

FACT SHEET: Gas Savings from Boiler Improvements



New Mexico Gas offers cash incentives for qualifying commercial, industrial and institutional customers who apply for incentives from boiler improvements. For additional details on how to receive such incentives, and the energy that you can save over the life of a boiler, contact James DeMeritt at jdemeritt@clearresult.com or (505) 225-2995.

WHEN TO IMPLEMENT BOILER IMPROVEMENTS

- Specify above-code efficiencies for boilers in new construction or replacement projects
- A boiler typically needs replacement after being in service for 20-40 years
- In some cases the natural gas cost savings from switching to a high efficiency boiler may warrant replacing a boiler before it reaches the end of its useful life
- Boiler burner replacement is a good retrofit measure when the existing burners cannot be adjusted to reach 70% efficiency
- Boiler reset is a good measure for most buildings where it is not currently implemented
- A boiler tune-up is a good measure for boilers that are over 10 years old

COMMERCIAL BOILERS

Commercial boilers are used to provide space heating via a hot water or steam distribution system. These include natural gas fired boilers of the following types:

- Non-condensing hot water heating boiler
- Condensing hot water heating boiler
- Steam heating boiler (low and high pressure)

Commercial boilers normally are categorized 300,000 Btu/hr or larger. Small commercial boilers have a capacity range of 300,000 – 2,500,000 Btu/hr while large commercial boilers have a capacity range of greater than 2,500,000 Btu/hr.

BOILER TUNE-UP

Boiler tune-up can be done to optimize burner combustion and efficiency. This measure typically includes measuring combustion efficiency, adjusting air flow to reduce excessive stack temperatures, adjusting draft control, checking combustion air intake, cleaning the fire side heat exchanger and water tubes, and calibrating the controls.

Existing System AFUE	New/Upgraded System AFUE								
	55%	60%	65%	70%	75%	80%	85%	90%	95%
50%	\$9.09	\$16.76	\$23.07	\$28.57	\$33.33	\$37.50	\$41.24	\$44.24	\$47.36
55%	—	\$8.33	\$15.38	\$21.42	\$26.66	\$31.20	\$35.29	\$38.88	\$42.10
60%	—	—	\$7.69	\$14.28	\$20.00	\$25.00	\$29.41	\$33.33	\$37.80
65%	—	—	—	\$7.14	\$13.33	\$18.75	\$23.52	\$27.77	\$31.57
70%	—	—	—	—	\$6.66	\$12.50	\$17.64	\$22.22	\$26.32
75%	—	—	—	—	—	\$6.50	\$11.76	\$16.66	\$21.10
80%	—	—	—	—	—	—	\$5.88	\$11.11	\$15.80
85%	—	—	—	—	—	—	—	\$5.55	\$10.50
90%	—	—	—	—	—	—	—	—	\$5.30

Interesting Facts

- Replacing an aged existing boiler with a new high efficiency boiler will typically reduce boiler gas use by 10-20%
- Retrofitting an existing boiler with new high efficiency burners will typically reduce boiler gas use by 5-10%
- Implementing a boiler reset strategy will typically reduce boiler gas use by 5%
- Boiler tune-ups can improve boiler efficiency by 5% or more
- Incentives may be available for retrofit & new construction projects

FACT SHEET:

Gas Savings from Boiler Improvements

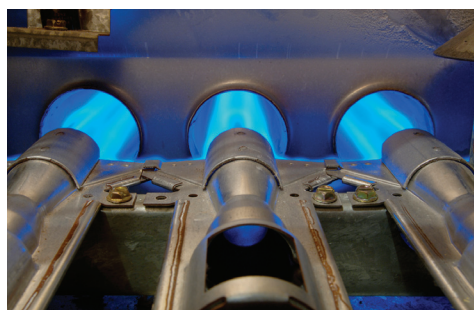
BURNER RESET CONTROLS

- Lowering hot water boiler control temperature can save natural gas because less heat is stored in the boiler vessel and off-cycle heat losses are reduced. This can be done by installing a controller that changes boiler temperature in response to outdoor air temperature.
- As the outdoor air temperature increases, the controller automatically resets the boiler control temperature downward to save natural gas.
- Not all boilers are able to operate at a lower temperature due to system limitations, which should be checked before implementing this strategy.

Some controllers offer a “heat purging” control when the boiler is cycled off, the controller allows the pump to continue to operate thus removing most of the available heat and supplying it to the heating system. Often, this measure can be combined with the boiler cutout control, since modern controller equipment is capable of handling both measures through one controller.



Some important terminology when discussing boiler efficiency includes:



Annual Fuel Utilization Efficiency (AFUE): AFUE is a measurement of the annual heating efficiency of a boiler, i.e. the heat transferred to the conditioned space divided by the fuel energy supplied to the boiler. For example, ENERGY STAR® qualified boilers have AFUE ratings of 85% or greater.

Combustion Efficiency: The ability of a boiler to burn fuel, represented as 100 minus the percent of heat that is lost to the flue.

Thermal Efficiency: The ratio of heat energy output to the heat energy input, similar to the AFUE except AFUE is an annual measure that accounts for conduction losses from the boiler.

High efficiency boilers offer the same function at lower energy use rates by incorporating some or all of the following: electronic ignition, which eliminates the need to have the pilot light burning all the time; new combustion technologies that extract more heat from the same amount of fuel; and sealed combustion that uses outside air to fuel the burner, reducing drafts and improving safety.

Burner Replacement: Facilities with boilers that are 10-20 years old may prefer to replace the existing natural gas burner with a more efficient burner instead of replacing the entire boiler. Replacement units include power burners that mechanically mix oxygen and gas for maximum efficiency. The measure only applies to existing boilers, since efficient burners now come as standard features with new boilers. Boiler emission standards vary by location, thus emissions requirements should be verified before conducting a retrofit. In addition, if a new blower motor is installed, the size of the motor and constant vs. variable speed will affect the electrical savings component of the retrofit.

Contact James DeMeritt at jdemeritt@clearesult.com or (505) 225-2995 for more information on incentives that may be available for boiler improvements, or other natural gas related energy efficiency projects.