

NEW HEAT PUMP WATER HEATER AT PALO ALTO CITY HALL



Building Year Built	1967
Building Size	86,496 sq. ft.
Project Details	Replaced commercial gas-powered water heater with a Electric Heat Pump Water Heater (HPWH)
Project Date	December 2023
CPAU Rebate	\$3,500
Manufacturer	State Water Heater—Model CSHP120



Project Description

The Palo Alto City Hall building, located at 250 Hamilton Ave, serves as a central hub for various city services, including the Police Department, Human Resources, IT, Legal, divisions of Utilities, Planning & Development, Public Works, and the City Manager’s Office. The city plays a vital role in leading by example and prioritizing building electrification across its range of structures. Through the alignment of facility repairs and upgrades, Palo Alto aims to set a precedent for sustainable urban development.

In December 2023, the city replaced its aging gas-powered water heater at 250 Hamilton Ave, which supplied hot water to washrooms and kitchens. The 14-year-old AO Smith Model BTN 250A 108 (100-gallon) unit had reached the end of its useful life and was showing signs of minor leaking.

The facility management team implemented a decarbonization solution by replacing the gas-powered water heater unit with a 119-gallon electric heat pump water heater (HPWH), specifically the State Water Heater—Model CSHP120. They retained the 300-gallon reserve tank as part of the system configuration. A dedicated 60-amp service was added for the new electric load.

Unit & System Benefits

CPAU chose a unit with energy-saving features, specifically designed for commercial use. It utilizes industry-leading heat pump technology, proving a more efficient way to heat water with electricity. By pulling heat from the surrounding air and transferring it into the tank, it operates at an industry leading 4.2 coefficient of performance (COP). The integrated 119-gallon storage tank maximizes performance and energy savings.

Economics

Commercial grade gas-powered water heater units of similar capacity range in price from \$7,500-\$10,000. Transitioning to an electric heat pump water heater (HPWH) proved to be financially comparable on a unit cost basis. However, project expenses escalated with the addition of electrical upgrades, analysis, and certifications. Despite these incremental costs, the project showcases the financial viability and sustainability benefits of HPWH systems. The total project cost was approximately \$16,940 with the cost breakdown below:

Project Item	Cost	-	Rebates	=	Total
Heat Pump Water Heater	\$8,060				
Electrical Upgrades	\$6,000				
Installation Costs	\$4,860				
Removal and Pickup	\$1,000				
Permits	\$520				
Structural Calculation	TBD				
Electrical Panel Load Schedule	TBD				
Title 24 Compliance	TBD				
CPAU Electrification Rebate			(\$3,500)		
Net Project Cost					\$16,940

Lessons Learned

The road to completing this project came with many successes and lessons learned. Here are some important things to consider before starting your project:

- Get quotes from at least two contractors. The city elected to have the project installed by Palo Alto Plumbing Heating & Air.
- When soliciting contractor quotes, be specific about the minimal requirements, equipment efficiency ratings, and the permit application as part of the base bid.
- Compare energy-efficiency options for the Heat Pump Water Heaters, including sizing.
- Evaluate the placement of a new Heat Pump Water Heater to ensure there is sufficient spacing and circulating air sources. The city installed the equipment in a 12 ft. x 8 ft. square area.
- Modifications may be needed; the manufacture’s anchorage system was not suitable for the available spacing. The contractor strapped the equipment to the floor and wall, resulting in anchorage modifications.
- Evaluate the current electrical service panel and consider sizing the panel to accommodate future electrical projects.

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For more information on the Commercial & Industrial Energy Efficiency Program, click on the QR code at right.

