



U.S. DEPARTMENT OF ENERGY
CHP Technical Assistance Partnerships
NORTHWEST

STEVENS VILLAGE, ALASKA, POWER PLANT & RECOVERED HEAT FACILITIES

Facility Description

The Village Council operates the electric utility in Stevens Village, Alaska. The power plant is a 30'x48' foam-core panel building on a steel piling foundation, see *Figure 1*. The power plant building was constructed new in 2003. The power plant is equipped with four diesel generators with a total capacity of 260 kW. Power is generated at 480V and is provided to the community via three phase 7.2/12.47kVA step-up transformers and a three-phase overhead distribution system. The 2005 annual electric generation is approximately 202,000 kWh, see *Figure 2*.

Heat from the diesel generator cooling system is used to heat the power plant building and is pumped through above grade insulated arctic pipe from the power plant to the nearby washeteria, refer to *Figure 3* and attached site plan and schematic. Heat exchangers located in the power plant and washeteria isolate the generator cooling system from the arctic piping and washeteria hydronic heating system.

Combined Heat and Power (CHP) Equip.

Power Plant

- Generators (#1 diesel fuel engines)
 - o John Deere 6068 95 kW
 - o John Deere 4045M 64 kW (marine jacketed)
 - o John Deere 4045M 64 kW (marine jacketed)
 - o John Deere 3029 37 kW
- Heat Exchanger (HX-1), brazed plate, 200 MBH, Ameridex SL140TL-LL-52
- Circulating pump (P-HR1), 29 gpm @ 11' TDH, 1/6 hp, 115V, 1 phase, Grundfos UP50-75F
- Circulating pump (P-HR3), 29 gpm @ 11' TDH, 1/6 hp, 115V, 1 phase, Grundfos UP50-75F

End User

- Washeteria
 - o Heat Exchanger (HX-2), brazed plate, 200 MBH, Ameridex SL140TL-LL-52
 - o 2 each boilers (B-1, B-2)



Figure 1: Stevens Village Power Plant

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Cooperating agencies: Washington State University Energy Program, U.S. Department of Energy, Alaska Energy Authority, Idaho Department of Water Resources Energy Division, Montana Department of Environmental Quality Energy Program and Oregon Department of Energy

Estimated Fuel Savings

The heat recovery system was installed in 2003 to provide heat to the washeteria and has saved the Village approximately 2,000 gallons of heating fuel per year, see *Figure 4*.

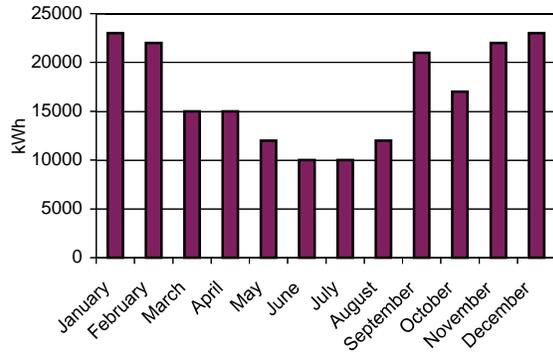


Figure 2: Electric Generation Profile

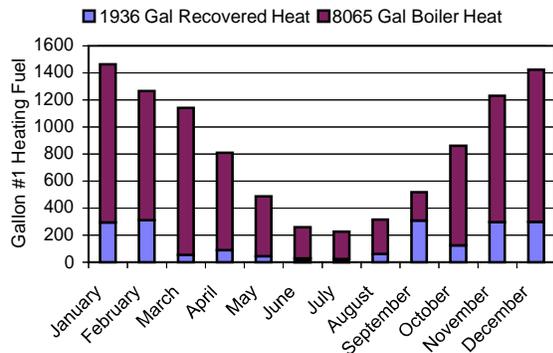


Figure 4: Thermal Energy Provided

Additional Considerations

A combination of "marine jacketed" and "non-marine jacketed" generators are used to meet the electric demand and to maximize recovered heat potential, and provide excellent fuel economy.



Figure 3: Heat Recovery System