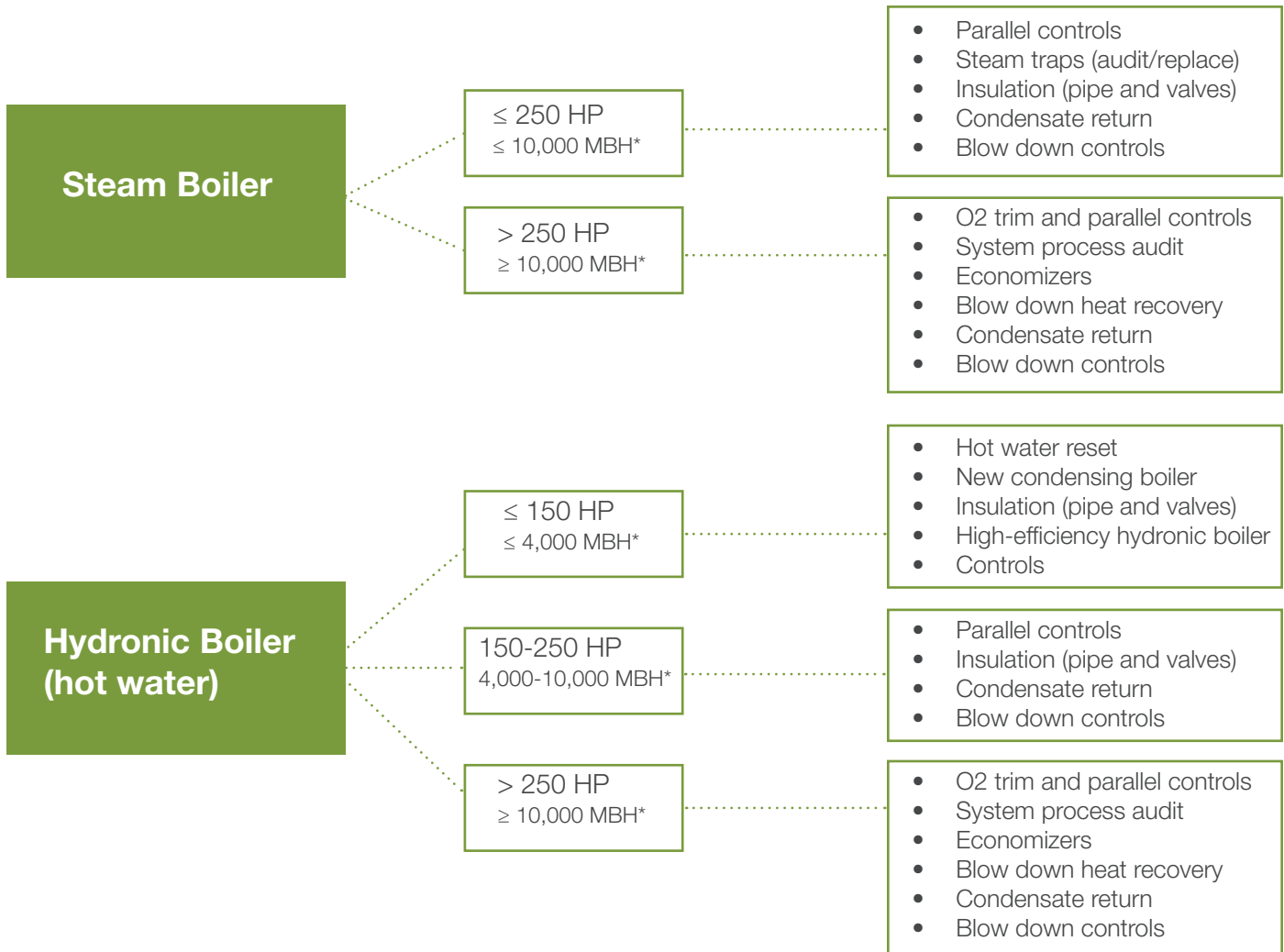


# Boiler Efficiency Improvement Guide

for commercial and industrial gas heat customers

**nationalgrid**

HERE WITH YOU. HERE FOR YOU.



1 boiler horse power = 34.5 lbs of steam/hour

1 boiler horse power = 33,478 btu's/hour

1 therm = 100,000 btu's

\* assumes an 80% efficient boiler

See reverse for a detailed explanation of the proposed energy efficiency measures.

[www.ngrid.com/pronet](http://www.ngrid.com/pronet)

Connect with us on



## Proposed Energy Efficiency Measures

### Parallel Controls

By replacing linkage controls with parallel controls, a boiler can improve its efficiency by as much as 2-3%. With parallel controls, a master controller signals separate servo motors that adjust the fuel flow and the airflow, which improves fuel combustion. The known losses associated with linkage controls are known as hysteresis losses. By improving boiler modulation, you can save energy by preventing short cycling and ensuring proper combustion. Prior to cycling on, a boiler must purge the gases for 30 seconds (pre purge). When a boiler cycles off, the system must purge the gases in the boiler for 20 seconds (post purge). During both purge cycles, all the conditioned air in the boiler is sent up the stack. By improving the modulation of the boiler, it will not cycle off as much, saving all the energy that is wasted with short cycling.

### O2 Trim

All combustion requires the correct measure of oxygen to fuel: too much or too little oxygen can cause undesirable effects. Too little oxygen results in carbon monoxide formation and accumulated soot. Too much oxygen results in low efficiency. A 3% excess of oxygen results in a 3% efficiency drop. With O2 trim, an electronic sensor is inserted into the boiler flue. The electronic sensor is connected to a control panel that measures oxygen and sends a signal to the control damper on the burner air supply. Automatic O2 trim systems continuously monitor the flue gases and adjust the burner air supply, thus increasing system efficiency.

### Economizers

Economizers are heat exchangers. The flue gases in the stack can reach temperatures of 450-800 degrees Fahrenheit. Economizers allow you to capture a portion of heat that would be wasted up the stack, and is used most commonly to preheat the make up water in the boiler.

### Steam Trap

The purpose of a steam trap is to keep steam in the system while removing condensate (water) and noncondensable gases. When noncondensable gases and water are in a steam system, they greatly reduce the heat transfer ability of the steam. A failed steam trap can also damage the equipment in the system. Damaged valves and "waterhammer" are direct results of steam trap failure. There are several types of steam traps; float/thermostatic, inverted bucket and thermodynamic. The most common steam trap is the mechanical steam trap. Paybacks on failed steam traps can sometimes be measured in days or weeks. A steam trap inspection and repair or replacement program is highly recommended.

### Boiler Reset Control

A boiler reset control is a device that automatically controls the boiler water temperature based on the outdoor air temperature. A boiler reset control allows the water in a boiler to run a little cooler during the fall and the spring, and hotter during the colder parts of the winter. A boiler reset control can improve the efficiency of a boiler by as much as 5%. Good candidates for this measure would be offices, schools or any facility that uses a boiler for comfort heating.

### Blow Down Heat Recovery

Boiler water is blown down to control the amount of total dissolved solids (TDS) in the boiler. This water is hot, pressurized, and dirty, creating large volumes of flash steam and possible disposal problems. A heat recovery system can reclaim large amounts of energy during this essential process and use this recovered heat somewhere in the system.

### Insulation (pipes and valves)

Any high temperature steam distribution system should be properly insulated. Any exposed piping, valves or equipment should be insulated to reduce heat loss and improve safety. As a rule of thumb, any surface that reaches a temperature of 120 degrees should be insulated.

FOR ELIGIBLE PROJECTS within National Grid's electric and/or gas service territories in Massachusetts, New York and Rhode Island. National Grid does not guarantee savings. Savings and energy efficiency experiences may vary. Terms and conditions apply. In Rhode Island: These programs are funded by the energy efficiency charge on all customers' utility bills, in accordance with Rhode Island law.

©2017 National Grid USA Service Company, Inc.