

**DOCKETED**

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*Comment Received From: Jennifer Kane  
Submitted On: 5/13/2024  
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**Trane Technologies Comments; Title 24-2025 45-day Express  
Terms**

*Additional submitted attachment is included below.*



May 13, 2024

California Energy Commission  
Docket No. 24-BSTD-01  
(Submitted via email to [doCKET@energy.ca.gov](mailto:doCKET@energy.ca.gov))

Re: 2025 California Energy Code

Dear CEC,

Thank you for the opportunity to submit comments in response to the proposed changes to the Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6.

Trane Technologies is a world leader in creating comfortable, sustainable, and efficient environments and leading our industry in sustainability practices. Through our strategic brands Trane and Thermo King, and our portfolio of environmentally responsible products and services, we bring efficient and sustainable climate solutions to buildings, homes and transportation. Our bold 2030 Sustainability Commitments are central to our business strategy and include a pledge to reduce our customers' carbon emissions by one gigaton (2% of the world's annual emissions) and to bring our own operations to carbon neutral. Our ambitious greenhouse gas (GHG) emissions reduction targets challenge us to lead by example, collaborate with our customers to drive sustainable innovation and create opportunity for all in our workplace and our communities.

We are aligned with CEC's mission to reduce carbon emissions from new buildings in support of the State's climate goals and encourage CEC to reconsider the mandatory prescriptive requirements for space conditioning systems in Section 140.4. The proposal prescriptively requires that offices and schools that use multizone systems must install either variable refrigerant flow (VRF) systems, or four-pipe fan coil (FPFC) systems served by air-to-water heat pumps for space heating. To use, for instance, a VAV system instead, either with VAV RTUs or with CHW AHUs, one would have to show compliance using the Performance Approach, which is a significant cost burden for many buildings. This limits consumer choice and prevents the most efficient equipment for a particular building and climate. We encourage CEC to consider both the energy and emission impact of this proposal, as certain systems limited by the proposal have the potential to use less energy and have fewer environmental emissions.

Modeled versus Actual Energy Performance: If this proposed change is motivated by a belief that it will save energy, CEC should note that VRF system modeling within most commercially available building simulation software is incorrectly optimistic. The full load



performance and the part load performance curves optimistically represent actual equipment performance because their default control settings do not operate like they are tested for certification. AHRI 1230 was recently changed to better reflect actual performance but remains optimistic. Most simulation tools use these test results. Additionally, most building simulation software including EnergyPlus and approved California Title 24 tools, like EnergyPro, IES VE, and CBECC, improperly represent the impact of the heat recovery mode, commonly perceived as an energy efficiency feature, by failing to calculate the substantial system efficiency penalty of this mode. Heat recovery is not free. This mode requires an elevated condenser temperature/pressure resulting in a 50-80% energy use increase compared to cooling only mode depending on operating conditions. The energy efficiency impact of these issues should be considered as they can be substantial when aggregated over an entire year of operation, and may not meet energy efficiency expectations.

Refrigerant Emissions: Heating and cooling systems with lower volumes of refrigerants and less connections may reduce possible greenhouse gas emissions over the lifespan of the equipment. [1] The significant refrigerant charge of systems in CEC's prescriptive proposal can cause increases in environmental emissions due to leakage and improper handling. In addition, the design engineering community may not be ready to ensure that systems are designed properly and ensure small rooms do not exceed the maximum refrigerant charge limitations in ASHRAE Standard 15 and as adopted into local codes. This is a safety issue for the children and staff in school if improper system design occurs.

CEC may wish to consider removing the prescriptive requirements that restrict technologies that could reduce CO2 emissions and energy consumption. As always, we appreciate your time and consideration of this feedback. Trane Technologies is happy to provide more information as CEC continues to improve the efficiency of buildings in California.

Sincerely,

A handwritten signature in black ink, appearing to read "Jennifer Kane".

Jennifer Kane  
Trane Technologies

CC: Helen Walter-Terrinoni, Trane Technologies

[1] [https://www.seattle.gov/documents/Departments/OSE/Building%20Energy/SEA\\_Refrigerant\\_Analysis\\_May2020.pdf](https://www.seattle.gov/documents/Departments/OSE/Building%20Energy/SEA_Refrigerant_Analysis_May2020.pdf)