

ENERGY DESIGN REVIEW FOR A NEW K-12 SCHOOL

Background

A detailed review of the design documents as well as the architectural, mechanical and electrical plans was performed for the planned construction of a new K-12 school in Anchorage, Alaska for the purposes of energy efficiency. The proposed facility is a two-story building encompassing a total enclosed area of approximately 171,000 ft². The review included the following:

- Evaluation of structural plans for energy efficiency
- Evaluation of the mechanical systems for energy efficiency
- Evaluation of electrical systems for energy efficiency
- Modeling and hourly simulation of the building for
 - Alternative HVAC Designs
 - Savings calculations for energy efficiency measures

Potential Energy Savings

Seven energy efficiency measures were identified in this project, with simple paybacks ranging from immediate to 5.9 years. The measures included in this report could save an estimated 226,069 kWh of electrical energy each year and an estimated 17,526 therms of natural gas energy per year. The total first year cost savings was estimated to be approximately \$29,406 per year. Total estimated implementation cost premium was estimated to be \$29,709 giving an average simple payback of 1.0 year.

SUMMARY OF SAVINGS AND COSTS						
Description	Potential Energy Conserved	Demand Savings (kW)	Potential Savings (\$/yr)	Implem. Cost Premium (\$)	Simple Payback (years)	
1 Reduce Light Levels in Offices	3,215 kWh/yr	1.71	409	0	Immed.	
2 Reduce Light Levels in Hallways	51,840 kWh/yr	13.50	5,818	0	Immed.	
3 Separate Zones for 1 st and 2 nd Floor Classrooms	91,000 kWh/yr 9,000 therms/yr	0.00	7,316	0	Immed.	
4 Reduce Light Levels in Second Floor House Commons	17,898 kWh/yr	9.52	2,279	1,008	0.4	
5 Reduce Light Levels in Gymnasium and Dance Area	50,881 kWh/yr	24.46	8,899	7,136	0.8	
6 Install Daylight Sensors in Perimeter Spaces	11,235 kWh/yr	9.96	2,015	5,705	3.9	
7 Install Economizer on Hot Water Boilers to Preheat Boiler Feedwater	8,526 therms/yr	N/A	2,670	15,860	5.9	
Totals	(Electricity)	226,069 kWh/yr	59.15 kW	\$29,406/yr	\$29,709	1.0 year
	(Natural Gas)	17,526 therms/yr				