Long Island Power Authority

Energy Audit Report

for

Deer Park Schools
Deer Park High School

October 16, 2007

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1 Executive Summary

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

Deer Park Schools Deer Park High School
30 Rockaway Ave
Deer Park, NY 11729
631-274-4080

Facility contact person: Kirk Gostkowski
LIPA account number(s): 724-44-7215-17
Gas 724-44-7200-06

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:

Fuel Oil	$224,715
Electricity	$277,819
Natural Gas	$4,302
Total	$506,836

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	$2,310	$19,293	$5,078	3.8 years	1.0%
Install Lighting Controls	$2,170	$16,310	$11,762	1.4 years	2.3%
Improve Temperature Control	$50	$12,950	$49,213	0.3 years	9.7%
Upgrade the HVAC		$1,820	$7,328	0.2 years	1.4%

1 Executive Summary

Description	Potential Rebate*	Cost After Rebate	Annual Savings	Payback with Rebate	% of Annual Energy Cost
Improve the Motors		$2,723	$589	4.6 years	0.1%
Totals	**$4,530**	**$53,096**	**$73,970**	**0.7 years**	**14.6%**

* **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.
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 Gallons of Oil Reduced
Upgrade the Lighting	10.4	26,036	
Install Lighting Controls		78,126	
Improve Temperature Control			26,759
Upgrade the HVAC		47,883	
Improve the Motors		3,910	
Totals	**10.4**	**155,955**	**26,759**

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.

1 Executive Summary

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.

The lighting has been recently upgraded. Energy savings from lighting should focus on lighting controls. Motion detectors could control lights in several rooms. Where additional outdoor lighting may be needed, motion controlled flood lights should be considered as an option to "Dusk to Dawn" lights. Motion activated lights may provide better security and reduce light pollution because they would be off most of the time.

The chillers are due for replacement. The replacement chillers may qualify for LIPA rebates. The facility manager should work with LIPA on the issue and carefully review the air conditioning needs. A written Air Conditioning strategy should be developed and a contractor should carefully ascertain that the controls are working properly. It may be possible to cool more area adequately if the total cooling capacity of the system is allocated carefully to each cooling zone. The strategy should define times and temperatures. In other words, if you overcool one area, there will be less chiller capacity for other area.

The audit software refers to improving temperature using a programmable thermostat. Read this to mean controls and control service to allow better temperature control and night setback.

There are unused gas boilers and cogeneration equipment. The evaluation of these systems is outside the scope of this audit. These projects should be reviewed individually and a decision made to, remove, mothball or recommission the equipment. A written heating strategy should be developed to include times, temperatures and relative system efficiencies at different times of the year. Modular gas fired heating may be a more cost effective heating option during milder weather.

The cogeneration systems should be revisited. Often the cogeneration equipment is sized to match the thermal needs of the facility. In other words, the cogeneration unit serves as a heating plant that produces electricity as a valuable byproduct. The analysis of the cogeneration units would require an evaluation of the equipment and a review of electric and natural gas rates. Generally efficiency and heating control will be more cost effective than energy production. Investment in controls and system maintenance is highly cost effective.

A strategy could be developed to monitor and verify the performance of the heating and cooling plants. There are several companies that sell inexpensive, portable data loggers that could be moved around the facility to monitor space temperatures. It may be possible to use the Andover control system to monitor the heating distribution.

Energy Star Rating

1 Executive Summary

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	**93**	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	**100**	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.

2 Energy Cost Reduction Opportunities

Upgrade the Lighting

The following table lists the details of the lighting upgrade. Applicable areas and the recommended action are shown. The first column identifies the line number that corresponds to the detailed lighting inventory at the end of this report.

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. In addition, the costs shown in this section are the basic costs you would incur if you were to install the project on your own. If you decide to use a contractor, then you most likely will see costs about 20-30% higher, plus the miscellaneous costs mentioned previously.

Upgrade the Lighting - Details

Line # - Area	Action	Cost and Savings
4 - Gym	For the existing 20 high bay fixtures, each using 250-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 20)	Cost After Rebates: $5,600 Annual Savings: $331 Payback: 16.9 years.
5 - Gym	For the existing 12 high bay fixtures, each using 400-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 12)	Cost After Rebates: $3,360 Annual Savings: $1,038 Payback: 3.2 years.
15 - Library	For the existing 12 track lighting fixtures, each using 65-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 40-Watt. (New qty: 12)	Cost After Rebates: $86 Annual Savings: $143 Payback: 0.6 years.
19 - Guidance Copy Room	For the existing 1 porcelain lampholder fixture using 100-Watt, incandescent lamps, retrofit with 22-Watt compact fluorescent screw-in lamps. (New qty: 1)	Cost After Rebates: $25 Annual Savings: $37 Payback: 0.7 years.
21 - Auditorium Dimming	For the existing 65 hi-hat fixtures, each using 150-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 120-Watt. (New qty: 65)	Cost After Rebates: $469 Annual Savings: $641 Payback: 0.7 years.

2 Energy Cost Reduction Opportunities

Line # - Area	Action	Cost and Savings
22 - Stage	For the existing 12 high bay fixtures, each using 200-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 150-Watt. (New qty: 12)	Cost After Rebates: $86 Annual Savings: $242 Payback: 0.4 years.
33 - Pool	For the existing 23 high bay fixtures, each using 400-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 23)	Cost After Rebates: $6,440 Annual Savings: $2,495 Payback: 2.6 years.
34 - Pool Over Stands	For the existing 11 high bay fixtures, each using 250-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 11)	Cost After Rebates: $3,080 Annual Savings: $105 Payback: 29.3 years.
57 - Doorway	For the existing 2 jelly-jar fixtures, each using 60-Watt, incandescent lamps, retrofit with 18-Watt compact fluorescent screw-in lamps. (New qty: 2)	Cost After Rebates: $41 Annual Savings: $35 Payback: 1.2 years.
60 - Garage	For the existing 2 surface-mounted wrap 1X4 fixtures, each using 2,4' energy-efficient lamps and ballasts, retrofit with T8 lamps and lo-power electronic ballasts.	Cost After Rebates: $108 Annual Savings: $11 Payback: 9.8 years.

Total Fixtures	
Unaffected Qty:	1,965
Affected Qty:	160
Total Existing Qty:	2,125

Totals	
Potential Rebate:	$2,310
Cost After Rebate:	$19,295
Annual Savings:	$5,078
Payback:	3.8 years

2 Energy Cost Reduction Opportunities

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.

2 Energy Cost Reduction Opportunities

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)
2 - Classrooms	60	35	Ceiling Occupancy Sensor	60	$9,000	$9,000	$2,100	$15,900	$8,439	1.9
4 - Gym	70	45							$924	
5 - Gym	70	45							$554	
17 - Social Studies Office	50	35	Ceiling Occupancy Sensor	1	$150	$150	$35	$265	$54	4.9
23 - Mediation Room	50	30	Ceiling Occupancy Sensor	1	$100	$80	$35	$145	$36	4.0
33 - Pool	75	60	Use the Existing Controls						$637	
34 - Pool Over Stands	75	20	Use the Existing Controls						$1,118	
Totals:					**$9,250**	**$9,230**	**$2,170**	**$16,310**	**$11,762**	**1.4**

2 Energy Cost Reduction Opportunities

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
Chiller Air Conditioned Areas	*existing*	7:00 AM	4:00 PM	5	70	60	74	
Admin, Library, Auditorium	*proposed*	7:00 AM	4:00 PM	5	70	55	74	
	existing			2		60		
	proposed			2		55		

Zone 1 Summary - Chiller Air Conditioned Areas Admin, Library, Auditorium	
Annual Heating Cost Savings (oil):	$3,585
Number of Thermostats Required:	1
Total Materials:	$3,000
Total Labor:	$10,000
Total Installation Cost:	$13,000
Payback:	3.6 years

4 Equipment Inventory

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 281. 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 281

Description	Summer	Winter	Average
Demand Charge	$9.99/kW	$8.88/kW	$9.25/kW
Energy Charge	$0.1605/kWh	$0.1456/kWh	$0.1506/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 3,024 CCF and $4,302, respectively. This yields an average cost $1.42260 / CCF. **Natural gas is used exclusively for cooking.**

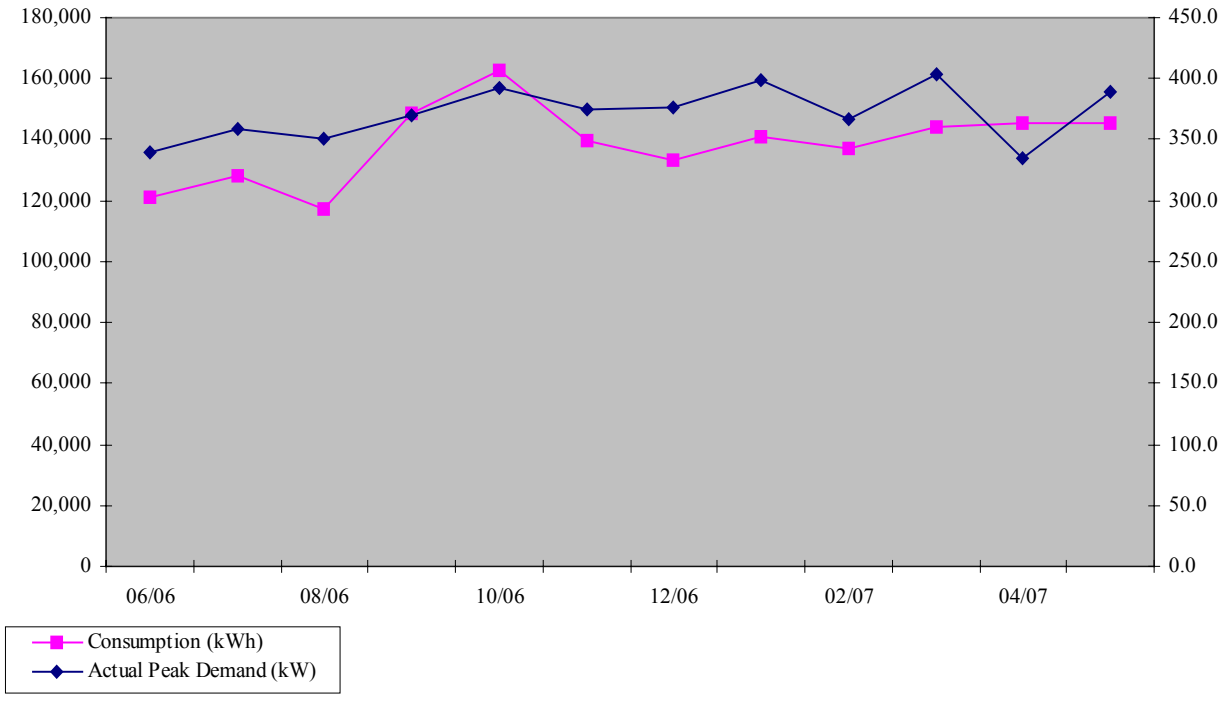
Annual oil usage is estimated to be 122,187 gallons at an annual cost of $224,715. Average cost per gallon is $1.84.

Table 3-2
Electricity Billing Data

4 Equipment Inventory

Month of Use	Days in Month	Consumption kWh	Peak Demand		Total Bill
			Actual	Billed	
06/06	30	120,900	340.0	340.0	$25,625
07/06	31	127,800	358.0	358.0	$27,268
08/06	31	117,300	351.0	351.0	$25,174
09/06	30	148,800	370.0	370.0	$30,875
10/06	31	162,900	392.0	392.0	$24,687
11/06	30	139,800	375.0	375.0	$20,938
12/06	31	133,200	377.0	377.0	$20,070
01/07	31	140,700	398.0	398.0	$20,839
02/07	28	137,100	367.0	367.0	$20,009
03/07	31	144,300	403.0	403.0	$20,695
04/07	30	145,184	334.0	334.0	$20,819
05/07	31	145,184	389.0	389.0	$20,819
Totals	***365***	***1,663,168***			***$277,819***

Figure 3-1
Electricity Usage Profile

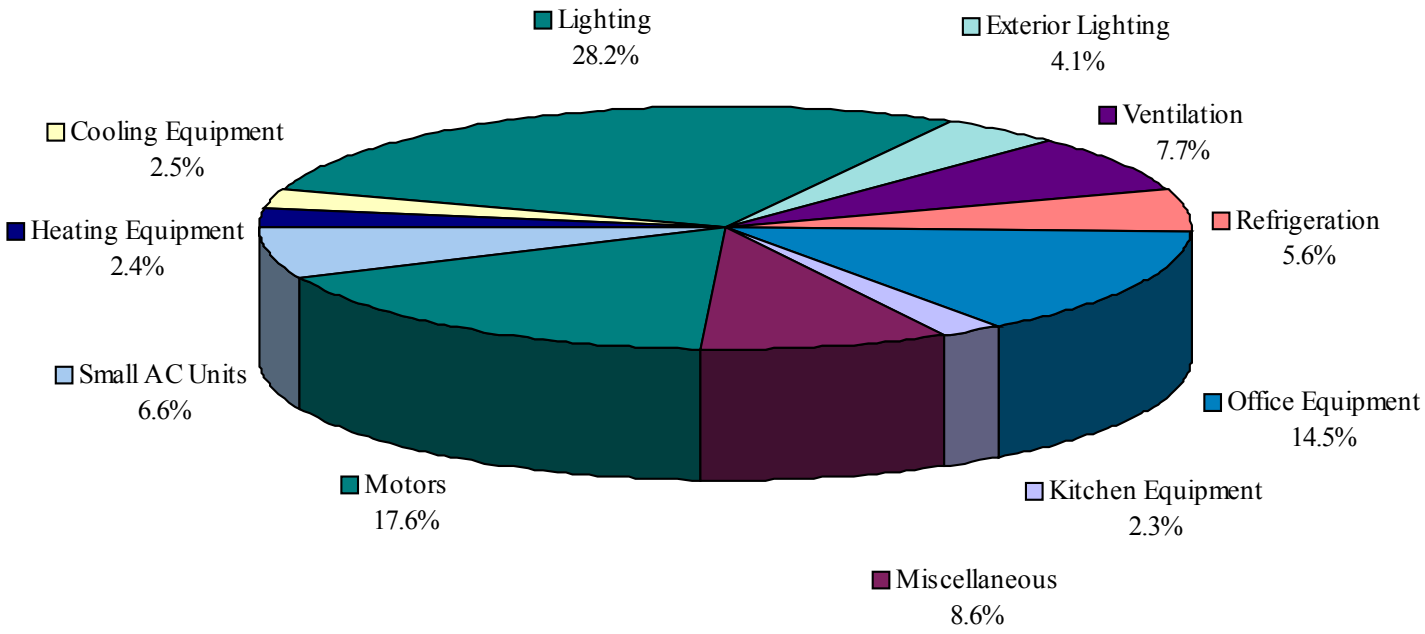


4 Equipment Inventory

Table 3-3
Electricity End Use

End Use	Percent of Total
Heating Equipment	2.4%
Cooling Equipment	2.5%
Lighting	28.2%
Exterior Lighting	4.1%
Ventilation	7.7%
Refrigeration	5.6%
Office Equipment	14.5%
Kitchen Equipment	2.3%
Miscellaneous	8.6%
Motors	17.6%
Small AC Units	6.6%
TOTAL	100.0%

Figure 3-2
Electricity End Use

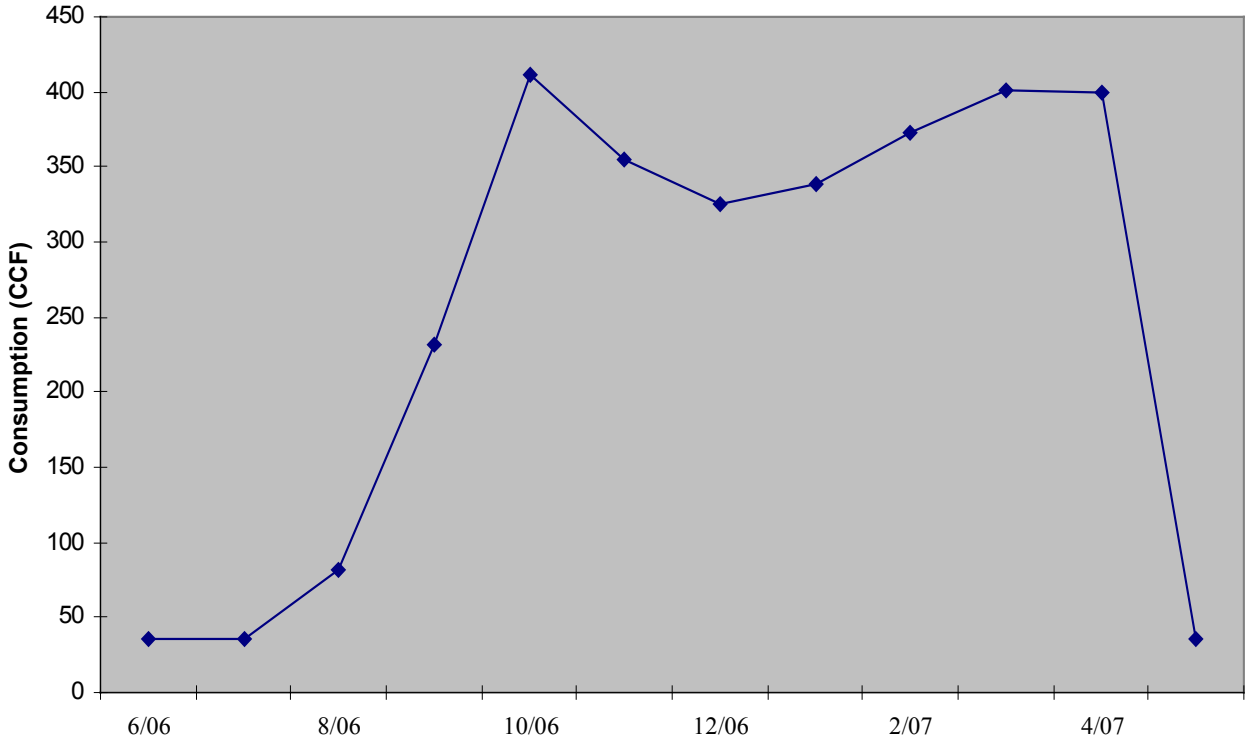


4 Equipment Inventory

Table 3-4
Natural Gas Billing Data

Date	Days per Month	Consumption (CCF)	Total Bill
6/06	30	36	$54
7/06	31	36	$54
8/06	31	81	$124
9/06	30	231	$300
10/06	31	411	$422
11/06	30	355	$541
12/06	31	325	$491
1/07	31	339	$490
2/07	28	373	$562
3/07	31	401	$605
4/07	30	400	$605
5/07	31	36	$54
Totals	***365***	***3,024***	***$4,302***

Figure 3-3
Natural Gas Usage Profile



4 Equipment Inventory

Building Characteristics

Facility Name:	Deer Park Schools Deer Park High School
Total Square Footage:	274,584
Building Type:	School

Building Construction						
Description	**Age (yrs)**	**Wall Type**	**Wall Insulation**	**Roof Type**	**Roof Insulation**	**Window Type**
2 Story School Building	43	Block	Minimal	Flat	Minimal	Double Pane

E Meter # 99246952 Gas Meter # 004927061

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)**
HB Smith Boilers: Forced Hot Water	2	4,000 MBH	oil	
Gas Boiler NOT USED	4	2,000 MBH		5

Cooling Equipment			
Description	**Qty**	**Capacity**	**Age (years)**
Chillers	8	10 Tons	10
Through Wall Unitary AC	21	2 Tons	5
Roof Top Split Systems	6	2 Tons	5
Roof Top Split Systems	2	3 Tons	5
Roof Top AC	1	5 Tons	10

Ventilation Equipment				
Description	**Qty**	**Capacity**	**Hrs/Wk Winter**	**Hrs/Wk Summer**

4 Equipment Inventory

Ventilation Equipment				
Description	**Qty**	**Capacity**	**Hrs/Wk Winter**	**Hrs/Wk Summer**
Roof Top Exhaust Fans	65	0.25 HP	70	60
Fresh Air to Auditorium	2	1 HP	168	168
Auditorium Air Handler	2	1.5 HP	30	15
Library Univent Air Handlers	5	0.15 HP	168	168
Pool Air Handlers	2	5 HP	168	168
Small Office Air Handlers	7	0.1 HP	50	40

Domestic Hot Water Systems			
Description	**Qty**	**Capacity**	**Fuel**
Heat Exchangers off Boiler	2		

Motor Inventory							
Equipment	**Qty**	**HP**	**ODP/ TEFC**	**RPM**	**Usage hrs/day**	**Usage days/wk**	**Estimated Load Factor**
Sewage Ejectors	2	0.75			6	6	0.8
Compressor for HVAC Controls	1	5			12	7	0.8
Circulators	2	7.5			20	7	0.8
Chilled Water pump	1	15			15	5	0.8
Cooling Tower	1	10			8	5	0.8
Wood Shop Compressor	1	5			5	5	0.8
Pool Hot Water & Heat	1	3			24	7	0.8
Macerators	2	2			10	5	0.8
South Side Circulators	2	7.5			18	7	0.8
South Side Circulator Spare	1	7.5					0.8
Basement Exhaust Fan	1	2			5	5	0.8
Pool Filter Pumps	2	7.5			24	7	0.8
Pool Filter Pumps	2	2			24	7	0.8

4 Equipment Inventory

Miscellaneous Equipment						
Description	**Qty**	**Capacity**	**Fuel**	**Hrs/Wk Usage**	**% Fuel Usage**	**End-Use**
Miscellaneous Load	1	20 kW	elec	120	7.5%	Miscellaneous
Computers	300	0.2 kW	elec	75	14.1%	Office Equipment
Copiers	5	0.3 kW	elec	40	0.2%	Office Equipment
Printers	9	0.2 kW	elec	40	0.2%	Office Equipment
Miscellaneous Small Air Conditioning	30	2 kW	elec	35	6.6%	Small AC Units
Shop Equipment	1	10 kW	elec	10	0.3%	Miscellaneous
Beverage Machines	2	1 kW	elec	60	0.4%	Kitchen Equipment
Heated Soup Wells	2	4.5 kW	elec	10	0.3%	Kitchen Equipment
Refrigerators	2	0.4 kW	elec	50	0.1%	Kitchen Equipment
2 Door Commercial Refrigerator	4	2 kW	elec	65	1.6%	Refrigeration
2 Door Commercial Refrigerator	1	2 kW	elec	65	0.4%	Refrigeration
Walk In Cooler	1	2 kW	elec	65	0.4%	Refrigeration
Walk in Freezers	2	2 kW	elec	70	0.9%	Refrigeration
Mini Beverage Dispenser	1	0.5 kW	elec	50	0.1%	Refrigeration
Grill	2	7 kW	elec	15	0.7%	Kitchen Equipment
Gas Ovens	2	80 MBH	gas	13	35.8%	Cooking
Gas Fryers	2	60 MBH	gas	13	26.8%	Cooking
Commercial Gas Range	1	60 MBH	gas	13	13.4%	Cooking
Gas Steam Kettle	1	100 MBH	gas	13	22.4%	Cooking
Cafeteria Heat Table	1	2 kW	elec	20	0.1%	Kitchen Equipment
Toaster	1	3 kW	elec	10	0.1%	Kitchen Equipment
Bread Warmer	1	3 kW	elec	40	0.4%	Kitchen Equipment
Hot Server	1	3 kW	elec	20	0.2%	Kitchen Equipment
6' Cold Server	1	1 kW	elec	20	0.1%	Kitchen Equipment
Auditorium Audio Visual	1	0.5 kW	elec	60	0.1%	Miscellaneous
TVs	25	0.15 kW	elec	10	0.1%	Miscellaneous
Dishwasher	1	0.4 kW	elec	5	0.0%	Miscellaneous
Home Science Ranges	3	6 kW	elec	5	0.3%	Miscellaneous

4 Equipment Inventory

Miscellaneous Equipment						
Description	**Qty**	**Capacity**	**Fuel**	**Hrs/Wk Usage**	**% Fuel Usage**	**End-Use**
Soda Machines	10	1 kW	elec	70	2.2%	Refrigeration
Ice Machine- Gym	1	1 kW	elec	40	0.1%	Miscellaneous
Commercial Washer	1	1.5 kW	elec	20	0.1%	Miscellaneous
Commercial Dryer	1	10 MBH	gas	20	3.4%	Miscellaneous
20 kW Cogeneration Units	2					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	70 exit sign fixtures, each using LED technology.	168
2	Classrooms	744 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	60
3	Auxiliary Gyms	40 recessed lensed 2X4 fixtures, each using 3,4' T8 lamps and electronic ballasts.	60
4	Gym	20 high bay fixtures, each using 250-Watt metal halide lamps.	70
5	Gym	12 high bay fixtures, each using 400-Watt metal halide lamps.	70
6	Locker Rooms	52 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	70
7	Restrooms	24 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	90
8	Stairs & Halls	282 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	110
12	Library Office	3 recessed lensed 2X4 fixtures, each using 3,4' T8 lamps and electronic ballasts.	50
13	Library	80 pendant-mounted fixtures, each using 1,4' T8 lamp and electronic ballast's.	60

4 Equipment Inventory

Lighting Equipment			
Line #	**Area**	**Description**	**Hrs/Wk Usage**
14	Library	30 recessed fixtures, each using 1,4' T8 lamp and electronic ballast's.	60
15	Library	12 track lighting fixtures, each using 65-Watt, incandescent "flood" lamps.	50
16	Consumer Science	20 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
17	Social Studies Office	8 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
18	Administration Offices	112 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	65
19	Guidance Copy Room	1 porcelain lampholder fixture using 100-Watt, incandescent lamps.	50
20	Auditorium	168 cove fixtures, each using 1,4' T8 lamp and electronic ballast's.	50
21	Auditorium Dimming	65 hi-hat fixtures, each using 150-Watt, incandescent "flood" lamps.	30
22	Stage	12 high bay fixtures, each using 200-Watt, incandescent "flood" lamps.	40
23	Mediation Room	4 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
24	Kitchen	23 surface-mounted wrap 1X4 fixtures, each using 3,4' T8 lamps and electronic ballasts.	70
25	Kitchen Office	2 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
26	Hot Lunch Kitchen	6 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	45
27	Cafeteria	138 surface-mounted wrap 1X4 fixtures, each using 3,4' T8 lamps and electronic ballasts.	50
28	Gym Office	5 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	50
29	Music Room	15 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	45
30	Shop	34 surface-mounted wrap 1X4 fixtures, each using 3,4' T8 lamps and electronic ballasts.	45

4 Equipment Inventory

Lighting Equipment			
Line #	**Area**	**Description**	**Hrs/Wk Usage**
31	Chiller Room	11 surface-mounted wrap 1X4 fixtures, each using 4, 4' T8 lamps and electronic ballasts.	20
32	Chiller Room	6 surface-mounted wrap 1X4 fixtures, each using 2, 4' T8 lamps and electronic ballasts.	20
33	Pool	23 high bay fixtures, each using 400-Watt metal halide lamps.	75
34	Pool Over Stands	11 high bay fixtures, each using 250-Watt metal halide lamps.	75
35	Pool Office	4 recessed lensed 2X4 fixtures, each using 4, 4' T8 lamps and electronic ballasts.	60
53	Foyer	12 hi-hat fixtures, each using 22-Watt, compact fluorescent, screw-in lamps .	70
54	Outdoor Field Lights	12 pole-mounted fixtures, each using 400-Watt high pressure sodium lamps.	90
55	Outdoor Security Lights	35 wall-mounted fixtures, each using 150-Watt high pressure sodium lamps.	90
56	Outdoor Security Lights	19 recessed fixtures, each using 70-Watt high pressure sodium lamps.	90
57	Doorway	2 jelly-jar fixtures, each using 60-Watt, incandescent lamps.	60
58	Outdoor Wall	1 wall-mounted fixture using 2, 150-Watt, incandescent "flood" lamps.	30
59	Outdoor Wall to Football Field	1 wall-mounted fixture using 400-Watt high pressure sodium lamps.	90
60	Garage	2 surface-mounted wrap 1X4 fixtures, each using 2,4' energy-efficient lamps and ballasts.	40
61	Main Entrance	3 pole-mounted fixtures, each using 100-Watt high pressure sodium lamps.	90
62	Flag Pole	1 wall-mounted fixture using 100-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.

Line # - Area	Action	Material Cost	Labor Cost	Total Cost	Annual Savings	Payback	Rebate Each*	Total Rebate*	Cost After Rebate	Payback After Rebate
4 - Gym	For the existing 20 high bay fixtures, each using 250-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 20)	$3,600	$2,700	$6,300	$331	19.0 years	$35	$700	$5,600	16.9 years
5 - Gym	For the existing 12 high bay fixtures, each using 400-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 12)	$2,160	$1,620	$3,780	$1,038	3.6 years	$35	$420	$3,360	3.2 years
15 - Library	For the existing 12 track lighting fixtures, each using 65-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 40-Watt. (New qty: 12)	$54	$32	$86	$143	0.6 years			$86	0.6 years
19 - Guidance Copy Room	For the existing 1 porcelain lampholder fixture using 100-Watt, incandescent lamps, retrofit with 22-Watt compact fluorescent screw-in lamps. (New qty: 1)	$20	$5	$25	$37	0.7 years			$25	0.7 years
21 - Auditorium Dimming	For the existing 65 hi-hat fixtures, each using 150-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 120-Watt. (New qty: 65)	$293	$176	$469	$641	0.7 years			$469	0.7 years
22 - Stage	For the existing 12 high bay fixtures, each using 200-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 150-Watt. (New qty: 12)	$54	$32	$86	$242	0.4 years			$86	0.4 years
33 - Pool	For the existing 23 high bay fixtures, each using 400-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 23)	$4,140	$3,105	$7,245	$2,495	2.9 years	$35	$805	$6,440	2.6 years
34 - Pool Over Stands	For the existing 11 high bay fixtures, each using 250-Watt metal halide lamps, install new open high-bay fixtures with 4 T5 fluorescent lamps (54 Watt) and electronic ballasts. (New qty: 11)	$1,980	$1,485	$3,465	$105	33.0 years	$35	$385	$3,080	29.3 years
57 - Doorway	For the existing 2 jelly-jar fixtures, each using 60-Watt, incandescent lamps, retrofit with 18-Watt compact fluorescent screw-in lamps. (New qty: 2)	$32	$9	$41	$35	1.2 years			$41	1.2 years
60 - Garage	For the existing 2 surface-mounted wrap 1X4 fixtures, each using 2,4' energy-efficient lamps and ballasts, retrofit with T8 lamps and lo-power electronic ballasts.	$63	$45	$108	$11	9.8 years			$108	9.8 years

***Important 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.

Long Island Power Authority – Summary Energy Audit Report for:

Deer Park Schools Deer Park High School

Printed: 10/16/07

Audit Date: 10/3/2007

Site:
Deer Park Schools Deer Park High School
30 Rockaway Ave
Deer Park, NY 11729

LIPA main account number:
724-44-7215-17

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

Annual Energy Costs:

Fuel Oil	$224,715
Electricity	$277,819
Natural Gas	$4,302
Total	$506,836

Description	Potential Rebate*	Cost After Rebate	Annual Savings	Payback with Rebate	% of Annual Energy Cost
Upgrade the Lighting	$2,310	$19,293	$5,078	3.8 years	1.0%
Install Lighting Controls	$2,170	$16,310	$11,762	1.4 years	2.3%
Improve Temperature Control	$50	$12,950	$49,213	0.3 years	9.7%
Upgrade the HVAC		$1,820	$7,328	0.2 years	1.4%
Improve the Motors		$2,723	$589	4.6 years	0.1%
Totals	**$4,530**	**$53,096**	**$73,970**	**0.7 years**	**14.6%**

* **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.
- Install new heating, ventilation, or air conditioning products to reduce the amount of energy required to condition your indoor environment.
- Install new motor products to reduce the amount of energy consumed by your motor-operated equipment.