



## Efficiency is Everything

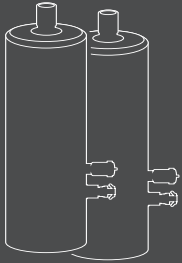
Carbon footprint reduction is a key component of sustainability efforts. Engine heaters on standby generators are an untapped source for energy efficiency. With a retrofit of Hotstart's HE-18 High Efficiency Engine Heater, end-users can see reduction in energy draw by up to 75% through the use of air-source heat pump technology.

### HE-18

Heat Capacity:  
Up to 5.25 kW  
GenSet:  
1 MW and larger  
Refrigerant:  
HFC-410A  
Total FLA:  
Up to 10.4A

## Existing Heaters

Reliable redundancy is achieved by plumbing the HE-18 in series with the existing engine heaters installed by the genset OEM. These resistance heaters work in tandem with the HE-18 through a programmable control interface, assuring gensets are properly heated at any ambient temperature. The testing environment contained two Watlow 4990W thermosiphon heaters.



## Thermosiphon Heaters - QTY 2

Wattage:  
9,980 W (9.9 kW) Total  
Circulation Method:  
Thermosiphon  
Set Temperature:  
38 °C (100 °F) [on] / 49 °C (120 °F) [off]



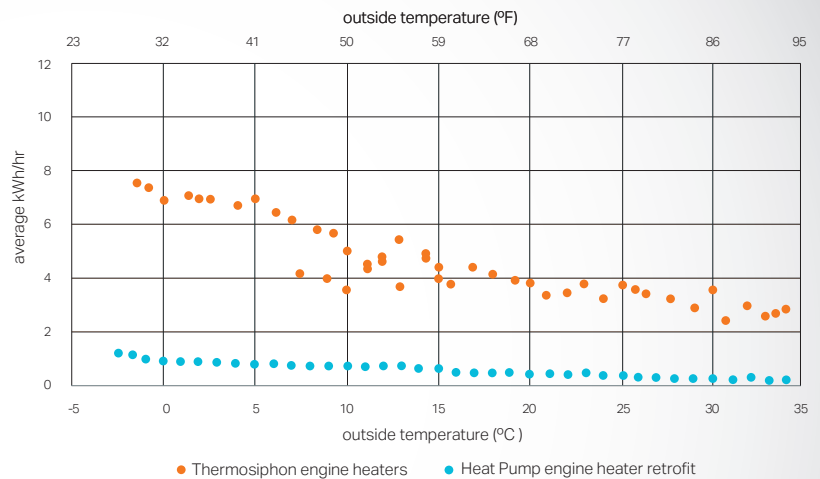
## Testing

A concrete generator room at the hospital site was selected to act as control and test environments for data capture. The generator room contained two Cummins KTA50-G3 16-cylinder engines coupled with a 1.25MW generator and two 4990W engine heaters for each engine.

Engine A with existing thermosiphon block heaters served as the baseline. Heater energy usage and room temperature was recorded every 30 seconds.

Engine B served as comparison to Engine A. The HE-18 was plumbed in series with the existing engine heaters and heater energy usage and room temperature was captured every 30 seconds. Average hourly energy usage (kWh/hr) was modeled relative to the hourly weather temperatures from the local weather station.

Heater average kWh/hr relative to outside temperature



## Energy Analysis

The HE-18 heat pump consumed 0.5 kWh/hr at 20 °C (68 °F) versus 3.7 kWh/hr for the existing heaters during the testing period. Based on the energy usage model of each heater and weather data for Spokane, Washington, the HE-18 is expected to result in an estimated annual savings of 32,000 kWh or 80% reduction as compared to the existing thermosiphon heaters energy usage.

	Thermosiphon Engine Heater	Heat Pump Engine Heater	Savings
Model predicted kWh consumed	48,500 kWh	22,800 kWh	25,700kWh (53%)