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NRDC Comments on August 24th Workshop HP Baselines and Alteration Requirements

Additional submitted attachment is included below.

September 7, 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 24, 2023 workshop for the 2025 Title 24 proposed requirements for heat pump baselines for new construction and alterations.

As submitted in NRDC et al's August 9th comments on the July 27th workshop,[1] NRDC broadly supports the CEC's efforts to expand heat pump baselines to promote zero-emission electric construction in the code's performance path and to promote zero-emission space heating in retrofits for the 2025 code. However, we remain concerned by the proposal to include the residential air conditioner to heat pump alteration requirement in the voluntary code under Part 11, rather than as a prescriptive requirement under Part 6. We are also concerned with the CEC's updated cost-effectiveness analysis for residential alterations presented in the July 27th workshop, which is based on an extremely small sample size and, as presented, does not clearly document how the costs were developed.

We offer the following specific comments on the material presented in the workshop:

NRDC urges the CEC to require air conditioner to heat pump alterations in Part 6 and to update its cost-effectiveness analysis. NRDC continues to urge the CEC to require heat pumps at the time of existing air conditioner (AC) replacements as a prescriptive requirement in Part 6 when cost-effective and feasible. As submitted previously, failing to include this requirement in Part 6 will miss a low-cost opportunity to install heat pumps in California that will result in higher costs for Californians in the future as state policies to require zero emissions heating equipment are realized. Installing heat pumps at the time of AC replacement (either keeping the

[1] https://efiling.energy.ca.gov/GetDocument.aspx?tn=251558&DocumentContentId=86433

existing furnace as backup or replacing it entirely) is technically feasible and should be cost-effective in most scenarios, as documented in NRDC's analysis submitted to the docket in April 2023.[2] This is not a new strategy or technology: the state of Maine, for example, has on the order of 100,000 heat pumps installed as part of dual fuel heating systems (using a variety of backup heat, including oil, gas, and wood).[3] There have also been thousands of AC to heat pump upgrades installed in California as part of the TECH program.[4]

Given this technical feasibility, allowing the continued installation of one-way air conditioners will not only result in unnecessary emissions, but will also saddle Californians with increased costs when they go to replace the furnace in future years. Starting in 2030, the California Air Resources Board (CARB) 2022 State Strategy for the State Implementation Plan[5] calls for zero emissions space heating, which would effectively prohibit the installation of a new furnace. For any homeowner replacing an air conditioner between now and 2030, this will leave them with the stranded asset of a one-way air conditioner when they need to replace the furnace with a heat pump within the next decade.

The cost-effectiveness analysis presented in the August 24th workshop does not reflect these realities. During the workshop, the CEC staff presented an updated cost-effectiveness analysis based on a very limited sample size (two to five contractors depending on the scenario) which shows that requiring a heat pump instead of an air conditioner is no longer cost-effective in the more moderate climate zones (6 through 10, 14, and 15). As a stakeholder, it is challenging to respond to the costs presented as detailed cost breakdowns specifying assumptions were not provided in the workshop, but based on the data available, it appears that the CEC's analysis is flawed in the following ways:

- **The CEC inaccurately assumes that the replacement equipment in 15 years will be a furnace combined with an air conditioner.** As discussed above, CARB is poised to require zero emissions heating equipment starting in 2030. The CEC's analysis is based on the flawed assumption that this state policy will not be realized. Specifically, the scenario where a heat pump is not installed in year 1, should include the cost to install a heat pump in year 15.

- **The CEC double counts the cost of switching from an AC to a heat pump.** The CEC has double counted the costs associated with switching from an AC to a heat pump in its cost-effectiveness analysis by using the same incremental cost for the replacement at year 15 as the initial incremental cost in year 1. The first costs gathered by the CEC are for the

[2] https://efiling.energy.ca.gov/GetDocument.aspx?tn=249551&DocumentContentId=84193
[3] Email communication with Dylan Voorhees, Vermont Energy Investment Corporation, 9/5/23
[4] https://efiling.energy.ca.gov/GetDocument.aspx?tn=251558&DocumentContentId=86433
[5] https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf

replacement of an existing AC with a heat pump. However in year 15, when this equipment is replaced the baseline system is no longer an AC. The correct scenario is a heat pump change out. Any incremental cost associated with upgrading to a heat pump from an AC in year 1 should be removed in the year 15 incremental cost. We expect this year 15 replacement cost to be much closer to the incremental equipment cost, as there should not be an incremental installation cost for a heat pump to heat pump switch out compared to an AC to AC switch out.

- **The sample size is too small to justify statewide decisions.** The CEC gathered costs from two Bay Area contractors for the scenario where the AC only is replaced and the existing furnace remains in place and from five contractors for the scenario where both the AC and furnace are replaced. These likely represent high-end cost estimates that are not valid throughout the state. As the CEC itself noted in the workshop, they found variability in cost across these five contractors, with the highest incremental cost found 4.7 times larger than the lowest incremental cost found. This high degree of variability indicates that this is not a sufficient sample size. As noted by the CEC prices for heat pumps are also likely being influenced by existing incentives and may be close to a peak caused by a variety of market factors. It is highly likely that average incremental prices throughout the state will be lower by January 2026 when this requirement would take effect due to the stabilization of the market and the effects that three more years of the TECH and Inflation Reduction Act (IRA) incentives will have on the market.

  We recommend that the CEC continue to collect data from a broader group of contractors representing markets throughout California as well as work with distributors and manufacturers to come up with more representative incremental cost data. The CEC should work to gather climate zone specific cost data or otherwise ensure that the cost data gathered is more representative of average costs across the state. This is particularly important as currently the high construction costs gathered from Bay Area contractors are being compared against the energy cost savings in warmer non-Bay Area climate zones with lower heating loads and therefore fewer energy savings, harming cost-effectiveness in these climate zones.

- **The CEC inaccurately includes the cost of a separate 220 V circuit for the indoor heat pump unit when supplemental heat is not required.** From what we understand, the CEC has included the cost of a separate 220 V circuit to the indoor air handler, even though supplemental heat is not required (both because the backup furnace is allowed and because it is not commonly specified by California contractors). While our understanding is that this 220 V power should not be necessary, for air handling units that do require 220 V power, this can be served by the existing 20 amp wiring upgraded to a 220V breaker or powered by a disconnect from the outdoor unit. It would not require a new separate circuit.

NRDC urges the CEC to establish the nonresidential new construction baselines through the Alternative Calculation Method (ACM) Reference Manual, rather than through prescriptive requirements. In general, NRDC strongly supports the CEC's efforts to establish all electric baselines for nonresidential new construction. Given the emerging nature of this space, the variety of all electric system types, and the inability to model many all-electric system types adequately in CBECC, it is imperative that the prescriptive path maintain multiple all electric options for compliance. We recommend that the CEC include a general prescriptive requirement limiting the system types for nonresidential new construction that either disallows fossil fuels or generally requires the use of heat pump technology. The specific baseline system type would then be set by building type in the ACM as it is for these buildings today.

This is particularly important for medium office buildings where the CEC is proposing a variable refrigerant volume (VRF) + dedicated outside air system (DOAS) baseline. While research has shown that these systems can reduce energy costs significantly compared to packaged systems,[6] research has also shown that they do not perform as well as indicated by their performance ratings.[7] They are also not appropriate for all medium office buildings, given their footprint and lineset length requirements, as well as potential owner concerns around refrigerants. We strongly discourage the CEC from setting a prescriptive requirement that would require VRF for these building types. We do strongly support the implementation of an electric baseline for medium office buildings and think that the VRF + DOAS system proposed is a reasonable baseline given the limitations of CBECC.

NRDC supports the single-family and multifamily new construction baselines proposed. As submitted previously, NRDC strongly supports the proposals to set dual space and water heating heat pump baseline for single family buildings and multifamily buildings with individual water heating systems. The proposed baselines will send strong electrification signals, while still allowing flexibility for gas systems through the performance path. NRDC encourages the CEC to keep working on the analysis for climate zone 15 for single family buildings as documented in our comments on the July 27th workshop. We expect that with updated assumptions, the CEC would find the dual baseline to be cost-effective in this climate zone as well.

We appreciate the opportunity to submit these comments and 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

[6] https://betterbricks.com/uploads/resources/Maximizing_HVAC_Efficiency_Flexibility_with_High_Efficiency_DOAS.pdf
[7] https://efiling.energy.ca.gov/GetDocument.aspx?tn=251562&DocumentContentId=86436