

Energy Efficiency for Commercial Boiler Systems



If you're a facility manager or business owner who is **looking to improve your heating system to save money and reduce carbon emissions**, proper boiler system design and equipment – including adding a condensing boiler – can cut your operating costs and avoid maintenance headaches.

Many boiler systems serve multiple loads at different temperatures throughout the year. For example, your heating system doesn't need the same hot water temperature on a mild day as on a cold winter night. Domestic hot water systems can also run at lower temperatures.



A conventional boiler loses efficiency when hot exhaust gases leave the combustion chamber through the chimney. These units cap out at ~85% efficient. Condensing boilers work by having the exhaust gases pass through a heat exchanger, which recovers the heat to preheat cold water returning from the radiators. A properly sized condensing boiler, especially one where the system is adjusted to ensure the return water temperature is low enough to condense, can achieve efficiencies up to 99%.

Working with a knowledgeable contractor or engineer to understand your loads and distribution system is critical to selecting a boiler to achieve optimal efficiency. They can also ensure that your return water temperature is low enough to reduce wasted energy in the entire system.

VGS is here to help, from recommending system design options and equipment choices to ensuring that you're able to operate your system at optimal efficiency, so you can save money, lower carbon emissions, and use less energy.

THE BENEFITS OF IMPROVING YOUR BOILER SYSTEM'S EFFICIENCY

SAVE ON ENERGY

As energy prices rise, using less natural gas has a direct impact on your profitability. Energy efficiency also positively impacts the resale value of your buildings when you go to sell.

HIGH ROI

Optimizing your boiler's efficiency is something that will pay for itself. While there is a higher upfront cost, it's a sound strategy for long-term savings.

REDUCE CARBON EMISSIONS

Addressing climate change is everyone's responsibility. Your customers will appreciate it too. Lease rates for 'green' buildings are often higher than average, so it's also good business.



ENERGY STAR CONDENSING BOILERS

VGS recommends ENERGY STAR-certified condensing boilers, which offer a minimum of 94% thermal efficiency and a turndown ratio of at least 5 to 1. The high turndown ratio means they can provide heating continuously even at low loads, instead of cycling on and off. This improves energy performance, reduces maintenance costs, and extends lifespan. ENERGY STAR-certified condensing boilers are a great fit for smaller buildings or for a modular system.

DIAL BACK BASED ON OUTDOOR AIR TEMPERATURE

When outdoor temperatures rise, less heat is needed to keep your indoor spaces comfortable. Rather than inefficiently cycling the boiler on and off, adding reset controls will lower your supply-water temperatures to continuously provide heating at a reduced rate, as well as providing more efficient condensing boiler operation.

OPTIMIZING DELTA T

Delta T is the difference between your hot-water temperature as it enters the system (the supply) and the cooler water as it exits (the return). The amount of heat an emitter gives off depends on both the Delta T and the water flow. By raising the Delta T, you can get the same space heating with lower water flow, requiring less pumping power. Maintaining a large difference between supply- and return-water temperatures helps keep the return temperature below 120F, allowing your boiler to condense and maximize overall efficiency. Replacing an indirect hot water tank with a semi-instantaneous water heater also eliminates standby losses and ensures more consistent condensing.



SAVINGS SPOTLIGHT.

St. Albans City School is saving **\$10,200** per year by installing modular condensing boilers, reducing their heating costs by over 15%.

TRANSITIONING TO A HYBRID OR MODULAR SYSTEM

If your existing standard boiler still works, you can reduce your energy use by adding a small modulating condensing boiler. On the coldest winter days, the standard boiler will operate, and on milder days the more efficient condensing boiler will take over. This can help transition to a modular system with multiple smaller condensing boilers that can efficiently accommodate different heating loads. When loads are low, one boiler will be able to operate at its minimum capacity, allowing for a lower turndown ratio. This lets individual boilers to be shut down for servicing, while the rest continue to work. These set ups can also be compact and stackable, so they work well for retrofits or with space constraints.

VGS SUPPORT

VGS offers technical assistance and incentives to lower your upfront costs for boiler system improvements, and we can help arrange financing options to help spread out your payments.

START SAVING TODAY

Learn more about all our efficiency recommendations, rebates, and tools at vgsvt.com/commercial. For help, contact VGS's Commercial Energy Efficiency Team at **802-951-0321** or email efficiency@vermontgas.com.