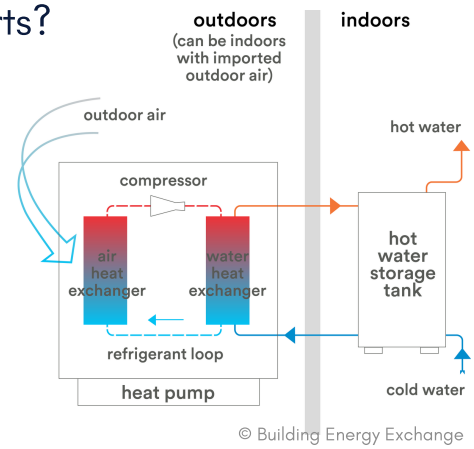
What is a heat pump water heater?

Heat Pump Water Heaters (HPWHs) provide domestic hot water (DHW) in buildings. They are similar to "regular" hot water heaters using gas or oil but use highly efficient electric heat pumps instead of fossil fuel combustion. Although much more efficient, heat pump water heaters do not produce hot water as rapidly as most fuel-fired systems do, and so must be paired with hot water storage to serve a building's needs. The components are modular, allowing multiple HPWHs to be connected together to serve buildings of various sizes.

What are the different types of HPWHs that the Pilot supports?

- Split systems: These systems typically consist of two components: the outdoor heat pumps and the indoor storage tanks. In many cases, these are connected with simple water piping, although some systems also use refrigerant piping.
- Hybrid systems: These systems contain the HPWH and the storage in one package. These are better suited to smaller buildings.



Split system schematic

What are benefits of HPWHs?

They are better for buildings and for the environment:

- They do not burn fossil fuels or emit combustion gases and particles into the air, which means less pollution and fewer greenhouse gas emissions, which help buildings meet NYC's ambitious climate goals.
- They are three times as efficient as electric resistance systems.

Where/how are split HPWHs located?

Like heat pumps for space heating, the outdoor units typically go on the roof but can also be mounted on exterior walls or in yards where zoning allows. When located on the roof, units can be set on the roof or mounted on parapets and can be grouped to take up less space. Units may be mounted on walls, as long as they are accessible for maintenance and are located to avoid issues from dripping condensate.

The outdoor units need to be located high enough to avoid snowbanks. The storage tanks must be located indoors and will need to connect to both the outdoor heat pumps and the existing water heating supply and return piping. In some cases, the "outdoor units" may be installed indoors and ducted to the outdoors.

Hybrid system

Where/how are hybrid HPWHs located?

Hybrid, or packaged, HPWHs must be located indoors. However, as they pull energy from the air to heat the water, they need sufficient free space around them, or may be ducted to the outdoors.

How long do they last?

These systems typically last at least 15 years.

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What type of maintenance is needed?

The outdoor units should be checked periodically to ensure they are free from leaves and other debris and may be power washed annually to maintain performance. Hybrid systems and storage tanks may contain sacrificial anode rods to control corrosion; these should be inspected annually and replaced as needed. Hybrid units also have an air filter that needs periodic washing.

How will this impact the residents?

The residents shouldn't notice a thing. The installation work will not disrupt the apartments, and the new HPWH system will supply hot water to the building just as before.

Split system indoor storage tanks

Do I need backup heat for the heat pump?

Some people choose to keep the fossil fuel system as a backup. This is a building-by-building choice. Many people choose not to use a backup. The heat pumps provide adequate DHW if correctly chosen and sized, even in cold climates. Heat pumps that use CO2 are particularly good at maintaining performance in the coldest temperatures.

Will I need to update my electrical service to the building to install HPWHs?

If the hot water system is the only system being electrified, the electrical service is probably adequate; however, a new subpanel to feed the heat pumps will be needed. If the building is electrifying other loads as well (e.g., space heating, cooking stoves), the chances are good that the service to the building will need to be upgraded. This question is typically answered in discussions with Con Ed.

If there is a power outage, will the heat pumps stop working?

Yes. There will be no DHW if there is a power outage. However, note that most fossil fuel DHW systems also rely on electric power and will not operate during an outage.

Split system outdoor heat pumps

How much money will a building save in energy costs?

Although heat pumps consume less energy than systems that use natural gas, fuel oil, or electric resistance heat, utility costs can be high due to the current cost of electricity in NYC. This is why the pilot is prioritizing systems currently using oil and encouraging load reduction measures like solar, low-flow fixtures, and showerheads in projects. The pilot also requires building staff and tenant education to ensure that systems are run as efficiently as possible.

What are other considerations?

In split systems, some portion of the water piping will run outside and require protection from freezing. This includes pipe insulation and typically some additional levels of protection, such as heat tracing and/or a water drain back system. The HPWH system will store water at high temperatures, and a mixing valve is needed to maintain a safe water delivery temperature to the apartments. In most cases, the current system will already have a mixing valve. Both types of HPWH systems require basement space for storage tanks, ideally close to the existing supply and return water piping.

If you want to learn more, contact electrificationpilot@hpd.nyc.gov

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