

BrightGen™ Hydrogen Combustion Technology

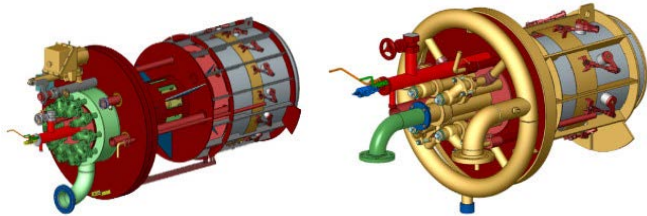
Utilizing non-carbon-based fuels for steam production

The BrightGen™ hydrogen steam boiler combustion technology from Babcock & Wilcox (B&W) is commercially ready and currently in operation worldwide. In fact, we have supplied more than 60 industrial water-tube boilers firing hydrogen and hydrogen-blended fuels. We have also performed hundreds of gas projects which have reduced the dependency on higher carbon-burning fuels.

Burning cleaner hydrogen or other non-carbon-based fuels in industrial processes results in lower-carbon intensive byproducts from the combustion process. Hydrogen can comprise 100% of the input fuel or be combined with other readily available fuels. BrightGen technology can be retrofit onto existing equipment or provided with new installations to fire these fuels efficiently and safely.



B&W can provide a comprehensive evaluation of the overall steam generation system needed to achieve safe and successful transition to non-carbon-based fuel firing.



Dedicated hydrogen burner (left) and dual fuel hydrogen/natural gas burner (right)

Improved carbon footprint with the use of non-carbon-based fuels



REDUCE CO₂ Emissions

Co-firing non-carbon-based fuels with coal or natural gas (hydrogen, ammonia, biogas, renewable natural gas, blends, etc.)



ELIMINATE CO₂ Emissions

Firing 100% non-carbon-based fuels (Pure hydrogen, ammonia, biogas, renewable natural gas)

Fuel switching considerations

A complete evaluation of the entire boiler system is necessary when considering the potential for fuel switching from a solid, liquid or gaseous fuel and integrating hydrogen or other non-carbon fuels into the combustion process.

B&W's fuel transition services begin with a thorough boiler performance evaluation consisting of the combustion system, heating surfaces, air system, controls and emissions. More than 155 years of combustion and steam generation experience is behind our BrightGen combustion technology.

Combustion systems – fuel composition, burners, ignitors, flame scanners, fuel piping/trains, flue gas recirculation

Heating surfaces – thermal impact including superheaters, reheaters, attemperator capacity, furnace tube metal integrity

Air system – furnace draft, fans, air heaters, air ducts, overfire air

Controls – boiler controls, automation systems, burner management system (BMS)

Emissions – changes in composition, emissions control systems, condensation at stack

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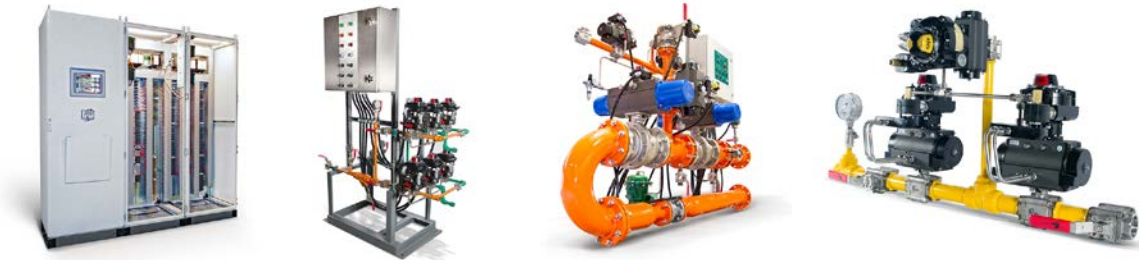
Products/Equipment

B&W can provide all the necessary equipment needed to achieve a safe and successful transition to non-carbon-based fuel firing, including:

- Fuel feed systems/Fuel trains
- Burners and overfire air (OFA) systems
- Igniters
- Flame scanners
- Valves
- Heating surfaces (superheaters, reheaters, attemperators)
- Combustion controls
- Burner management systems

Complete gas conversion capabilities

- Design, manufacture and commissioning of control systems, including BMS
- Design, manufacture and commissioning of natural gas piping and associated equipment, from tie-in point to boiler
- Design, manufacture and commissioning of upgrades to igniters and flame scanners
- Thermal modeling capability to predict future performance
- Code compliance review and approval (where applicable)
- Executed as supply-only, deliver and erect, or EPC

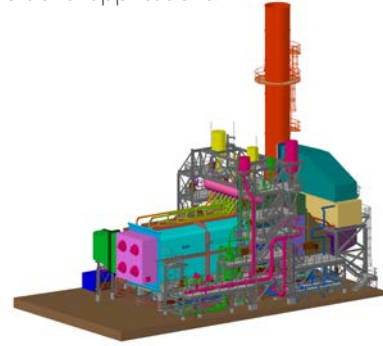


B&W's line of FPS® combustion technologies includes high-quality igniters, scanners, valves, controls and fuel trains necessary for the safe and successful use of non-carbon-based fuels for steam production.

Industrial hydrogen steam boilers

B&W has supplied more than 5000 water-tube package and industrial boilers with an established reputation for reliability and proven performance in many industries and applications. We've used our experience with a wide range of fuels to supply more than 60 hydrogen steam boilers and units which can fire hydrogen-blended fuels.

With the anticipated demand for a wider utilization of cleaner burning hydrogen and other low- or no-carbon fuels, B&W is ready to advance steam generation technology far beyond traditional applications.



More than 155 years of combustion and steam generation experience is behind B&W's BrightGen™ combustion technology.

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Established in 1867, Babcock & Wilcox is a global leader in renewable, environmental and thermal technologies and services for power and industrial applications.

For more information or to contact us, visit our website at www.babcock.com.