

ENERGY SAVINGS FOR A K-12 SCHOOL

Background

The facility studied in this audit is an elementary school located in Anchorage, Alaska that covers approximately 62,000 ft² of floor area. The facility also has two portable classrooms located on the school's property. The facility had an annual electrical energy consumption of over 506,000 kilowatt-hours (kWh) per year and an annual natural gas consumption of over 70,000 therms per year. The total energy costs were estimated to be approximately \$71,000 each year.



Potential Energy Savings

The energy efficiency opportunities recommended could potentially save an estimated 106,852 kWh of electrical energy each year, or about 21% of the facility's total electrical energy usage. The recommendations could reduce the facility's electrical demand by about 26.5 kW. The energy efficiency opportunities recommended could potentially save an estimated 19,149 therms of natural gas energy per year, or about 27% of the facility's total natural gas usage. The potential total annual cost savings due to implementing all of the recommended measures was estimated to be approximately \$14,219 per year. Total estimated implementation cost was about \$32,010 giving an average simple payback of 2.3 years.

SUMMARY OF ENERGY EFFICIENCY OPPORTUNITIES SAVINGS AND COSTS					
Description	Potential Energy Conserved	Demand Savings (kW)	Potential Savings (\$/yr)	Implem. Cost (\$)	Simple Payback (years)
1 Turn Off Computers and Monitors During Evenings and Weekends	9,420 kWh/yr	0.00	466	0	Immed.
2 Pull Blinds Down During Evenings and Weekends	945 therms/yr	N/A	294	0	Immed.
3 Setback the Temperature Level During Evenings and Weekends	3,632 kWh/yr 18,204 therms/yr	0.00	5,840	150	Immed.
4 Delamp Lighting or Install Separate Switching Circuits in Corridors, Computer Room and Front Office	7,907 kWh/yr	2.55	726	640	0.9
5 Separate Corridor Lighting Circuits	6,194 kWh/yr	5.10	493	640	1.3
6 Control and Setback Temperature of Relocatable Classrooms	24,522 kWh/yr	0.00	1,187	2,300	1.9
7 Replace HID Lighting with High Efficiency Fluorescent Lighting	36,325 kWh/yr	15.08	3,766	15,600	4.1

SUMMARY OF ENERGY EFFICIENCY OPPORTUNITIES SAVINGS AND COSTS (CONT'D)						
Description	Potential Energy Conserved	Demand Savings (kW)	Potential Savings (\$/yr)	Implem. Cost (\$)	Simple Payback (years)	
8 Install Light Sensors in Arctic Entryways	2,128 kWh/yr	0.84	228	1,449	6.4	
9 Replace Current Laminator with Cold Laminator	2,350 kWh/yr	1.25	269	1,900	7.1	
10 Install a Variable Frequency Drive on Glycol Pumps	14,374 kWh/yr	1.64	950	9,331	9.8	
Totals	(Electricity)	106,852 kWh/yr	26.46 kW	\$14,219/yr	\$32,010	2.3 years
	(Natural Gas)	19,149 therms/yr				

Major Opportunities for Energy Efficiency

Summaries of some of the major energy efficiency measures are briefly described as follows.

Measure 3 – Setback Temperature Level During Evenings and Weekends

Based on observations made by the audit team while at the facility, most of the facility was controlled at a constant temperature of 70 °F even during the weekend, which is when the school is typically unoccupied. It is recommended that the facility utilize the current EMS system in place to setback the temperature of the school to 60 °F during evenings and weekends when the school is typically unoccupied. Setting back the temperature when the school is unoccupied will reduce the usage of the boilers and air handlers resulting in electrical and natural gas energy savings. eQuest was used to develop a model of the school building and simulated to determine the estimated energy savings due to setting back the temperature during weekends and evenings.

Various Lighting Measures

Several energy efficiency measures involving lighting the facility were recommended. From replacing high-intensity discharge lamps to separating corridor lighting circuits, the lighting measures resulted in electrical energy savings over 50,000 kWh per year, with a potential demand reduction of over 23 kW.

