

Point Lay Heat Recovery Project



Point Lay, Alaska



Heat recovery project reduces local energy costs and emissions

Project Overview

In partnership with the Alaska Energy Authority (AEA), the North Slope Borough (NSB) designed and constructed a heat recovery project in the community of Point Lay, Alaska. The system connects the NSB Health Clinic, Search & Rescue Office, and Police Department to their diesel-generated power plant. These buildings utilize recovered heat from the plant that would otherwise be emitted into the atmosphere via radiators.

Objectives

The project objectives were to deliver recovered heat from the diesel plant to several buildings in Point Lay and to reduce heating costs to the power house.

Heat Recovery-How it Works

As a rule of thumb, engines are 30 percent efficient. That is, of the fuel energy input, 30 percent each goes to horsepower, jacket water heat, and exhaust heat. Ten percent goes to radiation and other losses. Jacket water cools the engine by dissipating almost 28 percent of the heat it generates. This heat is low grade and is sent to the atmosphere using radiators or cooling towers. Heat recovery is a unique system that takes heat captured in the jacket water and harnesses it for space heating. The jacket water loop is isolated from the building heating loop by a heat exchanger so that the heat recovery system does not impact engine performance.

Economic Feasibility

The system became operational in August of 2013. Between August 2013 and December 2014 it produced 2,153 MMBtu of thermal energy and displaced 20,000 gallons of diesel fuel. This displacement has saved Point Lay \$98,000. If the project continues to operate at this level it will pay for itself in less than five years.

Quick Facts

Total Project Costs: \$435,503

Funding: Renewable Energy Fund & Local Match

Capital Costs

Design: \$39,591

Construction: \$395,912

Equipment

Generator Make/Model: Caterpillar 3508 (Marine)
Output: 682 BKW, or 915 BHP

Diesel Fuel Offset

Estimated Annual: 6,000 gallons

Actual Annual: 20,000 gallons

Aug. 2013-Dec. 2014: 20,000 gallons

Fuel Savings

Estimated Annual: \$46,000

Actual Annual: \$98,000

Aug. 2013-Dec. 2014: \$98,000

Benefit/Cost Ratio: 1.37

Simple Payback: 4.4 years



Diesel engine with attached heat recovery system, photo courtesy of AEA.

Point Lay Heat Recovery Project

"Project benefits include local construction jobs, a clean energy source, increased heating reliability, increased system-wide flexibility, and much more."

Allocation of Funding

The Alaska Energy Authority's Renewable Energy Fund granted \$395,912 for the final design and construction of the heat system. Local funds matched \$39,591 and contributed to the construction.

Relevant Information

The heat recovery system is designed to reduce the amount of fuel consumed at the end user building and is not intended to serve as a primary heat source. The heating system in the end user building must be fully operational, maintained, and set to operate at appropriate temperatures to allow the heat recovery system to function. The amount of heat available for recovery varies with the electrical load on the generators.

Learning Experiences/Challenges

The new Point Lay power plant and heat recovery system was completely destroyed by fire in October of 2011 as it was nearing the completion of the construction phase. Luckily, the original power plant was still in operation and was not damaged by the fire. The cause of the fire appeared to be sparks from welding that ignited during the night. **Proper safety oversight and burn permits could have prevented this.** The North Slope Borough and the construction contractor were insured, but the rebuild of the system delayed the project by two years.



Portion of heat recovery system, photo courtesy of AEA.

Community Benefits

The primary community benefit of this project is the lowered cost of heating the North Slope Borough community buildings. The savings to the community can be added to the maintenance and equipment replacement funds to offset future costs.

Other benefits include local construction jobs, a clean energy source, increased heating reliability, increased system-wide flexibility, less air pollution in the village from decreased fuel use, lower probability of fuel spills in the village, and reduced maintenance of heating plants in each building.



Point Lay Powerhouse, photo courtesy of Skweskimos.com

Project Contact information

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