ORADELL BOARD OF EDUCATION
ORADELL PUBLIC SCHOOL
ENERGY ASSESSMENT

for

NEW JERSEY
BOARD OF PUBLIC UTILITIES

CHA PROJECT NO. 24384

November 2012

Prepared by:

6 Campus Drive
Parsippany, NJ 07054

(973) 538-2120

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APPENDICES

REPORT DISCLAIMER

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within ±20%, and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the facility was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing facility staff and spot measurements taken in the field.

1.0 EXECUTIVE SUMMARY

The Oradell Board of Education recently engaged CHA to perform an energy audit in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Oradell Public School	350 Prospect Avenue, Oradell, NJ	112,044	Original: 1929

The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of $37,100 for the recommended ECMs may be realized with a combined payback of 6.0 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures							
Energy Conservation Measure		Approx. Costs ($)	Approx. Savings ($/year)	Payback (Years) w/o Incentive	Potential Incentive ($)*	Payback (Years) w/ Incentive	Recommended For Implementation
1	Install Attic Insulation	46,000	3,800	12.1	0	12.1	Y
2	Replace HHW Pump Motors & Install VSD	18,000	6,200	2.9	2,600	2.5	Y
3	Install Network Controller for Computers	3,000	1,600	1.9	0	1.9	Y
4	Install DX Split Systems to Replace Window AC	197,000	900	>20	3,500	>20	
5	Demand Controlled Ventilation	10,000	5,200	1.9	0	1.9	Y
6	Air Sealing	619,000	33,400	18.5	0	18.5	
7	Lighting Replacement	107,200	12,900	8.3	11,660	7.4	
8	Install Occupancy Sensors	40,100	9,500	4.2	6,930	3.5	
9	Lighting Replacements with Occupancy Sensors	147,300	20,300	7.2	18,590	6.3	Y
* Incentive shown is the maximum amount potentially available per the NJ SmartStart Programs.							

Of the recommended measures listed above, CHA recommends that additional attic insulation be installed first (ECM-1). Proper insulation levels for the building are critical in the overall energy efficiency of the building. Once the insulation measure is implemented, it is suggested to implement ECM-9, followed by ECM-5 and then ECM-2. ECM-3 should be implemented last, as it is possible to meet close to the same savings through the implementation of a behavioral energy savings plan in which the building staff could be instructed to turn computers off when they are not in use. The order of implementation of the last four measures described above was determined strictly based on magnitude of savings so that the highest potential energy saving measure is suggested first, followed by the second highest, and so on.

2.0 INTRODUCTION AND BACKGROUND

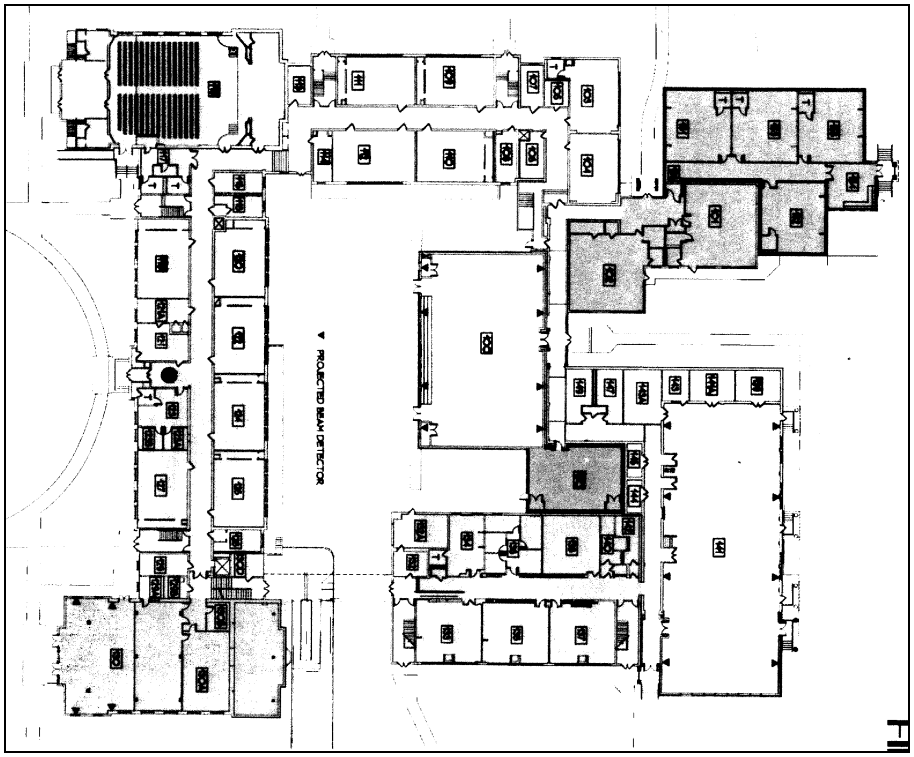
New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

The Oradell Public School is an elementary school located in Oradell, NJ, is an 112,044 square foot, two story block structure with exterior brick facing. The building was constructed in the 1920s, with additions of classrooms in the 1930s and 1950s. Other additions and renovations were performed between 2003 and 2007 that included new school board offices, roofs, gym, and a kindergarten wing. The majority of HVAC equipment for the new addition areas is located on rooftops over the areas being served; the original portion of the building is heated and cooled by Unit Ventilators served by the main boiler plant in the basement and Airedale units located within some of the classrooms. Occupancy includes approximately 800 students and 120 faculty members. The school is open and occupied by maintenance personnel Monday through Friday from 6:00 am to approximately 11:30 pm during the school year, and until 4:30 pm during the summer. Students are typically in the school between 8:30 am and 3:00 pm.

3.0 EXISTING CONDITIONS

3.1 Building - General

Built in the 1920s with several renovations and additions, the Oradell Public School building is an 112,044 square foot, two-story facility with high bay areas for the multipurpose room, gym, and auditorium. The general building layout is shown in the floor plan below:



NORTH

The school has approximately 800 students and 120 staff, and appeared fully utilized during the field survey. The building can be assumed to be fully occupied until 3:00 pm during the week. Custodial staff is typically in the building until 11:30 pm during the week. The hours of operation are:

- Monday through Friday 6:00 am to 11:30 pm (staff)
- Monday through Friday 8:30 am to 3:00 pm (students)
- Saturday & Sunday, open as needed

The original building, including the front wing and half of the two side wings, is constructed of block walls and brick veneer with an air space between. The interior walls are a mixture of painted block walls and framed walls filled with fiberglass insulation and finished with gypsum board. The newer additions were of similar architectural appearance, but were constructed to higher efficient energy standards due to the more stringent energy codes.

The original 1929 building's main front entrance has a pitched roof constructed of wood trusses and plywood sheathing with architectural roof shingles. Insulation for the attic of this area is located on the ceiling of the classrooms below. As a result of the insulation being disturbed during numerous renovations, much of the space is no longer properly insulated. There are also several areas where air

freely flows between the conditioned classroom spaces and the unconditioned attic space due to missing ceiling tiles or existing chimney penetrations. On both sides of this portion of the building, two 1930s and 1950s additions have a partial pitched roof of the same construction. These two areas, however, have had a flat roof installed cutting off the peak of the existing pitched roof. Similar to the 1929 section of the building, these spaces have insulation over the ceiling of the spaces below. These areas also have a majority of the space without proper insulation as a result of renovation or maintenance work. Addressing these issues with the building envelope is highly suggested, as proper air sealing and adequate insulation levels are critical to the overall energy efficiency of the building.

More recent additions (2003 - 2007) to this building all have flat roofs. The roof systems are comprised of structural steel framing with a metal deck having rigid foamboard insulation. Three different vintages of exterior roof finishes exist for the flat roof areas. One vintage utilizes black rubber membrane roofing, another uses light-colored stone ballast, and the most recent a reflective silver rubber membrane. This reflective rubber membrane roofing system is the most beneficial, as it reduces the total heat gain within the building therefore reducing the total building cooling load. Windows are typical of a school building (<40% on all exterior walls), and the majority of the original windows have been replaced with double pane glazing, mounted in vinyl frames. Entrance doors are part glass and part solid composite, and many have been replaced recently. All window and door seals appeared to be in good condition at the time of the site visit; these windows and doors are in good condition and do not appear to require replacement in the near future. The school has exposed walls facing all directions.

The majority of the classroom areas are approximately 12’ in height; the multipurpose room, which is utilized as auditorium, cafeteria, and gym with basketball hoops are all approximately 25’ tall. The building has a partial basement that is used for storage, Board of Education offices, and faculty lounge areas.

3.2 Utility Usage

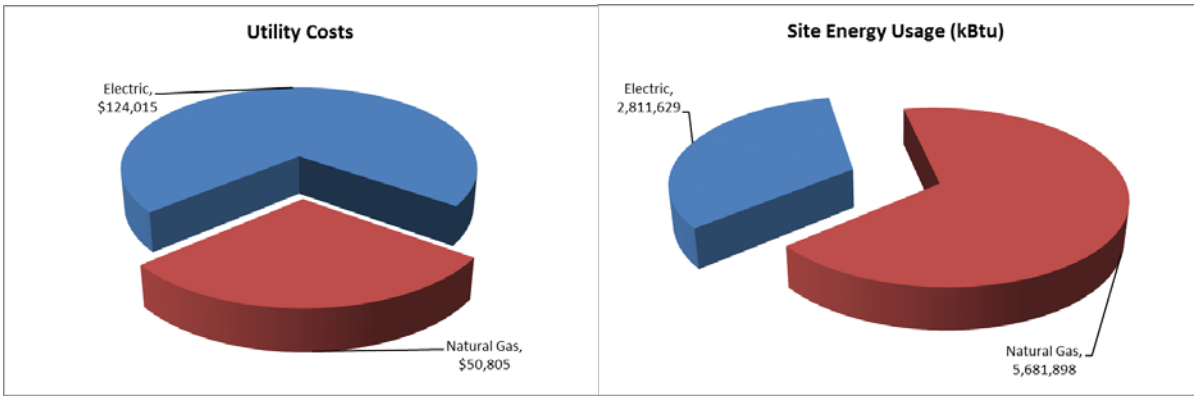
Utilities include electricity, natural gas, and potable water. Electricity is delivered by PSE&G and supplied by SJEC. Natural gas is delivered by PSE&G and supplied by Hess. See Appendix A for a detailed utility analysis.

The school has one electric meter and one gas meter. For the 12-month period ranging from May 2011 through April 2012, the utilities usage for the building was as follows:

Actual Cost & Site Usage by Utility

Electric		
Annual Usage	824,000	kWh/yr
Annual Cost	119,000	$
Blended Rate	0.144	$/kWh
Supply Rate	0.121	$/kWh
Demand Rate	6.25	$/kW
Peak Demand	333	kW
Min. Demand	186	kW
Avg. Demand	254.5	kW
Natural Gas		
Annual Usage	56,800	therms/yr
Annual Cost	50,800	$
Rate	0.89	$/Therm

Annual Cost & Site Energy Usage



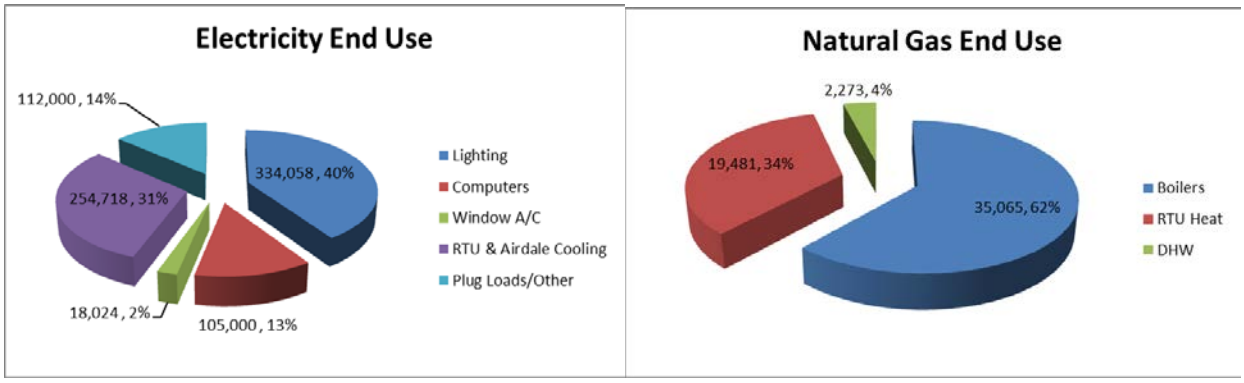
Electrical usage was generally higher in the summer months when air conditioning equipment was operational. Natural gas consumption was highest in winter months for heating.

The total energy usage depicted above is approximately 40% higher than the national median for similar K-12 school buildings. After analysis of the overall utility bill energy usage, it is apparent that this building is inefficient in comparison to other similar buildings in the country. See section 7.0 below for a more detailed comparison of this building versus national median energy-using K-12 school facilities.

The delivery component of the electric and natural gas bills will always be the responsibility of the utility that connects the facility to the power grid or gas line; however, the supply can be purchased from a third party; as is currently the case with electricity and natural gas. The electricity or natural gas commodity supply entity will require submission of one to three years of past energy bills. Contract terms can vary among suppliers. According to the U.S. Energy Information Administration, the average commercial unit costs of electricity and natural gas in New Jersey during the same periods as those noted above was $0.141 per kWh and $0.959 per therm. When compared to the average state values, it is recommended that the present natural gas and electricity supply rate be maintained.

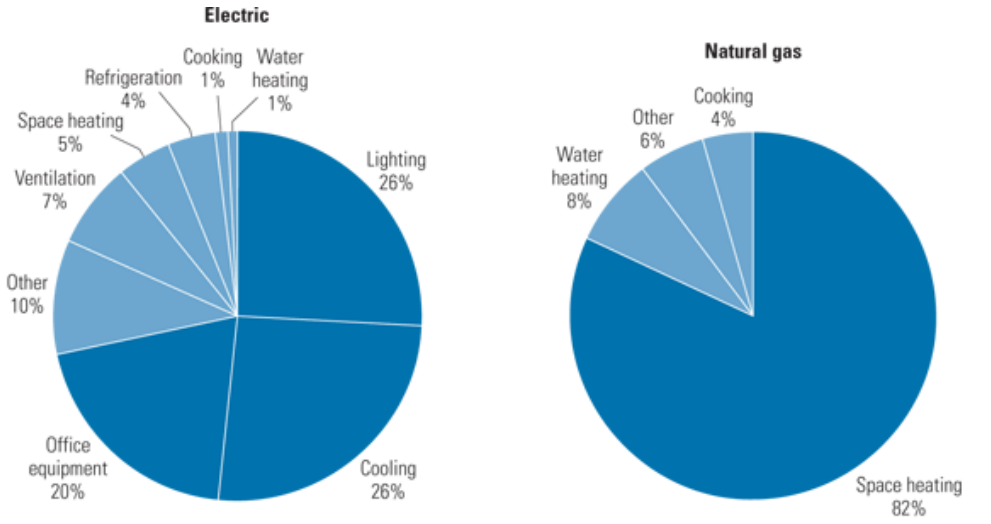
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations. See Appendix A for further end use information.

Site End-Use Utility Profile



Most of the electricity consumed by educational facilities is used to for lighting, cooling, and plug loads such as computers and copiers; most of the natural gas is used for space heating. Each school's energy profile is different, and the following charts represent typical utility profiles for K-12 schools.

Typical End-Use Utility Profile for Educational Facilities



Courtesy: E SOURCE; from Commercial Building Energy Consumption Survey, 1999 data

3.3 HVAC Systems

The systems and equipment described below serve the school building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Heating Hot Water Systems

The majority of the building is heated with hot water supplied by five Aerco Benchmark II condensing, natural gas fired boilers with full modulation gas burners. The boilers were installed in 2007, and are located in the boiler room in the basement of the original building. The hot water system operates from October until April, and the boilers are shut down during the summer.

The boilers are piped to a primary loop pumping system with three 10-HP pumps, two of which operate throughout the heating season. The third pump serves as back-up. These pumps are constant volume with standard efficiency motors, and a 3-way modulating valve for hot water reset control. Hot water is provided to the classroom unit ventilators (UVs), recessed ceiling cabinet heaters, and fintube radiators. Hot water system piping and valves appear to be adequately insulated.

This main boiler system appears to be very well maintained and as a result is operating very efficiently when compared to standard natural gas fired boiler plants. It is assumed that the overall seasonal efficiency for this system is approximately 88%, as compared to a non-condensing gas fired boiler that would operate at approximately 80% efficient or lower.

3.3.2 Package DX Cooling & Natural Gas Heating Rooftop Units

Four 2007 Aaon packaged direct expansion (DX) cooling and natural gas-fired heating rooftop units (RTUs) are located above the areas/spaces they serve. Each RTU is mounted on an extended curb, with outside air intake and relief air dampers, with an air mixing box. Supply and return ductwork is routed down through the roof curbs to duct distribution systems above the ceilings to each space. The RTUs serve special education room 232 and art room 231 (AC-1), the IMC/library (AC-2), kindergarten wing and administrative offices (AC-3), and band/music room (AC-4).

It was noted during the project kickoff meeting that AC-3 serving the administration offices has been problematic, and is not sufficiently cooling the space. The school personnel mentioned high humidity and inadequate airflow levels specifically relating to the conference room located in this area. This conference room requires several fans and dehumidifiers to maintain proper humidity levels and to assist in cooling the space. A detailed design and installation investigation should be conducted to determine what is causing the lack of proper air conditioning within the space. This investigation should include a full airflow balancing report. If the issue within the conference room is alleviated, substantial energy savings could be realized as all existing dehumidifiers and fans would be able to be removed from that area.

These rooftop units, in combination with the window air conditioners and airdale units described below, provide mechanical cooling to approximately 70% of the building. These units are all fairly new, and appear to have been well maintained since installation. With exception of AC-3 described above, these units all appear to be operating efficiently and as originally intended as designed. The only alteration that would benefit the efficiency would be adjusting the operation of AC-2 as described within ECM-5 in section 4.5 below.

3.3.3 Heating and Ventilating Rooftop and Air Handling Units

Three 2007 vintage Aaon natural gas fired heating and ventilating RTUs are located above the areas/spaces they serve. Each RTU is mounted on an extended curb, with outside air intake and relief air dampers, with an air mixing box. Supply and return ductwork is routed down through the roof curbs to duct distribution systems above the ceilings to each space. These units do not have the means to provide any mechanical cooling. The rooftop units serve the multipurpose room (HV-1), and two serve the gym (HV-2 & HV-3).

One 1990 McQuay heating and ventilating air handler serves the auditorium (AHU-1). This air handler is located in the ceiling above the auditorium and is ducted within the attic space to supply diffusers in the ceiling. Return air is pulled from the attic space that is currently being used as a plenum. This unit also does not provide any mechanical cooling to the auditorium.

During the building walkthrough it was noted that the insulation above the ceiling of the auditorium has been misplaced over the years. This misplaced attic insulation, along with some missing ceiling tiles, allows the conditioned air from the auditorium to escape through the attic into the atmosphere. This transfer of air creates a higher than normal heating load within the space, causing AHU-1 to work harder to heat the space. The photos below show the misplaced insulation within this space. The photo on the left shows the insulation piled off to the side of the attic, while the photo on the right shows the un-insulated area under AHU-1.

In addition to the insulation issues, this unit also does not have any return air ductwork connected to it. The system is set up so that the attic is being utilized as a plenum for the return air to reach the unit. If the attic were to be air sealed, this would work effectively. Since the attic is not sealed, however, the air that enters the attic from the conditioned space escapes through to the atmosphere and is replaced with much colder outside air. The unit would normally be supplied with return air that is close to the space set point temperature; therefore the unit would only have to be sized to handle a smaller temperature difference based on the volume of outside air required for ventilation as opposed to the full supply air volume. Currently this unit must be run at its full capacity and it still does not meet the load of the space. If the insulation is repaired and return air ductwork is installed, significant energy savings would be realized as this unit would not have to run at full capacity for the entire heating season. It is recommended to have a more detailed investigation conducted and a full system redesign be provided, which may include the installation of a new air handling unit, so that all design flaws can be corrected. The photo below shows the disconnected return air ductwork.

It was noted during the initial project kickoff meeting that all air handling units, including HV-1 through HV-3, AHU-1, and AC-1 through AC-4 (described above) have their filters changed at least three times per year. As mentioned above, all of these air handling units are operating efficiently and as originally intended as designed, with exception to AHU-1 described above. The only alteration to the heating and ventilation units is also with regards to the operation of the units as described within ECM-5 in section 4.5 below.

3.3.4 Unit Ventilators & Airedale Units

The pre-2007 construction classrooms and offices with exterior wall exposures are ventilated and heated by 30 horizontal floor-mounted cabinet UVs; there is no mechanical cooling within these UVs. Outside air is drawn through low sidewall louvers, and hot water piping provides heating during the winter. These units are approximately 22 years old and are McQuay/American Air Filter model AFBD. Due to the age of these unit ventilators, it is recommended that they are all thoroughly inspected to ensure proper operation of the outside air dampers, damper actuators, and valves.

Approximately nine classrooms are heated and cooled by Airedale model CHX4/2 packaged terminal air conditioners (PTACs). These units provide electric DX cooling as well as electric heat to the classrooms they serve. Although it is generally more efficient to cool a building with a central cooling system utilizing a chiller and chilled water piping and coils, the high costs associated with implementation of such a system makes a central air system installation impractical at this time. These Airdale units are currently operating efficiently and as originally intended as designed. As the units age and/or fail, it may become more practical to replace the air conditioning system with a central chilled water system rather than continuing to repair the individual units.

3.3.5 Window Units

There are approximately 34 window mounted air conditioners utilized within the building. These units are mainly Frigidaire model FAS156N1A2 and have a 10.8 energy efficiency ratio (EER). It was noted during the building walkthrough that these units are not removed from the windows during the winter.

3.3.6 Hydronic Heating Systems

Corridors and some spaces with exterior wall exposures are heated by perimeter hot water fintube radiators with wall mounted thermostats. Other HVAC equipment (RTUs, UVs) provide cooling/ ventilation and outside air for these spaces.

Corridors, entrance vestibules, and some rooms are heated by ceiling mounted hot water cabinet UVs controlled by space thermostats.

3.3.7 Exhaust Systems

Exhaust system fans are integrated into the school energy management systems (EMS) and generally operate during building occupancy.

Common exhaust plenums serve classrooms with rooftop mounted constant volume exhaust fans. Larger classrooms and spaces, including the gym and multipurpose room, have dedicated exhaust fans. Exhaust fans are used for restrooms and custodial closets throughout the building, and the boys and girls locker room areas each have a dedicated exhaust fan located on the roof.

3.4 Control Systems

The building is controlled by two separate EMS. The original building is controlled by a Johnson Controls EMS; the more recent additions served by RTUs are controlled by a Honeywell EMS. Both systems utilize direct digital controls (DDC) for all end devices and main plant controls. DDCs are integrated into a computerized front end operating the Johnson Controls and Honeywell software for equipment sequencing, scheduling, monitoring, and alarming. The Johnson Controls system includes the hot water system boilers/pumps, UVs, cabinet heaters, fintube radiators, and exhaust system fans. The Honeywell system includes heating and ventilation RTUs, packaged DX rooftop units, and some smaller split systems and Airedale units operate stand alone and are not tied into the EMS.

Each UV has a wall mounted thermostat; setpoints in the building are 72°F heating and cooling during occupied times, and 55°F heating and 85°F cooling during unoccupied times. However, thermostats can be adjusted by occupants to override the central control system.

Both existing controls systems have the ability to be remotely accessed by the maintenance staff through web based software packages. These controls systems are both operating effectively and as intended within the original design.

3.5 Lighting/Electrical Systems

Since building construction, the facility has re-ballasted and re-lamped some of their fixtures. A mixture of T12 and T8 – 4’ linear fluorescent bulbs, compact fluorescent twin biaxial bulbs, and compact fluorescent spiral bulbs are currently being utilized. Older style incandescent bulbs are also used in select areas, while metal halides are used in the high bay areas. Replacing these older incandescent bulbs with compact fluorescent equivalents and the metal halide fixtures with T-5 high output fluorescent fixtures would produce substantial electrical energy savings. The primary source of control for the lights is switches manually turned off at the end of the school day.

Exterior lights consist of metal halide bulbs in pole mounted shoebox and wall pack fixtures on daylight sensors and timers. Several of the smaller bulb fixtures were noted as being in continuous operation year-round. The wall packs and pole lights are powered by the building’s electrical system; however since they are relatively few in number and it is impractical to modify these fixtures or their operation schedules, there are no recommendations regarding them in this report.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

The boiler room contains one 100 gallon A.O. Smith Masterfit model BTR 197 110 natural gas-fired hot water heater installed in 2004; this serves the entire building. The majority of hot water piping appears to be insulated. Hot water demand is very low as there is not a commercial cafeteria kitchen in this building, and showers in the lockers are not used. Domestic hot water temperature is maintained at 140°F, and chemical disinfection soap is provided at the toilet rooms. Although there are more efficient alternatives to this non-condensing type water heater, the limited demand due to low hot water usage within the building and the fact that it is fairly new makes replacing the unit impractical. It is recommended, however, that a condensing type water heater be installed when the existing unit reaches the end of its useful life.

3.6.2 Plumbing Fixtures

The majority of the school's original lavatories, water closets, and urinals has been replaced with low flow plumbing fixtures during renovations and do not require upgrades. In general, lavatories are 2.5 gpm with push type faucets, water closets are 1.6 gpf, and urinals are 1.0 gpf.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Install Attic Insulation

The original, pre-2007 constructed portion of the building has a pitched or partially pitched roof with a full attic. These areas have suspended ceilings installed above the classrooms and support areas. Loose fiberglass batt insulation has been installed above the ceiling tiles to insulate the ceiling of the conditioned spaces. Over the years, work on equipment and installation of network and other wiring has left much of this insulation misplaced or missing entirely. Installing 16" of blown-in insulation (R-38) above the ceiling of the conditioned spaces was assessed for this ECM. Addition of insulation will result in a reduced heating and cooling load, therefore saving electrical and natural gas usage.

Attic insulation has an expected life of 24 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 48,000 kWh, 96,000 therms and $91,200.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-1 Install Attic Insulation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
46,000	2,000	0	4,000	3,800	0	3,800	1.0	0	12.1	12.1

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.2 ECM-2 Replace HHW Pump Motors & Install VSD

The hot water system is served by three 10-HP pumps (P-1, P-2, P-3), two of which operate throughout the heating season. The third pump serves as back up. The pumps are constant volume with standard efficiency motors.

Larger motors that operate pumps and fans continuously consume significant electrical energy. The hot water system pumps and AHUs serving these spaces operate at a constant speed (water and air flows) even though the building load does not require all the flow to maintain temperatures. By adding variable speed drives (VSDs) and inverter duty high efficiency motors, and reducing the flow (by slowing the motors down), significant electrical energy can be saved. Pressure actuated controllers are used to measure the water differential pressure in the hydronic systems and as valves close, the system pressure increases and pump speed is reduced.

The assumption of this calculation is that the operating hours, motor horsepower, and capacity stay the same. The energy savings are realized from operating higher efficiency motors and reducing power draw with VSDs.

Motors and variable speed drives have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 816,000 kWh and $124,000.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-2 Replace HHW Pump Motors & Install VSD

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
18,000	40,800	0	0	6,200	0	6,200	5.9	2,600	2.9	2.5

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.3 ECM-3 Install Network Controller

Approximately 150 personal computers are utilized in classrooms, offices, and other areas throughout the building. These computers are left on for the entire day; it was noted during the site visit that the computers had hibernate modes turned off. When computers are not being used, significant energy savings can be realized when the total energy draw is reduced. An evaluation was performed for installing a computer network controller to reduce electrical energy draw from the computer network system when computers are not in use.

Electronic controls have an expected life of 16 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 168,000 kWh and $25,600.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-3 Install Network Controller

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
3,000	10,500	0	0	1,600	0	1,600	7.5	0	1.9	1.9

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended. As an alternative solution to this measure, the school could implement a behavioral energy saving plan that includes mandating that all computers be manually turned off when they are not in use. If this plan is communicated to all staff members, the savings could potentially be close to that which is shown above without requiring software installation therefore eliminating the estimated budgetary cost. This behavioral plan could also potentially be expanded to include other energy savings habits such as manually turning off lights or window air conditioners before leaving a classroom or office, among other possible options.

4.4 ECM-4 Install DX Split Systems to Replace Window A/C

The building does not currently have a central air conditioning system that provides cooling to all spaces. Some of the classroom and office areas are air conditioned by window mounted air conditioning units. There are approximately 34 window air conditioners installed currently. These window A/C units operate on stand-alone controls and have an EER of approximately 7.5. Original manufacturer ratings listed on the units are slightly higher, but this number was de-rated due to age and physical appearance. These units operate inefficiently and can be controlled by the occupant to any desired temperature, significantly wasting electrical energy.

It is proposed to replace the window AC units with DX split systems with a much higher EER (14.0 or higher). These split systems can be tied into the building's EMS system to allow for the air conditioning to be controlled by the building maintenance personnel. The higher EER will result in a reduced total electrical energy use for the air conditioning system.

It was also noted during the building walkthrough that the existing window air conditioners are left in the windows year round. Replacement of these units will also reduce building infiltration, therefore reducing the total heating and cooling load. Savings for this resulting energy reduction were not calculated for this study.

Split system air conditioners have a life expectancy of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 91,500 kWh and $13,500.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-4 Install DX Split Systems to Replace Window A/C

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
197,000	6,100	0	0	900	0	900	(0.9)	3,500	>20	>20

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended.

4.5 ECM-5 Demand Control Ventilation

Heating and ventilation AHUs serve the multipurpose room (HV-1), gym (HV-2, 3), RTUs serve the library (AC-2), and a ceiling mounted air handling unit serves the auditorium (AHU-1). It is assumed the original system controls provide the full design ventilation outside air flow. Reducing outside air during occupied periods will reduce heating and cooling energy. The quantity of ventilation will be based on maintaining an acceptable carbon dioxide (CO_2) level in the space as an indicator of indoor air quality. A limit of 1000 PPM of CO_2 is recommended in ASHRAE Standard 62-1982, Ventilation for Acceptable Indoor Air Quality. Sensors will be installed to measure the building air CO_2 concentration, and the control sequence of operation programmed into the BAS. During unoccupied periods, the outside air dampers should be closed.

Equipment supply and outside airflows were obtained from existing design drawings where possible, or from vendors per serial/model numbers found in the field. For the analysis, estimated savings for demand

control ventilation are based on reducing the total average volume of outside air by 50% based on observed space usage. The energy savings are the differences in utility usage.

Controls have an expected life of 18 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 331,200 kWh, 48,600 therms and $93,600.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

ECM-5 Demand Control Ventilation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
10,000	18,400	0	2,700	5,200	0	5,200	8.3	0	1.9	1.9

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.6 ECM-6 Air Sealing

There are several locations within the pre-2007 constructed areas where air is free to pass between the conditioned spaces and the attic. These areas include several large (3'x3') openings in the existing chimneys, chases, and above the stage in the auditorium where ceiling tiles are missing (5- 2'x4' tiles). In addition to these large openings the entire dropped ceiling in this area does not have any form of air barrier between the conditioned space and the unconditioned attic space. Although the dropped ceiling blocks some of the air from penetrating into the attic, it is assumed that there is a gap around the perimeter of each of the ceiling tiles accounting for approximately 393 square feet of open area for the conditioned air to escape through. These openings increase the heating and cooling loads by effectively creating a larger space for the heating and cooling systems to condition.

Closing off openings between the conditioned spaces and attic to reduce the overall heating and cooling loads will save energy. It is proposed to replace all missing or damaged ceiling tiles, close off the large openings in the chases and chimneys, and install a 0.010" thick polyethylene vapor/air barrier above the steel beams spanning across the attic above the dropped ceiling before installing the insulation suggested within ECM-1. Implementation of this measure in conjunction with ECM-1 can create a substantial reduction in the buildings heating and cooling loads, reducing total natural gas and electrical energy consumption.

Air sealing has an expected life of 10 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 412,000 kWh, 383,000 therms and $403,000.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-6 Air Sealing

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
619,000	34,100	0	31,800	33,400	0	33,400	(0.5)	0	18.5	18.5

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended based on the long payback. It is recommended, however, that the ceiling of the second floor of the original peak-roofed sections of the building be properly air sealed during any potential renovation project of that area. There are different ways that this can be achieved, but this project could potentially be very costly as it would require substantial design analysis and code compliance analysis. A licensed engineer should be consulted to determine structural loading of the proposed ceiling system, and an architect should be consulted to ensure energy and fire code compliance.

4.7 ECM-7 Lighting Replacement

The building's older classrooms and occupied spaces generally use linear fluorescent fixtures with T-12 bulbs; newer areas are equipped with 4' linear fluorescent T-8s. U-tube T-8s and T-12s, along with 2 foot T-8s are also used in some fixtures. Most can lights and surface mounted standard bulb fixtures use compact fluorescent lights (CFLs) to replace original incandescent bulbs.

Modern fluorescent lamps convert electrical power into useful light more efficiently than an incandescent lamp or T-12 bulbs. A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix C). There is an opportunity to reduce consumption by upgrading the existing T-12 fixtures to T-8 or super T-8 fixtures.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. The difference between energy requirements resulted in a total annual savings of 52,200 kWh with an electrical demand reduction of about 27 kW. Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

Lighting has an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 1,005,000 kWh and $193,500.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-7 Lighting Replacement

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
107,200	67,000	37	0	12,900	0	12,900	0.4	11,600	8.3	7.4

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM-9.

4.8 ECM-8 Install Occupancy Sensors

The current elementary school lighting is controlled by manual switches. Lights are generally turned on in the morning and shut off at night. During occupied times, there are rooms that are not occupied; however, the lights remain on. Adding occupancy controls to the individual rooms will automatically control the lights based on occupancy. The occupancy sensor can be wall mounted near the switch or placed at the ceiling for larger room coverage. All occupancy sensors are equipped with a manual override feature. These sensors are generally not recommended in public toilet rooms.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 946,500 kWh and $142,500.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-8 Install Occupancy Sensors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
40,100	63,100	0	0	9,500	0	9,500	2.3	6,930	4.2	3.5

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM-9.

4.9 ECM-9 Lighting Replacements with Occupancy Sensors

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM-7 and ECM-8 to reflect actual expected energy and demand reduction.

The combination of lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturers, and total energy savings over the life of the project are estimated at 1,741,500 kWh and $304,500.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

ECM-9 Lighting Replacements with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
147,300	116,100	37	0	20,300	0	20,300	0.4	18,590	7.2	6.3

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

4.10 System Improvement Opportunities

The following items can be implemented by the owner to provide additional energy savings:

- Vending misers can be added to all district owned vending machines. The school should also request that vendor owned machines be upgraded or removed if they are not high efficiency equipment.

- There are nine Airedale units installed throughout the building that provide cooling to the classrooms. Replacing the condensing units serving these Airedale units with high efficiency units when the existing equipment fails should be considered. The units are currently operating effectively and do not require immediate replacement.

- In addition to the nine Airedale units utilized for air conditioning, are 34 window mounted air conditioners. The window units provide adequate air conditioning; however, it results in a considerable amount of smaller air conditioning equipment for the building. It is recommended that a more detailed study be performed to investigate the potential installation of a central air conditioning system to serve the spaces that are currently being air conditioned by standalone equipment. A more detailed study is required to determine chiller sizing, chilled water piping routing, and selection of terminal devices before accurate installation costs and savings can be calculated for this measure.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

The facility will be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects applied to facilities whose demand in any of the preceding 12 months exceeds 100 kW. This average minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations, however. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP).

- Incentive Amount: $0.10/SF
- Minimum incentive: $5,000
- Maximum Incentive: $50,000 or 50% of Facility annual energy cost

The standard incentive pays $0.10 per square foot, up to a maximum of $50,000, not to exceed 50% of facility annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional $0.05 per square foot, up to a maximum of $25,000, rather than the standard incentive noted above.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved

Incentives #2 and #3 can be combined to yield additive savings.

Total P4P incentives for all measures evaluated in this report are summarized below:

	Incentives $		
	Electric	Gas	Total
Incentive #1	$0	$0	$5,602
Incentive #2	$25,082	$48,026	$73,108
Incentive #3	$25,082	$48,026	$73,108
Total All Incentives	**$50,165**	**$96,052**	**$151,819**

Implementing all the ECMs in this report would result in savings in excess of the minimum 15% P4P requirement, and therefore the building would be eligible for incentives #2 and #3. See Appendix D for additional details.

5.1.2 New Jersey Smart Start Program

For this program, specific incentives for energy conservation measures are calculated on an individual basis utilizing the 2011 New Jersey Smart Start incentive program. This program provides incentives dependent upon mechanical and electrical equipment. If applicable, incentives from this program are reflected in the ECM summaries and attached appendices.

If the complex qualifies and enters into the New Jersey Pay for Performance Program, all energy savings will be included in the total site energy reduction, and savings will be applied towards the Pay for Performance incentive. A project is not applicable for both New Jersey incentive programs.

More information for this program can be found at the website below:
http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

5.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or natural gas utility companies.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, natural gas, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can significantly reduce the implementation cost of energy conservation projects.

The program pays 70% of each project cost up to $75,000 per electrical utility account; total funding for each year is capped at $250,000 per customer. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at http://www.njcleanenergy.com. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

Due to the peak demand observed from the utility bills of 333 kW, this building is not eligible for the direct install program.

5.1.4 Energy Savings Improvement Plans (ESIP)

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use “energy savings obligations” to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. Energy savings obligations are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities (see Appendix E). The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs.

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

The facility was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array. All rooftop areas have been replaced, and are in good condition. It is recommended to install a permanent PV array at this time.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWATT solar power generation model is provided in Appendix F.

Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Since the facility is a non-profit organization, federal taxes are paid and this project is eligible for this incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The average SREC value per credit is estimated to be about $63/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

The existing load justifies the use of a 250 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

The implementation cost and savings related to this ECM are presented in Appendix F and summarized as follows:

Photovoltaic (PV) Rooftop Solar Power Generation – 250 kW System

Budgetary Cost	Annual Utility Savings				Total Savings	Federal Tax Credit *	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total					
$	kW	kWh	Therms	$	$	$	$	Years	Years
$1,000,000	0.0	306,400	0	$46,100	$46,100	0	$19,303	21.7	15.3

* No federal tax credit currently available.
** Solar Renewable Energy Certificate Program (SREC) as of November 2012 is $63/1000kwh

This measure is not recommended due to the long payback time. It is suggested, however, that the market for SREC credits is closely monitored. This market is fluctuating, and if the value per SREC is increased the measure could potentially show for a shorter payback in the near future.

7.0 EPA PORTFOLIO MANAGER

The EPA Portfolio Manager benchmarking tool was used to assess the building's energy performance. Portfolio Manager provides a Site and Source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft^2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed ECMs, the Energy Star rating will increase.

The Site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity (such as natural gas or oil), or as secondary energy, which is the product created from a raw fuel (such as electricity or district steam). Site EUI is a measure of a building's annual energy utilization per square foot. Site EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types.

$$\textbf{\textit{Site Energy Intensity}} = \frac{(\textit{Electric Usage in kBtu + Natural Gas in kBtu})}{\textit{Building Square Footage}}$$

To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, the Portfolio Manager uses the convention of Source EUIs. The source energy also accounts for all losses incurred in production, storage, transmission, and delivery of energy to the site; which provides an equivalent measure for various types of buildings with different energy sources.

$$\textbf{\textit{Source Energy Intensity}} = \frac{(\textit{Electric Usage in kBtu X Site/Source Ratio + Natural Gas in kBtu X Site/Source Ratio})}{\textit{Building Square Footage}}$$

The EPA Score, Site EUI, and Source EUI for Oradell Public School are as follows:

Energy Intensity	Oradell Public School	National Average
EPA Score	30	50
Site (kBtu/sf/year)	76	63
Source (kBtu/sf/year)	137	115

To be eligible to receive a national Energy Star score, a building must meet all three of these requirements:

1. Building designation – More than 50 percent of the building's gross floor area must be one of the spaces eligible to receive an Energy Star score. The remainder of the building must abide by specific rules for each space type.
2. Operating characteristics – To ensure the building is consistent with the peer group used for comparison, each space in your building must meet certain minimum and maximum thresholds for key operating characteristics.
3. Energy data – At least 12 full consecutive calendar months for all active meters, accounting for all energy use (regardless of fuel type) in the building.

In addition, a Licensed Professional (meaning a Professional Engineer or Registered Architect) must verify that all energy use is accounted for accurately, that the building characteristics have been properly reported (including the square footage of the building), that the building is fully functional in accordance with industry standards, and that each of the indoor environment criteria has been met.

The Oradell Public School is considered a higher than average energy consumer by the EPA Portfolio Manager which gives it a lower than average EPA score. For the School to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the School. This building does not appear to be eligible for Energy Star certification at this time.

The Portfolio Manager account can be accessed by entering the username and password shown below at the login screen of the Portfolio Manager website (https://www.energystar.gov/istar/pmpam/).

A full EPA Energy Star Portfolio Manager Report is located in Appendix G.

The user name ([redacted]) and password ([redacted]) for the building's EPA Portfolio Manager Account has been provided to the Oradell Board of Education.

8.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Oradell Public School identified potential ECMs for lighting and control replacement, attic insulation installation, heating hot water pump motor replacement and VSD installation, network controller installation, and demand controlled ventilation. Potential annual savings of $37,100 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1 HVAC Condensing Boiler Addition

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (With incentive)
	Electric	Electric	Nat Gas	Total					Years	Years
$	kWh	kW	Therms	$	$	$		$		
46,000	2,000	0	4,000	3,800	0	3,800	1.0	0	12.1	12.1

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

ECM-2 Replace HHW Pump Motors & Install VSD

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
18,000	40,800	0	0	6,200	0	6,200	5.9	2,600	2.9	2.5

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

ECM-3 Install Network Controller

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	years	years
3,000	10,500	0	0	1,600	0	1,600	7.5	0	1.9	1.9

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

ECM-5 HVAC Demand Control Ventilation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
10,000	18,400	0	2,700	5,200	0	5,200	8.3	0	1.9	1.9

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

ECM-9 Lighting Replacements with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive*	Payback (without incentive)	Payback (with incentive)
$	Electric kWh	Electric kW	Nat Gas Therms	Total $	$	$		$	Years	Years
147,3 00	116,100	37	0	20,300	0	20,300	0.4	18,590	7.2	6.3

* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

APPENDIX A

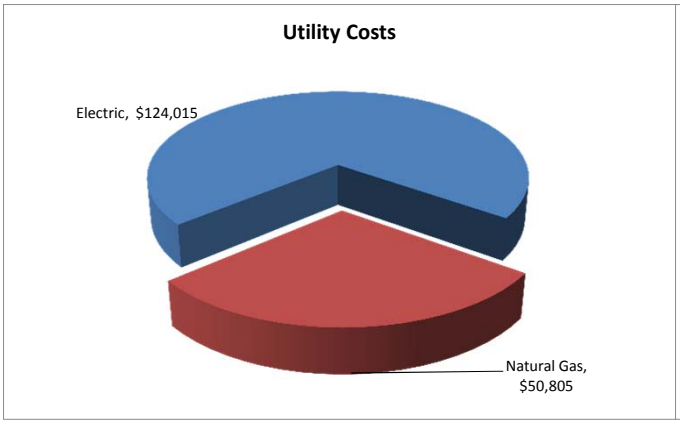
Utility Usage Analysis

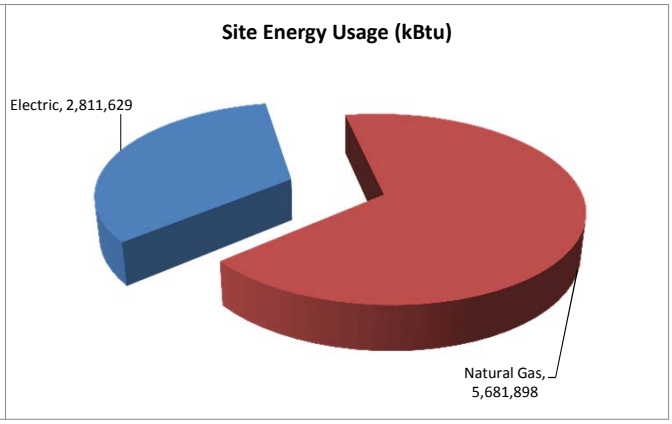
Oradell Elementary School
350 Prospect Avenue, Oradell, NJ 07649

Utility Bills: Account Numbers

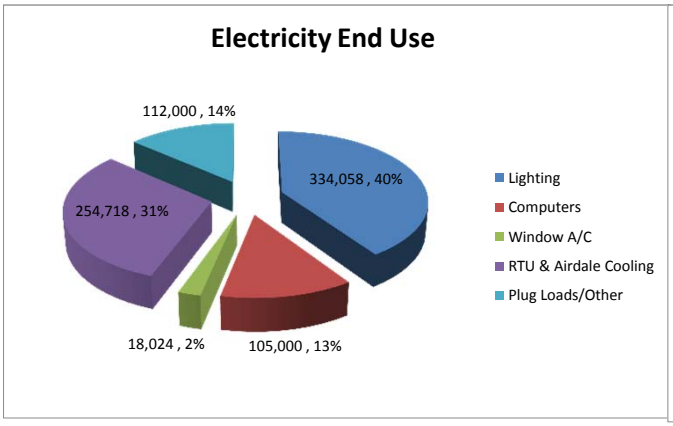
Account Number	School Building	Location	Type	Notes
4201154009	Elementary School	350 Prospect Avenue, Oradell, NJ 07649	Electric	
4201154009	Elementary School	350 Prospect Avenue, Oradell, NJ 07649	Natural Gas	

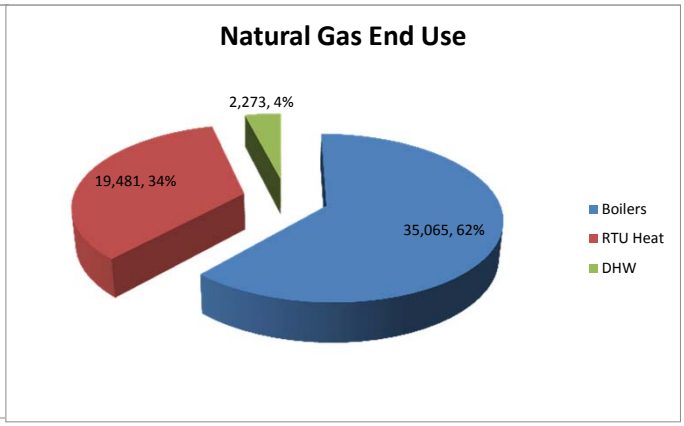
Overall Utility Usage Summary			
	Electric	Natural Gas	
Utility Costs*	$ 124,015	$ 50,805	
Utility Usage (kWh, Therm, Gal)	823,800	56,819	
$ Cost/Unit (kWh, Therm, Gal)	0.150540	0.894	
Electric Demand (kW)	333		Total
Equivalent Site Usage (kBtu)	2,811,629	5,681,898	8,493,527
Equivalent Source Usage (kBtu)	9,390,842	5,948,947	15,339,789





Utility End Use Analysis		
Electricity Use (kWh):		**Notes/Comments:**
334,058	Lighting	From Lighting Calculations
105,000	Computers	Based on 700 kWh/yr/pc
18,024	Window A/C	From Window A/C ECM Calculation
254,718	RTU & Airdale Cooling	Balance of electricity usage
112,000	Plug Loads/Other	Based on 1 kWh/sf/yr per prior experience
Natural Gas Use (Therms):		**Notes/Comments:**
35,065	Boilers	Therms/SF x Square Feet Served
19,481	RTU Heat	Therms/SF x Square Feet Served
2,273	DHW	Based on utility analysis





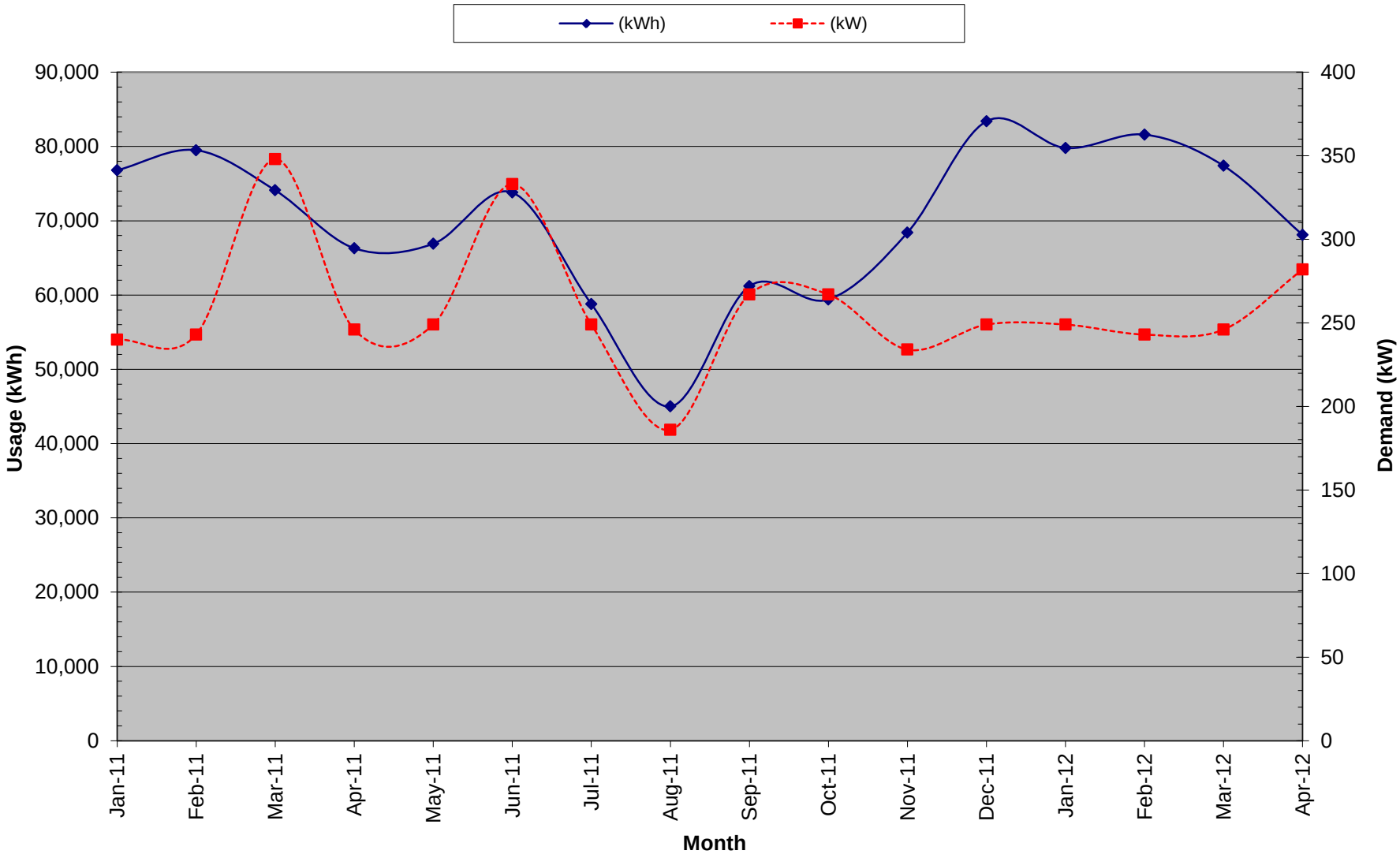
Oradell Elementary School
350 Prospect Avenue, Oradell, NJ 07649

Electric Service
Delivery - PSE&G
Supplier - South Jersey Energy

For Service at: Elementary School
Account No.: 4201154009
Meter No.: 778009530

			Charges			Unit Costs		
Month	Consumption (kWh)	Demand (kW)	Total ($)	Delivery ($)	Supply ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
January-11	76,800	240.00	$11,249.57	$3,117.72	$8,131.85	$ 0.146	$ 0.136	$ 3.42
February-11	79,500	243.00	$11,591.09	$3,173.63	$8,417.46	$ 0.146	$ 0.135	$ 3.42
March-11	74,100	348.00	$11,245.46	$3,399.75	$7,845.71	$ 0.046	$ 0.030	$ 3.42
April-11	66,300	246.00	$10,003.99	$2,984.15	$7,019.84	$ 0.151	$ 0.138	$ 3.42
May-11	66,900	249.00	$9,280.23	$3,023.07	$6,257.16	$ 0.139	$ 0.126	$ 3.42
June-11	73,800	333.00	$13,110.69	$6,208.18	$6,902.51	$ 0.178	$ 0.125	$ 11.57
July-11	58,800	249.00	$10,347.07	$4,847.51	$5,499.56	$ 0.176	$ 0.127	$ 11.60
August-11	45,000	186.00	$7,999.14	$3,790.29	$4,208.85	$ 0.178	$ 0.129	$ 11.78
September-11	61,200	267.00	$10,905.77	$5,181.73	$5,724.04	$ 0.178	$ 0.127	$ 11.78
October-11	59,400	267.00	$8,474.14	$2,918.46	$5,555.68	$ 0.143	$ 0.127	$ 3.49
November-11	68,400	234.00	$9,472.53	$3,075.08	$6,397.45	$ 0.138	$ 0.127	$ 3.49
December-11	83,400	249.00	$11,347.77	$3,547.37	$7,800.40	$ 0.136	$ 0.126	$ 3.49
January-12	79,800	249.00	$10,951.21	$3,487.52	$7,463.69	$ 0.137	$ 0.126	$ 3.49
February-12	81,600	243.00	$11,394.81	$3,522.86	$7,871.95	$ 0.140	$ 0.129	$ 3.49
March-12	77,400	246.00	$10,882.18	$3,415.40	$7,466.78	$ 0.141	$ 0.130	$ 3.49
April-12	68,100	282.00	$9,849.42	$3,279.81	$6,569.61	$ 0.145	$ 0.130	$ 3.49
Total (12-months)	**823,800**	**333.00**	**$124,014.96**	**$46,297.28**	**$77,717.68**	**$ 0.151**	**$ 0.127**	**$ 6.25**

Electric Usage - Oradell Elementary School



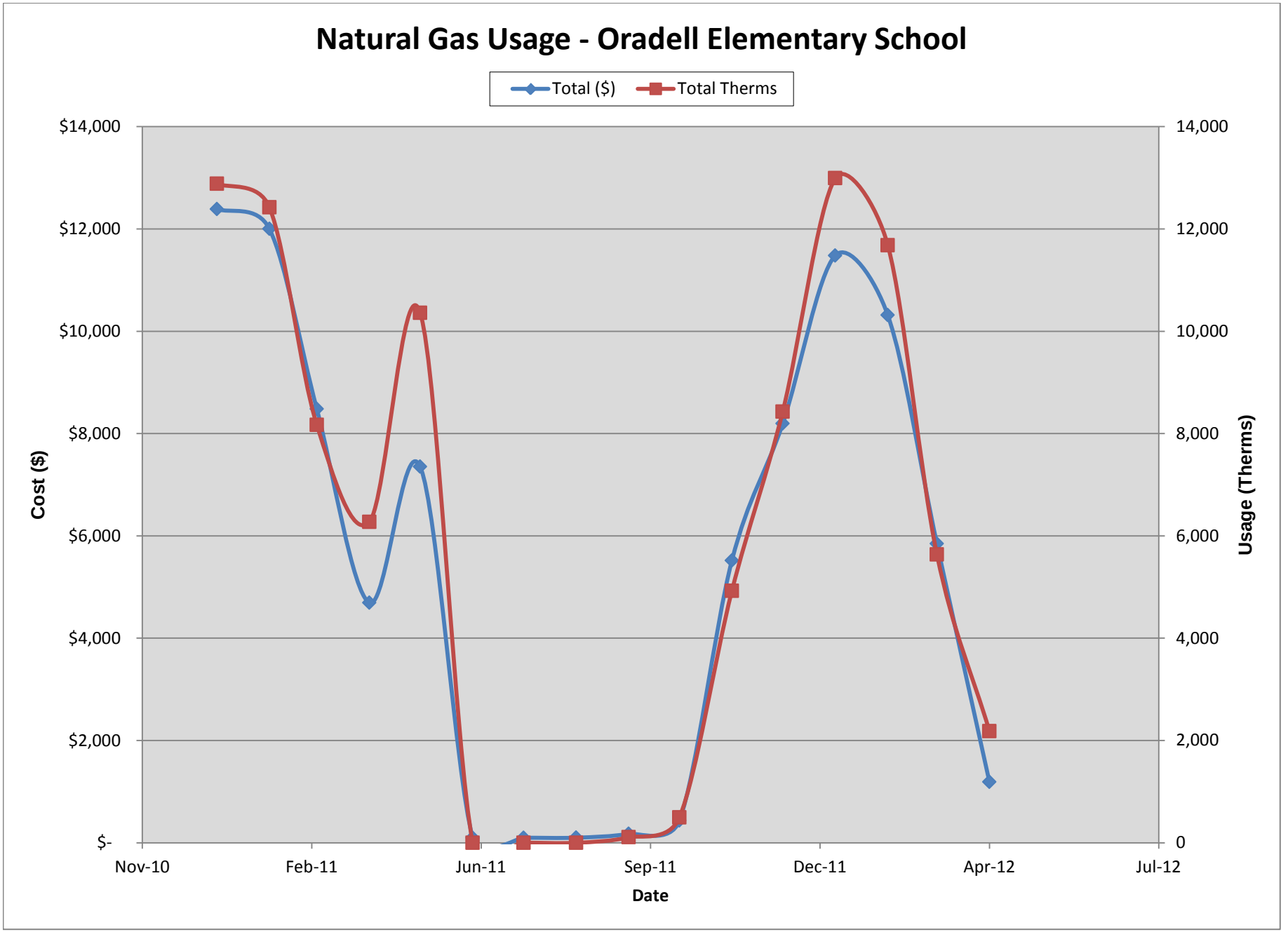
Utility Data - Oradell
Electric Graph

Oradell Elementary School
350 Prospect Avenue, Oradell, NJ 07649

Gas Service
Delivery - PSE&G
Supplier - Hess

For Service at: Elementary School
Account No.: 4201154009
Meter No.: n/a

Month	Total ($)	Delivery ($)	Supply ($)	Total Therms	$/Therm
Jan-11	$ 12,390	$ 4,312	$ 8,078	12884	$ 0.96
Feb-11	$ 12,001	$ 4,219	$ 7,782	12423	$ 0.97
Mar-11	$ 8,481	$ 3,364	$ 5,117	8169	$ 1.04
Apr-11	$ 4,693	$ 764	$ 3,929	6272	$ 0.75
May-11	$ 7,353	$ 1,163	$ 6,190	10360	$ 0.71
Jun-11	$ 99	$ 98	$ 1	3	$ 39.38
Jul-11	$ 99	$ 98	$ 1	2	$ 48.24
Aug-11	$ 100	$ 100	$ -	0	$ -
Sep-11	$ 175	$ 115	$ 59	108	$ 1.61
Oct-11	$ 434	$ 172	$ 262	495	$ 0.88
Nov-11	$ 5,519	$ 2,740	$ 2,779	4927	$ 1.12
Dec-11	$ 8,194	$ 3,407	$ 4,787	8430	$ 0.97
Jan-12	$ 11,481	$ 4,257	$ 7,224	12993	$ 0.88
Feb-12	$ 10,314	$ 4,006	$ 6,308	11683	$ 0.88
Mar-12	$ 5,848	$ 2,872	$ 2,976	5636	$ 1.04
Apr-12	$ 1,190	$ 355	$ 835	2182	$ 0.55
Total (12-months)	**$ 50,805**	**$ 19,382**	**$ 31,423**	**56,819**	**$ 0.89**


Natural Gas Usage - Oradell Elementary School
Total ($)
Total Therms
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$-
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Cost ($)
Usage (Therms)
Nov-10
Feb-11
Jun-11
Sep-11
Dec-11
Apr-12
Jul-12
Date

Supplier Charges:
Electricity

Month	Consumption (kWh)	(Current Supplier) South Jersey Energy ($)	(Alternative Supplier) PSE&G ($)	Difference ($)
January-11	76,800	$ 8,131.85	$ 8,718.68	$ 586.83
February-11	79,500	$ 8,417.46	$ 9,595.59	$ 1,178.13
March-11	74,100	$ 7,845.71	$ 9,185.98	$ 1,340.27
April-11	66,300	$ 7,019.84	$ 8,023.02	$ 1,003.18
May-11	66,900	$ 6,257.16	$ 7,997.13	$ 1,739.97
June-11	73,800	$ 6,902.51	$ 8,897.56	$ 1,995.05
July-11	58,800	n/a	n/a	n/a
August-11	45,000	$ 4,208.85	$ 6,554.16	$ 2,345.31
September-11	61,200	$ 5,724.04	$ 7,999.16	$ 2,275.12
October-11	59,400	$ 5,555.68	$ 7,227.43	$ 1,671.75
November-11	68,400	$ 6,397.45	$ 7,783.03	$ 1,385.58
December-11	83,400	$ 7,800.40	$ 8,940.12	$ 1,139.72
January-12	79,800	$ 7,463.69	$ 9,081.93	$ 1,618.24
February-12	81,600	$ 7,871.95	$ 9,558.32	$ 1,686.37
March-12	77,400	$ 7,466.78	$ 8,800.64	$ 1,333.86
April-12	68,100	$ 6,569.61	$ 7,977.49	$ 1,407.88
Total (All)		**$ 103,632.98**	**$ 126,340.24**	**$ 22,707.26**

APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #24384
Oradell Board of Education
Oradell Public School Building
Original Construction Date: 1929
Classroom Addtion Date: 1930, 1950
Gym & Kindergarten Wind Addition: 2007

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
Heating Hot Water Boilers	5	Aerco	Boilers 1-5: Benchmark II	Boiler 1: G-09-1549	Heating / Natural Gas	2,000,000 Btuh Input Each, 10,000,000 Btuh Input Total, / 92% + Eff.	Boiler Room	Original Building, Does not serve 2007 additions	2007	30	Good Condition
Heating Hot Water Pumps	3	Taco	P-1, P-2 & P-3 Model# F12508E2EAJ1LOA	NOT AVAILABLE	Primary Loop Pumps / Electric	10 HP / 1,765 RPM / Standard Eff., 89.5%	Boiler Room	Constant Volume HHW loop	2008	16	Good Condition
Domestic Hot Water Heater	1	A.O. SMITH Masterfit	BTR 197 110	MF040017407	Domestic Hot Water Heating / Natural Gas	100 Gallon / 199,000 Btuh / 80% Eff.	Boiler Room	Entire Building Domestic HW	2004	4	Good Condition
AC-1	1	AAON	RM-025-3-0-BA02-244	200607-AMGR26606	HVAC / DX Electric Cooling	10,000 CFM / CLG: 24.9 Tons HTG: 270 MBH/ 7.5 HP SF / EER 10.4	Rooftop Above Area Served	Special Ed Rm 232 & Art Rm 231	2007	10	Good Condition
AC-2	1	AAON	RM-015-3-0-BA02-234	200609-AMGL26585	HVAC / DX Electric Cooling	6,000 CFM / CLG: 14.4 Tons HTG: 180 MBH/ 5 HP SF / EER 10.6	Rooftop Above Area Served	IMC (Library)	2007	10	Good Condition
AC-3	1	AAON	RM-020-3-0-BA02-244	200607-AMGP26607	HVAC / DX Electric Cooling	8000 CFM / CLG: 19.8 Tons HTG: 270 MBH / 5 HP SF / EER 11.5	Rooftop Above Area Served	Kindergarten Wing	2007	10	Good Condition
AC-4	1	AAON	RM-006-3-0-BA01-234	200607-AMGF26596	HVAC / DX Electric Cooling	2,400 CFM / CLG: 6.7 Tons HTG: 180 MBH / 2 HP SF / EER 10.4	Rooftop Above Area Served	Band/Music Room	2007	10	Good Condition
HV-1	1	AAON	RM-010-3-0-0000-234	200606-AMGJ26586	HVAC /Ventilation, Natural Gas Heating	4,000 CFM / HTG: 180 MBH / 3 HP SF	Rooftop Above Area Served	Multi-Purpose Room	2007	10	Good Condition
HV-2	1	AAON	RM-015-3-0-0000-234	200606-AMGL26587	HVAC /Ventilation, Natural Gas Heating	6,000 CFM / HTG: 180 MBH / 5 HP SF	Rooftop Above Area Served	New Gym	2007	10	Good Condition
HV-3	1	AAON	RM-015-3-0-0000-234	200606-AMGL26588	HVAC /Ventilation, Natural Gas Heating	6,000 CFM / HTG: 180 MBH / 5 HP SF	Rooftop Above Area Served	New Gym	2007	10	Good Condition
AHU-1	1	McQuay	LDH128DH	3VH00356-04	HVAC / Ventilation, Natural Gas Heating	6000 CFM / HTG: 200 MBH / 5.0 HP SF	Auditorium Ceiling	Auditorium	1990	-7	Good Condition
UV	30	American Air Filter/Trane	AFBD	Multiple	HVAC / Ventilation, Hot Water Heating	Fractional HP fan motors, max size 1/8 HP	Horizontal unit ventilator floor mounted cabinet	Classrooms With Exterior Walls	1990	-2	GoodCondition
Airdale Units	9	Airdale	CHX4/2-460/410	Multiple	DX Electric Cooling/Ventilation		Vertical floor mounted ptac unit	Classrooms With Exterior Walls	1990	-7	Good Condition
Window Units	34	Frigidaire	FAS156N1A2	Multiple	HVAC / Electric DX Cooling Window Unit	15,100 BTU EA / Fractional HP fan motors / 10.8 EER	Exterior Wall Windows	Various	-	-	GoodCondition

APPENDIX C

ECM Calculations

Oradell Public School - NJBPU
CHA Project #24384
Oradell Public School

ECM Summary Sheet

ECM-1 Install Attic Insulation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
46,000	2,000	0	4,000	3,800	0	3,800	1.0	0	12.1	12.1

ECM-2 Replace HHW Pump Motors & Install VSD

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
18,000	40,800	0	0	6,200	0	6,200	5.9	2,600	2.9	2.5

ECM-3 Install Network Controller for Computers

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
3,000	10,500	0	0	1,600	0	1,600	7.5	0	1.9	1.9

ECM-4 Install DX Split Systems to Replace Window A/C

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
197,000	6,100	0	0	900	0	900	(0.9)	3,500	>20	>20

ECM-5 Demand Controlled Ventilation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
10,000	18,400	0	2,700	5,200	0	5,200	8.3	0	1.9	1.9

ECM-6 Air Sealing

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
619,000	34,100	0	31,800	33,400	0	33,400	(0.5)	0	18.5	18.5

ECM-7 Lighting Replacements

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
107,000	67,000	37	0	12,900	0	12,900	0.4	11,660	8.3	7.4

ECM-8 Install Occupancy Sensors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
40,000	63,100	0	0	9,500	0	9,500	2.3	6,930	4.2	3.5

ECM-9 Lighting Replacements with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
$	kWh	kW	Therms	$	$	$		$	Years	Years
147,000	116,100	37	0	20,300	0	20,300	0.4	18,590	7.2	6.3

Oradell Public School - NJBPU
CHA Project #24384

Utility Costs		Yearly Usage	MTCDE
$ 0.151	$/kWh blended	823800	0.00042021
$ 0.127	$/kWh supply	823,800	0.00042021
$ 6.25	$/kW	333.00	0
$ 0.89	$/Therm	56,819	0.00533471
$ 9.48	$/kgals	569	0

Oradell Public School

	Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy
		kW	kWh	therms	cooling kWh	kgal/yr	$				
ECM-1	Install Attic Insulation	0.0	2,021	3,981	0	0	$ 3,800	$ 45,927	12.1	22.1	24
ECM-2	Replace HHW Pump Motors & Install VSD	0.0	40,809	0	0	0	$ 6,200	$ 17,824	2.9	17.1	20
ECM-3	Install Network Controller for Computers	0.0	10,500	0	0	0	$ 1,600	$ 3,000	1.9	4.4	16
ECM-4	Install DX Split Systems to Replace Window A/C	0.0	6,133	0	0	0	$ 900	$ 196,600	218.4	2.6	15
ECM-5	Demand Controlled Ventilation	0.0	18,365	2,672	0	0	$ 5,200	$ 10,000	1.9	22.0	18
ECM-6	Air Sealing	0.0	34,103	31,768	0	0	$ 33,400	$ 618,900	18.5	183.8	10
ECM-7	Lighting Replacements	36.6	67,000	0	0	0	$ 12,900	$ 107,222	8.3	28.2	13
ECM-8	Install Occupancy Sensors	0.0	63,082	0	0	0	$ 9,500	$ 40,100	4.2	26.5	14
ECM-9	Lighting Replacements with Occupancy Sensors	36.6	116,092	0	0	0	$ 20,300	$ 147,317	7.3	48.8	12

Oradell Public School - NJBPU
CHA Project #24384
Oradell Public School

This ECM includes installation of Fiberglass attic blanket insulation

ECM-1: Install Attic Insulation

Existing Roof Area	33,450	sf
Existing U-value	0.10	Btu/hr/(sf*F)
Existing R-value	10.0	
Proposed R-value	38	
Proposed U-value	0.03	Btu/hr/(sf*F)
Heating System Efficiency	88%	
Cooling System Efficiency	1.20	kW/ton
Heating "On" Temp	60	F

Existing Cooling			Existing Heating		
Existing Cooling Load Temp Diff.	73	F	Existing Heating Load Temp Diff.	74	F
Existing Max. Roof Cooling Load	244,185	Btu/hr	Existing Max. Roof Heating Load	247,530	Btu/hr
Proposed Cooling			Proposed Heating		
Proposed Cooling Load	64,259	Btu/hr	Proposed Heating Load	65,139	Btu/hr
Occupied Cooling Setpoint	72	F	Occupied Heating Setpoint	72	F
Unoccupied Cooling Setpoint	78	F	Unoccupied Heating Setpoint	65	F

Existing Heating Total	475,437,394	Btu/yr
Proposed Heating Total	125,115,104	Btu/yr
Savings	350,322,290	Btu/yr
Input	**3,981**	**therms**
Existing Cooling Total	2,742	kWh/yr
Proposed Cooling Total	722	kWh/yr
Savings	2,021	kWh/yr

				Occupied				Unoccupied							
Avg Outdoor Air Temp. Bins °F	**Existing Equipment Bin Hours**	**Occupied Equipment Bin Hours**	**Unoccupied Equipment Bin Hours**	**Existing Heat Gain**	**Proposed Heat Gain**	**Existing Heat Loss**	**Proposed Heat Loss**	**Existing Heat Gain**	**Proposed Heat Gain**	**Existing Heat Loss**	**Proposed Heat Loss**	**Existing Cooling Load**	**Existing Heating Load**	**Proposed Cooling Load**	**Proposed Heating Load**
				(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(kWh/yr)	(Btu/yr)	(kWh/yr)	(Btu/yr)
97.5	3	2	1	85,298	22,447	-	-	65,228	17,165	-	-	23	-	6	-
92.5	34	18	16	68,573	18,045	-	-	48,503	12,764	-	-	201	-	53	-
87.5	131	70	61	51,848	13,644	-	-	31,778	8,363	-	-	557	-	147	-
82.5	500	268	232	35,123	9,243	-	-	15,053	3,961	-	-	1,290	-	340	-
77.5	620	332	288	18,398	4,841	-	-	-	-	-	-	611	-	161	-
72.5	664	356	308	1,673	440	-	-	-	-	-	-	59	-	16	-
67.5	854	458	397	-	-	-	-	-	-	-	-	-	-	-	-
62.5	927	497	430	-	-	-	-	-	-	-	-	-	-	-	-
57.5	600	321	279	-	-	48,503	12,764	-	-	25,088	6,602	-	22,578,750	-	5,941,776
52.5	610	327	283	-	-	65,228	17,165	-	-	41,813	11,003	-	33,157,313	-	8,725,609
47.5	611	327	284	-	-	81,953	21,566	-	-	58,538	15,405	-	43,430,644	-	11,429,117
42.5	656	351	305	-	-	98,678	25,968	-	-	75,263	19,806	-	57,600,900	-	15,158,132
37.5	1,023	548	475	-	-	115,403	30,369	-	-	91,988	24,207	-	106,935,469	-	28,140,913
32.5	734	393	341	-	-	132,128	34,770	-	-	108,713	28,609	-	89,002,088	-	23,421,602
27.5	334	179	155	-	-	148,853	39,172	-	-	125,438	33,010	-	46,085,738	-	12,127,826
22.5	252	135	117	-	-	165,578	43,573	-	-	142,163	37,411	-	38,985,975	-	10,259,467
17.5	125	67	58	-	-	182,303	47,974	-	-	158,888	41,813	-	21,428,906	-	5,639,186
12.5	47	25	22	-	-	199,028	52,376	-	-	175,613	46,214	-	8,843,344	-	2,327,196
7.5	22	12	10	-	-	215,753	56,777	-	-	192,338	50,615	-	4,507,388	-	1,186,155
2.5	13	7	6	-	-	232,478	61,178	-	-	209,063	55,016	-	2,880,881	-	758,127
TOTALS	**8,760**	**4,693**	**4,067**									**2,742**	**475,437,394**	**722**	**125,115,104**

Site Name - NYSERDA Flextech
CHA Project #
Building Name

ECM-1: Install Attic Insulation - Cost

Multipliers	
Material:	1.10
Labor:	1.20
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
16" thick blown fiberglass insulation	33,450	sf	$ 0.13	$ 0.75	$ 0.30	$ 4,783	$ 30,105	$ 11,039	$ 45,927	
(R-38)						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

ALL ESTIMATES ARE +/- 80% ACCURATE -DO NOT USE FOR PROCUREMENT

$ 45,927	Subtotal
$ -	Contingency
$ -	Contractor O&P
$ -	Engineering
$ 45,927	**Total**

ECM-M5: Install Variable Speed Drives - HW Pump

Variable Inputs

Blended Electric Rate	$0.15
Heating System "On" Point	60
VFD Efficiency	98.5%

ECM Description Summary

This ECM includes adding high efficency motors and variable speed drives to the two heating hot water pumps

PUMP SCHEDULE

Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
HWP-1, HWP-2	2	10.0	20.0	89.5%	92.1%	13.34	12.96
					Total:	13.34	12.96

SAVINGS ANALYSIS

OAT - DB Avg Temp F (A) See Note 3	OAT - WB Avg Temp F (B) See Note 3	Annual Hours in Bin (C) See Note 3	Heating Hours Bin (D) =IF(A>TP,0,C)	Pump Load % (E) =0.5+0.5*(50-A)/(50-10)) See Note 4	Existing Pump kWh (F) =D*AA	Proposed Pump kW (G) =BB*E^2.5/CC See Note 5	Speed efficiency % (H)	Proposed Pump kWh (I) =D*G	Proposed Savings kWh (J) =F-H
97.5	75	3	0	0%	0	0.0	0.0%	0	0
92.5	74	34	0	0%	0	0.0	0.0%	0	0
87.5	72	131	0	0%	0	0.0	0.0%	0	0
82.5	69	500	0	0%	0	0.0	0.0%	0	0
77.5	67	620	0	0%	0	0.0	0.0%	0	0
72.5	64	664	0	0%	0	0.0	0.0%	0	0
67.5	62	854	0	0%	0	0.0	0.0%	0	0
62.5	58	927	0	0%	0	0.0	0.0%	0	0
57.5	53	600	600	43%	8,002	1.5	73.4%	1,267	6,735
52.5	47	610	610	53%	8,135	2.7	84.1%	1,930	6,205
47.5	43	611	611	58%	8,148	3.4	88.8%	2,352	5,796
42.5	38	656	656	64%	8,749	4.3	92.7%	3,037	5,712
37.5	34	1,023	1,023	69%	13,643	5.3	95.9%	5,643	8,000
32.5	30	734	734	75%	9,789	6.4	98.2%	4,791	4,998
27.5	25	334	334	81%	4,454	7.7	99.8%	2,566	1,889
22.5	20	252	252	86%	3,361	9.1	100.0%	2,281	1,079
17.5	16	125	125	92%	1,667	10.6	100.0%	1,323	344
12.5	11	47	47	97%	627	12.3	99.7%	578	49
7.5	6	22	22	100%	293	13.2	99.0%	292	1
2.5	2	13	13	100%	173	13.2	99.0%	173	1
		8,760	5,027		67,042			26,233	40,809

Notes:

1) Existing motor power was determined using…
2) New motor power is the same as existing motor power adjusted for the new efficiency, if a new motor is proposed.
3) Weather data from NOAA for …
4) The pump load is estimated at 100% at X deg. OAT and 50% at X deg. OAT and varies linearly in between.
5) The required VFD motor draw is based on a 2.5 power relationship to load.

HW PUMP VFD - SAVINGS SUMMARY

	Electric Demand (kW)	Electric Usage (kWh)	Nat Gas Usage (Therms)	Maint. ($)	Total Cost ($)
Savings	0	40,809	0	$0	$6,162

ECM-M5: Install Variable Speed Drives - HW Pump - Cost

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
10 HP VFD	2	ea	$ 2,021	$ 509		$ 4,447	$ 1,375	$ -	$ 5,822	
10 HP Motor	2	ea	$ 646	$ 88		$ 1,421	$ 238	$ -	$ 1,659	
Reprogram DDC system	2	ls	$ 1,000	$ 350		$ 2,200	$ 945	$ -	$ 3,145	
Electrical - misc.	2	ea	$ 200	$ 150		$ 440	$ 405	$ -	$ 845	
Pipe pressure sensor/transmitter	1	ea	$ 850	$ 500		$ 935	$ 675	$ -	$ 1,610	
Misc. piping modification	1	ea	$ 200	$ 150		$ 220	$ 203	$ -	$ 423	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

ALL ESTIMATES ARE +/- 80% ACCURATE -DO NOT USE FOR PROCUREMENT

$ 13,503	Subtotal
$ 1,350	10% Contingency
$ 2,971	20% Contractor O&P
$ -	
$ 17,824	**Total**

Oradell Public School - NJBPU
CHA Project #24384
Oradell Public School

ECM-3: Network Controller Savings Calculations

Notes:

1. Savings are for the installation of a centralized computer management system installed on the client server that will centralize the power management functions that are native to the Windows environment.
2. Energy savings per computer are based on historical information from previous installations encompassing tens of thousands of computers.
3. There are approximately 150 computers in all

Background Data Average Consumption and Savings Figures	kWh
Average Total Consumption per PC per Year	500-700
Average Energy and Cost Waste per PC per Year	350-450
Average savings per PC	70
Average savings per IMac	50

Number of PCs	150
Number of IMac's	0

Return on Investment Analysis	kWh
Annual Energy Savings	10,500

HEATING PENALTY		Comments
Total kWh	10,500	This is the total kWh reduction.
Htg. Season	60%	The percentage of the kWh reduction that oc
Conducted/Convected Heat	30%	Use Standard Fluorescent fixture
Regained	80%	Percentage regained. If in return air plenum
Net kWh	378	Resultant kWh from percentage reductions.
Net btu	1,290,114.00	Conversion of kWh to btu's.
Therms	13	Conversion of btu's to Therms
Htg. Eff.	88%	Heating system efficiency.
Net Penalty	14.7	Therms
$/Therm	$ 0.89	Cost per Therm
Penalty	$ 13	Final heating reduction penalty.

ALL ESTIMATES ARE +/- 80% ACCURATE -DO NOT USE FOR PROCUREMENT

:curs when heat is required.

application the percentage would be close to 100%.

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Name	QTY	AREA/EQUIPMENT SERVED	COOLING CAPACITY (BTU-EA)	Total CAPACITY (Tons)
Window AC	30	Classrooms/Offices	15,100	38
		Total Electric DX Cooling:	*Tons*	*38*

ECM-4: Install DX Split Systems to Replace Window A/C

ECM Description Summary

By replacing older window AC equipment with higher SEER/EER DX condensing units, significant electrical energy can be saved. Control schemes can be incorporated that were not possible with the older equiopment as well, but the equipment can also operate in same manner as existing (i.e., stand alone, or monitored/sequenced by a BAS). It is recommended these units be replaced by more modern DX split system equipment with high efficiecny fans and compressors.

ASSUMPTIONS			Comments		
Electric Cost	$0.147	/ kWh			
Average run hours per Week	60	Hours			
Space Balance Point	55	F			
Space Temperature Setpoint	70	deg F	Setpoint.		
BTU/Hr Rating of existing DX equipment	453,000	Btu / Hr	Total BTU/hr of DX cooling equipment to be replaced.	37.75	tons
Average EER	9.5		Units average 8 years old, EERs were 10 when new		
Existing Annual Electric Usage	18,024	kWh			

Item	Value	Units	Comments
Proposed EER	14.4		New ductless mini-splits (per manufacturer)
Proposed Annual Electric Usage	11,891	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	6,133	kWh
Annual Cost Savings	$902	
Total Project Cost	$196,600	
Simple Payback	218	years

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
97.5	3	1	100%	1
92.5	34	12	88%	11
87.5	131	47	76%	36
82.5	500	179	65%	116
77.5	620	221	53%	117
72.5	664	237	41%	98
67.5	854	0	0%	0
62.5	927	0	0%	0
57.5	600	0	0%	0
52.5	610	0	0%	0
47.5	611	0	0%	0
42.5	656	0	0%	0
37.5	1,023	0	0%	0
32.5	734	0	0%	0
27.5	334	0	0%	0
22.5	252	0	0%	0
17.5	125	0	0%	0
12.5	47	0	0%	0
7.5	22	0	0%	0
2.5	13	0	0%	0
Total	8,760	697	54%	378

Oradell Public School - NJBPU
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Oradell Public School

ECM-4: Install DX Split Systems to Replace Window A/C

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Existing (30) Window A/C Demolition	30	EA	$ 50	$ 100		$ 1,650	$ 4,050	$ -	$ 5,700	
(30) AC, 1.5 ton air conditioner condensing unit	30	EA	$ 2,500	$ 2,500		$ 82,500	$ 101,250	$ -	$ 183,750	
Electrical - misc.	1	LS	$ 1,000	$ 4,500		$ 1,100	$ 6,075	$ -	$ 7,175	
						$ -	$ -	$ -	$ -	

ALL ESTIMATES ARE +/- 80% ACCURATE -DO NOT USE FOR PROCUREMENT

$ 196,625	Subtotal
$ -	0% Contingency
$ -	0% Contractor O&P
$ -	0% Engineering
$ 196,600	**Total**

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AIR HANDLER	AREA SERVED	FAN MOTOR HP	CFM	OA CFM
AC-2	Library	5.0	6,000	900
HV-1	Multipurpose Room	3.0	4,000	600
HV-2	GYM	5.0	6,000	900
HV-3	GYM	5.0	6,000	900
AHU-1	Auditorium	10.0	6,000	900
		28.0	*HP*	*4,200* *CFM*

ECM 5: Demand Controlled Ventilation

ECM Description Summary

It is assumed the original system controls provide the full design ventilation outside air flow. Reducing outside air during occupied time periods will reduce heating and cooling energy used during the occupied period. A limit of 1000 PPM of CO2 is recommended in ASHRAE Standard 62-1982, Ventilation for Acceptable Indoor Air Quality. During unoccupied periods the outside air dampers should be closed.

Electric Cost	$ 0.15	/kWh
Natural Gas Cost	$ 0.89	/therm
Facility Ventilation Heating Load	198,450	BTU/Hour[1,3,5]
Facility Ventilation Cooling Load	24,300	BTU/Hour[2,4,5]
Existing Ventilation Heating Usage	5,344	therms[7]
Existing Ventilation Cooling Usage	14,238	kWh[8]
Proposed Ventilation Heating Usage	2,672	therms[9]
Proposed Ventilation Cooling Usage	7,119	kWh[9]
Proposed Ventilation Fan Savings	11,246	kWh[6,10]
Total heating savings	2,672	**therms**
Total cooling savings	18,365	**kWh**
Total cost savings	$5,151	
Estimated Total Project Cost	$10,000	[11]
Simple Payback	2	**years**

Assumptions

1	4,200	OA AHU heating airflow based on assumed 15% of total
2	1,800	OA AHU cooling airflow based assumed 15% of total
3	35	°F, Assumed average heating Δt (mixed air and supply)
4	10	°F, Assumed average cooling Δt (mixed air and supply)
5	80%	Typical AHU efficiency assumed based on historical project experience
6	20.9	kW of existing supply fan motor calculated based on electrical data from nameplate
7	2,693	AHU run hours per heating season based on bin data
8	2,000	AHU run hours per cooling season based on bin data
9	50%	Estimated savings for DCV based on historical project experience
10	539	Assumed supply fan run time reduction based on 20% fan is "off" due to DCV
11	$ 2,000	estimated measure cost for installation of sensors and associated controls per AHU

Oradell Public School - NJBPU
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ECM-6: Air Sealing

Notes:

1. Infiltration CFM based on openings in chimneys (3'x3' each, (3) total), and 5 ceiling tiles in the auditorium as well as missing air barrier
2. All identified infilatration points will be sealed as part of this measure.
3. Calculations utilize Oradell, NJ weather data.

381.1	...EXISTING CRACK AREA IN SQ.FT. (AREA)	
35%	...% INFILTRATION VS. EXFILTRATION (%INF)	
5	...LOCAL SHIELDING CLASS (LSC)	
2	...# OF STORIES TO BUILDING (FLOORS)	
144.0000	...EFFECTIVE LEAKAGE AREA - IN^2/FT^2 (EFL)	
0.0299	...STACK COEFFICIENT, A (A)	
0.0016	...STACK COEFFICIENT, B (B)	
10.2	...AVERAGE WIND VELOCITY (VEL)	
72	...SPACE HEATING SETPOINT (HTSP)	
65	...UNOCCUPIED SPACE HEATING SETPOINT (HTSPUNOC)	
40.5	...AVERAGE O.A. TEMP. DURING HEATING SEASON (OAHT)	
5,027	...HRS/YR OF HEATING SEASON FROM WEATHER DATA (HHPY)	
72	...SPACE COOLING SETPOINT (CLSP)	
71.8	...AVERAGE O.A. TEMP. DURING COOLING SEASON (OACT)	
3,733	...HRS/YR OF COOLING SEASON FROM WEATHER DATA (CHPY)	
60	...HRS/WK OF ACTUAL BUILDING OCCUPANCY (HRSOCC)	

(Heat Leak Occ)	AREA * %INF * EFL *((A * (HTSP - OAHT)) + (B * VEL^2))^.5 ==========	20,225.5	HLOCC	(CFM)
(Heat Leak Unocc)	AREA * %INF * EFL *((A * (HTSPUNOC - OAHT)) + (B * VEL^2))^.5 ======	18,217.3	HLUNOCC	(CFM)
(Cool Leak Occ)	AREA * EFL *((A * (CLSP - OACT)) + (B * VEL^2))^.5 ================	22,843.3	CLOCC	(CFM)

Therms	...TYPE OF FUEL (GAS CCF, OIL GAL, COAL TONS)			
$0.890	...FUELCOST			
100,000	...BTUs / UNIT (BTUs/UNIT)			
12%	...LOSSES OF HEATING SYSTEM (EOSH)			
(Occupied Heating)	1.08 * HLOCC * (HTSP - OAHT) * HRSOCC * HHPY / 70 / (BTUs/UNIT) / (1-EOSH) ==========	14,049	Therms	
	FUELCOST * FUEL SAVED ==========	$12,503.3	SAVINGS	
(Unoccupied Heating)	1.08 * HLUNOCC * (HTSPUNOC - OAHT) * (HHPY - (HRSOCC * HHPY /168)) / (BTUs/UNIT) / (1-EOSH) ==========	17,719	Therms	
	FUELCOST * FUEL SAVED ==========	$15,770.0	SAVINGS	
32.573	....COOLING MMBTU REQUIRED TO COOL 1000 CFM/YR (CBTU)			
12,000	....AVG BTU/TON EFF. OF CHILLER (BTU/TON)			
0.83	....AVG. KW/TON OF SUPPORT EQUIPMENT (KWSUPT)			
$ 0.1510	...ELECTRICITY UNIT ($) COST/KWHR (ELECCOST)			
55%	...COOLING FACTOR - % OF FACILITY THAT IS COOLED (CF)			
(Cooling Savings)	CLOCC * CBTU / 1000 * HRSOCC / 50 * 1,000,000 * CF / 12000 ========	40,924	TON-HRS	
	TON-HRS * KWSUPT ==========	34,103	kWh	
	ELECCOST * KWH SAVED ==========	$5,149.6	SAVINGS	

STACK COEFFICIENT

# of Sto	Coeff A
1	0.015
2	0.0299
3	0.0449
4	0.0628
5	0.0786
6	0.0943
7	0.1101
8	0.1258
9	0.1416
10	0.1573

WIND COEFFICIENT

	Shielding Class				
# of Stories	1	2	3	4	5
1	0.0119	0.0092	0.0065	0.0039	0.0012
2	0.0157	0.0121	0.0086	0.0051	0.0016
3	0.0184	0.0143	0.0101	0.006	0.0018
4	0.0218	0.017	0.012	0.0071	0.0021
5	0.0251	0.0195	0.0138	0.0082	0.0024
6	0.0283	0.0221	0.0156	0.0092	0.0027
7	0.0316	0.0246	0.0174	0.0103	0.003
8	0.0348	0.0272	0.0192	0.0113	0.0033
9	0.0381	0.0297	0.021	0.0124	0.0036
10	0.0413	0.0323	0.0228	0.0134	0.0039

LOCAL SHIELDING CLASSES

CLASS	DESCRIPTION
1	No obstructions or local shielding
2	Light Local shielding; few obstructions, few trees, or small shed
3	Moderate local shielding, some obstructions within two house heights, thick hedge, solid fence, or one neighboring house
4	Heavy shielding; obstuctions around most of perimeter, buildings or trees within 30 ft i most directions; typical suburban shielding.
5	Very heavy shielding; large obstructins surrounding perimeter within two building height typical downtown shielding

SCOPE OF WORK IS BASED UPON THE FOLLOWING FIELD-MEASURED CRACK AREAS:

Chimney and chase openings (3) total average 3'x3' each	=	27 FT.
Missing ceiling tiles above auditorium stage 2'x4' x 5 tiles	=	40 FT.
Missing air/vapor barrier - 30,450 SF (see calculations below)	=	314 FT.
TOTAL:	=	**381.06 Sq.FT**

Air/Vapor Barrier Calculation

Total Area	26,760 SF
SF/Ceiling Tile	8 SF
# Ceiling Tiles	3350 #
Perimeter LF/Tile	12 LF
Total Perimeter	40200 LF
Est Crack Size/LF	0.007813 [1/128"/LF]
Total Opening	314.0625 SF

Oradell Public School - NJBPU
CHA Project #24384
Oradell Public School

ECM-6: Air Sealing

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
(5) new ceiling tiles	5	EA	$ 20	$ 5		$ 110	$ 34	$ -	$ 144	
Close (3) existing chimney/chase openings	1	LS	$ 1,200	$ 1,000		$ 1,320	$ 1,350	$ -	$ 2,670	
Install Air/Vapor Barrier	33,450	SF	$ 5	$ 5		$ 183,975	$ 225,788	$ -	$ 409,763	
						$ -	$ -	$ -	$ -	

ALL ESTIMATES ARE +/- 80% ACCURATE -DO NOT USE FOR PROCUREMENT

$ 412,576	Subtotal
$ 61,886	15% Contingency
$ 61,886	15% Contractor O&P
$ 82,515	20% Engineering
$ 618,900	**Total**

APPENDIX D

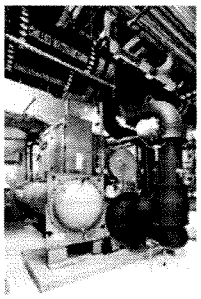
New Jersey Pay For Performance Incentive Program

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings. Pay for Performance relies on a network of program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop an energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation.



Eligibility

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100 kW demand in order to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profits, affordable multifamily housing, and local governmental entities. Your energy reduction plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manufacturing, water treatment and datacenter building types whose annual energy consumption is heavily weighted on process loads. Details are available in the high energy intensity section of the FAQ page.

ENERGY STAR Portfolio Manager

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

This rating system assesses building performance by tracking and scoring energy use in your facilities and comparing it to similar buildings. That can be a big help in locating opportunities for cost-justified energy efficiency upgrades. And, based on our findings, you may be invited to participate in the Building Performance with ENERGY STAR initiative and receive special recognition as an industry leader in energy efficiency.

Incentives

Pay for Performance incentives are awarded upon the satisfactory completion of three program milestones:

Incentive #1 - Submittal of complete energy reduction plan prepared by an approved program partner - Contingent on moving forward, incentives will be between $5,000 and $50,000 based on approximately $.10 per square foot, not to exceed 50% of the facility's annual energy expense.

Incentive #2 - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum performance threshold of 15% savings has been achieved.

CONTACT US

A detailed Incentive Structure document is available on the applications and forms page.

Energy Efficiency Revolving Loan Fund (EE RLF)

New Jersey-based commercial, institutional or industrial entities (including 501(c)(3) organizations) that have received an approved energy reduction plan under Pay for Performance may be eligible for supplemental financing through the EE RLF. The financing, in the form of low-interest loans, can be used to support up to 80% of total eligible project costs, not to exceed $2.5 million or 100% of total eligible project costs from all public state funding sources. Visit the NJ EDA website for details.

Steps to Participation

Click here for a step-by-step description of the program.

New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

New Jersey SmartStart BUILDINGS®

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

Incentive Amount: ..... $0.10 per sq ft
Minimum Incentive: $5,000
Maximum Incentive:: ..... $50,000 or 50% of facility annual energy cost (whichever is less)

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: 15%

Electric Incentives

Base Incentive based on 15% savings: ..... $0.09 per projected kWh saved
For each % over 15% add: ..... $0.005 per projected kWh saved
Maximum Incentive: ..... $0.11 per projected kWh saved

Gas Incentives

Base Incentive based on 15% savings: ..... $0.90 per projected Therm saved
For each % over 15% add: ..... $0.05 per projected Therm saved
Maximum Incentive: ..... $1.25 per projected Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: 15%

Electric Incentives

Base Incentive based on 15% savings: ..... $0.09 per actual kWh saved
For each % over 15% add: ..... $0.005 per actual kWh saved
Maximum Incentive: ..... $0.11 per actual kWh saved

Gas Incentives

Base Incentive based on 15% savings: ..... $0.90 per actual Therm saved
For each % over 15% add: ..... $0.05 per actual Therm saved
Maximum Incentive: ..... $1.25 per actual Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to $1 million per gas and electric account per building; maximum of $2 million per project. See Participation Agreement for details.

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012.
Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.
Values used in this calculation are for measures with a positive return on investment (ROI) only.

Total Building Area (Square Feet)	112,044
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.05	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$124,394	$50,805
Existing Usage (from utility)	823,800	56,819
Proposed Savings	228,023	38,421
Existing Total MMBtus	8,494	
Proposed Savings MMBtus	4,620	
% Energy Reduction	**54.4%**	
Proposed Annual Savings	$71,400	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.25
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.25

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,602
Incentive #2	$25,082	$48,026	$73,108
Incentive #3	$25,082	$48,026	$73,108
Total All Incentives	**$50,165**	**$96,052**	**$151,819**

Total Project Cost	$1,039,568

		Allowable Incentive
% Incentives #1 of Utility Cost*	3.2%	$5,602
% Incentives #2 of Project Cost**	7.0%	$73,108
% Incentives #3 of Project Cost**	7.0%	$73,108
Total Eligible Incentives***	**$151,819**	
Project Cost w/ Incentives	$887,749	

Project Payback (years)	
w/o Incentives	w/ Incentives
14.6	12.4

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.

*** Maximum allowable amount of Incentive #1 is $50,000 if not funded by NJ BPU, and $25,000 if it is.
Maximum allowable amount of Incentive #2 & #3 is $1 million per gas account and $1 million per electric account; maximum 2 million per project

APPENDIX E

ESIP Program Information

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

- PROGRAMS
  - NJ SMARTSTART BUILDINGS
  - PAY FOR PERFORMANCE
  - COMBINED HEAT & POWER AND FUEL CELLS
  - LOCAL GOVERNMENT ENERGY AUDIT
  - LARGE ENERGY USERS PILOT
  - ENERGY SAVINGS IMPROVEMENT PLAN
  - DIRECT INSTALL
  - ENERGY BENCHMARKING
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Plan

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

This Local Finance Notice outlines how local governments can develop and implement an ESIP for their facilities. Below are two sample RFPs:

- Local Government
- School Districts (K-12)

The Board also adopted protocols to measure energy savings.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Local units considering an ESIP should carefully review the Local Finance Notice, the law, and consult with qualified professionals to determine how they should approach the task.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. As explained in the Local Finance Notice, this may be done internally if an agency has qualified staff to conduct the audit. If not, the audit must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach - and it's free. **Incentives provide 100% of the cost of the audit.**

ENERGY REDUCTION PLANS

If you have an ESIP plan you would like to submit to the Board of Public Utilities, please email it to ESIP@bpu.state.nj.us. Please limit the file size to 3MB (or break it into smaller files).

- Frankford Township School District
- Northern Hunterdon-Voorhees Regional High School
- Manalapan Township ***(180 MB** - Right Click, Save As)*

Program Updates

- Board Order - Standby Charges for Distributed Generation Customers
- T-12 Schools Lighting Replacement Initiative - Funding Allocation Reached

Other updates posted.

new jersey department of community affairs
people.places.progress
division of local government services dlgs

LFN 2011-17

June 16, 2011

Local Finance Notice

Update on Implementing Energy Savings Improvement Programs

This Local Finance Notice provides guidance concerning Energy Savings Improvement Program (ESIP) matters that affect local units covered under the Local Public Contracts Law (LPCL, N.J.S.A. 40A:11) and the Public School Contracts Law (PSCL, N.J.S.A. 18A:18A).

The Notice covers a model ESCO (Energy Services Company) Request for Proposal document and provides information on using the "Do-It-Yourself" process for implementing an ESIP. This Notice supplements Local Finance Notice 2009-11 concerning ESIPs.

Model ESCO Request for Proposal Document

General Issues

The Division of Local Government Services and the Board of Public Utilities have completed development of a model ESCO Request for Proposal Document. It is designed to assist all organizations (contracting units) covered by the LPCL and PSCL hire an energy services company (ESCO) to develop and implement an Energy Savings Plan (ESP) as part of an Energy Savings Improvement Program as authorized under N.J.S.A. 40A:11-4.6 and 18A:18A-4.6.

Specifically, the document serves as the starting point for these government agencies to select an ESCO through the competitive contracting procedure (N.J.S.A. 40A:11-4.1 et seq. and 18A:18A-4.1 et seq.).

Notwithstanding the efforts of the State agencies to ensure that the RFP is consistent with all relevant procurement procedures, laws, and regulations, there are several issues contracting unit personnel should keep in mind:

1) Local legal advisors should review the document to ensure it is consistent with any allowable local practices and legal considerations.
2) The individual responsible for managing the project should review the entire RFP in order to be able to answer questions and ensure the document meets local needs.
3) Forms have been carefully designed to meet the need of this specific process. Care should be taken if proposed forms are removed and replaced with ones normally used by the contracting unit.

Contact Information

Director's Office
V. 609.292.6613
F. 609.292.9073

Local Government Research
V. 609.292.6110
F. 609.292.9073

Financial Regulation and Assistance
V. 609.292.4806
F. 609.984.7388

Local Finance Board
V. 609.292.0479
F. 609.633.6243

Local Management Services
V. 609.292.7842
F. 609.633.6243

Authority Regulation
V. 609.984.0132
F. 609.984.7388

Mail and Delivery
101 South Broad St.
PO Box 803
Trenton, New Jersey
08625-0803
Web: www.nj.gov/dca/lgs
E-mail: dlgs@dca.state.nj.us

Distribution

Municipal and Freeholder Clerks
Municipal and County Chief Financial Officers
Local Authority and Fire District Officials
School Business Administrators
Local Procurement Officials

Feedback from users about the model is encouraged and the Division plans to update it as experience warrants. To start this feedback process two immediate options are available to users.

1. An ESIP webpage has been established for ESIP issues (the model document will be posted there as well) and it has the ability for users to email comments directly to the Division.

2. The Division will hold a meeting to accept comments from interested parties on the RFP. The meeting is scheduled for Thursday, July 28, 2011 at 9:30, to take place at DCA offices at 101 South Broad Street in Trenton. **Attendees are asked to register** (via email) if they plan to attend or speak; if too many people sign up, we may move the location and will need to contact attendees. **This is not an educational session** – there will be no staff presentations on the RFP and is expressly to take comments that are not submitted in writing. It is expected that professional organizations will sponsor training sessions this fall.

As changes are made, they will be noted in text or in a tracked document and posted to the website. Users are urged to check the site to be sure they are using the latest version. The GovConnect Local Procurement role will be used to notify procurement officials when a new version has been posted.

Using the Model ESCO RFP

The Model ESCO RFP is broken into several self-explanatory sections:

Part A. Instructions to Proposers
Part B. Terms and Conditions
Part C. Scope of Work
Part D. Proposal Evaluation
Part E. Form of Proposal and Content
Part F. Appendix
Part G. Proposal Forms

It is designed to be used by contracting units under the LPCL and PSCL, but it requires the user to edit the document to reflect the specific type of contracting unit. These edits are substantive and reference-related edits, and are listed below.

The RFP is designed to minimize the amount of drafting of technical issues related to an ESIP effort. Since development of an Energy Savings Plan (ESP) is based on an audit that meets the statutory requirements previously conducted by the contracting unit, it is the responsibility of the contracting unit to provide proposers with a copy of the audit as part of the ESCO RFP package (or linked to an online posting of the audit).

The audit should guide contracting units to make preliminary decisions concerning energy conservation measures to include in their ESIP. To inform proposers of these decisions, Appendix A of the RFP must be completed by the contracting unit to inform proposers of the projects to be undertaken and any special considerations that proposers are to incorporate into their proposal.

The RFP also uses a formal process for potential proposers to submit questions and requests for clarifications. Appendix B is a form for the submission of these requests and is referred to throughout the text.

Contracting units are also reminded the Competitive Contracting process does not allow for negotiating proposals. While legal elements of the contract (project development agreement) may require legal determinations and modifications, the process does not allow for negotiation of price or related substantive elements and any element that would have provided less than a level playing field for proposers.

Contracting units are also cautioned that setting qualification standards that arbitrarily limit competition is inconsistent with public bidding requirements.

Office of State Comptroller Filing: Contracting units are also reminded of their obligations to meet State Comptroller requirements for public contracts. In accordance with N.J.S.A 52:15C-10, contracting units must notify OSC as early as practicable, but no later than 30 days before advertisement, of any negotiation or solicitation of a contract that may exceed $10 million. Contracting units must also provide post-award notification for any contract for an amount exceeding $2 million. Notification must be given within 20 days of the award.

Substantive Edits:

Several sections are highlighted in green. These sections should be carefully edited to meet contracting unit needs. This has important application to evaluation criteria in Section D. Once finalized, the green highlight should be removed.

Section B-16; Insurance should be reviewed by the contracting unit's Risk Management professionals to be sure the standards are appropriate to the contracting unit and the work to be done.

The following Sections also require local decisions and editing:

- A-3: # of copies of proposal and # of CDs to be submitted
- A-4: Web posting address, if desired
- A-5: If extra credit is to be provided on evaluation scoring for attending site walk through
- B-11: Delete LPCL or PSCL section as appropriate
- B-34: Use only if PSCL
- C-1: Explanation of type of audit information
- C-3(k): Include if ESCO is to provide financing option
- Use of Appendix F and Proposal Requirements #8: These forms are related to submission of Political Contribution Disclosure forms. Only PSCL agencies are required to use these forms as pursuant to Public School Fiscal Accountability Procedures (N.J.A.C. 6A23A-6.3). The forms and references to it should be removed for all LPCL users.

Reference Editing:

<Brackets> are used to highlight text that requires user editing. Users need to review each set and edit as necessary to properly reflect the contracting unit's circumstances. For example, brackets are used to reflect statutory references (i.e., LPCL or PSCL listings), the name of owner, or refer to a website. It is urged that preparers use the search function to locate brackets to be sure all references are corrected.

Header: the header section should be edited to reflect the name of the contracting unit

Footer: The footer includes a reference to the version of the RFP document. It is recommended that the reference be removed when the RFP is circulated.

The model includes a draft Cover letter to send to potential proposers. Located immediately following the cover page, it should be removed and used as a separate document, not part of the RFP.

Consider how to refer to the owner's full name or where "owner" is used.

The ESIP Alternative to ESCO: the "Do-it-Yourself" Process

The ESIP law (see Local Finance Notice 2009-11) allows two approaches to taking advantage of the financing options the law provides. It allows development and implementation using an ESCO and permits a "Do-It-Yourself" (DIY) option.

The DIY approach involves the contracting unit properly procuring services from different organizations to perform the various elements of an ESIP (i.e., audit, ESP preparation, developing construction plans and specification, etc.). It is an alternative to the ESCO approach, where a single organization provides a wide range of services.

Under both contracting models, it is important that contractors performing a range of services do not have conflicts (e.g., the firm developing plans and specifications cannot conduct the final system verification, or the firm that conducts the audit cannot serve as an ESCO).

The DIY approach allows the contracting unit to contract for an energy audit from a NJ Division of Property Management and Construction (DPMC) approved energy auditor. At the conclusion of the audit, the contracting unit can choose to specify energy conservation measures (ECM's) in its ESP than can be implemented through a DYI process. The process (ESCO or DIY) also requires that an independent organization verify the ESP.

Once the governing body approves the ESP, the contracting unit can then hire (subject to procurement law) a DPMC approved professional architect or engineering firm to design the improvements and prepare the plans and specifications for implementing the Energy Savings Plan. In these cases, subject to the contracting unit procurement requirements, the firm conducting the audit and preparing the ESP, if DPMC qualified, may also provide the services necessary to develop plans and specifications for the contracting unit to use for bidding purposes, as long as they provide the contracting unit Errors and Omissions insurance coverage.

Under the ESIP DIY approach, there would be no conflict in a properly procured single organization conducting the audit, developing the ESP, then preparing plans and specifications. This does not apply when using the ESCO approach, where the auditor and ESCO must be independent.

Once construction plans and specifications are complete, the contracting unit would then conduct the bidding process as it would any public works construction project: manage the project as it sees fit (the firm that did the plans could also serve as construction manager), and then contract as necessary for commissioning and final third party verification. The two verification steps (the ESP and verifying implementation) must be performed by an organization independent of the ones preparing the ESP, overseeing construction and commissioning.

By following this process, the contracting unit can then apply to the Local Finance Board for the issuance of ESIP-based energy saving obligations or enter into appropriate lease financing.

The ESIP approach to energy improvement provides a range of options for contracting units to accrue energy savings while improving the environment, taking advantage of low-cost financing and state and federal incentives. DLGS and the BPU encourage comments and questions (through the ESIP web page) on this new opportunity so we can improve it as time goes on.

Approved: Thomas H. Neff, Director, Division of Local Government Services

Table of Web Links

Page	Shortcut text	Internet Address
1, 4	Local Finance Notice 2009-11	http://www.nj.gov/dca/lgs/lfns/09lfns/2009-11.doc
2	ESIP webpage	http://www.nj.gov/dca/lgs/lpcl/esip.htm
2	email comments	mailto:lpcl@dca.state.nj.us
2	to register (via email	mailto:lpcl@dca.state.nj.us
2	GovConnect Local Procurement	http://www.nj.gov/dca/surveys/ppsurvey.htm
3	State Comptroller requirements.	http://www.nj.gov/comptroller/compliance/index.html

APPENDIX F

Photovoltaic (PV) Rooftop Solar Power Generation

PVWatts * * * * *

AC Energy & Cost Savings

* * * * *

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 90 characters.)

Station Identification	
Cell ID:	0268370
State:	New Jersey
Latitude:	40.9 ° N
Longitude:	74.2 ° W
PV System Specifications	
DC Rating:	250.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	192.5 kW
Array Type:	Fixed Tilt
Array Tilt:	40.9 °
Array Azimuth:	180.0 °
Energy Specifications	
Cost of Electricity:	15.1 ¢/kWh

Results

Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	3.18	19665	2960.37
2	3.90	21651	3259.34
3	5.05	29675	4467.27
4	5.16	28286	4258.17
5	5.47	30352	4569.19
6	5.70	29759	4479.92
7	5.36	28297	4259.83
8	5.32	28335	4265.55
9	5.16	27327	4113.81
10	4.60	26153	3937.07
11	3.32	18710	2816.60
12	3.00	18190	2738.32
Year	4.60	306400	46125.46

Oradell BOE - Photovoltaic Cost estimate

Cost of Electricity	$0.151	/kWh
System Capacity	250.0	kW
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Rooftop Solar Power Generation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	* Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$1,000,000	**0.0**	**306,400**	**0**	**$46,100**	**0**	**$46,100**	**$0**	**$19,303**	**21.7**	**15.3**

** Solar Renewable Energy Certificate Program (SREC) SREC as of November 2012= $63/1000kwh

NOTE: COST ESTIMATES ARE +/- 80 %. DO NOT USE FOR PROCURMENT

APPENDIX G

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Oradell Elementary School

Building ID: 3198923
For 12-month Period Ending: April 30, 2012[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: July 27, 2012

Facility
Oradell Elementary School
350 Prospect Avenue
Oradell, NJ 07649

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1950
Gross Floor Area (ft²): 112,044

Energy Performance Rating[2] (1-100) 30

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,810,806
Natural Gas (kBtu)[4]	5,681,898
Total Energy (kBtu)	8,492,704

Energy Intensity[4]

Site (kBtu/ft²/yr)	76
Source (kBtu/ft²/yr)	137

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	700

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	63
National Median Source EUI	115
% Difference from National Median Source EUI	20%
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.

Certifying Professional
N/A

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**

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Oradell 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	350 Prospect Avenue, Oradell, NJ 07649	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		☐
School (K-12 School)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	112,044 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	150	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	No	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	70 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Months	11(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 Electric & Gas Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
04/01/2012	04/30/2012	68,100.00
03/01/2012	03/31/2012	77,400.00
02/01/2012	02/29/2012	81,600.00
01/01/2012	01/31/2012	79,800.00
12/01/2011	12/31/2011	83,400.00
11/01/2011	11/30/2011	68,400.00
10/01/2011	10/31/2011	59,400.00
09/01/2011	09/30/2011	61,200.00
08/01/2011	08/31/2011	45,000.00
07/01/2011	07/31/2011	58,800.00
06/01/2011	06/30/2011	73,800.00
05/01/2011	05/31/2011	66,900.00
Electricity Consumption (kWh (thousand Watt-hours))		**823,800.00**
Electricity Consumption (kBtu (thousand Btu))		**2,810,805.60**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**2,810,805.60**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

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

Start Date	End Date	Energy Use (therms)
04/01/2012	04/30/2012	2,182.37
03/01/2012	03/31/2012	5,636.48
02/01/2012	02/29/2012	11,683.11
01/01/2012	01/31/2012	12,992.52
12/01/2011	12/31/2011	8,429.77
11/01/2011	11/30/2011	4,926.92
10/01/2011	10/31/2011	494.96
09/01/2011	09/30/2011	108.17
08/01/2011	08/31/2011	0.00
07/01/2011	07/31/2011	2.05

06/01/2011	06/30/2011	2.51
05/01/2011	05/31/2011	10,360.12
Natural Gas Consumption (therms)		**56,818.98**
Natural Gas Consumption (kBtu (thousand Btu))		**5,681,898.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**5,681,898.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Oradell Elementary School
350 Prospect Avenue
Oradell, NJ 07649

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Oradell Elementary School	
Gross Floor Area Excluding Parking: (ft^2)	112,044
Year Built	1950
For 12-month Evaluation Period Ending Date:	April 30, 2012

Facility Space Use Summary

School	
Space Type	K-12 School
Gross Floor Area (ft^2)	112,044
Open Weekends?	Yes
Number of PCs	150
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	No
Percent Cooled	70
Percent Heated	100
Months °	11
High School?	No
School District °	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 04/30/2012)	**Baseline** (Ending Date 04/30/2012)	**Rating of 75**	**Target**	**National Median**
Energy Performance Rating	30	30	75	N/A	50
Energy Intensity					
Site ($kBtu/ft^2$)	76	76	50	N/A	63
Source ($kBtu/ft^2$)	137	137	90	N/A	115
Energy Cost					
$/year	$ 164,473.23	$ 164,473.23	$ 107,688.74	N/A	$ 137,697.51
$/$ft^2$/year	$ 1.47	$ 1.47	$ 0.96	N/A	$ 1.23
Greenhouse Gas Emissions					
$MtCO_2e$/year	700	700	458	N/A	586
$kgCO_2e/ft^2$/year	6	6	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 Median column presents energy performance data your building would have if your building had a median rating of 50.

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

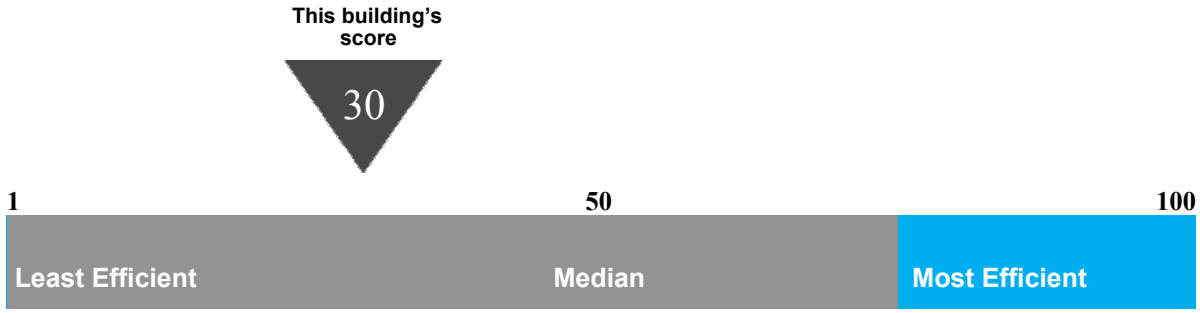
Statement of Energy Performance

2012

Oradell Elementary School
350 Prospect Avenue
Oradell, NJ 07649

Portfolio Manager Building ID: 3198923

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 137 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending April 2012

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: 07/27/2012