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*Comment Received From: Amy Cortese*
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## 120V heat pump water heaters

Thank you for your consideration. Please see attached.

*Additional submitted attachment is included below.*


# 120V Heat Pump Water Heaters

The retrofit ready, plug-in 120-Volt heat pump water heater (HPWH) is an emerging technology. This technology is developed and market ready within two years of identification of the need and specifications. It is a first of a kind unique technology that can avoid panel upgrades and help meet utilities, cities and states meet decarbonization policies and goals by transforming the retrofit market. The low power 120-volt design can plug in to existing wall outlets without requiring expensive panel upgrades and/or home rewiring that can be required for traditional 240-volt units. The 120-volt HPWH represents an ideal decarbonization solution for retrofit applications to replace existing gas-fired tank type water heaters and is expected to be well suited to smaller homes with space and power constraints. Four manufacturers are currently developing 120V products, with minimum of seven unique models are expected to be available in the market by mid-2022.

## Need for the EPIC support:

Over 93% of California's water heating stock is directly pumping fossil fuels for heating water. Water heating with natural gas represents one of the largest GHG emissions end use in a typical residence in CA. The 240V HPWH is a proven technology and energy efficient option for many residences but poses installation challenges in some homes with space constraints or inadequate ampacity in the electrical panel. The 120V HPWH offers a solution for these installations. Table 1 summarizes key characteristics of the emerging 120V HPWH technology and the longstanding 240V HPWH technology.

**Table 1**. Summary of 120V product characteristics vs. 240V product characteristics.

| Metric | 120V HPWH | 240V HPWH |
|---|---|---|
| **Ideal application (retrofit vs. new construction)** | Retrofit - gas unit replacement | New construction; retrofit - electric resistance unit replacement |
| **Able to operate on a shared circuit?** | Yes | No – requires dedicated 40A circuit |
| **Electric panel upgrade(s) required?** | No | Sometimes |
| **Estimated first hour rating (50-gallon unit)** | 45-74 gal* | 67-94 gal* |
| **Space-constrained options**[1] | Yes | No |
| **Supplemental Heat** | No | Yes |
| **Grid Connectivity** | CTA-2045 Compatible, Built-in Wi-Fi compatible | CTA-2045 Compatible, Built-in Wi-Fi compatible |

[1] See NEEA's Advanced Water Heating Specification 7.0

* Based on one manufacturer data, range varies depending on mixing valve configuration

Due to the lower energy input, 120V HPWHs do not have as much quick recovery capability. This lower quick recovery rate may be compensated for by techniques such as including higher temperature storage with mixing valves, larger tank sizes or enhanced tank stratification. This technology needs a 3rd party validation to make sure that it is meeting with customer comfort requirements and continuous advancement of the technology for future proofing.

NBI is currently leading a field validation of the 120V HPWH technology with field verification data expected in phases. EPI can help support the product development and lab and filed test validation on the below:

- Performance of the technology:
    - Climate zones: cold, medium, hot (CZ 1 to 16)
    - Building types: Single family, multifamily and manufactured homes
    - Vintages: Older homes such as built prior to 1980 (constrained panel), Newer homes such as built after 1980
    - Install locations: conditioned and non-conditioned areas
    - Demand: low, medium and high demand applications
- Cold climate applications of HPWH
- Boost capacity of 120V HPWHs
- Load shifting potential of 120V HPWHs