tech primer

Point of Use (POU) Domestic Hot Water

Highly efficient on-demand hot water systems that reduce emissions and maintenance costs.

tech overview

applicable building types
hotels; large commercial; institutional

when to implement
at equipment replacement; mid-cycle; refinancing

fast facts
- eliminates standby energy loss
- reduces GHG emissions
- offers design flexibility
- reduces maintenance costs

costs & benefits*

GHG Savings

Tenant Experience Improvements

Utility Savings

Capital Costs

Maintenance Requirements

*ratings are based on system end use, see back cover for details.

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getting to know POU heaters

Point-of-use (POU) domestic hot water (DHW) heaters are a highly efficient, all-electric retrofit option for decentralized DHW systems in commercial office buildings.

how do POU heaters work?

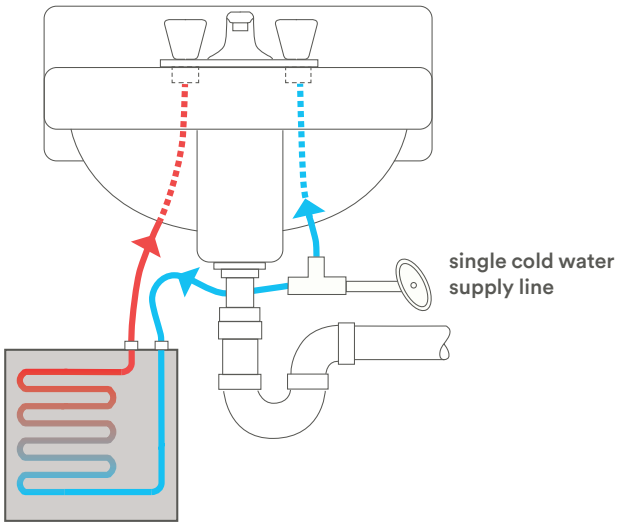
Most commercial office buildings have centralized domestic hot water (DHW) systems, typically supplied by on-site boilers. Electric point-of-use (POU) water heaters, also known as "tankless" or "instantaneous" water heaters, are a decentralized strategy to provide hot water on-demand without using storage tanks and distribution piping.

POU water heaters are particularly effective in commercial buildings, which have a lower DHW demand per occupant compared to residential buildings, and where storage tanks experience longer standby periods during unoccupied hours, resulting in significant energy loss. Additionally, conventional storage tank heaters or boiler-supplied DHW systems are typically located in the basement or a remote location far from the end use, resulting in heat loss as hot water travels through distribution piping.

The initial cost of POU heating systems depends upon the number of POU heaters needed, and may be greater than that of conventional storage tank water heater or boiler-supplied DHW systems. However, POU heaters last longer and have lower operating and maintenance costs, offsetting higher upfront costs. Since POU heaters are decentralized, if a unit requires servicing, only the point of use it serves is without hot water.

By replacing or supplementing a traditional gas, oil, or steam hot water heating system, electric POU heaters can significantly reduce greenhouse gas emissions and save energy.

Fig 1. When a hot water tap is turned on, cold water travels from a supply line into the POU unit where an electric element heats the water. The rate at which the water is heated varies with the rate of water flow and the required temperature rise.



Assess
Always consult a qualified service provider before undertaking any building upgrades.

Installation
Consider the following when installing POU heaters:

- Identify bathrooms with additional electric supply and sufficient power outlets for POU units. Otherwise, it may be necessary to make electrical service upgrades.
- For faucets equipped with low flow fixtures, select a POU heater that matches the flow rate of the faucet.
- Adjust domestic hot water temperature setpoint according to building guidelines.
- For commercial office buildings that feature locker rooms with showers where DHW demand is higher, consider installing a POU heater with storage capacity.

costs & benefits of POU heaters*

Greenhouse Gas (GHG) Savings

Converting a commercial office building's DHW system to a POU system can greatly reduce DHW related GHG emissions.

Tenant Experience Improvements

Tenant experience will remain largely unchanged, however POUs allow the building to reduce emissions while maintaining consistent domestic hot water availability.

Utility Savings

Although POUs consume significantly less energy than systems that use natural gas, fuel oil, or district steam, utility costs for operating POUs can be high due to the current cost of electricity. Future changes in utility costs should be considered when evaluating project feasibility.

Capital Costs

The initial cost of a POU heating system is greater than that of a conventional storage tank water heater or boiler supplied DHW system, depending on the number of POU heaters to be installed. POU heaters will typically last longer and have lower operating costs, which could offset the higher purchase price. Plan to replace traditional domestic hot water systems with POU systems at end-of-life.

Maintenance Requirements

There are little to no maintenance requirements for self-contained POU heaters. POU heaters are a decentralized DHW system. If a single unit requires replacement, only that unit is without hot water.

**The Costs & Benefits rating system is based on a qualitative 1 to 4 scale where 1 is lowest and 4 is highest. Green correlates to savings and improvements, orange correlates to costs and requirements. Ratings are determined by industry experts and calculated relative to the system end use, not the whole building.*

Note: GHG & utility savings are dependent on existing equipment and fuel type. Energy savings are dependent on domestic load profile and existing equipment stand-by losses.

take action

This document is one of more than a dozen High Performance Technology Primers prepared by Building Energy Exchange and its partners to introduce decision-makers to solutions that can help them save energy and improve comfort in their buildings. Access the complete Tech Primer library: **be-exstl.org/building-blocks**

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The Building Energy Exchange (BE-Ex), located in New York City, has served as a trusted resource for the real estate, design, and construction industries for over a decade. BE-Ex supports the growth of centers of excellence across the country dedicated to reducing the effects of climate change by improving the built environment.

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Call: (212) 349-3900
Visit: be-exchange.org
Email: info@be-exchange.org