

DOCKETED

Docket Number:	22-BSTD-01
Project Title:	2025 Energy Code Pre-Rulemaking
TN #:	252214
Document Title:	Natural Resources Defense Council Comments - on HPWH Ventilation Requirements
Description:	N/A
Filer:	System
Organization:	Natural Resources Defense Council
Submitter Role:	Public
Submission Date:	9/11/2023 12:40:31 PM
Docketed Date:	9/11/2023

*Comment Received From: Natural Resources Defense Council
Submitted On: 9/11/2023
Docket Number: 22-BSTD-01*

NRDC Comments on HPWH Ventilation Requirements

Additional submitted attachment is included below.

September 11, 2023

California Energy Commission
Re: Docket No. 22-BSTD-01
715 P Street
Sacramento, CA 95814
docket@energy.ca.gov

Dear Commissioners and CEC Staff,

The Natural Resources Defense Council (NRDC) submits the following comments on behalf of its more than 450,000 members and activists in California who are advocating for affordable and equitable decarbonization and clean air policies to help mitigate the climate crisis and advance a sustainable economy. These comments are in response to the California Energy Commission's (CEC) August 23, 2023 workshop for the 2025 Title 24 proposed requirements for residential and multifamily heat pump water heaters.

In general, NRDC supports the water heating measures proposed in the August 23rd workshop and particularly supports the enhanced water heater electric-ready language. NRDC is however opposed to the individual heat pump water heater (HPWH) ventilation requirements as proposed. We are concerned that as written these requirements will inhibit the installation of HPWHs in California, in particular in retrofit scenarios. Our comments focus on these concerns.

While NRDC supports the intent to provide adequate ventilation air to HPWHs, which is needed to ensure optimum performance, we are concerned that the requirements as proposed in the Final CASE report¹ are overly restrictive and will prohibit or unnecessarily increase the cost of HPWH installations beyond what is necessary to achieve adequate ventilation, particularly in retrofit scenarios where the water heater location and configuration will be constricted by the existing configuration and house layout.

For example, the proposed language in the CASE study would require ducting for any water heater in a room smaller than approximately 84 cubic feet.² This is much larger than the closets that many existing water heaters are installed in. There is no basis for this room size limitation when a louvered door is installed. Manufacturer guidance does not include a minimum size limitation for louvered door installations.³ When a louvered door is installed, a HPWH can be

¹ https://title24stakeholders.com/wp-content/uploads/2023/08/2025_T24_CASE-Report-_MF-DHW-Final-1.pdf

² This dimension was determined using the Rheem ProTerra compressor capacity of 4200 Btu/h. <https://images.thdstatic.com/catalog/pdfImages/ec/ec57a584-4a80-4fa0-b5b7-37df54796add.pdf>

³ Ibid.

installed in any size room that it can physically fit and continue to perform well. However, the CASE report proposal arbitrarily constrains this louvered door pathway to a room 84 cubic feet or larger. Notably, a space in compliance with the heat pump water heater ready language in Section 150.0 would be forced to duct under the proposed Section 110.3(c)7, as the reserved space required by the heat pump ready language is only 2.5'x2.5'x7'.

More generally, we are concerned that the language as written sets overly specific requirements which are not warranted or needed given the continued development of new products within the HPWH space and the strength of manufacturer guidance. While the Shrinking Room Study showed degraded performance of HPWH with reduced ventilation, it also showed that manufacturer guidance as written does a good job of ensuring HPWH performance.⁴ All that code needs to do, therefore, is ensure that HPWHs are installed per manufacturer guidance. Deferring to manufacturer guidance is particularly important given the emerging nature of products in this space. Setting specific minimums does not allow for the development of new HPWH configurations that may have different installation requirements.

Finally, we are concerned with the requirement to have backup heat for HPWH supplied with unconditioned air where the compressor cutout temperature is below the Winter Median of Extremes. While we understand that the intent of this requirement is to avoid consumer dissatisfaction from equipment that is unable to maintain adequate hot water temperatures, it would increase energy use by requiring back up resistance electricity instead of allowing heat pump only operation and limit innovation in this space. This is particularly important for emerging 120 V HPWH products which have been recently introduced and some of which do not include back up heat. Setting a requirement for backup heat would prevent manufacturers from developing controls or other strategies (e.g. preheat, supplementary storage to ride through winter extremes) that would enable water heaters to perform satisfactorily without it. Manufacturers are substantially motivated to satisfy consumers' hot water demands and so again we recommend that this section of the code defer to manufacturer guidance.

We have provided specific suggested edits to the language proposed in the Final CASE Report below and urge the CEC to adopt these edits as it moves to the Express Terms Draft.

We appreciate the opportunity to submit these comments and would welcome further discussion.

Sincerely,

Merrian Borgeson
California Director, Climate & Clean Energy
Natural Resources Defense Council (NRDC)

Meg Waltner
Project Manager
Energy 350, on behalf of NRDC

⁴ <https://neea.org/resources/heat-pump-water-heaters-in-small-spaces-lab-testing-the-amazing-shrinking-room>

Appendix – Suggested edits to language proposed in Final CASE Report

Heat pump water heaters (HPWHs).

~~A. Backup Heat. Backup heat is required for air source systems when inlet air is unconditioned, unless the compressor cutout temperature is below the Winter Median of Extremes for the closest location listed in Table 2-3 from Reference Joint Appendix JA2.~~

AB. Ventilation. Ventilation air for consumer integrated HPWHs shall be obtained by one of the methods below. Minimum volume and opening size requirements shall be the sum for all HPWHs installed in the same space. Compressor capacity shall be determined using AHRI 540 Table 4 reference conditions for refrigeration with the “High” rating test point.

1. Installed using a method for ventilation detailed by the manufacturer. For new construction, manufacturer installation instructions documenting this methodology shall be included with plans submitted to the enforcement agency for approval.

2. If manufacturer does not specify installation instructions, one of the following methodologies:

~~4j.~~ Installed without ducts in a space with a minimum volume ~~the larger of~~ 100 cu. ft. per kBtu/hr of compressor capacity or the minimum provided by the manufacturer for this method.

~~2j.~~ Installed without ducts in a space smaller than required by subsection 1 above, according to the following requirements:

- ~~i.~~ Installation space shall be ~~the larger of 20 cu. ft. per kBtu/hr of compressor capacity or the minimum provided by the manufacturer for this method, and~~ vented to a communicating space via permanent openings.
- ii. Communicating space shall meet the minimum volume of subsection 1, minus the volume of the installation space.
- iii. Permanent openings shall consist of a single layer of fixed flat slat louvers or grilles with a total minimum NFA the larger of 125 sq. in. plus 25 sq. in. per kBtu/hr of compressor capacity or the minimum provided by the manufacturer for this method, and meet the following requirements:
 - a. Fully louvered doors; or
 - b. Two openings, one commencing within 12 inches from the enclosure top and one commencing within 12 inches from the enclosure bottom.

~~3j.~~ Installed with ducts in any size space, according to manufacturer requirements and the following:

- i. The space joined to the installation space via ducts shall meet the minimum volume of subsection 1, minus the volume of the installation space.
- ii. All duct connections and building penetrations shall be sealed.

- iii. Exhaust air ducts and all ducts which cross pressure boundaries shall be insulated to R-6 or higher.
- iv. If only the HPWH inlet or outlet is ducted, installation space shall include permanent openings consisting of a single layer of fixed flat slat louvers or grilles in the bottom half of the room, and/or a door undercut. With a ducted inlet, minimum NFA shall be equal to the cross-sectional area of the duct. With a ducted exhaust, the minimum NFA shall be equal to the larger of 20 sq. in. or the minimum NFA provided by the manufacturer for this method.
- v. If inlet and outlet ducts terminate within the same pressure boundary, airflow from termination points shall be diverted away from each other.

~~4. Installed using a method for ventilation, other than those described in subsections 1 through 3, certified by the manufacturer. A letter from the manufacturer providing this certification shall be included with plans submitted to the enforcement agency for approval.~~