

Delta Junction Wood Chip Heating



Delta Junction, Alaska



Biomass project saves teaching position and reduces fire risk

Project Overview

In partnership with the Alaska Energy Authority (AEA), the Delta Greely School District designed and constructed a wood chip boiler system to heat the Delta School. Hot water is piped from the boiler to the school's existing heating system. The fuel oil system remains in place as an automatic backup.

Objectives

- Reduce the energy costs to the school district
- Displace fuel oil with a local wood fuel
- Develop a chip industry in the region
- Create much needed jobs
- Mitigate wildfire risk

Reasons Biomass was Chosen

The primary reason the community chose a wood chip heating system over an alternate renewable energy source was for the added benefit of reducing wildfire hazards in the area. There are more than four million acres of forest in the Delta Junction vicinity. The school also standardized their boiler equipment with Tok School's wood heating equipment to streamline operations and maintenance.

Economic Feasibility

The project became operational in September of 2011. Between September 2011 and December 2014, it produced 9,988 MMBtu of thermal energy and displaced 96,000 gallons of fuel oil. This displacement has saved the community \$297,000. With proper maintenance, the boiler life is expected to exceed 20 years. Additional benefits will be realized; the project will continue to use an energy source that keeps fuel payments in the local economy and creates local employment.

Quick Facts

Total Project Costs: \$2.8 million

Funding: Renewable Energy Grant Fund: \$2 MM
Other State Funding: \$800,000

Capital Costs

Design: \$248,086
Construction: \$2,551,914

Equipment

Output: 200 yards/hour for Spruce trees
Boiler Make/Output: Messersmith, 5.5 MMBtu/hr

Fuel Oil Offset

Estimated annual: 60,000 gallons
Actual annual: 29,000 gallons
Comprehensive savings: 96,000 gallons
(Sept. 2011-Dec. 2014)

Fuel Savings

Estimated Annual: \$135,000
Actual Annual: \$97,000
Comprehensive savings: \$297,000
(Sept. 2011-Dec. 2014)

Jobs Created: 1 Full-time Operator, 4 Part-time

"In 2015, Delta combined all K-12 students into the high school building, allowing all students to be warmed by renewable biomass."

Messersmith boiler system, photo courtesy of Delta Greely School District.



Delta Junction Wood Chip Heating

Allocation of Funding

The Alaska Energy Authority's Renewable Energy Grant Fund contributed \$2 million for the purchase of the wood chip-fired boiler and the construction of the boiler and fuel storage building. The state also granted \$800,000 for the chip storage, vans, labor, and plumbing and piping costs.

Fuel and Storage

Wood chips are provided by Logging and Milling Associates for approximately \$63/ton. They are transferred from the fuel storage bunker via a traveling auger and dropped onto a conveyor belt that transfers the chips into the boiler. The Delta High School's estimated energy need is 1,400 to 2,100 tons of wood chips per year.

Learning Experiences/Challenges

Operating and maintaining a chip boiler is a commitment. The school maintenance worker was not originally involved in the boiler's design and was concerned about the impact to his job. He did eventually become a strong supporter of the project, but earlier input and support would have been beneficial and could have resulted in a more effective design.

Fuel quality is extremely important to the successful generation of the biomass boiler. Silica-heavy spruce-needles, dirt, and other contaminants created clinkers in the combustion chamber and increased maintenance and downtime. Although a common misconception, allowing dirt and contaminants to be burned with the wood even for a short time proves detrimental to the system.



Hurst boiler, photo courtesy of Reba Lean.

Community Benefits

Cost savings from the biomass boiler allowed the high school to add a teaching position in the fall of 2015 as well as restart the preschool program. In the school's science classes, students participate in moisture testing and visit the boiler facility to understand combustion.

Students in the career vocational program have the opportunity to train in boiler operations. Community members are excited about the educational experience because it has the potential to inspire even more growth and discovery in local biomass development.

In the summer of 2015, Delta combined all K-12 students into the high school building, allowing all Delta Junction students to be warmed by a local, renewable energy resource.



Boiler storage facility, photo courtesy of AEA.

Project Contact Information

Parties Involved:

Laural Jackson, DGSD Superintendent
Email: ljackson@dgsd.us
Phone: 907-895-4657, ext. 21

Bill Burr, maintenance & operations director
Email: bburr@dgsd.us
Phone: 907-803-0003

Case Study Author:

Zoe Tressel, AEA Intern
Website: Akenergyauthority.org

Updated February, 2016