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

ANVIK, ALASKA, POWER PLANT AND RECOVERED HEAT FACILITIES

Facility Description

Alaska Village Electric Cooperative (AVEC) operates the electric utility in Anvik, Alaska. The existing power plant is a 15'x36' insulated metal building on a wood post and pad foundation, *see Figure 1*. The power plant building was constructed in the mid 1970's and was relocated to its present site in the late 1990's. The power plant is equipped with three diesel generators with a total capacity of 495 kW. Power is generated at 208/120V three phase, and is provided to the community via 208/7.2kVA step-up transformers, and a three-phase overhead distribution system. The 2005 annual electric generation is approximately 461,500 kWh/year, *see Figure 2.*

Heat from the diesel generator cooling system is used to heat power plant facilities and is pumped through below grade insulated arctic pipe from the power plant to the nearby school building boiler module, *refer to Figure 3 and attached site plan and schematic*. Heat exchangers isolate the generator cooling system and school hydronic systems from the below grade arctic piping.

Combined Heat and Power (CHP) Equipment

Power Plant

- Generators (#1 diesel fuel engines)
  - Detroit Diesel Series 60 rated 207 kW
  - Cummins LTA-10 rated 168 kW
  - CAT 3304B rated 120 kW
- Heat exchanger (HX-1), brazed plate, 200 MBH, Ameridex SL140TL-KK-80
- Circulating pump (P-4), 30 gpm @ 11' TDH, 1/6 hp, 115V, 1 phase, Grundfos UP50-75F

Figure 1: Anvik Power Plant

End Users

- School Boiler Module
  - Heat exchanger (HX-2), brazed plate, 200 MBH, Ameridex SL140TL-KK-80
  - Circulating pump (P-3), 30 gpm @ 11' TDH, 1/6 hp, 115V, 1 phase, Grundfos UP50-75F
  - 2 each boilers (B-1, B-2), oil fired 400 MBH, Weil McLain BL478WF, Beckett CF500W oil burner, 3.4 GPH

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Estimated Fuel Savings

The heat recovery system was installed in 1999 to provide heat to the school and saved the school approximately 5,000 gallons of heating fuel per year, *see Figure 4*.

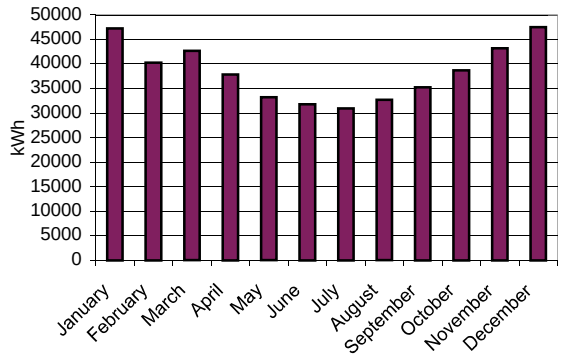

Figure 2: Electric Generation Profile

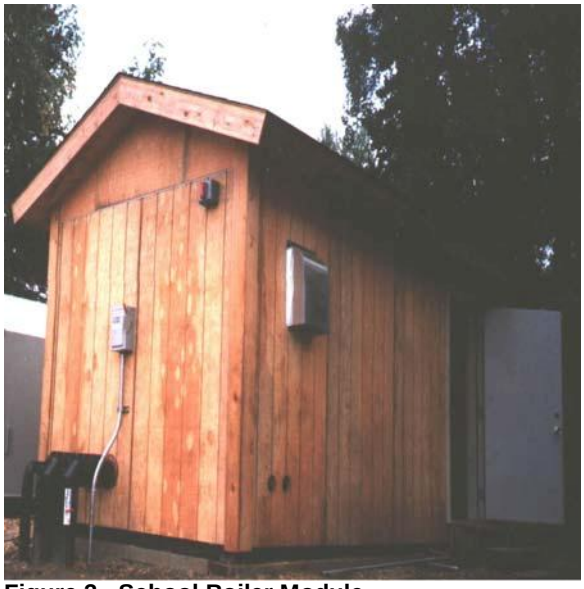

Figure 3: School Boiler Module

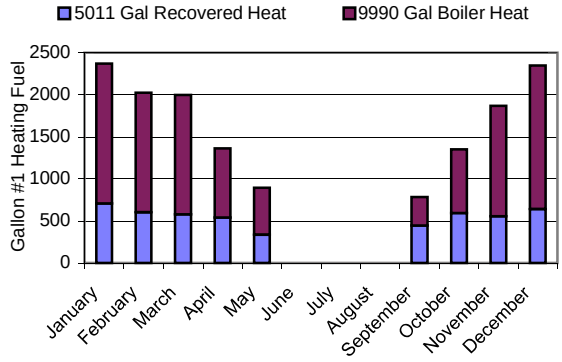

Figure 4: 1999 Thermal Energy Provided

Additional Considerations

In circa 2004, the plant cooling system was modified to provide heat to two uninsulated 8'X20' storage containers and one insulated 8'x20' crew living quarters. Due to the high heat demand of the uninsulated storage containers there is no longer any recovered heat available to the school, *see Figure 5*. Should the storage containers be insulated equivalent to a minimum R13 envelope, it is estimated there would be enough recovered heat available to save the school approximately 3,200 gallons of diesel fuel per year, *see Figure 6*.

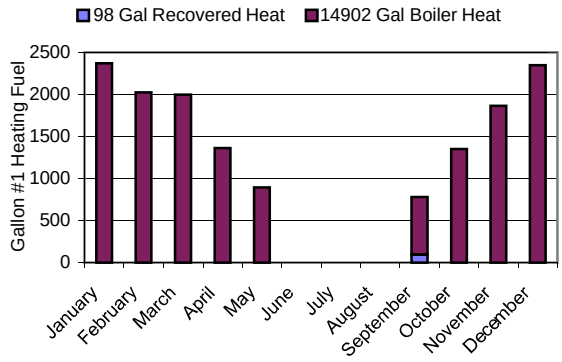

Figure 5: 2005 Thermal Energy Provided

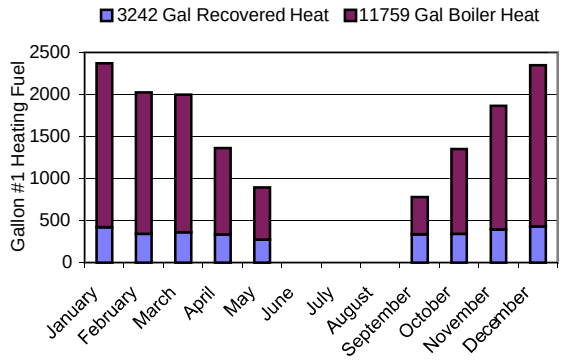

Figure 6: Potential Thermal Energy Provided