tech overview

applicable building types
hotel, large commercial, and institutional

implementation
at equipment replacement, mid-cycle or refinance

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

tech primer

Point of Use (POU) Domestic Hot Water

Highly efficient on-demand domestic hot water that reduces emissions and maintenance costs.

cost & benefits

GHG savings

Tenant Experience Improvements

Utility Savings

Capital Costs

Maintenance Requirements

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

Building Performance Exchange
A program of Built Environment Plus

Getting to know POU heaters

Point-of-use (POU) electric domestic hot water (DHW) heaters are a decentralized, highly efficient retrofit option to electrify a commercial office building's domestic hot water system.

How do POU heaters work?

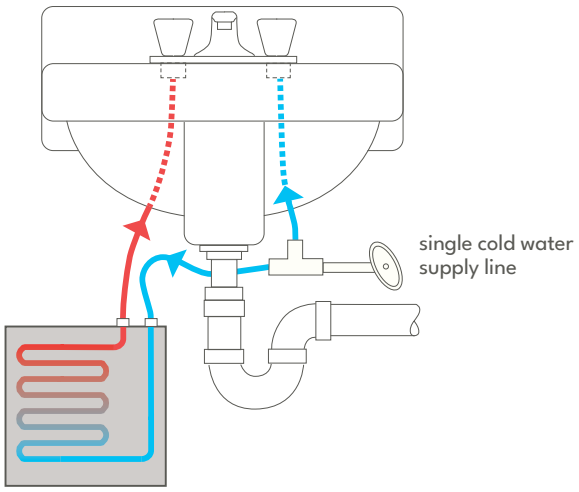
Most commercial office buildings have centralized domestic hot water systems, most often supplied by on-site boilers. Electric point-of-use (POU) water heaters, also known as "tankless" or "instantaneous" water heaters, create a decentralized heating system to provide hot water on demand without the use of storage tanks and distribution piping. Energy that would otherwise be consumed by keeping hot water at the desired temperature in storage tanks and throughout distribution piping is saved by heating water on demand, directly where water is needed.

POU water heaters are particularly effective for commercial buildings, which have a lower domestic hot water demand per occupant compared to residential buildings, and where storage tanks tend to 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 a POU heating system is dependent on the number of POU heaters needed and may be greater than that of a conventional storage tank water heater or boiler supplied DHW system. However, POU heaters last longer and have lower operating and maintenance costs, offsetting the higher upfront costs. Since POU heaters are a decentralized system, if a unit requires replacement, only the demand which that unit serves is without hot water.

By either 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
There are several considerations to keep in mind when installing POU heaters:

- Identify that bathrooms have additional electric supply and sufficient power outlets for the POU units. Otherwise, it may be necessary to make upgrades to the electric service.
- For faucets equipped with low flow fixtures select a POU heater that matches the flowrate of the faucet.
- Adjust domestic hot water temperature set point 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 and 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 for replacement of traditional domestic hot water systems with POU systems at end-of-life.

Maintenance Requirements

There is 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.

Take Action

This document is one of more than a dozen High Performance Technology Primers prepared by the Building Performance Partnership (BPP) to introduce decision-makers to solutions that can help them save energy and improve comfort in their buildings.

For more information, contact Built Environment Plus.

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The Building Performance Partnership (BPP), created by Building Energy Exchange (BE-Ex) and the Institute for Market Transformation (IMT), supports the creation and operation of local high-performance building hubs that accelerate measurable, equitable, and sustainable action to improve the health, comfort, and performance of buildings. With support from both BE-Ex and IMT, partner hubs serve their respective regions with customized resources that cater to the needs of their communities while benefiting from the existing resources and expertise of our network.

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*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, **dark blue** 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 and utility savings are dependent on existing window conditions and are based on the heating and cooling loads. Assumes existing windows are leaky, un-insulated, and without special coatings.