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**NRDC AEA CEL AIA California and PCE Joint Comments on Oct 6
Workshop on Electrification**

Additional submitted attachment is included below.



October 20, 2020

California Energy Commission
Docket Office, MS-4
Re: Docket No. 19-BSTD-03
1516 Ninth Street
Sacramento, CA 95814
docket@energy.ca.gov

RE: Staff Workshop: 2022 Energy Code Pre-Rulemaking – Proposed 2022 Energy Code on Electrification

Dear Commissioner McAllister and Energy Commission Staff:

On behalf of the Natural Resources Defense Council (NRDC), Association for Energy Affordability (AEA), Community Energy Labs (CEL), American Institute of Architects California, and Peninsula Clean Energy (PCE), 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) October 6, 2020 workshop on electrification.

We appreciate the CEC's continued efforts to reduce barriers to building decarbonization in Title 24 and to expand the use of heat pump space and water heating. Specifically, we appreciate the CEC's efforts to evaluate alternative electric baselines and to propose compliance incentives for residential electric buildings. While these efforts are a step in the right direction, alone they will be insufficient to meaningfully shift the market to electric new construction. Without tightening the gas baseline and ensuring that gas buildings do their fair share in reducing their climate emissions, the adoption of clean electric technologies will most likely continue to be marginal during the 2022 code period.

In normal times, we'd go one step at a time, with incremental steps every three years, and we'd eventually get to zero-emissions buildings within a decade. But these are not normal times: we're already seeing massive and widespread wildfires that climate experts were expecting by mid-century, not today. As climate change is accelerating under our eyes, we must accelerate our pace of action if we are to stave off its worst impacts.

This is particularly important given the time scale at which codes affect construction practices. The 2022 code will affect permits that will be pulled starting in 2023, for buildings that will get built between 2024 and 2026 because of the lag between permitting and end of construction, particularly on large projects. Delaying large-scale electrification until the 2025 code update would allow new buildings to be built with gas equipment and plumbing, and would allow new gas infrastructure to be deployed for those buildings until 2029. This is incompatible with the science, or with the climate reality we are now experiencing. Simply put, delay would result in new buildings that would exist for many decades and aggravate, rather than mitigate the climate crisis.

The technology to power new buildings with clean electricity exists, it costs no more to install at scale, actually less when including the compliance incentives proposed by staff, and upcoming financial incentives from the TECH and SGIP programs. Thirty-five California cities and counties have already adopted clean electric building codes to date. And it costs less to operate, particularly when accounting for rooftop solar electricity that is now standards for low-rise residential buildings in California.

We must not let industry inertia stand in the way of climate safety. We urge the Commission to set strong decarbonization requirements for all buildings that will lead to broad adoption of heat pumps for space and water heating in new construction starting in 2023. We offer the following specific comments on the information presented in the October 6th workshop for the CEC's consideration.

Detailed Comments

CEC must set lower-emission mixed-fuel baselines for all building types

While we support the CEC's proposal to introduce electric space and water heating baselines for multifamily (both low and high rise) and certain non-residential building types, and to provide compliance credits to low-rise residential designs that use electric space and water heating, this will fail to drive decarbonization in new construction at the pace and scale needed

to address the climate crisis we are already facing today. In addition to these new electric baselines and compliance credits, CEC must reduce the greenhouse gas (GHG) emissions of the mixed-fuel baselines for all building types.

A cost-effective way to do this is to switch electric water heating and space heating end uses from gas to electric in the mixed-fuel baselines. The use of the new time-dependent source energy (TDS) metric, combined with electric space and water heating baselines for mixed-fuel buildings, will provide flexibility for builders who need more time to transition, while ensuring new construction that still uses gas does its fair share in reducing GHG emissions.

These changes can be implemented cost-effectively while providing design and equipment flexibility to builders. In single family homes, it costs less to install a heat pump water heater (HPWH) than a gas tankless water heater. Heat pump space heating (HPSH) also costs less than separate furnace and air conditioner systems, as analyzed by E3 and AECOM.¹ Similarly, for multifamily residential, a ducted heat pump leads to first cost savings compared to the current baseline system types, as documented in the All-Electric Multifamily Compliance Pathway Codes and Standards Enhancement report.² For office buildings, variable air volume (VAV) systems combined with photovoltaic (PV) and electric reheat can have lower first costs and emissions. Switching to these electric systems in the mixed-fuel baseline will result in equal or lower first costs and provide a strong baseline for low emissions buildings while continuing to provide design and equipment flexibility to builders.

The decarbonized mixed-fuel baseline approach would provide flexibility to transition progressively: builders would be able to continue to use gas appliances as needed, by combining them with other measures and compliance options to achieve TDS compliance targets. And when using the HPWH or HPSH option they would have no impact on construction practices other than a switching of appliances -- which can occur at no added cost. These changes do not affect other gas appliances that some home buyers may be sensitive to, such as cooking, dryers, and fireplaces. It only encourages the electrification of major gas appliances and allows for the implementation of other efficiency measures as alternates to achieving the same emissions outcomes.

¹ Residential Building Electrification in California, E3, April 2019

² <https://efiling.energy.ca.gov/GetDocument.aspx?tn=234888&DocumentContentId=67748>

Alternative baselines do not have to meet cost-effectiveness requirements

If the electric baselines are alternatives to mixed-fuel baselines, they don't need to be cost-effective using time-dependent valuation (TDV): federal preemption and the Warren-Alquist Act only require that there is a cost-effective option (which can be the mixed-fuel baseline when using TDV). The Warren-Alquist Act specifies that performance standards shall be based on energy consumption per square foot. Allowing alternative baselines using a TDS equivalency basis clearly meets this requirement. Furthermore, historically California has not required alternative compliance paths to meet cost-effectiveness requirements, when there is already one cost-effective path (as is the case here). Similarly, the practice of allowing multiple pathways or options, not all of which meet cost-effectiveness requirements, has been followed in other state codes, such as Washington. This gives the CEC a lot of flexibility to design electric baselines that are attractive for builders, while reducing energy use and emissions and not trading off key envelope efficiency measures.

Non-residential baseline results need refinement and do not reflect opportunities to create an all-electric baseline

We are concerned that the modeling presented at the workshop does not adequately represent the opportunities for electric HVAC systems in non-residential buildings. We recommend that the CEC conduct further analysis of non-residential electric baselines that can support rapid market adoption of electric new construction. Based on the work of the modeling group of expert mechanical engineers convened by NRDC over summer 2019, which analyzed electrification barriers using the current baselines, and other input from stakeholders, we expect alternate baselines with TDV to be feasible. Specifically, the results for variable refrigerant flow (VRF) systems presented on October 6th need reviewing; based on modeling conducted under the 2019 standards and prototypes we expect VRF to result in TDV energy savings. The modeling conducted by the working group using the 2019 software and TDV found that non-residential buildings were able to get close to if not beat the gas systems baseline for most building types, using CEC prototype models.³

We recommend refining the non-residential modeling results and reaching out to designers in the community who have been modeling electric buildings for input so that the proposed

³ This modeling was conducted by members of the 2019 Alternative Compliance Method stakeholder working group, with participation of CEC staff.

baselines accurately reflect the achievable results in the software. NRDC would be happy to make these connections as needed.

We also recommend that the CEC assess PV in combination with electric HVAC systems to assess cost-effectiveness. Specifically, PV in combination with VAV and electric resistance reheat can have a lower first cost and overall energy use than a traditional VAV with hot water reheat system, since PV generation is coincident to commercial office building reheat load and there are no hot water recirculation losses.

PV should be utilized to create cost-effective packages

We support the proposal to include PV in the prescriptive baseline for high-rise multifamily and non-residential buildings, to enhance the cost-effectiveness of electric space and water heating. We recommend that cost-effectiveness of electric construction be looked at as a package, including other efficiency upgrades under consideration for 2022, utilizing PV to enhance this cost-effectiveness. Warren-Alquist specifically states the standards “shall be cost-effective when taken in their entirety,” which supports this package-based approach.

CALGreen should require full electrification

We support using CALGreen to set the stage for future standards. However, the current proposal to include HPWH in the standard design is insufficient for CALGreen. CALGreen should require full electrification, including the 2022 Zero Code for California for non-residential buildings.⁴ This can then be adopted by local jurisdictions as desired.

The residential prescriptive design should eliminate gas water and space heating

In addition to the baseline changes described above, the residential prescriptive path in Part 6 should eliminate the option for gas water heaters to be installed in new construction. Gas water heaters and furnaces could continue to be installed under the performance path. Given their cost-effectiveness, first-cost parity, and the future retrofit costs for replacing a tankless water heater with a heat pump water heater, or a gas furnace with a heat pump, there is no reason why gas water heaters and furnaces should be allowed prescriptively in Part 6, except for replacements where installation of HPWH is not feasible (e.g., replacing tankless gas or WH in conditioned space with no place to vent intake/exhaust).

⁴ http://zero-code.org/wp-content/uploads/2020/08/2022_ZERO_Code_for_California.pdf

Summary

CEC has the opportunity to implement 2022 standards that will result in no higher (and potentially significantly lower) construction and energy costs for new buildings, provide design and equipment flexibility to builders and homeowners, improve indoor and outdoor air quality and health outcomes for Californians, and significantly reduce climate emissions. Each of these outcomes is consistent with state objectives and public health goals, and set the building sector on track for full decarbonization by the 2025 code update. While the pace of this transition is faster than has been the case historically, it is feasible and cost-effective. We urge CEC to seize this opportunity for the sake of Californians health, wallets, and climate safety, and to chart the next step in climate leadership for other states and countries to follow.

Thank you,

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