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NRDC Earthjustice RMI Comments on July 2023 HP Workshop

Additional submitted attachment is included below.

August 9, 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,

We submit the following comments on behalf of the Natural Resources Defense Council, Earthjustice, and Rocky Mountain Institute in response to the presentations in the July 27, 2023 Pre-Rulemaking Staff Workshop on Heat Pump Baselines and Photovoltaic System Requirements for the 2025 Title 24 Building Energy Standards. Collectively, our organizations represent hundreds of thousands of concerned Californians who are advocating for affordable and equitable building decarbonization and clean air policies to help mitigate the climate crisis.

Overall, we strongly support the CEC's work 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. These efforts are critical to accelerating building decarbonization in alignment with California's broader emissions reduction goals. Building electrification combined with clean electricity is a critical component to meeting the state's emissions and air pollution goals. The urgency of the measures proposed in the July 27th workshop is highlighted by the stark effects of climate change that we are seeing across the globe this summer. On the tails of the two hottest months on record, we must move as quickly as possible to reduce emissions from California's building sector. Title 24 is a critical tool to achieving these reductions through decarbonization of new and existing buildings.

We were specifically pleased to see the CEC's focus on alterations and appreciate the CEC staff's hard work to incorporate these measures into their proposals. Requirements for alterations are a critical opportunity to address emissions in existing buildings, as any replacement or renovation that happens is an opportunity to reduce that building's emissions – or, if missed, lock in an emitting appliance for potentially decades to come. For this reason, we strongly support the proposal to require that commercial rooftop units under 65,000 Btu/hr be a heat pump at the time of replacement. Similarly, while we appreciate the CEC's work on residential alterations, we are concerned that the proposal to include heat pump replacements in the voluntary portion of Part 11–rather than as a Part 6 prescriptive requirement–will miss a critical opportunity to scale up heat pumps in the state that we cannot afford to miss.

We strongly support the proposals outlined in the workshop to expand the heat pump baselines to both space and water heating for new residential and multifamily buildings. We also strongly support the work to expand the new construction heat pump space heating baselines to larger commercial buildings, with specific comments on the implementation of these baselines below. Setting new construction baselines using electric space and water heating will drive zero-emission construction throughout the state, while continuing to allow design flexibility through the performance path.

We offer the following detailed comments on the baseline and alterations measures proposed in the workshop:

We recommend that the CEC require residential air conditioners replaced under the prescriptive path be a heat pump under Part 6.

As submitted in our previous comments on the docket, replacing an air conditioner (AC) with a heat pump (HP) at the time of equipment change out is a cost-effective, low cost opportunity to lock in emissions reductions.[1] This is supported by the CEC's analysis which found that the first cost of a heat pump is less than a furnace and AC system and would result in life-time long-term system cost (LSC) savings.[2] The opportunity is huge: approximately 1.9 million central air conditioners are due for replacement in California today that could be affected by this requirement in the near term.[3] The magnitude of this opportunity also highlights the magnitude of a missed opportunity: air conditioners that are not replaced with heat pumps in 2026 will likely remain in place well into the 2040s, locking in the associated emissions for decades or burdening the homeowner with the cost of retiring the equipment early to meet future appliance emissions requirements. The requirement to install a heat pump would still allow for a gas furnace that operates in tandem with the heat pump, but would align with future appliance emissions standards by ensuring that heat pump heating is in place.

These air conditioner to heat pump retrofits are already happening in California and across the country today. The cities of Aspen, CO, Portola Valley, and San Mateo all currently have requirements that air conditioners be replaced with heat pumps at the time of equipment change out. They are also happening throughout California under the TECH program: as of August 2023, there had been 5,136 central AC and furnace to heat pump retrofits through the program. Additionally, 1,248 retrofits under the program have chosen to keep the furnace in place as back

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[1] Earth Justice, NRDC, RMI, and Sierra Club Joint Comments on AC to HP Replacement Opportunity, https://efiling.energy.ca.gov/GetDocument.aspx?tn=249551&DocumentContentId=84193

[2] Presentation - July 27, 2023 - 2025 Pre-Rulemaking Staff Workshop on Heat Pump Baselines and Photovoltaic System Requirements, Slides 36-37 https://efiling.energy.ca.gov/GetDocument.aspx?tn=251405&DocumentContentId=86256

[3] Earth Justice, NRDC, RMI, and Sierra Club Joint Comments on AC to HP Replacement Opportunity, https://efiling.energy.ca.gov/GetDocument.aspx?tn=249551&DocumentContentId=84193

up (this number includes replacements where the existing home did not have an AC).[4] There have also been several studies in the northeast and midwest looking at the integration of heat pumps with backup heat, showing how these systems can function effectively.[5]

As noted during the workshop, controls are required to ensure proper integration when the existing furnace remains in place: this requires that a capable thermostat be installed and programming to ensure appropriate heating lockout temperatures are properly configured. Typical thermostats cost in the range of $100-$250 with an estimated additional $100-$200 for labor.[6] There are many thermostats that meet the requirements of these dual fuel systems that are readily available for installation.[7]

In addition to the fact that these systems are available and feasible, there is a large risk in continuing to allow the installation of air-conditioners only, due to the likelihood of existing and future appliance emissions standards. The Bay Area Air Quality Management District (BAAQMD) will require zero-emissions space heating equipment starting in 2029. Requiring AC replacements to be heat pumps under Part 6 would protect Bay Area residents against the potentially costly scenario, when their furnace dies in the future, of having a newly installed AC that they must replace with a heat pump due to the BAAQMD policy, when they could have made this change for minimal incremental cost at the time of their AC installation. In the case of a homeowner who replaces an air conditioner in 2026 and then needs a furnace replacement in 2029, they would likely need to remove the relatively new air conditioner and replace it with a new heat pump. The cost of having to effectively pay to replace the equipment twice would swamp the incremental cost of installing a heat pump. It is likely that similar policies will be enacted throughout the state, emphasizing the need to safeguard against this potential high cost outcome.

We therefore urge the CEC to reconsider its proposal to include the AC-to-HP replacement provisions in the voluntary portion of Part 11 rather than Part 6. We are concerned that Part 11 won't have the broad impact needed as outlined above, since it is voluntary and would rely on jurisdictions for adoption. Additionally, even for jurisdictions that do adopt the Part 11 provisions, we are concerned that they will not be enforced, since Part 11 lacks the established compliance forms and procedures that exist for Part 6.

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[4] https://techcleanca.com/public-data/ updated August 2, 2023

[5] See for example: https://cadmusgroup.com/wp-content/uploads/2022/06/Residential-ccASHP-Building-Electrification-Study_Cadmus_Final_060322_Public.pdf, https://www.masssave.com/-/media/Files/PDFs/Case-Studies/2-0515-MS-Dick-MacDonough-23Rev.pdf, and https://www.mncee.org/sites/default/files/report-files/86417-Cold-Climate-Air-Source-Heat-Pump-%28CARD-Final-Report-2018%29.pd

[6] Earth Justice, NRDC, RMI, and Sierra Club Joint Comments on AC to HP Replacement Opportunity

[7] See Mass Saves controls product list: https://www.masssave.com/-/media/Files/PDFs/Save/Residential/Integrated-Controls-and-Dual-Fuel-TStats_Master.pdf

We support the CEC's proposal to require commercial rooftop units under 65,000 BTU/hr to be replaced with a heat pump at time of equipment change out.

We strongly support the CEC's proposed prescriptive requirement for commercial single zone packaged rooftop units below 65,000 Btu/h to be replaced with heat pumps at the time of equipment change out. As submitted previously, these units are essentially drop-in replacements for existing rooftop units, result in first cost savings, and emissions reductions (including both gas and electric savings in some climate zones).[8] The proposed measure would also be broadly impactful – affecting roughly 80 percent of the market as estimated by the CEC. We strongly support the CEC's work on this measure and encourage the CEC to adopt it in Part 6 as proposed. We also support the CEC's continued efforts to evaluate larger units for inclusion in Part 11.

We support the expansion of heat pump baselines to multi-zone nonresidential systems and urge the CEC to ensure that there are multiple compliance pathways for all-electric multi-zone systems under both the prescriptive and performance compliance paths.

We appreciate the CEC's efforts to develop the air-to-water space heating heat pump modeling capability in CBECC and to develop the proposed space heating baselines for multi-zone systems in large and medium offices and large schools. These baselines will be an important driver for zero emissions space heating in large nonresidential buildings.

While we support the CEC's work, we urge the CEC to be cautious in how it develops the specific language around these baselines to ensure that there is flexibility to install different all-electric system types under the prescriptive path, rather than specifying one prescriptive option per building type. The CEC could achieve this through a broadly defined requirement in the prescriptive path that requires the installed space heating system to be electric and leaves the details of the baseline to the Alternative Calculation Method (ACM) Reference Manual. This should be written in a way that is inclusive of air-to water heat pumps, variable refrigerant flow (VRF), variable air volume (VAV) with limited electric resistance reheat as proposed in IOU's CASE report, heat recovery chillers, and built up systems with a combination of air-to-water heat pumps, heat recovery chillers, conventional chillers, and storage. For example, the prescriptive path could require that the heating system be heat pump based unless the exceptions for VAV with electric reheat are met and then leave the details of defining that heat pump system by building type to the ACM. This would set a strong decarbonization signal while still allowing design flexibility.

This is important because the prescriptive path is frequently utilized for non-residential buildings and it could hinder the progress of all-electric construction if these various heat pump pathways were not available prescriptively. We want to encourage innovation in this space and allow

[8] Earth Justice, NRDC, RMI, and Sierra Club Joint Comments on AC to HP Replacement Opportunity

designers to develop efficient heat pump system configurations without being overly limited by code. It is also important to include these prescriptive paths because not all of the electric systems mentioned can be modeled in CBECC currently – there needs to be a compliance pathway prescriptively for these systems to avoid adding new barriers for all electric systems in code.

In summary, we strongly support the CEC's efforts to expand heat pump baselines to multi-zone nonresidential systems, but urge the CEC to craft the Part 6 language carefully to allow for the installation of different efficient electric heating system configurations.

We support the proposals to extend heat pump baselines to space and water heating for single- and multi- family buildings.

We strongly support 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.

We note that in the CEC's analysis, the incremental cost to go from an AC/furnace system to a heat pump seems high. In new construction, we would expect the heat pump system to cost significantly less, since it is just one piece of equipment that only requires work by one trade, whereas the AC/furnace system requires gas infrastructure as well as the cost of two appliances. However, in Climate Zone 12 for example, the analysis shows that the heat pump costs approximately $800 more than the AC/furnace combination – this does not seem accurate for a new construction context.[9] Similarly, in Climate Zone 15, the AC/furnace only has an incremental cost of $1,000 compared to a heat pump; this also doesn't seem correct given the increased infrastructure and equipment cost of the gas system.[10] We urge the CEC to continue to refine these cost estimates going forward. In particular, we suspect that if costs were updated, the heat pump space heating baseline would also be cost-effective in Climate Zone 15, which is currently omitted from the proposal.

In summary, overall we strongly support the CEC's efforts to encourage heat pumps in alterations and new construction, with the specific feedback outlined above.

We appreciate the efforts of the CEC team in developing these proposals and would welcome further discussion on any of the comments submitted.

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[9] Presentation - July 27, 2023 - 2025 Pre-Rulemaking Staff Workshop on Heat Pump Baselines and Photovoltaic System Requirements, Slide 24
https://efiling.energy.ca.gov/GetDocument.aspx?tn=251405&DocumentContentId=86256
[10] Ibid, Slide 25

Sincerely,

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