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NRDC Comments on Title 24 2022 Draft Express Terms

Additional submitted attachment is included below.

Dear Commissioner McAllister and Energy Commission Staff:

March 9, 2021

Re. Comments on the Title 24 2022 Draft Express Terms

On behalf of the Natural Resources Defense Council (NRDC) who is advocating for affordable and equitable building decarbonization and clean air policies to help mitigate the climate crisis and advance a sustainable economy, we respectfully submit the following comments in response to the California Energy Commission's (CEC) draft Express Terms for 2022 Title 24 Standards released February 22, 2021.

We thank the CEC for their hard work on this draft and the adjustments made to advance decarbonization, clean air, and housing affordability policies. In addition to our separate comments[1] submitted on March 5, 2021 with a broad coalition of California businesses, environmental NGOs, architects, and engineers, we submit these supplemental specific comments on the draft Express Terms.

As expressed in the March 5, 2021 coalition comments, CEC's proposal is an important and positive step forward. The draft Express Terms strongly encourage all-electric construction while continuing to allow flexibility to the industry to build with gas while they transition their design, processes, and workforce to build all-electric. While this does not reflect the speed at which this transition needs to happen, it goes in the right direction for moving away from fossil fuel use in buildings, and it gives industry flexibility in exactly how and how fast to transition to all-electric construction. The Express Terms would also make substantial improvements to the energy efficiency of the code, particularly for non-residential buildings and covered processes.

While there is much in the draft Express Terms that we support, improvements are needed in three areas:

1) Strengthen and expand electrification incentives for building and system types where the technology is cost effective;
2) Provide policy certainty to the industry by committing to all-electric in the 2025 update;
3) Provide an all-electric model code option in CALGreen in this update to help cities and counties across the state adopt their own local all-electric codes in 2023.

[1] https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-BSTD-03

We offer the following specific comments on the first area.

Single Family

We generally support the partially electrified baselines for single family and recommend that the CEC further strengthen the Climate Zone 10 baseline.

We appreciate the CEC's continued efforts to establish heat pump baselines in Title 24 that shift the market toward pollution-free electric construction in the code's performance path. The proposal in the Express Terms to switch the baseline to a heat pump water heater (HPWH) in most climate zones (1, 2, 5-9, 11, 12, 15, and 16) and a heat pump space heater (HPSH) in the remaining climate zones (3, 4, 10, 13, and 14), will send a strong signal to the market to encourage electrification while continuing to allowing builders to choose gas if desired. The proposed baselines represent a compromise between the strong need for rapid electrification to avoid emissions and future cost lock-in, and the need to give industry time to adapt to electrification. These baselines are a marked improvement from those proposed in the January 26, 2021 workshop, which would have fallen short of the needed market signal for electrification.

One area where CEC should go further is the baseline for climate zone 10 which spans from inland San Diego up through the Inland Empire. The Express Terms proposed a HPSH baseline for climate zone 10, despite the more modest space heating load in that climate zone than other climate zones with a proposed HPSH baseline. The HPSH baseline in climate zone 10 would not send a strong enough electrification signal and would likely result in a significant number of home builders continuing to choose gas. Climate zone 10 is particularly significant as it is the third largest climate zone in anticipated 2023 housing starts, accounting for 12.7% of anticipated single and multifamily starts in 2023. Due to this significant impact in terms of number of homes built and the modest heating load in climate zone 10, switching to a HPWH baseline in this climate zone is needed to set a meaningful and consistent electrification incentive across the state.

We recommend that the code allow replacement water heaters in climate zone 16 to be HPWH in the prescriptive path.

The code as drafted would prohibit fuel switching from a gas water heater to a HPWH in climate zone 16 upon replacement when using the prescriptive path, which most replacements use. This prohibition is out of alignment with the state's overall goals to promote decarbonization through electrification as well as the potential for HPWHs to perform well in this climate zone. We understand the concern that HPWHs installed in unconditioned spaces in climate zone 16 may operate in electric resistance mode for too many hours of the year, this can be avoided through installation of units with superior cold climate performance or installation of units in conditioned or semi-conditioned space. For example, a field study of Rheem and Sanden units installed in British Columbia found average annual COPs of 1.79 and 2.69, respectively.[2] All of the Rheem units in this study were ducted to and from outside air. Installation in semi-conditioned space would improve performance further. Given the potential for these

[2]https://energy350.com/wp-content/uploads/2018/11/CO2-Integrated-Heat-Pump-Water-Heater-Performance-Report-FINAL.pdf

technologies to perform well in cold climates and their alignment with the state's goals, they should not be outlawed prescriptively.

We support the proposed requirements for kitchen range hoods, the electrification-ready requirements, and the adoption of CASE requirements for alterations and additions.
We support the requirements proposed for kitchen range hoods, electric-ready for all water heating, space heating, cooking and clothes drying, and alterations and additions. The kitchen range hood requirements will improve indoor air quality by requiring a minimum capture efficiency or flow rate for range hoods. These requirements should be more stringent for gas stoves than for electric stoves, because gas stoves emit CO and NOx pollutants which have been shown to increase the risk of asthma and other illnesses.[3] We also support the new electrification-ready requirements, which will build on existing requirements to ensure that new homes built with gas will be ready for all appliances to electrify in the future. This includes the needed electric infrastructure for electric stoves, heat pumps, and dryers as well as the required space and piping configurations for HPWHs. The cost of including this infrastructure is small in new construction and guards against higher future costs when end-uses are electrified. Finally, we strongly support the proposed improvements for alterations and additions. Alterations and additions represent a key opportunity to improve the efficiency of the existing building stock, which represents the vast majority of buildings in the state. The proposed changes will result in significant energy savings and should be maintained in the final Express Term.

Multifamily

We support the CEC's proposal to require space heating systems serving individual dwelling units to be heat pumps in most climate zones. However, we are concerned about the prescriptive requirement that only allow a dual fuel heat pump or furnace in some climate zones.
The CEC has proposed a prescriptive and baseline system requirement for space heating systems serving individual dwelling units that would require heat pumps in climate zones 1 through 15 for buildings less than 4 stories, and in climate zones 2 through 15 for taller buildings. For other climate zones, the baseline system would be a furnace or dual-fuel heat pump, depending on the climate zone and building height. While we strongly support the shift to heat pumps in most climate zones, we are concerned that the prescriptive requirements for furnaces and dual-fuel heat pumps in climate zones 1 and 16 would continue to develop gas infrastructure when there are alternatives available, such as cold climate heat pumps that perform well in these climate zones. We are concerned with a prescriptive limitation against these systems because the prescriptive path is often followed for multifamily buildings and therefore this provision could act as a barrier to electrification in these climate zones. We recommend that the CEC ensure a prescriptive path for all electric space heating in all climate zones, whether through a list of alternative options identified in the code itself or an executive

[3] 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

director equivalency exemption that would allow for the approval of alternative prescriptive compliance options.

We recommend that the CEC require water heaters serving individual dwelling units to be HPWH.

We appreciate the CEC's efforts to ensure that central HPWHs have multiple compliance paths in the code. However, the CEC should not miss the opportunity to further promote decarbonization of new multifamily housing by requiring new water heaters serving individual dwelling units to be HPWH. HPWH are a cost-effective option for systems serving new multifamily dwelling units. We recommend that the CEC add a prescriptive requirement that systems serving individual dwelling units be HPWH and that this serve as the baseline for multifamily buildings in the performance path (for buildings with individual water heaters). As an alternative and at a minimum, the space and piping infrastructure for a future HPWH should be reserved for systems serving individual dwelling units, similar to what has been proposed for residential buildings. These space requirements are even more important in multifamily buildings with individual unit water heaters, as they are likely to be more space constrained at the time of retrofit when they may try to replace a tankless gas water heater with a HPWH.

The CEC should ensure that central HPWHs are able to comply via the performance path.

We appreciate the CEC's work to integrate central HPWH into the performance software. However, since the latest version of the research software has not yet been released and the baseline system types for central water heaters are not included in the Express Terms, we are unable to evaluate whether central HPWH have a reasonable compliance path through the performance software. We respectfully request that the CEC quickly release a research version of the compliance software so that stakeholders can assess that central HPWH are able to comply via the performance path without a penalty.

We strongly support the proposed requirements for kitchen range hoods and electrification-ready requirements.

Similar to single family residential, we support the proposed requirements for kitchen range hoods and electrification-ready buildings. The kitchen range hood requirement will help improve indoor air quality for residents of multifamily buildings. This is particularly given that multifamily buildings are more likely to be occupied by renters and/or low income tenants who have less control over the choices that affect their indoor air quality. The electrification-ready requirements will prevent higher costs of electrification in the future. We support the addition of an electric-ready requirement for central laundry rooms. For water heating, the CEC did not propose the same space and piping requirements as single-family. We recommend that in the case of water heaters serving individual dwelling units, these same layout and piping requirements apply.

Non-residential

We support the CEC's proposal that would require single zone systems to be heat pumps for most climate zones and building types, but are concerned with the prescriptive requirements for dual fuel heat pumps in certain climate zones.

Similar to our comments on multifamily, we strongly support the CEC's proposal to require single zone systems in most building types and climate zones to be heat pumps. These single zone systems are easy and cost-effective to electrify. We are concerned however with the prescriptive requirement for some climate zones and building types to use a dual fuel heat pump. Many small nonresidential buildings follow the prescriptive path and so this would effectively require these buildings to install a gas system, locking in gas infrastructure in these buildings. As described above, this requirement would be out of alignment with the state's goals and we recommend that an alternative pathway be allowed either through the code directly or as an executive director equivalency exemption.

We recommend that the CEC expand the heat pump requirements beyond single zone systems to all packaged units, including those that serve multizone systems. Packaged heat pumps exist today and are an easy and cost-effective opportunity to decarbonize small and medium sized non-residential buildings. Similar to the single zone requirement, we recommend that the heat pump requirement for packaged units apply both prescriptively and as the performance baseline for these systems.

We strongly support the proposal to require HPWH in new small schools. This will result in cost-effective savings, healthier learning and playing environments for kids, and prevent the stranding of gas infrastructure in schools over the next decade -- an extra cost that our school systems should not bear. Electrifying water heating in small schools is a no-regret opportunity to advance electrification further and we support its inclusion.

We urge the CEC to publish the research software and draft baseline HVAC system maps at the same time as 45-day language to allow validation of the non-residential baselines. While the CEC has published the baselines for single-zone systems and residential buildings in the Express Terms, it has not published the full system map of baselines for non-residential buildings that are typically in the Alternative Calculation Methodology (ACM) Reference manual. We urge the CEC to publish both a draft system map and the research software at the same time as the 45-day language so that industry can evaluate the proposed baselines in light of the new time-dependent valuation (TDV) and time-dependent source energy (TDS) values. As a minimum, these baseline systems should not penalize electrification.

We urge the CEC to integrate central space heating heat pumps into the modeling software as soon as possible.
The inability to model central space heating heat pumps in the CBECC-Com software remains a major barrier to compliance for large non-residential all electric buildings under the performance path, which tend to use these central systems. We appreciate the work being done by the CEC to integrate this functionality in the software and recommend that it be included as soon as possible. This functionality should span the full range of these products, including those that function as heat pumps only, heat recovery chillers that operate primarily as chillers, and modular heat recovery chillers that can operate primarily in heating or cooling mode. The software should also allow for integration between these systems and thermal storage systems.

We strongly support the adoption of the CASE measures and the adoption of photovoltaic and energy storage requirements in the Express Terms, which will lead to substantial energy and emissions savings. In particular, we support the proposed air barrier verification requirements, the new fan power limits, the expansion of the economizer requirement down to 33,000 Btu/h, HVAC control requirements, lighting and daylighting measures, and envelope improvements. We also support the proposed changes for covered processes, such as refrigeration system improvements, steam trap monitoring, and controlled environment horticulture. We also support the addition of modest PV and battery requirements for nonresidential and multifamily buildings, which will provide further emissions reductions for these building types. All these measures combined will result in significant efficiency improvements and reduced emissions and should be maintained as the CEC moves to 45-day language.

Summary

In summary, we appreciate the CEC's hard work on the Express Terms and support the significant progress towards cleaner, healthier and more affordable new construction. Specifically, we support the shift towards partially electrified baselines for many building types and climate zones and the adoption of CASE measures. We urge the CEC to go further where technically feasible and cost-effective to provide policy certainty to the market, accelerate the transition away from fossil fuel pollution, and help prevent any remaining barriers to electrification in the code.

Sincerely,

Pierre Delforge
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Natural Resources Defense Council