Galena Biomass Project

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Sustainable Energy for Galena, Alaska
Presentation Agenda

- Project History
- Wood Fuel Supply
- Heating System

Sustainable Energy for Galena, Alaska
Project History

Former Galena Air Base

- Ownership transition to City of Galena

- Rural Energy Issues
  - Inefficient and aging infrastructure
  - Old steam distribution system consumed ~230,000 gallons annually
  - Expensive diesel fuel

- Alaska Energy Authority – Renewable Energy Fund Grant
Project History

Former Galena Air Base

- Project Feasibility Studies
- Gana-A ‘Yoo, Limited Forest Stewardship Plan
- Steam Utilidor Assessment
- Forest Inventory of Galena Working Circle
- Engineering Design
Project History

Timber Harvest Entity

- The City of Galena, Galena City School District (GCSD) and Louden Tribal Council (LTC) created a local non-profit organization, Sustainable Energy for Galena, Alaska (SEGA) tasked with providing wood fuel supply

- Gana-A ‘Yoo, Limited, the City of Galena and SEGA entered into a 20-year Timber Sale Agreement
Wood Fuel Supply

SEGA – Organized in Fall 2014

- 20-year contract
- 4720 acres
- Predominantly deciduous species
- Mixed conifer and hardwood

- Winter Timber Harvest & Chip Processing
  - (4 successful seasons)
  - Harvest 25 acres/year
Wood Fuel Supply

Hitachi ZX200 with Waratah 622B processor
Wood Fuel Supply

Log bunks positioned in harvest unit area, ~2-3 cords per bunk
Wood Fuel Supply

John Deere 748G-III Skidder

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Wood Fuel Supply

Log-landings positioned on temporary trail
Wood Fuel Supply

Peterbilt self-loading log truck
Wood Fuel Supply

One season of passive drying has resulted in an average of 32% Moisture Content ($\text{MC}_{\text{wb}}$)
Wood Fuel Supply

Bandit M1400 knife-chipper
Wood Fuel Supply

Bulk Chip Storage, 2-3 weeks of fuel when full
Heating System

Day-bin, 4-5 days worth of fuel when full
Heating System

Automated auger, conveyor belt and metering-bin feed system
Heating System

Burn-box rear feed system and front access door
Heating System

Former Galena Air Base

- 2016 Summer Construction Season

- Installed heat distribution and new domestic water line

- Converted existing diesel boilers for hot-water/glycol, installed 4.5 MMBtu Messersmith burn-box with Hurst Boiler and performed several additional support tasks

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Heating System

Convert from a steam to hot water heat distribution system
Heating System

Above-grade segment of distribution lines, some segments are below-grade
Results

Est. 16.5 billion Btu Heat Requirement

Annual averages:

- Oil used – 40,000 gallons (g)
- Wood used - 1600 green tons (gt)
- Oil displaced - 195,000 g
- Oil displaced due to biomass – 95,000 g
- New money introduced to local economy - $415,000

Previous Steam system used 230,000 g/year
System improvements alone provide 100,000 g savings.

- Cost of Oil - $5.50/g
- Cost of Wood - $259/gt
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