

TECH HPWH Permitting Pilot

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The TECH Clean California initiative is funded by California gas corporation ratepayers under the auspices of the California Public Utilities Commission.

TECH Permitting Pilot

Technology and Equipment for Clean Heating (TECH) - Permitting Pilot

Can we make it easy to get a permit for a heat pump?

If you work in a Bay Area building department or have insight into heat pump installation challenges and needs, **TECH wants to hear from you!**



Pilot Goals

- 1) Simplify the permitting process for heat pump projects
- 2) Develop a single-day permit for heat pump water heater conversions
- 3) Support ongoing efforts to train building departments on heat pump best practices

Roles & Goals of TECH Stakeholder & Working Groups

Permitting Pilot Stakeholder & Working Group Activities and Timeline	
Meeting 1: September 30, 2021 <i>Full Stakeholder Group</i>	Prioritizing Resources – Session #1 <ul style="list-style-type: none">• Clarify roles of stakeholder Group vs. Working Group• Surface known issues and needs
Meeting 2: December 9, 2021 <i>Working Group only</i>	Prioritizing Resources – Session #2 <ul style="list-style-type: none">• Narrow priority permitting needs; outline of draft resource/approaches Support to Implement – Session #1 <ul style="list-style-type: none">• What supports do jurisdictions need to adopt?
Meeting 3: January 27, 2022 <i>Working Group only</i>	Review Draft Resources – Session #1 <ul style="list-style-type: none">• Alignment with needs; technical and usability feedback Support to Implement – Session #2 <ul style="list-style-type: none">• Discuss partner recruitment and implementation map/path
Meeting 4 March 24, 2022 <i>Full Stakeholder Group</i>	Review draft Resources – Session #2 <ul style="list-style-type: none">• Review “final drafts” of initial resources; establish approach for sharing Support to Implement – Session #3 <ul style="list-style-type: none">• Partner recruitment update; discuss data sharing opportunities and realities

Permitting Pilot Beta Resources

The Permitting Pilot team has created three resources to facilitate a single day HPWH Permit:

- 1) HPWH Permit Guide
- 2) HPWH Supplemental Permit Template
- 3) Electrical Load Estimator

HPWH Permit Guide

Individual Dwelling Units and Heat Pump Water Heaters 2019 Building Code Assistance Packet

Please note: For other water heating systems and configurations refer to the 2019 Building Energy Efficiency Standards section 150.2 for existing construction or 150.1 for new construction.

What is the purpose of the Heat Pump Water Heater (HPWH) 2019 Building Code Assistance Packet?

This packet offers general code compliance information and tools for permit applicants and building departments to ensure successful and code compliant HPWH projects in individual dwelling units. These tools include the **HPWH Permitting Checklist** (page 2), **HPWH Permit Supplement Template**, and **Electrical Load Estimator**. They will either be attached as physical copies or can be referenced at the links provided. Their intended use is to streamline permit applications and projects.

When does the 2019 Code allow HPWHs?

	Performance Path	Prescriptive Path
New Construction	Allowed	Allowed (detailed in checklist)
Additions installing a 2 nd water heater	Allowed	Any electric is allowed when no gas service is available
Alterations	Allowed	Allowed (detailed in checklist)

Can a plumber (C-36 license) apply for a permit for a heat pump water heater? Yes! If:

- The HPWH does not include electrical work, OR
- The HPWH does require electrical work and the Authority Having Jurisdiction (AHJ) has a water heater permit or a joint plumbing/electrical permit, OR
- An electrical permit is required for a new panel, new circuit, etc., that permit can be applied for by a C-36 licensed contractor in a Joint Venture with an Electrical Contractor (C-10 license), by a C-10 Contractor, or by a General (B).

What is required for a HPWH on the required CF1R-ALT-05-E Compliance Form¹ and Permit Application?

- **Water Heater Type:** Heat Pump Water Heater
- **Fuel Type:** Electric
- **Heating Efficiency Type:** Uniform Energy Factor (UEF)
- **Heating Efficiency Value:** “[NEEA 3](#)” if required for a building with natural gas service; or a value \geq the minimum UEF in accordance with federal appliance standards.

STATE OF CALIFORNIA
Prescriptive Residential Alterations That Do Not Require HERS Field Verification
 CECC-F1R-ALT-05-E (Revised 01/20) CALIFORNIA ENERGY COMMISSION
 CERTIFICATE OF COMPLIANCE CF1R-ALT-05-E
 Prescriptive Residential Alterations That Do Not Require HERS Field Verification Page 2 of 3
 Project Name: Smith Res water heater replacement Site Prepared:

H. Water Heating Systems (Section 150.2(b)1G)														
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Dwelling Unit Name	Water Heating System ID or Name	Water Heating System Location or Area Served	Water Heating System Type	Water Heater Type	# of Water Heaters in System	Water Heater Storage Volume (gal)	Fuel Type	Rated Input Type	Rated Input Value	Heating Efficiency Type	Heating Efficiency Value	Standby Loss (%)	Exterior Insulation R-Value	Back-Up Solar Savings Fraction
House	HPWH	garage	DHW	HPWH	1	80	Electric	kW	4.5	Uniform Energy Factor	Tier 3	n/a	n/a	n/a
Add Row	Delete Row													

Source: www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Residential_Documents/Alterations_and_Additions_Non_HERS_Verified_Forms/

What else is required to submit along with the permit?

Each jurisdiction has its own submittal requirements for a HPWH. Please confirm AHJ-specific requirements with the building department. Be prepared to offer the following information during permit application or inspection:

- An **electrical line/circuit diagram** may be required, especially if the HPWH requires a new electric circuit, a new manual disconnect, or a new service panel.
- A **site diagram** may be required, especially if the HPWH is installed in a new location. Site diagrams should include the location of the water heater and demonstrate sufficient air volume and or ventilation per manufacturer’s required specifications.
- **Electrical load calculations** may be required, especially if the HPWH adds to the building’s electric load. If not required at permit application, have an electrical load calculation specific to the project site ready at inspection. Accepted load calculations can be developed in accordance with National Electric Code Sections 220.83b and 220.87.

HPWH Permit Guide - Checklist

HPWH Permitting Checklist

2019 Building Code Compliance Checklist (for permit submittal and or field inspection)

BayREN and TECH Clean California offer the following checklist for California state level building code requirements for the installation of heat pump water heaters. This is intended to assist permit applicants and building department staff to submit, review, approve, install, and inspect heat pump water heater alterations in single family homes.

This checklist has been reviewed and vetted by the following organizations:

BayREN Logo

CEC Logo

TUCC/ICC Logo

Other?

HPWH Permitting Checklist

Can a HPWH replace an existing water heater and is it allowed at the site? YES! If: (Check one)

- The building is in CZ 1-15, natural gas is connected to the existing water heater location, and the installed HPWH is not located outdoors **AND**:
 - Is rated as NEEA Tier 3 (§ 150.2(b)1Hiiiic) **OR**
 - Meets minimum federal appliance standards with demand responsive controls, and is located on an R-10 rigid surface (§ 150.2(b)1Hiiiib);
- OR**
- No natural gas is connected to the existing water heater location and the HPWH meets minimum federal appliance standards. § 150.2(b)1Hiiid **OR**
- The permit applicant can demonstrate the project complies with Energy Code using the performance method. § 150.2(b)2

General Water Heater Requirements (Check all that apply)

- The installed HPWH matches what is on the approved CF1R form.
- Insulation for new and existing hot and cold-water pipes from the storage tank (when accessible).
- Condensate waste removal, and if necessary, a drop/overflow basin and drainage piping. Note that condensate contains no combustion products or acids and so may be drained to sanitary sewer or to outside via a hose.
- Seismic bracing for the storage tank.

HPWH Issues Specific to Tank Size and Installation Location (Check all that apply)

- HPWH will be installed in the same location and with the same size storage tank as existing tanked water heater.
- If the HPWH has a storage tank volume greater than the existing water heater and the HPWH is installed on raised floor, a structural load calculation has been performed.
- HPWH will be installed in a location with sufficient air volume or ventilation per manufacturer's required specifications.
- If the water heater being replaced was a natural gas water heater, the natural gas line has been capped off (and gas valve removed).

Electric Circuit (Check at least one)

- New electric circuit, conduit, manual [disconnect](#) or visible circuit breaker will be installed that is sufficient for the HPWH.

Electric Service Panel (Check at least one)

- Existing electric service panel is sufficient for the building's new load with the HWP, **OR**
- Electric service panel sufficient for the building's new load will be installed, **OR**
- Existing electric service panel is sufficient for the building's new load with the HPWH because a circuit pausing device or method will be used and will be connected to the dedicated HPWH circuit.

Jurisdictions May Require (Check all that apply) |

- Submit a site diagram. Note that applicants may use HPWH Permit Supplement Template if AHJ deems appropriate.
- Submit the electrical line diagram. Note that applicants may use the HPWH Permit Supplement Template for this requirement.
- Submit the electrical load calculation. Note that applicants may use the Electrical Load Estimator if appropriate.
- Submit the structural load calculation.

Statement of Compliance:

By my signature, I attest that the information provided above is true and accurate.

Name of Applicant: _____

Contractor/Company Name: _____

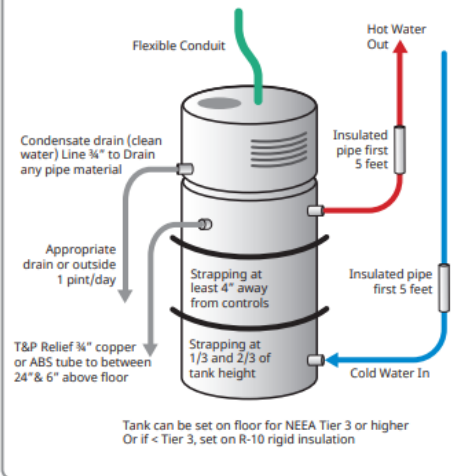
Signature of Applicant: _____

CSLB License Number: _____

HPWH Supplemental Permit Template

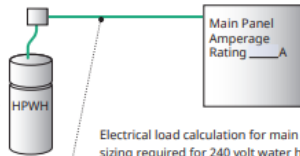
HPWH Permit Supplement Template

Standard Heat Pump Water Heater Detail



Single Line Electric Diagram

Disconnecting means (e.g., breaker or switch or plug) must be in sight of heat pump water heater



Wire type and gauge: _____

Conduit type: _____

Conduit size: _____

If other steps are used please add details below: _____

Site or floor plan outline to show labeled locations of water heater and electric panel(s):



Click above to upload image or include/staple illustration

Additional Code Considerations

Garage Install:

Gas Water heaters must be elevated at least 18" above floor level and gas equipment must be protected from vehicle collisions by elevation and safety bollards installed in garage in the normal path of a vehicle. These concerns do not apply to HPWHs.

*Indoors Install

(Closet or Mechanical room):

Like other locations, provide for adequate thermal air circulation means or thermal venting of cooled air (ducts or vented doors, or door edges trimmed up)

Outdoors Install:

Conform to planning department setback requirements and noise requirements

Attic Install:

Adequate support for weight, 22" x 30" access and solid floor path min. 24" wide, Working platform min 30" x 30" in front of appliance. Water heater in pan with 3/4" overflow line to outdoors. Include vacuum breaker on hot water line.

Project Address: _____ City: _____ Authority Having Jurisdiction: _____

Scope: Heat Pump Water Heater Installation:

Controlling Codes: 2019 Calif. Plumbing Code, CEC, 2019 California Energy Code

Make & Model # _____ Model Nameplate Volts: _____ Amps: _____

Tank Size: _____ Gallons Storage: _____

Volts x _____ Amps = _____ Watts

Efficiency Energy Factor: _____ UEF

NEEA Tier: _____ Electric Circuit Breaker Size: _____

Install location type: (Check all that apply)

- Installed in location of existing tanked water heater Garage or Basement
- In conditioned space In Attic
- In conditioned space with venting

Describe venting origin and destination: _____

Dimensions of room or closet _____ ft x _____ ft x _____ ft > _____ manufacture recommended cubic feet

STATEMENT OF COMPLIANCE:

By my signature, I attest that the information provided is true and accurate.

Name of Applicant: _____ Date: _____

Electrical Load Estimator Tool

Key:

User inputs

User input if applicable

Applicable Equipment	Description of Load	Default Value (measured in Watts)	Nameplate Rating (measured in Watts)	Applicable Rating (measured in Watts)	Units
General Lighting/Power Load					
Required	Insert Total sq. footage of building ->	1,700	Multiply square footage by $\frac{VA}{ft^2}$ ->	3	5,100
Required	Insert # of Kitchen Circuits ->	2	Multiply # by volt-amperes/circuit ->	1,500	3,000
Required	Insert # of Laundry Circuits ->	1	Multiply # by volt-amperes/circuit ->	1,500	1,500
Subtotal				9,600	Watts
Appliances and Equipment Excluding Air Conditioner(s)					
Instruction below		Default	Nameplate Rating	Applicable Rating	Units
Dropdown (Yes or No)	Appliance Name	Default Value (measured in Watts)	Insert if Different than Default Value	Max Default Value or User Inserted Value (measured in Watts)	Units
No	Microwave (only if	1,400		0	Watts
No	Trash Compactor	1,000		0	Watts
Yes	Dishwasher	1,500		1,500	Watts
No	Disposal	1,000		0	Watts
No	Electric Wall Oven	2,000		0	Watts
No	Electric/Induction Range	5,000		0	Watts
Yes	Electric Clothes Dryer	4,000		4,000	Watts
No	Electric Clothes Washer	500		0	Watts
No	Electric Tankless Water Heater	15,000		0	Watts
Yes	Electric Water Heater	4,000		4,000	Watts
No	Electric Heat Pump Water Heater	550		0	Watts
No	Electric Vehicle Supply Equipment (EVSE) - Required for new homes	7,000		0	Watts
No	Evaporative Cooler	500		0	Watts
No	Pool or Spa	2,000		0	Watts
No	Other	n/a		0	Watts
No	Other	n/a		0	Watts
No	Other	n/a		0	Watts
Subtotal (Appliance and Equipment)				9,500	Watts
Total (General Lighting/Power Load + Appliance and Equipment)				19,100	Watts
General and Appliance Load Subtotal (sum of all previously indicated)					
Subtotal (A) = Total Watts - 10,000 VA				9,100	Watts
Subtotal (B) = Subtotal (A) x .40				3,640	Watts
General Load = Subtotal (B) + 10,000 VA				13,640	Watts
Heating and Air-Conditioning Load (Include the largest of the following)					
Central Cooling Load (Amps x Volts)	Insert Central Cooling Load Value Here (Amps) if applicable ->	29	Central Cooling Load Value * (Select either 120 Volts or 240 Volts here) ->	240	6,960
Central Heating Load (Amps x Volts)	Insert Central Heating Load Value Here (Amps) if applicable ->		Central Heating Load Value * (Select either 120 Volts or 240 Volts here) ->		15,000

Next Steps

Upcoming Events

- March 24, 2022 Stakeholder Meeting
- Registration link provided [here](#)

Finalizing Permitting Pilot Beta Resources

- The Permitting Pilot Beta Resources will be vetted by the Stakeholder Group
- Resources will be shared with interested parties after edits from the Stakeholder Group are incorporated

Work with Pilot Partner Jurisdiction

- The City of Pleasant Hill has agreed to partner with the TECH Permitting Pilot

Proposed Timeline

	Working Group	Partner AHJ
Phase A: September 2021 to March 2022		
Host Permit Pilot Stakeholder and Working Group meetings	✓	✓
Develop and vet supports/strategy for a technically feasible single-day permit process for HPWHs	✓	✓
Recruit partner jurisdiction to adopt and implement a technically feasible single-day permit process for HPWHs		●
Phase B: March 2022 – March 2023 (and beyond)		
Support ongoing engagement with Working Group	●	●
Provide updated content and guidance related to HPWH Packet and use cases	●	●
Support Partner Jurisdiction to ensure adoption of recommended permit process		●
Support Partner Jurisdiction process (trainings; operational support/funding; materials/resources for applicants)		●
Report on Partner Jurisdiction and Working Group lessons learned	●	●