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NRDC Comments on Draft Express Terms

Additional submitted attachment is included below.

November 17, 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) Draft Express Terms for the 2025 Title 24 Building Energy Efficiency Standards ("Title 24") published November 3, 2023.

NRDC appreciates the CEC's hard work in developing the Draft Express Terms. Title 24 is a critical tool to accelerate building decarbonization throughout the state in alignment with California's broader emissions reduction goals. Overall, NRDC strongly supports the Draft Express Terms, which make critical updates to the code to expand heat pump baselines that promote zero-emission electric construction, encourage retrofits to choose zero-emission space heating, and make important energy efficiency updates which will save Californians money, increase comfort, and reduce load throughout the state, enabling further decarbonization.

NRDC offers the following specific comments on the changes proposed in the Draft Express Terms:

1) NRDC strongly supports and appreciates the CEC's work to address alterations through prescriptive requirements that would encourage the adoption of residential and commercial heat pumps at the time of equipment replacement.

Residential
For residential buildings, the CEC has proposed that additions follow new construction requirements related to space heating system types and that additional water heaters serving additions be heat pump water heaters.[1] We strongly support these requirements, which will ensure that additions to existing buildings meet the same standards as new construction and

[1] Section 150.2 (a)

encourage the adoption of heat pump space and water heating in these buildings. The CEC has also proposed that, at the time of replacement, central air conditioners be replaced with a heat pump or an air conditioner with complementary measures.[2] We strongly support this proposal, which will help encourage the adoption of heat pumps in alignment with the state's goals at the time when this change is easiest and lowest cost, as documented in NRDC's previously submitted comments.[3] Since a heat pump is essentially the same piece of equipment as an air conditioner with the addition of a reversing valve, for most homes this equipment swap can be made easily at the time of air conditioner replacement and the requirements as written will encourage this choice, helping to accelerate progress towards the state's 6 million heat pump goal by 2030. While overall NRDC strongly supports the requirements for residential heat pump alterations, we request that the CEC consider the following modifications as it crafts the 45-day language:

- As written, the requirements would not apply to entirely new central air conditioning systems or systems where the ductwork is also being replaced. These new and full system replacements are the most opportune time to install a heat pump as ducts and electrical infrastructure can be sized as needed and should therefore also be subject to these requirements. We recommend that the section of the code governing new and full system replacements[4] reference either the system replacement provision[5] or the new construction provision.[6]
- The CEC has included two exceptions to the alterations requirement for situations where the installation of a heat pump rather than an air conditioner would trigger a main service panel upgrade[7] or would increase the existing heating load by 12,000 Btu/h or more.[8] While we support the use of exceptions to exempt uncommon situations that would have increased installation requirements, we are concerned that as written these exceptions are broader than necessary. We therefore encourage the CEC to limit both exceptions to being applicable in heating-dominated climate zones only as they are not necessary in cooling-dominated climate zones. For Exception 1, the provisions of 150.0(h) limit the sizing of backup electric resistance heat such that a panel upgrade should not be needed in these climate zones. For Exception 2, heating load will be less than cooling load in cooling-dominated climate zones.

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[2] Section 150.2 (b)1Fii
[3] See: https://efiling.energy.ca.gov/GetDocument.aspx?tn=249551&DocumentContentId=84193, https://efiling.energy.ca.gov/GetDocument.aspx?tn=251558&DocumentContentId=86433, and https://efiling.energy.ca.gov/GetDocument.aspx?tn=252182&DocumentContentId=87186
[4] Section 150.2(b)1C
[5] Section 150.2 (b)1Fii
[6] Section 150.1(c)6
[7] Exception 1 to Section 150.2(b)1Fii
[8] Exception 2 to Section 150.2(b)1Fii

- Additionally, we recommend that the CEC clarify the wording of Exception 2.[9] As written "compliance... is not required if the addition of the heat pump exceeds the existing heating load by 12,000 Btu/h or more." We believe the intent of this language is to exempt projects where the addition of a heat pump would result in the selection of a heat pump with a capacity that is 12,000 Btu/h or more than would be needed if an air conditioner-only was selected, but this is not clear from the wording as written, which implies that the addition of a heat pump would increase the building's heating load, which is inaccurate. A suggested alternative would be: "compliance…is not required if the addition of the heat pump would result in the selection of equipment that exceeds the existing equipment's cooling capacity by 12,000 Btu/h or more. Documentation of heating and cooling load calculations in accordance with 150.0(h) shall be submitted to the Authority Having Jurisdiction."

Nonresidential

For nonresidential buildings, the CEC has proposed that replacement rooftop packaged units (RTUs) less than 65,000 Btu/h be heat pumps or air conditioners plus furnaces with complementary measures for most climate zones for retail, grocery, school, office, financial, and library buildings. Overall, we strongly support this provision which will encourage the adoption of heat pumps at the time of equipment change out, when incremental cost and effort is lowest. While we support the proposal, we recommend the following specific changes to the language as proposed:

- We are concerned that for climate zones 1 and 16 (depending on the building type), a heat pump would no longer be allowed prescriptively, despite the fact that there are heat pumps that perform well in these climate zones. It would also create a more burdensome path for heat pumps in climate zones 2 and 14 (depending on the building type) than what is allowed today. We recommend either creating an alternative prescriptive path for heat pumps in climate zones 1 and 16 so that there is a prescriptive option for heat pump RTUs in every climate zones or removing climate zones 1, 2, 14, and 16 from these requirements entirely, leaving the choice of equipment in those climate zones as it is today.
- We are concerned with the proposed exception[10] which would allow for an exception to the requirements if the installation of a heat pump RTU would require a "utility service upgrade that involves a new utility transformer." While we are open to including an electrical infrastructure upgrade exception to this requirement, we are concerned that the proposed exception as worded is overly broad and does not provide a clear methodology for documenting whether this exception would apply and therefore will be challenging to

[9] Ibid.

[10] Exception 1 to Section 141.0(b)2Cii

enforce. We recommend tightening this language so that it is clear, limited, and enforceable.

2) NRDC strongly supports the CEC's work to expand heat pump baselines for residential and nonresidential buildings.

The CEC has proposed to expand on the existing heat pump space and water heating prescriptive baselines established in the 2022 edition of Title 24 by setting heat pump space and water heating baselines for homes in all climates,[11] expanding the heat pump space heating baselines for nonresidential buildings to large, multi-zone systems in schools and offices,[12] and setting heat pump water heating baselines for individual water heaters serving multifamily buildings.[13] We strongly support these expanded baselines, which will encourage building electrification while continuing to provide builders options under the performance path. We request that the CEC consider the following amendments as they move to the 45-day language:

- ➢ We recommend that the CEC expand the list of system types prescriptively allowed for multizone systems in schools to include variable refrigerant flow (VRF) systems, similar to the allowance for multizone systems in office buildings. This will provide more flexibility under the prescriptive path in electric heating system choice for new school construction.
- ➢ We recommend that CEC remove the exception that would allow for gas instantaneous water heaters in high-rise buildings.[14] While individual water heaters are not common in high-rise buildings, this exception unnecessarily promotes the installation of costly gas infrastructure in these buildings and should be removed.

3) NRDC requests that the CEC make additional changes to the heat pump water heater ventilation requirements proposed to ensure that requirements do not unnecessarily hinder the installation of heat pump water heaters.

The CEC has proposed requirements to ensure that heat pump water heaters are installed with adequate ventilation to achieve optimum performance.[15] While we support the intent of this requirement to ensure adequate ventilation and appreciate the changes that have been made from the language proposed in the Final CASE Report, we remain concerned that the language proposed does not strike the appropriate balance between ensuring performance and preventing unnecessary barriers to installing heat pump water heaters. We offer the following specific comments:

- ➢ The requirements state that compressor capacity shall be determined using AHRI 540 Table 4 reference conditions for refrigeration with the "High" rating test point.

[11] Sections 160.1(c)6 and 160.1(c)8
[12] Section 140.4(a)3
[13] Section 170.2 (b)
[14] Exception 1 to Section 170.2 (b)
[15] Section 110.3 (c) 7

Manufacturers do not currently test to or publish this value in their product literature. We are therefore concerned that basing the required room size based on this value is unenforceable as there would be no way for a contractor to document the size of the compressor to calculate the installation space required.

- We appreciate that the water heater installation space size limit under Option 2, which allows for installation in a small room or closet that is vented to an adjacent space, was removed. As submitted in NRDC's previous comments,[16] this limit is unnecessary when there are louvered doors or permanently installed openings connecting the spaces and we therefore appreciate that it was omitted in the Draft Express Terms.
- Section 110.3 (c)7B2ii: the language in this section should be clarified to state that the permanent openings are not in addition to the louvered doors, nor are they required to be in the door itself (i.e., they could be through the water heater closet wall instead). For example, if the water heater is installed in a corner there may be installations where it is preferable to install the louvers in a wall and would achieve the same outcome as if they were through the door. Additionally, the language that the louver should be "located within 12 inches" of the top and bottom of the enclosure should also be clarified. This should refer to where the louver begins and should clarify what is meant by the enclosure. Specifically, is the top of the enclosure the doorway or the ceiling height of the room where the water heater is installed?
- Section 110.3(c)7B3iv: the ducted inlet configuration should only require a net free area (NFA) of 20 square inches (same as ducted exhaust). Requiring the NFA to be the same size as the duct is not supported by the research and is significantly more than what is needed for adequate ventilation.
- Section 110.3(c)7B4: This provision does not provide any relief for alternate configurations as is. There is no way to meet the requirements of 110.3(c)7B without meeting one of the three specific requirements listed. As submitted previously, we continue to recommend that this language be changed to "Installed per manufacturer's instructions for ventilation requirements." If this language is not acceptable an alternative could be, "Installed using a method certified to the Energy Commission by the manufacturer to provide adequate ventilation to achieve within 15 percent of rated energy performance."

4) NRDC supports the changes proposed to ensure that heat pumps and other space-conditioning equipment are sized properly and do not result in excessive use of back-up electric resistance heat.

NRDC supports the changes proposed in Section 150.0 (h) aimed to ensure proper sizing, selection, and quality installation of space-conditioning equipment. We offer the following comments to strengthen the provision:

[16] https://efiling.energy.ca.gov/GetDocument.aspx?tn=252214&DocumentContentId=87220

- 150.0(h)5cia: We recommend that this language should be strengthened by stating that the equipment be able to deliver that capacity at the design temperature and referred to the specific CBC section for minimum requirements.
- 150.0(h)7: We recommend that the CEC consider whether a lockout temperature lower than 35F would be appropriate, in particular given the requirement to deliver full capacity at the design temperature. We also recommend that the CEC remove the exemption from supplemental heating control for Climate Zone 15. While heating loads are low in climate zone 15, this control should still be in place for extreme weather days, when the grid is likely to be strained.
- 150.0(h) 8:
    - We are concerned that part A of this section conflicts with 150.0(h)5cia that requires the system to be able to meet design load without supplementary heating.
    - We are concerned that part B of this section could lead to large electric resistance sizing in cooling dominated climate zones.
- 150.0(h) 10A: We recommend rewording the second half of this sentence for clarity as it is confusing as written ("and the building complying with solar ready requirements of Section 110.10(b)1A without making use of Exception 5").

5) NRDC supports the many energy efficiency and electric-ready changes proposed in the Draft Express Terms. These provisions will result in energy savings, reduce load, and ensure that buildings not built all-electric today will have the necessary infrastructure for future electrification. All of these measures help support the state's goal of emissions reductions. We specifically support the following measures:

- Section 110.4 - which would require certain pools to be heated by heat pumps or renewable energy.
- Section 120.2(l) - which sets mandatory requirements that zone hot water design supply temp shall be no greater than 130 F. This provision both saves energy and enables future electrification.
- Section 120.3 - which requires increased mandatory pipe insulation in nonresidential buildings.
- Section 120.6 (h) - which sets horticultural lighting efficacy to 2.3 micromoles/joule.
- Section 120.6 (k) - which requires electric readiness for commercial kitchens.
- Section 140.4 (d) and (r) - which require the use of Guideline 36 control sequences.
- Section 140.4 (s) - we support the requirement for mechanical heat recovery for systems with large simultaneous heating and cooling loads which will harness this important energy efficiency opportunity.
    - Editorial comments on Section 140.4 (s):
        - We recommend revising the following language: "The heat recovery system shall include a heat recovery chiller, or other means, capable <u>at a</u>

minimum of transferring the lesser of the following from spaces in cooling to spaces in heating and/or to the SWH system" to clarify that this is the minimum amount of heat recovery required.

- The storage requirements of 140.4(r)2 are still referenced but no longer included.

- Table 150.1 A - we support the updated window U-factors as proposed, which will improve comfort, reduce load, and provide energy savings. As submitted previously to the CASE team, we expect that even higher efficiency levels would be cost-effective.
- Section 160.1(b) - which updates the mandatory wall insulation levels for multifamily buildings.
- Section 160.4(e) - which increases the mandatory pipe insulation requirements for multifamily buildings.
- Section 160.9 (f) - which expands the electric ready requirements to require multifamily buildings with central hot water systems to be heat pump water heater ready.
- Table 170.2-A - which increases the prescriptive window U-factors for multifamily buildings.

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