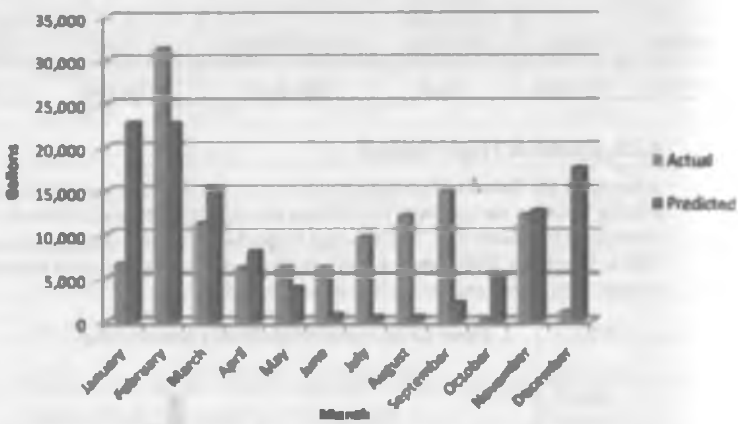
Figure 4.2-16: Teaneck High School Electricity Usage



Local spikes in the summer could be attributed to summer session activities or increased occupancy due to preparation for the next school year. Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-17 below compares actual oil usage to model-predicted oil use. Actual oil usage accounts not only for the gallons of oil consumed per month, but also for the gallons of oil represented by the monthly natural gas consumption. The boilers are dual-fuel and use either oil or natural gas depending on which fuel option is cheaper.

Figure 4.2-17: Teaneck High School Oil Usage



In the existing system, the single stage absorption chiller is energized by steam from the boilers, which requires the boilers to run all year long. This results in a spike in oil usage in the summer months. CDM recommends base loading the screw chillers in the summer months, so that the absorption chiller is only needed for peak conditions. The domestic hot water load on the existing boilers can be segregated to a new condensing domestic water heater to help accomplish this change. Table 4.2-21 provides anticipated savings associated with the implementation of a separate domestic hot water heater. No maintenance cost savings were considered for this measure.

Table 4.2-21: Teaneck High School DHW Heater Payback	
Current Annual Oil Cost for DHW load on existing boilers	$15,702
Predicted Annual Gas Cost for separate DHW heater	$6,725
Total Annual Savings	$8,977
Initial Capital Cost of Upgrade	$5,240
Incentives**	$0
Cost of Upgrade	$5,240
Simple Payback	**0.6**
Lifetime Energy Savings (24 years)*	$343,471.86
Annual Maintenance Cost Savings (AMCS)	$0
Annual Return on Investment (AROI)	166.24%

Table 4.2-21: Teaneck High School DHW Heater Payback	
Internal Rate of Return (IRR)	193.41%
Net Present Value (NPV)	$227,233.40

*Assumes 3% yearly inflation on fuel costs
**No incentives were noted for domestic hot water heaters

Currently, the chilled water, hot water, and domestic hot water circulation pumps are set to provide a constant flow through their respective systems when in operation. The Board expressed interest in variable speed control for the hot water circulation pumps. Varying the flow in the water systems to match building requirements can provide significant electricity savings, as the pumps are no longer consistently running at full speed. However, the decreased electricity is compensated by an increase in the oil load. Since the oil usage is a function of boiler run time, the cast iron, firetube boilers run at full capacity whenever they are running. Therefore, a variable frequency drive (VFD) on the water circulation pumps causes the boiler to run longer and consume more fuel to meet the building's heating and cooling needs. Table 4.2-22 provides anticipated savings associated with the implementation of variable speed drives for all pumps. CDM anticipates no maintenance cost savings associated with variable speed drives.

Table 4.2-22: Teaneck High School Variable Speed Hot Water Pump Payback	
Predicted Annual Savings (kWh)	173,840
Electricity-related Savings	$27,391
Predicted Annual Savings (Gal Oil)	-3,522
Oil-related Savings	-$11,729
Total Annual Savings	$15,663
Initial Capital Cost of Upgrade	$76,123
Incentives**	$0
Cost of Upgrade	$76,123
Simple Payback	4.9
Lifetime Energy Savings (15 years)*	$296,030.29
Annual Maintenance Cost Savings (AMCS)	$0
Annual Return on Investment (AROI)	14.17%
Internal Rate of Return (IRR)	22.24%
Net Present Value (NPV)	$184,888.40

*Assumes 3% yearly inflation on oil and electricity costs
**No incentives were noted for variable speed drives on hot water circulation pumps

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.3-23 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Where equipment ages were not found on the equipment tags, they have been estimated based on the unit appearance or approximate renovation dates. In some cases, service locations may have been estimated based on unit proximity. Additionally, in cases where a unit's manufacturer and/or model could not be determined due to an unreadable, faded, destroyed, or lost tag, manufacturer and model number information has been represented as "unknown".

Table 4.2-23 Teaneck High School HVAC Equipment Service Lives

Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life
Absorption Chiller	Boiler Room	Bldg. Dist.	Trane	ABSC04[illegible]AL[illegible]01A AAHABBAAAA0D 0 3011000011	Unknown	~5	[illegible]
ACC	Roof	Server Closet	Friedrich	MR09C1E	~SEER 18	~5	[illegible]
ACC	Roof	Server Closet	Friedrich	MR09C1E	~SEER 18	~5	[illegible]
ACC	Main Office	Main Office	Friedrich	NR30C3F; indoor evap: MW30Y3F	~SEER 18	~5	[illegible]
ACC	Principal Office	Principal Office	Friedrich	NR24C3F; indoor evap: MW24Y3F	~SEER 18	~5	[illegible]
ACC	Nurse's Office - 1st floor	Nurse's Office - 1st floor	Daikin	FXMQ36MVJU	Unknown	~5	[illegible]
ACC	Technician's Room	Technician's Room	Friedrich	outdoor: MR30C3F; indoor: MW30C3F	~SEER 18	~5	[illegible]
ACC	Technician's Room	Technician's Room	Friedrich	outdoor: MR30C3F; indoor: MW30C3F	~SEER 18	~5	[illegible]
ACU	Nurse's Office - 1st floor	Nurse's Office - 1st floor	Carrier	38[illegible]MX[illegible]	Unknown	~5	[illegible]
AHU (RTU-6)	Roof	Auditorium	[illegible]	Unknown	Unknown	>30	[illegible]

Table 4.2-23 Teaneck High School HVAC Equipment Service Lives							
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
AHU [RTU-4]	Roof	Media center	Tjernlund	Unknown	Unknown	>30	34
AHU [RTU-1]	Roof	Windowless classrooms	McQuay	RWS804BW	Unknown	~20	20
AHU [RTU-3]	Roof	Lecture Hall	unknown	unknown	Unknown	~20	20
AHU	Roof	Band Room	Trane	unknown	Unknown	~9	20
AHU [RTU-2]	Roof	guidance, media, exterior classrooms	McQuay	RWS804BW	Unknown	~20	20
AHU	Gym	Gym	Trane	B6C611A B/MA	Unknown	7	20
AHU	Gym	Gym	Trane	B6C611A B/MA	Unknown	7	20
AHU	Gym Locker Room	Gym Locker Room	Trane	MCCA010GAVGAAA000D0CCA00C0A0000AC000C000AA0000	Unknown	~5	20
Boiler	Boiler Room	Bldg. Dist.	Cleaver Brooks	CB1-200-350-015	~85%	~10	25
Boiler	Boiler Room	Bldg. Dist.	Cleaver Brooks	CB1-200-350-015	~85%	~10	25
EF	Roof	Auditorium	Unknown	Unknown	Unknown	>20	20
EF	Roof	Auditorium	Unknown	Unknown	Unknown	>20	20
EF	Roof	Art Room 327	Greenheck	CUBE-131-4	Unknown	~5	20
EF	Roof	Art Room 325	Greenheck	GB-180-7	Unknown	~5	20
EF	Roof	Kitchen	PVC	FX36BFT	Unknown	~5	20
EF	Roof	Hallway	PVC	FX16BFT	Unknown	~5	20
EF	Roof	Hallway	PVC	DX7B	Unknown	~5	20
EF	Roof	Gym	Greenheck	GB-200-10	Unknown	~5	20
EF	Roof	Gym	Greenheck	GB-200-10	Unknown	~5	20
EF	Roof	Gym	Greenheck	GB-200-10	Unknown	~5	20
EF	Roof	Gym	Greenheck	GB-200-10	Unknown	~5	20
EF	Roof	3rd floor Hallway	PVC	AB35	Unknown	~5	20
EF	Roof	Boys toilet	PVC	DX10SB	Unknown	~5	20
EF	Roof	Girls Toilet	unknown	unknown	unknown	~15	20

Table 4.2-22 Teaneck High School HVAC Equipment Service Lives

Description (Tag ID)	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	[illegible] Expected Life (Years)
EF	Roof	Room adjacent to Girl's Toilet	PVC	DX10SR	Unknown	~15	20
EF	Roof	room 321	PVC	DX10SR	Unknown	~5	20
EF	Unknown	Unknown	Unknown	WXR82L	Unknown	~20	20
EF	Unknown	Unknown	Unknown	WXR82L	Unknown	~20	20
EF	Unknown	Unknown	Unknown	WXR82L	Unknown	~20	20
MAU	Art Rooms 327 & 325 (3rd fl)	Art Rooms 327 & 325 (3rd fl)	Trane	B6C611B B/MA	Unknown	6	20
MAU	Room 140 A	Gym	Trane	B6C611D B/MA	Unknown	6	20
MAU	Room 139 (Aux Gym)	Gym	Trane	B6C611C B/MA	Unknown	6	20
Pump	Boiler Room	Sump	Magnetek	8-186891-02	Unknown	~5	10
Pump	Boiler Room	Sump	Magnetek	8-186891-02	Unknown	~5	10
Pump	Boiler Room	Circulation	Universal Electric	SVE56T17D850A	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Universal Electric	SVE56T17D850A	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Bell and Gossett	100AB F48	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Taco	007-BF5	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Baldor	CJH3108	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Baldor	CJH3108	Unknown	~10	[illegible]
Pump	Boiler Room	Condenser	Taco	FM5010	Unknown	~10	[illegible]
Pump	Boiler Room	Condenser	Taco	FM5010	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Taco	92	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Taco	92	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Taco	FM4008	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Taco	FM4008	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	US Electrical	B075	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	US Electrical	B075	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Marathon	9VJ143TTDR5336A B	Unknown	~10	[illegible]
Pump	Boiler Room	Circulation	Marathon	9VJ143TTDR5336A B	Unknown	~10	[illegible]
Pump	Boiler Room	Fuel Oil	Marathon	91VN56T17324JP	Unknown	~10	[illegible]

Table 4.2-23 Teaneck High School HVAC Equipment Service Lives							
Description (Tag ID)	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
Pump	Boiler Room	Fuel Oil	Marathon	[illegible]	Unknown	~10	20
Pump (P-1)	Boiler Room	Circulation	BFS Industries	BFSB151-3/4	Unknown	~10	20
Pump (P-2)	Boiler Room	Circulation	BFS Industries	BFSB151-3/4	Unknown	~10	20
Pump (P-3)	Boiler Room	Circulation	BFS Industries	BFSB151-3/4	Unknown	~10	20
Pump	Boiler Room	Condenser	Baldor	37027X33	Unknown	~10	20
Pump	Boiler Room	Condenser	Baldor	37027X33	Unknown	~10	20
Pump	Boiler Room	Chiller	Unknown	Unknown	Unknown	~15	20
Pump	Boiler Room	Chiller	Unknown	Unknown	Unknown	~15	20
[illegible] Chiller	Boiler Office	Bldg Dist	Dunham	PCWX100	Unknown	~15	23
[illegible] Chiller	Boiler Office	Bldg Dist	Dunham	PCWX100	Unknown	~15	23
UH	Press Box	Press Box	Chromalox	MUH0361	Unknown	Unknown	13
Wall ACU	Room 303	Room 303	Frigidaire Electrolux	Unknown	Unknown	~10	10
Wall ACU	Technical Closet	Technical Closet	Unknown	Unknown	Unknown	~15	10
Wall ACU	Admin Office	Admin Office	Unknown	Unknown	Unknown	~15	10
Wall ACU	Science Lab	Science Lab	Unknown	Unknown	Unknown	~15	10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

It can be seen that several of the rooftop units (RTU-1, 2, 3, 4, and 5) have either exceeded or are close to exceeding their ASHRAE expected service lives. Consequently, it can be assumed that these units are not performing at their rated efficiencies. Unfortunately, CDM was unable to determine the capacity of many of these units because model numbers were not available. For modeling and cost estimating purposes, the two large Tjernlund units have been assumed to each be 300 MBH models with a cooling capacity of 20 tons. Table 4.2-24 demonstrates the anticipated combined savings resulting from upgrading to similarly sized modern units, with a cooling seasonal energy efficiency ratio (SEER) of 14.7 (COP is approximately 3.76), and heating annual fuel utilization efficiency (AFUE) of 94.6%. Due to the increased efficiency and enhanced controls and capabilities of these units, they typically offer a 40% energy savings over their predecessors.

Table 4.2-24: Teaneck High School RTU Replacements Payback	
Predicted Annual Savings (therms)	1336
Predicted Annual Savings (kwh)	12696
Total Annual Savings	$3,460
Initial Capital Cost of Upgrade	$130,008
Incentives**	$3,160
Cost of Upgrade	$126,848
Simple Payback	**36.7**
Lifetime Energy Savings (24 years)*	$119,115.59
Annual Maintenance Cost Savings (AMCS)	$0
Annual Return on Investment (AROI)	(-1.44%)
Internal Rate of Return (IRR)	(-0.46%)
Net Present Value (NPV)	($46,226.14)

*Assumes 3% yearly inflation on electricity costs

**Incentives, per New Jersey Smart Start Program, $79/Ton

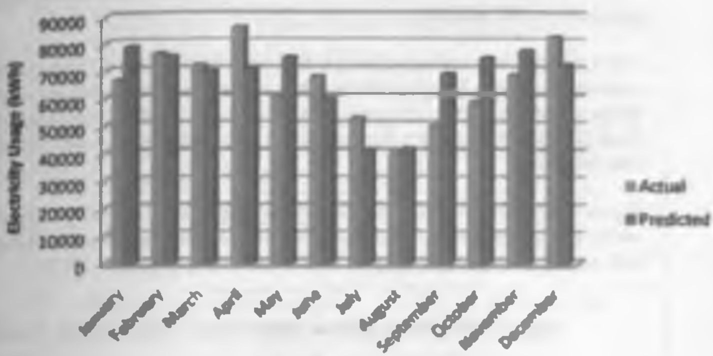
CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-25 below.

Table 4.2-25 Teaneck High School Domestic Water Heaters						
Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Observed Condition
Boiler Room	Bradford White	Unknown	40A-15-3-103-N-AA	Electric	Unknown	Not in Use

4.2.7 Thomas Jefferson Middle School

A model of Thomas Jefferson Middle School was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009 and oil bills from November 2007 to December 2009. Figure 4.2-18 below compares actual monthly electricity usages, with those predicted by the eQuest model.

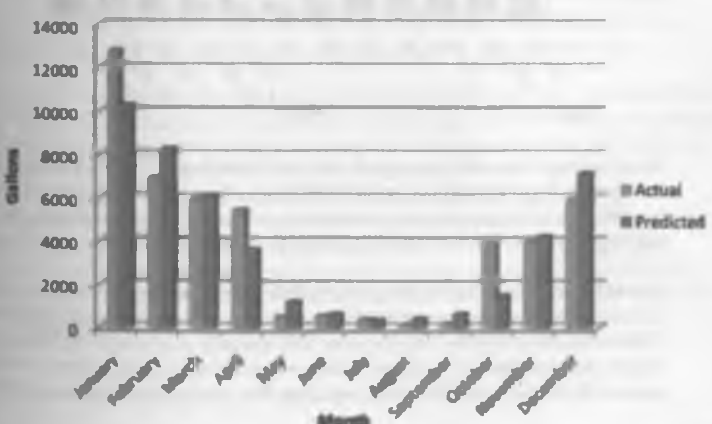
Figure 4.2-18: Thomas Jefferson Middle School Electricity Usage



Local spikes in the summer could be attributed to summer session activities or increased occupancy due to preparation for the next school year. Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-19 below compares the school's actual monthly oil usage to model-predicted oil use. Actual oil usage accounts not only for the gallons of oil consumed per month, but also for the gallons of oil represented by the monthly natural gas consumption.

Figure 4.2-19: Thomas Jefferson Middle School Oil Usage

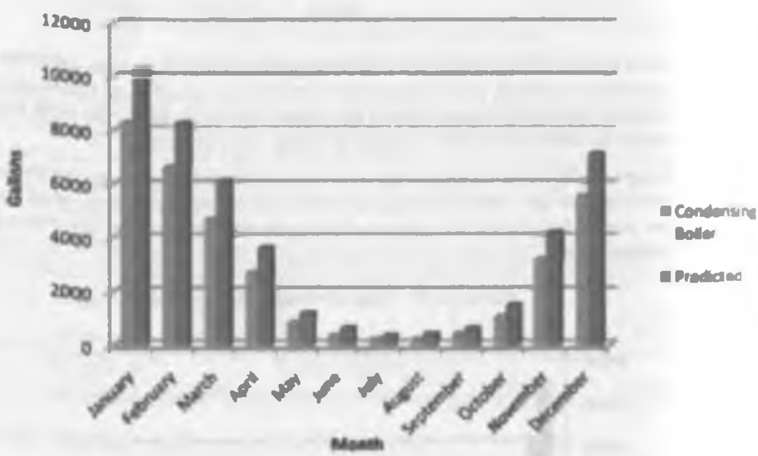


Currently, the heating system utilizes two (2) Smith Cast Iron Sectional boilers. Each boiler has a gross-output capacity of 5,618 MBH. CDM conservatively estimates these boilers to be 80% efficient.

CDM recommends replacing these boilers with high-efficiency, natural gas-fired, condensing boilers. Based on the building model, and accounting for a 25% safety factor, CDM has calculated a peak heating load of 6,700 MBH. CDM anticipates that three (3) 3,000 MBH output, high-efficiency condensing boilers should adequately heat the school.

Figure 4.2-20 compares current gas usage with predicted gas usage resulting from a switch to high-efficiency, condensing boilers. Condensing boilers are modeled with a full-load efficiency of ~91.5% and return water temperature of 100°F.

Figure 4.2-20: Thomas Jefferson Middle School – Boiler Upgrade - Oil Usage



Fiscal savings from such an upgrade are then identified in Table 4.2-26 below. Lifetime savings calculations for all ECRM's may be found in Appendix I. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of typical firetube boilers. CDM estimates a firetube boiler system will typically cost around $3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around $2,000 per year. Therefore, replacing the existing boiler system with a condensing boiler system should result in an operation and maintenance cost savings of $1,500 per year.

Table 4.3-26: Thomas Jefferson Middle School Boiler Upgrade Payback	
Current Annual Oil Cost for Existing Boilers	$106,826
Predicted Annual Gas Cost for Condensing Boilers	$59,659
Total Annual Savings	$47,167
Initial Capital Cost of Upgrade	$156,190
Incentives**	$9,000
Cost of Upgrade	$147,190
Simple Payback	3.1
Lifetime Energy Savings (24 years)*	$1,669,804.34
Annual Maintenance Cost Savings (AMCS)	$1,500
Annual Return on Investment (AROI)	28.90%
Internal Rate of Return (IRR)	35.94%
Net Present Value (NPV)	$977,257.83

*Assumes 3% yearly inflation on fuel costs

**[illegible], per New Jersey Clean Energy Program, are $1.00 per MBH

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.3-27 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Where equipment ages were not found on the equipment tags, they have been estimated based on the unit appearance or approximate renovation dates. In some cases, service locations may have been estimated based on unit proximity. Additionally, in cases where a unit's manufacturer and/or model could not be determined due to an unreadable, faded, destroyed, or lost tag, manufacturer and model number information has been represented as "unknown".

Table 4.2-27 Thomas Jefferson Middle School HVAC Equipment Service Lives

Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
ACC	Media Center/Classrooms Roof	Child Guidance	Trane XR12	Model 2TTR2036A 00AA	Unknown	~5	[illegible]
ACC	Media Center/Classrooms Roof	Internal rooms	Carrier	Model 38CKC042	Unknown	~5	[illegible]
ACC	Outer Wall	Server Closet	Friedrich	Model MB30C3F	SEER 18	~5	[illegible]
AHU	Media Center/Classrooms Roof	Auditorium	Trane/ Intellipack	Model SLHFC40E 6C6ND1D01A0CE L00RT00600	~80%	~7	[illegible]
AHU	Media Center/Classrooms Roof	Locker Rooms	Trane	Model TSCA006G BA0EAD0CAAEDA	~80%	7	[illegible]
AHU	Main Office	Main Office	Trane	D6WB15042E0BA BABA0GA0	~80%	~7	[illegible]
AHU	Main Office	Main /Office	Trane	Model MCCB010U 0C0UB	~80%	7	[illegible]
AHU	Chorus Room	Chorus Room	Trane	Model BCVC054E 1D02E...BB...	~80%	7	[illegible]
AHU	Children Study	Children Study	Trane	Model 85G477AB	~80%	7	[illegible]
AHU	Basement serving Caf/Kitchen	Caf/Kitchen	Trane	Model MCCB017U 0C0UB	~80%	7	[illegible]
AHU	Unknown	Unknown	Trane	Model BICH024E2A 0A1C02 E00...BB	~80%	7	[illegible]
AHU	Locker Room unit, under Gym	Gym	Trane	Model MCCB006U 0C0UB	~80%	7	[illegible]
AHU	Locker Room unit, under Gym	Gym	Trane	Model MCCB014U 0C0UA	~80%	7	[illegible]
AHU	Locker Room unit, under Gym	Gym	Trane	Model MCCB014L 0C0UA	~80%	7	[illegible]
AHU	Grade	Main/Principal's Offices	Trane	Model TTA090A30	~80%	~7	[illegible]
AHU	Cafeteria	Cafeteria	Trane	Model MCCB021U 0C0B	~80%	~7	[illegible]
Boiler	Boiler Room	All rooms	HB Smith	Series 450 Mills B	~80%	>20	[illegible]
Boiler	Boiler Room	All rooms	Trane	Series 450 Mills B	~80%	>20	[illegible]
EF	Media Center/Classrooms Roof	Unknown	Loren Cook	Model 135R4B	Unknown	~5	[illegible]
EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 70C15DH	Unknown	~5	[illegible]
EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 70C15DH	Unknown	~5	[illegible]
EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 120C4B	Unknown	~5	[illegible]

Section 4
Energy Conservation and Retrofit Measures

Table 4.2-27 Thomas Jefferson Middle School HVAC Equipment Service Lives

EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 90C15DH	Unknown	~5	20
EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 100C2B	Unknown	~5	20
EF	Media Center/Classrooms Roof	Media Center	Loren Cook	Model 165C4B	Unknown	~5	20
EF	Media Center/Classrooms Roof	Media Center	Loren Cook	Model 100R2B	Unknown	~5	20
EF	Media Center/Classrooms Roof	Dance Room	Loren Cook	Model 180C6B	Unknown	~5	20
EF	Media Center/Classrooms Roof	Kitchen	Unknown	Unknown	Unknown	~15	20
EF	Media Center/Classrooms Roof	Kitchen	unknown	unknown	Unknown	~15	20
EF	Media Center/Classrooms Roof	Gym	Loren Cook	Model 245C8B	Unknown	~5	20
EF	Media Center/Classrooms Roof	Gym	Loren Cook	Model 245C8B	Unknown	~5	20
EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 100C10DH	Unknown	~5	20
EF	Media Center/Classrooms Roof	Restroom	Loren Cook	Model 90C10DH	Unknown	~5	20
EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 100C3B	Unknown	~5	20
EF	Media Center/Classrooms Roof	Restroom	Loren Cook	Model 70C15DH	Unknown	~5	20
EF	Media Center/Classrooms Roof	Locker Rooms	Loren Cook	Model 135C5B	Unknown	~5	20
EF	Kitchen	Kitchen	Loren Cook	Model 225TCNB	Unknown	~5	20
EF	Roof	Kitchen	Loren Cook	165 CPS	Unknown	~5	20
Pump	Boiler Room	Circulation	Bell and Gossett	M80121	Unknown	~10	20
Pump	Boiler Room	Circulation	Bell and Gossett	M80121	Unknown	~10	20
Pump	Boiler Room	Circulation	Baldor	M2531T	Unknown	~10	20
Pump	Boiler Room	Circulation	Baldor	M2531T	Unknown	~10	20
UH	Hallway near Boiler Room	Hallway near Boiler Room	Trane	Model UHSA060	Unknown	~7	13
UH	Kitchen Office	Kitchen Office	Smark	Unknown	Unknown	~7	13

Table 4.2-27 Thomas Jefferson Middle School HVAC Equipment Service Lives							
Wall ACU	Nurse's Office	Nurse's Office	GE	Model [illegible]	Unknown	~10	[illegible]
Wall ACU	Teacher's Lounge	Teacher's Lounge	unknown	unknown	Unknown	~10	[illegible]
Wall ACU	G-6 Basement Comp Rm	G-6 Basement Comp Rm	GE	Model AM24DAR1	Unknown	~10	[illegible]
Wall ACU	G-6 Basement Comp Rm	G-6 Basement Comp Rm	GE	Model AM24DAR1	Unknown	~10	[illegible]
Wall ACU	G-6 Basement Comp Rm	G-6 Basement Comp Rm	GE	Model AM24DAR1	Unknown	~10	[illegible]
Wall ACU	Kitchen Office	Kitchen Office	Sharp	Unknown	Unknown	~10	[illegible]

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

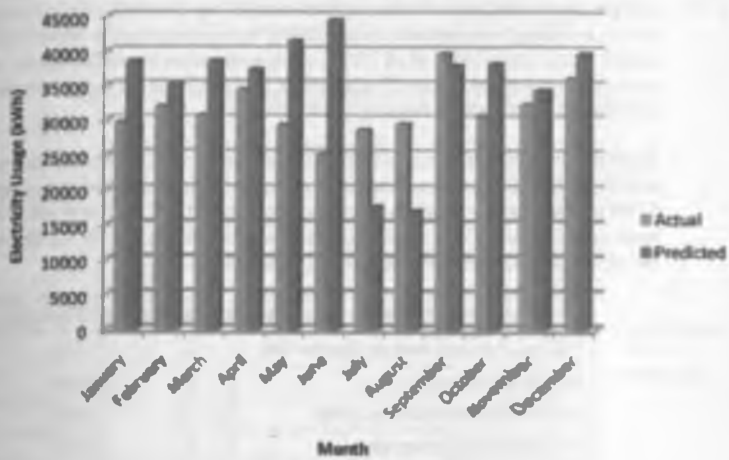
CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-28 below.

Table 4.2-28 Thomas Jefferson Middle School Domestic Water Heaters						
Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Observed Condition
Boiler Room	AO smith	Unknown	Model HW 200M 942	Electric	199 MBH	Fair

4.2.8 Whittier Elementary School

A model of the Whittier Elementary School was created in eQuest to predict heating and cooling loads for the building. To calibrate this model, CDM used electricity and natural gas bills from July, 2007 through December, 2009 and oil bills from November 2007 to December 2009. Figure 4.2-21 below compares actual monthly electricity usages, with those predicted by the eQuest model. Historical monthly usages were averaged for each month observed over multiple years.

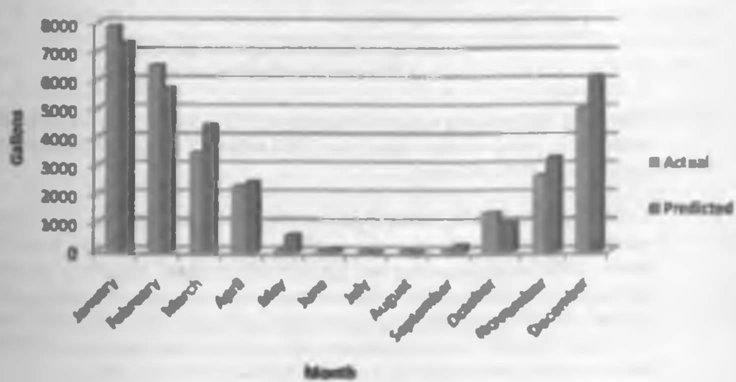
Figure 4.2-21: Whittier Elementary School Electricity Usage



Local spikes in the summer could be attributed to summer session activities or increased occupancy due to preparation for the next school year. Increased electrical usage in the winter is indicative of the greater heat load during the peak heating season as well as the heavy occupancy during these months.

Figure 4.2-22 below compares the school's actual monthly oil usage to model-predicted oil use. Actual oil usage accounts not only for the gallons of oil consumed per month, but also for the gallons of oil represented by the monthly natural gas consumption.

Figure 4.2-22: Whittier Elementary School Oil Usage



Currently the HVAC systems at the Whittier Elementary School are controlled independently, by room thermostats. It is recommended that a direct digital control (DDC) building management system (BMS) be implemented. A system like this would monitor and control all HVAC equipment, allowing maintenance staff to operate systems and adjust climate control in real time to maximize comfort, while minimizing unnecessary heating and cooling.

Typically implementation of a BMS will save the owner 5-15% of the energy devoted to HVAC. As all systems are currently independently monitored and controlled, CDM conservatively estimates that implementing a DDC BMS will allow the school to save, on average, 10% of the energy being used for HVAC. Table 4.2-29 demonstrates the potential payback from such an implementation.

Table 4.2-29 Whittier Elementary School DDC BMS Payback	
Predicted Annual Savings (Gallons Oil)	3,122
Annual Savings (Oil)	$7,400
Predicted Annual Savings (kWh)	20,053
Annual Savings (Electricity)	$3,343
Total Annual Savings	$10,742
Initial Capital Cost of Upgrade	$47,530
Incentives**	$0
Cost of Upgrade	$47,530
Annual Maintenance Cost Savings (AMCS)	$0
Simple Payback	**4.4**
Lifetime Energy Savings (15 years)*	$199,797.00
Annual Return on Investment (AROI)	15.93%
Internal Rate of Return (IRR)	24.24%
Net Present Value (NPV)	$108,903.46

*Assumes 3% yearly inflation on oil and electricity costs

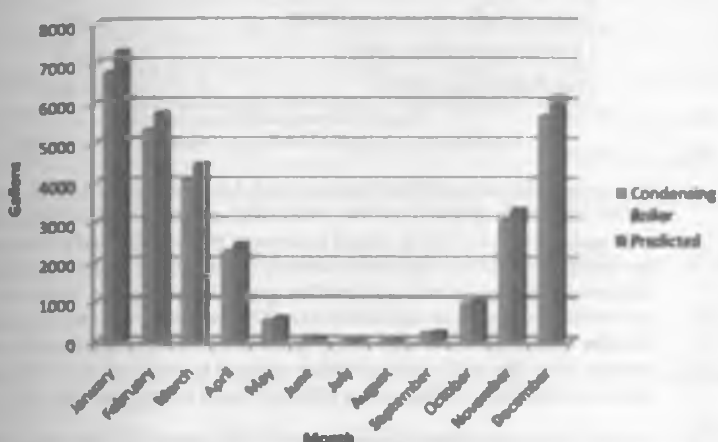
**No incentives found for this upgrade

Currently, the heating system utilizes two (2) Smith Cast Iron Sectional boilers. Each boiler has a gross-output capacity of 2,836 MBH. CDM conservatively estimates these boilers to be 80% efficient.

CDM recommends replacing these boilers with high-efficiency, natural gas-fired, condensing boilers. Based on the building model, and accounting for a 25% safety factor, CDM anticipates that two (2) 3,000 MBH output, high-efficiency condensing boilers should adequately heat the school. In this upgrade, the existing steam heating system would be retrofitted for hot water use. Steam traps would be replaced with hot water control valves, condensate piping would be scheduled for demolition, and new hot water return piping and insulation would be installed.

Figure 4.2-23 compares current gas usage with predicted gas usage resulting from a switch to high-efficiency, condensing boilers. Condensing boilers are modeled with a full-load efficiency of ~91.5% and return water temperature of 100°F

Figure 4.2-23: Whittier Elementary School – Boiler Upgrade - Oil Usage



Fiscal savings from such an upgrade are then identified in Table 4.2-30 below. Lifetime savings calculations for all ECRM's may be found in Appendix I. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of typical firetube boilers. CDM estimates a firetube boiler system will typically cost around $3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around $2,000 per year. Therefore, replacing the existing boiler system with a condensing boiler system should result in an operation and maintenance cost savings of $1,500 per year.

Table 4.2-30: Whittier Elementary School Boiler Upgrade Payback	
Current Annual Oil Cost for Existing Boilers	$73,996
Predicted Annual Gas Cost for Condensing Boilers	$64,326
Total Annual Savings	$9,670
Initial Capital Cost of Upgrade	$222,990
Incentives**	$6,000

Table 4.2-30: Whittier Elementary School Boiler Upgrade Payback	
Cost of Upgrade	$216,990
Simple Payback	**19.4**
Lifetime Energy Savings (24 years)*	$368,896.32
Annual Maintenance Cost Savings (AMCS)	$1,500
Annual Return on Investment (AROI)	0.96%
Internal Rate of Return (IRR)	4.24%
Net Present Value (NPV)	$33,728.57

*Assumes 3% yearly inflation on fuel costs

**Incentives, per New Jersey Clean Energy Program, are $1.00 per MBH

Over several decades, ASHRAE has compiled data pertaining to service lives of most HVAC related equipment. From this, ASHRAE indicates a median service life (life until replacement) for HVAC related equipment that may be used as an estimate for the useful life of HVAC equipment currently in service. For example, ASHRAE indicates a make-up air unit has a median service life of 20 years. Therefore, if a make-up air unit has been in service for more than 20 years, the owner may want to consider replacement. Not only will a replacement ensure minimal downtime between units (the unit is replaced before it ceases to function), but it will also maintain rated system efficiency, as efficiency tends to decrease with age.

All major equipment noted during CDM's on site audit is listed in Table 4.2-31 below, along with estimated current ages and ASHRAE-expected service lives. It should be noted that only equipment that was observed at the time of the audit is included.

Table 4.2-31 Whittier Elementary School HVAC Equipment Service Lives							
Description [Tag ID]	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
ACC	Roof	Elevator	Mitsubishi Mr. Slim	MU12NN; evap: MS12NN(Ceak)	SEER 18	~10	[illegible]
ACC	Roof	Classrooms	Trane	RAUCC40EPT830A0D 000T00	Unknown	~7	[illegible]
ACC	Faculty Courtyard	Lunch Room in Basement	Friedrich	MR24C3E-A	SEER 18	~5	[illegible]
ACC	Front Entrance	Main Office	Friedrich	MR30C3F	SEER 18	~5	[illegible]
ACC	Principal's Office	Principal's Office	Friedrich	MR24C3F	SEER 18	~5	[illegible]
ACC	Other	Room 2 Computer Room	Friedrich	indoor: MW12C1F; outdoor: MR12C1F	SEER 18	~5	[illegible]
Boiler	Boiler Room	Bldg Dist	Smith	28A-13	~80%	>20	[illegible]
Boiler	Boiler Room	Bldg Dist	Smith	28A-S/W-[illegible]	~80%	>20	[illegible]
EF	Roof	Nurse's Office	Loren Cook	100C10DH	Unknown	~7	[illegible]

Table 4.2-31 Whittier Elementary School HVAC Equipment Service Lives							
Description (Tag ID)	Unit Location	Service Location	Manufacturer	Model	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
EF	Roof	Nurse's office	Loren Cook	100C10DH	Unknown	~7	20
EF	Roof	Interior Rooms	Carnes	VEBK10K2A1NA20APCX	Unknown	~10	20
EF	Roof	Interior rooms	Carnes	VEBK12L1A1NA20APCX	Unknown	~10	20
EF	Roof	Interior rooms	Carnes	VEBK18M1A1NA20APCX	Unknown	~10	20
EF	Roof	Interior rooms	Carnes	VEBK24P1C1NA20APCX	Unknown	~10	20
EF	Roof	Interior rooms	Carnes	VEBK15L1A1NA20APCX	Unknown	~10	20
EF	Roof adjacent to Caf	Interior rooms	Unknown	Unknown	Unknown	~20	20
EF	Roof adjacent to Caf	Interior rooms	Unknown	Unknown	Unknown	~20	20
EF	Roof adjacent to Caf	Interior rooms	Unknown	Unknown	Unknown	~20	20
EF	Roof adjacent to Caf	Interior rooms	Unknown	Unknown	Unknown	~20	20
EF	Roof adjacent to Caf	Interior rooms	Unknown	Unknown	Unknown	~20	20
EF	Existing Roof area	Interior rooms	Unknown	Unknown	Unknown	~20	20
EF	Existing Roof area	Interior rooms	Unknown	Unknown	Unknown	~20	20
Pump	Boiler Room	Circulation	Emerson	P3FZY-4417	Unknown	~10	20
Pump	Boiler Room	Circulation	Emerson	P3FZY-4417	Unknown	~10	20
Pump	Boiler Room	Circulation	Marathon	SVJ213TTDV7049AA	Unknown	~10	20
Pump	Boiler Room	Circulation	Marathon	SVJ213TTDV7049AA	Unknown	~10	20
Pump	Boiler Room	Circulation	Leland-Faraday	M891A	Unknown	~10	20
Pump	Boiler Room	Circulation	Leland-Faraday	M891A	Unknown	~10	20
Wall A/CU	Other	Child Study Team	RCA	Unknown	Unknown	~15	10

Many classrooms in the school utilize unit ventilators for heating. As facility personnel continue to service unit ventilators throughout the building, they should note the condition and approximate age of the units. Those that are older than 15 years should be considered for replacement, as they are likely operating significantly below the equipment-rated efficiency.

CDM also created an inventory of observed domestic water heaters. This will attempt to inform the BOE of any water heaters that are in need of replacement. Equipment observed to be in poor or aging condition would warrant replacement, as they are likely not operating at peak efficiency. This domestic water heater inventory may be seen as Table 4.2-32 below.

Table 4.2-32 Whittier Elementary School Domestic Water Heaters						
Location	Make	Storage Capacity (Gallons)	Model Number	Type	Heating Capacity	Observed Condition
Boiler Room	Rheem	50	41V50	Gas-Fired	40 MBH	Good
Basement Room	AO Smith	80	DVE80A917	Electric	15 kW	Good

4.3 Alternative Energy Sources

4.3.1 Photovoltaic Solar Energy System Overview

Photovoltaic (PV) cells convert energy in sunlight directly into electrical energy through the use of silicon semi conductors, diodes and collection grids. Several PV cells are then linked together in a single frame of module to become a solar panel. PV cells are able to convert the energy from the sun into electricity. The angle of inclination of the PV cells, the amount of sunlight available, the orientation of the panels, the amount of physical space available and the efficiency of the individual panels are all factors that affect the amount of electricity that is generated.

Based on the estimated cumulative total available roof area, calculations determine that the installation of eleven systems with a total rating of approximately 1395 kW (dc) will be appropriate for the eight School District buildings.

As part of this energy audit, a preliminary engineering feasibility study of the sites outlined above to support solar generation facilities was completed consisting of the following tasks:

a. Site Visit by our engineers.

b. Satellite Image Analysis and Conceptual design and layout of the photovoltaic system

c. Design and construction cost estimates

d. Determine a preliminary design for the size and energy production of the solar system.

The total unobstructed available area of each section of the roof with southern exposure was evaluated. It is important to note the following:

1. The structural integrity of the roofs was not confirmed during our site visit. The municipal buildings may require some degree of roofing work prior to the implementation of a solar system.

2. In the case of the flat areas, the PV system sizing and kWh production was calculated assuming the installation of a crystalline module facing south direction (220 Degree Azimuth) and tilted approximately 20 degrees to allow better rain water shedding and snow melting. Please note that the kWh production as well as system size may differ significantly based on final panel tilt selected during the RFP and design phase.

3. Blended electric rates were used based on actual utility bills and were applied for the facilities.

The following is a preliminary study on the feasibility of installing PV solar systems at the eight School District buildings to generate a portion of each facility's electricity requirements. Each system is designed to offset the electric purchased from the local utility and not as a backup or emergency source of power.

In order to determine the best location for the installation of the PV solar system, a satellite image analysis and site walkthrough of the facilities was performed on February 9-11th. As per the Scope of Work, only the facilities roofs were considered for PV installation.

Also, as part of our assessment we investigated possible locations for electrical equipment that need to be installed such as combiner boxes, disconnect switches and DC to AC inverters. Consideration was also given to locations of interconnection between the solar system and building's electrical grid.

4.3.1.1 Benjamin Franklin Middle School

The roof of the Benjamin Franklin Middle School is flat with very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 265.5 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 800A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.2 Bryant Elementary School

The roof of the Bryant Elementary School is flat with very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 49.8 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 800A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.3 Eugene Field Administration Building

The roof of the Eugene Field Administration Building is flat with very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 60.2 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 400A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.4 Hawthorne Elementary School

The roof of the Hawthorne Elementary School is flat with very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 148.1 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 800A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.5 Lowell Elementary School

The roof of the Lowell Elementary School is flat with very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 69.9 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 800A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.6 Teaneck High School

The roof of the Teaneck High School is flat with numerous obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 277.8 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 3000A, 3 Phase, 480V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.7 Thomas Jefferson Middle School

The roof of the Thomas Jefferson Middle School is flat with very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 549.5 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 800A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.8 Whittier Elementary School

The roof of the Whittier Elementary School is flat with very few obstructions such as exhaust fans, rooftop HVAC units, and electrical and gas piping. There is a minimal amount of shading on the roof from adjacent foliage that would need to be addressed during the design phase of the project. The structural integrity of the roof was not confirmed although a visual inspection revealed no leaks or major defects. The structural integrity of the roof and the existence of a warranty shall be confirmed prior to the implementation of a PV system.

The Project Team conducted both a facility walkthrough and a satellite image analysis and based on the estimated total available area we calculated the installation of a solar system, rated at approximately 239.9 kW (dc).

Electrical Service

The interconnection point for the PV system will require a modification or replacement of the existing 800A, 3 Phase, 208V service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements. Further investigation and verification of existing electrical equipment would be required prior to implementation of a PV system.

4.3.1.9 Basis for Design and Calculations

The most common roof mounted system is referred to as a ("fixed tilt") system typically mounted to a metal rack that can be fixed at a specific angle. There are also ("tracking systems") or movable along one or two axes to follow the position of the sun during the day. For a roof-mounted PV system, tracking systems are very rarely installed and are usually used for ground-mounted systems only, as they require more complex racks and higher maintenance costs. For the "fixed" system, the tilt is determined based on the following factors: geographical location, total targeted kWh production, seasonal electricity requirements and weather conditions such as wind. Ideally, the module tilt for Northern New Jersey should be 25-35 degrees with an azimuth as close as possible to 180 (south); however, our experience has shown that PV systems are typically installed at a tilt of 20 degrees or lower in order to avoid any issues with wind and to maximize total system size.

The type of PV panels and equipment used to mount the system shall be determined based on the wind conditions and structural integrity of the roof determined during the design phase of the project. In general, penetration/tie-down systems, non-penetrating ballasted type systems, or a combination of the two should be considered.

Calculation of PV System Yield

An industry accepted software package, PV Watts was used to calculate projected annual electrical production of the crystalline silicon PV system in its first year, as summarized in Table 4.3-1. The system was design to provide maximum kWh production based on available roof space.

Table 4.3-1 Summary of Solar (PV) Systems

Site	Est. Area (ft2)	kWh	Annual Energy Savings	Est. Annual SREC	Lifetime Energy Savings (25 Years)*	Annual Return On Investment (AROI)	Net Present Value (NPV)	Internal Rate of Return (IRR)
Benjamin Franklin Middle School	26,646	325,372	$50,107.3	$205,127	$1,866,213	4.20%	$42,134	3.22%
Bryant Elementary	4,976.2	60,976	$10,549	$38,442	$390,776	3.15%	-$83,435	1.95%
Eugene Field Administration Building	6,026	73,837	$12,183	$46,550	$451,320	3.32%	-$83,957	2.09%
Hawthorne Elementary School	14,812	181,536	$29,963	$114,446	$1,109,613	4.06%	$25,081	3.16%
Lowell Elementary School	6,994	85,712	$16,114	$54,036	$598,936	3.69%	-$9,059	2.89%
Teaneck High School	27,776	340,420	$54,127	$214,613	$2,006,114	4.27%	$108,716	3.38%
Thomas Jefferson Middle School	54,953	673,496	$119,863	$424,596	$4,441,022	4.63%	$632,029	4.09%
Whittier Elementary School	23,987	293,964	$49,096	$185,338	$1,818,724	4.30%	$131,487	3.51%

*3% yearly inflation on electricity costs

Total Costs

It should be noted that construction costs are only estimates based on historic data compiled from similar installations, and engineering opinion. Additional engineering and analysis is required to confirm the condition of the roofs, structural integrity of the roofs, the system type, sizing, costs and savings. Budget costs assume existing roofs are structurally sound, do not need to be replaced, and can accommodate a solar system. For illustration purposes, a draft financial analysis pro forma is attached outlining all project costs and revenues.

Table 4.3-2 Engineers Opinion of Probable Cost

Engineers Opinion of Probable Cost	$10,862,698

As stated above the estimated installation costs are based on significant experience with the pricing of solar installations in New Jersey, and are intended to provide the District with a realistic budget cost. A typical solar installation can vary in cost from $7.00 - $10.00 per watt depending on size, complexity of the system, labor rates, etc. Approximately 60-70% of that number is material costs while the balance is labor, engineering, etc. Like any installation, certain conditions can affect a price upward or downward. For purposes of this analysis the estimated installation cost does not include any roofing or structural work which may be required to maintain warranties or for additional structural support. We have included a budget of $9/watt for the solar system installation with an additional estimated budget of $100,000 for potential electric service work.

Refer to Section 7 for discussion on Solar Renewable Energy Certificates and other financing options for solar projects. The financial model in Appendix E provides an annual forecast illustration of project revenues and costs for 25 years.

4.3.2 Wind Power Generation

On-site wind power generation typically utilizes a form of turbine, which is rotated with the flow of wind across it, this rotational force powers a generator, producing DC electricity. The DC electricity is then converted into AC electricity, which can be used for commercial power, or can be fed back into the power grid, reducing the overall electric demand. The size of the turbine is proportional to the amount of wind and concurrently the amount of energy it can produce.

CDM has determined that it is feasible for the Teaneck School District to install wind turbine energy systems at 8 of its sites. This is primarily due to 1.3 year payback for averaged wind speeds. There are many other incentives that could possibly provide additional funding which would reduce the payback period further, and possibly eliminate the cost of the turbine installation completely.

Because the School District does not have a large area for installation of a larger wind turbine at any of the 8 locations surveyed for the audit, a small 2.5kW wind turbine was chosen. A turbine of this size could be installed in most locations. Depending on area available, and funding, the School District may choose to install more than 1 wind turbine on the premises.

Utilizing the NASA Surface Meteorology wind mapping tool, it was determined that the local average wind speeds for Teaneck, NJ ranged from 9.01 mph to 13.02 mph, or 4.03 m/s to 4.5m/s at 20 meters above the ground. In general, around 7 mph of average wind speed, as determined over the course of a year, is necessary to "fuel" the turbine. These values fall within the range of feasibility for installation of a new wind turbine system.

For the purposes of this feasibility analysis, CDM chose a 2.5kW Wind Energy Solutions (WES) Tulipo wind turbine. This turbine size is used most often for small commercial applications. Power Curve data was determined through the use of the product specification sheets on vendor websites. Actual turbine size, height, location, and manufacturer should be determined upon design of a wind turbine system.

The estimated wind speed data, associated wind probability distribution function (weibull value), turbulence losses, and other relevant data were then incorporated into Wind Cad to estimate the annual output for the wind turbine. Refer to Appendix J for Wind Cad Modeling.

In order to determine simple payback analysis of the proposed wind turbine, CDM used the industry standard of $3-$8/W to compute total cost of the wind turbine. For this analysis, CDM used $7/W. This figure includes Overhead & Profit values. By installing the proposed wind turbine, the BOE will offset between $282.3 and $736 per year in utility costs per facility based on the minimum and maximum average local wind speeds. In addition, Renewable Energy Credits (REC's) are obtainable for renewable power and incentives are available through the Renewable Energy Incentive Program (REIP); refer to Section 7 for a more in depth explanation.

This simple payback calculation takes into account the incentive provided for wind turbines through the REIP program. For the first 16,000 kWh of production, the incentive is $3.20/kWh. For production between 16,000 kWh – 750,000 kWh the REIP program incentive is $0.50/kWh. CDM used this incentive as an upfront deduction from the Engineer's Opinion of Probable Cost. In addition, in order to benefit from the REIP incentive, the BOE must purchase a wind turbine on the approved NJ Clean Energy list. CDM chose the WES Tulipo wind turbine for this analysis as it is approved by the NJ Clean Energy program and is the appropriate size for smaller commercial installations and the limited area available on the site. Refer to the NJ Clean Energy website for more information.

Table 4.3-3 includes a simple payback analysis for the installation of one wind turbine energy system. Refer to Appendix K for a more detailed wind turbine financing spreadsheet, including utility cost avoidance and REC's.

Table 4.3-3: Simple Payback Analysis for Wind Turbine Energy System

Parameter	Wind Turbine (Minimum Site Wind Speed – 8.81 mph)	Wind Turbine (Maximum Site Wind Speed – 12.82 mph)	Wind Turbine (Average Site Wind Speed – 11.2 mph)
Engineer's Opinion of Probable Cost	$21,895	$21,895	$21,895
Renewable Energy Incentive Program**	-$12,214	-$21,895	-$20,304
Total Cost	$9,681	$0	$1,591
1st Year Production	3,817 kWh	8,316 kWh	6,345 kWh
Annual Estimated Electric Savings	$643.2	$1,401.2	$1,069.1
Annual Estimated REC Revenue	$86	$208	$159
Project Simple Payback	13.1 Years	0 Years	1.3 Years
Annual Return On Investment (AROI)	3.85%	0	74.16%

Table 4.3-3: Simple Payback Analysis for Wind Turbine Energy System			
Parameter	Wind Turbine (Minimum Site Wind Speed – 9.81 mph)	Wind Turbine (Maximum Site Wind Speed – 13.82 mph)	Wind Turbine (Average Site Wind Speed – 11.2 mph)
Lifetime Energy Savings (15 years)**	$23,827.2	$51,907	$38,804.8
Internal Rate of Return (IRR)	7.82%	0	80.28%
Net Present Value (NPV)	$8,625.7	$35,483.5	$25,502.4

*Refer to Appendix J for Wind Cad Modeling

**REIP incentive is calculated for only the first year and is applied as a deduction.

Based on the simple payback model, summarized in Table 4.3-3, it would benefit the School District to further investigate the installation of a wind energy system for all 8 sites. This is primarily based on the initial upfront capital investment required for a wind turbine energy system installation and the 1.3 year average wind speed payback period.

It should be noted that CDM used only REC values, utility cost avoidance factors, and the REIP incentive in determining simple payback periods. As stated above, other incentives and financial programs such as Power Purchase Agreements are available to help finance this installation. For example, if a Power Purchase Agreement is completed, the private company financing the project would benefit from the 30% tax credit. Other incentives such as CREB's and first year usage incentives could be available to the School District in lowering the payback period. Refer to *www.dsireusa.org* for an extensive listing of possible incentives for the New Jersey area.

It should also be noted that the wind turbine represented above is for feasibility purposes only. If the BOE decides to install a wind turbine, different mounting heights, turbine sizes, and manufacturers should be considered. In addition, permits may be required for installation according to local zoning laws. The FAA must also be notified in order to give clearance for the tower, and for installation of aviation safety lights if necessary.

4.3.3 Ground Source Heat Pumps

Geothermal systems utilize the constant temperature of the earth throughout the year (at depths from 5 ft. to 1,000 ft. the earth temperature remains at 53 deg. F) as the primary source of energy for the heating/cooling and domestic hot water production. Additionally, since the earth is maintained at a constant temperature from heat absorbed from the sun this energy is considered a "renewable resource," and therefore is not as reliant on existing supplies of fossil fuels.

Even though this application requires significantly higher up-front costs, it has several advantages over conventional HVAC systems such as substantially lower operating and maintenance costs. The life span of the system is longer than conventional heating and cooling systems. Most loop fields are warranted for 25 to 50 years and are expected to last at least 50 to 100 years. However it is important to note that geothermal systems are more difficult to install in existing facilities and require higher capital cost due to having to complete significant infrastructure changes. Therefore, installation of a geothermal system is not recommended at any of the Teaneck BOE facilities at this point.

4.4 Additional Measures

As discussed in Section 2, it may be possible to reduce the plug load of the buildings even further with the implementation of smart strips and energy star appliances. Smart Strips save energy by electronically unplugging all of the devices that are plugged into the "Automatically Switched outlets" when the device plugged into the control outlet is turned off. It is important to note that CDM is not suggesting that computers be plugged into the automatically switched off outlets, as there would be potential for the computers to be shut off mid-operation. There are a vast amount of computer peripherals that are typically left on after a computer is shut off, including monitors, scanners, printers and DSL/Cable modems. These peripherals can be plugged into the automatic outlets.

A standard Smart Strip has one 'control' outlet, six (6) outlets that are automatically switched off when the control device is and three (3) outlets that are always hot. An example of how the BOE can implement the use of Smart Strips within appropriate computer stations at the Teaneck High School Library is to plug a computer into the control outlet, five (5) monitors and a personal printer (8 W in standby mode) into the automatic outlets and three (3) computers into the always hot outlets. An LCD monitor can use up to 34W; in standby mode the monitor utilizes 1 - 2W. A CRT monitor typically utilizes around 75W. The following table 4.5-1 summarizes the payback of a Smart Strip, assuming 5 LCD monitors and 1 printer are automatically powered down that would otherwise been left on 8 hours/day and in standby mode 16 hours/day, 5 days/week for 9 months.

Table 4.4-1: Simple Payback

Smart Strip Classroom Application Example	
Predicted Annual Savings – 5 LCD monitors, 1 printer (kWH)	611
*Total Annual Savings	$97
Initial Capital Cost	$40
Simple Payback (months)	5.0
Lifetime Energy Savings (15 years)	$1,804
Net Present Value (NPV)	$1,452

*Aggregate Cost of $.1589/kWh taken from the Teaneck High School

The following Table 4.4-2 summarizes other applications for the Smart Strip that may be applicable throughout the buildings:

Table 4.4-2 Applications for Smart Strips

Control Outlet	Switched Outlets
Computer	Monitors, printers, scanners, lamps
TV	VCR, DVD player, cable box
Lamp	Stereo, space heater

The BOE should continue to implement Energy Star appliances. This is recommended on an 'as-needed' basis.

In addition to replacing old appliances with Energy Star appliances, the following two maintenance procedures can work to save the energy consumed by the refrigerators. One is cleaning dirty condenser coils, twice a year. A refrigerator's condenser coils and cooling fins are located either under the unit behind a grille in the front or on the back of the appliance. The coils can be cleaned with a brush or vacuum cleaner hose. The second source of wasted energy associated with a refrigerator is the door seal. Realigning the door or replacing a no longer airtight door seal will work to improve energy efficiency.

It may also be considered that the 'Vending Misers' be purchased and utilized for vending machines throughout the schools. A 'Vending Miser' powers down a vending machine when the surrounding area is unoccupied and automatically repowers when the area is occupied, utilizing an infrared sensor. Similarly to occupancy sensors on lighting fixtures; however, the vending miser also monitors the ambient temperature while the vending machine is powered down and uses this as sort of an internal thermostat to power up the machine and ensure that the drinks remain cold. The implementation of a 'Vending Miser' also reduces maintenance costs and extends the life of the machine, by reducing the number of compressor cycles. A 'Vending Miser' is a $180 investment, but has been found to reduce power consumption of a cold drink vending machine by an average of 46%.

Section 5
Evaluation of Energy Purchasing and Procurement Strategies

5.1 Energy Deregulation

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 and the deregulation of the market allowed all consumers to shop for their electric supplier. The intent was to create a competitive market for electrical energy supply. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party supplier. Energy deregulation in New Jersey increased the energy buyers' options by separating the function of electricity distribution from that of electricity supply.

To sell electric generation service in New Jersey, electric power suppliers must be licensed by the New Jersey Board of Public Utilities (NJ BPU). They must also be registered with the local public utility (PSE&G) to sell electric service in that utility's service areas. The following suppliers are licensed with the NJ BPU and are registered to sell electric service in the PSE&G service territory:

- Amerada Hess Corp
- BOC Energy Services
- Con Edison Solutions, Inc.
- Constellation New Energy, Inc.
- Direct Energy, LLC.
- First Energy Solutions Corp.
- Glacial Energy
- Integrys Energy Service
- Liberty Power
- Pepco Energy Services, Inc.
- PP&L Energy Plus, LLC.
- Reliant Energy Solutions East, LLC.
- Sempra Energy Solutions
- South Jersey Energy
- Strategic Energy LLC
- Suez Energy Resources NA, Inc
- UGI Energy Services

As noted in Section 3, the Board is currently benefiting from the deregulation of the market and is utilizing South Jersey Energy as their third party supplier. It could possibly benefit the Board to obtain price quotes from other third party suppliers.

5.2 Demand Response Program

A Demand Response Program is another opportunity for energy cost savings. Demand Response is a program through which a business can make money on reducing their electricity use when wholesale electricity prices are high or when heavy demand causes instability on the electric grid, which can result in voltage fluctuations or grid failure. Demand Response is an energy management program that compensates the participant for reducing their energy consumption at critical times. Demand Response is a highly efficient and cost efficient means of reducing the potential for electrical grid failure and price volatility and is one of the best solutions to the Mid-Atlantic region's current energy challenges.

The program provides at least two hours advance notice before curtailment is required. There is typically one event a year that lasts about three hours, and since this happens only in summer months, when demand for electricity is at its highest, it may better facilitate the District's involvement. This as a result of summer occupancy requirements, although, energy curtailment in discretionary.

Participation in Demand Response is generally done through companies known as Curtailment Service Providers, or CSPs, who are members of Pennsylvania New Jersey Maryland (PJM) interconnection. There is no cost to enroll in the program and participation is voluntary, for instance, you can choose when you want to participate. In most cases, there is no penalty for declining to reduce your electricity use when you're asked to do so. The event is managed remotely by notifying your staff of the curtailment request and then enacting curtailment through your Building Management System.

CSPs will share in a percentage of your savings, which may differ among various CSPs, since there may be costs associated with the hardware and /or software required for participation, so it is recommended that a number of CSPs be contacted to review their offers.

Section 6
Ranking of Energy Conservation and Retrofit Measures (ECRM)

6.1 ECRMs

The main objective of this energy audit is to identify potential Energy Conservation and Retrofit Measures and to determine whether or not the identified ECRM's are economically feasible to warrant the cost for planning and implementation of each measure. Economic feasibility of each identified measure was evaluated through a simple payback analysis. The simple payback analysis consists of establishing the Engineer's Opinion of Probable Construction Cost estimates; O&M cost savings estimates, projected annual energy savings estimates and the potential value of New Jersey Clean Energy Rebates or Renewable Energy Credits, if applicable. The simple payback period is then determined as the amount of time (years) until the energy savings associated with each measure amounts to the capital investment cost.

As discussed in Section 3, aggregate unit costs for electrical energy delivery and usage, natural gas delivery and usage, and oil delivery and usage, which accounts for all demand and tariff charges at each complex, was determined and utilized in the simple payback analyses.

In general, ECRMs having a payback period of 20 years or less have been recommended and only those recommended ECRMs within Section 4 of the report have been ranked for possible implementation. The most attractive rankings are those with the lowest simple payback period.

Ranking of ECRMs has been broken down into the following categories:

- Lighting Systems
- HVAC Systems
- Solar
- Wind

6.1.1 Lighting Systems

Table 6.1-1 includes the recommended ECRMs to provide energy savings for all building lighting systems, which include the installation of energy-efficient luminaires and occupancy sensors. A detailed discussion on building lighting systems is presented in Section 4.1.

Table 6.1-1
Ranking of Energy Savings Measures Summary – Lighting System Retrofits

Location/Measure	Engineer's Opinion of Probable Cost	Incentives	Total Cost	Annual Fiscal Savings[1]	Simple Payback (Years)
Teaneck High School - Press Box	$107.8	$0	$107.6	$78.02	1.4
Bryant Elementary School	$119,549	$23,230	$96,319	$16,291.8	5.9
Whittier Elementary School	$116,162.9	$7,660	$108,502.9	$18,477.9	5.9
Eugene Field Administration Building	$60,271.5	$4,125	$56,146.5	$8,666.7	6.5
Teaneck High School	$154,753.3	$11,850	$142,903.3	$21,750.8	6.6
Benjamin Franklin Middle School	$411,953.7	$21,136	$390,818.7	$52,546.9	7.4
Thomas Jefferson Middle School	$229,038.3	$15,735	$213,303.3	$27,888.1	7.6
Lowell Elementary School	$77,998.8	$3,710	$74,288.8	$8,366	8.9
Hawthorne Elementary School	$108,470.2	$4,365	$103,836.2	$11,216	9.3

1. 'Total Cost' takes into account any applicable rebates.
2. 'Annual Fiscal Savings' takes into account maintenance costs savings.

6.1.2 HVAC Systems

Table 6.1-2 includes the recommended ECRM to provide energy savings for building HVAC systems, most of which provide a simple payback of less than 20 years. A detailed discussion on building HVAC systems is presented in Section 4.2.

Table 6.1-2
Ranking of Energy Savings Measures Summary – HVAC System Upgrades

Building	Measure	Retrofit Cost	Incentives	Total Cost	Annual Fiscal Savings	Simple Payback (Years)
Teaneck High School	DW Heater	$5,240	$0	$5,240	$9,977	0.5
Benjamin Franklin Middle School	Boiler	$104,127	$6,000	$98,127	$33,637	2.9
Thomas Jefferson Middle School	Boiler	$156,190	$9,000	$147,190	$46,667	3.1
Bryant Elementary School	DDC BMS	$40,915	$0	$40,915	$11,347	3.6
Whittier Elementary School	DDC BMS	$47,539	$0	$47,539	$10,742	4.4
Teaneck High School	VFD	$76,123	$0	$76,123	$15,863	4.8
Hawthorne Elementary School	DDC BMS	$42,584	$0	$42,584	$7,560	5.6
Eugene Field Administration Building	DDC BMS	$21,456	$0	$21,456	$3,777	5.7
Lowell Elementary School	DDC BMS	$40,629	$0	$40,629	$7,109	5.7
Bryant Elementary School	Boiler	$181,165	$6,000	$175,165	$20,871	8.4

Hawthorne Elementary School	Boiler	$181,165	$6,000	$175,165	$17,739	9.9
Lowell Elementary School	Boiler	$222,990	$6,000	$216,990	$21,871	9.9
Eugene Field Administration Building	Boiler	$104,127	$6,000	$98,127	$7,017	14.0
Whittier Elementary School	Boiler	$222,990	$6,000	$216,990	$11,170	19.4
Hawthorne Elementary School	AHU	$17,753	$790	$16,963	$681	24.9
Teaneck High School	AHU	$130,008	$3,160	$126,848	$3,460	36.7

1. 'Total Cost' takes into account any applicable rebates.
2. 'Annual Fiscal Savings' takes into account maintenance costs savings.

6.1.3 Solar Energy

Implementation of new solar energy systems have been evaluated to determine the economic feasibility for furnishing and installing such systems for eight buildings for the Teaneck School District. Based on the simple payback modeling performed, it would benefit the Board to further investigate installing the solar energy systems. This is primarily based on the initial upfront capital investment required for a solar energy system installation and the average 12.7 year payback period.

Two major factors influencing the project financial evaluation is the variance of the prevailing energy market conditions and Solar Renewable Energy Credit (SRBC) rates, with the largest impact to the payback model being the SREC credit pricing. For the payback model, conservative estimates of the SREC's market value over a 15 year period were assumed, as discussed in Section 4.3.

Table 6.1-3 includes a simple payback analysis for the installation of seven solar energy systems for the Teaneck School District. Refer to Appendix E for a more detailed solar financing spreadsheet.

Table 6.1-3 Ranking of Energy Savings Measures Summary – Solar Energy Systems

Building & Measure	Retrofit Cost	Annual SREC Credit	Annual Fiscal Savings	Simple Payback (Years)
Thomas Jefferson Middle School - PV Solar System	$6,307,156	$424,596	$119,863	11.6
Whittier Elementary School - PV Solar System	$2,823,532	$185,336	$49,096	12.0
Teaneck High School - PV Solar System	$3,249,778	$214,613	$64,127	12.1
Benjamin Franklin Middle School - PV Solar System	$3,111,660	$205,127	$60,107.3	12.2
Hawthorne Elementary School - PV Solar System	$1,791,339	$114,446	$29,963	12.4
Lowell Elementary School - PV Solar System	$911,769	$64,036	$16,114	13.0

Eugene Field Administration Building - PV Solar System	$602,762	$46,550	$12,163	13.7
Bryant Elementary - PV Solar System	$664,710	$38,442	$10,549	14.6

6.1.4 Wind Power Generation

Implementation of a new on-site wind energy system has been evaluated to determine the economic feasibility for furnishing and installing such systems for the Teaneck School District. Based on the simple payback modeling performed, it would benefit the Board to further investigate installing the on-site wind energy systems at the nine surveyed locations. This is primarily based on the initial upfront capital investment required for a wind energy system installation and an acceptable payback period.

Three major factors influencing the project financial evaluation is the variance of the prevailing energy market conditions, Renewable Energy Certificate (REC) rates and the Renewable Energy Incentive Program, with the largest impact to the simple payback model being the REIP incentive.

Table 6.1-4, includes a summary of the wind energy ECRM for the Teaneck School District.

Table 6.1-4: Simple Payback Analysis for Wind Turbine Energy System

Parameter	Wind Turbine (Minimum Site Wind Speed – 9.01 mph)	Wind Turbine (Maximum Site Wind Speed – 13.82 mph)	Wind Turbine (Average Site Wind Speed – 11.2 mph)
Engineer's Opinion of Probable Cost	$21,895	$21,895	$21,895
Renewable Energy Incentive Program**	-$12,214	-$21,895	-$20,304
Total Cost	$9,681	$0	$1,591
1st Year Production	3,817 kWh	8,316 kWh	6,346 kWh
Annual Estimated Electric Savings	$643.2	$1,401.2	$1,069.1
Annual Estimated REC Revenue	$96	$208	$159
Project Simple Payback	**13.1 Years**	**0 Years**	**1.3 Years**

Section 7
Available Grants, Incentives and Funding Sources

7.1 Renewable Energy

7.1.1 Renewable Energy Certificates (NJ BPU)

As part of New Jersey's Renewable Portfolio Standards (RPS), electric suppliers are required to have an annually-increasing percentage of their retail sales generated by renewable energy. Electric suppliers fulfill this obligation by purchasing renewable energy certificates (RECs) from the owners of solar generating systems. One REC is created for every 1,000 kWh (1 MWh) of renewable electricity generated. Although solar systems generate electricity and SRECs in tandem, the two are independent commodities and sold separately. The RPS, and creation of RECs, is intended to provide additional revenue flow and financial support for renewable energy projects in New Jersey. Class I RECs, which include electricity generation from wind, wave, tidal, geothermal and sustainable biomass typically trade at around $25/MWh. RECs generated from solar electricity, or SRECs, trade at $550/MWh due to supplemental funding from NJ PBU. The supplemental funding will decrease over time to $350/MWh.

7.1.2 Clean Energy Solutions Capital Investment Loan/Grant (NJ EDA)

NJ EDA in cooperation with NJ DEP is offering interest-free loans and grants for energy efficiency, combined heat and power (CHP) and renewable energy projects with total project capital equipment costs of at least $1 million. The interest-free loans are available for up to $5 million, a portion of which may be issued as a grant. The most recent round was closed as of October 2009, but new CESCI program updates will be posted at www.njeda.com. For additional information, contactCESCI@njeda.com or call 866-534-7789.

7.1.3 Renewable Energy Incentive Program (NJ BPU)

The Renewable Energy Incentive Program (REIP) provides rebates for installing solar, wind, and sustainable biomass systems in Smart Growth regions. Rebates of $1.00 per watt are available for solar electricity projects up to 50 kW in capacity. Wind systems can receive rebates up to $3.20 per expected kWh produced. Sustainable biomass rebates start at $4.00 per watt installed with a maximum incentive amount of 30 percent of project costs. REIP will give out $53.25 million in rebates from 2009 - 2012. Project owners must complete the Pay for Performance Program, Direct Install or Local Municipal audit, or the rebate will be reduced by $0.10 per watt. For more information on REIP, please see www.njcleanenergy.com.

7.1.4 Grid Connected Renewables Program (NJ BPU)

The New Jersey Grid Connected Renewables Program offers competitive incentives for wind and sustainable biomass electricity generation projects larger than 1

Megawatt (MW). Applications for the most recent round of funding, which totaled $6 million, were due January 8, 2010. Requests for Proposals (RFPs) for the next round will be posted at www.njcleanenergy.com and www.state.nj.us/bpu. A total of roughly $16 million is available for incentives under this program during 2010. Most of the incentives offered under this program will take the form of a payment for energy production ($/MWh) once the project is operating. Incentives range up to $58.49/MWh for publicly-owned wastewater biogas projects. Up to 10% of the incentive may be requested in the form of a lump grant to cover up-front costs such as financing fees, interconnection fees, project design, permitting, and construction costs.

7.1.5 Utility Financing Programs

All four Electric Distribution Companies (EDCs) in New Jersey have developed long term contracting or financing programs for the development of solar energy systems. In all of the programs, Solar Renewable Energy Credits (SRECs) generated by the solar energy systems will be sold at auction to energy suppliers who are required to purchase a certain quantity of SRECs to meet their Renewable Portfolio Standard requirements.

7.1.6 Renewable Energy Manufacturing Incentive (NJ BPU)

New Jersey's Renewable Energy Manufacturing Incentive (REMI) program provides rebates to purchase and install solar panels, inverters, and racking systems manufactured in New Jersey. Rebates for panels start at $0.25 per watt and rebates for racking systems and inverters start at $0.15 per watt for solar projects up to 500 kW in capacity. To be eligible for REMI, applicants must apply to either the Renewable Energy Incentive Program (REIP) or the SREC Registration Program (SRP).

7.1.7 Clean Renewable Energy Bonds (IRS)

CREBs are 0% interest bonds typically issued for up to approximately $3.0 million administered by the Internal Revenue Service (IRS). Last year, $2.2 billion in CREBs was allocated to municipal entities to fund 610 renewable energy projects, including anaerobic digestion. IRS has been allocating funding for CREBs annually since 2005. Last year, IRS solicited applications starting in April, which were due in August. The IRS is expected to receive additional funding for CREBs and release another round of solicitations in 2010.

7.1.8 Qualified Energy Conservation Bonds (IRS)

These IRS 0% interest bonds are very similar to CREBs except they are allocated based on state and county population. New Jersey was allocated $90 million as part of the ARRA stimulus fund. QECBs are typically distributed through municipal bond banks or state economic development agencies.

7.1.9 Global Climate Change Mitigation Incentive Fund (US EDA)

The Economic Development Agency (part of the U.S. Department of Commerce) administers the GCCMIF to public works projects that reduce greenhouse gas emissions and creates new jobs. In FY 2009, $15 million was allocated to the fund, and additional funding is expected to be allocated in FY 2010. Applications are due on a rolling basis. The program does not have a maximum grant amount but does limit the grant to 50 percent of the project cost.

7.1.10 Private Tax-Exempt Financing

Similar to traditional municipal bond financing, there are many private financial service companies that offer a myriad of options for tax-exempt financing of municipal projects. The providers of these services suggest that this capital can be offered at competitive rates in an expedited timeframe and with fewer complications when compared to traditional municipal financing methods. Though these factors would need to be compared on a case-by-case basis, the one distinct advantage to private financing on the current project would likely be the flexibility to structure payments to meet budget needs with consideration given to the terms and conditions of existing loan and/or bond agreements. It should also be noted that, in many cases, the construction and long term financing can be rolled into a single private financing agreement. Also, in some instances, equipment manufacturers have the ability to offer competitive financing terms (e.g. Siemens Financial Services Corporation), though financing from these sources is generally contingent upon a substantial portion of the project cost (~20% to 30%) being for their respective equipment.

7.1.11 Performance Based Contracts (ESCOs)

A second financing alternative for a project of this nature would be to enter into a Performance Based Contract with an Energy Services Company (ESCO). The premise of this type of contract is that it requires no initial municipal capital contributions in order to implement the project - instead relying on future operations cost savings and/or energy production, to fund the annual payments. Prior to entering into an agreement for the funding of the project, an ECSO would perform an energy audit and/or conceptual studies to confirm future energy cost savings or energy production inherent with the projects implementation and operation. The contract would then be formulated based on some measurable parameter(s) (sludge reduction, energy production, etc.) which would be verified by measurement throughout the contract duration. The savings in energy costs or energy production would then be used to pay back the capital investment of the project over the contract time period (typically on the order of 10-years or less). The ESCO would guarantee the agreed upon energy savings or energy production. If the project does not meet energy savings or production commitments, the ESCO pays the owner the equivalent difference.

With this funding alternative, the ownership and operation of the facility would be maintained by the original owner. A performance contract may also include ESCO operation and maintenance of the energy-related facilities if that were deemed appropriate. Significant ESCO's with experience in this area include Siemens Building Technologies, Chevron and Johnson Controls. CDM has functioned in several roles on performance based contracts including being the owner's representative and, on different contracts, providing design-build services (as a subcontractor to the ECSO). We can provide additional experience-based information upon request.

7.1.12 Power Purchase Agreements (SPCs)

More commonly referred to as a Build-Own-Transfer (BOT) agreement in the Water/Wastewater industry, a Power Purchase Agreement (PPA) also delivers a project with no initial capital contribution by the original owner. In this model, a Special Purpose Company (SPC) created by a developer, would own the energy production facilities. Within the framework of a PPA, a SPC will typically lease property from the owners for construction and operation of the new facilities. The funding and construction of the new facilities would be performed by the SPC who would then own and operate the facilities for the duration of the contract (typically 20 to 30 years). Throughout that period of time, the original owner would purchase power from the SPC at a pre-negotiated rate which would take into account the initial capital cost, operation and maintenance of the constructed facility, ancillary benefits of the project and investor returns on investment. For renewable energy, financial incentives may enable this financing approach to compete favorably with utility power tariffs. Incentives include state and local tax credits, renewable energy credits, and Federal energy production tax credits or energy investment tax credits. It is expected that a number of experienced companies and developers may be interested in a PPA for New Jersey municipal renewable energy projects.

7.2 Energy Efficiency

7.2.1 Introduction

New Jersey's Clean Energy Program (NJ CEP) promotes increased energy efficiency and the use of clean, renewable sources of energy including solar, wind, geothermal, and sustainable biomass. The results for New Jersey are a stronger economy, less pollution, lower costs, and reduced demand for electricity. NJCEP offers financial incentives, programs, and services for residential, commercial, and municipal customers.

NJCEP reduces the need to generate electricity and burn natural gas which eliminates the pollution that would have been caused by such electric generation or natural gas usage. The benefits of these programs continue for the life of the measures installed, which on average is about 15 years. Thus, the public receives substantial environmental and public health benefits from programs that also lower energy bills and benefit the economy.

7.2.2 New Jersey Smart Start Buildings Program (NJ BPU)

The New Jersey Smart Start Buildings Program offers rebate incentives for several qualifying equipment such as high efficient premium motors and lighting, and lighting controls.

Incentive information and incentive calculation worksheets are provided for the various new equipment installation identified in this report and are included in Appendix G.

7.2.3 Pay for Performance Program (NJ BPU)

Another program offered through the New Jersey Smart Start Program, is the Pay for Performance Program. Commercial, industrial and institutional buildings with an average annual peak demand over 200 kW are eligible for participation. In addition, local government agencies, which do not meet the 200 kW demand requirement and are not receiving Energy Efficiency and Conservation Block Grants are eligible.

Incentives are available for buildings that are able to present an Energy Reduction Plans that reduce the building's current energy consumption by 15% or more, in addition to incentives for installing the recommended measures and incentives for presenting the energy savings in a post-construction benchmarking report. No more than 50% of the total energy savings may be derived from lighting retrofits. In addition, the total energy savings of 15% may not come from the implementation of one energy savings measure. The incentive structure is provided in Appendix G.

7.2.4 Clean Energy Solutions Capital Investment Loan/Grant (NJ EDA)

NJ EDA in cooperation with NJ DEP is offering interest-free loans and grants for energy efficiency, combined heat and power (CHP) and renewable energy projects with total project capital equipment costs of at least $1 million. The interest-free loans are available for up to $5 million, a portion of which may be issued as a grant. The most recent round was closed as of October 2009, but new CESCI program updates will be posted at www.njeda.com. For additional information, contactCESCI@njeda.com or call 866-534-7789.

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7.2.6 Performance Based Contracts (ESCOs)

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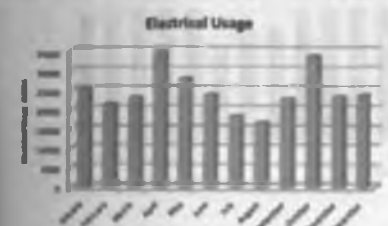
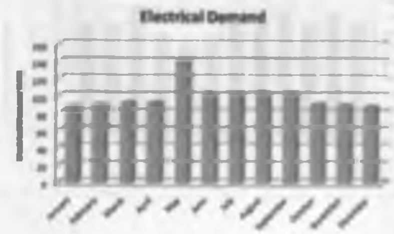
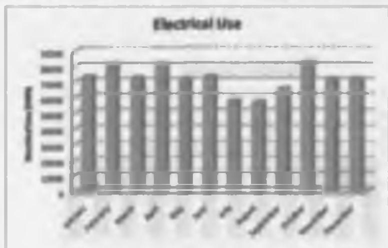
APPENDIX A

UTILITY BILL INFORMATION



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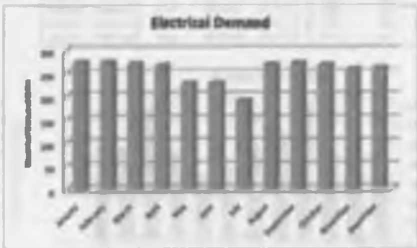
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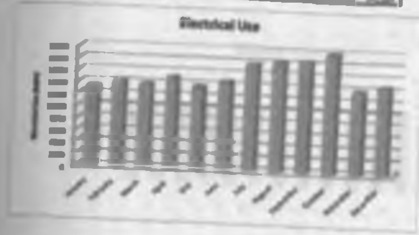
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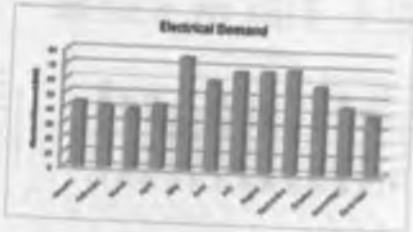
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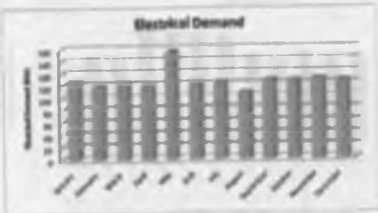
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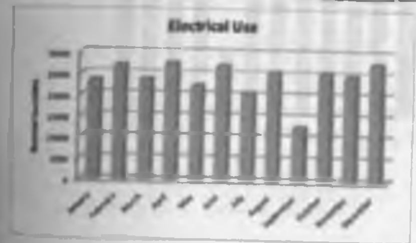
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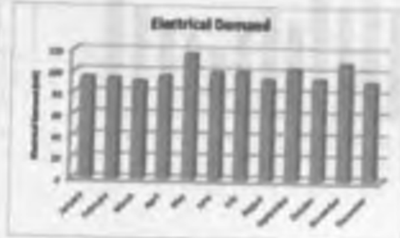
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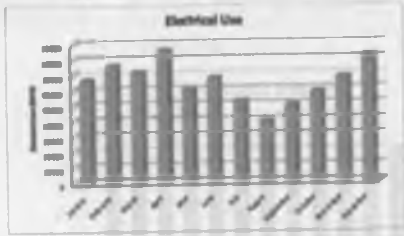
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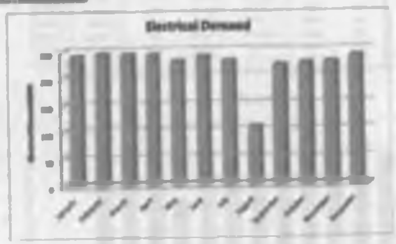
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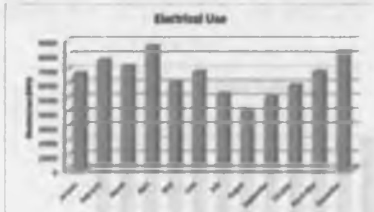
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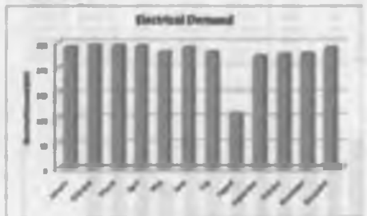
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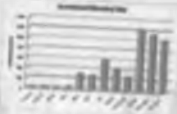

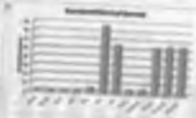

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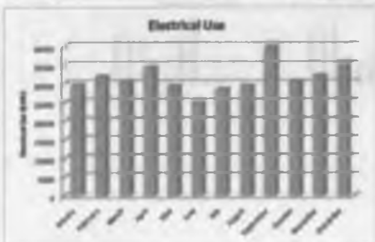

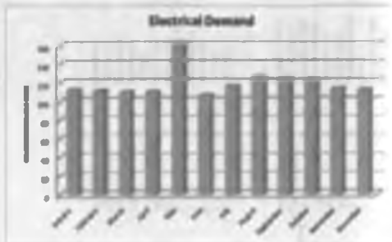

Natural Gas Bills

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[illegible]	[illegible]	Dec	579 783	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	563 534	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	Apr	528 000	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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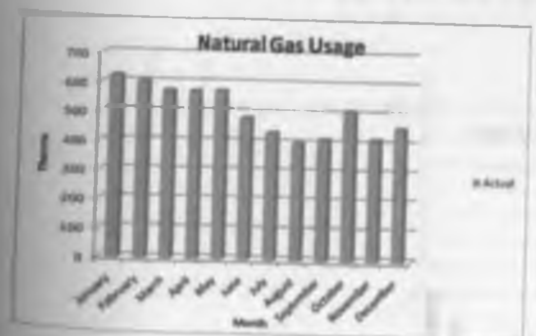
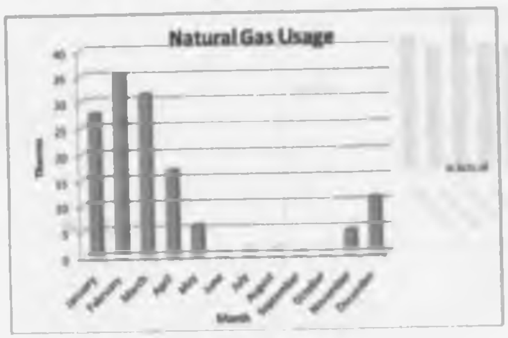
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	May/Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	May/Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Month	Average Therm Usage
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	[illegible]
June	[illegible]
July	[illegible]
August	[illegible]
September	[illegible]
October	[illegible]
November	[illegible]
December	[illegible]



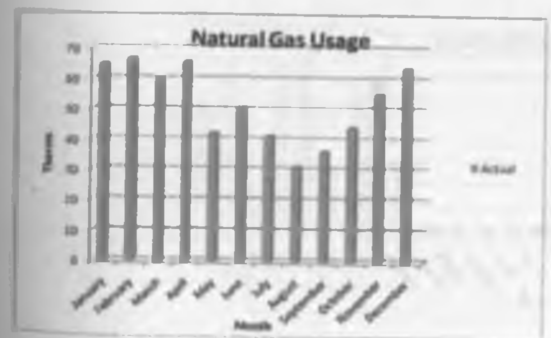
Natural Gas Bills							
[illegible] Gas Account [illegible] - Bryant							
Date	Year	Month	Meter [illegible]	Total Supply	Total Delivery	Total Charge	Cost/Therm
Jun 14 - Jul 16	2007	Jul	1.049	[illegible]	[illegible]	[illegible]	[illegible]
Jul 16 - Aug 14	2007	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 14 - Sep 13	2007	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 13 - Oct 12	2007	Oct	[illegible]	[illegible]	[illegible]	[illegible]	#DIV/0!
Oct 12 - Nov 12	2007	Nov	1.148	[illegible]	[illegible]	[illegible]	[illegible]
Nov 12 - Dec 13	2007	Dec	1.047	[illegible]	[illegible]	[illegible]	[illegible]
Dec 13 - Jan 15	2008	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jan 15 - Feb 14	2008	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Feb 14 - [illegible] 14	2008	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mar 14 - Apr 16	2008	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apr 16 - May 14	2008	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May 14 - Jun 13	2008	Jun	1.042	[illegible]	[illegible]	[illegible]	[illegible]
Jun 13 - Jul 15	2008	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 15 - Aug 13	2008	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 13 - Sep 12	2008	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 12 - Oct 13	2008	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 13 - Nov 11	2008	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 11 - Dec 12	2008	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dec 12 - Jan 8	2009	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jan 8 - Feb 6	2009	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Feb 6 - [illegible] 4	2009	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mar 4 - Apr 7	2009	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apr 7 - May 8	2009	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] 8 - Jun 10	2009	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jun 10 - Jul 13	2009	Jul	1.042	[illegible]	[illegible]	[illegible]	[illegible]
Jul 13 - Aug 11	2009	Aug	1.042	[illegible]	[illegible]	[illegible]	[illegible]
Aug 11 - Sep 11	2009	Sep	1.043	[illegible]	[illegible]	[illegible]	[illegible]
Sept 11 - Oct 13	2009	Oct	0	$0.00	[illegible]	[illegible]	#DIV/0!
Oct 13 - Nov 10	2009	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 10 - Dec 11	2009	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Month	Average Therm Usage
January	[illegible]
February	36
March	[illegible]
April	17
May	6
June	1
July	1
August	1
September	0
October	0
November	[illegible]
December	[illegible]



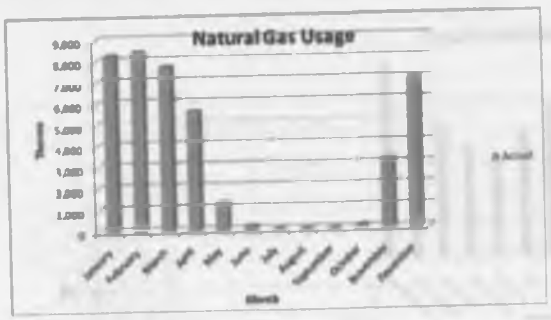
Natural Gas Bills							
[illegible] Gas Account [illegible]							
Date	Year	Month	Meter [illegible]	Total Supply	Total Delivery	Total Charge	Cost/Therm
Jun 14 - Jul 15	2007	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 16 - Aug 14	2007	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 14 - Sep 14	2007	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 14 - Oct 12	2007	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 12 - Nov 13	2007	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 13 - Dec 13	2007	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dec 13 - Jan 15	2008	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jan 15 - Feb 13	2008	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Feb 13 - Mar 14	2008	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mar 14 - Apr 15	2008	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apr 15 - May 14	2008	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May 14 - Jun 13	2008	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jun 13 - Jul 15	2008	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 15 - Aug 13	2008	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 13 - Sep 12	2008	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 12 - Oct 13	2008	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 13 - Nov 11	2008	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 11 - Dec 12	2008	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dec 12 - Jan 8	2009	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jan 8 - Feb 5	2009	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Feb 5 - Mar 5	2009	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mar 5 - Apr 7	2009	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apr 7 - May 8	2009	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May 8 - Jun 10	2009	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jun 10 - Jul 13	2009	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 13 - Aug 11	2009	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 11 - Sep 11	2009	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 11 - Oct 12	2009	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 12 - Nov 10	2009	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] 10 - Dec 11	2009	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Month	Average Therm Usage
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	[illegible]
June	[illegible]
July	[illegible]
August	[illegible]
September	[illegible]
October	[illegible]
November	[illegible]
December	[illegible]



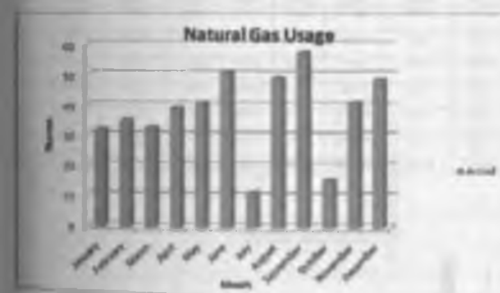
Natural Gas Bills								
[illegible]								
Date	Year	Month	Meter [illegible]	Total Supply	Total Delivery	Total Charge	Cost/Therm	
Jun 14 - Jul 16	2007	Jul	[illegible]	[illegible]	[illegible]	[illegible]	#DIV/0!	
Jul 16 - Aug 14	2007	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Aug 14 - Sep 13	2007	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible] 13 - Oct 12	2007	Oct	[illegible]	[illegible]	[illegible]	[illegible]	#DIV/0!	
Oct 12 - Nov 12	2007	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Nov 12 - Dec 13	2007	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Dec 13 - Jan 15	2008	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Jan 15 - Feb 13	2008	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Feb 13 - Mar 14	2008	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Mar 14 - Apr 15	2008	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Apr 15 - May 14	2008	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
May 14 - Jun 13	2008	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Jun 13 - Jul 11	2008	Jul	[illegible]	[illegible]	[illegible]	[illegible]	#DIV/0!	
Jul 11 - Aug 13	2008	Aug	[illegible]	[illegible]	[illegible]	[illegible]	#DIV/0!	
Aug 13 - Sep 12	2008	Sep	[illegible]	[illegible]	[illegible]	[illegible]	#DIV/0!	
[illegible] 12 - Oct 13	[illegible]	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Oct 13 - Nov 11	2008	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Nov 11 - Dec 12	2008	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Dec 12 - Jan 8	[illegible]	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Jan 8 - Feb 5	2009	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Feb 5 - [illegible] 4	2009	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Mar 4 - Apr 7	2009	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Apr 7 - May 8	2009	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
May 8 - Jun 10	2009	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Jun 10 - Jul 13	2009	Jul	0	[illegible]	[illegible]	[illegible]	#DIV/0!	
Jul 13 - Aug 11	2009	Aug	0	[illegible]	[illegible]	[illegible]	[illegible]	
Aug 11 - Sep 11	2009	Sep	0	[illegible]	[illegible]	[illegible]	[illegible]	
Sept 11 - Oct 12	2009	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Oct 12 - Nov 11	2009	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Nov 11 - Dec 11	2009	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Month	Average Therm Usage
January	8,358
February	8,411
March	7,719
April	5,877
May	1,277
June	179
July	0
August	0
September	0
October	145
November	3,621
December	7,503



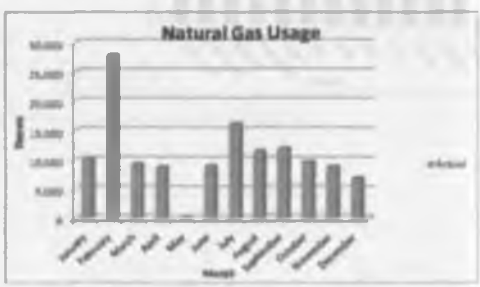
Natural Gas Bills							
[illegible] Gas Account [illegible]							
Date	Year	Month	Meter [illegible]	Total Supply	Total Delivery	Total Charge	Cost/Therm
Jun 12 - Jul 12	2007	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 12 - Aug 10	2007	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 10 - Sep 11	2007	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 11 - Oct 10	2007	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 10 - Nov 8	2007	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 8 - Dec 11	2007	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dec 11 - Jan 11	2008	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jan 11 - Feb 11	2008	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Feb 11 - Mar 12	2008	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mar 12 - Apr 11	2008	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apr 11 - May 12	[illegible]	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May 12 - Jun 11	[illegible]	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jun 11 - Jul 11	[illegible]	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 11 - Aug 11	[illegible]	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 11 - Sep 12	[illegible]	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 12 - Oct 14	[illegible]	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 14 - Nov 7	[illegible]	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 7 - Dec 10	[illegible]	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dec 10 - Jan 6	[illegible]	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jan 6 - Feb 3	[illegible]	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Feb 3 - Mar 4	[illegible]	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mar 4 - Apr 3	2009	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apr 3 - May 6	2009	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May 6 - Jun 8	2009	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jun 8 - Jul 9	2009	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 9 - Aug 7	2009	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 7 - Sep 9	2009	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 9 - Oct 8	2009	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 8 - Nov 6	2009	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 6 - Dec 9	2009	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Month	Average Therm Usage
January	33
February	35
March	33
April	39
May	41
June	51
July	11
August	49
September	57
October	14
November	41
December	48



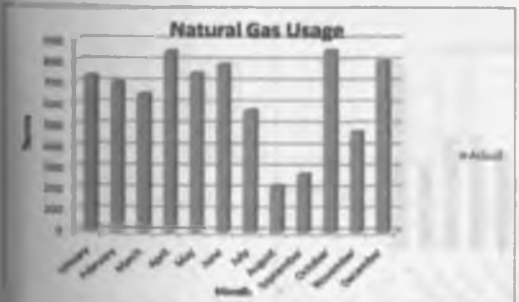
[illegible]

Month	Average Therm Usage
January	10,679
February	27,246
March	9,112
April	8,902
May	98
June	8,978
July	15,183
August	11,430
September	11,958
October	9,717
November	8,830
December	6,713

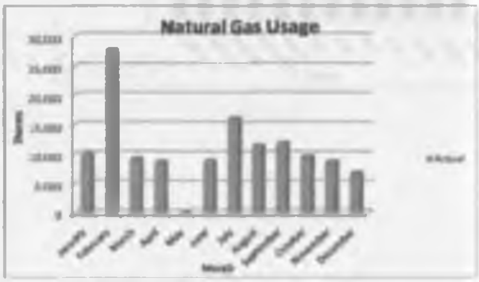


Natural Gas Bills							
[illegible]							
Date	Year	Month	Meter (CCF/DTH)	Total Supply	Total Delivery	Total Charge	Cost/Therm
Jun 14 - Jul 15	[redacted]	Jul	527.876	$521.42	$172.35	$693.77	$1.31
Jul 15 - Aug 14	[redacted]	Aug	0.000	$0.00	$32.87	$32.87	#DIV/0!
Aug 14 - Sep 14	[redacted]	Sep	0.000	$0.00	$32.87	$32.87	#DIV/0!
Sept 13 - Oct 13	[redacted]	Oct	1512.079	$1,277.06	$464.59	$1,741.65	$1.14
Oct 12 - Nov 12	[redacted]	Nov	554.783	$475.94	$180.13	$653.06	$1.18
Nov 12 - Dec 12	[redacted]	Dec	739.479	$709.15	[illegible]	$1,011.46	$1.37
Dec 13 - Jan 15	[redacted]	Jan	763.445	$751.87	$275.78	[illegible]	$1.36
Jan 15 - Feb 13	[redacted]	Feb	841.674	$958.17	$275.48	$894.25	[illegible]
Feb 13 - Mar 15	[redacted]	Mar	517.718	$714.60	[illegible]	$963.79	[illegible]
Mar 15 - Apr 15	[redacted]	Apr	797.136	$975.17	$249.89	$1,230.26	[illegible]
Apr 15 - May 14	[redacted]	May	739.751	$963.12	[illegible]	$1,175.69	[illegible]
May 14 - Jun 13	[redacted]	Jun	778.519	$1,140.17	$243.81	$1,383.98	[illegible]
Jun 13 - Jul 15	[redacted]	Jul	496.712	[illegible]	$134.15	$643.75	[illegible]
Jul 15 - Aug 14	[redacted]	Aug	138.176	$192.69	$71.87	$250.06	[illegible]
Aug 14 - Sep 12	[redacted]	Sep	348.791	$467.68	$134.67	$521.45	[illegible]
Sept 12 - Oct 13	[redacted]	Oct	491.812	$529.79	$157.48	$687.27	[illegible]
Oct 13 - Nov 11	[redacted]	Nov	496.563	$495.16	$167.67	$657.83	[illegible]
Nov 11 - Dec 12	[redacted]	Dec	825.48	$773.17	$298.17	$1,071.94	[illegible]
Dec 12 - Jan 8	[redacted]	Jan	697.61	$659.47	$254.68	$914.15	[illegible]
Jan 8 - Feb 5	[redacted]	Feb	753.29	$892.58	[illegible]	[illegible]	[illegible]
Feb 5 - Mar 4	[redacted]	Mar	658.83	$604.36	$142.09	$756.45	[illegible]
Mar 4 - Apr 7	[redacted]	Apr	898.95	$583.43	$288.17	$871.60	[illegible]
Apr 7 - May 6	[redacted]	May	747.37	$438.76	$142.90	$681.33	[illegible]
May 6 - Jun 10	[redacted]	Jun	731.41	$447.05	$259.29	$776.34	[illegible]
Jun 10 - Jul 13	[redacted]	Jul	883.759	$401.38	$125.41	$630.97	[illegible]
Jul 13 - Aug 11	[redacted]	Aug	511.799	$301.62	$171.29	$417.88	[illegible]
Aug 11 - Sep 11	[redacted]	Sep	485.367	$241.99	$159.67	$409.56	[illegible]
Sept 11 - Oct 12	[redacted]	Oct	507.571	$274.18	$173.61	$446.79	[illegible]
Oct 12 - Nov 10	2009	Nov	401.57	$254.04	$135.40	$389.44	[illegible]
Nov 10 - Dec 11	2009	Dec	825.922	$967.11	$285.12	$854.23	[illegible]
Nov 10 - Dec 17	2009	Dec	634.079	$458.37	$210.59	$648.96	[illegible]

Month	Average Therm Usage
January	731
February	703
March	644
April	837
May	744
June	784
July	570
August	317
September	273
October	[illegible]
November	[illegible]
December	793

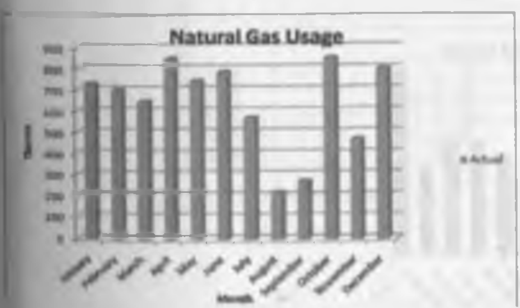


Month	Average Therm Usage
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	[illegible]
June	[illegible]
July	[illegible]
August	[illegible]
September	[illegible]
October	[illegible]
November	[illegible]
December	[illegible]



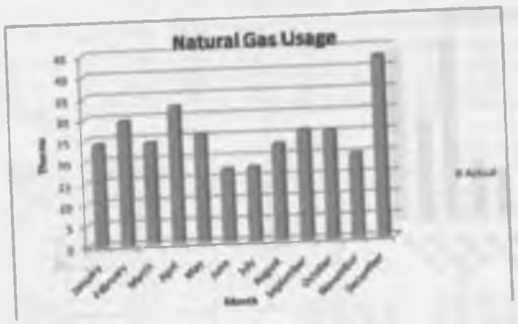
Natural Gas Bills							
[illegible] Gas Account [illegible] Thomas Jefferson							
Date	Year	Month	Meter [illegible]	Total Supply	Total Delivery	Total Charge	Cost/Therm
Jun 14 - Jul 14	2007	Jul	127.870	$521.42	$171.83	$693.77	$1.41
Jul 14 - Aug 14	2007	Aug	0.559	$4.89	$12.87	$10.07	#DIV/0!
Aug 14 - Sep [illegible]	2007	Sep	0.559	$3.93	$12.87	$10.07	#DIV/0!
Sept 13 - Oct [illegible]	2007	Oct	1351.078	$1,777.36	$684.89	$2,761.45	[illegible]
Oct 12 - Nov [illegible]	2007	Nov	554.783	$675.94	[illegible]	[illegible]	[illegible]
Nov 12 - Dec [illegible]	2007	Dec	729.479	[illegible]	[illegible]	$1,071.46	[illegible]
Dec 13 - Jan [illegible]	2008	Jan	753.443	$755.83	$272.98	$1,035.95	[illegible]
Jan 15 - Feb [illegible]	2008	Feb	641.674	$659.17	$235.68	[illegible]	[illegible]
Feb 13 - Mar [illegible]	2008	Mar	632.713	$714.60	$229.19	$943.79	[illegible]
Mar 13 - Apr [illegible]	2008	Apr	767.136	$971.17	$264.09	$1,235.26	[illegible]
Apr 15 - May [illegible]	2008	May	739.751	$993.22	$231.87	$1,225.09	[illegible]
May 14 - Jun [illegible]	2008	Jun	774.058	$1,140.17	[illegible]	$1,383.08	[illegible]
Jun 13 - Jul [illegible]	2008	Jul	498.712	[illegible]	[illegible]	[illegible]	[illegible]
Jul [illegible] - Aug [illegible]	2008	Aug	138.126	[illegible]	[illegible]	[illegible]	[illegible]
Aug 14 - Sep [illegible]	2008	Sep	349.791	$407.88	[illegible]	[illegible]	[illegible]
Sept 12 - Oct [illegible]	2008	Oct	401.813	[illegible]	$137.44	[illegible]	[illegible]
Oct 13 - Nov [illegible]	2008	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 11 - Dec [illegible]	2008	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dec 11 - Jan [illegible]	2009	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jan 8 - Feb 5	2009	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Feb 5 - Mar 6	2009	Mar	[illegible]	[illegible]	[illegible]	$754.44	[illegible]
Mar 6 - Apr 7	2009	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apr 7 - May 8	2009	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May 8 - Jun 10	2009	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jun 10 - Jul 13	2009	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jul 13 - Aug 11	2009	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aug 11 - Sep 11	2009	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sept 11 - Oct 12	2009	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oct 12 - Nov 10	2009	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nov 10 - Dec 11	2009	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Month	Average Therm Usage
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	[illegible]
June	[illegible]
July	[illegible]
August	[illegible]
September	[illegible]
October	[illegible]
November	[illegible]
December	[illegible]



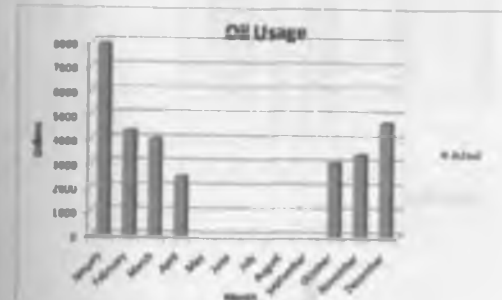
Natural Gas Bills							
		[illegible] Gas Account [illegible]					
Date	Year	Month	Meter [illegible]	Total Supply	Total Delivery	Total Charge	Cost/Therm
[illegible]	2007	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2007	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2007	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2007	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2007	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2008	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Jan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Feb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Mar	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Apr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Jun	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Aug	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Sep	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Oct	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Nov	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2009	Dec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Month	Average Therm Usage
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	[illegible]
June	[illegible]
July	[illegible]
August	[illegible]
September	[illegible]
October	[illegible]
November	[illegible]
December	[illegible]



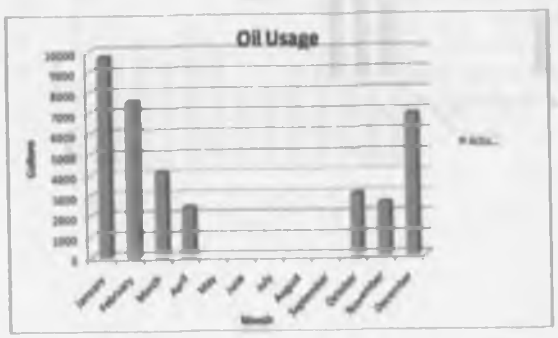
Oil Bills					
[illegible] Oil Account [illegible] Benjamin Franklin					
Date	Year	Month	Cost/Gal	Gal	Total Cost
[illegible]	2007	Nov	[illegible]	[illegible]	[illegible]
[illegible]	2007	Dec	[illegible]	[illegible]	[illegible]
[illegible]	2007	Dec	[illegible]	[illegible]	[illegible]
[illegible]	2007	Dec	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	2008	Feb	[illegible]	[illegible]	[illegible]
[illegible]	2008	Feb	[illegible]	[illegible]	[illegible]
[illegible]	2008	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oct	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]

Month	Averaged
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	
June	
July	
August	
September	
October	[illegible]
November	[illegible]
December	[illegible]



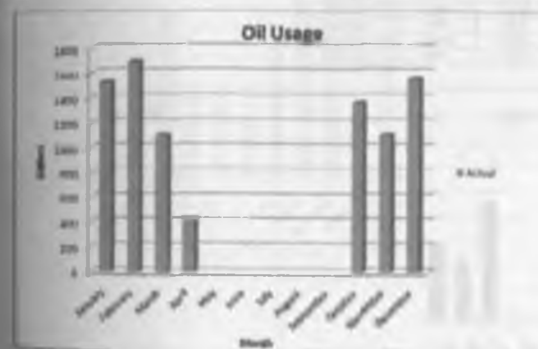
Oil Bills					
[illegible]					
Date	Year	Month	Cost/Gal	Gal	Total Cost
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oct	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]

Month	Averaged
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	
June	
July	
August	
September	
October	[illegible]
November	[illegible]
December	[illegible]



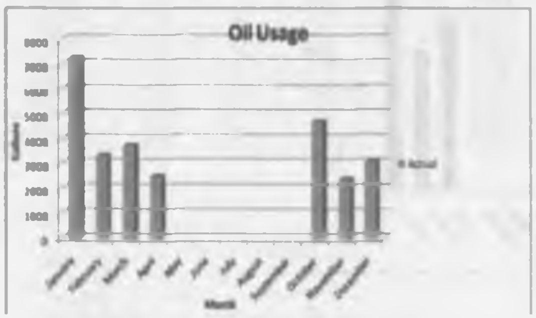
Oil Bills					
[illegible]					
Date	Year	Month	Cost/Gal	Gal	Total Cost
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oct	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]

Month	Amount
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	
June	
July	
August	
September	
October	[illegible]
November	[illegible]
December	[illegible]



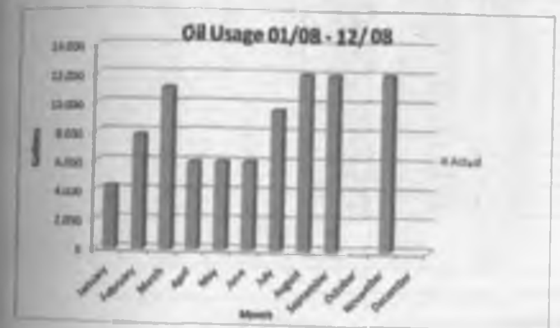
Oil Bills					
Teaneck Oil Account #[illegible] [illegible]					
Date	Year	Month	Cost/Gal	Gal	Total Cost
[illegible]	2007	Nov	[illegible]	[illegible]	[illegible]
[illegible]	2007	Nov	[illegible]	[illegible]	[illegible]
[illegible]	2007	Dec	[illegible]	[illegible]	[illegible]
[illegible]	2007	Dec	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	2008	Feb	[illegible]	[illegible]	[illegible]
[illegible]	2008	Feb	[illegible]	[illegible]	[illegible]
[illegible]	2008	Mar	[illegible]	[illegible]	[illegible]
[illegible]	2008	Mar	[illegible]	[illegible]	[illegible]
[illegible]	2008	Oct	[illegible]	[illegible]	[illegible]
[illegible]	2008	Nov	[illegible]	[illegible]	[illegible]
[illegible]	2008	Dec	[illegible]	[illegible]	[illegible]
[illegible]	2008	Dec	[illegible]	[illegible]	[illegible]
[illegible]	2008	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]

Month	Averaged
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	
June	
July	
August	
September	
October	[illegible]
November	[illegible]
December	[illegible]



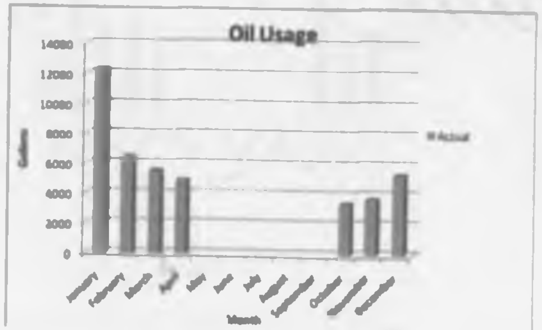
Oil Bills					
Teaneck Oil Account #[illegible] High School					
Date	Year	Month	Cost/Gal	Gal	Total Cost
[illegible]	2008	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	May	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jun	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jul	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jul	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Aug	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Aug	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Aug	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Sep	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Sep	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]

Month	Gal Usage 01/08 - 12/08
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	[illegible]
June	[illegible]
July	[illegible]
August	[illegible]
September	[illegible]
October	
November	[illegible]
December	



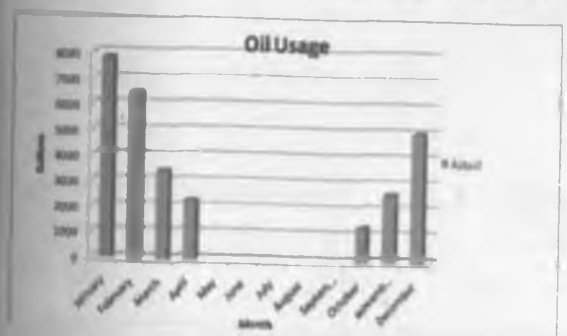
Oil Bills					
Tenant Oil Account [illegible]					
Date	Year	Month	Cost/Gal	Gal	Total Cost
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oct	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Apr	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]

Month	Averaged
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	
June	
July	
August	
September	
October	3400
November	[illegible]
December	[illegible]



Oil Bills					
Tenant Oil Account [illegible]					
Date	Year	Month	Cost/Gal	Gal	Total Cost
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Jan	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Feb	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Mar	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Oct	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Nov	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Dec	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Month	Averaged
January	[illegible]
February	[illegible]
March	[illegible]
April	[illegible]
May	
June	
July	
August	
September	
October	[illegible]
November	[illegible]
December	[illegible]



APPENDIX B

STATEMENT OF ENERGY PERFORMANCE

PORTFOLIO MANAGER REFERENCE SHEET

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Benjamin Franklin Middle School

Building ID: 2244139
For 12-month Period Ending: November 30, 2009[1]
Date SEP becomes Ineligible: N/A

Date SEP Generated: May 04, 2010

Facility
Benjamin Franklin Middle School
1315 Taft Road
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 1957
Gross Floor Area (ft²): 100,202

Energy Performance Rating[2] (1-100) 21

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	2,861,096
Fuel Oil (No. 2) (kBtu)	4,168,579
Natural Gas (kBtu)[4]	638,089
Total Energy (kBtu)	7,667,766
Energy Intensity[4]	
Site (kBtu/ft²/yr)	77
Source (kBtu/ft²/yr)	144
Emissions (based on site energy use)	
Greenhouse Gas Emissions (MtCO₂e/year)	776
Electric Distribution Utility	
Public Service Elec & Gas Co	
National Average Comparison	
National Average Site EUI	58
National Average Source EUI	109
% Difference from National Average Source EUI	32%
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[5] for Indoor Environmental Conditions:

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

Notes:
1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]

[illegible]

EPA Form 5900-16

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Benjamin Franklin Middle School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	1315 Taft Road, Teaneck, NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Middle School (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	100,202 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	93	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	2	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	40 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: 778018617 (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
10/09/2008	11/08/2008	83,520.00
09/10/2008	10/09/2008	86,240.00
08/08/2008	09/09/2008	86,880.00
07/10/2008	08/07/2008	83,280.00
06/09/2008	07/09/2008	84,320.00
04/04/2008	06/09/2008	1[illegible]0,000.00
03/04/2008	04/03/2008	[illegible]0,160.00
02/04/2008	03/03/2008	87,680.00
01/07/2008	02/03/2008	75,120.00
12/11/2007	01/08/2008	71,520.00
778018617 Consumption (kWh (thousand Watt-hours))		787,838.88
778018617 Consumption (kBtu (thousand Btu))		2,[illegible]9,891.84
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		2,[illegible]9,891.84
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 2288818 (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
10/09/2008	11/08/2008	988.75
09/10/2008	10/09/2008	438.87
08/08/2008	09/09/2008	296.27
07/10/2008	08/07/2008	417.88
06/09/2008	07/09/2008	481.57
04/04/2008	06/09/2008	1,277.81
03/04/2008	04/03/2008	818.74
02/04/2008	03/03/2008	803.31
01/07/2008	02/03/2008	847.52
12/11/2007	01/08/2008	888.28
2288818 Consumption (therms)		6,084.43
2288818 Consumption (kBtu (thousand Btu))		[illegible]8,442.88

Total Natural Gas Consumption (MBtu (thousand Btu))	896,442.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Fuel Type: Fuel Oil (No. 2)

Meter: 128398 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
11/01/2009	11/30/2009	5,008.00
10/01/2009	10/31/2009	0.00
09/01/2009	09/30/2009	0.00
08/01/2009	08/31/2009	0.00
07/01/2009	07/31/2009	0.00
06/01/2009	06/30/2009	0.00
05/01/2009	05/31/2009	0.00
04/01/2009	04/30/2009	2,438.70
03/01/2009	03/31/2009	4,938.00
02/01/2009	02/28/2009	3,601.80
01/01/2009	01/31/2009	6,464.10
12/01/2008	12/31/2008	5,660.10
128398 Consumption (Gallons)		30,666.70
128398 Consumption (MBtu (thousand Btu))		4,198,876.70
Total Fuel Oil (No. 2) Consumption (MBtu (thousand Btu))		4,198,876.70
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

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

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

Certifying Professional

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

Name: ______________________________ Date: ____________

Signature: ______________________________

*Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Benjamin Franklin Middle School
1315 Taft Road
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Benjamin Franklin Middle School	
Gross Floor Area Excluding Parking: (ft²)	100,202
Year Built	1957
For 12-month Evaluation Period Ending Date:	November 30, 2008

Facility Space Use Summary

Middle School	
Space Type	K-12 School
Gross Floor Area(ft²)	100,202
Open Weekends?	No
Number of PCs	98
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	40
Percent Heated	80
Months	12
High School?	No
School District	Teaneck

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 11/30/2008)	Baseline (Ending Date 09/30/2008)	Rating of 75	Target	National Average
Energy Performance Rating	21	21	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	77	72	46	N/A	[illegible]
Source (kBtu/ft²)	144	142	86	N/A	109
Energy Cost					
$/year	$ 188,383.32	$ 216,766.16	$ 110,134.84	N/A	$ 140,854.50
$/ft²/year	$ 1.88	$ 2.16	$ 1.10	N/A	$ 1.41
Greenhouse Gas Emissions					
MtCO₂e/year	776	763	481	N/A	590
kgCO₂e/ft²/year	8	8	5	N/A	6

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

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

Statement of Energy Performance

2009

Benjamin Franklin Middle School
1316 Taft Road
Teaneck, NJ 07666

Portfolio Manager Building ID: 2244139

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

This building uses 144 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 06/04/2010

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Bryant Elementary School

Building ID: 2244798
For 12-month Period Ending: October 31, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: May 04, 2010

Facility
Bryant Elementary School
1 Tyron Avenue
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 1926
Gross Floor Area (ft²): 47,430

Energy Performance Rating[2] (1-100) 7

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	943,359
Fuel Oil (No. 2) (kBtu)	4,641,929
Natural Gas (kBtu)[4]	13,603
Total Energy (kBtu)	5,598,891
Energy Intensity[5]	
Site (kBtu/ft²/yr)	118
Source (kBtu/ft²/yr)	166
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	486
Electric Distribution Utility	
Public Service Elec & Gas Co	
National Average Comparison	
National Average Site EUI	72
National Average Source EUI	102
% Difference from National Average Source EUI	63%
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[6] for Indoor Environmental Conditions:

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

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

The government estimates the average time needed to fill out this form is [illegible] (includes the time for entering energy data, PE facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA [illegible], Washington, D.C. 20460.

EPA Form 5900-16

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Bryant Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	1 Tyron Avenue, Teaneck, NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Bryant Elementary (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	47,438 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	10	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	30 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: 726081215 (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
09/12/2008	10/13/2008	23,600.00
08/12/2008	09/11/2008	19,200.00
07/14/2008	08/11/2008	14,880.00
06/11/2008	07/13/2008	22,000.00
05/09/2008	06/10/2008	26,760.00
04/08/2008	05/08/2008	31,820.00
03/06/2008	04/07/2008	22,160.00
02/07/2008	03/04/2008	16,880.00
01/09/2008	02/08/2008	23,840.00
12/13/2008	01/08/2008	30,720.00
11/13/2008	12/12/2008	28,080.00
726081215 Consumption (kWh (thousand Watt-hours))		**246,800.00**
726081215 Consumption (kBtu (thousand Btu))		**842,081.60**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**842,081.60**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 2809408 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
09/12/2008	10/13/2008	0.00
08/12/2008	09/11/2008	1.04
07/14/2008	08/11/2008	1.04
06/11/2008	07/13/2008	1.04
05/09/2008	06/10/2008	0.00
04/08/2008	05/08/2008	2.08
03/06/2008	04/07/2008	6.36
02/07/2008	03/04/2008	27.22
01/09/2008	02/08/2008	86.41
12/13/2008	01/08/2008	9.40
11/13/2008	12/12/2008	26.08

2000408 Consumption (therms)	130.70
2000408 Consumption (kBtu (thousand Btu))	13,070.00
Total Natural Gas Consumption (kBtu (thousand Btu))	13,070.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Fuel Type: Fuel Oil (No. 2)

Meter: 128382 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
10/01/2009	10/31/2009	0.00
09/01/2009	09/30/2009	0.00
08/01/2009	08/31/2009	0.00
07/01/2009	07/31/2009	0.00
06/01/2009	06/30/2009	0.00
05/01/2009	05/31/2009	0.00
04/01/2009	04/30/2009	2,380.00
03/01/2009	03/31/2009	3,888.10
02/01/2009	02/28/2009	6,797.20
01/01/2009	01/31/2009	10,298.00
12/01/2008	12/31/2008	6,288.40
11/01/2008	11/30/2008	1,800.00
128382 Consumption (Gallons)		33,466.70
128382 Consumption (kBtu (thousand Btu))		4,641,929.43
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		4,641,929.43
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

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

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

Certifying Professional

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

Name: ______________________________ Date: __________

Signature: ______________________________

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Bryant Elementary School
1 Tyron Avenue
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Bryant Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	47,438
Year Built	1928
For 12-month Evaluation Period Ending Date:	October 31, 2008

Facility Space Use Summary

Bryant Elementary	
Space Type	K-12 School
Gross Floor Area(ft^2)	47,438
Open Weekends?	No
Number of PCs	10
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	20
Percent Heated	90
Months	12
High School?	No
School District	Teaneck

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 10/31/2008)	Baseline (Ending Date [illegible])	Rating of 75	Target	National Average
Energy Performance Rating	7	4	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	118	119	67	N/A	72
Source (kBtu/ft²)	198	178	79	N/A	102
Energy Cost					
$/year	$ 105,257.89	$ 141,823.21	$ 50,947.89	N/A	$ 64,842.40
$/ft²/year	$ 2.22	$ 2.89	$ 1.07	N/A	$ 1.36
Greenhouse Gas Emissions					
$MtCO_2e$/year	486	503	233	N/A	299
$kgCO_2e/ft^2$/year	10	11	5	N/A	6

Note: Over 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

1 - This attribute is optional.
2 - A default value has been supplied by Portfolio Manager.

Statement of Energy Performance

2009

Bryant Elementary School
1 Tyron Avenue
Teaneck, NJ 07666

Portfolio Manager Building ID: 2244796

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

This building's score

7

1 | 50 | 100

Least Efficient | Average | Most Efficient

This building uses 166 kBtu per square foot per year.*

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

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

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

Date of certification

Date Generated: 06/04/2010

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Eugene Field Administration Building

Building ID: 2244836
For 12-month Period Ending: November 30, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: May 04, 2010

Facility
Eugene Field Administration Building
1 Merrison Street
Teaneck , NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 1955
Gross Floor Area (ft²): 24,877

Energy Performance Rating[2] **(1-100)** 82

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	598,416
Fuel Oil (No. 2) (kBtu)	1,173,363
Natural Gas (kBtu)[4]	69,923
Total Energy (kBtu)	1,841,702
Energy Intensity[5]	
Site (kBtu/ft²/yr)	74
Source (kBtu/ft²/yr)	131
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	181
Electric Distribution Utility	
Public Service Elec & Gas Co	
National Average Comparison	
National Average Site EUI	112
National Average Source EUI	199
% Difference from National Average Source EUI	-34%
Building Type	Office

Stamp of Certifying Professional

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

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

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

Notes:
[illegible]

[illegible]

EPA Form 5900-16

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Eugene Field Administration Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	1 Merrison Street, Teaneck , NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Administration Building (Office)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	24,877 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Weekly operating hours	65 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	47	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	25	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

ENERGY STAR® Data Checklist for Commercial Buildings

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

Meter Type: Electricity

Meter: 678004548 (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
10/13/2009	11/10/2009	13,440.00
09/12/2009	10/12/2009	13,110.00
08/12/2009	09/11/2009	18,840.00
07/14/2009	08/11/2009	18,470.00
06/11/2009	07/13/2009	16,350.00
05/09/2009	06/10/2009	14,430.00
04/08/2009	05/08/2009	14,760.00
03/06/2009	04/07/2009	15,120.00
02/06/2009	03/05/2009	13,080.00
01/09/2009	02/05/2009	13,860.00
12/13/2008	01/08/2009	11,340.00
678004548 Consumption (kWh (thousand Watt-hours))		**185,800.00**
678004548 Consumption (kBtu (thousand Btu))		**548,649.60**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**548,649.60**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 2209889 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
10/13/2009	11/10/2009	58.18
09/12/2009	10/12/2009	50.13
08/12/2009	09/11/2009	49.04
07/14/2009	08/11/2009	41.88
06/11/2009	07/13/2009	56.37
05/09/2009	06/10/2009	52.07
04/08/2009	05/08/2009	47.88
03/06/2009	04/07/2009	77.36
02/06/2009	03/05/2009	57.81
01/09/2009	02/05/2009	74.23
12/13/2008	01/08/2009	88.84

2280000 Consumption (therms)	631.46
2280000 Consumption (kBtu (thousand Btu))	63,146.00
Total Natural Gas Consumption (kBtu (thousand Btu))	63,146.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Fuel Type: Fuel Oil (No. 2)		
Meter: 128366 (Gallons) Space(s): Entire Facility		
Start Date	End Date	Energy Use (Gallons)
11/01/2008	11/30/2008	1,700.10
10/01/2008	10/31/2008	0.00
09/01/2008	09/30/2008	0.00
08/01/2008	08/31/2008	0.00
07/01/2008	07/31/2008	0.00
06/01/2008	06/30/2008	0.00
05/01/2008	05/31/2008	0.00
04/01/2008	04/30/2008	423.40
03/01/2008	03/31/2008	1,313.70
02/01/2008	02/29/2008	1,075.80
01/01/2008	01/31/2008	2,153.70
12/01/2007	12/31/2007	1,793.80
128366 Consumption (Gallons)		8,460.50
128366 Consumption (kBtu (thousand Btu))		1,173,363.24
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		1,173,363.24
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

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

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

Certifying Professional

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

Name: ______________________ Date: __________

Signature: ______________________

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Eugene Field Administration Building
1 Merrison Street
Teaneck , NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Eugene Field Administration Building	
Gross Floor Area Excluding Parking: (ft^2)	24,877
Year Built	19[illegible]
For 12-month Evaluation Period Ending Date:	November 30, 2008

Facility Space Use Summary

Administration Building	
Space Type	Office
Gross Floor Area(ft^2)	24,877
Weekly operating hours	65
Workers on Main Shift	47
Number of PCs	28
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 11/30/2008)	Baseline (Ending Date [illegible])	Rating of 75	Target	National Average
Energy Performance Rating	82	81	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	74	70	83	N/A	112
Source ($kBtu/ft^2$)	131	134	147	N/A	198
Energy Cost					
$/year	$ 44,837.44	$ 47,083.50	$ 50,301.40	N/A	$ 68,131.20
$/ft²/year	$ 1.80	$ 1.92	$ 2.02	N/A	$ 2.74
Greenhouse Gas Emissions					
$MtCO_2e/year$	151	165	203	N/A	275
$kgCO_2e/ft^2/year$	7	7	8	N/A	11

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

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

Statement of Energy Performance

2009

Eugene Field Administration Building
1 Morrison Street
Teaneck , NJ 07666

Portfolio Manager Building ID: 2244835

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

This building's score

82

1 50 100

Least Efficient Average Most Efficient

This building uses 131 kBtu per square foot per year.*

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

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

I certify that the [illegible] is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 05/04/2010

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Hawthorne Elementary School

Building ID: 2244841
For 12-month Period Ending: November 30, 2009[1]
Date SEP becomes Ineligible: N/A
Date SEP Generated: May 04, 2010

Facility
Hawthorne Elementary School
201 Fycke Lane
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 1925
Gross Floor Area (ft²): 48,373

Energy Performance Rating[2] (1-100) 3

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	1,337,185
Natural Gas (kBtu)[4]	4,315,928
Total Energy (kBtu)	5,653,113
Energy Intensity[5]	
Site (kBtu/ft²/yr)	116
Source (kBtu/ft²/yr)	182
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	433
Electric Distribution Utility	
Public Service Elec & Gas Co	
National Average Comparison	
National Average Site EUI	62
National Average Source EUI	98
% Difference from National Average Source EUI	86%
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[6] for Indoor Environmental Conditions:

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

Notes:
1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]

[illegible]

EPA Form 5900-16

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Hawthorne Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	201 Fycke Lane, Teaneck, NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Hawthorne Elementary (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	46,373 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	20	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	20 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		☐

ENERGY STAR® Data Checklist
for Commercial Buildings

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

Fuel Type: Electricity		
Meter: 678004502 (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
10/13/2009	11/11/2009	30,600.00
09/12/2009	10/12/2009	37,140.00
08/12/2009	09/11/2009	28,620.00
07/14/2009	08/11/2009	29,220.00
06/11/2009	07/13/2009	37,380.00
05/09/2009	06/10/2009	34,140.00
04/08/2009	05/08/2009	35,340.00
03/05/2009	04/07/2009	36,680.00
02/06/2009	03/04/2009	29,100.00
01/09/2009	02/05/2009	31,280.00
12/13/2008	01/08/2009	25,920.00
678004502 Consumption (kWh (thousand Watt-hours))		**355,380.00**
678004502 Consumption (kBtu (thousand Btu))		**1,212,556.56**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**1,212,556.56**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: 2415218 (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
10/13/2009	11/11/2009	4,731.45
09/12/2009	10/12/2009	237.08
08/12/2009	09/11/2009	0.00
07/14/2009	08/11/2009	0.00
06/11/2009	07/13/2009	0.00
05/09/2009	06/10/2009	173.91
04/08/2009	05/08/2009	1,861.66
03/05/2009	04/07/2009	6,009.98
02/06/2009	03/04/2009	7,300.52
01/09/2009	02/05/2009	8,213.68
12/13/2008	01/08/2009	7,750.37

3015218 Consumption (therms)	36,278.65
3015218 Consumption (kBtu (thousand Btu))	3,627,865.00
Total Natural Gas Consumption (kBtu (thousand Btu))	3,627,865.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

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

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

Certifying Professional

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

Name: ______________________________ Date: ____________

Signature: ______________________________

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Hawthorne Elementary School
201 Fycke Lane
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Hawthorne Elementary School	
Gross Floor Area Excluding Parking: (ft²)	48,373
Year Built	1928
For 12-month Evaluation Period Ending Date:	November 30, 2009

Facility Space Use Summary

Hawthorne Elementary	
Space Type	K-12 School
Gross Floor Area(ft²)	48,373
Open Weekends?	No
Number of PCs	25
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	20
Percent Heated	90
Months	12
High School?	No
School District	Teaneck

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 11/30/2009)	Baseline (Ending Date 07/31/2008)	Rating of 75	Target	National Average
Energy Performance Rating	3	3	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	115	111	46	N/A	67
Source (kBtu/ft²)	182	179	77	N/A	91
Energy Cost					
$/year	$ 109,888.96	$ 117,371.80	$ 40,344.47	N/A	$ 58,252.17
$/ft²/year	$ 2.23	$ 2.38	$ 0.84	N/A	$ 1.20
Greenhouse Gas Emissions					
$MtCO_2e$/year	433	426	193	N/A	234
$kgCO_2e/ft^2$/year	9	9	4	N/A	5

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

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

Statement of Energy Performance

2009

Hawthorne Elementary School
201 Fycke Lane
Teaneck, NJ 07666

Portfolio Manager Building ID: 2244841

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

This building's score

3

1 | 50 | 100

Least Efficient | Average | Most Efficient

This building uses 182 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 06/04/2010

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Teaneck High School

Building ID: 2244849
For 12-month Period Ending: October 31, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: May 04, 2010

Facility
Teaneck High School
100 Elizabeth Avenue
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 1934
Gross Floor Area (ft^2): 215,808

Energy Performance Rating[2] (1-100) 25

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	6,414,883
Fuel Oil (No. 2) (kBtu)	1,666,228
Natural Gas (kBtu)[4]	14,089,978
Total Energy (kBtu)	22,171,089

Energy Intensity[5]	
Site (kBtu/ft^2/yr)	
Source (kBtu/ft^2/yr)	N/A

Emissions (based on site energy use)	
Greenhouse Gas Emissions (MtCO$_2$e/year)	N/A

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	82
National Average Source EUI	141
% Difference from National Average Source EUI	
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[6] for Indoor Environmental Conditions:

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Teaneck High School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	100 Elizabeth Avenue Teaneck, NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Teaneck High School (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	215,808 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	Yes	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	208	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	2	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no"		☐
Percent Cooled	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	Yes	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 [redacted] and high school), the user should check 'yes' to 'high school'.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: 779014248 (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
09/11/2009	10/12/2009	167,777.00
08/12/2009	09/10/2009	182,746.00
07/14/2009	08/11/2009	159,334.00
06/11/2009	07/13/2009	173,806.00
05/08/2009	06/10/2009	203,936.00
04/08/2009	05/08/2009	171.87
03/06/2009	04/07/2009	206,966.00
02/05/2009	03/04/2009	147,647.00
01/09/2009	02/05/2009	154,998.00
12/14/2008	01/08/2009	127,374.00
11/12/2008	12/13/2008	171,463.00
779014248 Consumption (kWh (thousand Watt-hours))		1,713,987.67
779014248 Consumption (kBtu (thousand Btu))		5,848,100.06
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		5,848,100.06
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 3128286 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
09/11/2009	10/12/2009	11,224.66
08/12/2009	09/10/2009	2,870.67
07/14/2009	08/11/2009	5,833.08
06/11/2009	07/13/2009	17,724.04
05/08/2009	06/10/2009	17,724.04
04/08/2009	05/08/2009	0.00
03/06/2009	04/07/2009	17,328.08
02/05/2009	03/04/2009	18,346.80
01/09/2009	02/05/2009	22,929.81
12/14/2008	01/08/2009	18,894.67
11/12/2008	12/13/2008	1,267.64

3128296 Consumption (therms)	131,938.31
3128296 Consumption (kBtu (thousand Btu))	13,193,831.00

Meter: 3106391 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
09/11/2009	10/12/2009	125.33
08/12/2009	09/10/2009	27.13
07/14/2009	08/11/2009	7.30
06/11/2009	07/13/2009	41.88
05/09/2009	06/10/2009	108.34
04/08/2009	05/08/2009	96.84
03/05/2009	04/07/2009	129.63
02/06/2009	03/04/2009	113.12
01/09/2009	02/05/2009	180.99
12/14/2008	01/08/2009	108.53
11/12/2008	12/13/2008	140.08
3106391 Consumption (therms)		1,069.06
3106391 Consumption (kBtu (thousand Btu))		106,906.00
Total Natural Gas Consumption (kBtu (thousand Btu))		13,299,838.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Fuel Type: Fuel Oil (No. 2)

Meter: 128383 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
11/01/2008	11/30/2008	12,014.00
128383 Consumption (Gallons)		12,014.00
128383 Consumption (kBtu (thousand Btu))		1,666,227.67
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		1,666,227.67
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

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

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

Certifying Professional

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

Name: ______________________________ Date: ____________

Signature: ______________________________

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Teaneck High School
100 Elizabeth Avenue
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Teaneck High School	
Gross Floor Area Excluding Parking: (ft²)	215,806
Year Built	1934
For 12-month Evaluation Period Ending Date:	October 31, 2008

Facility Space Use Summary

Teaneck High School	
Space Type	K-12 School
Gross Floor Area(ft²)	215,806
Open Weekends?	Yes
Number of PCs	209
Number of walk-in refrigeration/freezer units	2
Presence of cooking facilities	Yes
Percent Cooled	50
Percent Heated	50
Months	12
High School?	Yes
School District	Teaneck

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 10/31/2008)	Baseline (Ending Date 11/30/2008)	Rating of 75	Target	National Average
ENERGY STAR Performance Rating	26	22	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	N/A	115	68	N/A	87
Source (kBtu/ft²)	N/A	189	N/A	N/A	141
Energy Cost					
$/year	$ 481,342.50	$ 650,829.23	N/A	N/A	N/A
$/ft²/year	$ 2.23	$ 3.04	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	N/A	2,348	N/A	N/A	N/A
$kgCO_2e/ft^2$/year	N/A	10	N/A	N/A	N/A

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

Notes:

1 - This attribute is optional.

2 - A default value has been supplied by Portfolio Manager.

Statement of Energy Performance

2009

Teaneck High School
100 Elizabeth Avenue
Teaneck, NJ 07666

Portfolio Manager Building ID: 2244849

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

This building uses N/A kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 05/04/2010

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Lowell Elementary School

Building ID: 2244844
For 12-month Period Ending: November 30, 2009[1]
Date SEP becomes Ineligible: N/A

Date SEP Generated: May 04, 2010

Facility
Lowell Elementary School
1025 Lincoln Place
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 19[illegible]4
Gross Floor Area (ft^2): 47,106

Energy Performance Rating[2] **(1-100)** 18

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	897,168
Fuel Oil (No. 2) (kBtu)	3,296,772
Natural Gas (kBtu)[4]	75,681
Total Energy (kBtu)	4,268,621

Energy Intensity[5]	
Site (kBtu/ft^2/yr)	91
Source (kBtu/ft^2/yr)	136

Emissions (based on site energy use)	
Greenhouse Gas Emissions (MtCO$_2$e/year)	383

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	67
National Average Source EUI	100
% Difference from National Average Source EUI	36%
Building Type	K-12 School

Stamp of Certifying Professional

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

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

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

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

[illegible] the average time needed to fill out this form is 6 hours (includes the time for entering energy data, PE facility inspection, and notarizing the SEP) and welcomes [illegible] to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

EPA Form 5900-16

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Lowell Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	1025 Lincoln Place, Teaneck, NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Lowell Elementary (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	47,108 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	23	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no"		☐
Percent Cooled	20 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12(Optional)	Is this school in operation for at least 8 months of the year?		☐

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: 728881842 (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
10/08/2009	11/06/2009	24,160.00
09/10/2009	10/08/2009	27,960.00
08/08/2009	09/09/2009	8,280.00
07/10/2009	08/07/2009	8,960.00
06/09/2009	07/09/2009	20,800.00
05/07/2009	06/08/2009	24,960.00
04/04/2009	05/06/2009	23,520.00
03/04/2009	04/03/2009	28,640.00
02/04/2009	03/03/2009	22,080.00
01/07/2009	02/03/2009	25,540.00
12/11/2008	01/06/2009	20,320.00
728881842 Consumption (kWh (thousand Watt-hours))		**236,220.00**
728881842 Consumption (kBtu (thousand Btu))		**805,962.64**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**805,962.64**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 2415218 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
10/09/2009	11/06/2009	52.02
09/10/2009	10/08/2009	6.27
08/08/2009	09/09/2009	138.77
07/10/2009	08/07/2009	121.96
06/09/2009	07/09/2009	9.38
05/07/2009	06/08/2009	89.86
04/04/2009	05/06/2009	73.04
03/04/2009	04/03/2009	63.77
02/04/2009	03/03/2009	51.32
01/07/2009	02/03/2009	51.10
12/11/2008	01/06/2009	41.78

2415218 Consumption (therms)	699.06
2415218 Consumption (kBtu (thousand Btu))	69,906.00
Total Natural Gas Consumption (kBtu (thousand Btu))	69,906.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Fuel Type: Fuel Oil (No. 2)

Meter: 128383 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
11/01/2009	11/30/2009	3,486.60
10/01/2009	10/31/2009	0.00
09/01/2009	09/30/2009	0.00
08/01/2009	08/31/2009	0.00
07/01/2009	07/31/2009	0.00
06/01/2009	06/30/2009	0.00
05/01/2009	05/31/2009	0.00
04/01/2009	04/30/2009	2,801.00
03/01/2009	03/31/2009	4,800.80
02/01/2009	02/28/2009	2,200.10
01/01/2009	01/31/2009	6,035.40
12/01/2008	12/31/2008	4,740.70

128383 Consumption (Gallons)	23,763.90
128383 Consumption (kBtu (thousand Btu))	3,296,771.70
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))	3,296,771.70
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?	☐

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

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

Certifying Professional

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

[illegible]: ______________________________ Date: ____________

Signature: ______________________________

[illegible] applying for the ENERGY STAR

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Lowell Elementary School
1025 Lincoln Place
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Lowell Elementary School	
Gross Floor Area Excluding Parking: (ft²)	47,108
Year Built	1934
For 12-month Evaluation Period Ending Date:	November 30, 2009

Facility Space Use Summary

Lowell Elementary	
Space Type	K-12 School
Gross Floor Area(ft²)	47,108
Open Weekends?	No
Number of PCs	23
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	20
Percent Heated	90
Months	12
High School?	No
School District	Teaneck

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 11/30/2009)	Baseline (Ending Date 09/30/2008)	Rating of 75	Target	National Average
Energy Performance Rating	16	16	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	91	88	52	N/A	67
Source (kBtu/ft²)	139	139	79	N/A	100
Energy Cost					
$/year	$ 86,980.37	$ 109,387.00	$ 49,913.47	N/A	[illegible]
$/ft²/year	$ 1.86	$ 2.32	$ 1.06	N/A	$ 1.36
Greenhouse Gas Emissions					
$MtCO_2e$/year	383	388	220	N/A	281
$kgCO_2e/ft^2$/year	8	8	5	N/A	6

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

Notes:

o - This attribute is optional.

d - A default value has been supplied by Portfolio Manager.

Statement of Energy Performance

2009

Lowell Elementary School
1025 Lincoln Place
Teaneck, NJ 07666

Portfolio Manager Building ID: 2244844

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

This building's score

18

1 — 50 — 100

Least Efficient — Average — Most Efficient

This building uses 136 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Thomas Jefferson Middle School

ENERGY STAR

Building ID: 2244879
For 12-month Period Ending: November 30, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: May 04, 2010

Facility
Thomas Jefferson Middle School
655 Teaneck Road
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 1958
Gross Floor Area (ft²): 105,216

Energy Performance Rating[2] (1-100) 30

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	2,537,875
Fuel Oil (No. 2) (kBtu)	5,687,892
Natural Gas (kBtu)[4]	797,693
Total Energy (kBtu)	9,023,460

Energy Intensity[5]	
Site (kBtu/ft²/yr)	86
Source (kBtu/ft²/yr)	143

Emissions (based on site energy use)	
Greenhouse Gas Emissions (MtCO$_2$e/year)	847

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	72
National Average Source EUI	120
% Difference from National Average Source EUI	19%
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[6] for Indoor Environmental Conditions:

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Thomas Jefferson Middle School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	655 Teaneck Road, Teaneck, NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Thomas Jefferson Middle School (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	106,216 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	127	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	3	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	50 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.	

ENERGY STAR® Data Checklist
for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: 778015816 (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
10/13/2009	11/10/2009	68,400.00
09/12/2009	10/12/2009	59,280.00
08/12/2009	09/11/2009	46,080.00
07/14/2009	08/11/2009	31,920.00
06/11/2009	07/13/2009	51,840.00
05/09/2009	06/10/2009	68,400.00
04/09/2009	05/08/2009	59,760.00
03/06/2009	04/07/2009	69,800.00
02/06/2009	03/04/2009	61,200.00
01/09/2009	02/05/2009	73,440.00
12/13/2008	01/08/2009	55,920.00
778015816 Consumption (kWh (thousand Watt-hours))		655,040.00
778015816 Consumption (kBtu (thousand Btu))		2,209,116.48
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		2,209,116.48
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 3340982 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
10/13/2009	11/10/2009	401.67
09/12/2009	10/12/2009	507.67
08/12/2009	09/11/2009	466.39
07/14/2009	08/11/2009	511.80
06/11/2009	07/13/2009	683.79
05/09/2009	06/10/2009	791.42
04/09/2009	05/08/2009	747.37
03/06/2009	04/07/2009	898.95
02/06/2009	03/04/2009	668.83
01/09/2009	02/05/2009	761.06
12/13/2008	01/08/2009	697.65

3349882 Consumption (therms)	7,124.30
3349882 Consumption (kBtu (thousand Btu))	712,430.00
Total Natural Gas Consumption (kBtu (thousand Btu))	712,430.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Fuel Type: Fuel Oil (No. 2)

Meter: 128387 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
11/01/2009	11/30/2009	6,521.00
10/01/2009	10/31/2009	0.00
09/01/2009	09/30/2009	0.00
08/01/2009	08/31/2009	0.00
07/01/2009	07/31/2009	0.00
06/01/2009	06/30/2009	0.00
05/01/2009	05/31/2009	0.00
04/01/2009	04/30/2009	7,228.20
03/01/2009	03/31/2009	2,800.00
02/01/2009	02/28/2009	7,898.60
01/01/2009	01/31/2009	10,052.80
12/01/2008	12/31/2008	6,511.80
128387 Consumption (Gallons)		41,011.40
128387 Consumption (kBtu (thousand Btu))		5,687,881.57
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		5,687,881.57
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

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

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

Certifying Professional

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

Name: ______________________________ Date: ____________

Signature: ______________________________

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Thomas Jefferson Middle School
[illegible] Teaneck Road
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Thomas Jefferson Middle School	
Gross Floor Area Excluding Parking: (ft²)	105,216
Year Built	1956
For 12-month Evaluation Period Ending Date:	November 30, 2009

Facility Space Use Summary

Thomas Jefferson Middle School	
Space Type	K-12 School
Gross Floor Area(ft²)	105,216
Open Weekends?	No
Number of PCs	127
Number of walk-in refrigeration/freezer units	3
Presence of cooking facilities	Yes
Percent Cooled	50
Percent Heated	50
Months	12
High School?	No
School District	Teaneck

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 11/30/2009)	Baseline (Ending Date 08/30/2008)	Rating of 75	Target	National Average
Energy Performance Rating	30	26	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	86	90	56	N/A	72
Source (kBtu/ft²)	143	161	94	N/A	120
Energy Cost					
$/year	$ 199,824.13	$ 249,101.30	$ 130,571.07	N/A	$ 166,984.81
$/ft²/year	$ 1.90	$ 2.37	$ 1.24	N/A	$ 1.59
Greenhouse Gas Emissions					
$MtCO_2e$/year	847	881	555	N/A	711
$kgCO_2e/ft^2$/year	8	8	5	N/A	7

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

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

Statement of Energy Performance

2009

Thomas Jefferson Middle School
655 Teaneck Road
Teaneck, NJ 07666

Portfolio Manager Building ID: 2244879

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

This building uses 143 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 05/04/2010

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Whittier Elementary School

Building ID: 2244881
For 12-month Period Ending: November 30, 2009[1]
Date SEP becomes Ineligible: N/A

Date SEP Generated: May 04, 2010

Facility
Whittier Elementary School
491 West Englewood Avenue
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

Year Built: 1921
Gross Floor Area (ft²): 56,118

Energy Performance Rating[2] (1-100) 15

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	1,267,811
Fuel Oil (No. 2) (kBtu)	3,850,478
Natural Gas (kBtu)[4]	34,633
Total Energy (kBtu)	5,152,922

Energy Intensity[5]	
Site (kBtu/ft²/yr)	93
Source (kBtu/ft²/yr)	148

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	478

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	66
National Average Source EUI	105
% Difference from National Average Source EUI	41%
Building Type	K-12 School

Stamp of Certifying Professional

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

Meets Industry Standards[6] for Indoor Environmental Conditions:

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

Certifying Professional
Matthew Goss
11 British American Boulevard
Latham, NY 12110

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

EPA Form 5900-16

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Whittier Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	K-12 School	Is this an accurate description of the space in question?		☐
Location	491 West Englewood Avenue, Teaneck, NJ 07666	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Whittier Elementary (K-12 School)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	56,118 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Open Weekends?	No	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		☐
Number of PCs	28	Is this the number of personal computers in the K12 School?		☐
Number of walk-in refrigeration/freezer units	0	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		☐
Presence of cooking facilities	Yes	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		☐
Percent Cooled	40 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	90 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	12(Optional)	Is this school in operation for at least 8 months of the year?		☐

High School?	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: 778003529 (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
10/10/2009	11/09/2009	27,400.00
09/11/2009	10/09/2009	34,200.00
08/11/2009	09/10/2009	38,000.00
07/11/2009	08/10/2009	34,000.00
06/10/2009	07/10/2009	23,000.00
05/08/2009	06/09/2009	23,000.00
04/07/2009	05/07/2009	31,400.00
03/05/2009	04/06/2009	38,000.00
02/06/2009	03/04/2009	28,600.00
01/08/2009	02/05/2009	30,800.00
12/12/2008	01/07/2009	28,200.00
778003529 Consumption (kWh (thousand Watt-hours))		332,600.00
778003529 Consumption (kBtu (thousand Btu))		1,134,831.20
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		1,134,831.20
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: 3175230 (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
10/10/2009	11/09/2009	14.57
09/11/2009	10/09/2009	38.64
08/11/2009	09/10/2009	36.48
07/10/2009	08/10/2009	17.72
06/13/2009	07/09/2009	16.68
05/08/2009	06/12/2009	18.74
04/07/2009	05/07/2009	31.30
03/05/2009	04/06/2009	40.77
02/06/2009	03/04/2009	22.00
01/08/2009	02/05/2009	34.50
12/12/2008	01/07/2009	18.80
3175230 Consumption (therms)		288.20
3175230 Consumption (kBtu (thousand Btu))		28,820.00
Total Natural Gas Consumption (kBtu (thousand Btu))		28,820.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Fuel Type: Fuel Oil (No. 2)

Meter: 128301 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
11/01/2009	11/30/2009	2,000.10
10/01/2009	10/31/2009	0.00
09/01/2009	09/30/2009	0.00
08/01/2009	08/31/2009	0.00
07/01/2009	07/31/2009	0.00
06/01/2009	06/30/2009	0.00
05/01/2009	05/31/2009	0.00
04/01/2009	04/30/2009	2,264.70
03/01/2009	03/31/2009	2,667.80
02/01/2009	02/28/2009	5,311.80
01/01/2009	01/31/2009	8,568.60
12/01/2008	12/31/2008	6,960.10
128301 Consumption (Gallons)		27,763.10
128301 Consumption (kBtu (thousand Btu))		3,866,478.22
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		3,866,478.22
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

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

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

Certifying Professional

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

Name: ______________________________ Date: __________

Signature: ______________________________

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Whittier Elementary School
491 West Englewood Avenue
Teaneck, NJ 07666

Facility Owner
Teaneck Board of Education
1 Merrison Street
Teaneck , NJ 07666

Primary Contact for this Facility
Anthony D'Angelo
1 Merrison Street
Teaneck , NJ 07666

General Information

Whittier Elementary School	
Gross Floor Area Excluding Parking: (ft²)	55,118
Year Built	1921
For 12-month Evaluation Period Ending Date:	November 30, 2009

Facility Space Use Summary

Whittier Elementary	
Space Type	K-12 School
Gross Floor Area(ft²)	55,118
Open Weekends?	No
Number of PCs	28
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	Yes
Percent Cooled	40
Percent Heated	90
Months	12
High School?	No
School District	Teaneck

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	Current (Ending Date 11/30/2009)	Baseline (Ending Date 11/30/2009)	Rating of 75	Target	National Average
Energy Performance Rating	15	15	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	93	93	52	N/A	86
Source (kBtu/ft²)	148	148	82	N/A	105
Energy Cost					
$/year	$ 105,558.11	$ 105,558.11	$ 58,079.08	N/A	$ 75,039.67
$/ft²/year	$ 1.92	$ 1.92	$ 1.07	N/A	$ 1.36
Greenhouse Gas Emissions					
MtCO₂e/year	478	478	265	N/A	340
kgCO₂e/ft²/year	9	9	5	N/A	6

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

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

Statement of Energy Performance

2009

Whittier Elementary School
491 West Englewood Avenue
Teaneck, NJ 07666

Portfolio Manager Building ID: 2244881

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

This building's score

15

1 | 50 | 100

Least Efficient | Average | Most Efficient

This building uses 148 kBtu per square foot per year.*

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

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

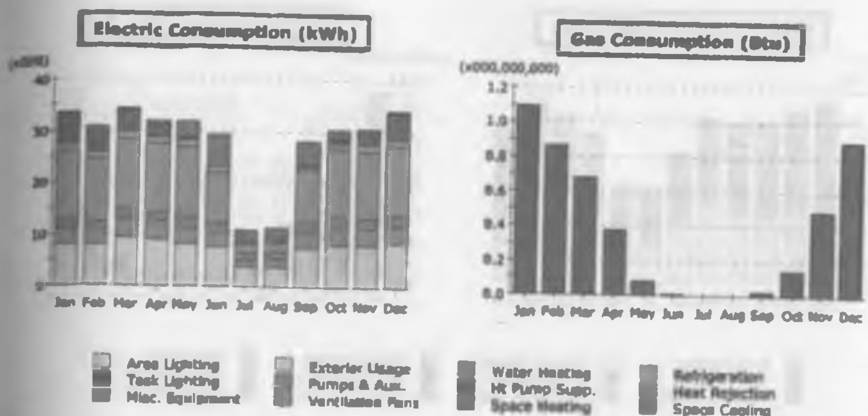
I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

Date Generated: 05/04/2010

APPENDIX C

EQUEST MODEL RUN SUMMARIES

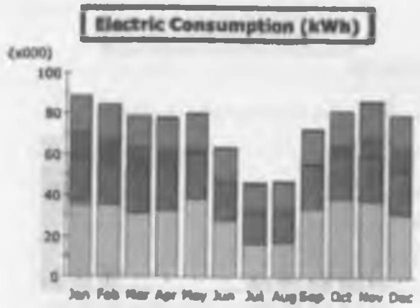


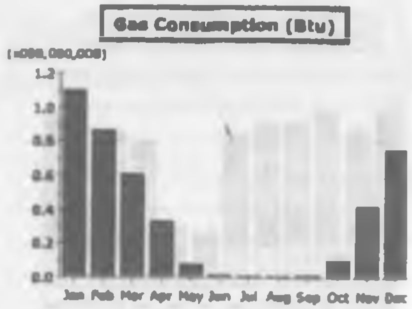
Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	0.04	0.04	0.07	0.48	3.16	5.89	2.01	2.39	4.34	1.47	0.02	0.04	19.91
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	6.09	4.03	4.05	2.32	0.55	0.06	-	-	0.15	0.92	3.10	5.25	27.01
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	1.30	1.41	1.70	1.90	1.37	1.13	0.48	0.48	1.03	1.16	1.24	1.41	14.33
Vent. Fans	13.37	12.08	13.38	12.94	13.37	9.99	1.82	1.91	10.29	13.37	12.94	13.38	128.88
Pumps & Aux.	1.44	1.20	1.87	1.84	1.81	1.63	1.35	1.35	1.64	1.84	1.86	1.86	19.88
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	3.14	3.09	3.69	3.54	3.28	2.98	1.80	1.86	3.34	3.28	3.26	3.42	35.38
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	7.96	7.84	9.37	8.07	8.32	7.57	3.77	3.08	7.68	8.32	8.27	8.67	90.62
Total	33.62	30.66	34.12	31.88	31.85	29.26	10.91	11.53	28.10	30.26	30.71	34.12	336.38

Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.09	0.87	0.68	0.37	0.08	0.01	-	-	0.02	0.15	0.49	0.89	4.66
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.09	0.87	0.68	0.37	0.08	0.01	-	-	0.02	0.15	0.49	0.89	4.66





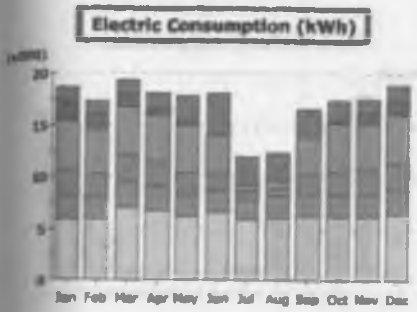
Area Lighting · Task Lighting · Misc. Equipment · Exterior Usage · Pumps & Aux. · Ventilation Fans · Water Heating · Ht Pump Supp. · Space Heating · Refrigeration · Heat Rejection · Space Cooling

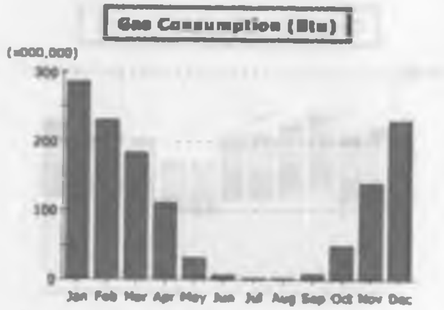
Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	0.02	0.06	0.10	0.40	0.80	0.93	1.30	0.70	0.40	0.16	0.02	4.94
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.01	0.01	0.00	-	-	-	-	-	-	-	-	0.00	0.04
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	18.14	17.00	15.90	15.32	16.65	15.18	12.91	13.27	16.03	16.65	17.16	18.20	190.16
Pumps & Aux.	11.03	10.61	11.30	8.77	2.23	0.24	0.02	0.00	0.61	3.90	8.95	11.03	69.61
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	22.40	21.31	20.04	21.80	22.02	18.40	16.15	16.34	21.41	23.02	22.63	20.84	248.51
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	36.08	35.53	31.20	32.70	37.08	27.58	16.32	16.03	33.63	37.08	37.49	31.20	324.07
Total	88.55	84.47	78.14	77.96	80.07	63.11	46.32	47.45	72.46	81.00	86.40	79.46	887.39

Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.08	0.84	0.58	0.31	0.06	-	-	-	0.00	0.09	0.40	0.73	4.07
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.20
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.10	0.86	0.60	0.33	0.08	0.02	0.01	0.01	0.02	0.11	0.42	0.75	4.30





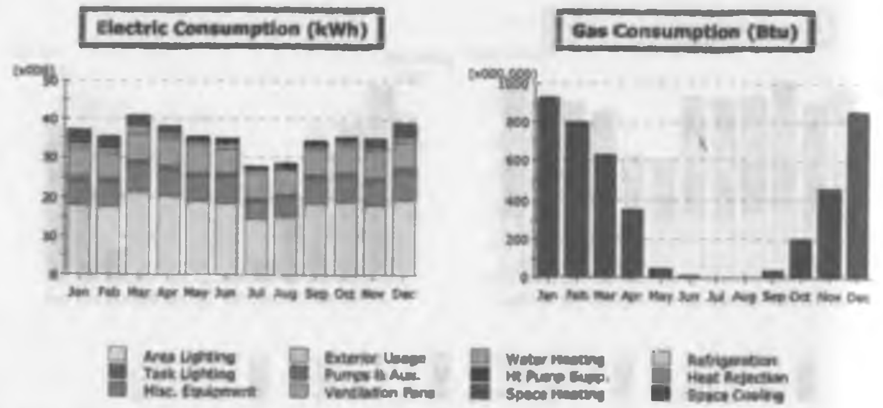
Area Lighting | Task Lighting | Misc. Equipment | Exterior Usage | Pumps & Aux. | Ventilation Fans | Water Heating | Ht Pump Supp. | Space Heating | Refrigeration | Heat Rejection | Space Cooling

Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	1.36	1.22	1.36	1.41	2.46	4.10	2.78	2.67	2.74	1.88	1.31	1.36	24.70
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.99	1.60	1.28	0.76	0.19	0.02	-	-	0.04	0.33	0.98	1.62	[illegible]
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	4.63	4.10	4.03	4.48	4.63	3.47	0.65	0.68	3.57	4.63	4.48	4.63	44.05
Pumps & Aux.	2.65	2.38	2.96	2.31	2.09	1.65	0.72	0.73	[illegible]	2.10	2.38	2.61	23.98
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	2.06	2.03	2.44	2.33	2.16	2.27	2.02	2.11	2.20	2.16	2.15	2.25	26.17
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	5.95	5.87	7.03	6.73	6.22	6.54	5.83	6.07	6.34	6.22	6.19	6.40	75.49
Total	18.64	17.20	[illegible]	[illegible]	17.75	18.13	11.95	[illegible]	16.36	17.40	17.49	[illegible]	[illegible]

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	282.3	226.1	180.0	106.7	27.0	2.5	-	-	5.9	46.8	137.8	227.0	1,243.0
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	3.1	3.1	3.8	3.5	3.0	2.9	2.4	2.4	2.5	2.6	2.8	3.1	35.2
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	285.4	229.2	183.8	110.2	30.0	5.4	2.4	2.4	8.4	49.4	140.6	[illegible]	1,278.2

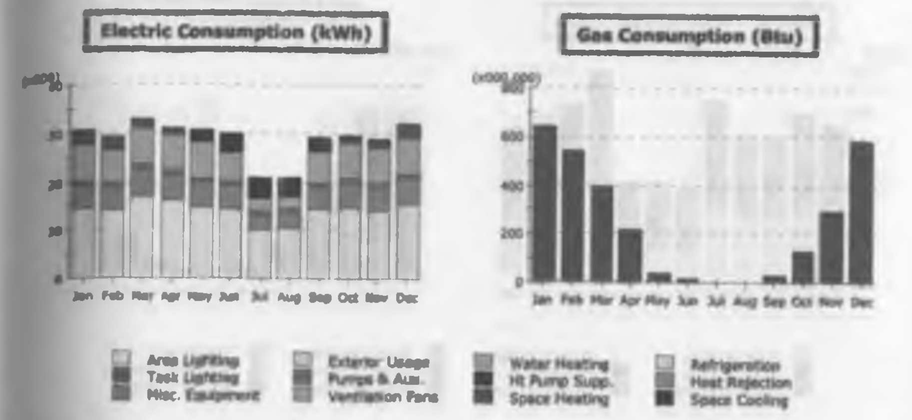


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	0.13	0.80	1.44	0.90	0.97	1.07	0.27	0.80	-	5.81
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	3.77	3.21	2.07	1.74	0.22	0.03	-	0.00	0.17	1.02	2.30	3.97	18.80
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	1.31	1.30	1.06	1.51	1.30	1.17	0.76	0.75	1.03	1.11	1.34	1.34	14.30
Vent. Fans	7.13	6.44	7.13	6.90	7.13	6.86	6.19	6.19	6.60	7.13	6.90	7.13	81.63
Pumps & Aux.	1.14	1.03	1.12	1.03	0.95	0.90	0.92	0.93	0.91	1.00	1.06	1.14	12.08
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	6.80	5.90	7.16	6.86	6.36	6.96	4.86	5.05	6.36	6.36	6.86	6.63	74.83
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	17.90	17.43	21.07	20.14	18.70	18.68	14.22	14.76	18.30	18.70	17.81	19.40	217.83
Total	37.33	35.73	40.96	38.36	35.32	35.25	27.97	28.43	34.52	35.80	35.32	38.30	424.32

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	926.0	798.3	627.7	352.0	42.0	9.5	-	0.8	32.1	187.5	457.2	853.4	4,295.[illegible]
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	926.0	798.3	627.7	352.0	42.0	9.5	-	0.8	32.1	187.5	457.2	853.4	4,295.[illegible]

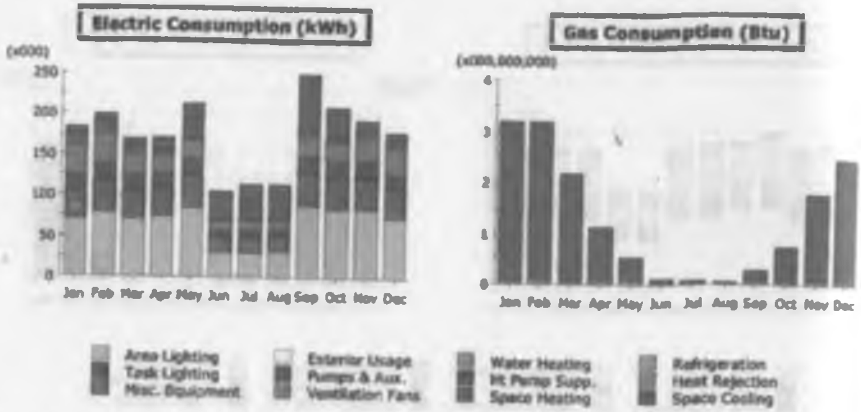


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.01	0.42	2.88	4.00	4.06	3.90	1.72	0.86	0.20	-	18.00
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	3.08	2.61	2.03	1.13	0.16	0.04	-	-	0.12	0.87	1.88	2.04	14.23
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	7.44	6.72	7.47	7.21	7.44	5.80	2.83	2.80	6.22	7.43	7.21	7.46	75.06
Pumps & Aux.	1.03	0.88	1.01	0.91	0.79	0.75	0.77	0.77	0.77	0.87	0.92	1.00	10.50
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	4.80	4.73	5.06	0.42	5.02	4.79	3.41	3.12	4.70	5.02	4.30	5.23	55.57
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.25	14.04	16.70	16.08	14.89	14.54	10.13	10.36	14.12	14.86	14.18	15.52	170.28
Total	30.59	29.03	32.98	31.17	30.86	29.99	30.90	20.99	29.34	29.72	28.93	32.05	300.00

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	631.1	537.0	390.9	211.4	28.6	6.8	-	-	20.7	123.1	291.0	580.0	2,820.3
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	5.8	5.8	7.1	6.7	5.6	5.2	3.3	3.2	4.4	4.9	5.0	5.0	63.4
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	638.9	543.0	398.0	218.2	34.2	12.0	3.3	3.2	25.1	128.0	296.1	586.0	2,883.7



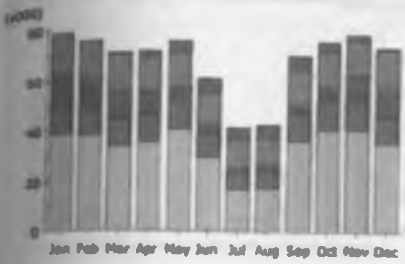
Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	7.7	8.6	8.2	16.4	41.6	25.0	44.8	42.2	72.4	37.3	13.6	8.4	318.2
Heat Reject.	-	-	-	0.1	0.4	0.2	1.3	0.9	1.2	0.2	-	-	4.2
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	36.1	15.8	10.0	6.7	3.5	2.6	0.4	0.4	1.7	4.7	9.5	12.1	87.6
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	34.6	36.3	30.7	20.7	23.1	10.4	9.9	10.4	26.5	23.1	26.6	29.4	275.3
Pumps & Aux.	19.2	20.1	18.1	17.3	18.0	8.7	9.1	9.2	19.7	17.9	19.1	19.2	195.8
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	35.5	38.7	35.2	36.4	41.3	19.7	19.6	20.0	42.5	41.7	41.0	36.8	408.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	69.7	79.8	69.7	73.5	84.5	30.5	29.5	30.8	87.8	84.5	84.2	73.4	798.1
Total	182.7	193.1	169.0	170.9	212.4	105.1	115.0	113.0	249.9	209.0	194.4	179.2	2,100.0

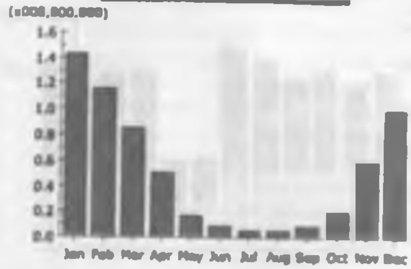
Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	3.11	3.09	2.09	1.05	0.47	0.08	0.06	0.05	0.23	0.66	1.72	2.38	14.97
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.06	0.08	0.07	0.07	0.07	0.02	0.02	0.02	0.06	0.05	0.07	0.08	0.65
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3.18	3.17	2.16	1.12	0.54	0.10	0.07	0.07	0.29	0.72	1.76	2.45	15.64

Electric Consumption (kWh)



Gas Consumption (Btu)



Area Lighting
Task Lighting
Misc. Equipment
Exterior Usage
Pumps & Aux.
Ventilation Fans
Water Heating
Ht Pump Supp.
Space Heating
Refrigeration
Heat Rejection
Space Cooling

Electric Consumption (kWh x000)

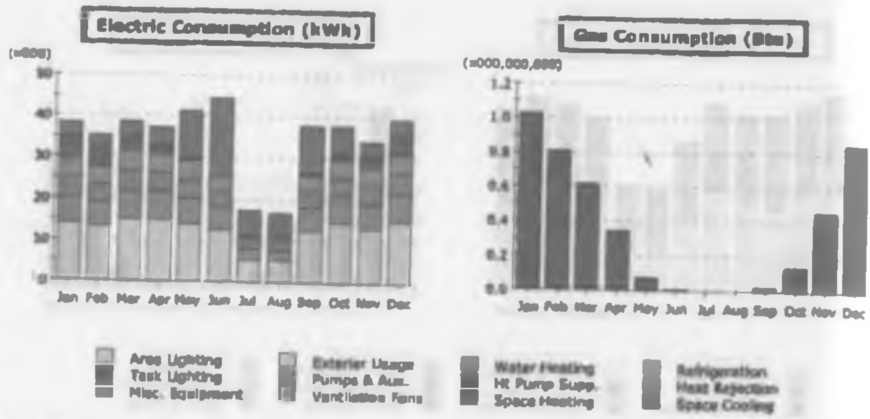
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	0.04	0.17	0.53	1.90	4.70	6.04	5.30	5.34	5.06	4.05	1.76	0.31	35.06
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	16.63	15.06	14.01	13.30	13.30	11.90	10.26	10.30	12.76	13.30	13.96	14.52	159.82
Pumps & Aux.	11.76	10.54	11.40	9.56	4.25	3.10	2.14	2.14	3.49	4.94	8.24	11.20	83.57
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	11.86	14.53	10.52	10.86	12.31	0.41	6.34	6.45	11.11	12.21	12.20	10.96	125.82
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	30.38	37.34	33.16	34.40	40.02	28.80	16.00	17.12	33.55	40.01	30.82	34.87	396.75
Total	70.96	75.04	69.70	70.35	74.64	50.53	40.00	41.52	68.57	74.28	76.97	71.95	801.03

Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.41	1.13	0.83	0.48	0.14	0.07	0.00	0.00	0.07	0.18	0.57	0.98	5.96
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.03	0.03	0.02	0.02	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.25
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.44	1.16	0.86	0.51	0.17	0.09	0.08	0.06	0.09	0.21	0.59	1.00	6.22

APPENDIX D

LIGHTING SPREADSHEETS



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	3.41	3.07	3.48	4.33	11.80	18.93	6.34	5.87	11.70	7.91	3.30	3.40	82.55
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	5.63	4.57	3.60	2.04	0.44	0.06	-	-	0.16	0.84	2.84	4.02	25.19
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	4.96	4.21	4.79	4.64	4.67	3.54	0.87	0.96	3.66	4.67	4.40	4.67	44.97
Pumps & Aux.	4.58	4.13	4.56	4.36	4.38	3.74	2.46	2.48	3.81	4.42	4.37	4.57	47.86
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	6.32	5.96	6.06	6.03	6.32	5.66	2.87	2.40	5.70	6.09	6.02	6.06	68.28
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	13.90	13.20	15.20	15.14	13.90	12.52	3.60	5.40	12.79	14.60	13.33	15.20	150.97
Total	38.46	35.15	38.36	37.32	41.41	44.45	17.05	16.00	37.92	38.12	34.25	38.63	419.78

Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.02	0.80	0.61	0.34	0.07	0.01	-	-	0.02	0.13	0.45	0.85	4.29
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.08
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.03	0.80	0.62	0.34	0.08	0.01	[illegible]	[illegible]	0.03	0.14	0.46	0.86	4.37

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

APPENDIX E

SOLAR ENERGY FINANCING WORKSHEET

Benjamin Franklin Middle School
Design Goal: Provide
17% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh)	[illegible]
Current Utility Price ($/kWh)	[illegible]

Calculations

Solar Rating (Zip Code: [illegible])	[illegible] kWh/sq m/day
Solar Capacity Needed (kW)	[illegible]
Roof Space Needed (sq ft)	[illegible]
Annual Solar kWh (PV Watts)	[illegible]
Net System Installation Cost ($/kW)	[illegible]
Electrical Service Modification Cost	[illegible]
Total System Installation Cost	[illegible]
Materials	[illegible]
Labor	[illegible]
Engineers Opinion of Probable Cost	[illegible]

Assumptions

Annual System Degradation	[illegible]
Annual Utility Inflation	[illegible]
Annual Maintenance Costs	[illegible]

Year	Utility Price	Solar kWh	Utility Savings	SRECs	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]	[illegible]
[illegible]	[illegible] kWh/sq m/day
[illegible]	[illegible]

Utility Price	Solar kWh	Utility Savings	SRECs	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]
Design Goal: Provide
[illegible] of average annual electricity

Existing Conditions
Average Annual Electrical Usage (kWh) [illegible]
Current Utility Price ($/kWh) [illegible]

Calculations
Solar Rating (Zip Code [illegible]) [illegible]
Solar Capacity Required (kW) [illegible]
Roof Space Needed (sq ft) [illegible]
Annual Solar kWh (PV Watts) [illegible]
Net System Installation Cost ($/kWh) [illegible]
Electrical Service Modification Cost [illegible]
Total System Installation Cost [illegible]
Materials [illegible]
Labor [illegible]
Engineers Opinion of Probable Cost [illegible]

Assumptions
[illegible] [illegible]
Annual Utility Inflation [illegible]
Annual Maintenance Costs [illegible]

Year	Utility Price	Solar kWh	Utility Savings	[illegible]	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]

Year	Utility Price	Solar kWh	Utility Savings	[illegible]	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Lowell Elementary School
Design Scot Provide
30% of average annual electricity

Existing Conditions
Current Average Annual Electrical Usage (kWh) [illegible]
Current Utility Price ($/kWh) [illegible]

Calculations
Solar Rating (Zip Code: [illegible]) [illegible]
Solar Capacity Required (kW) [illegible]
Roof Space Needed (sq ft) [illegible]
Annual Solar kWh (PV Watts) [illegible]
kW System Installation Cost ($/kWh) [illegible]
Electrical Service Modification Cost [illegible]
Total System Installation Cost [illegible]
Materials [illegible]
Labor [illegible]
Engineers Opinion of Probable Cost [illegible]

Assumptions
Annual System Degradation [illegible]
Annual Utility Inflation [illegible]
Annual Maintenance Costs 2%

Year	Utility Price	Solar kWh	Utility Savings	SRECs	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] High School
Design Scot Provide
[illegible] of average annual electricity

Existing Conditions
Current Average Annual Electrical Usage (kWh) [illegible]
Current Utility Price ($/kWh) [illegible]

Calculations
Solar Rating (Zip Code: [illegible]) [illegible]
Solar Capacity Required (kW) [illegible]
Roof Space Needed (sq ft) [illegible]
Annual Solar kWh (PV Watts) [illegible]
kW System Installation Cost ($/kWh) [illegible]
Electrical Service Modification Cost [illegible]
Total System Installation Cost [illegible]
Materials [illegible]
Labor [illegible]
Engineers Opinion of Probable Cost [illegible]

Assumptions
Annual System Degradation [illegible]
Annual Utility Inflation [illegible]
Annual Maintenance Costs 2%

Year	Utility Price	Solar kWh	Utility Savings	SRECs	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Thomas Jefferson Middle School
Design Cost [illegible]
[illegible] of average annual electricity

Existing Conditions
Current Average Annual Electrical Usage (kWh) [illegible]
Current Utility Price ($/kWh) [illegible]

Calculations
Solar Rating City Code [illegible] [illegible]
Solar Capacity Required (kW) [illegible]
Roof Space Needed (sq-ft) [illegible]
Annual Solar kWh (PV Watts) [illegible]
Net System Installation Cost ($/kWh) [illegible]
Electrical Service Modification Cost [illegible]
Total System Installation Cost [illegible]
Materials [illegible]
Labor [illegible]
Engineers Opinion of Probable Cost [illegible]

Assumptions
Annual System Degradation [illegible]
Annual Utility Inflation [illegible]
Annual Maintenance Costs [illegible]

Year	Utility Price	kWh	Utility Savings	Rebate	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] Elementary School
Design Cost [illegible]
[illegible] of average annual electricity

Existing Conditions
Current Average Annual Electrical Usage [illegible] [illegible]
Current Utility Price [illegible] [illegible]

Calculations
[illegible]

Assumptions
[illegible]

Year	Utility Price	Solar kWh	Utility Savings	Rebate	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX F

FACILITY DATA FORMS

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for __each__ building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Benjamin Franklin Middle School			
Street Address 1315 Taft Road		**County** Bergen	
City Teaneck		**State** New Jersey	**Zip** 07666
Facility's Description 3 Story Structure Grades 5 - 8			
Total Sq Ft 100,202	**Year Built** 1967	**Hours/Week Occupied** 90	**Number of Employees** 105 emp. / 575 students

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: __________

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #42 006 678 18	
Annual kWh Use	**Annual Electricity Cost**
[illegible]2,080	$136,841.27
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
PSE&G #42 006 678 18	
Annual Use in Therms	**Annual Natural Gas Cost**
6,662.257	$8,403.43

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Allied #128366	
Annual Use in Gallons	**Annual Fuel Oil Cost**
30,062.70	$56,321.93

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ____________	Project No: ____________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Bryant Elementary School			
Street Address 1 Tryon Avenue		**County** Bergen	
City Teaneck		**State** New Jersey	**Zip** 07666
Facility's Description 1 Story Structure Grades Pre-K & K			
Total Sq Ft 47,436	**Year Built** 1928 (1948,1952,1997)	**Hours/Week Occupied** 60	**Number of Employees** 78 emp. / 385 students

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ______________

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 / 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #65 828 671 05	
Annual kWh Use	**Annual Electricity Cost**
281,040	$45,770.43
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
PSE&G #65 828 671 05	
Annual Use in Therms	**Annual Natural Gas Cost**
134.892	$288.17

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Allied #128362	
Annual Use in Gallons	**Annual Fuel Oil Cost**
38469.70	$88,337.71

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ______________	Project No: ____________________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for __each__ building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Eugene Field Administration Building			
Street Address 1 Merrison Street		**County** Bergen	
City Teaneck		**State** New Jersey	**Zip** 07666
Facility's Description 2 Story Structure Central Administration Offices			
Total Sq Ft 24,877	**Year Built** 1956	**Hours/Week Occupied** 86	**Number of Employees** 47 employees

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☒	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☐	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ______

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 / 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #65 900 523 01	
Annual kWh Use	**Annual Electricity Cost**
179,610	$30,848.81
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
PSE&G #65 900 523 01	
Annual Use in Therms	**Annual Natural Gas Cost**
648.98	$916.28

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Allied #128385	
Annual Use in Gallons	**Annual Fuel Oil Cost**
9,297.5	$17,170.33

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ____________ Project No.: ________________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name: Hawthorne Elementary School			
Street Address: 201 Fycke Lane		County: Bergen	
City: Teaneck		State: New Jersey	Zip: 07666
Facility's Description: 1 Story Structure Grades 1 - 4			
Total Sq Ft: 49,373	Year Built: 1926 (1950,1997)	Hours/Week Occupied: 60	Number of Employees: 60 emp. / 342 students

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ________

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 / 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #67 562 643 03	
Annual kWh Use	**Annual Electricity Cost**
414,450	$63,843.93
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
PSE&G #67 562 643 03	
Annual Use in Therms	**Annual Natural Gas Cost**
41,287.56	$47,485.61

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Fuel Oil Cost**

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ____________	Project No.: ____________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Lowell Elementary School			
Street Address 1025 Lincoln Place		**County** Bergen	
City Teaneck		**State** New Jersey	**Zip** 07666
Facility's Description 2 Story Structure Grades 1 - 4			
Total Sq Ft 47,106	**Year Built** 1934 (1998)	**Hours/Week Occupied** 60	**Number of Employees** 61 emp. / 305 students

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ______________

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 / 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #65 900 523 01	
Annual kWh Use 322,480	**Annual Electricity Cost** $46,721.38
Max Summer kW See attached document	**Max Winter kW** See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
PSE&G #65 900 523 01	
Annual Use in Therms 17,257.80	**Annual Natural Gas Cost** $755.80

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Allied #128363	
Annual Use in Gallons 25,880.90	**Annual Fuel Oil Cost** $47,910.42

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ______________ Project No.: ____________________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for __each__ building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Teaneck High School			
Street Address 100 Elizabeth Avenue		**County** Bergen	
City Teaneck		**State** New Jersey	**Zip** 07666
Facility's Description 3 Story Structure Grades 9 - 12			
Total Sq Ft 216,806	**Year Built** 1927-34 (1956, 1976)	**Hours/Week Occupied** 110	**Number of Employees** 187 emp. / 1,410 students

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ______________

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #42 003 120 18	
Annual kWh Use	**Annual Electricity Cost**
1,696,696	$[illegible],316.62
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
PSE&G #42 003 120 18 (Meter 1) PSE&G #66 793 594 06 (Meter 2)	
Annual Use in Therms	**Annual Natural Gas Cost**
1,102.407 (Meter 1) 116,186.3 (Meter 2- 9/08-7/09)	$1,425.38 (Meter1) $121,524.86 (Meter2 8/08-7/09)

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Allied #128393	
Annual Use in Gallons	**Annual Fuel Oil Cost**
* 45,580.7 (7/1/08-12/1/09) switched to gas	* $149,446.86 (7/1/08-12/1/09) switched to gas

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ____________	Project No.: ________________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name: Teaneck High School - Athletic Field - Lights			
Street Address: 100 Elizabeth Avenue		County: Bergen	
City: Teaneck		State: New Jersey	Zip: 07666
Facility's Description: Lighting for Athletic Field / Stadium - 4 light poles - Used Mainly for Varsity, Junior Varsity, Freshman - Recreational Football Games and Marching Band & Cheerleader Practice for the Months of September - November.			
Total Sq Ft: N/A	Year Built: 1996	Hours/Week Occupied: Sept = 9, Oct-Nov = 25	Number of Employees: N/A

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ________

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #65 806 170 04	
Annual kWh Use	**Annual Electricity Cost**
9,100.80	$7,848.28
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Therms	**Annual Natural Gas Cost**

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Fuel Oil Cost**

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ______________ Project No.: ____________________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program

Facility Name Teaneck High School - Athletic Field - Scoreboard			
Street Address 100 Elizabeth Avenue		**County** Bergen	
City Teaneck		**State** New Jersey	**Zip** 07666
Facility's Description Scoreboard for Athletic Field / Stadium used for Varsity, Junior Varsity, Freshman, & Recreational Football Games for the Months of September - November. Also power & lighting for Press Box and Field House, which is used for Storage			
Total Sq Ft N/A	**Year Built** 1960	**Hours/Week Occupied** Sept -Nov = 9	**Number of Employees** N/A

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ____________

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 0 8 to 6 3 0 0 9

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #67 473 393 04	
Annual kWh Use	**Annual Electricity Cost**
2,394	$1,816.79
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Therms	**Annual Natural Gas Cost**

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Fuel Oil Cost**

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ____________	Project No.: ____________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for each building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name Thomas Jefferson Middle School			
Street Address 655 Teaneck Road		**County** Bergen	
City Teaneck		**State** New Jersey	**Zip** 07666
Facility's Description 3 Story Structure Grades 6 - 8			
Total Sq Ft 106,216	**Year Built** 1958	**Hours/Week Occupied** 60	**Number of Employees** 55 emp. / 627 students

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ______

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 08 to 6 / 30 09

ELECTRICITY

Electric Utility Name & Account Number(s)	
PSE&G #42 003 988 18	
Annual kWh Use	**Annual Electricity Cost**
760,720	$122,936.61
Max Summer kW	**Max Winter kW**
See attached document	See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s)	
PSE&G #42 003 988 18	
Annual Use in Therms	**Annual Natural Gas Cost**
7,363.267	$8,940.86

FUEL OIL

Fuel Oil Utility Name & Account Number(s)	
Allied #128367	
Annual Use in Gallons	**Annual Fuel Oil Cost**
41,903.40	$76,966.27

PROPANE

Propane Utility Name & Account Number(s)	
Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as: solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type:	
Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ____________ Project No.: ________________

APPENDIX C - FACILITY DATA FORM

Complete one Facility Data Form for __each__ building. If you are seeking to energy audit multiple buildings, complete one Facility Data Form for each.

FACILITY INFORMATION

Please complete the information below for this specific facility that is seeking enrollment in the Program.

Facility Name: Whittier Elementary School			
Street Address: 491 West Englewood Avenue		County: Bergen	
City: Teaneck		State: New Jersey	Zip: 07666
Facility's Description: 2 Story Structure Grades 1 - 4			
Total Sq Ft: 56,118	Year Built: 1921 (1948,1952,1997)	Hours/Week Occupied: 90	Number of Employees: 55 emp. / 402 students

Building Type (Check only one of the following):

☐	Emergency Services	☐	Garage
☐	Center/Meeting Hall/Library	☐	Offices
☐	Recreation/Entertainment/Parks	☐	Religious
☒	School	☐	School: College
☐	Water Treatment/Pumping	☐	Other: ______

ENERGY DATA

Please complete the energy information below for the most recent 12 month period available. In order to gain a complete picture of the facility's energy use, be sure to include all types of energy used by the facility. Do not include vehicle fuel.

The Data Below is for the 12 Month Period: 7 / 1 / 0 8 to 6 / 3 0 0 9

New Jersey's Clean Energy Program
njcleanenergy.com

ELECTRICITY

Electric Utility Name & Account Number(s) PSE&G #65 182 086 03	
Annual kWh Use [illegible],080	**Annual Electricity Cost** $67,304.61
Max Summer kW See attached document	**Max Winter kW** See attached document

NATURAL GAS

Natural Gas Utility Name & Account Number(s) PSE&G #66 128 016 03	
Annual Use in Therms 276.941	**Annual Natural Gas Cost** $457.54

FUEL OIL

Fuel Oil Utility Name & Account Number(s) Allied #128381	
Annual Use in Gallons 28,680.70	**Annual Fuel Oil Cost** $62,358.57

PROPANE

Propane Utility Name & Account Number(s) Not Applicable	
Annual Use in Gallons	**Annual Propane Cost**

OTHER

In this section please indicate any other fuel type that the facility uses, such as, solar energy, wind energy, bio-fuel, cogeneration, fuel cells.

Other Fuel Type: Not Applicable	
Annual Energy Use (indicate units)	**Annual Energy Cost**

STAFF USE ONLY

Date Received: ____________	Project No: ____________

TEANECK BOARD OF EDUCATION

PSEG ANNUAL DEMAND KW from July 2008 to June 2009

MONTH	B.F. M.S.	BRYANT	EUGENE FIELD	HAWTHORNE	LOWELL	TEANECK H.S.	TEANECK H.S.	TEANECK H.S.	T.J. M.S.	WHITTIER
							FIELD - LIGHTS	SCOREBOARD		
Jul-08	276.00	104.00	65.10	127.20	105.65	566.60	141.60	10.90	[illegible]	no bill
Aug-08	126.80	104.00	67.80	113.40	110.40	279.60	0.00	10.70	66.40	115.20
Sep-08	250.80	106.40	65.10	123.00	112.00	585.20	0.00	10.70	213.40	126.00
Oct-08	280.80	108.00	51.60	116.20	89.60	431.30	136.80	10.80	215.00	128.00
Nov-08	271.20	84.80	48.50	123.60	107.20	520.70	137.60	12.60	223.20	128.00
Dec-08	no bill	85.40	39.60	130.20	91.20	457.60	128.20	8.40	224.80	120.00
Jan-09	281.60	86.40	[illegible]	128.40	94.40	494.50	0.00	0.20	247.20	112.00
Feb-09	286.40	88.80	42.30	117.00	96.00	482.75	0.00	0.20	244.80	110.00
Mar-09	268.80	90.40	40.50	118.20	91.35	507.15	4.80	0.20	235.20	110.00
Apr-09	271.30	90.40	40.20	118.20	98.00	485.15	2.80	0.20	240.00	110.00
May-09	no bill	180.80	113.40	232.80	92.80	1260.70	3.80	5.40	244.80	212.00
Jun-09	240.00	100.00	45.60	118.40	88.00	636.50	5.00	[illegible]	247.20	106.00

APPENDIX G

NJ SMARTSTART INCENTIVES INFORMATION AND WORKSHEETS

New Jersey's Clean Energy Program

njcleanenergy.com

New Jersey SmartStart Buildings

BPU

2010 Prescriptive Lighting Application

Customer Information

Applicant	Electric Utility Serving Applicant	Electric Account No.	Installation Date

Facility Address	City	State	Zip

Type of Project	Size of Building
❑ New Construction ❑ Renovation ❑ Equipment Replacement	

Company Mailing Address	City	State	Zip

Contact Person (Name/Title)	Telephone No.	Fax No.
	( )	( )

Incorporated? ❑ Yes ❑ No ❑ Exempt	Federal Tax ID# or SSN	Email Address

Issue Payment to	Please assign payment to contractor/vendor indicated below
❑ Customer ❑ Contractor ❑ Other	Customer Signature

Payee Information (must submit W-9 form with application)

Company	Contact Name	Incorporated? Yes No	Email Address / Federal Tax ID#

Street Address	City	State	Zip	Telephone No.	Fax No.
				( )	( )

Contractor/Vendor Information (if different from Payee)

Company	Contact Name	Incorporated? ❑ Yes ❑ No	Email Address / Federal Tax ID#

Street Address	City	State	Zip	Telephone No.	Fax No.
				( )	( )

Building Type (circle one)

Education-Primary School Education-Community College Education-University Grocery Medical-Hospital Medical-Clinic Lodging Hotel/Guest Rooms Lodging Motel Manufacturing Light Industrial Office-Large Office-Small Restaurant-Sit Down Restaurant-Fast Food Retail-3 Story Large Retail-Single Story Large Retail-Small Storage Conditioned Storage Unconditioned Warehouse Other

Prescriptive Lighting Incentive

$__________ Total Incentive (per attached worksheet calculations)

Note: Prescriptive Lighting Worksheet must accompany this application.

Specific Program Requirements* [illegible]

1. Please refer to the Program Guide for [illegible] requirements.
2. Include the manufacturer's [illegible] with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. Incentives for T-5 and T-8 lamps with electronic ballasts are available only for fixtures with a Total Harmonic Distortion of ≤20%.
4. All eligible lighting devices must be UL listed.
5. Requirements for CFL fixtures (must meet all requirements):
   - Fixtures must be new and ENERGY STAR qualified
   - Fixtures must [illegible]
   - Total Harmonic Distortion (THD) must not exceed 32%
   - Power factor of the ballast must be no less than 90%
   - The [illegible] all fixtures for a minimum of 2 years. Warranty does not pertain to lamps or photocells not physically part of the fixture.
   - The [illegible] – minimum of 1 yr.

5.1 Screw-in PAR 38 or 30 Compact Fluorescent Lamps (CFL) with [illegible]
   - The lamp must be warranted by the manufacturer for 8,000 hours
   - Total Harmonic Distortion must not exceed 32%
   - Power factor of the ballast must be ≥90%

6. Pulse Start Metal Halide (including pole-mounted parking lot lighting) must have a 13% [illegible]

7. T-5 or T-8 fixtures replacing incandescent or T-12 [illegible] greater than [illegible] watt or High Intensity Discharge shall comply as follows:

7.1 T-5 fixtures replacing T-12 fluorescent or [illegible] 350 watts or greater or HID fixtures shall have a ballast factor greater than or equal to 1.0, have [illegible] greater than or equal to 91%, have a minimum 2 lamps and be designated as [illegible]

7.2 T-8 fixtures replacing T-12 fluorescent or [illegible] 250 watts or greater or HID fixtures shall have a ballast factor greater than or equal to 1.14, have [illegible] greater than or equal to 91%, have a minimum of 4 lamps and be designated as [illegible] minimum 32 watts.

7.3 Incentives for delamped T-8 lamps with new reflectors are available only for fixtures with a Total Harmonic Distortion of ≤20%. Electronic ballast replacement required for all [illegible]. [illegible] can include reductions in linear lamp [illegible] conditions. For example, 1-8' linear [illegible] can be considered as 2-4' linear lamps. U-bend lamps 4' in total length can be considered as 2-F17/T8 lamps.

7.4 Electronic ballast replacement is necessary for all [illegible] fixtures.

7.5 Reduced wattage T8 (28W/25W 4') (1-4 lamps) retrofit requires lamp and ballast replacement.

8. LED Refrigerated/Freezer Case Lighting must meet NEEP Design Lights Consortium [illegible] or be on an ENERGY STAR or a SSL Qualified Product list. For new door [illegible] on existing open cases, indicate the number of LED fixtures to be installed. Also indicate "New Door" in the Fixture Type column on the Prescriptive Lighting Worksheet (ie. New Door 5' LED).

Application Checklist [illegible]

- ❑ Payee Information is filled out and a W-9 form of the payee is included
- ❑ Manufacturer's specification sheets for proposed technology are included
- ❑ A copy (all pages) of a recent month's utility bill is included

ACKNOWLEDGEMENT

______________________________ **CUSTOMER'S SIGNATURE**	By signing, I certify that I have read, understand and agree to the Specific [illegible] Terms and Conditions listed on the application form. I will also submit for approval a properly completed application package, which includes this [illegible] of applicable manufacturer's specification sheets and complete utility bill [illegible]

Prescriptive Lighting Measures and Incentives*

Type of Fixture	Incentive
Recessed and Surface-Mounted Compact Fluorescents (New Fixtures Replacing Incandescent Fixtures Only): [illegible]	$25 per 1-lamp fixture $30 per 2-lamp or more fixture
Screw-in PAR 38 or PAR 30 (CFL) as per 5.1 above	$7 per lamp replaced
High [illegible] Fixtures For retrofit of T-12 fixtures to T-5 or T-8 with [illegible] ballasts	$14 per fixture (1-4 lamps retrofits)

For replacement of fixtures with new T-5 or T-8 fixtures

Type of Old Fixture	Wattage of Old Fixture	Type of New Fixture	Incentive Per Fixture Removed
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Type of Fixture	Incentive
For retrofit of T-8 fixtures by [illegible] & new reflectors are available only for fixtures with a total Harmonic Distortion of [illegible]. [illegible] required for all eligible delamped fixtures.	[illegible] per fixture
New Construction & Complete Renovation	Performance based only
LED Exit Signs (new fixtures only): For existing facilities with connected load [illegible] For existing facilities with connected load [illegible]	[illegible] per fixture [illegible] per fixture
Pulse Start Metal Halide (for fixtures [illegible] watts)	[illegible] per fixture [illegible] lighting)
Parking lot [illegible] – LED	[illegible] per fixture
T-12 or T-8 fixtures by [illegible] & new reflectors. Electronic ballast replacement is necessary for all eligible delamped fixtures.	[illegible] per fixture
Retrofit of existing [illegible] T-8 [illegible] to Reduced Wattage (28W/25W 4')	[illegible] per fixture (1-4 lamps)
LED Refrigerated/Freezer Case Lighting Incentive for replacement of [illegible] in medium or low temperature display cases	[illegible] per 5' LED fixture [illegible] per 6' LED fixture
Induction Lighting Fixtures Retrofit of HID	[illegible] per HID [illegible] fixture retrofitted with induction lamp, power coupler and [illegible]
Replacement of HID	[illegible] per HID [illegible] fixture with a new induction fixture

Mail or fax your application package DIRECTLY to the Commercial/Industrial Market Manager.

New Jersey's Clean Energy Program
c/o TRC Energy Services
900 Route 9 North, Suite 104 • Woodbridge, NJ 07095
Phone: 866-657-6278 • Fax: 732-855-0422

Visit our web site: NJCleanEnergy.com/ssb

*Incentives/Requirements subject to change.

NJ SmartStart Buildings®

Program Terms and Conditions

Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

Design Services – Services that may be offered to design professionals under the Program.

Energy-Efficient Measures – Any device eligible to receive a Program Incentive payment through the NJ Clean Energy Commercial and Industrial Program (New Jersey SmartStart Buildings).

New Jersey Utilities – The regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Market Manager – TRC Energy Services.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

Program Incentives – Refers to the amount or level of incentive that the Program provides to Participating Customers pursuant to the Program offered herein (see description under "Incentive Amount" heading).

Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above. Program Incentives for new construction are available only for projects in areas designated for growth in the State Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for new Program incentives throughout the State. Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Locator available from the HMFA website or contact the Market Manager if you are uncertain about project eligibility.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy efficient measures that were pre-approved (for exceptions to this condition, please refer to "Exceptions for Approval".) In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheet and manufacturer's cut sheets (where appropriate). This information must be submitted to the Market Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Market Manager on or before December 31, 2010 in order to be eligible for 2010 incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Market Manager's approval letter is not eligible for an incentive. The Market Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. Any Customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.

Exceptions for Approval – The Application and Eligibility Process pertains to all projects except for those involving either Unitary HVAC or Motors having an incentive amount less than $5,000. These measures, at this incentive level, may be installed without prior approval. In addition, but at the sole discretion of the Market Manager, emergency replacement of equipment may not require a prior approval determination and letter. In such cases, please notify the Market Manager of such emergencies as early as possible, then an application will soon be sent in that was not pre-approved.

Post Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Market Manager's initial approval letter.

Please refer to the Program Guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not be eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Market Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to $600,000 per utility account in a calendar year. Contact the Market Manager regarding any questions.

Tax Liability – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their Federal Tax Identification number or social security number to the Market Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (Business Assistance or Incentive Clearance Certificate) that is dated within 90 days of equipment installation.

Endorsement – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Market Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.

New Jersey's Clean Energy Program™

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BPU

2010 Prescriptive Lighting Incentive Worksheet

Customer Information

[illegible]	Facility Address
☐ Check here if multiple worksheets are being submitted for one project/building.	Date Submitted

Prescriptive Lighting Information

For additional fixtures, attach additional sheets and check here ☐

Reason N-New R-Replaced	Fixture Type Installed	Fixture Type Removed	Permanent Delamp w/ New Reflector (Y/N)	Location (Bldg/Rm)	Size of Replaced Lamps in Watts	A Incentive Per Fixture (Table)	B # of Units	Total Incentives (AxB)
(Examples) R	2x4 3L T-8	2x4 3L T-12	N	Office	40	$15	6	[illegible]
R	2x2 2L T-8	2x2 2L T-12	N	Office	[illegible]	$15	10	[illegible]
R	26w CFL	100w Incan	N	Supply Room	100	$25	3	[illegible]
R	250w Pulse Start Metal Halide	400w Mercury Vapor	N	Warehouse	400	$25	3	[illegible]
N	New Doors W LED	1L T-8 F	N	Dairy Case [illegible]	[illegible]	$42	25	[illegible]

Total (including additional sheets)

[illegible]

Specific Program Requirements* [illegible]

1. Please refer to the Program Guide for additional applicable technical requirements.
2. Include the manufacturer's specification sheet with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. Incentives for T-5 and T-8 lamps with electronic ballasts are available only for fixtures with a Total Harmonic Distortion of ≤20%.
4. All eligible lighting devices must be UL listed.
5. Requirements for CFL fixtures (units must meet all requirements):
   - Fixtures must be new and Energy Star qualified
   - Fixtures must have replaceable electronic ballasts
   - Total Harmonic Distortion (THD) must not exceed 32%
   - Power factor of the ballast must be no less than 90%
   - The manufacturers must warrant all fixtures for a minimum of 5 years. Warranty does not pertain to lamps or photocells not physically part of the fixture.
   - The installer must warrant fixture installation – minimum of 1 yr.

5.1 Screw-in PAR 38 or 30 Compact Fluorescent Lamps (CFL) with [illegible] ballasts replacing existing incandescent fixtures
   - The lamp must be warranted by the manufacturer for 8,000 hours
   - Total Harmonic Distortion must not exceed 32%
   - Power factor of the ballast must be ≥90%

6. Pulse Start Metal Halide (including [illegible] parking lot lighting) must have a 12% minimum wattage reduction.

7. T-5 or T-8 Fixtures replacing incandescent or T-12 fluorescent fixtures greater than [illegible] watt or High Intensity Discharge shall comply as follows:

7.1 T-5 fixtures replacing T-12 fluorescent or incandescent fixtures 250 watts or greater or HID fixtures shall have a ballast factor greater than or equal to 1.0, have reflectivity greater than or equal to 95%, have a minimum 3 lamps and be designated as [illegible]

7.2 T-8 fixtures replacing T-12 fluorescent or incandescent fixtures 250 watts or greater or HID fixtures shall have a ballast factor greater than or equal to 1.14, have reflectivity greater than or equal to 91%, have a minimum of 4 lamps, and be designated as [illegible] [illegible] watts.

7.3 Incentives for delamped T-8 lamps with new reflectors are available only for fixtures with a total Harmonic Distortion of ≤20%. Electronic ballast replacement required for all eligible delamped fixtures. [illegible] For example, 1-8' linear fluorescent lamp can be considered as 2-4' linear lamps. U-bend lamps 4' in total length can be considered as [illegible] lamps.

7.4 Electronic ballast replacement is necessary for all eligible delamped fixtures.

7.5 Reduced wattage T8 (28W/25W 4') (1-4 lamps) retrofit requires lamp and ballast replacement.

8. LED Refrigerated/Freezer Case Lighting must meet NEEP Design Lights Consortium Standards or be on an ENERGY STAR or a SSL Qualified Product list. For new door installations on existing open cases, indicate the number of LED fixtures to be installed. Also indicate "New Door" in the Fixture Type column on the Prescriptive Lighting Worksheet (ie. New Door & LED).

ACKNOWLEDGEMENT

CUSTOMER'S SIGNATURE

By signing, I certify that I have read, understood and agree to the Specific Program Requirements/Terms and Conditions listed on this application form. [illegible]

Prescriptive Lighting Measures and Incentives*

Type of Fixture	Incentive
Recessed and Surface-Mounted Compact Fluorescent (New Fixtures Replacing Incandescent Fixtures Only): [illegible]	\$25 per 1-lamp fixture \$30 per 2-lamp or more fixture
Screw-in PAR 38 or PAR 30 (CFL) as per 5.1 above	\$7 per lamp replaced
High-Efficiency Fluorescent Fixtures For retrofit of T-12 fixtures to T-5 or T-8 with electronic ballasts	\$15 per fixture (1-4 lamps retrofitted)

For replacement of fixtures with new T-5 or T-8 fixtures

Type of Old Fixture	Wattage of Old Fixture	Type of New Fixture	Incentive Per Fixture Removed
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
HID only	[illegible]	[illegible]	[illegible]
HID only	[illegible]	[illegible]	[illegible]
HID only	[illegible]	[illegible]	[illegible]
T-12 only	[illegible]	[illegible]	[illegible]
T-12 only	[illegible]	[illegible]	[illegible]

Type of Fixture	Incentive
For retrofit of T-8 fixtures by permanent delamping & new reflectors are available only for fixtures with a total Harmonic Distortion of ≤20%. Electronic ballast replacement required for all eligible delamped fixtures.	\$30 per fixture
New Construction & Complete Renovation	Performance based [illegible]
LED Exit Signs (new fixtures only): For existing facilities with connected load <75 kW For existing facilities with connected load ≥ 75 kW	[illegible] per fixture [illegible] per fixture
Pulse Start Metal Halide (for fixtures ≥ 150 watts)	[illegible] per fixture (includes parking lot lighting)
Parking lot low bay - LED	[illegible] per fixture
T-12 to T-8 fixtures by permanent delamping & new reflectors. Electronic ballast replacement is necessary for all eligible delamped fixtures.	[illegible] per fixture
Retrofit of existing 32 watt T-8 system at Reduced Wattage (28W/25W 4')	[illegible] per fixture (1-4 lamps)
LED Refrigerated/Freezer Case Lighting Incentive for replacement of fluorescent lighting [illegible] in medium or low temperature display cases	[illegible] per 5' LED Fixture [illegible] per 6' LED Fixture
Induction Lighting Fixtures Retrofit of HID	[illegible] per HID [illegible] fixture retrofitted with induction lamp, power coupler and generator. Replacement unit must use 30% less wattage per fixture than existing HID system.
Replacement of HID	[illegible] per HID [illegible] fixture with a new induction fixture.

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Market Manager – TRC Energy Services.

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Post Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Market Manager's initial approval letter.

Please refer to the Program Guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not be eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Market Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to $500,000 per utility account in a calendar year. Contact the Market Manager regarding any questions.

Tax Liability – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their Federal Tax Identification number or social security number to the Market Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (Business Assistance or Incentive Clearance Certificate) that is dated within 90 days of equipment installation.

Endorsement – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Market Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.

New Jersey's Clean Energy Program

njcleanenergy.com

New Jersey SmartStart Buildings

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2010 Lighting Controls Application

Customer Information

Company	Electric Utility Serving Applicant	Electric Account No.	Installation Date

Building Address	City	State	Zip
Type of Project: ☐ New Construction ☐ Renovation ☐ Equipment Replacement		Size of Building	
Company Mailing Address	City	State	Zip
Contact Person (Name/Title)	Telephone No. ( )	Fax No. ( )	
Incorporated? ☐ Yes ☐ No ☐ Exempt	Federal Tax ID# or SSN	Email Address	
Incentive Payment to: ☐ Customer ☐ Contractor ☐ Other	Please assign payment to [illegible] Customer Signature		

Payee Information (must submit W-9 form with application)

Company	Contact Name		Incorporated? Yes No	Email Address / Federal Tax ID#	
Street Address	City	State	Zip	Telephone No. ( )	Fax No. ( )

Contractor/Vendor Information (if different from Payee)

Company	Contact Name		Incorporated? ☐ Yes ☐ No	Email Address / Federal Tax ID#	
Street Address	City	State	Zip	Telephone No. ( )	Fax No. ( )

Building Type (circle one)

Education-Primary School; Education-Community College; Education-University; Grocery; Medical-Hospital; Medical-Clinic; Lodging Hotel/Guest Rooms; Lodging Motel; Manufacturing Light Industrial; Office-Large; Office-Small; Restaurant-Sit Down; Restaurant-Fast Food; Retail-3 Story Large; Retail-Single Story Large; Retail-Small; Storage Conditioned; Storage Unconditioned; Warehouse; Other

Lighting Control Incentive

$________ Total Incentive (per attached worksheet calculations)

Note: Lighting Controls Incentive Worksheet must accompany this application.

[illegible]

Specific Program Requirements*

1. Please refer to the Program Guide for additional applicable technical requirements, including special requirements for lighting controls.
2. Include the manufacturer's specification sheet with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. All lighting controls eligible for incentives must be UL listed.
4. Lighting control incentives are only available for control of eligible energy efficient lighting fixtures.
5. If more than one eligible lighting control device is associated with the same eligible fixture, the incentive paid will be for the lighting control device that yields the largest incentive only.
6. Occupancy Sensor Controls (existing facilities only):
   - There is no incentive available for occupancy sensors installed in a space where they are prohibited by state or local building or safety code. Additionally, no incentive is eligible for occupancy sensors in the following specific spaces in all cases: stairways, restrooms ([illegible]), elevators, corridors/hallways, lobbies, and closets/storage areas.
   - Incentives will only be paid for eligible occupancy sensors (OSW & OSR) controlling at least 2 eligible lighting fixtures and, for OSR installations, a minimum total connected load of 180 watts.
   - Incentives will only be paid for eligible OSRH occupancy sensors controlling eligible fixtures when the controlled wattage is greater than 180 watts.
   - Occupancy sensors with manual override to the "ON" position are ineligible for incentive.
7. High-Low Controls (OHLF and OHLH):
   - Incentives will not be paid for high-low controls on eligible fluorescent fixtures where daylight dimming controls can be effectively employed.
   - Incentives will not be paid for spaces smaller than 250 square feet.
   - Incentives available only when "low level" is no more than 50% of "high level."
   - Incentives are not available for the following spaces: stairways, elevators, corridors/hallways, or lobbies.
   - OHLF will control fixtures that have a ballast factor less than 1.0 for T-5s and 1.14 for T-8s.
   - OHLH will control fixtures that have a ballast factor greater than or equal to 1.0 for T-5s and 1.14 for T-8s.
8. Daylight Dimming Controls for eligible fixtures:
   - Incentives will only be paid for eligible daylight dimming controls operating at least 4 eligible ballasts with a minimum total connected load of 240 watts.
   - Dimming shall be continuous or stepped at 4 or more levels.
   - Incentives will be paid only for eligible daylight dimming control systems designed in accordance with IESNA practice as delineated in "RP-5-99, IESNA Recommended Practice of Daylighting."
   - DLD will control fixtures that have a ballast factor less than 1.0 for T-5s and 1.14 for T-8s.
   - DDH will control fixtures that have a ballast factor greater than or equal to 1.0 for T-5s and 1.14 for T-8s.

Application Checklist

- ☐ Payee Information is filled out and a W-9 form of the payee is included
- ☐ Manufacturer's specification sheets for proposed technology are included
- ☐ A copy (all pages) of a recent month's utility bill is included

ACKNOWLEDGEMENT

____

CUSTOMER'S SIGNATURE

By signing, I certify that I have read, understand and agree to the Specific Program Requirements/Terms and Conditions listed on this application form. I will also submit for approval a properly completed application package, which includes this signed application, worksheet (if applicable), manufacturer's specification sheets and complete utility bill (name and address on utility bill must match name and address on application).

Lighting Control Prescriptive Incentives*

Control Device Type	Incentive per Unit
OSW – Occupancy Sensor Wall Mounted (Existing facilities only)	$20 per control
OSR – Occupancy Sensor Remote Mounted (Existing facilities only)	$35 per control
DLD – Fluorescent Daylight Dimming	$25 per fixture controlled
DLD – Fluorescent Daylight Dimming (Office Applications)	$50 per fixture controlled
OHLF – Occupancy Controlled High-Low with Step Ballast	$25 per fixture controlled
OSRH – Occupancy Sensor Remote Mounted	$35 per control
OHLH – Occupancy Controlled High-Low with Step Ballast	$75 per fixture controlled
DDH – Daylight Dimming	$75 per fixture controlled

Mail or fax your application package DIRECTLY to the Commercial/Industrial Market Manager.

New Jersey's Clean Energy Program
c/o TRC Energy Services
900 Route 9 North, Suite 104 • Woodbridge, NJ 07095
Phone: 866-657-6278 • *Fax:* 732-855-0422

Visit our web site: www.NJCleanEnergy.com

NJ SmartStart Buildings®

Program Terms and Conditions

Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

Design Services – Services that may be offered to design professionals under the Program.

Energy-Efficient Measures – Any device eligible to receive a Program Incentive payment through the NJ Clean Energy Commercial and Industrial Program (New Jersey SmartStart Buildings).

New Jersey Utilities – The regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Market Manager – TRC Energy Services.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

Program Incentives – Refers to the amount or level of incentive that the Program provides to Participating Customers pursuant to the Program offered herein (see description under "Incentive Amount" heading).

Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above. Program Incentives for new construction are available only for projects in areas designated for growth in the State Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for new Program Incentives throughout the State. Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Locator available from the HMFA website or contact the Market Manager if you are uncertain about project eligibility.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy efficient measures that were pre-approved (for exceptions to this condition, please refer to "Exceptions for Approval".) In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheets and manufacturer's cut sheets (where appropriate). This information must be submitted to the Market Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Market Manager on or before December 31, 2010 in order to be eligible for 2010 incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Market Manager's approval letter is not eligible for an incentive. The Market Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. **Any Customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

Exceptions for Approval – The Application and Eligibility Process pertains to all projects except for those involving either Unitary HVAC or Motors having an incentive amount less than $5,000. These measures, at this incentive level, may be installed without prior approval. In addition, but at the sole discretion of the Market Manager, emergency replacement of equipment may not require a prior approval determination and letter. **In such cases, please notify the Market Manager of such emergencies as early as possible, that an application will soon be sent in that was not pre-approved.**

Post Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Market Manager's initial approval letter.

Please refer to the Program Guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not be eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Market Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to $500,000 per utility account in a calendar year. Contact the Market Manager regarding any questions.

Tax Liability – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their Federal Tax Identification number or social security number to the Market Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (Business Assistance or Incentive Clearance Certificate) that is dated within 90 days of equipment installation.

Endorsement – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Market Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.

New Jersey's Clean Energy Program

njcleanenergy.com

New Jersey SmartStart Buildings

BPU

2010 Lighting Controls Incentive Worksheet

Customer Information

[illegible]	[illegible]
☐ [illegible]	[illegible]

Lighting Controls Information

[illegible]

Location	Reason N-New R-Replaced	Control Device Type	Fixture Type Controlled	Watts Controlled per Device	A # of Fixtures Controlled per Device	B # of Units*	C Incentive per Unit	Total Incentive (B x C)
[illegible]	(Example) N	[illegible]	4-lamp, T8	[illegible]	2	4	[illegible]	[illegible]
[illegible]	N	[illegible]	2-lamp, T8	[illegible]	6	[illegible]	[illegible]	[illegible]
[illegible]	N	[illegible]	2-lamp, T8	[illegible]	N/A	[illegible]	[illegible]	[illegible]
[illegible]	N	[illegible]	4-lamp, T8	[illegible]	N/A	12	[illegible]	[illegible]
[illegible]	N	[illegible]	4-lamp, T5	[illegible]	1	[illegible]	[illegible]	[illegible]

*[illegible]

Total (including additional sheets) $

[illegible]

Specific Program Requirements*

1. Please refer to the Program Guide for additional applicable technical requirements, including special requirements for lighting controls.
2. Include the manufacturer's specification sheet with the application package and mail or fax directly to the Commercial/Industrial Market Manager.
3. All lighting controls eligible for incentives must be UL listed.
4. Lighting control incentives are only available for control of eligible energy efficient lighting fixtures.
5. If more than one eligible lighting control device is associated with the same eligible fixture, the incentive paid will be for the lighting control device that yields the largest incentive only.
6. Occupancy Sensor Controls (existing facilities only):
   - There is no incentive available for occupancy sensors installed in a space where they are prohibited by state or local building or safety code. Additionally, no incentive is eligible for occupancy sensors in the following specific spaces in all cases: stairways, restrooms (remote mounted only allowed), elevators, corridors/hallways, lobbies, and closets/storage areas.
   - Incentives will only be paid for eligible occupancy sensors (OSW & OSR) controlling at least 2 eligible lighting fixtures and, for OSR installations, a minimum total connected load of 180 watts.
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   - Occupancy sensors with manual override to the "ON" position are ineligible for incentive.
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   - Incentives will not be paid for high-low controls on eligible fluorescent fixtures where daylight dimming controls can be effectively employed.
   - Incentives will not be paid for spaces smaller than 250 square feet.
   - Incentives available only when "low level" is no more than 60% of "high level."
   - Incentives are not available for the following spaces: stairways, elevators, corridors/hallways, or lobbies.
   - OHLF will control fixtures that have a ballast factor less than 1.0 for T-5s and 1.14 for T-8s.
   - OHLH will control fixtures that have a ballast factor greater than or equal to 1.0 for T-5s and 1.14 for T-8s.
8. Daylight Dimming Controls for Eligible Fixtures:
   - Incentives will only be paid for eligible daylight dimming controls operating at least 4 eligible ballasts with a minimum total connected load of 240 watts.
   - Dimming shall be continuous or stepped at 4 or more levels.
   - Incentives will be paid only for eligible daylight dimming control systems designed in accordance with IESNA practice as delineated in "RP-5-99, IESNA Recommended Practice of Daylighting."
   - DLD will control fixtures that have a ballast factor less than 1.0 for T-5s and 1.14 for T-8s.
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Lighting Control Prescriptive Incentives*

Control Device Type	Incentive per Unit
OSW – Occupancy Sensor Wall Mounted (Existing facilities only)	$20 per control
OSR – Occupancy Sensor Remote Mounted (Existing facilities only)	$35 per control
DLD – Fluorescent Daylight Dimming	$25 per fixture controlled
DLD – Fluorescent Daylight Dimming (Office Applications)	$50 per fixture controlled
OHLF – Occupancy Controlled High-Low with Step Ballast	$25 per fixture controlled
OSRH – Occupancy Sensor Remote Mounted	$35 per control
OHLH – Occupancy Controlled High-Low with Step Ballast	$75 per fixture controlled
DDH – Daylight Dimming	$75 per fixture controlled

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NJ SmartStart Buildings®

Program Terms and Conditions

Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

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Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Market Manager – TRC Energy Services.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

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Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above. Program Incentives for new construction are available only for projects in areas designated for growth in the State Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for new Program incentives throughout the State. Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Locator available from the HMFA website or contact the Market Manager if you are uncertain about project eligibility.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy efficient measures that were pre-approved (for exceptions to this condition, please refer to "Exceptions for Approval".) In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheet and manufacturer's cut sheets (where appropriate). This information must be submitted to the Market Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Market Manager on or before December 31, 2010 in order to be eligible for 2010 incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Market Manager's approval letter is not eligible for an incentive. The Market Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. **Any Customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

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Post Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Market Manager's initial approval letter.

Please refer to the Program Guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not be eligible for incentives offered through this program.

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Tax Liability – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their Federal Tax Identification number or social security number to the Market Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (Business Assistance or Incentive Clearance Certificate) that is dated within 90 days of equipment installation.

Endorsement – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Market Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.

New Jersey Clean Energy Program

Technical Worksheet – Solar Electric Equipment Information

Please carefully read all of the following information. With the help of your Installation Contractor, fully complete Sections A through D, as applicable, of the attached Technical Worksheet for Solar Electric Equipment, as well as the New Jersey Clean Energy Program Rebate Application Form.

GENERAL TERMS AND CONDITIONS

Rebates will be processed based on the date the New Jersey Clean Energy Program (NJCEP) approves the Final Application Form, not on the purchase date of the equipment. Program procedures and rebates are subject to change or cancellation without notice.

To qualify for a rebate, Applicant must comply with all Program Eligibility Requirements, Terms and Conditions, and Installation Requirements, and submit a completed Pre-Installation Application Form. For more information about the New Jersey Clean Energy Program, or for assistance in completing applications or forms, please see www.njcleanenergy.com or call 866-NJSMART.

INSTALLATION REQUIREMENTS

Equipment installation must meet the following minimum requirements in order to qualify for payment under the provisions of the New Jersey Clean Energy Program; proposed changes to the requirements will be considered, but they must be documented by the Applicant or Installation Contractor and approved by the NJCEP. These requirements are not all-encompassing and are intended only to address certain minimum safety and efficiency standards.

A. Code Requirements

1. The installation must comply with the provisions of the National Electrical Code and all other applicable local, state and federal codes and practices.
2. All required permits must be properly obtained and posted.
3. The NJCEP inspection must be performed before the local Building Code Enforcement Office. If not, this may delay the processing of the rebate.
4. All required inspections must be performed (i.e., Electrical/NEC, Local Building Codes Enforcement Office, etc.). Note: In order to ensure compliance with provisions of the NEC, an inspection by a state-licensed electrical inspector is mandatory.

B. Solar Electric Module Array

1. Modules must be UL Listed and must be properly installed according to manufacturer's instructions.
2. The maximum amount of sunlight available year-round on a daily basis should not be obstructed. All applications must include documentation of the impact from any obstruction on the annual performance of the solar electric array. This analysis can be performed by using the New Jersey Clean Power Estimator on the program website www.njcep.com
3. In order to qualify for program incentives, the solar electric system must adhere to a minimum design threshold, relative to the estimated system production using PVWATTS:
   - Solar electric array orientations require that the calculated system output must be at least 80% of the default output calculated by PVWatts. Additionally, all individual series strings of modules output must be at least 70% of the default output calculated by PVWatts.
   - For building integrated solar electric systems (i.e., part of the building envelope materials are comprised of solar electric components), the estimated system output must be 40% of the default output estimated by PVWATTS.
4. System wiring must be installed in accordance with the provisions of the NEC.
5. All modules installed in a series string must be installed in the same plane.

C. Inverter and Controls

1. The inverter and controls must be properly installed according to manufacturer's instructions.
2. The inverter must be certified as compliant with the requirements of IEEE 929 for small photovoltaic systems and with UL 1741.
3. The system should be equipped with the following visual indicators and/or controls:
   - On/off switch - Operating mode setting indicator - AC/DC over current protection - Operating status indicator
4. Warning labels must be posted on the control panels and junction boxes indicating that the circuits are energized by an alternate power source independent of utility-provided power.
5. Operating instructions must be posted on or near the system, or on file with facilities operation and maintenance documents.
6. Systems must have monitoring capability that is readily accessible to the owner. This monitor (meter or display) must at minimum display instantaneous and cumulative production. All projects greater than 10kW must have an output meter that meets ANSI C12 standards.

D. Control Panel to Solar Electric Array Wire Runs

1. Areas where wiring passes through ceilings, walls or other areas of the building must be properly restored, booted and sealed.
2. All interconnecting wires must be copper. (Some provisions may be made for aluminum wiring; approval must be received from utility engineering departments prior to acceptance.)
3. Thermal insulation in areas where wiring is installed must be replaced to "as found or better condition." Access doors to these areas must be properly sealed and gasketed.
4. Wiring connections must be properly made, insulated and weather-protected.
5. All wiring must be attached to the system components by the use of strain reliefs or cable clamps, unless enclosed in conduit.
6. All outside wiring must be rated for wet conditions and/or encased in liquid-tight conduit.
7. Insulation on any wiring located in areas with potential high ambient temperature must be rated at 90° C or higher.
8. All wiring splices must be contained in UL-approved workboxes.

E. Batteries (If Applicable)

1. The batteries must be installed according to the manufacturer's instructions.
2. Battery terminals must be adequately protected from accidental contact.
3. DC-rated over current protection must be provided in accordance with the provisions of the NEC.

New Jersey Clean Energy Program

Technical Worksheet – Solar Electric Equipment Information

Original Application Date: ____	Revised Application Date: ____
Customer Name: ____ (Corresponding to Rebate Application Form)	Application Number: ____ (Assigned by the NJBPU)

A: EQUIPMENT INFORMATION

1. Solar Electric Module Manufacturer: ____ Module Model Number: ____
2. Power Rating per Module: ____ DC Watts (Refer to STC conditions) Number of Modules: ____
3. Total Array Output: ____ DC Watts (No. of Modules x Power Rating)
4. Inverter Manufacturer: ____ Inverter Model Number: ____
5. Inverter's Continuous AC Rating: ____ AC Watts Number of Inverters: ____
6. Total Inverter Output: ____ AC Watts (Inverter Continuous AC Rating x Number of Inverters)
7. Inverter's Peak Efficiency: ____ (Refer to manufacturer's peak efficiency rating)

B: PROPOSED INSTALLATION/INTERCONNECTION INFORMATION

1. Solar Electric Array Location: _ Rooftop _ Pole Mount or Ground Mount Location:
2. Solar Electric Module Orientation: ____ degrees (e.g., 180 degrees magnetic south)
   Note: In Central New Jersey, magnetic south compass reading is 10 degrees east of true south.
3. Solar Electric Module Tilt: ____ degrees (e.g., flat mount = 0 degrees; vertical mount = 90 degrees)
4. Solar Electric Module Tracking: _Fixed _Single axis _Double-axis
5. Inverter Location: _ Indoor _ Outdoor Location: ____
6. Utility-Accessible AC Disconnect Switch Location: ____
7. System Type and Mode of Operation:
   - _ Utility interactive (parallel/capable of back feeding the meter) (_ with battery backup)
   - _ Dedicated circuit, utility power as backup (transfer switch) (_ with battery charging)
   - _ Stand-alone (system confined to an independent circuit, no utility backup) (_ with battery charging)

C: INCENTIVE REQUEST CALCULATION

1. System rated output (Section A, line 3 above): ____ DC Watts
2. Incentive Calculation (Calculate appropriate incentive based on System Rated Output)

Residential Applicants that perform Energy Efficiency Audit

a. 0 to 10,000 Watts x $1.75/Watt = $____

Residential Applicants that do not perform Energy Efficiency Audit

b. 0 to 10,000 Watts x $1.55/Watt = $____

d. Total Rebate Calculation: $____

Commercial, Farm, Public and Non-Profit

0 to 50,000 Watts x $1.00/Watt = $____

Large PV Project Applications

> 50,000 Watts = $ Not eligible for rebates

Total Rebate Calculation: $____

3. School Applicants: Maximum Annual School Rebate: $____
   (For Public School applicants, enter the lesser value from no. 4 on the School Application form or $50,000)
4. Total Installed System Cost: $____
   (Eligible installed system cost includes all equipment, installation, and applicable interconnection costs before the New Jersey Clean Energy Program Incentive.)
5. **Requested Incentive** (Enter the appropriate value from C2. b or c): $____

D: WARRANTY INFORMATION

1. Module: ____ Years at ____ Percent of Rated Power Output 2. Inverter: ____ Years 3. Installation: ____ Years

APPENDIX H

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS

CDM

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

1	[illegible] Middle School Lighting Upgrades	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1	[illegible] Middle School Lighting Upgrades	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CDM

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

1	[illegible] Building Lighting Upgrades	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1	[illegible] Elementary School Lighting Upgrades	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CDM

[illegible]

ENGINEER'S OPINION OF [illegible]

Location: Teaneck BOE
Estimate by: [illegible]
Checked by: [illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Lowell Elementary School Lighting Upgrades Subtotal	1	ls		$ [illegible] [illegible]	1	ls	$ [illegible]	$ [illegible] [illegible]	$ [illegible]

SUBTOTAL =	$ [illegible]
MARKUP % =	[illegible]
MARKUP =	$ [illegible]
SUB-TOTAL [illegible] =	$ [illegible]
CONTINGENCY % =	[illegible]
CONTINGENCY =	$ [illegible]
BUDGET COST ESTIMATE =	$ [illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Teaneck High School Lighting Upgrades Subtotal	1	ls		$ [illegible] [illegible]	1	ls	$ [illegible]	$ [illegible] [illegible]	$ [illegible]

SUBTOTAL =	$ [illegible]
MARKUP % =	[illegible]
MARKUP =	$ [illegible]
SUB-TOTAL [illegible] =	$ [illegible]
CONTINGENCY % =	[illegible]
CONTINGENCY =	$ [illegible]
BUDGET COST ESTIMATE =	$ [illegible]

CDM

[illegible]

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: Teaneck BOE
Estimate by: [illegible]
Checked by: [illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Thomas Jefferson Middle School Lighting Upgrades Subtotal	1	ls		$ [illegible] [illegible]	1	ls	$ [illegible]	$ [illegible] [illegible]	$ [illegible]

SUBTOTAL =	$ [illegible]
MARKUP % =	[illegible]
MARKUP =	$ [illegible]
SUB-TOTAL [illegible] =	$ [illegible]
CONTINGENCY % =	[illegible]
CONTINGENCY =	$ [illegible]
BUDGET COST ESTIMATE =	$ [illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	[illegible] Elementary School Lighting Upgrades Subtotal	1	ls		$ [illegible] [illegible]	1	ls	$ [illegible]	$ [illegible] [illegible]	$ [illegible]

SUBTOTAL =	$ [illegible]
MARKUP % =	[illegible]
MARKUP =	$ [illegible]
SUB-TOTAL [illegible] =	$ [illegible]
CONTINGENCY % =	[illegible]
CONTINGENCY =	$ [illegible]
BUDGET COST ESTIMATE =	$ [illegible]

CDM

[illegible]

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: [illegible]
Estimate by: [illegible]
Checked by: [illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	[illegible]	1	[illegible]		$ 15.00	1	[illegible]	$ 60.00	$ 60.00	$ 75.00

SUBTOTAL =	$	75.00
MARKUP % =		0.15
MARKUP =	$	11.25
SUB-TOTAL =	$	86.25
CONTINGENCY % =		0.25
CONTINGENCY =	$	21.56
BUDGET COST ESTIMATE =	$	107.81

[illegible]

CDM

[illegible]

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

Location: [illegible]
Estimate by: [illegible]
Checked by: [illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	[illegible]	1	[illegible]		[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]

SUBTOTAL =	$	[illegible]
CONTINGENCY % =		[illegible]
CONTINGENCY =	$	[illegible]
BUDGET COST ESTIMATE =	$	[illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	[illegible]	1	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SUBTOTAL =	$	[illegible]
CONTINGENCY % =		[illegible]
CONTINGENCY =	$	[illegible]
BUDGET COST ESTIMATE =	$	[illegible]

CDM

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

[illegible]

CDM

ENGINEER'S OPINION OF CONSTRUCTION COST ESTIMATE

[illegible]

CDM

ENGINEER'S OPINION OF [illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
Location: Teaneck - Board of Education
Estimate by: AN
Checked by: NS

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Benjamin Franklin Middle School Boiler, Gas-Fired, Condensing High Efficiency 3,000 MBH	2	ea.	$ 25,218.00	$ 50,436.00	2	ea.	$ 11,000.00	$ 22,000.00	$ 72,436.00
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ [illegible]
MARKUP % = 0.15
MARKUP = $ [illegible]
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ [illegible]
BUDGET COST ESTIMATE = $ [illegible]

Note:
Labor pricing is per RS Means 2010.
Boiler pricing is per manufacturer quote dated 2/26/2010 (includes cost of [illegible])

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
2	Bryant Elementary School Boiler, Gas-Fired, Condensing High Efficiency 3,000 MBH	2	ea.	$ 25,218.00	$ 50,436.00	2	ea.	$ 11,000.00	$ 22,000.00	$ 72,436.00
	Demolition of Heat Exchanger, Shell and Tube	1	ea.		$ -	1	ea.	$ 605.00	$ 605.00	$ 605.00
	Demolition of Condensate Receiver	1	ea.		$ -	1	ea.	$ 543.75	$ 543.75	$ 543.75
	Demolition of Condensate Return Piping	1,110	L.F.		$ -	1,110	L.F.	$ [illegible]	$ [illegible]	$ [illegible]
	HW Return Piping (steel, black, threaded, 2.5")	70	L.F.	$ 19.20	$ 1,344.00	70	L.F.	$ 19.50	$ 1,365.00	$ [illegible]
	HW Return Piping (steel, black, threaded, 2")	80	L.F.	$ 12.55	$ 1,004.00	80	L.F.	$ 15.20	$ 1,216.00	$ [illegible]
	HW Return Piping (steel, black, threaded, 1.5")	80	L.F.	$ 9.40	$ 752.00	80	L.F.	$ 12.15	$ 972.00	$ 1,724.00
	HW Return Piping (steel, black, threaded, 1")	80	L.F.	$ 6.20	$ 496.00	80	L.F.	$ 10.20	$ 816.00	$ 1,312.00
	HW Return Piping (steel, black, threaded, 0.75")	800	L.F.	$ 4.30	$ [illegible]	800	L.F.	$ 8.90	$ 7,120.00	$ [illegible]
	Hydronic HW Control Valve, 0.75"	40	ea.	$ 56.00	$ [illegible]	40	ea.	$ 27.50	$ 1,100.00	$ 3,360.00
	Controls Upgrades	1	ea.		$ -	1	ea.		$ -	$ [illegible]
	Air Control, Air Separator, 2.5"	1	ea.	$ 940.00	$ 940.00	1	ea.	$ 194.00	$ 194.00	$ 1,134.00
	Circulation Pump, Cast Iron, 3 HP	2	ea.	$ 2,400.00	$ 4,800.00	2	ea.	$ 490.00	$ 980.00	$ 5,780.00
	Expansion Tank, Steel, [illegible] gal	2	ea.	$ [illegible]	$ [illegible]	2	ea.	$ [illegible]	$ [illegible]	$ [illegible]
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ [illegible]
MARKUP % = 0.15
MARKUP = $ [illegible]
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ [illegible]
BUDGET COST ESTIMATE = $ [illegible]

Note:
All pricing is per RS Means 2010, with exception of boiler and controls upgrade.
Boiler pricing is per manufacturer quote dated 2/26/2010 (includes cost of [illegible])
Controls upgrade pricing is estimated as 15% of total [illegible]

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
Location: Teaneck - Board of Education
Estimate by: RR
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	Rodda Center Administration Building									
3	Boiler, Gas-Fired, Condensing High Efficiency 3,000 MBH	2	ea.	$ 25,218.00	$ [illegible]	2	ea.	$ 11,000.00	$ 22,000.00	$ 72,436.00
	Subtotal				[illegible]				22,000.00	

SUBTOTAL = $ 72,436.00
MARKUP % = $ 0.15
MARKUP = $ 10,865.40
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ 20,825.35
BUDGET COST ESTIMATE = $ [illegible]

Note:
Labor pricing is per RS Means 2010.
Boiler pricing is per manufacturer quote dated 2/26/2010 (includes cost of existing system demolition).

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	[illegible] Elementary School									
4	Boiler, Gas-Fired, Condensing High Efficiency 3,000 MBH	2	ea.	$ 25,218.00	$ [illegible]	2	ea.	$ 11,000.00	$ 22,000.00	$ 72,436.00
	Demolition of Heat Exchanger, Shell and Tube	1	ea.		$ -	1	ea.	$ [illegible]	$ [illegible]	$ 686.00
	Demolition of Condensate Receiver	1	ea.		$ -	1	ea.	$ 543.70	$ 543.70	$ 543.70
	Demolition of Condensate Return Piping	1,110	L.F.		$ -	1,110	L.F.	$ [illegible]	$ [illegible]	$ 8,290.20
	HW Return Piping (steel, black, threaded, 2.5")	70	L.F.	$ 19.35	$ [illegible]	70	L.F.	$ [illegible]	$ 1,355.00	$ 2,710.00
	HW Return Piping (steel, black, threaded, 2")	80	L.F.	$ 12.65	$ [illegible]	80	L.F.	$ [illegible]	$ 1,216.00	$ 2,280.00
	HW Return Piping (steel, black, threaded, 1.5")	80	L.F.	$ 9.40	$ 752.00	80	L.F.	$ [illegible]	$ 972.00	$ 1,724.00
	HW Return Piping (steel, black, threaded, 1")	80	L.F.	$ 6.20	$ [illegible]	80	L.F.	$ [illegible]	$ 816.00	$ 1,312.00
	HW Return Piping (steel, black, threaded, 0.75")	800	L.F.	$ 4.35	$ 3,480.00	800	L.F.	$ [illegible]	$ 7,120.00	$ 10,600.00
	Hydronic HW Control Valve, 0.75"	40	ea.	$ 55.00	$ 2,200.00	40	ea.	$ 27.50	$ 1,100.00	$ 3,300.00
	Controls Upgrades	1	ea.		$ -	1	ea.		$ -	$ 16,456.42
	Air Control, Air Separator, 2.5"	1	ea.	$ 940.00	$ [illegible]	1	ea.	$ 194.00	$ 194.00	$ 1,134.00
	Circulation Pump, Cast Iron, 3 HP	2	ea.	$ 2,400.00	$ [illegible]	2	ea.	$ [illegible]	$ [illegible]	$ 5,760.00
	Expansion Tank, [illegible], 30 gal	2	ea.	$ [illegible]	$ [illegible]	2	ea.	$ [illegible]	$ [illegible]	$ 2,016.00
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ 128,887.97
MARKUP % = $ 0.15
MARKUP = $ 19,333.19
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ 38,222.01
BUDGET COST ESTIMATE = $ [illegible]

Note:
All pricing is per RS Means 2010, with exception of boiler and controls upgrade.
Boiler pricing is per manufacturer quote dated 2/26/2010 (includes cost of existing system demolition).
Controls upgrade pricing is estimated as 15% of total mechanical system cost.

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
Location: Teaneck - Board of Education
Estimate by: RR
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	Lowell Elementary School									
5	Boiler, Gas-Fired, Condensing High Efficiency 3,000 MBH	2	ea.	$ 25,218.00	$ 50,436.00	2	ea.	$ 11,000.00	$ 22,000.00	$ 72,436.00
	Demolition of Heat Exchanger, Shell and Tube	1	ea.		$ -	1	ea.	$ 455.00	$ 455.00	$ 455.00
	Demolition of Condensate Receiver	1	ea.		$ -	1	ea.	$ 543.70	$ 543.70	$ 543.70
	Demolition of Condensate Return Piping	[illegible]	L.F.		$ -	[illegible]	L.F.	$ [illegible]	$ [illegible]	$ [illegible]
	HW Return Piping (steel, black, threaded, 3")	70	L.F.	$ 25.00	$ 1,750.00	70	L.F.	$ 22.50	$ 1,575.00	$ [illegible]
	HW Return Piping (steel, black, threaded, 2")	120	L.F.	$ 12.55	$ 1,506.00	120	L.F.	$ 16.20	$ 1,824.00	$ [illegible]
	HW Return Piping (steel, black, threaded, 1.5")	120	L.F.	$ 9.40	$ 1,128.00	120	L.F.	$ 12.15	$ 1,458.00	$ [illegible]
	HW Return Piping (steel, black, threaded, 1")	120	L.F.	$ 6.20	$ 744.00	120	L.F.	$ 10.20	$ 1,224.00	$ [illegible]
	HW Return Piping (steel, black, threaded, 0.75")	1,600	L.F.	$ 4.29	$ [illegible]	1,600	L.F.	$ 8.90	$ 14,240.00	$ [illegible]
	Hydronic HW Control Valve, 0.75"	80	ea.	$ 55.50	$ [illegible]	80	ea.	$ 27.50	$ 2,200.00	$ [illegible]
	Controls Upgrades	1	ea.		$ -	1	ea.		$ -	$ [illegible]
	Air Control, Air Separator, 3"	1	ea.	$ 1,450.00	$ 1,450.00	1	ea.	$ 243.00	$ 243.00	$ [illegible]
	Circulation Pump, Cast Iron, 10 HP	2	ea.	$ 3,675.00	$ 7,350.00	2	ea.	$ 610.00	$ 1,220.00	$ [illegible]
	Expansion Tank, [illegible], 100 gal	2	ea.	$ 1,175.00	$ [illegible]	2	ea.	$ [illegible]	$ [illegible]	$ [illegible]
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ [illegible]
MARKUP % = $ 0.15
MARKUP = $ [illegible]
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ [illegible]
BUDGET COST ESTIMATE = $ [illegible]

Note:
All pricing is per RS Means 2010, with exception of boiler and controls upgrade.
Boiler pricing is per manufacturer quote dated 2/26/2010 (includes cost of existing system demolition).
Controls upgrade pricing is estimated as 15% of total mechanical system cost.

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	Thomas Jefferson Middle School									
6	Boiler, Gas-Fired, Condensing High Efficiency 3,000 MBH	3	ea.	$ [illegible]	$ [illegible]	3	ea.	$ 11,000.00	$ 33,000.00	$ [illegible]
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ [illegible]
MARKUP % = $ 0.15
MARKUP = $ [illegible]
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ [illegible]
BUDGET COST ESTIMATE = $ [illegible]

Note:
Labor pricing is per RS Means 2010.
Boiler pricing is per manufacturer quote dated 2/26/2010 (includes cost of existing system demolition).

[illegible]
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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
Location: Teaneck - Board of Education
Estimate by: AA
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	Whittier Elementary School									
1	Boiler, Gas-Fired, Condensing High Efficiency 3,000 MBH	2	ea.	$ 25,219.00	$ 50,438.00	2	ea.	$ 11,000.00	$ 22,000.00	$ 72,438.00
	Demolition of [illegible], Shell and Tube	1	ea.		$ -	1	ea.	$ 605.00	$ 605.00	$ 605.00
	Demolition of Condensate Receiver	1	ea.		$ -	1	ea.	$ 543.75	$ 543.75	$ 543.75
	Demolition of [illegible] Return Piping	2,030	L.F.		$ -	2,030	L.F.	$ 9,381.25	$ 9,381.25	$ 9,381.25
	HW Return Piping (steel, black, threaded, 3")	70	L.F.	$ 25.00	$ 1,750.00	70	L.F.	$ 22.50	$ 1,575.00	$ 3,325.00
	HW Return Piping (steel, black, threaded, 2")	120	L.F.	$ 12.55	$ 1,506.00	120	L.F.	$ 15.20	$ 1,824.00	$ 3,330.00
	HW Return Piping (steel, black, threaded, 1.5")	120	L.F.	$ 9.40	$ 1,128.00	120	L.F.	$ 12.15	$ 1,458.00	$ 2,586.00
	HW Return Piping (steel, black, threaded, 1")	120	L.F.	$ 6.20	$ 744.00	120	L.F.	$ 10.20	$ 1,224.00	$ 1,968.00
	HW Return Piping (steel, black, threaded, 0.75")	1,600	L.F.	$ 4.26	$ 6,816.00	1,600	L.F.	$ 8.90	$ 14,240.00	$ 21,056.00
	Hydronic HW Control Valve, 0.75"	80	ea.	$ 56.50	$ 4,520.00	80	ea.	$ 27.50	$ 2,200.00	$ 6,720.00
	Controls Upgrades	1	ea.		$ -	1	ea.		$ -	$ 20,233.00
	Air Control, Air Separator, 3"	1	ea.	$ 1,450.00	$ 1,450.00	1	ea.	$ 243.00	$ 243.00	$ 1,693.00
	Circulation Pump, Cast Iron, 10 HP	2	ea.	$ 3,675.00	$ 7,350.00	2	ea.	$ 610.00	$ 1,220.00	$ 8,570.00
	Expansion Tank, Steel, 100 gal	2	ea.	$ [illegible]	$ [illegible]	2	ea.	$ [illegible]	$ [illegible]	$ 2,879.00
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ [illegible]
MARKUP % = $ 0.15
MARKUP = $ [illegible]
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ [illegible]
BUDGET COST ESTIMATE = $ [illegible]

Note:
All pricing is per RS Means 2010, with exception of boiler and controls upgrade.
Boiler pricing is per manufacturer quote dated 2/26/2010 (includes cost of [illegible])
Controls upgrade pricing is estimated as 10% of total [illegible]

[illegible]
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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
Location: Teaneck - Board of Education
Estimate by: AA
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	Hawthorne Elementary School									
2	Air Handler, High Efficiency 48 MBH heating, 5 tons cooling	2	ea.	$ 4,850.00	$ 9,700.00	2	ea.	$ 1,320.00	$ 2,640.00	$ 12,340.00
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ 12,340.00
MARKUP % = $ 0.15
MARKUP = $ [illegible]
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ [illegible]
BUDGET COST ESTIMATE = $ [illegible]

*Pricing per RS Means 2010
**Pricing per RS Means 2010

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	Teaneck High School									
3	Air Handler, High Efficiency (80 MBH heating, 20 tons cooling)	2	ea.	$ [illegible]	$ [illegible]	2	ea.	$ [illegible]	$ [illegible]	$ [illegible]
	Subtotal				[illegible]				[illegible]	

SUBTOTAL = $ [illegible]
MARKUP % = $ 0.15
MARKUP = $ [illegible]
SUB-TOTAL w/ OH & P = $ [illegible]
CONTINGENCY % = 0.25
CONTINGENCY = $ [illegible]
BUDGET COST ESTIMATE = $ [illegible]

*Pricing per manufacturer quote 2/1/10
**Pricing per RS Means 2010

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

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Estimate by: EMB
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL & LABOR UNIT COST	MATERIAL & LABOR SUBTOTAL	TOTAL
10	Bryant Elementary School DDC Control System	47,438	SF	$ 0.60	$ 28,462.80	$ 28,462.80
	Subtotal				28,462.8	

Notes:
1. DDC Control System Pricing is estimated at $0.60 per square foot
2. At an assumed $400 per control point, this will allow for 102 points

SUBTOTAL =	$	28,462.80
MARKUP % =	$	0.15
MARKUP =	$	4,269.42
SUB-TOTAL w/ OH & P =	$	32,732.22
CONTINGENCY % =		0.25
CONTINGENCY =	$	8,183.06
BUDGET COST ESTIMATE =	$	40,915.28

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL & LABOR UNIT COST	MATERIAL & LABOR SUBTOTAL	TOTAL
11	Eugene Field Administration Building DDC Control System	24,877	SF	$ 0.60	$ 14,926.20	$ 14,926.20
	Subtotal				14,926.2	

Notes:
1. DDC Control System Pricing is estimated at $0.60 per square foot
2. At an assumed $400 per control point, this will allow for 54 points

SUBTOTAL =	$	14,926.20
MARKUP % =	$	0.15
MARKUP =	$	2,238.93
SUB-TOTAL w/ OH & P =	$	17,165.13
CONTINGENCY % =		0.25
CONTINGENCY =	$	4,291.28
BUDGET COST ESTIMATE =	$	21,456.41

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Estimate by: EMB
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL & LABOR UNIT COST	MATERIAL & LABOR SUBTOTAL	TOTAL
12	Hawthorne Elementary School DDC Control System	49,371	SF	$ 0.60	$ 29,622.60	$ 29,622.60
	Subtotal				29,622.60	

Notes:
1. DDC Control System Pricing is estimated at $0.60 per square foot
2. At an assumed $400 per control point, this will allow for 126 points

SUBTOTAL =	$	29,622.60
MARKUP % =	$	0.15
MARKUP =	$	[illegible]
SUB-TOTAL w/ OH & P =	$	[illegible]
CONTINGENCY % =		0.25
CONTINGENCY =	$	[illegible]
BUDGET COST ESTIMATE =	$	[illegible]

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL & LABOR UNIT COST	MATERIAL & LABOR SUBTOTAL	TOTAL
13	Lowell Elementary School DDC Control System	47,106	SF	$ 0.60	$ 28,263.60	$ 28,263.60
	Subtotal				28,263.60	

Notes:
1. DDC Control System Pricing is estimated at $0.60 per square foot
2. At an assumed $400 per control point, this will allow for 102 points

SUBTOTAL =	$	28,263.60
MARKUP % =	$	0.15
MARKUP =	$	4,239.54
SUB-TOTAL w/ OH & P =	$	32,503.14
CONTINGENCY % =		0.25
CONTINGENCY =	$	8,125.79
BUDGET COST ESTIMATE =	$	40,628.93

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

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Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL & LABOR UNIT COST	MATERIAL & LABOR SUBTOTAL	TOTAL
14	Whittier Elementary School DDC Control System	55,118	SF	$ 0.60	$ 33,070.80	$ 33,070.80
	Subtotal				33,070.80	

Notes:
1. DDC Control System Pricing is estimated at $0.60 per square foot
2. At an assumed $400 per control point, this will allow for 119 points

SUBTOTAL =	$	33,070.80
MARKUP % =	$	0.15
MARKUP =	$	4,960.62
SUB-TOTAL w/ OH & P =	$	38,031.42
CONTINGENCY % =		0.25
CONTINGENCY =	$	9,507.86
BUDGET COST ESTIMATE =	$	47,539.28

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Estimate by: ADN
Checked by: MG

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
15	Teaneck High School Variable Frequency Drive, Enclosed (NEMA 1), 480 Volt, 10 HP motor	7	ea	$ 1,500.00	$ 10,500.00	7	ea	$ 785.00	$ 5,[illegible]	$ 16,415.00
	2 Way Zone Valve, Bronze Body, High Head, 125' Pump Head, 1/2" Soldered**	210	ea	$ 151.00	$ 31,[illegible]	210	ea	$ [illegible]	$ 4,[illegible]	$ 36,040.00
	Subtotal				42,770.[illegible]				10,[illegible]	

Pricing per RS Means Costworks 2010

**Assumes 1 valve per unit ventilator, 30 unit ventilators per pump, with 25% contingency

SUBTOTAL =	$ 52,358.00
MARKUP % =	$ 0.15
MARKUP =	$ 7,543.25
SUB-TOTAL w/ OH & P =	$ 57,898.25
CONTINGENCY % =	0.25
CONTINGENCY =	$ 15,224.56
BUDGET COST ESTIMATE =	$ 76,122.81

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Estimate by: ASH
Checked by: MG

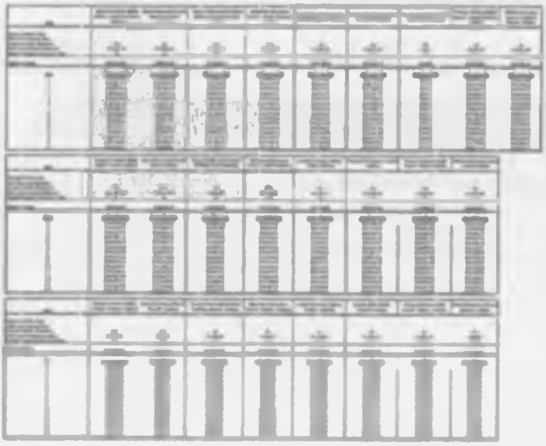
ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
19	**Teaneck High School** Water Heater, Gas-Fired, High Efficiency 194 MBH	1	ea.	$ 2,675.00	$ 2,675.00	1	ea.	$ 970.00	$ 970.00	$ [illegible]

Pricing per RS Means Costworks 2010

SUBTOTAL =	$ 3,645.00
MARKUP % =	$ 0.15
MARKUP =	$ 546.75
SUB-TOTAL w/ OH & P =	$ 4,191.75
CONTINGENCY % =	0.25
CONTINGENCY =	$ 1,047.94
BUDGET COST ESTIMATE =	$ 5,239.69

APPENDIX I

ECRM FINANCIAL ANALYSES



[illegible]

[illegible]

ECM	Teaneck Wind Turbine System - Minimum Wind Speed	Teaneck Wind Turbine System - Maximum Wind Speed	Teaneck Wind Turbine System - Average Wind Speed
Assumed Inflation (Gas)			
Initial Yearly Savings (Gas)			
Assumed Inflation (Electricity)	3%	3%	3%
Initial Yearly Savings (Electricity)	$643.33	$1,401.20	$1,069.10
Assumed Average Useful Life (Years)	25	25	25
Lifetime Savings	[illegible]	[illegible]	[illegible]
Year	Annual Savings	Annual Savings	Annual Savings
1	$643.33	$1,401.20	$1,056.10
2	$662.63	$1,443.24	$1,101.17
3	$682.37	$1,486.53	$1,134.21
4	$702.94	$1,531.13	$1,168.23
5	$723.82	$1,577.06	$1,203.28
6	$745.65	$1,624.37	$1,239.38
7	$768.01	$1,673.11	$1,276.56
8	$791.05	$1,723.30	$1,314.86
9	$814.79	$1,775.00	$1,354.30
10	$839.23	$1,828.29	$1,394.93
11	$864.41	$1,883.15	$1,436.78
12	$890.34	$1,939.59	$1,479.88
13	$917.05	$1,997.78	$1,524.28
14	$944.56	$2,057.71	$1,570.01
15	$972.90	$2,119.44	$1,617.11
16	$1,002.08	$2,183.02	$1,665.62
17	$1,032.15	$2,248.51	$1,715.59
18	$1,063.11	$2,315.97	$1,767.06
19	$1,471.85	$3,205.84	$2,440.02
20	$1,127.86	$2,457.01	$1,874.67
21	$1,161.69	$2,531.72	$1,930.91
22	$1,196.54	$2,605.84	$1,988.84
23	$1,232.44	$2,684.84	$2,048.51
24	$1,269.41	$2,765.39	$2,109.96
25	$1,307.49	$2,848.35	$2,173.26

IRR, NPV, AROI - HVAC ECMS

Boiler Upgrade Benjamin Franklin Middle School			Boiler Upgrade Thomas Jefferson Middle School			Boiler Upgrade [illegible] Elementary School			Boiler Upgrade Lowell Elementary School		
Year		Cash Flow	Year		Cash Flow	Year		Cash Flow	Year		Cash Flow
0		([illegible] 130.78)			($147,[illegible] 13)			($175,[illegible])			([illegible])
1	$32,137.[illegible]	$33,637.[illegible]	1	$47,[illegible] 37	$48,[illegible] 37	1	$16,[illegible]	$17,[illegible]	1	$[illegible] 871.12	$[illegible] 1,871.12
2	$[illegible] 101.11	$34,[illegible] 11	2	$[illegible] 34	$[illegible] 34	2	$16,[illegible] 87	$18,[illegible] 87	2	$[illegible] 26	$[illegible] 26
3	$34,[illegible] 14	$[illegible] 14	3	$[illegible] 81	$[illegible] 81	3	$17,227.[illegible]	$18,727.[illegible]	3	$[illegible] 611.72	$[illegible] 111.72
4	$[illegible] 87	$[illegible] 87	4	$[illegible] 60	$[illegible] 60	4	$17,[illegible]	$19,[illegible]	4	$22,[illegible] 07	$[illegible]
5	$[illegible]	$37,[illegible]	5	$[illegible] 23	$[illegible] 23	5	$[illegible] 277.[illegible]	$[illegible] 777.[illegible]	5	$[illegible]	$[illegible] 437.[illegible]
6	$37,[illegible]	$[illegible]	6	$[illegible]	$[illegible]	6	$[illegible] 34	$[illegible] 34	6	$[illegible] 71	$[illegible] 71
7	$[illegible] 373.[illegible]	$[illegible] 872.[illegible]	7	$[illegible]	$[illegible]	7	$[illegible] 10	$[illegible] 10	7	$[illegible] 10	$[illegible] 10
8	$[illegible] 46	$41,[illegible] 46	8	$[illegible]	$[illegible]	8	$[illegible]	$21,[illegible]	8	$[illegible] 01	$[illegible] 01
9	$[illegible] 10	$42,[illegible] 10	9	$[illegible]	$[illegible]	9	$20,[illegible]	$22,[illegible]	9	$[illegible]	$[illegible]
10	$41,[illegible]	$43,431.[illegible]	10	$[illegible]	$[illegible]	10	$21,[illegible]	$22,[illegible]	10	$[illegible]	$[illegible]
11	$43,[illegible] 44	$44,[illegible]	11	$[illegible]	$[illegible]	11	$21,[illegible] 72	$[illegible] 72	11	$27,[illegible]	$[illegible]
12	$44,[illegible] 12	$[illegible] 13	12	$[illegible]	$[illegible]	12	$22,[illegible] 44	$23,[illegible] 44	12	$[illegible]	$[illegible]
13	$[illegible]	$47,[illegible]	13	$[illegible] 32	$[illegible] 32	13	$23,[illegible]	$24,[illegible]	13	$[illegible]	$[illegible]
14	$47,[illegible] 27	$[illegible] 27	14	$[illegible]	$[illegible]	14	$23,[illegible] 37	$[illegible] 37	14	$[illegible]	$[illegible]
15	$[illegible] 10	$[illegible] 10	15	$71,[illegible]	$72,[illegible]	15	$24,[illegible]	$[illegible]	15	$[illegible] 13	$[illegible] 313.[illegible]
16	$[illegible]	$[illegible]	16	$[illegible]	$[illegible]	16	$[illegible]	$[illegible]	16	$31,[illegible] 84	$33,[illegible] 84
17	$[illegible]	$[illegible]	17	$[illegible] 70	$[illegible] 70	17	$[illegible] 67	$[illegible] 67	17	$[illegible] 67	$[illegible]
18	$[illegible]	$[illegible]	18	$[illegible]	$[illegible]	18	$[illegible] 43	$[illegible] 43	18	$[illegible]	$[illegible]
19	$[illegible]	$[illegible]	19	$[illegible]	$[illegible]	19	$27,[illegible] 84	$[illegible] 84	19	$34,[illegible] 47	$[illegible] 47
20	$[illegible] 42	$[illegible] 42	20	$[illegible]	$[illegible]	20	$[illegible] 01	$[illegible] 01	20	$[illegible]	$[illegible]
21	$[illegible]	$[illegible]	21	$[illegible] 43	$[illegible] 43	21	$[illegible]	$[illegible]	21	$[illegible] 81	$[illegible] 81
22	$[illegible]	$[illegible]	22	$[illegible] 11	$[illegible] 11	22	$[illegible] 14	$[illegible] 14	22	$[illegible]	$[illegible]
23	$[illegible]	$[illegible]	23	$[illegible]	$[illegible]	23	$31,[illegible] 41	$32,[illegible] 41	23	$[illegible] 17	$[illegible] 17
24	$[illegible]	$[illegible]	24	$[illegible]	$[illegible]	24	$32,[illegible] 67	$33,[illegible] 67	24	$[illegible] 17	$41,[illegible] 17
IRR	37.12%		IRR	[illegible]		IRR	11.[illegible]%		IRR	11.[illegible]%	
NPV	$[illegible]		NPV	$[illegible]		NPV	$[illegible]		NPV	$[illegible]	
AROI	[illegible]%		AROI	[illegible]%		AROI	[illegible]%		AROI	[illegible]%	

[illegible]

IRR, NPV, ARCI - HVAC ECRMS

Boiler Upgrade [illegible] Elementary School		
Year		Cash Flow
		($175,165.00)
1	$19,371.38	$20,871.38
2	$19,952.80	$21,452.40
3	$20,551.07	$22,051.07
4	$21,167.60	$22,667.60
5	$21,802.63	$23,302.63
6	$22,456.70	$23,956.70
7	$23,130.40	$24,630.40
8	$23,824.32	$25,324.32
9	$24,539.05	$26,039.05
10	$25,275.22	$26,775.22
11	$26,033.47	$27,533.47
12	$26,814.48	$28,314.48
13	$27,618.91	$29,118.91
14	$28,447.48	$29,947.48
15	$29,[illegible]	[illegible]
16	$30,179.90	$31,679.90
17	$31,[illegible]	[illegible]
18	$32,017.80	$33,517.80
19	$32,976.43	$34,476.43
20	$33,967.70	$35,467.70
21	$34,986.81	$36,486.81
22	$36,036.40	$37,536.40
23	$37,117.81	$38,617.81
24	$38,231.34	$39,731.34
IRR	13.[illegible]%	
NPV	$301,909.92	
ARCI	7.7[illegible]%	

Boiler Upgrade Whittier Elementary School		
Year		Cash Flow
		($216,[illegible])
1	$9,[illegible].70	$11,[illegible].70
2	$9,[illegible].07	$11,[illegible].07
3	$10,[illegible].67	$11,[illegible].67
4	$10,[illegible].43	$12,[illegible].43
5	$10,[illegible].42	$12,[illegible].42
6	$11,[illegible]	$12,[illegible]
7	$11,[illegible].22	$13,[illegible].22
8	$11,[illegible].61	$13,[illegible].61
9	$12,[illegible]	$13,[illegible]
10	$12,[illegible].07	$14,[illegible].07
11	$12,[illegible].37	$14,[illegible].37
12	$13,[illegible].23	$14,[illegible].23
13	$13,[illegible].70	$15,[illegible].70
14	$14,[illegible]	$15,[illegible]
15	$14,[illegible]	$16,[illegible].41
16	$14,[illegible]	$16,[illegible]
17	$15,[illegible]	$17,017.18
18	$15,[illegible]	$17,[illegible]
19	$16,[illegible]	$17,[illegible]
20	$16,[illegible].01	$18,[illegible].01
21	$17,[illegible]	$18,[illegible]
22	$17,[illegible].64	$19,[illegible].64
23	$18,[illegible]	$20,[illegible]
24	$18,[illegible].14	$20,[illegible].14
IRR	4.24%	
NPV	$33,720.57	
ARCI	0.[illegible]%	

Boiler Upgrade [illegible] Administration Building		
Year		Cash Flow
		($66,128.75)
1	$5,517.14	$7,017.14
2	$5,[illegible]	$7,[illegible]
3	$5,[illegible].13	$7,[illegible].13
4	$6,[illegible].73	$7,[illegible].73
5	$6,[illegible]	$7,[illegible]
6	$6,[illegible]	$7,[illegible]
7	$6,[illegible].75	$8,[illegible].75
8	$6,[illegible]	$8,[illegible]
9	$6,[illegible]	$8,[illegible]
10	$7,[illegible]	$8,[illegible]
11	$7,414.[illegible]	$8,914.[illegible]
12	$7,637.01	$9,137.01
13	$7,[illegible].12	$9,[illegible].12
14	$8,102.11	$9,602.11
15	$8,[illegible].17	$9,[illegible].17
16	$8,[illegible]	$10,[illegible]
17	$8,[illegible]	$10,[illegible]
18	$9,[illegible]	$10,[illegible]
19	$9,[illegible]	$10,[illegible]
20	$9,674.34	$11,174.34
21	$9,[illegible].57	$11,[illegible].57
22	$10,[illegible].51	$11,[illegible].51
23	$10,571.41	$12,071.41
24	$10,[illegible]	$12,[illegible]
IRR	7.1[illegible]%	
NPV	$[illegible]	
ARCI	2.[illegible]%	

IRR, NPV, ARCI - HVAC ECRMS

[illegible] [illegible]		
Life of ECRM (Yrs)	24	
Year	Cash Flow	
0	($16,[illegible].13)	
1	$[illegible]	
2	$7[illegible].43	
3	$7[illegible].47	
4	$[illegible].18	
5	$7[illegible].43	
6	$7[illegible].47	
7	$[illegible].18	
8	$837.[illegible]	
9	$[illegible]	
10	$[illegible]	
11	$[illegible].21	
12	$942.[illegible]	
13	$970.[illegible]	
14	$1,[illegible]	
15	$1,[illegible]	
16	$[illegible]	
17	$1,[illegible]	
18	$1,[illegible]	
19	$1,1[illegible]	
20	$1,1[illegible].14	
21	$1,2[illegible]	
22	$1,2[illegible]	
23	$1,2[illegible]	
24	$1,344.01	
IRR	2.[illegible]%	
NPV	($1,0[illegible].17)	
ARCI	-4.[illegible]%	

[illegible] High School		
Life of ECRM (Yrs)	24	
Year	Cash Flow	
0	($125,[illegible])	
1	$3,[illegible]	
2	$3,[illegible]	
3	$3,[illegible].71	
4	$3,[illegible]	
5	$3,[illegible]	
6	$4,[illegible]	
7	$4,[illegible].42	
8	$4,[illegible]	
9	$4,[illegible]	
10	$4,[illegible]	
11	$4,[illegible]	
12	$4,[illegible]	
13	$4,[illegible].13	
14	$5,[illegible].13	
15	$5,[illegible]	
16	$5,[illegible]	
17	$5,[illegible]	
18	$5,[illegible]	
19	$5,[illegible].42	
20	$6,[illegible].13	
21	$6,[illegible].14	
22	$6,[illegible]	
23	$6,[illegible].72	
24	$6,[illegible].61	
IRR	-0.[illegible]%	
NPV	($48,[illegible].14)	
ARCI	-1.[illegible]%	

ECM#		[redacted] DOC BMS		[redacted] DOC BMS		[redacted] DOC BMS		[redacted] DOC BMS		[redacted] DOC BMS
[illegible] (Oil or Gas)		3%		3%		3%		3%		3%
Initial Year's Savings (Oil or Gas)		$7,757.57		$2,084.50		$5,370.71		$4,815.69		$7,369.57
[illegible] (Electricity)		3%		3%		3%		3%		3%
Initial Year's Savings (Electricity)		$3,028.57		$1,602.84		$2,189.21		$2,229.44		$3,342.84
[illegible] Life (Years)		15		15		15		15		15
Lifetime Savings		$211,944.82		$75,258.14		$148,697.18		$135,272.88		$193,797.80
Year	Year	Annual Savings	Year	Annual Savings	Year	Annual Savings	Year	Annual Savings	Year	Annual Savings
0	0	($49,915.25)	0	($21,456.41)	0	($42,564.71)	0	($48,839.00)	0	($57,339.20)
1	1	$11,347.15	1	$3,777.43	1	$7,569.66	1	$7,108.13	1	$10,742.40
2	2	$11,987.56	2	$3,890.76	2	$7,796.70	2	$7,322.45	2	$11,064.67
3	3	$12,038.19	3	$4,007.48	3	$8,030.61	3	$7,542.06	3	$11,396.61
4	4	$12,398.33	4	$4,127.70	4	$8,270.53	4	$7,768.34	4	$11,738.51
5	5	$12,771.31	5	$4,251.53	5	$8,518.84	5	$8,001.39	5	$12,090.67
6	6	$13,154.45	6	$4,379.08	6	$8,754.07	6	$8,241.43	6	$12,453.39
7	7	$13,548.69	7	$4,510.45	7	$9,028.80	7	$8,488.67	7	$12,826.99
8	8	$13,955.36	8	$4,645.77	8	$9,297.86	8	$8,743.33	8	$13,211.80
9	9	$14,374.25	9	$4,785.14	9	$9,576.75	9	$9,005.63	9	$13,608.15
10	10	$14,805.45	10	$4,928.69	10	$9,864.04	10	$9,275.80	10	$14,016.40
11	11	$15,249.62	11	$5,076.55	11	$10,159.96	11	$9,554.08	11	$14,436.89
12	12	$15,707.11	12	$5,228.85	12	$10,464.76	12	$9,840.70	12	$14,870.00
13	13	$16,178.32	13	$5,385.72	13	$10,778.73	13	$10,135.92	13	$15,316.10
14	14	$16,663.67	14	$5,547.29	14	$11,102.06	14	$10,440.00	14	$15,775.58
15	15	$17,163.58	15	$5,713.71	15	$11,435.12	15	$10,753.20	15	$16,248.85
	IRR	25.68%	IRR	18.44%	IRR	18.62%	IRR	18.11%	IRR	24.24%
	NPV	$124,334.44	NPV	$33,554.74	NPV	$67,312.33	NPV	$62,902.08	NPV	$108,903.45
	AROI	21.07%	AROI	10.94%	AROI	11.09%	AROI	10.63%	AROI	15.93%

/PDs	
High School	
[illegible]	15
Year	Cash Flow
0	($76,132.81)
1	$15,862.77
2	$16,338.65
3	$16,828.81
4	$17,333.68
5	$17,853.69
6	$18,389.30
7	$18,940.98
8	$19,509.21
9	$20,094.48
10	$20,697.32
11	$21,318.24
12	$21,957.78
13	$22,616.52
14	$23,295.01
15	$23,993.86
IRR	22.24%
NPV	$154,098.40
AROI	14.17%

eQuest Energy Savings

electricity:	173,640 kWh	$27,591.40
oil:	3522.11 gal oil	-$11,728.63
		$15,862.77

[illegible]	
[illegible]	
[illegible]	24
Year	Cash Flow
0	([illegible])
1	[illegible]
2	$10,276.26
3	$10,[illegible].87
4	$10,[illegible].16
5	$1[illegible],[illegible].17
6	[illegible]
7	$1[illegible],913.[illegible]
8	$12,276.41
9	$12,[illegible].03
10	$1[illegible],017.[illegible]
11	$1[illegible],[illegible].21
12	$1[illegible],918.48
13	$14,[illegible].77
14	$14,[illegible]
15	[illegible]
16	$1[illegible],[illegible]3.79
17	$1[illegible],918.11
18	$1[illegible].41
19	$1[illegible].12
20	$17,[illegible]
21	$1[illegible]
22	[illegible]
23	$19,118.[illegible]
24	$1[illegible].41
IRR	[illegible].41%
NPV	$22[illegible]
AROI	[illegible]%

APPENDIX J

WINDCAD MODELS

WindCad Turbine Performance Model

WES Tulipo Wind Turbine, Grid - Intertie

Prepared For:	Teaneck School District
Site Location:	-----
Data Source:	NASA Atmospheric Science Data Center
Date:	3/24/2010

2.5 kW

Inputs:

Ave. Wind (m/s) =	4.03
Weibull K =	2
Site Altitude (m) =	0
Wind Shear Exp. =	0.180
Anem. Height (m) =	20
Tower Height (m) =	20
Turbulence Factor =	8.0%

Results:

Hub Average Wind Speed (m/s) =	4.03
Air Density Factor =	0%
Average Output Power (kW) =	0.44
Daily Energy Output (kWh) =	10.5
Annual Energy Output (kWh) =	3,817
Monthly Energy Output =	318
Percent Operating Time =	55.0%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	8.29%	0.000
2	0.00	16.05%	0.000
3	0.08	18.87%	0.012
4	0.22	17.88%	0.040
5	0.48	14.41%	0.070
6	0.88	10.11%	0.089
7	1.43	6.29%	0.088
8	1.98	3.44%	0.068
9	2.28	1.66%	0.038
10	2.38	0.74%	0.018
11	2.42	0.29%	0.007
12	2.38	0.10%	0.002
13	2.38	0.03%	0.001
14	2.36	0.01%	0.000
15	2.02	0.00%	0.000
16	1.80	0.00%	0.000
17	1.63	0.00%	0.000
18	1.38	0.00%	0.000
19	1.21	0.00%	0.000
20	0.87	0.00%	0.000
	Totals	99.18%	0.436

2008, BWC

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). The cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

WindCad Turbine Performance Model

WES Tulipo Wind Turbine, Grid - Intertie

Prepared For: Teaneck School District
Site Location: ----
Data Source: NASA Atmospheric Science Data Center
Date: 3/24/2010

2.5 kW

Inputs:	
Ave. Wind (m/s) =	5.82
Weibull K =	2
Site Altitude (m) =	0
Wind Shear Exp. =	0.160
Anem. Height (m) =	20
Tower Height (m) =	20
Turbulence Factor =	8.0%

Results:	
Hub Average Wind Speed (m/s) =	5.82
Air Density Factor =	0%
Average Output Power (kW) =	0.95
Daily Energy Output (kWh) =	22.8
Annual Energy Output (kWh) =	8,316
Monthly Energy Output =	693
Percent Operating Time =	75.1%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	4.57%	0.000
2	0.00	8.52%	0.000
3	0.08	11.37%	0.007
4	0.22	12.87%	0.028
5	0.48	13.03%	0.064
6	0.88	12.08%	0.107
7	1.43	10.41%	0.148
8	1.98	8.38%	0.166
9	2.28	6.33%	0.144
10	2.38	4.51%	0.108
11	2.42	3.04%	0.073
12	2.38	1.94%	0.046
13	2.38	1.17%	0.028
14	2.36	0.67%	0.016
15	2.02	0.38%	0.007
16	1.80	0.19%	0.003
17	1.63	0.09%	0.002
18	1.38	0.04%	0.001
19	1.21	0.02%	0.000
20	0.97	0.01%	0.000
	Totals	99.60%	0.948

2008 BWC

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

WindCad Turbine Performance Model

WES Tulipo Wind Turbine, Grid - Intertie

Prepared For:	Teaneck School District
Site Location:	—
Data Source:	NASA Atmospheric Science Data Center
Date:	3/24/2010

2.5 kW

Inputs:

Ave. Wind (m/s) =	5.01
Weibull K =	2
Site Altitude (m) =	0
Wind Shear Exp. =	0.180
Anem. Height (m) =	20
Tower Height (m) =	20
Turbulence Factor =	8.0%

Results:

Hub Average Wind Speed (m/s) =	5.01
Air Density Factor =	0%
Average Output Power (kW) =	0.72
Daily Energy Output (kWh) =	17.4
Annual Energy Output (kWh) =	6,345
Monthly Energy Output =	529
Percent Operating Time =	68.0%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	6.12%	0.000
2	0.00	11.13%	0.000
3	0.06	14.25%	0.008
4	0.22	15.24%	0.034
5	0.49	14.34%	0.070
6	0.88	12.16%	0.107
7	1.43	9.41%	0.134
8	1.98	6.70%	0.133
9	2.28	4.41%	0.100
10	2.39	2.69%	0.064
11	2.42	1.52%	0.037
12	2.39	0.80%	0.019
13	2.39	0.40%	0.009
14	2.36	0.18%	0.004
15	2.02	0.08%	0.002
16	1.80	0.03%	0.001
17	1.63	0.01%	0.000
18	1.38	0.00%	0.000
19	1.21	0.00%	0.000
20	0.97	0.00%	0.000
	Totals:	99.47%	0.724

2008, BWC

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). The cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

APPENDIX K

WIND FINANCIAL WORKSHEETS

[illegible]

Annual kWh [illegible]

Engineer's Opinion of Probable Cost [illegible]

Assumptions:

[illegible]

Annual Utility Inflation [illegible]

Annual Maintenance Costs [illegible]

REC Factor [illegible]

REIP Incentive [illegible]

Year	Utility Price	Annual Wind kWh Production	Utility Savings	Renewable Energy Credits (RECs)	Renewable Energy Incentive Program (REIP)	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Annual kWh [illegible]

Engineer's Opinion of Probable Cost [illegible]

Assumptions:

[illegible]

Year	Utility Price	Annual Wind kWh Production	Utility Savings	Renewable Energy Credits (RECs)	Renewable Energy Incentive Program (REIP)	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Teaneck Board of Education
(Average Site Wind Speed @30m – 11.21 mph)

Annual kWh: 6,345
Engineer's Opinion of Probable Cost: $21,875.00

Assumptions

Annual System Degradation	0.50%
Annual Utility Inflation	3.00%
Annual Maintenance Costs	$0.02/kWh Production
REC Factor	$25/MWh Production
REIP Incentive	$3.20/kWh First 16,000 kWh
	$0.50/kWh 16,000 kWh - 750,000 kWh

Year	Utility Price	Annual Wind kWh Production	Utility Savings	Renewable Energy Credits (RECs)	Renewable Energy Incentive Program (REIP)			
1	0.1681	6,345.0	$1,080.1	$159	$20,304	($127)	$1,103.9	$1,103.9
2	0.1736	6,313.3	$1,095.7	$158	$0	($126)	$1,117.3	$2,218.1
3	0.1788	6,281.7	$1,122.9	$157	$0	($126)	$1,154.3	$3,382.5
4	0.1841	6,250.3	$1,150.8	$156	$0	($125)	$1,182.1	$4,564.5
5	0.1896	6,219.0	$1,179.4	$155	$0	($124)	$1,210.5	$5,775.1
6	0.1953	6,188.0	$1,208.7	$155	$0	($124)	$1,239.7	$7,014.8
7	0.2012	6,157.0	$1,238.8	$154	$0	($123)	$1,269.4	$8,284.3
8	0.2072	6,126.2	$1,269.6	$153	$0	($123)	$1,300.2	$9,584.5
9	0.2135	6,095.6	$1,301.1	$152	$0	($122)	$1,331.6	$10,916.1
10	0.2199	6,065.1	$1,333.4	$152	$0	($121)	$1,363.8	$12,279.8
11	0.2264	6,034.8	$1,366.6	$151	$0	($121)	$1,396.8	$13,676.6
12	0.2332	6,004.6	$1,400.5	$150	$0	($120)	$1,430.6	$15,107.2
13	0.2402	5,974.6	$1,435.3	$149	$0	($119)	$1,465.2	$16,572.4
14	0.2474	5,944.7	$1,471.0	$149	$0	($119)	$1,500.7	$18,073.1
15	0.2549	5,915.0	$1,507.6	$148	$0	($118)	$1,537.1	$19,610.3
16	0.2625	5,885.4	$1,545.0	$147	$0	($118)	$1,574.3	$21,184.7
17	0.2704	5,856.0	$1,583.4	$146	$0	($117)	$1,612.7	$22,797.4
18	0.2785	5,826.7	$1,622.8	$146	$0	($117)	$1,651.9	$24,449.3
19	0.2869	5,797.6	$1,663.1	$145	$0	($116)	$1,692.1	$26,141.4
20	0.2955	5,768.6	$1,704.4	$144	$0	($115)	$1,733.3	$27,874.7
21	0.3043	5,739.8	$1,746.8	$143	$0	($115)	$1,775.5	$29,650.2
22	0.3135	5,711.1	$1,790.2	$143	$0	($114)	$1,818.7	$31,468.9
23	0.3229	5,682.5	$1,834.7	$142	$0	($114)	$1,863.1	$33,332.0
24	0.3325	5,654.1	$1,880.3	$141	$0	($113)	$1,908.5	$35,240.5
25	0.3425	5,625.8	$1,927.0	$141	$0	($113)	$1,955.1	$37,195.6