Long Island Power Authority

Energy Audit Report

for

Deer Park Schools
Robert Frost Middle School

March 5, 2008

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Section Page

Comment [AB1]:
03-12-01
Re-started from v7.10 and redid the changes through 7.13.
1. Edited gas string to include mention of total CCF.
2. Fixed TOC footer to say "Energy Report" instead of "New York Energy Report".
3. Edited Lighting Controls text to accommodate ems points in the lighting controls table.
4. No need to fix the two links that were to QC:. They weren't in 7.10.
5. Renamed to 7.15
04-02-01
1. Fixed gas string to correct total CCF.
5. Renamed to 7.16

1 Executive Summary

This report presents the findings of an energy survey conducted on October 3, 2007 by Bill Conn for:

Deer Park Schools Robert Frost Middle School
450 Half Hollow Road
Deer Park, NY 11729
631-274-4080

Facility contact person: Kirk Gostkowski
LIPA account number(s): 724-39-4200-18
Gas 724-98-4203-13 Gas 724-98-4202-16

Long Island Power Authority (LIPA) conducts energy surveys at no charge to its customers. The surveys promote LIPA's message of safeguarding the environment, reducing dependence on foreign oil and delaying the need to build costly new power plants. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	$126,316
Natural Gas	$89,000
Total	$215,316

The potential annual energy cost savings are shown below in Table 1-1.

Table 1-1
Energy Cost Reduction Opportunities (ECRO's)

Description	Potential Rebate*	Cost After Rebate	Annual Savings	Payback with Rebate	% of Annual Energy Cost
Upgrade the Lighting	$1,960	$16,660	$5,412	3.1 years	2.5%
Install Lighting Controls	$1,575	$11,925	$4,204	2.8 years	2.0%
Improve Temperature Control	$100	$3,030	$1,703	1.8 years	0.8%
Totals	**$3,635**	**$31,615**	**$11,319**	**2.8 years**	**5.3%**

* **NOTE**: Rebates are subject to caps, changes and eligibility requirements. In addition, there may be other rebates that apply. Prior to purchasing any equipment you must contact your LIPA representative or the audit program administrator, Stacey Wagner, at (631) 755-5358 for assistance in the pre-approval process and in determining your potential rebate amount.

1 Executive Summary

The estimated demand and energy savings are shown below in Table 1-3. The information in this table corresponds to the recommendations in Table 1-1.

Table 1-3
Estimated Energy Savings

Recommendation	Total kW Reduction	Total Annual kWh Reduction	Total Annual Therms Reduced
Upgrade the Lighting	10.5	27,194	
Install Lighting Controls		28,568	
Improve Temperature Control			1,338
Totals	**10.5**	**55,762**	**1,338**

The remainder of the report is organized as follows: Section 2 explains the details of the Energy Cost Reduction Opportunities, Section 3 shows the historical energy usage and costs for this facility. Section 4 gives an equipment inventory and discusses the building characteristics (architectural, mechanical, electrical, etc.), and Section 5 is the methodology used to survey and analyze your facility.

Auditor's Comments
In most school buildings the most cost effective measure will be temperature control during unoccupied periods. The temperature is currently being setback at night but there may be opportunities to optimize these savings. Each school should have a temperature control schedule and the heat set back 15 minutes before the end on occupancy. Some investment may be needed to assure all pneumatic controls are working properly.

Any reported overheating in any areas should be addressed promptly.

Most exhaust fans have wind up timers. This is simple and well suited to areas with irregular use. The building temperature is regulated by pneumatic controls. From the energy analysis it appears that they are working relatively well.

1 Executive Summary

Energy Star Rating

The Environmental Protection Agency's Energy Star Portfolio Manager program rates buildings by their energy efficiency. This rating is adjusted for building use and location. This is a voluntary program established to help facility managers establish baselines for energy consumption and measure progress.

How the Rating System Works

The national energy performance rating is a type of external benchmark that helps energy managers assess how efficiently their buildings use energy, relative to similar buildings nationwide. The rating system's 1–100 scale allows everyone to quickly understand how a building is performing — a rating of 50 indicates average energy performance, while a rating of 75 or better indicates top performance.

EPA, in conjunction with stakeholders, developed the energy rating as a screening tool; it does not by itself explain why a building performs a certain way, or how to change the building's performance. It does, however, help organizations assess performance and identify those buildings that offer the best opportunities for improvement and recognition.

Your building's actual source energy data is weather normalized; this enables EPA to assess your building's performance relative to the typical weather for your region, without bias for the specific weather patterns in the rating year.

Excerpted from Energy Star.gov

Based upon your current building use and energy consumption the Environmental Protection Agency your facility rating is as follows:

Baseline Score	**50**	Your current rating. This score represents your buildings relative energy efficiency on a 1-100 scale compared to similar buildings in your climate. This number can serve as a baseline to gauge improvements in energy efficiency.
Target	**64**	The target score is a customer-selected number. In this case the Target score was based on the energy reduction recommendations in this energy audit. In other words, this is where your score should be after implementation of the efficiency measures.
Energy Star Designation	**75**	Facilities with a Rating of 75 or above can receive an Energy Star designation by the EPA

Energy Star Portfolio Manager http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

1 Executive Summary

Audit Disclaimer

This audit has been conducted and prepared by LIPA for the sole purpose of presenting energy cost reduction opportunities for you. This report is not intended for any other purpose. The data used in this audit was provided by your organization and was not independently verified by us.

While the recommendations in this report have been reviewed for technical accuracy, LIPA is not liable if projected savings are not actually achieved. The recommendations are based on an analysis of conditions observed at the time of the audit and information provided by your organization. Estimated savings are computed on the basis of research by government agencies and engineering groups. Actual savings will depend on many factors including conservation measures implemented, seasonal variations in fuel price and weather, and specific energy use practices of the building occupants.

Costs are based on average local costs for materials and labor. It is strongly suggested that you contact a qualified contractor prior to implementing any of the recommendations outlined in this report. Many items are not included in our costs, such as removal and disposal of the existing equipment, bringing the new equipment installation up to code, asbestos abatement, lighting ballast PCB and lamp mercury handling, etc.

We hope that this report is helpful and that you will implement the energy savings measures that we recommended. If you have any questions, please contact Stacey Wagner at (631) 755-5358 or your LIPA representative.

Install Lighting Controls

Install Lighting Controls to Reduce the Lighting Use

In some areas the lighting is left on unnecessarily. Many times this is due to the idea that it is better to keep the lights on rather than to continuously switch them on and off. The on/off dilemma was studied and it was found that the best option is to turn the lights off whenever possible. Although this does reduce the lamp life, the energy savings far outweigh the lamp replacement costs. The cutoff for when to turn the lights off is around two minutes. If the lights can be off for only a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is all it would take. In some cases a wind-up timer is what is required. Another type is the timeclock which allows the user to set an on/off schedule. Timeclocks can be a dial clock with on/off indicators on it, or a timeclock can be a small box the size of a thermostat where the user programs the on/off schedule in a digital format like setting the alarm on a wristwatch. Occupancy sensors detect motion and will switch the lights on when the room is occupied. They can either be mounted in place of the current wall switch, or they can be mounted on the ceiling to cover large areas. Lastly, photocells are a lighting control that sense light levels and will turn the lights off when there is adequate daylight. These are mostly used outside, but they are becoming much more popular in energy-efficient office designs as well.

Details of the lighting controls recommendation are shown in the following table.

Line # - Area	Exist. Hrs.	New Hrs.	Type of Control to Install	Qty	Mat'l Cost	Labor Cost	Potential Rebate	Cost After Rebate	Annual Savings	Payback (yrs)
3 - Classrooms	50	40	Ceiling Occupancy Sensor	45	$6,750	$6,750	$1,575	$11,925	$3,193	3.7
12 - Gym	60	50							$1,011	
Totals:					**$6,750**	**$6,750**	**$1,575**	**$11,925**	**$4,204**	**2.8**

Improve Temperature Control

It is the intention of almost all facilities to keep the thermostat set at the most economical position while providing an appropriate climate for the occupants. However, due to thermostat problems, too many people with access to the thermostat, or faulty setback equipment, many control systems fall short of the optimum energy cost savings.

Install Digital Thermostats

By installing digital thermostats you eliminate most of the impediments to significant energy cost savings. Digital thermostats can be purchased with password capability, or key capability, or other deterrent. And in addition to the savings found through consistent setpoints, they can be programmed to more extreme unoccupied temperatures with a warm-up schedule that prepares the building for occupancy.

The following tables show the existing setpoints for each area of the facility and also the recommended or "proposed" setpoints (shown in the shaded rows). It should be noted that the temperature setpoints in the facility may have varied greatly over the past twelve months. The information shown below for the "existing conditions" is based on data collected at the site and is adjusted up or down depending upon the amount of energy used over the past twelve months.

Zone 1		Occupied Periods From	Occupied Periods To	Days/ Week	Heating Profile Occupied	Heating Profile Unocc	Cooling Profile Occupied	Cooling Profile Unocc
Air Conditioned Offices & Classrooms	*existing*	7:00 AM	5:00 PM	5	70	62	72	
	proposed	7:00 AM	5:00 PM	5	70	55	72	
	existing			2		62		
	proposed			2		55		

Zone 1 Summary - Air Conditioned Offices & Classrooms	
Annual Heating Cost Savings (gas):	$1,703
Number of Thermostats Required:	1
Total Materials:	$65
Total Labor:	$1,500
Total Installation Cost:	$1,565
Payback:	0.9 years

2 Energy Cost Reduction Opportunities

Zone 2		Occupied Periods From	Occupied Periods To	Days/ Week	Heating Profile Occupied	Heating Profile Unocc	Cooling Profile Occupied	Cooling Profile Unocc
Non Air Conditioned Spaces	*existing*	7:00 AM	5:00 PM	5	70	62		
	proposed	7:00 AM	5:00 PM	5	70	55		
	existing			2		62		
	proposed			2		55		

Zone 2 Summary - Non Air Conditioned Spaces	
Number of Thermostats Required:	1
Total Materials:	$65
Total Labor:	$1,500
Total Installation Cost:	$1,565
Payback:	Immediately.

3 Historical Energy Usage and Costs

Table 3-2 and Figure 3-1 represents the electrical energy usage for the surveyed building from Jun-06 to May-07. LIPA provides electricity to the facility under Rate 285. This electric rate has a component for consumption that is measured in kilowatt-hours (kWh). It is measured by multiplying the wattage of the equipment times the hours that it operates. For example, a 1,000-Watt lamp operating for 5 hours would measure 5,000 Watt-hours. Since one kilowatt is equal to 1,000 Watts, the measured consumption would be 5 kWh. This rate has another component for Peak Demand that is measured in kilowatts (kW). Following the example above, if your facility had nothing else in it except for the 1,000-Watt lamp, then your monthly Peak Demand would be 1.0 kW. Your meter averages your demand constantly over 15 or 30-minute intervals (depending upon the utility and the specific rate). At the end of the month you are charged for the highest "average" and this is called your Peak Demand. Based on these definitions of consumption and Peak Demand it can be shown that keeping equipment off whenever it is not in use will reduce your consumption, while not operating equipment simultaneously will reduce your Peak Demand.

Rates used in this report reflect the most current rate structure available. Table 3-1 shows the annualized rate structure:

Table 3-1
Rate Structure for Rate 285

Description	Summer	Winter	Average
Demand Charge	$24.33/kW	$4.68/kW	$11.23/kW
Energy Charge	$0.1522/kWh	$0.1447/kWh	$0.1472/kWh

Figure 3-2 is a pie chart reflecting the electrical end-uses and their contribution to the total electricity usage. Table 3-3 is the electrical end-use in data format.

Table 3-4 and Figure 3-3 on the following pages show the natural gas energy usage for the surveyed building from Jun-06 to May-07. Gas is supplied by Keyspan. The annual usage and cost are 69,932 CCF and $89,000, respectively. This yields an average cost $1.27270 / CCF.

Figure 3-4 is a pie chart reflecting the gas end-uses and their contribution to the total gas usage. Table 3-5 is the gas end-use in data format.

Table 3-2

3 Historical Energy Usage and Costs

Electricity Billing Data

Month of Use	Days in Month	Consumption kWh	Peak Demand		Total Bill
			Actual	Billed	
06/06	30	57,600	232.0	232.0	$14,355
07/06	31	33,600	116.6	116.6	$7,360
08/06	31	49,920	211.8	211.8	$13,698
09/06	30	45,280	236.0	236.0	$10,343
10/06	31	78,560	217.8	217.8	$12,288
11/06	30	52,000	218.6	218.6	$8,043
12/06	31	67,520	221.9	221.9	$10,454
01/07	31	70,400	213.6	213.6	$10,563
02/07	28	78,400	223.2	223.2	$11,668
03/07	31	52,800	215.7	215.7	$7,856
04/07	30	66,880	228.0	228.0	$10,087
05/07	31	60,000	245.6	245.6	$9,601
Totals	***365***	***712,960***			***$126,316***

Figure 3-1
Electricity Usage Profile

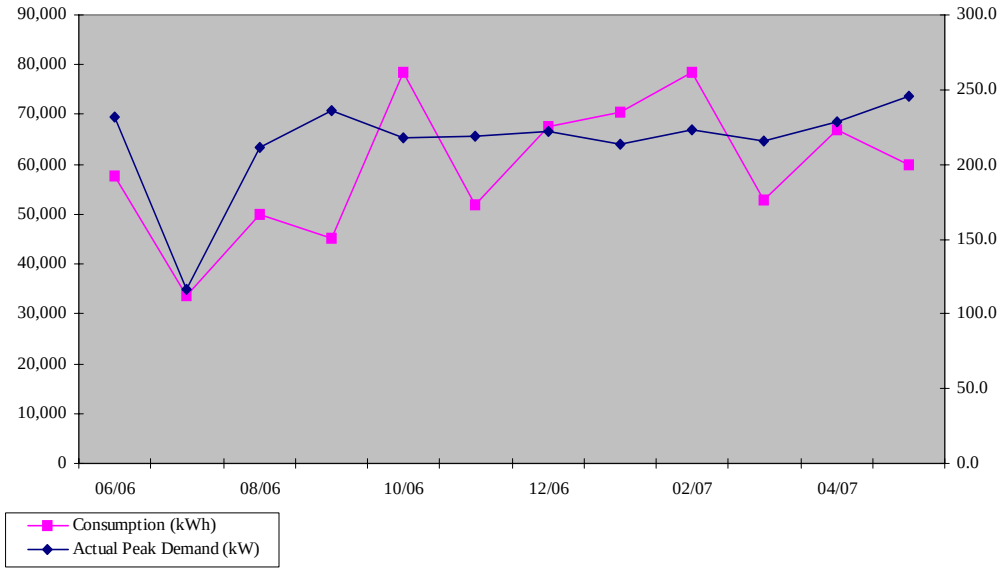


Table 3-3
Electricity End Use

End Use	Percent of Total
Cooling Equipment	6.7%
Lighting	45.7%
Exterior Lighting	1.3%
Ventilation	5.7%
Miscellaneous	29.9%
Motors	10.7%
TOTAL	100.0%

Figure 3-2
Electricity End Use

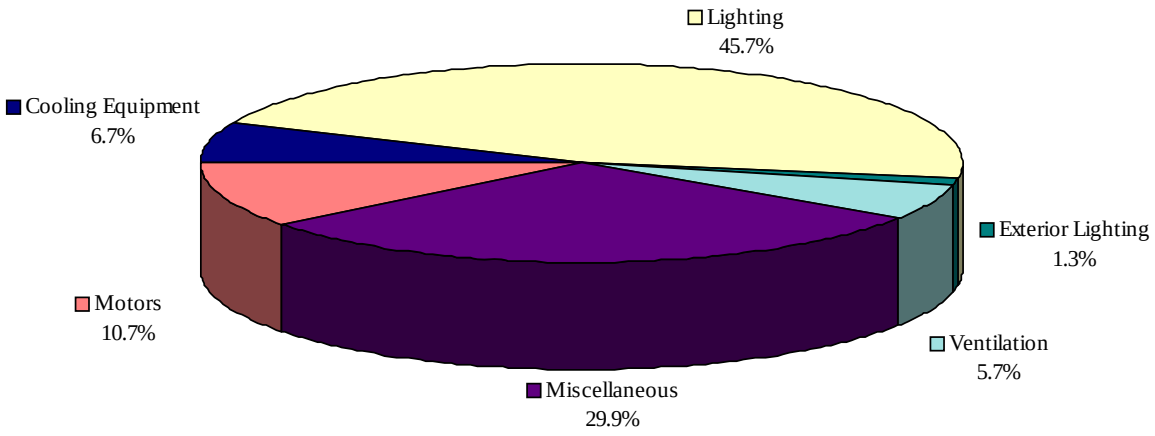


Table 3-4 Natural Gas Billing Data

Date	Days per Month	Consumption (CCF)	Total Bill
6/06	30	1,186	$1,489
7/06	31	395	$693
8/06	31	421	$688
9/06	30	667	$875
10/06	31	2,551	$2,807
11/06	30	5,613	$7,773
12/06	31	9,344	$11,975
1/07	31	15,437	$18,556
2/07	28	17,311	$21,310
3/07	31	9,327	$12,481
4/07	30	6,421	$8,606
5/07	31	1,260	$1,748
Totals	***365***	***69,932***	***$89,000***

Figure 3-3 Natural Gas Usage Profile

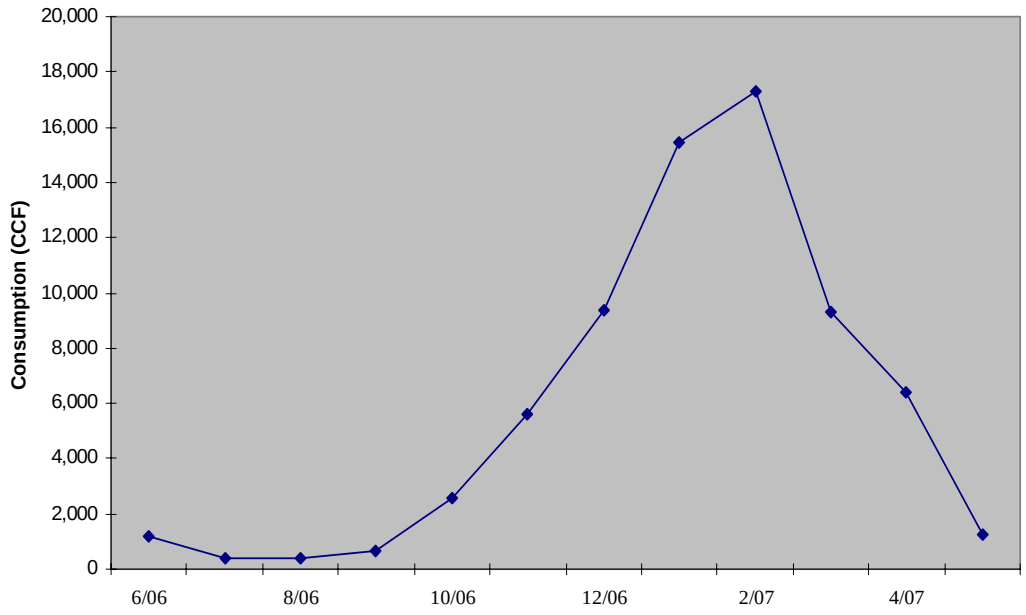
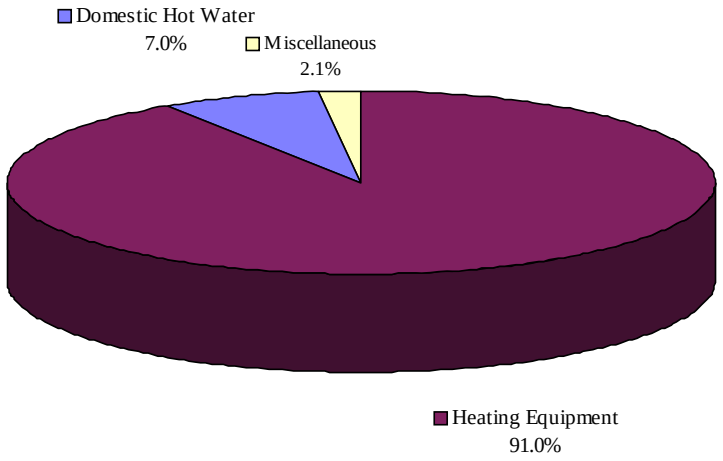


Table 3-5
Natural Gas End Use

End Use	Percent of Total
Heating Equipment	91.0%
Domestic Hot Water	7.0%
Miscellaneous	2.1%
TOTAL	100%

Figure 3-4
Natural Gas End Use



4 Equipment Inventory

Building Characteristics

Facility Name:	Deer Park Schools Robert Frost Middle School
Total Square Footage:	142,305
Building Type:	Middle School

Building Construction						
Description	**Age (yrs)**	**Wall Type**	**Wall Insulation**	**Roof Type**	**Roof Insulation**	**Window Type**
2 Story School Building	40	Block	Minimal	Flat	Minimal	Single Pane

Electric Meter 99246724

Equipment Inventory

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, or a lack of nameplates. The Miscellaneous Equipment table ends with a column that shows that line's contribution to the total respective fuel bill (electricity, gas, oil, etc.)

Heating Equipment				
Description	**Qty**	**Capacity**	**Fuel**	**Age (yrs)**
Dual Fuel Boilers	2	4,000 MBH	gas	40

Cooling Equipment			
Description	**Qty**	**Capacity**	**Age (years)**
Rooftop AC Units	2	2 Tons	10
Server Room AC	2	2 Tons	5
Through Wall AC	23	2 Tons	5

Ventilation Equipment				
Description	**Qty**	**Capacity**	**Hrs/Wk Winter**	**Hrs/Wk Summer**
Gym Exhaust	4	0.5 HP	60	40
Exhaust Fans	36	0.25 HP	60	40
Air Handlers for Heat	10	0.25 HP	65	10
Room Air Handlers	70	0.12 HP	80	10

4 Equipment Inventory

Ventilation Equipment				
Description	**Qty**	**Capacity**	**Hrs/Wk Winter**	**Hrs/Wk Summer**
Kitchen Air Handler	1	0.2 HP	5	
Gym Air Handlers	4	0.2 HP	60	5

Domestic Hot Water Systems			
Description	**Qty**	**Capacity**	**Fuel**
90 Gallon	1	385 mbh	gas

Motor Inventory							
Equipment	**Qty**	**HP**	**ODP/ TEFC**	**RPM**	**Usage hrs/day**	**Usage days/wk**	**Estimated Load Factor**
Circulators -Heating	2	7.5			16	7	0.8
Circulators -Heating	1	1			16	7	0.8
Circulators -Heating	1	1					0.8
Air Compressor for Shops	1	5			6	5	0.8
Oil Compressor to Boilers	2	2			4	7	0.8
Compressors Pneumatic Controls	2	2			12	7	0.8
Boiler Room Sump Pump	2	0.75			1	7	0.8
Boiler Power Vent	2	0.5			4	7	0.8
Boiler Internal Circulation	2	0.2			8	7	0.8
Cogeneration Circulator NOT USED	1	0.5					0.8

Miscellaneous Equipment						
Description	**Qty**	**Capacity**	**Fuel**	**Hrs/Wk Usage**	**% Fuel Usage**	**End-Use**
Miscellaneous Load	1	8 kW	elec	90	5.3%	Miscellaneous
Milk Cooler	2	1 kW	elec	50	0.7%	Miscellaneous
3 Door Commercial Refrigerator	2	4.5 kW	elec	60	3.9%	Miscellaneous
Bread Warmer	4	1.2 kW	elec	60	2.1%	Miscellaneous

4 Equipment Inventory

Miscellaneous Equipment						
Description	**Qty**	**Capacity**	**Fuel**	**Hrs/Wk Usage**	**% Fuel Usage**	**End-Use**
Gas Ovens	3	50 MBH	gas	10	1.1%	Miscellaneous
Gas Range- 10 Burner	1	100 MBH	gas	5	0.4%	Miscellaneous
Gas Fired Kettles	2	40 MBH	gas	7	0.4%	Miscellaneous
Gas Steamers	1	40 MBH	gas	5	0.2%	Miscellaneous
Beverage Dispenser	2	0.5 kW	elec	50	0.4%	Miscellaneous
Various Shop Tools	6	1 kW	elec	25	1.1%	Miscellaneous
Generator - No Block Heater	1					Miscellaneous
Refrigerators	3	0.4 kW	elec	50	0.4%	Miscellaneous
Computers	175	0.15 kW	elec	70	13.4%	Miscellaneous
Copiers	2	0.4 kW	elec	40	0.2%	Miscellaneous
Printers	10	0.2 kW	elec	30	0.4%	Miscellaneous
Ice Machine in Gym	1	1 kW	elec	50	0.4%	Miscellaneous
Soda Machine	6	0.6 kW	elec	50	1.3%	Miscellaneous
Water Coolers	2	0.2 kW	elec	30	0.1%	Miscellaneous
20 kW Gas Fired cogeneration NOT USED	1					Miscellaneous

The second to the last column of the Miscellaneous Equipment Table shows the percentage of the total fuel usage (electricity, natural gas, or fuel oil) which corresponds with the pie charts on the previous pages. The “Hrs/Wk Usage” column values include the equipment load factor and duty cycling (i.e. an air compressor running at 80% capacity and cycling on 30% of the time during a 60 hour week would have an “Hrs/Wk Usage” value of 60*0.08*0.30 = 14 Hrs/Wk).

Lighting Equipment			
Line #	**Area**	**Description**	**Hrs/Wk Usage**
1	Exit Signs	23 exit sign fixtures, each using LED technology.	168
2	Boiler Room	20 surface-mounted open industrial 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	25
3	Classrooms	720 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50

4 Equipment Inventory

Lighting Equipment			
Line #	**Area**	**Description**	**Hrs/Wk Usage**
4	Stairs & Halls	3 recessed lensed 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	90
5	Stairs & Halls	114 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	90
6	Restrooms	50 recessed lensed 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	60
7	Kitchen	38 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	60
8	Technology Area	168 surface-mounted open industrial 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	50
9	Admin Offices	21 recessed lensed 2X4 fixtures, each using 3,4' T8 lamps and electronic ballasts.	60
10	Admin Offices	11 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	60
11	Office Rest room	2 surface-mounted open industrial 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	40
12	Gym	56 high bay fixtures, each using 400-Watt metal halide lamps.	60
13	Gym Stage	10 hi-hat fixtures, each using 300-Watt, incandescent lamps.	10
14	Gym Stage	4 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	40
15	Gym Stage	5 track lighting fixtures, each using 200-Watt, incandescent lamps.	1
16	Gym Office	4 recessed lensed 2X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	65
17	Gym Office	8 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	65
18	Locker Rooms	68 surface-mounted wrap 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	65
19	Showers	10 surface-mounted wrap 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	50
20	Various Offices	19 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	45

4 Equipment Inventory

Lighting Equipment			
Line #	**Area**	**Description**	**Hrs/Wk Usage**
21	Band Room 1	15 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	45
22	Band Room 1	12 surface-mounted wrap 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	40
23	Choral Room	6 recessed lensed 2X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	40
24	Choral Room	12 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	40
25	Instrument Room	2 recessed lensed 2X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	30
26	Band Room 2	8 hi-hat fixtures, each using 22-Watt, compact fluorescent, screw-in lamps .	50
27	Band Room 2	8 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
28	Band Room 2	4 recessed lensed 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	50
29	Prep Rooms	20 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
30	Cafeteria	132 surface-mounted wrap 1X4 fixtures, each using 1,4' T8 lamp and electronic ballast's.	50
31	Art Rooms	50 recessed lensed 2X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
35	Foyer	18 recessed fixtures, each using 2, 4' T8 lamps and electronic ballasts.	168
36	Outdoor	4 pole-mounted fixtures, each using 150-Watt high pressure sodium lamps.	90
37	Outdoor	50 surface-mounted fixtures, each using 100-Watt metal halide lamps.	90
38	Outdoor Courtyard	2 surface-mounted fixtures, each using 100-Watt, incandescent lamps.	40
39	Parking Lot	7 pole-mounted fixtures, each using 150-Watt high pressure sodium lamps.	90

5 Methodology

The first step in the energy analysis is the site survey. The auditor walks your entire site to inventory the building envelope (roof, windows, etc.), the heating, ventilation, and air conditioning equipment (HVAC), the lighting equipment, other facility-specific equipment, and to gain an understanding of how each facility is used.

The collected data is then processed with a software package from The Daylight Savings Company in Goshen, NY (1-800-337-2192) that calculates the anticipated energy usage. The actual energy usage is entered directly from your utility bills. The anticipated energy usage is compared to the actual usage. If necessary, corrections are made to the site-collected data until the anticipated energy usage matches the actual usage. This process develops an end-use baseline for all of the fuels used at the facility. The baseline is used to calculate the energy savings for the measures that are recommended in this report.

The savings in this report are not duplicative. The savings for each recommendation may actually be higher if the individual recommendations were installed instead of the entire project. For example, the lighting module calculates the change in wattage and multiplies it by the new operating hours instead of the existing operating hours (if there was a change in the hours at all). The lighting controls module calculates the change in hours and multiplies it by the new system wattage instead of the existing wattage. Therefore, if you chose to install the recommended lighting system but not the lighting controls, the savings achieved with the new lighting system would actually be higher because there would have been no reduction in the hours of use.

The same principal follows for heating, cooling, and temperature recommendations - even with fuel switching. If there are recommendations to change the temperature settings to reduce fuel use, then the savings for the heating/cooling equipment recommendations are reduced, as well.

Our thermal module calculates the savings for temperature reductions using ASHRAE's modified bin method. The savings are calculated in "output" values –meaning energy, not fuel savings. To show fuel savings we multiply the energy values times the fuel conversion factor (these factors are different for electricity, natural gas, fuel oil, etc.) and also take into account the heating/cooling equipment efficiency. The temperature recommendation savings are lower when the heating/cooling equipment is more efficient or is using a cheaper fuel. Also, you may see natural gas savings in this report even if you do not currently have natural gas. This happens when fuel switching was recommended for your heating/cooling equipment and you have temperature reduction recommendations, as well.

Thermal recommendations (insulation, windows, pipe insulation etc.) are evaluated by taking the difference in the thermal load due to reduced heat transfer. Again, the "thermal load" is the thermal load after the other recommendations have been accounted for.
Lastly, installation costs are then applied to each recommendation and simple paybacks are calculated. Costs are derived from Means Cost Data, other industry publications, and local contractors and suppliers.

Long Island Power Authority – Summary Energy Audit Report for:

Deer Park Schools Robert Frost Middle School

Printed: 3/5/08

Audit Date: 10/3/2007

Site:
Deer Park Schools Robert Frost Middle School
450 Half Hollow Road
Deer Park, NY 11729

LIPA main account number:
724-39-4200-18

Facility contact person: Kirk Gostkowski
Facility contact phone #: 631-274-4080

Annual Energy Costs:

Electricity	$126,316
Natural Gas	$89,000
Total	$215,316

Description	Potential Rebate*	Cost After Rebate	Annual Savings	Payback with Rebate	% of Annual Energy Cost
Upgrade the Lighting	$1,960	$16,660	$5,412	3.1 years	2.5%
Install Lighting Controls	$1,575	$11,925	$4,204	2.8 years	2.0%
Improve Temperature Control	$100	$3,030	$1,703	1.8 years	0.8%
Totals	**$3,635**	**$31,615**	**$11,319**	**2.8 years**	**5.3%**

* **NOTE**: Rebates are subject to caps, changes and eligibility requirements. Contact your LIPA representative or the audit program administrator, Stacey Wagner at (631) 755-5358 for assistance in determining your potential rebate amount.

Recommendation Highlights:

- Install new lighting products to increase the efficiency of your lighting fixtures.
- Install lighting controls in certain areas of your facility to reduce lighting use during unoccupied periods.
- Modify your temperature setpoints to reduce the energy use associated with heating and/or cooling your facility.