Waste Heat Recovery System

TMEIC’s waste heat recovery (WHR) system is a custom engineered electrical generator running off stack gas waste heat, generating power, saving money, and possibly qualifying for government monetary awards for saving energy.

Applications

The WHR system saves energy from the huge amount of heat lost up the exhaust stack from industrial combustion installations such as:

- Steel reheat furnaces
- Glass furnaces

The diagram below shows how the waste heat is captured and converted to electric power in a turbine generator.
**System Operation**

The process steps to capture the waste heat and generate electrical power are:

1. A portion of the hot stack exhaust gases is transferred to the heat exchanger
2. In the exchanger, heat is transferred from the hot exhaust gases to a liquid such as water/glycol or thermal oil
3. This hot liquid is pumped to the heat recovery evaporator in the Organic Rankine Cycle (ORC) system.
4. The refrigerant is boiled in the evaporator and fed to an expander turbine which drives the electrical generator
5. The turbine generator generates electrical power which is fed to the mill distribution network
6. The exhaust refrigerant is condensed, using plant water as a heat sink, and pumped back to the evaporator to repeat the cycle
7. The master controller monitors the system variables such as pressure, temperature, and electrical power, and controls the variable speed pumps for optimum performance

**Power Levels and Savings**

The waste heat recovery systems come in a wide range of sizes and power levels. For example, a typical steel reheat furnace with 320 metric tons per hour capacity will provide recoverable waste heat of 760 kW. The energy savings, at $0.1125 per kWh electric cost, amount to $675,000 per year.

For more information on our heat recovery systems:
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