

Kirell Energy Systems, LLC

Affordable Energy Technology for Industrial Heat Recovery Operations



HPC-120

The breakthrough of the Kirell Energy Systems, LLC (KES) technology (patented) is its ability to very efficiently harness waste heat (down to 220°F) from industrial waste heat, landfill flares and biogas electrical generation equipment and efficiently converts this into electricity. The core technology is best described as a “Freon® engine”. A refrigerant is heated and thereby converted from liquid to pressurized gas by passing through a heat exchanger that absorbs normally discarded low-level waste heat. In a

controlled fashion, the pressurized gas is used to drive a proprietary expander that generates shaft power used to run a generator. Because the KES technology works in a closed loop system, the gas medium is cooled after passing through the expander and liquefied by a condenser. The liquid is collected for reuse. Using a liquid pump, the Freon is pumped into the waste heat exchanger to reinitiate the cycle. The electricity generated by the KES system may be used by the facility housing the KES system or sold back to the local utility. The net result is a significant improvement to the bottom line of a landfill operator.

FEATURES

- **Compatible with Industrial, Flare and Biogas Electrical Generation equipment**
 - ✓ **Flare - Integrating a HPC unit into flares enables a system to generate 500-5,000kW at a typical site**
 - ✓ **Biogas Electrical Generation - Up to 15% increase in electrical generation with no additional emissions**
 - ✓ **Industrial applications allows generation capabilities as small as 50KW from heat sources**
- **Low cost of operation - typically 75% less cost than reciprocating electrical generation equipment**

- **Fully automated operation - full PLC control of systems, with full failsafe safety features and emergency stops throughout the system**
- **Modular design enables quick installation**
- **The HPC unit easily integrates into existing customer equipment systems**
- **Configurable electrical output**
- **Cost, depending on whether a solar or waste heat will vary from \$1,800KW for waste heat to \$4,500KW for Solar Installations.**
- **Incentive programs are available for both technologies from state and federal programs.**
- **Equipment sizes vary with the amount of output required. Our larger expander style systems range in size up to 5 Mega Watts.**
- **Power generated can be either Synchronous or Inductive depending on power consuming requirements.**

SYSTEM SPECIFICATIONS

Physical: 120 KW WASTE HEAT UNIT (does not include cooling tower dimension)

Dimensions: 4' wide x 5' long x 6'tall

Weight: 3000 lbs.

Connections: 2- 2" water hose connection to KES unit

Thermo Input Requirements, 230° F at 150 GPM

Electrical:

Output, 230V- 4160V single or 3 phase / 60Hz.

Cooling Tower: 120 ton unit required which can be air or water or combined PAC system

Diagram 1
Kirell Waste Heat-to-Electric Energy System
'Patented'

