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# UPCOMING CHANGES TO DEPARTMENT OF ENERGY (DOE) COMMERCIAL WATER HEATER STANDARDS

THE DOE HAS INCREASED THE FEDERAL ENERGY EFFICIENCY STANDARDS FOR COMMERCIAL WATER HEATERS TO REDUCE OVERALL ENERGY CONSUMPTION IN THE UNITED STATES.

The DOE standard increase in efficiency, currently planned to start October 6, 2026 results in current standard efficiency water heaters no longer being manufactured. Therefore, because of this upcoming change, now is the time for building owners to plan for transitioning your gas fired standard efficiency water heater plant -- even though DOE enforcement of civil penalties has been delayed to October 6, 2027.

First, what is standard and high efficiency? Current standard efficiency water heaters typically operate at an efficiency of approximately 80% or less. The upcoming standards require a minimum of 95% efficient equipment.

Below are some replacement options for existing gas fired standard efficiency water heaters with considerations that should be addressed as you move forward.

## REPLACE WITH GAS FIRED HIGH EFFICIENCY WATER HEATERS

***Air Side Considerations:***

95% efficiency is achieved by capturing more energy from the byproduct of burning natural gas resulting in the temperature of the flue gases lowering below the dewpoint and acidic condensation forming on the water heater flue materials. When the existing water heater heat exchanger and flue material is not appropriate for this corrosive environment, the flue will need to be replaced or lined.

Appropriate condensing flue materials can be expensive and will likely be a driving factor for evaluating equipment options.

***Water Side Considerations:***

High efficiency water heaters operate at lower water temperatures than standard efficiency equipment, typically resulting in changes to the piping of the water heater plant. Pipe changes need to be in conformance with the manufacturer's recommendations to maintain warranties and long-term performance of equipment. These pipe changes can impact pipe sizing, points of connection, piping configuration, the need to neutralize condensate, etc.

## REPLACE WITH ELECTRIC RESISTANCE WATER HEATERS

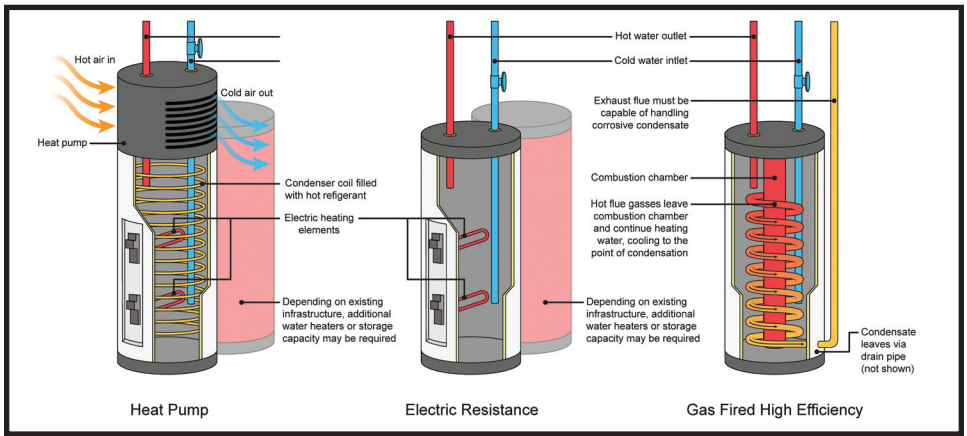
***Electrical System Considerations:***

Electric resistance water heaters require a substantial amount of power to operate as they utilize emersion coil(s) to heat the water directly. A review of the building's electrical system is required to determine if adequate power is available and what modifications are needed.

The impact on the electrical system may be costly and will likely be a driving factor for the option selected.

***Equipment Sizing Considerations:***

As the amount of power available for the electric resistance water heater plant may be




Water Heater Comparison

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limited by the existing infrastructure, additional coordination with the manufacturer will be required. The sizing of the water heater plant will likely result in additional storage capacity which can result in physical considerations when installing the new equipment.

## REPLACE WITH HEAT PUMP WATER HEATERS

***Electric System Considerations:***

Heat pump water heaters utilize a combination of electricity and a refrigerant cycle to produce hot water. The refrigerant cycle reduces the electrical requirements of the equipment therefore reducing the impact to the existing electrical system. Heat pumps can use multiple times less electricity when compared to electric resistance water heaters.

While heat pumps can utilize substantially less electricity to heat water, the impact on the electrical system may be costly and might be a driving factor when evaluating options.



Shown in both photos is an electric domestic water heating plant.

***Equipment Sizing Considerations:***

Heat pumps currently require a greater amount of recovery time from periods of high usage resulting in greater storage requirements. Typically, the amount of storage required for a heat pump water heater plant is more than that for electric resistance equipment.

***Technology Considerations:***

Due to the nature of heat pump water heater operation, conformance with manufacturer recommendations is mandatory to maintain warranties and daily performance of equipment.

Retrofit of heat pump water heater plants where gas fired standard efficiency water heaters are currently operational will result in a highly engineered system. The system should be designed by the client's engineer and the manufacturer to produce a successful project.

Manufacturers are providing options for hybrid equipment that utilize both heat pump technology along with electric resistance coils. This option can be explored when conditions are necessary. Air source heat pumps typically require components to be located outdoors. The availability of space for this component needs to be reviewed and considered when evaluating options.

## UTILIZE EXISTING HVAC BOILER PLANT

***Compatibility:***

In some cases, the existing HVAC boiler plant currently utilized to heat the building may be available to create domestic hot water via heat exchangers, pumps, etc. An objective engineer should review the feasibility of utilizing the existing HVAC boiler plant to create domestic hot water factoring capacity, physical constraints, system modifications, etc.

In conclusion, evaluating options for replacement of gas fired standard efficiency water heater plants will require an evaluation by an objective engineer taking into consideration the existing building infrastructure as impacted by DOE standards. Operational costs for the equipment should also be taken into consideration as this is the primary driving factor of the DOE standards. All options and aspects of designing new water heater plants are not listed above as this article highlights just some of the likely driving factors when making this decision. Finally, it should be noted that various rebates and incentives for this type of project may be available to building owners to help offset design and construction costs.

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