



# HIGH EFFICIENCY ENGINE HEATER

Energy Analysis - Hillsboro, OR

## 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-24 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.

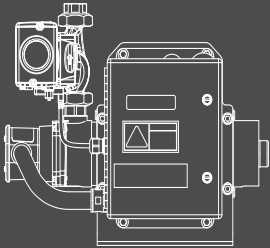
## HE-24

Heat Capacity:  
Up to 7 kW  
GenSet:  
1 MW and larger  
Total FLA:  
Up to 10.4A



## Existing Heaters

Reliable redundancy is achieved by plumbing the HE-24 in series with the existing engine heaters installed by the genset OEM. These resistance heaters work in tandem with the HE-24 through a programmable control interface, assuring gensets are properly heated at any ambient temperature. The testing environment included contained two enclosures, each with a generator with one Hotstart CSM 9kW forced circulation heater.



## CSM

Wattage:  
9,000W (9 kW) Total  
Circulation Method:  
Forced Circulation  
Set Temperature:  
60 °C (140 °F) [on] / 71 °C (160 °F) [off]



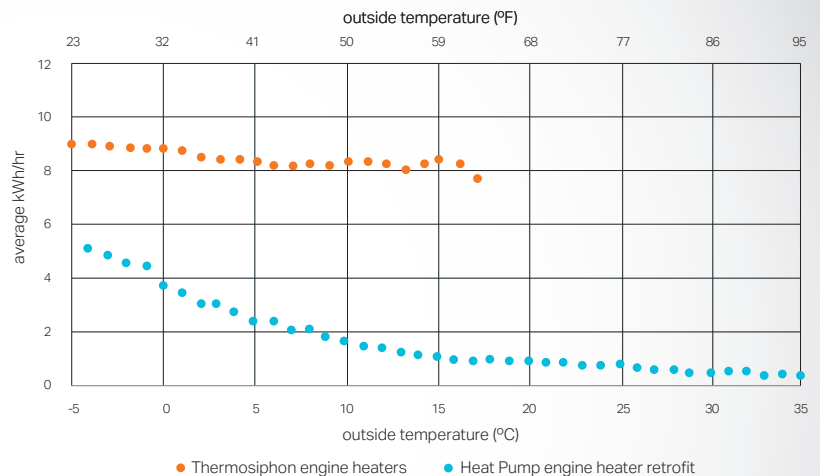
## Testing

Two outdoor generator enclosures at the data center site were selected to act as control and test environments for data capture. Each enclosure contained a CAT 3516 16-cylinder engine coupled with a 3 MW generator and one 9000W forced circulation engine heater for each engine.

Engine 2B with existing forced circulation engine heater served as the baseline. Heater energy usage and room temperature was recorded every 30 seconds.

Engine 2A served as comparison to Engine 2B. The HE-24 was plumbed in series with the existing engine heater and served as the primary heater. HE-24 energy usage and room temperature was captured every 30 seconds. Average hourly energy usage (kWh/hr) was modeled relative to the hourly weather temperatures

Heater average kWh/hr relative to outside temperature



## Energy Analysis

The HE-24 engine heater consumed 0.9 kWh/hr at 20° C (68° F) versus 8.4 kWh/hr for the existing heater during the testing period. Based on the energy usage model of each heater, additional energy savings measures recommended by Hotstart\*, and weather data for Hillsboro, Oregon, the HE-24 is expected to result in an estimated annual savings of 56,200 kWh or 78% reduction as compared to the existing engine heaters energy usage.

	Forced Circulation Engine Heater	Heat Pump Engine Heater	Savings
Model predicted kWh consumed	72,000 kWh	15,800 kWh	56,200 kWh (78%)

\*Savings include additional energy savings measures recommended by Hotstart