High Efficiency Gas Booster Heaters

A Pacific Energy Center Factsheet

Pacific Gas and Electric Company
Pacific Energy Center

How This Technology Saves Energy

Utilizing gas booster heaters to supply sanitizing water to a dishwashing machine can offer increased energy cost savings for an end-user. Some water heaters may not respond to the instantaneous water demands of a dishwasher and may suffer poor performance during peak dishwashing periods. High efficiency gas booster heaters can take the pressure off standard hot water heaters with the use of improved heat exchangers and solid state thermostats, which transfer a greater percentage of heat generated by the burners into the water.

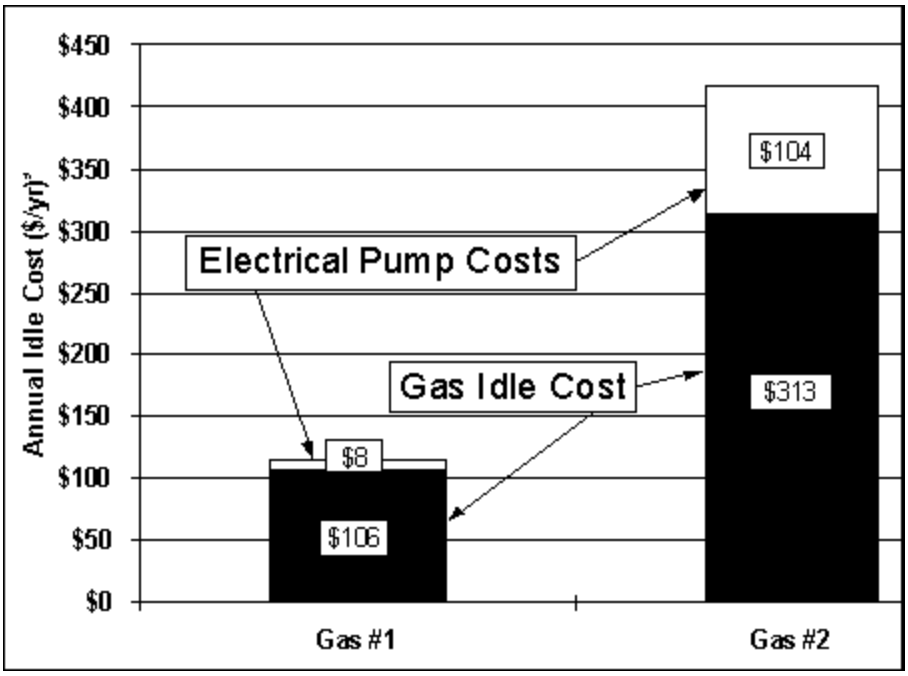
Energy Efficiency Measures Used in Gas Booster Heaters

Manufacturers have responded to the needs of end-users who have dishwashers that place a high demand on their standard water heater systems. They have responded by designing gas booster heaters that operate quickly, conveniently, and more efficiently. The improved designs have incorporated several energy-saving features into gas booster heaters.

- *Gas infrared burners* offer a compact and rapid means of heating water. This provides a fast response time when a load is placed on a booster heater.
- *Increased surface area on heat exchangers* improves energy efficiency. The increased surface area provides better opportunity for heat to transfer into the water.
- *Circulation pumps* move water from the heat exchanger to the storage tank. When water in the tank reaches the desired set-point, the smart circulation controls stop the pump. Decreasing the pumps on-time reduces heat losses and saves pump energy.
- *Insulated tanks* reduce stand-by or idle energy consumption. A booster heater spends several hours per day consuming energy in a "ready-to-use" mode. Insulated tanks can better maintain an outgoing sanitizing water temperature at all times, thus, reducing stand-by energy consumption.
- *Solid-state thermostats* offer more precise temperature control than conventional controls, minimizing temperature overshoot as a booster heater is preheating or recovering to the thermostat set point. Increased control is achieved by using a more sensitive thermostat with a smaller band width.

Benefits and Pitfalls

High efficiency gas booster heaters with smart electronic controls can offer increased savings over gas booster heaters without smart controls. Graph 1 illustrates the importance of auto shutoff for the circulation pump. Gas #1 has a circulation pump that turns off when the tank temperature reaches it's set point. Gas #2 circulation pump runs continuously which drives up the idle energy costs. Gas #1 smart controller reduces idle cost by almost 75%.



Graph 1. Gas Booster Heater Idle Performance Characteristics

*Based on 20 hours of idle per day, 30 days per month. Gas booster heater #1 has an idle rate of 2460 Btu/h and a pump idle rate of 0.01 kW. Gas booster heater #2 has an idle rate of 7250 Btu/h and a pump -idle rate of 0.14 kW.

Benefits

- *Manufacturers insulate the storage tanks.* This reduces standby or idle energy consumption.
- *Highly sensitive thermostats with small band widths* increase booster heater response during demand and idling.
- *High-efficiency gas booster heaters incorporate* high-end components such as solid-state controls. Better electronics translates to better control of water temperatures, which results in energy savings.
- *Circulation pumps increase* energy efficiency during heating.

Benefits (cont'd)

- *A high-efficiency gas booster heater can deliver* more water than the same sized standard efficiency booster heater.
- *In California gas booster heaters* will have a lower energy cost than their electric counterparts.

Pitfalls

- *Gas booster heaters can have a higher initial cost* compared to their electric equivalent. They require gas pipe lines and in some cases exhaust ducting.
- *Flame proofing devices* ensure proper ignition of gas burners but may cause slightly slower startup times than electric equivalents. Good gas booster heater design incorporates fast burner start up and ample hot water storage to handle instantaneous demands.

For More Information

Contact your Pacific Gas & Electric Company representative or call 1-800-468-4743 for more information about Pacific Gas & Electric Company's energy efficiency programs and other services. You can also visit Pacific Gas & Electric Company on the Internet at http://www.pge.com and Pacific Gas & Electric Company's Food Service Technology Center at http://www.pge.com/fstc.