

*Comment Received From: Daikin Comfort Technologies
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Daikin Comments on 2025 Energy Code Rulemaking 45 Day Express Terms

Additional submitted attachment is included below.



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May 9, 2024

Mr. David Hochschild, Chair
Dr. Andrew McAllister, Commissioner
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket 24-BSTD-01

(Submitted electronically to Docket 24-BSTD-01: Daikin Comments on 2025 Energy Code Rulemaking)

Dear Chair David Hochschild and Commissioner Andrew McAllister,

Daikin U.S. Corporation (“Daikin”) respectfully submits this letter in response to the California Energy Commission (CEC) 2025 45-day Express Term proposed changes to Energy Code (Title 24, Part 6), published on March 29, 2024. Daikin U.S. Corporation is a subsidiary of Daikin Industries, Ltd., the world’s largest air conditioning equipment manufacturer. The Daikin Group includes Daikin Applied, Daikin North America LLC, and Goodman Manufacturing Company, L.P. We understand the amount of effort CEC has put into these updates and we appreciate the opportunity to provide these comments.

Daikin supports CEC’s expansion of the use of heat pumps to further California’s need for decarbonization and providing effective energy use reduction. Daikin believes that heat pumps are the proven technology to achieve substantial GHG reduction and energy savings in both residential and nonresidential buildings and appreciates the inclusion of the heat pump baselines mandating use of heat pumps. However, we have concerns related to overly prescriptive compliance options for schools and offices, the use of EER2 for sizing PV systems with Variable Speed Heat Pumps and defrost delay timer requirements, explained below.

Section 140.4 – Prescriptive Requirements for Space Conditioning Systems

Daikin believes that the proposed requirements are overly prescriptive and limit consumer choice that may provide important energy efficiency improvements. The choice of equipment is business level decisions which should be made on a case-by-case basis, and CEC should not exclude energy efficiency-improving technologies. During the Lead Commissioner Hearings for the 2025 Building Energy Efficiency Standards the CEC explained that the limited selections are a result of not having sufficient time to evaluate other alternatives. Daikin believes that the lack of sufficient time to do so should not result in overly prescriptive requirements that limit consumer choice.

In **Section 140.4(a)3.A**, Multizone zone space-conditioning system types for Office, CEC proposes offices designed prescriptively must use either a VRF and DOAS or a four-pipe fan coil (FPFC) with heating hot water supplied by an air-to-water heat pump (AWHP) and DOAS for ventilation for all climate zones. However, in **Section 140.4(a)3.B** Multizone zone space-conditioning system types for Schools, CEC limits prescriptively to only a four-pipe fan coil (FPFC) with heating hot water supplied by AWHP and DOAS for ventilation for all climate zones. An AWHP and DOAS for ventilation is uncommon for use in these instances while VRF plus a DOAS is a viable option for an all-electric solution but is prohibited in the prescriptive compliance path for schools. The VRF and DOAS type of system is commonly used in schools today and to ignore this does not seem appropriate. Further, comments that infer that AWHP are a more cost-effective solution likely ignore the fact that the costs assumed do not include the pump operational costs.

Daikin is very concerned with the lack of choice and that building owners will struggle to comply with these overly prescriptive requirements. To address these concerns, Daikin proposes to modify **Section 140(a)3.A and B** as shown below in red text. **Section 140.4(a)3.A.** should include Schools and **Section 140(a)3.B.** can then be removed and the remainder of the Section renumbered accordingly

- A. Offices and Schools. Office buildings and Schools shall use space conditioning systems complying with one of the following requirements:
- i. The space conditioning system shall be a variable refrigerant flow (VRF) heat pump system with a dedicated outdoor air system (DOAS) providing ventilation. Indoor fans shall meet the requirements of Section 140.4(a)3D. The DOAS shall comply with Section 140.4(a)3E; or.
 - ii. The space conditioning system shall be a four-pipe fan coil (FPFC) system with a DOAS providing ventilation. The FPFC hot water coils shall be supplied by an air-to-water heat pump (AWHP) space-heating hot water loop which complies with Section 140.4(a)3C. The DOAS shall comply with Section 140.4(a)3E; or.
 - iii. The space conditioning system shall utilize heating supplied through a hot water loop served by an AWHP which complies with Section 140.4(a)3C. Ventilation systems shall include DCV in all zones. All air systems shall be equipped with a heat recovery system in compliance with Section 140.4(q). A hydronic recirculated-air heating system complying with Section 140.4(a)3F shall be used in climate zone 16.

EER2 and PV Sizing Concerns

Daikin supports the Energy Code and the benefits of replacing gas fired equipment with electric alternatives, in addition to PV Systems. Daikin understands the proposed requirements for PV sizing are intended to address that lower EER2 HVAC systems could increase peak power usage and thus requires larger

PV systems. However, Daikin believes that EER2 is an irrelevant peak power management metric for Variable Speed Heat Pumps (VSHP) technology. We believe that prescribing EER2 thresholds of 11.7 for sizing PV Systems, as currently proposed in **Table 110.2-A**, could be counterproductive to the adoption of VSHP technology and the attainment of the state's heat pump and decarbonization targets.

As explained in detail in our Daikin comments submitted to CEC on September 7, 2023, EER2 is not a metric that in any way captures the benefits and performance of VSHP's. Daikin believes that requiring EER2 for VSHP PV System integration may slow their adoption and fail to recognize and capitalize on their inherent benefits. EER2 requirements as written could exclude VSHP, especially the cost-effective product models with moderate EER2 rating, from eligibility in this program and limit their potential to deliver greater annual energy savings and reduce energy bills.

EER2 is a metric measured at high ambient (95F) conditions. High ambient conditions, however, represent only a small portion of time in a year across most locations in the US, albeit an important time-period from a load management perspective. The average duration that cities experienced temperature conditions between 93-97F was 1.2% of the annual hours.

Specifically, in California, across its 16 climate zones, based on weather data from 2017, the average number of hours over 95F is estimated to be 189 hours annually, which is about 4.4% of total cooling load hours. Some of the hotter CA climate zones experience over 30% of cooling operating hours above 90F with over 20% of cooling operating hours above 95F as well. However, we note that in a study published by the DOE that most of the products installed in homes are oversized. As a result, it is expected that due to potential oversizing of HPs sold in California, they can adequately meet the cooling and heating loads, provide options for load shedding, and provide higher efficiency operation for much of its annual operation. Seasonal Energy Efficiency Ratio (SEER2) is a better indicator of annual energy consumption and a higher SEER2 can reflect measurable energy savings, and a reduction in GHG emissions. A higher EER2 requirement also increases the refrigerant charge size due to driving up the full load efficiency of the refrigeration system. Creating a policy that indirectly encourages the use of equipment with larger charge sizes is also directly in conflict with the fundamental premise of new federal regulations that phase down the use of high Global Warming Potential (GWP) refrigerants (i.e., the AIM Act).

Daikin recommends the CEC add an exception to the use of EER2 for VSHP as a metrics for sizing PV systems in Sections 150.1 and 170.2 to aid in encouraging the continued adoption and growth of highly efficient VSHP technology. Also, please note that the Equation 150.1-C seems to have been stricken. We believe this is an error and ask CEC to confirm and, as appropriate, remove the strike-through of this equation.

Proposed additional Exceptions:

Exception 6 to Section 150.1(c)14: PV systems using VSHP technology.

Exception 6 to Section 170.2(f): PV systems using VSHP technology.

Sections 150.0(h)6 and 160.3(b)7 - Defrost

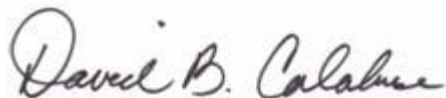
Daikin also has concern in **Sections 150.0(h)6 and 160.3(b)7** regarding defrost. Ratings for equipment are based on default settings. Our variable speed equipment uses demand defrost controls that initiate defrost based on measured performance parameters. Implementing a set delay timer requirement of 90 minutes would negatively impact equipment performance for these highly efficient products. It is unclear if demand defrost control products would be required to meet this 90 minute requirement.

Daikin recommends striking this greater than or equal to 90 minutes requirement language. Alternately, CEC could add an exception, as included below, for equipment using demand defrost controls.

Exception 3 to Section 150.0(h)6: Equipment that uses demand defrost controls.

We appreciate the Commissions time and strongly urge consideration and adoption of these proposals.

Sincerely,



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