



U.S. DEPARTMENT OF ENERGY

CHP Technical Assistance Partnerships

NORTHWEST

KOKHANOK, ALASKA, POWER PLANT AND RECOVERED HEAT FACILITIES

Facility Description

The City operates the electric utility in Kokhanok, Alaska. The power plant is a 30'x48' foam-core panel building on a concrete slab foundation, *see Figure 1*. The power plant building was constructed new in 2004. The power plant is equipped with four diesel generators with a total capacity of 495 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 420,000 kWh, *see Figure 2*.

Heat from the diesel generator cooling system is used to heat the school complex and is pumped through below grade insulated arctic pipe from the power plant to the nearby school mechanical building, *refer to Figure 3 and attached site plan and schematic*. A single heat exchanger located in the power plant isolates the generator cooling system from the arctic piping and the school hydronic heating systems.

Combined Heat and Power (CHP) Equip.

Power Plant

- Generators (#1 diesel fuel engines)
 - o John Deere 4045 60 kW
 - o John Deere 6068 115 kW
 - o John Deere 6081 160 kW
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- Heat Exchanger (HX-1), brazed plate, 300 MBH, Ameridex SL140TL-LL-80
- Circulating pump (P-HR1), 35 gpm @ 7' TDH, 1/6 hp, 115V, 1 phase, Grundfos UP50-75F

End User

- School
 - o Circulating pump (P-HR3), 40 gpm @ 8' TDH, 1/3 hp, 115V, 1 phase, Grundfos UPS40-40
 - o Boiler (B-1), oil fired 408 MBH, Weil McLain BL676SW
 - o Boiler (B-2), oil fired 886 MBH, Weil McLain BL878SW



Estimated Fuel Savings

The heat recovery system was installed in 2004 to provide heat to the school and saved the school approximately 4,900 gallons of heating fuel per year, see Figure 4.

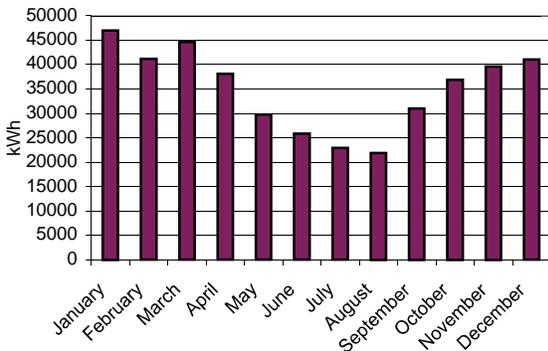


Figure 2: Electric Generation Profile

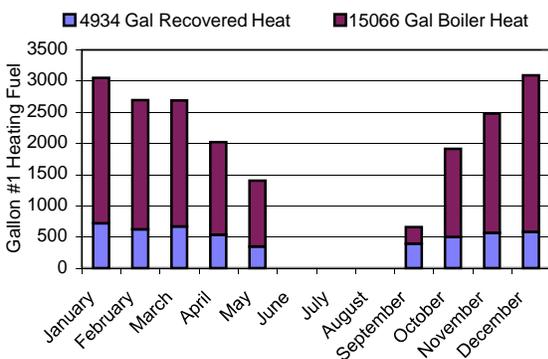


Figure 4: Thermal Energy Provided

Additional Considerations

When either of the smaller units is ready for replacement a marine manifold unit of similar capacity should be installed to increase the amount of jacket water heat available for recovery.



Figure 3: Heat Recovery System