JUNE 2018 | GSA's Proving Ground

# EMERGING BUILDING TECHNOLOGIES

182 CONDENSING BOILERS INSTALLED THROUGHOUT GSA

## Focus on Condensing Boilers

### REVISED CONTROL STRATEGIES ARE KEY TO EFFICIENCY

Condensing boilers capture the heat that is lost through steam in conventional boilers and, under the right conditions, outperform conventional boilers by a substantial margin. Based on GPG's assessment and recommendation, 182 condensing boilers have been installed throughout GSA's portfolio; 72 of these are in America's heartland, GSA's Region 6, where they have become standard practice.

As is the case with many innovative technologies, condensing boiler efficiency depends on proper operation. "Condensing boilers require thinking outside the box for successful operation," observed Gabriel Sanchez, Smart Buildings Program Manager, Region 6. "Unlike conventional boiler control strategies, you have to take return temperatures into consideration to realize operational efficiencies." Now when replacing a conventional boiler with a condensing boiler, Region 6 follows protocols to ensure maximum efficiency, including proper return water temperatures and a requirement that the installer provides operator training. They've also simplified operations by installing master boiler controllers. Sanchez reports that though a master controller doesn't provide as much data as tying all the boilers directly to the BAS does, the trade-off of simplified programming and operations is worth it. **GPG's assessment recommends end-of-life replacement of conventional boilers with condensing boilers but only where conditions permit a return water temperature below 130°F.**

When compared to high-efficiency boilers, condensing boilers were found to be life-cycle cost-effective even when only 3%-5% more efficient.

*"Establishing proper control strategies that require return water temperatures below 130°F is key. When operated properly, condensing boilers should rock and roll."*

– Gabriel Sanchez
Smart Buildings Program Manager, R6

BEST
PRACTICES

## Condensing Boilers

- Ensure a return water temperature below 130°F.
- Conduct a thermal load calculation to select a boiler that meets maximum load without excess capacity. Previous plant sizing is seldom a reliable gauge.
- Select boilers with a low turndown ratio and low minimum flow requirement.
- Operate multiple smaller boilers in parallel at low loads.
- Use condensing boilers for 75% of heating load with a conventional boiler as backup during the coldest weather.

## RESOURCES

### Learn More About Condensing Boilers

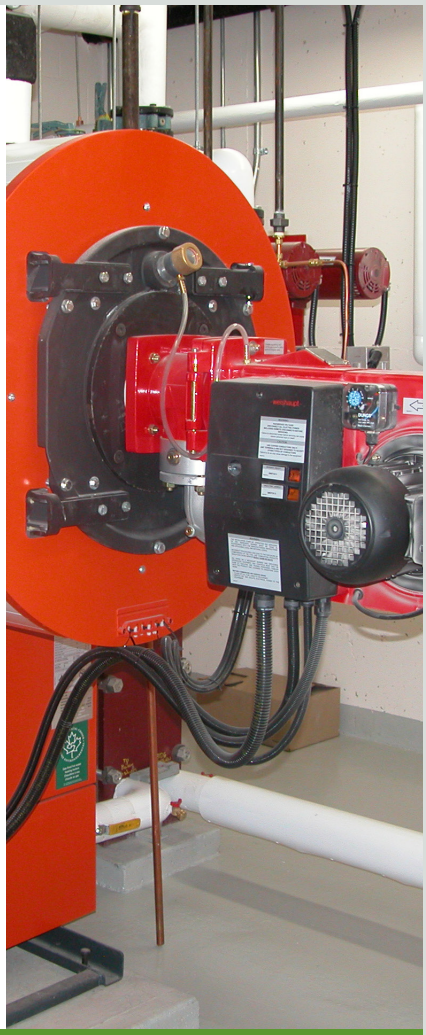
GPG Findings 004 & Reports from Pacific Northwest National Laboratory and National Renewable Energy Laboratory »

Webinar Recording, 07.13.17 »

Webinar Presentation Slides »

Map of GSA Deployment of Condensing Boilers »

For more information about GSA's Proving Ground program or tested technologies: www.gsa.gov/gpg or contact Michael Hobson michael.hobson@gsa.gov



Emerging Building Technologies' two programs, GSA Proving Ground (GPG) and Pilot to Portfolio (P2P), enable GSA to make sound investment decisions in next-generation building technologies based on their real-world performance. **www.gsa.gov/gpg**