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Dear Commissioner McAllister and Energy Commission Staff:

June 4, 2021

Re. Comments on the Title 24 2022 Express Terms Released May 6, 2021,
Docket Number 21-BSTD-01

On behalf of the Natural Resources Defense Council (NRDC), Rocky Mountain Institute, Sierra Club, and Earthjustice who are advocating for affordable and equitable building decarbonization and clean air policies to help mitigate the climate crisis, we respectfully submit the following comments in response to the California Energy Commission's (CEC) draft code language (Express Terms) for 2022 Title 24 efficiency standards released May 6, 2021.

At least 300,000 new housing units are expected to be built in the state under the three-year life of the 2022 code. Using methane (a.k.a. natural gas) to provide heat and hot water in these buildings would lock their residents into rapidly increasing energy bills and harmful indoor air pollution for decades, would cost Californians $1 billion in unnecessary gas infrastructure, and cause 3 million tons additional carbon emissions by 2030.[1] As concluded in a recent United Nations report, "expansion of natural gas infrastructure and usage is incompatible with keeping warming to 1.5° C."[2] It is therefore critical the 2022 Building Code be as effective as possible in reducing California's dependency on fossil fuels. Indeed, because California is a national and global leader in building efficiency standards and with new construction globally expected to add the equivalent of one New York City's worth of new buildings every month for the next 40 years,[3] a strong building code will help influence other jurisdictions looking to California's leadership in setting advanced building energy standards.

[1] https://rmi.org/california-cant-wait-on-all-electric-new-building-code/
[2] United Nations Environment Programme, Global Methane Assessment at 10 (2021), *available at* https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions.
[3] https://architecture2030.org/buildings_problem_why/2/

We appreciate the CEC's continued efforts to shift the market toward clean and efficient all-electric new construction through code changes such as strengthened electric-ready requirements and the inclusion of heat pump space or water heating in standard designs for most building types. These efforts are critical to accelerating building decarbonization and helping achieve a clean-air and carbon-neutral economy in California. While our organizations continue to support an all-electric building code, to the extent the Commission believes it needs to follow a phased transition approach before both heat pump space and water heating are included in standard building designs, **the following important improvements are needed to ensure the 2022 code removes unnecessary barriers to advancing clean and efficient all-electric construction**:

1. **Make heat pump water heaters (HPWH) the baseline for single family in climate zone 10**, as proposed by staff at the 5/24/2021 workshop. We strongly support staff's proposal and requested this change in our comments on draft Express Terms. Climate zone 10 spans from western Riverside County down to East San Diego. It is one of the highest new home construction climate zones in the state with nearly 15 percent of all new single-family housing units expected in 2023. The Express Terms currently set electric HVAC (heating ventilation and air conditioning) as the baseline. With heating being a relatively small load in this climate zone, this would fail to provide a strong incentive for electric heating because a gas furnace could easily comply. This could set up this high-construction area for three more years of gas-fueled buildings and gas infrastructure.
2. **Provide a prescriptive compliance pathway for all-electric heat pumps in non-residential and multifamily in climate zones 1 and 16, as is currently allowed under the 2019 code.** The Express terms set the prescriptive space heating baseline to a dual-fuel heat pump, which has the effect of prohibiting electric heat pumps for buildings that comply using the prescriptive path in these climate zones. This would be a step backwards from today's code, which allows for any minimum efficiency heat pump to comply prescriptively, including ductless, ducted, water-source, and packaged terminal heat pumps.[4] All of these options would be eliminated under the prescriptive path as proposed and would require gas infrastructure for buildings in these climate zones when complying prescriptively.

   While we understand that a minimum efficiency split heat pump has a higher Time Dependent Valuation score in climate zones 1 and 16 than a dual fuel heat pump and therefore cannot be used to set the performance baseline, we urge the commission to continue to allow all heat pump options prescriptively, as in the current code. The prescriptive path is used extensively in multifamily and non-residential buildings. Excluding heat pumps from the prescriptive path would slow the adoption of heat pumps

[4] All of these system types are used in multifamily buildings today, as documented during the stakeholder engagement process: https://title24stakeholders.com/wp-content/uploads/2019/02/2022-Title-24_External-Stakeholder-Meeting_Multifamily_2019_02_08_Final-Draft.pdf, Page 46

in those buildings and lead to continued gas infrastructure development, in spite of the availability of alternatives, such as cold climate heat pumps, that perform well in these climate zones. **We urge the CEC to include an alternative compliance option in the prescriptive path that would allow for heat pumps to comply in all climate zones**. Not doing so would create obstacles to electrification for non-residential and multi-family construction in climate zones 1 and 16.

To ensure good heat pump performance in these colder climates, we recommend that this compliance option include minimum specifications for cold climate performance for equipment installed in climate zones 1 and 16. For residential equipment used in multifamily buildings, we recommend the alternative compliance option requirements in these climate zones align with the Northeast Energy Efficiency Partnership's cold climate specification that requires a coefficient of performance (COP) greater than 1.75 at 5°F (at maximum capacity), use a variable speed compressor, and have a heating seasonal performance factor (HSPF) greater than 9.[5] For commercial equipment, we recommend that the CEC set minimum COP and capacity requirements at 17°F, which are typically reported by manufacturers, and a variable speed compressor.

3. **Expand the compliance incentive to system types most commonly used in large buildings** – The Express Terms propose robust compliance incentives (notwithstanding climate zone 10, 1, and 16 as discussed above) for individual HVAC and water heating systems used in single-family homes, as well as for single-zone heat pumps commonly used in multifamily units and smaller non-residential buildings like small offices and schools.[6] However, large non-residential buildings often use multi-zone, packaged, or central HVAC and HPWH systems, and there is currently no compliance incentive for the electric heat pump versions of these systems in the Express Terms. Expanding incentives to all system types is needed to shift all new construction to clean electric, so there is no need to build new gas infrastructure that will become stranded before the end of its life. As a first step, we recommend that the CEC expand the electric baseline systems to all packaged units, such as rooftop units, including those that serve multizone systems.

With these improvements, we support the CEC's proposed standards. We also highlight the following key advances in the draft Express Terms that must remain in adoption of the final code:

- **The incentive-based approach that encourages efficient electric space and water heating through compliance incentives.** With heat pump baselines set to the largest energy user among space or water heating in each climate zone, the new source energy metric, and enhanced compliance software modeling capabilities, the compliance

[5] https://neep.org/high-performance-air-source-heat-pumps/ccashp-specification-product-list
[6] While the language does not explicitly limit the requirements to small buildings, single zone systems are typically used in smaller non-residential building.

incentive approach has the potential to result in rapid and large-scale adoption of clean electric technologies, by providing pathways that reduce both construction and operating costs, energy use and emissions, while giving the building industry the flexibility it needs to shift their construction practices and train their workforce. If strengthened as recommended in these comments, this flexible approach to advancing clean and efficient all-electric construction will be the first in the world among countries the size of California to strongly incentivize clean electric heat pumps and require electric-ready. It will be an important milestone toward essential building decarbonization and climate crisis mitigation efforts.

- **The strengthened and expanded electric-ready requirements** for water heating, space heating, cooking, and drying will ensure that new homes fueled by gas will be able to affordably upgrade to electric appliances in the future. This includes the needed electric infrastructure for electric water heaters, heat pumps, stoves, dryers, and battery storage as well as the required space and piping configurations for heat pump water heaters (HPWH). Making these buildings electric-ready costs very little at the time of construction, and it guards against higher future costs when gas rates are expected to spiral upward due to a declining rate base for recovering rising infrastructure costs.
- **The kitchen range hood requirements** which will improve indoor air quality by requiring a minimum capture efficiency or flow rate for range hoods. These requirements must be more stringent for gas stoves than for electric stoves, because gas stoves emit carbon monoxide (CO) and nitrogen oxide (NOx) pollutants which have been shown to increase the risk of asthma and other illnesses.[7]
- **The new standalone multifamily chapter:** the new multifamily chapter will clarify and streamline requirements for multifamily projects which are a critical housing type to reduce housing costs, and allow people to live closer to their workplaces, reducing sprawl and transportation energy use and emissions. Multifamily buildings must currently comply with a patchwork of standards across the single family and nonresidential chapters of the code, depending on the building height. The single multifamily chapter will unify requirements for this sector and reduce market confusion, which will increase code compliance. Additionally, the standalone multifamily chapter will allow for future energy efficiency measures to be targeted specifically for this building type, enhancing the potential for future cost-effective savings.
- **The updated fan efficiency requirements** which will require both a mandatory minimum fan energy index and prescriptive fan power limits lead to significant energy savings in one of the major energy-using systems in nonresidential buildings. We strongly support the requirements proposed in the Statewide Codes and Standards

[7] UCLA Fielding School of Public Health, *Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in Californi*a (2020), https://coeh.ph.ucla.edu/effects-residential-gas-appliances-indoor-and-outdoor-air-quality-and-public-health-california

CASE report and urge the CEC to retain strong fan efficiency requirements in the final code.

In addition to the above changes to the Express Terms, the CEC should **continue to enhance the compliance software to be able to model HVAC systems not currently supported, including systems commonly used in large buildings, and advanced heat pumps used in all types of buildings.** The California code compliance software (CBECC) cannot currently model, or does not appropriately model, system types that are less common but nonetheless essential to cost-effective building decarbonization. These include multi-pass central HPWH, air-to-water heat pumps for space heating, heat recovery chillers, and thermal storage. The commission has made great progress on these issues over the past few years, continued and rapid progress is essential to fully transition new construction off fossil fuels.

In summary, we appreciate the CEC's leadership on this essential code update. We urge CEC to implement our recommended changes so this code update can mark another milestone in California's climate leadership and demonstrate how climate action goes hand in hand with faster and cheaper new construction, lower bills, and cleaner air.

Sincerely,

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