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AHRI Comments â€™ Title 24-2025 August 15-day Express Terms

See attached.

Additional submitted attachment is included below.

September 6, 2024

California Energy Commission (CEC)
Docket Unit, MS-4
1516 Ninth Street
Sacramento, California 95814-5512

(Submitted electronically to Docket 24-BSTD-01)

Re: AHRI Comments – Title 24-2025 August 15-day Express Terms [Docket No. 24-BSTD-01]

Dear CEC Staff:

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) respectfully submits this letter in response to the CEC Notice regarding the Energy Code (Title 24, Part 6), published to the CEC public docket on August 22, 2024.

AHRI represents more than 330 manufacturers of air conditioning, heating, water heating, and refrigeration equipment. It is an internationally recognized advocate for the heating, ventilating, air-conditioning, and refrigeration (HVACR) and water heating industry and certifies the performance of many of the products manufactured by its members. In North America, the annual economic activity resulting from the HVACR industry is more than \$211 billion. In the United States alone, AHRI member companies, along with distributors, contractors, and technicians employ more than 704,000 people.

AHRI appreciates CEC considering the concerns raised by a diverse group of stakeholders regarding the limitation CEC had proposed on permissible mechanical systems when complying with the prescriptive path. Manufacturers, utility representatives, building designers, and building owners all objected to changes proposed for schools and offices. While AHRI appreciates CEC revisiting proposed changes for these multi-zone HVAC systems in nonresidential buildings, and agree it is a significant improvement over the June 15-Day Express Terms, AHRI supports all technology options being available to designers in the prescriptive path. AHRI has several concerns and suggested improvements, detailed herein, that we hope CEC can address by revising the 15-day Express Terms prior to the September 11th adoption hearing.

Section 100 – definition for “NEEA Advanced Water Heater Specification” and Knock-on Effects

AHRI appreciates CEC updating the definition for “Northwest Energy Efficiency Alliance (NEEA) Advanced Water Heater Specification” to reference the current version 8.1; however, there are requirements introduced with v8.1 that were optional in previous versions. These new requirements, such as the use of “EcoPort” for demand response will limit consumer choices, is counter to CEC goals, and have knock-on effects in downstream sections.

First, in addition to the requirement to use “EcoPort” for demand response, NEEA v8.1 includes design requirements for products beyond performance, such as noise requirements and number of years equipment must be warrantied. NEEA v8.1 also does not include integrated HPWHs. CEC should ensure that consumers have adequate choices and cite only applicable energy efficiency provisions of the specification and provide a pathway for integrated HPWHs.

Second, Appendix JA13 includes qualification requirements for heat pump water heater (HPWH) demand management systems. Should CEC definitionally adopt NEEA v8.1, without permitting acceptable equivalent alternatives, then CTA-2045/EcoPort would also become a JA13 requirement. AHRI 1430 (I-P): Demand Flexible Electric Storage Water Heaters (with Addendum 1), available for free on AHRI’s website, “applies to communication, infrastructure, and system functionality as these relate to the implementation of energy management strategies for demand flexible water heaters (DFWH), with a nominal storage capacity greater than or equal to forty gallons and less than or equal to 120 gallons, installed in residential and small commercial applications.”¹ AHRI is in the process of developing and publishing a product list of HPWH’s that comply with AHRI 1430. The launch of AHRI’s 1430 product list is expected to launch in the third quarter of 2025. AHRI recommends that CEC permit alternatives to the “EcoPort” requirement of NEEA v8.1 for demand flexible HPWHs.

Third, by definitionally requiring NEEA v8.1, AHRI is concerned that the new requirements in the specification will lead to downstream effects when the spec is referenced in Title 24. For JA13, AHRI suggests that CEC only reference energy efficiency provisions of NEEA v8.1 (Section 2.4.2 of the NEEA Advanced Water Heating Specification). AHRI requests that CEC staff review and consider if changes would be required in other Title 24 sections where the NEEA specification is referenced, such as Section 170.2(d)2.

Section 120.10 – Mandatory Requirements for Fans

AHRI appreciates CEC staff modifying the referenced test procedure to the new federal procedure. AHRI requests CEC staff consider an additional exception to align the scope of this requirement with ASHRAE 90.1-2022. Exception 2 to Section 6.5.3.1.3 excludes “[e]mbedded fans and fan arrays with a combined motor nameplate horsepower of 5 hp or less or with a fan system electrical input power of 4.1 kW or less” from FEI requirements. Commercial and Industrial Fan regulations recently adopted into Title 20 exclude all embedded fans (as defined in AMCA 214-21), so this additional exception would also be consistent with California regulations.

Section 140.4 – Prescriptive Requirements for Nonresidential Buildings

¹ <https://www.ahrinet.org/search-standards/ahri-1430-i-p-demand-flexible-electric-storage-water-heaters-addendum-1>

AHRI has submitted extensive comments on this section, and the proposals prescriptive requirements to install both heat pump space and water heaters in single and multifamily residential and nonresidential buildings.² AHRI supports all multi-zone space-conditioning system technology options to continue to be used in the prescriptive path.

For offices and schools in Section 140.4 – Prescriptive Requirements for Space Conditioning Systems the June 15-Day Express Terms would have required offices to use either a variable refrigerant flow (VRF) and dedicated outdoor air system (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. For schools, only one prescriptive system choice had been proposed – an FPFC with AWHP and DOAS. The system proposed to be prescribed is extremely uncommon for schools. This was completely untenable for designers, building owners, and equipment manufacturers, as evidenced by the overwhelming number of comments docketed opposing this proposed language.

AHRI appreciates CEC’s hard work to expand the system choices prescriptively permitted for nonresidential buildings with multi-zone systems. First, AHRI supports CEC excluding Buildings greater than 150,000 square feet or greater than 5 habitable stories and school buildings in climate zones 6 and 7, which failed the revised cost-effective test for prescriptive systems limitations. AHRI also appreciates that the August 15-Day Express Terms proposal, in Section 140.4(a)3A allow for several prescriptive compliance options:

1. The building can use a VRF heat pump system that incorporates refrigerant-loop heat recovery and a DOAS for ventilation.
2. The space-conditioning system can be FPFC terminal units supplied by an AWHP space-heating hot water loop with a DOAS providing ventilation to all zones served by the space-conditioning system.
3. Office buildings in all climate zones and school buildings in climate zones 2, 4, and 8 through 16, are permitted to use a variable air volume (VAV) system with heating supplied through a hot water loop served by an AWHP. There are also several additional energy efficiency requirements specified for schools and offices in this subsection.
4. Dual-fan dual-duct (DFDD) systems with hot and cold decks each served by separate fan systems can be used prescriptively, so long as economizers are installed on the cold deck where required by Section 140.4(e), the hot decks served by heat pumps supply 100% return air. Outdoor air may be supplied as required to supplement the cold deck to maintain the design minimum outdoor air rate. Terminal unit control sequences are required to comply with ASHRAE Guideline 36.
5. A space-conditioning system determined by the Executive Director to use no more energy than the systems specified in Section 140.4(a)3.

² In written comments filed on August 9, 2023, in response to the July 27, 2023, stakeholder workshop, AHRI raised several technical and cost concerns with the heat pump baseline proposal. (Docket 21-BSTD-01, TN# 251553). AHRI also filed comments on May 13, 2024, and June 28, 2024, in response to 45-day and 15-day Express Terms, respectively, to Docket 24-BSTD-01.

While this language in the August 15-Day Express Terms is a significant improvement over the June 15-Day Express Terms, AHRI remains supportive of all technology options being available to designers in the prescriptive pathway. Corrections to the cost-effectiveness analysis and modeling adjustments opened several additional prescriptive options, additional time to fully vet other technology options, such as commercial package air conditioners and heat pumps, water-source heat pumps, dual fuel heat pumps, or even fossil fuel space heating equipment might also be viable solutions upon further review.

AHRI has additional feedback on the use of AWHPs for CEC to consider, based on information presented in Staff Memo – Revisions to 2025 Energy Code, Section 1404(a)3 - Variable Air Volume with AWHP and Parallel Fan-Powered Boxes.³ Figure 1 in the Memo shows the large office LSC savings for several space-conditioning systems. The graph shows significant LSC savings in nearly every climate zone for the FPFC+AWHP+DOAS system. AHRI requests that the FPFC+AWHP+DOAS system not be used to set the prescriptive baseline (and be the benchmark system for compliance using the proposed executive director path) for three reasons.

First, AWHPs are an emerging, and highly complex equipment type in the U.S. There have been limited installations in both commercial and residential applications, in new and existing buildings. AWHPs can provide space heating, space heating and cooling, space heating and domestic hot water, or space heating, cooling and domestic hot water.⁴ There are a variety of space heating applications, including in-floor (radiant) heating, heating through radiators, pre-heating domestic hot water using an indirect tank with hydronic coil, and heating using hydronic air handlers. The temperature of water for end-uses can be high, medium, or low temperature, depending on the application. The two main configurations of AWHPs are monobloc or split systems. A monobloc heat pump heats the water, and rejects cold air outside, while a split system heats water and rejects cold air within the building. Each of these aspects impacts use patterns, energy consumption, and ultimately energy efficiency. Installation type, application, and conditions have implications regarding comparisons to competitive products.

Air-to-water heat pumps are within scope of [ANSI/AHRI Standard 550/590-2023 \(I-P\), Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle](#); however, heating part-load ratings for heat pump water-heating packages and heat recovery water-chilling packages can only be calculated at individual part load points. Per the standard, neither Integrated Part-Load Value (IPLV.IP) nor Non-Standard Part-Load Value (NPLV.IP) shall be calculated for such points. Within AHRI 550/590, the Part-load Value (PLV) metric is a single number figure of merit expressing part-load efficiency for equipment based on weighted operation at various partial load capacities for the equipment.

Second, AWHPs can be optionally certified, but only for cooling performance, under the AHRI Air-Cooled Water-Chilling Packages Using the Vapor Compression Cycle (ACCL)

³ TN #: 258650, docketed on August 22, 2024.

⁴ For example, air-to-water units designed exclusively to heat potable water as covered by either AHRI Standard 1300 or [Appendix E to Subpart B of Part 430 – Uniform Test Method for Measuring the Energy Consumption of Water Heaters](#), should be out of scope for any ATWHP specification.

Certification Program.⁵ Work is ongoing within the cognizant AHRI Committee to add heating certification to ACCL, but there is a current lack of testing capabilities, so a timeline has not been determined. There are provisions within the ACCL Certification to optionally certify to EN Standards 14511:2022, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors*, and EN Standard 14825:2022, *Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling, commercial and process cooling - Testing and rating at part load conditions and calculation of seasonal performance*; however, heating performance however; heat rejection capacity is excluded from the program scope.⁶

Third, for full-load heating performance, AHRI 550/590 defines performance with 110°F leaving water temperature. While this temperature may be appropriate for closed-loop radiant floor heating systems, it is not clear from CEC’s staff report if this temperature is sufficient for use with an FPFC. AHRI urges CEC to use equipment with established test procedures and certification programs for establishing prescriptive requirements. Additionally, supporting information on how the systems were modeled is imperative. There are equipment types, such as AWHPs that Energy Plus cannot model directly. Stakeholders should be able to review the modeling used to determine LSC savings. AHRI hopes CEC will consider this feedback regarding AWHP as staff continues to work on adding additional system options.

Regarding the Executive Director pathway, CEC has added an “escape hatch” for systems not included in the prescriptive list stating, “A space-conditioning system determined by the Executive Director to use no more energy than the systems specified in Section 140.4(a)3.”⁷ AHRI expressed concern in 15-day comments that no process has been provided to outline the process of submitting determinations to the Executive Director. This language has been used in other sections of Title 24 to provide options, including Title 24-2019 for “a water-heating system determined by the Executive Director to use no more energy than the one specified in Item i, ii, iii, or iv.”⁸ CEC staff was able to point to one example where this pathway was used, for a central heat pump water heating system prior to CBECC including modeling capability for heat pump technology.⁹ According to CEC staff, the approval from start to finish took a couple months.¹⁰ Only the final approved design, which was narrowly focused with significant prescriptive detail due to modeling limitation, was docketed.¹¹ AHRI is also concerned that the modeling limitation for certain equipment types in Energy Plus, such as VRF, may be insufficient for proving energy equivalence to baseline equipment.¹²

AHRI appreciates that there is an option to include new and innovative equipment to be included in the prescriptive pathway; however, a process needs to be put in place to ensure it can

⁵ AHRI ACCL Certification Program Resources are available, here: <https://www.ahrinet.org/certification/ahri-certification-programs/air-cooled-water-chilling-packages-using-vapor-compression-cycle-accl>

⁶ Refer to Table 1 of the [AHRI ACCL Operations Manual](#) for program scope.

⁷ August 15-Day Language (TN#: 258643) Section 140.4(a)(3)(A)(v).

⁸ Title 24-2019, Section 150.2(a)(1)(D)(v)

⁹ Email correspondence with CEC staff

¹⁰ *Id.*

¹¹ <https://efiling.energy.ca.gov/GetDocument.aspx?tn=234434&DocumentContentId=67301>

¹² It is well known to CEC that FSEC performance curves are out of date and inaccurate due to questionable testing procedures and that NORESKO curves are a conservative representation of VRF systems.

be used and is useful. AHRI recommends a task force be formed to provide input to CEC on the process and collaboratively identify systems to be assessed for approval by the Executive Director as an additional prescriptive path to compliance. Stakeholders that should be included in the taskforce include CEC staff, code officials in California jurisdictions, design engineers, and equipment manufacturers. Additionally, packages that have been submitted for Executive Director approval but are still under consideration or were not approved should be documented to keep this process efficient and transparent. Ideally, the timeline for Executive Director approval should be no more than 5 business days, from receipt of a complete package.

Section 140.4(p)2 proposes to require DOAS supplying outdoor air to cycle off any zone heating and cooling equipment fans, circulation pumps and terminal unit fans when there is no call for heating or cooling in the zone. In response to the 45-Day Express Terms, AHRI recommended some additional verbiage to accommodate refrigerant leak mitigation strategies that may require indoor fans to operate continuously or when a refrigerant leak is detected, in accordance with ASHRAE 15-2022. ASHRAE 15-2022 addresses all the safety issues regarding the use of Group A2L refrigerants. AHRI proposes the following exception to Section 140.4(p)(2):

Exception 5 to Section 140.4(p)2: Zone heating and cooling fans shall be allowed to operate when required by mechanical code to provide the required refrigerant mitigation strategy.

Section 141.0 – Additions, Alterations, and Repairs to Existing Nonresidential, and Hotel/Motel Buildings, to Existing Outdoor Lighting, and to Internally and Externally Illuminated Signs

CEC has proposed modifications to Table 141.0-E-1 – New of Replacement Single Zone Air Conditioner or Heat Pump Requirements in the August 15-Day language. Immediately after the footnotes in Table 141.0-E-1, CEC notes it is “[Skipping Exception to Section 141.0(b)2Cii through Section 141.1].” However, there is text that is present in the June 15-Day language immediately after the table and footnotes, that is before Exception to Section 141.0(b)2Cii. AHRI requests that CEC confirm the status of “Air conditioners with furnaces or dual fuel heat pumps complying with Table 141.0-E-1 using variable speed fan and controls shall be designed to vary the indoor fan air flow rate as a function of the load and shall have a minimum of two stages of fan control. The minimum speed at stage 1 shall be set for ventilation only mode and shall be the greater of 50% or the minimum fan speed required to meet the minimum ventilation airflow rate. The indoor fan shall draw no more than 30% of the fan power at full fan speed when operating at 50% speed”¹³ prior to Title 24-2025 adoption.

Title 24 Proposed Revisions Preempted by EPCA

AHRI raised the issue of EPCA preemption in its 45-day comments and first 15-day comments.¹⁴ reiterates that these concerns remain in this August 15-day Express Terms draft.

¹³ June 15-Day Language (Docket 21-BSTD-01, TN# 252915), text after Table 140.1-E-1

¹⁴ In written comments filed on August 9, 2023, in response to the July 27, 2023, stakeholder workshop, AHRI raised, in detail, federal preemption concerns. (Docket 21-BSTD-01, TN# 251553).

The Proposed Revisions in Title 24 are preempted by the Energy Policy and Conservation Act (EPCA), 42 U.S.C. § 6291 et al. EPCA prevents states and their political subdivisions from enacting laws, regulations, and building codes that *concern* the energy use of EPCA-covered products and equipment.¹⁵ Title 24-2025, as proposed, aims to set stricter energy standards for EPCA-covered products, which is preempted by EPCA. Both *California Restaurant Association v. City of Berkeley*¹⁶ and *Air Conditioning, Heating, and Refrigeration Institute v. City of Albuquerque*¹⁷ cases indicate that the proposed prescriptive path lacks flexibility, does not align with federal requirements, and fails to qualify for an exemption or waiver under EPCA. If enacted as written, Title 24-2025 would be legally invalid.

New Metrics for Evaluation of Measures and Compliance with Energy Code Raise Concerns

AHRI remains concerned about the implementation of new metrics for proposed measures and code compliance. The CEC has proposed using a new metric, Long-term System Cost (LSC), to evaluate cost-effectiveness both for proposed measures and the performance approach.¹⁸ CEC did not address AHRI's concerns regarding the new metrics or release any additional information as requested. Refer to AHRI Title 24-2025 15-day Express Terms comments submitted on June 28, 2024, and AHRI Title 24-2025 45-day Express Terms submitted on May 13, 2024, for details.

AHRI appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,



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¹⁵ 42 U.S.C.A. § 6297(2)(A).

¹⁶ *California Rest. Ass'n v. City of Berkeley*, 89 F.4th 1094 (9th Cir. 2024).

¹⁷ *Air Conditioning, Heating & Refrigeration Inst. v. City of Albuquerque*, 835 F. Supp. 2d 1133 (D.N.M. 2010).

¹⁸ Title 24-2025 Pre-rulemaking Express Terms, Section 140.1 – Performance Approach: Energy Budget, (Docket 21-BSTD-01, TN# 252915)