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AHRI Comments â€™ Title 24-2022 45-Day Express Terms [Docket No 21-BSTD-01]

Please see attached comments

Additional submitted attachment is included below.



2311 Wilson Boulevard Suite 400 Arlington VA 22201 USA
Phone 703 524 8800 | Fax 703 562 1942
www.ahrinet.org

June 21, 2021

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 19-BSTD-03
1516 Ninth Street
Sacramento, California 95814-5512

(submitted electronically to Docket 21-BSTD-01)

Re: AHRI Comments – Title 24-2022 45-Day Express Terms [*Docket No. 21-BSTD-01*]

Dear CEC Staff:

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) respectfully submits comments in response to the California Energy Commission (CEC) 45-day language in the Notice of Proposed Action - Express Terms published on May 6, 2021.

AHRI represents 332 air-conditioning, heating, and refrigeration equipment manufacturers. In North America, the annual output of the HVACR and water heating industry is worth more than \$44 billion. In the United States, the industry supports 1.3 million jobs and \$256 billion in economic activity annually. AHRI represents the majority of North American HVACR and water heating equipment manufacturers, all impacted by changes to California's Energy Code, California Code of Regulations (CCR), Title 24, Part 6.

AHRI and its members support the reduction of greenhouse gas emissions and welcome opportunities to partner with stakeholders on working toward that goal. AHRI's members continuously review and design new higher efficiency equipment that improves consumer comfort, without compromising consumer choice, product quality, or safety. In fact, AHRI members offer the most technologically advanced and efficient HVACR and water-heating equipment available anywhere in the world.

Removal of Prescriptive Path and Performance Path for Certain Equipment Types – Sections 140.4(a)2, 150.1(c) 7 and 8, and 170.2(c)3A and (d)

AHRI respectfully opposes the proposed revisions to the Energy Code that remove certain types of equipment—primarily equipment that utilizes natural gas—from the

prescriptive compliance path and pose impermissible barriers to installing this same equipment under the performance compliance path (Proposed Revisions). The Proposed Revisions concern the energy use of products covered by the Energy Policy and Conservation Act (EPCA), 42 U.S.C. § 6201 *et seq.*, and are therefore preempted by federal law. Accordingly, while the Commission’s intention behind the Proposed Revisions may align with state goals, if enacted as written, the Proposed Revisions will be legally invalid.

A. Summary of the Proposed Revisions

Under the 45-day Express Language, the design and construction of a building may demonstrate compliance with Part 6 under either the performance compliance approach or the prescriptive compliance approach. A building complies with the performance standards if the energy consumption calculated for the Proposed Design Building is no greater than the energy budget calculated for the Standard Design Building using Commission-certified compliance software, as specified by the Alternative Calculation Methods Approval Manual. Buildings that comply with the prescriptive standards must be designed, constructed, and equipped to meet all of the requirements for the appropriate climate zone (CZ).

The Proposed Revisions prohibit the use of several types of equipment, such as gas water heaters, furnaces, and boilers, under the prescriptive compliance approach by mandating the use of specific types of equipment in certain climate zones. For example, for single family residential buildings, the Proposed Revisions to Section 150.1(c)7 state that “[f]or climate zones 3, 4, 10, 13 and 14, the space conditioning system shall be a heat pump, or shall meet the performance compliance requirements of Section 150.1(b)1.” Similarly, Proposed Revisions to Section 150.1(c)8 require the use of heat pump water heaters in several climate zones, with limited exceptions.¹ All other products are therefore prohibited from using the prescriptive path to comply. The Proposed Revisions include similar mandates on the type of equipment that must be used under the prescriptive path for multi-family (low and high-rise) buildings. Additionally, in CZ 1 and 16, only dual fuel heat pumps can be installed under the prescriptive path for retail, grocery, and school building spaces. The Proposed Revisions are detailed in Table 1 below.

Table 1. Proposed Revisions

Section	Equipment Impacted	Proposed Change
150.1(c)7	Space Heating and Space Cooling	Removes gas equipment from prescriptive path for single family homes <ul style="list-style-type: none"> • “For climate zones 3, 4, 10, 13 and 14, the space conditioning system shall be a heat pump, or shall meet the performance

¹ Section 150.1(c)8 includes an exception for the use of instantaneous gas water heaters in CZ 3, 4, 10, 13, and 14.

Section	Equipment Impacted	Proposed Change
		compliance requirements of Section 150.1(b)1.”
150.1(c)8	Domestic Water-Heating	Removes gas equipment from prescriptive path for single family homes. <ul style="list-style-type: none"> • “Water-heating systems shall meet the requirements of A, B, C, or shall meet the performance compliance requirements of Section 150.1(b)1C.” • “EXCEPTION 1 to Section 150.1(c)8: For climate zones 3, 4, 10, 13 and 14, a gas or propane instantaneous water heater with an input of 200,000 Btu per hour or less and no storage tank may be installed.” • “NOTE: The space conditioning system shall be a heat pump as specified in Section 150.1(c)7.”
170.2(c)3A	Space Heating and Space Cooling	Removes gas equipment (and heat pumps from CZ 1 and 16) from the prescriptive path. <ul style="list-style-type: none"> • “(i) Multifamily Buildings three habitable stories or less. For climate zones 1 through 15, the space conditioning system shall be a heat pump. For climate zones 16, the space conditioning system shall be an air conditioner with furnace. Additionally, for climate zones 4-10, balanced ventilation systems without heat or energy recovery required by Section 160.2(b)2Aivb1 shall have fan efficacy of 0.4 W/cfm or less. • (ii) Multifamily Buildings four habitable stories or greater. For climate zones 2 through 15, the space conditioning system shall be a heat pump. For climate zones 1 and 16, the space conditioning system shall be a dual-fuel heat pump.”
170.2(d)	Domestic Water-Heating	Requires use of Heat Pump Water Heater or gas instantaneous water heaters for individual dwelling units. <ul style="list-style-type: none"> • “For systems serving individual dwelling units, the water heating system shall meet the requirement of either A, B, C, or shall meet the performance compliance requirements of Section 170.1.”

Section	Equipment Impacted	Proposed Change
140.4(a)2 Single Zone Space Conditioning System Type	Space Heating and Space Cooling	Removes gas equipment in most single zone space conditioning system types from prescriptive path for commercial buildings, with heat pump use banned in certain scenarios in CZ 1 and 16 <ul style="list-style-type: none"> • <u>“Single zone space conditioning systems with direct expansion cooling with rated cooling capacity 240,000 Btu/hr or less serving the following spaces shall meet the applicable requirements in A-H,² or shall meet the performance compliance requirements of Section 140.1. All other system types, including systems with rated cooling capacity greater than 240,000 Btu/hr, multi-zone systems, and systems using central boilers or chillers, shall comply with the applicable requirements of Section 140.”</u>

By mandating the use of certain types of equipment, such as heat pumps, that do not utilize natural gas in certain climate zones, the Proposed Revisions ban the installation and use of gas water heaters, furnaces, and boilers under the prescriptive path in those climate zones.

The Proposed Revisions to the performance compliance approach likewise prohibit the use of certain natural gas equipment, albeit less directly. Specifically, the Proposed Revisions would determine the energy budget for a Standard Design Building

² Proposed Section 140.4(a)2 A-H:

A. Retail and Grocery Building Spaces in climate zones 2 through 15. The space conditioning system shall be a heat pump.

B. Retail and Grocery Building Spaces in climate zones 1 and 16 with cooling capacity less than 65,000 Btu/hr. The space conditioning system shall be an air conditioner with furnace.

C. Retail and Grocery Building Spaces in climate zones 1 and 16 with cooling capacity 65,000 Btu/hr or greater. The space conditioning system shall be a dual-fuel heat pump.

D. School Building Spaces. For climate zones 2 through 15, the space conditioning system shall be a heat pump. For climate zones 1 and 16, the space conditioning system shall be a dual-fuel heat pump.

E. Office, Financial Institution, and Library Building Spaces in climate zones 1 through 15. The space conditioning system shall be a heat pump.

F. Office, Financial Institution, and Library Building Spaces in climate zones 16 with cooling capacity less than 65,000 Btu/hr. The space conditioning system shall be an air conditioner with furnace, a dual-fuel heat pump.

G. Office, Financial Institution, and Library Building Spaces in climate zones 16 with cooling capacity 65,000 Btu/hr or greater. The space conditioning system shall be a dual-fuel heat pump.

H. Office Spaces in Warehouses. The space conditioning system shall be a heat pump in all climate zones.

EXCEPTION to Section 140.4(a)2: Systems utilizing recovered heat for space heating.

“by applying the mandatory and prescriptive requirements to the Proposed Design Building.”³ This directly and inextricably incorporates the impermissibly stringent requirements of the prescriptive pathway into the performance pathway. Theoretically, a builder may use equipment prohibited under the prescriptive pathway, but it would be unable to meet the energy budget for the building without increasing energy efficiency elsewhere. Thus, the performance pathway effectively conditions the use of the prohibited equipment on the implementation of energy efficiency offsets.⁴

B. EPCA Preempts the Proposed Revisions to the Prescriptive Compliance Path

EPCA expressly preempts the Proposed Revisions because they constitute (1) regulations concerning the energy use of a covered product under 42 U.S.C § 6297(c), and (2) do not meet all seven requirements a building code must meet in order to avoid preemption under EPCA. 42 U.S.C § 6297(f)(3). Furthermore, EPCA preemption case law supports the conclusion that EPCA preempts the Proposed Revisions to the prescriptive compliance path and performance compliance path. Accordingly, if enacted as written, the Proposed Revisions will be legally invalid.

1. EPCA’s plain language preempts the Proposed Revisions because they concern the energy use of an EPCA-covered product.

EPCA “establishes nationwide standards for the energy efficiency and energy use of major residential and commercial appliances and equipment, including heating, ventilating, and air conditioning (HVAC) products and water heaters.” *Air Conditioning, Heating, and Refrigeration Institute v. Albuquerque*, 2008 WL 5586316, at *1 (D.N.M.). Under EPCA, the U.S. Department of Energy (“DOE”) is primarily responsible for promulgating regulations that prescribe a “minimum level of energy efficiency or a maximum quantity of energy use” for covered consumer products.⁵ 42 U.S.C. §6291(6)(A); *see id.* §6295.

EPCA contains separate, but similar, express preemption provisions for consumer products and commercial and industrial products and equipment. The statute states in relevant part:

- For consumer products, that “no State regulation concerning the energy efficiency, energy use, or water use of such covered product shall be effective with respect to such product” unless the regulation falls within certain enumerated conditions. *Id.* § 6297(c).
- For commercial products, that it “supersede[s] any State or local regulation concerning the energy efficiency or energy use of a product for which a standard is prescribed or established” in the federal statute. *Id.* § 6316(b)(2)(A).

³ *Id.* at Section 140.1(a).

⁴ *See* Proposed Revisions, Section 140.1 – Performance Approach: Energy Budgets.

⁵ Covered products and equipment are listed in 42 U.S.C. §§ 6292, 6311 and include dual fuel heat pumps, water heaters, boilers, and furnaces, among other appliances—the equipment banned by the Proposed Revisions.

The key terms in the preemption provisions demonstrate Congress' intent to reserve to the federal government energy policy decisions regarding covered products' consumption of fossil fuels. For consumer products, "energy use" is defined as "**the quantity of energy directly consumed** by a consumer product at point of use." *Id.* § 6291(4). For commercial and industrial products, "energy use" is similarly defined as "**the quantity of energy directly consumed** by an article of industrial equipment at the point of use." *Id.* § 6311(4). For all standards, "energy" is defined as "electricity, or fossil fuels." *Id.* §§ 6311(7), 6291(3).⁶

Congress intended EPCA to "preempt State law under most circumstances." *Air Conditioning, Heating, & Refrigeration Inst.*, 2008 WL 5586316, at *7; H.R. Rep. 100-11 at 19. "The plain language of the [Act's] preemption statute makes clear that Congress intended the preemption to be broad in scope." *Air Conditioning, Heating, and Refrigeration Inst. v. City of Albuquerque*, 835 F. Supp. 2d 1133, 1136 (D.N.M. 2010). In particular, "the use of the word 'concerning' suggests that Congress intended the preemption provision to be expansive." *Id.* (citation omitted). The Oxford English Dictionary defines "concerning" as "[t]o refer to or relate to; to be about."⁷

The Proposed Revisions are regulations⁸ "concerning" the "energy use" of covered products because they relate to the amount of natural gas used by the products at issue. The Proposed Revisions mandate the use of certain equipment that do not utilize natural gas, such as heat pumps, in certain climate zones, thereby banning the installation and use of gas water heaters, furnaces, and boilers under the prescriptive path in those climate zones. Because the Proposed Revisions prohibit gas water heaters, furnaces, and boilers from using the prescriptive path to compliance in most circumstances, they necessarily reduce the quantity of natural gas used by those products to zero.

The fact that the Proposed Revisions to the prescriptive compliance path include limited exceptions (e.g., the limited exception for the use of gas instantaneous water heaters in climate zones 3, 4, 10, 13, and 14 under Section 150.1(c)7) and a performance path to compliance is irrelevant to whether the Proposed Revisions are preempted. The Proposed Revisions to the prescriptive path are regulations concerning the energy use of covered products, regardless of the existence of exemptions or the availability of the performance path to compliance. Under EPCA, a regulation does not need to prohibit the energy use of covered products to be preempted in all circumstances; it merely has to

⁶ EPCA also contains an express exception to preemption for "a regulation or other requirement contained in a State or local building code for new construction concerning the energy efficiency or energy use" of covered products that meet all of the seven conditions in 42 U.S.C. § 6297(f)(3). For EPCA's exemption to preemption to apply, there must be a showing that the seven statutory factors are met. *See* 42 U.S.C. § 6297(f)(3); *see also Bldg. Industry Ass'n of Wash. v. Wash. Bldg. Code Council*, 683 F.3d 1144, 1148 (9th Cir. 2012). In order for the Commission to make the requisite showing, it *must*, at a minimum, consider and analyze each of the seven requirements set forth in 42 U.S.C. § 6297(f)(3)(A)-(G). To date, the Commission has made no such finding and, as discussed below, AHRI is confident that the Proposed Revisions do not satisfy all seven preemption factors.

⁷ OXFORD ENGLISH DICTIONARY, *Concern* (Nov. 13, 2020), <https://www.oed.com/view/Entry/38153?rskey=D6AeEH&result=1&isAdvanced=false#eid>

⁸ EPCA defines "state regulation" as any "law, regulation, or other requirement of a State and its political subdivisions." 42 U.S.C. § 6297(a)(2)(A).

concern the energy use of covered products, and the Proposed Revisions to the prescriptive path to compliance do just that.

The Proposed Revisions to performance pathway similarly exceed the minimum levels of efficiency established by DOE. Under EPCA, the Standard Building Design must be based on products that meet but do not exceed the federal energy efficiency standards. 42 U.S.C. § 6297(f)(3)(D). The Proposed Revisions run afoul of this requirement because they embed the impermissible prohibitions of the prescriptive pathway into the energy budget for the Standard Design Building. Conditioning the use of EPCA-covered products on the implementation of energy efficiency offsets does not permit a builder to select products that meet, but do not exceed, federal energy standards.

2. EPCA case law invalidating restrictive codes concerning EPCA-covered products supports preemption of the Proposed Revisions.

The leading case addressing the above EPCA provisions, *Air Conditioning, Heating and Refrigeration Institute v. City of Albuquerque*, supports the conclusion that EPCA preempts the Proposed Revisions to the prescriptive compliance path.

The Proposed Revisions closely resemble the code revisions that the U.S. District Court for New Mexico deemed invalid in *Albuquerque*. In *Albuquerque*, AHRI challenged Volumes I and II of the 2007 Albuquerque Energy Conservation Code on the grounds that the code imposed minimum energy efficiency standards for commercial and residential buildings that were preempted by EPCA. 835 F. Supp. 2d at 1135. Volume I applied to commercial and multi-family residential buildings, and Volume II applied to one- and two-family detached dwellings and townhouses. *Id.* Both volumes included performance and prescriptive paths to compliance. The prescriptive paths included in both volumes set prescriptive standards for individual components that provided for energy efficiency standards in excess of federal standards. *Id.* However, the City of Albuquerque argued the prescriptive compliance path was not preempted because there were other lawful compliance paths. *Id.* at 1136.

The court found the City's argument unavailing and held that revisions to a prescriptive path to compliance was a regulation subject to EPCA's preemption provision, regardless of the availability of a performance path to compliance. *Id.* at 1140. In reaching this holding, the court stated, "[t]he City has not persuaded the Court that a local law is not preempted when it presents regulated parties with viable, non-preempted options. (See Mem. Op. and Order at 14, Doc. No. 61, filed October 3, 2008, 2008 WL 5586316 ("the Court can find no support for the novel proposition that the inclusion of one or more alternatives for compliance in a regulation keeps each of the alternatives from being considered a regulation")))." *Id.* at 1137. Ultimately, the Court concluded "that the prescriptive provisions of Volume I requiring the use of heating, ventilation, or air conditioning products or water heaters with energy efficiency standards more stringent than federal standards are regulations that concern the energy efficiency of covered products and, therefore, are preempted as a matter of law." *Id.*

As in *Albuquerque*, the Proposed Revisions revise the prescriptive path to compliance under the Energy Code. The *Albuquerque* court found that such a regulation is subject to EPCA's preemption provision, regardless of the existence of a performance path to compliance. Thus, the fact that an alternative performance path under the Proposed Revisions exists will not save the regulation from EPCA preemption.

3. The Proposed Revisions fail to satisfy EPCA's seven statutory requirements for exemption from preemption.

CEC has the burden to ensure the Proposed Revisions meet EPCA's seven statutory requirements for exemption from preemption. CEC has not attempted to demonstrate the Proposed Revisions satisfy EPCA's exemption requirements and, indeed, cannot do so because the Proposed Revisions fail to meet at least two of these seven requirements. As such, the Proposed Revisions do not qualify as exempt from EPCA preemption.

The CEC has not satisfied its burden to demonstrate that the Proposed Revisions are exempt from preemption. The U.S. Court of Appeals for the Ninth Circuit, in *Building Industry Association of Washington v. Washington Building Code Council*, has established that it is the CEC's burden to ensure that the Proposed Revision satisfies EPCA's seven factors for exemption from preemption—which it has not done. 683 F.3d 1144 (9th Cir. 2012).⁹ In that case, the Ninth Circuit recognized that EPCA contains an express preemption provision but nonetheless held that Washington met the specifically enumerated criteria to qualify for the preemption exception. *Id.* at 1148. In reaching this conclusion, the Ninth Circuit explicitly stated that, “[s]tates seeking to implement energy conservation goals through their building codes must therefore ensure that the code satisfies the conditions established in EPCA for exemption from federal preemption.” *Id.* The CEC has not made this showing and the Proposed Revisions cannot qualify for an exemption without the CEC doing so.

Further, even if the Commission had undertaken an exemption analysis, it quickly would have found that the proposed revisions cannot satisfy all seven factors for an exemption. Under EPCA, if a regulation fails to satisfy even one of the seven factors, the exemption does not apply, and the proposed code change is preempted. 42 U.S.C. § 6297(f)(3). The proposed revisions cannot meet three of the seven factors outlined in 42 U.S.C. § 6297(f)(3), because (1) they do not allow a builder to select various items whose combined efficiencies meet the objective; (2) they require the installation of components

⁹ Notably, the Ninth Circuit held that Washington met the specifically enumerated criteria to qualify for the exemption from preemption because the “ordinance itself had created a situation in which the builder had no choice.” *Id.* at 1152. The Washington code complied with EPCA because it did “not create any penalty or legal compulsion to use higher efficiency products.” *Id.* This stands in sharp contrast to the Proposed Revisions, which unequivocally mandate the use of specific types of equipment in certain climate zones.

that exceed federal energy efficiency standards; and (3) they set a baseline building design that exceeds these same federal standards.¹⁰

The first factor requires that a “code permits a builder to meet an energy consumption or conservation objective for a building by selecting items whose combined energy efficiencies meet the objective.” *Id.* § 6297(f)(3)(A). This factor requires “that the building code allow a builder to select various items whose combined energy efficiencies meet the objective.” *Air Conditioning, Heating, and Refrigeration Institute v. City of Albuquerque*, 2008 WL 5586316, at *9 (D.N.M. Oct. 3, 2008). The Proposed Revisions cannot meet this factor because they mandate—directly in the prescriptive pathway and effectively in the performance pathway—the use of specific equipment depending on the climate zone.

The second factor states that a state’s energy code cannot require that “a covered product have an energy efficiency exceeding the applicable energy conservation standard established in or prescribed under” 42 U.S.C. § 6295, unless DOE Secretary has issued a rule granting a waiver for the particular state regulation. The Proposed Revisions cannot meet this factor, because they require the use of certain types of equipment, such as heat pumps, thereby banning the use of covered products in most instances. By banning EPCA-covered products, the Proposed Revisions reduce the energy use of those covered products to zero. In doing so, it effectively requires that “a covered product have an energy efficiency exceeding the applicable energy conservation standard,” and the CEC has not sought a waiver from the DOE Secretary allowing this.¹¹

Likewise, the performance compliance approach also requires EPCA-covered products to have an energy efficiency standard exceeding the federal level, albeit more indirectly. Buildings can use natural gas appliances, but only if offset by using other EPCA-covered appliances that exceed federal energy efficiency standards. In *Air Conditioning, Heating, and Refrigeration Inst. v. City of Albuquerque*, the court reasoned:

“it is undisputed that if products at the federal efficiency standard are used, a building owner must make other modifications to the home to increase its energy efficiency in order to comply with the Code. **Thus, in effect, there is a penalty imposed for selecting products that meet, but do not exceed, federal energy standards.** A building code that effectively requires the installation of products that exceed federal energy standards cannot satisfy this provision. See, e.g., H.R. Rep. 100–11 at 26 H.R. Rep. 100–11 at 26 (building code exception intended to “ensure that performance-based codes cannot expressly *or effectively* require the installation of covered products whose efficiencies exceed ... the applicable Federal standard ...”) (emphasis added).” 2008 WL 5586316, at *9.

¹⁰ The Proposed Revisions may fail to meet other required factors for an exemption to EPCA preemption as well. However, as explained above, it is the CEC’s burden to examine these factors and explain how the Proposed Revisions meet all of them.

Like the performance-based code at issue in *City of Albuquerque*, the performance compliance approach in the Proposed Revisions imposes a legal penalty for selecting products that meet, but do not exceed, federal energy standards. See also *Bldg. Indus. Ass'n of Washington*, 683 F.3d at 1152 (“The Albuquerque ordinance thus effectively required use of higher efficiency products by imposing a penalty through the code itself.”). Thus, this portion of the Proposed Revisions fails to satisfy EPCA’s requirements to be exempt from preemption as well.

Finally, **the fourth factor** requires that “[i]f the code uses one or more baseline building designs against which all submitted building designs are to be evaluated,” such baseline building designs, if they affect EPCA-covered products, must be based on energy efficiency standards that meet but do not exceed the federal energy efficiency standards. See 42 U.S.C. § 6297(f)(3)(D). Because the performance pathway directly incorporates the energy efficiency requirements of the prescriptive pathway, which exceeds federal standards, the baseline building design the performance path sets forth is unduly restrictive and thus fails to meet the fourth factor to qualify for an EPCA preemption exemption.

For these reasons, the Proposed Revisions are not exempt from EPCA preemption.

C. The Proposed Revisions Violate Congressional Intent

“There is no doubt that Congress intended to preempt state regulation of the energy efficiency of certain building appliances in order to have uniform, express, national energy efficiency standards.” *Air Conditioning, Heating, and Refrigeration Institute*, 2008 WL 5586316, at *7 (D.N.M.). Congress vested DOE, not states, with the authority to make critical decisions about energy use and efficiency of covered products and equipment in order to create a nationwide comprehensive energy policy.

As originally enacted, EPCA permitted significant state involvement in appliance regulation. However, in 1987, Congress amended EPCA to add the preemption provisions to “reduce the regulatory and economic burdens on the appliance manufacturing industry” and to protect the appliance manufacturing industry from “a growing patchwork of differing State regulations which would increasingly complicate their design, production, and marketing plans.” See S. Rep. No. 100-6, at 1, 4 (1987).

The Proposed Revisions to the Energy Code prohibit the use of certain products under the prescriptive compliance path, which would have a significant impact on the market for those products, reducing consumer choice and potentially forcing consumers to use less effective or less energy efficient products. EPCA’s preemption provisions exist to ensure that DOE can make decisions that balance the benefits and burdens of efficiency standards, rather than allowing states to make decisions that could have such unintended market consequences.

D. AHRI supports CEC Maintaining Consumer’s Energy Choices

AHRI agrees with CEC's assessment that moving to an all-electric baseline in 2022 is premature.¹² On January 26, 2021, CEC correctly identified that neither the market nor the workforce is ready to support electric-only new construction. Technicians installing and servicing heat pumps must be trained to the latest of both technical and professional standards. Title 24 is also not ready for policies limiting a consumer's choice to freely select equipment regardless of energy used. Rather than regulations preventing the use of energy sources for space and/or water-heating, CEC should focus on financial incentives for reducing carbon emissions through policies that encourage the installation of equipment that reduces carbon emissions and structural updates that reduce the amount of energy needed for space- and/or water-heating. It is imperative that CEC preserve the flexibility for equipment to use any energy source when it is more practical, economical, and environmentally beneficial to do so. For example, the future benefit of Hydrogen or Hydrogen blends distributed in the natural gas system allows for the utilization of excess, non-peak electricity to be stored in the system by creating Hydrogen gas for later use. Research is ongoing.

Therefore, in light of EPCA's preempting federal energy standards and the current challenges associated with electric-only new construction, AHRI asks that CEC remove limits on EPCA-covered products like natural gas appliances from both the prescriptive and performance compliance approaches.

Technical Review of the Express Terms

AHRI reviewed the Express Terms; a technical review and recommendations to address concerns are included, below.

A. Definitions – Section 100.1

AHRI would like to propose minor modifications to the definitions section.

First, commercially available desiccant systems will be available prior to Title 24-2022 coming into force. To more clearly permit desiccant dehumidification in HVAC systems, AHRI recommends modification to INTEGRATED HVAC SYSTEM:

INTEGRATED HVAC SYSTEM is an HVAC system designed to handle both sensible and latent heat removal. Integrated HVAC systems may include, but are not limited to: HVAC systems with a sensible heat ratio of 0.65 or less and the capability of providing cooling, dedicated outdoor air systems, single package air conditioners with either at least one refrigerant circuit providing hot gas reheat or

¹² As a report prepared for CEC has acknowledged, "changes to mandatory or prescriptive code requirements or to the baselines used in the performance approach must be cost-effective and technically feasible while avoiding issues with Federal preemption." Roger Hedrick et al., *Heat Pump Baseline for Non-Residential and High-Rise Residential Buildings: Feasibility Analysis*, 2 (May 19, 2021).

a desiccant dehumidification system, and stand-alone dehumidifiers modified to allow external heat rejection.

Secondly, AHRI recommends a modification to the DX-DEDICATED OUTDOOR AIR SYSTEM UNITS definition to acknowledge that the product is not always supplied with a means to reheat dehumidified air.

DX-DEDICATED OUTDOOR AIR SYSTEM UNITS (DX-DOAS)- a type of air-cooled, water-cooled, or water-source DOAS unit that dehumidifies 100 percent outdoor air and may include reheat capable of controlling the supply dry-bulb temperature of the dehumidified air to the designed supply air temperature.

B. Mandatory Filter Gasketing Requirements – Sections 120.1(c)1D, 150.0(m)12Bv, and 160.2(b)1Bv

AHRI is concerned with the introduction of gasketing requirements in Section 120.1(c)(1)(D). The draft language presents unintended compliance concerns for systems installed in Nonresidential and Hotel/Motel Buildings. This new section requires filter racks to be gasketed or sealed to eliminate any air from bypassing the MERV 13 filter. While the intent of language proposed seems to be designed to ensure that equipment operates as intended, we see three issues with compliance: (1) there appears to be no tolerance for the requirement; (2) it is unclear how the requirement would be enforced; and (3) for side-loaded filters, which are common for packaged commercial equipment, gasketing the filter rack to completely remove all gaps will end up crushing/crimping the filter itself.

Regarding compliance, in the April 9, 2021, comments¹³ to the pre-rulemaking, the Home Ventilation Institute (HVI) requested clarification on two scenarios to confirm compliance with gasketing and sealing requirements, “Scenario A: A filter with a flat surface is held against another flat surface with pressure applied by a gasket or seal from the opposite surface. For example, a square cardboard filter squeezed against the bottom of an EPS insulated housing filter slot of a supply only ventilation device by a compressible sealing material on the opposite surface (e.g., within the access door).” And “Scenario B: A filter with a tight fit on at least 4 edges of the perimeter is installed against a hard, flat surface.” These are likely scenarios in equipment to support air filter functioning as designed to protect occupants from exposure to small airborne particles; however, by use of the word “eliminate” an impossible equipment configuration has been created.

AHRI recommends that this requirement be modified as follows, “If an available equipment option, filter racks or grilles shall be specified to include any available gasket or seal technology that reduces air bypassing the filter. EXCEPTION 1: Gasketing on side-load filter racks are exempt.” This would ensure that the designer specify an option, if available for the configuration of the equipment. Code officials would be able to review

¹³ Refer to HVI comments, TN237402_20210409T111527_Home Ventilating Institute Comments on CEC Draft Express Terms, dated April 9, 2021, docketed in 19-BSTD-03

the mechanical drawings for this requirement and request equipment cut sheets, if necessary, to enforce. Further, specifying a reduction, rather than an elimination of air bypass will improve the condition without creating an impossible requirement. Further, it clearly exempts equipment configurations that cannot comply. For equipment that cannot be specified with a gasket, there appear to be gasketed filters on the market for consumers to purchase.

The above analysis and recommendations also apply to Sections 150.0(m)12Bv and 160.2(b)1Bv, Air Filtration and System Design.

C. Mandatory Requirements for Fans – Section 120.10

Firstly, AHRI appreciates CEC harmonizing with ASHRAE 90.1 and implementing a fan energy index (FEI) minimum of 0.95 for VAV. In earlier drafts, the FEI had been increased to 1.00 minimum, based on the assumption that the fan would include a variable speed drive. Recognizing that ASHRAE 90.1-2019 set the limit at 0.95 to account for the drive losses, which are still there is correct. Variable speed or even two-speed fans provide significantly more energy savings than a 5-percent improvement at full load, AHRI supports CEC including the 0.95 factor for variable speed fans and remain consistent with other standards, like ASHRAE 90.1.

Secondly, AHRI appreciates modifications to EXCEPTION 1 to Section 120.10(a) to more clearly exclude equipment currently in the process of first-time federal regulation, for example, computer room air conditioners (CRAC) and dedicated outdoor air systems (DOAS). However, AHRI retains concerns regarding both consumer confusion regarding the application of the requirement to equipment without final rules and the application of FEI to embedded fans, discussed below. Despite the clear intent of DOE to issue energy conservation standards for this equipment, there is no guarantee that CRAC and DOAS will have final rules published by January 1, 2023, when Title 24-2022 goes into force. In fact, the Unified Agenda, published June 11, 2022, indicates DOE's timing for publishing the Notice of Proposed Rulemaking is February 2022.¹⁴ It is unlikely that the Final Rule for DOAS will be published before January 1, 2023. In the very real event that federal rules have not been issued, a preempted conflict will be created if CRAC and DOAS are in scope of FEI requirements. Both equipment types are categories of Commercial Air Conditioning and Heating Equipment found at 10 CFR 431.97 and cannot be subject to double regulation with FEI requirements.

AHRI recommends modifying EXCEPTION 1 to Section 120.10(a) as follows, "Embedded fans that are part of equipment listed under Section 110.2, Section 110.1, or equipment that has an energy conservation standard under 10 CFR 431 or 10 CFR 430, computer room air conditioners (CRAC), or dedicated outdoor air systems (DOAS)."¹⁵

¹⁴ Energy Conservation Standards for Dedicated Outdoor Air Systems, RIN: 1904-AD92. Spring 2021 status, published June 11, available, here:

<https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202104&RIN=1904-AD92>

¹⁵ If CEC needs to define Computer Room Air Conditioner (CRAC), AHRI recommends adopting (and combining) the relevant definitions 3.3 Computer and Data Processing Room Air Conditioner (CDPR) and 3.4 Computer Room

Including an exemption for 10 CFR 430 would clearly exempt fans embedded in federally regulated consumer products. ~~including any equipment with new energy conservation standards with effective dates prior to January 1, 2026.~~

While an exception to Section 120.10(a)2, that FEI values for embedded fans do not need to be third party verified is appropriate, AHRI recommends instead clearly exempting embedded fans. *Embedded fans cannot be accurately and comparably rated using AMCA 208.* Section 4.4 of AMCA 208-18 and Annex D (informative) includes the entirety of calculation methods for embedded fans. It is not written in mandatory language and cannot be used reliably to rate embedded fans with an FEI. Neither consumers nor regulators are able to determine which products have inextricably embedded fans and which do not. **AHRI strongly urges CEC to exclude all embedded fans** – there is no consistent, clear, uniform, repeatable, and reliable method to determine the FEI of an embedded fan.

To exempt embedded fans and remove the compliance confusion, AHRI recommends deleting 120.10(a)(1) and modifying EXCEPTION 1 to Section 120.10(a), as follows, “Embedded fans and fans intended for replacement of embedded fans that are part of equipment listed under Section 110.2, Section 110.1, or equipment that has an energy conservation standard under 10 CFR 431, including any equipment with new energy conservation standards with effective dates prior to January 1, 2026 are exempt.”

D. Fan Power Budget – Sections 140.4(c), 170.2

While AHRI supports the conceptual change to regulating fan system input KW instead of fan bhp, we have some concerns with the proposed regulatory text. Most importantly, based on a simplified analysis using motor power, the Fan Power Budget language, as proposed, is overly stringent – much more so than the proposal introduced to ASHRAE 90.1, particularly for certain application. The stringency varies considerably by unit size and without modification, this proposal stands to eliminate larger commercial packaged air conditioners and heat pumps (rooftop units or RTUs) from the California market.¹⁶

This proposal impacts more than RTUs; however, large RTUs are space constrained products because of transportation limitations – they must fit on flat-bed trucks. Using most stringent cases for static pressure allowances in the analysis there will be an increase in unit casing size by approximately 15%-percent to accommodate larger fans (for typical job applications). If compliance requires larger fans and cabinets, units will be unable to meet transportation limitations. Similar issues may be present, albeit on

Air Conditioner (CRAC) from AHRI Standard 1360, *Performance Rating of Computer and Data Processing Room Air Conditioners* (pg. 2), available, here:

https://ahrinet.org/App_Content/ahri/files/STANDARDS/AHRI/AHRI_Standard_1360_IP_2017.pdf

¹⁶ Data from individual manufacturers of constant volume RTUs over 60 Tons complying with January 1, 2023, DOE efficiency standards will not be able to supply enough static pressure to meet application (job) requirements while complying with the proposed fan power limits. Manufacturers will submit data individually to CEC.

a smaller scale, with rooftop air-handlers (RTAH). RTAHs can be split for shipping, whereas packaged RTUs cannot be due to electrical wiring and refrigerant piping.

As CEC is aware, manufacturers are already well into the redesign process to bring RTUs into compliance with the January 1, 2023, DOE efficiency standards.¹⁷ To bring a product line to market to address new regulatory requirements, not only must the product be redesigned, but it must also be retested, have its components recertified, and the entire product must be recertified to safety and efficiency standards.¹⁸ To expand, first manufacturers must design the new cabinet and fan, then test fan performance. Next additional performance and safety tests can be conducted somewhat in parallel. These include performance testing DX systems and furnaces to comply with federal efficiency standards and safety testing the product. Furnace and electric heat testing takes approximately one year to conduct. Next, and only after performance and safety tests are substantially complete, acoustical, wind and seismic tests must be conducted, which takes approximately one year. To further complicate the design cycle for these products, manufacturers are also planning for the introduction of entirely new products, also complying with DOE 2023 efficiency standards, using A2L refrigerants to comply with California Air Resource Board regulations. In all, the process to comply with the fan power budget requirement will take five years.

While the CASE team responsible for developing this proposal made many presentations on this new approach, critical inputs necessary to analyze the impact of the different approach was not shared. For example, stakeholders could not obtain the static pressure allowance used in the analysis. Without this information, many additional hours of stakeholder review of the proposal. Stakeholders have also questioned certain assumptions for being overly stringent. For example, the fan requirement was set for a 15-percent higher FEI than new minimum requirements for stand-alone fans. This

¹⁷ Direct final rule to establish amended energy conservation standards for small, large, and very large air-cooled commercial package air conditioning and heating equipment and commercial warm air furnaces. [81 FR 2420](#) (January 15, 2016). TABLE 3 TO § 431.97—UPDATES TO MINIMUM COOLING EFFICIENCY STANDARDS FOR AIR CONDITIONING AND HEATING EQUIPMENT. [Note: Does not include single package vertical air conditioners and single package vertical heat pumps, packaged terminal air conditioners, and packaged terminal heat pumps, computer room air conditioners, and variable refrigerant flow multi-split air conditioners and heat pumps.]

¹⁸ CEC staff has been aware of the 2023 compliance timeline since well before the Direct Final Rule was published January 15, 2016. Although States were not direct signatories to the Term Sheet, the ASRAC Committee approving the Working Group's recommendations included California Energy Commission staff. The Term Sheet with the negotiated timeline was signed in 2015. For CEC to propose including such a significant provision with only one year compliance is not feasible. Principles of administrative law and due process dictate that a government agency cannot require stakeholders to dedicate resources to comply with any regulation until it is final, in this case January 1, 2022. CEC could have made a proposal final in the 2019 edition of Title 24 with a compliance date of January 1, 2023, to give manufacturers sufficient time to comply. CEC is also aware that CARB in the middle of promulgating a major regulation impacting the refrigerants used in affected equipment. This regulation is an excellent example of why due process requires clear notice. Manufacturers must design to prescribed standards and requirements. As of the date of this submission, no parties—neither CEC, CARB nor manufacturers—have adequate notice of what the prescribed safety standards will be in California. Stakeholders have no notice of their regulatory requirements, and therefore a 2023 compliance date for fan power requirements contravenes basic due process. A 2025 compliance date for refrigerants could suffer from the same inadequacies if the prescribed design requirements are amended upon adoption into the building code and manufactures lack time to react.

situation was present for nearly every component within the units, leading to an overly stringent proposal with compliance nearly impossible at actual job static pressures for larger tonnage units. To improve this proposal, AHRI recommends adding a benefit for two-stage fans and reducing stringency of other provisions. If CEC intends to adopt the proposal without modification, as written, compliance should begin no earlier than January 1, 2028.

We recognize that products are not compliant or non-compliant in and of themselves; however, if they cannot comply at the customers' required external static pressure requirements, then the products essentially are non-compliant. AHRI members will supply data directly to CEC outlining the proposal impact on products.

The complexity of the analysis on products, using job application data, is considerable. This time-consuming project is still ongoing. AHRI hopes to submit supplementary comments with an industry analysis within two weeks of the comment deadline.

Larger fans and cabinets are also problematic on replacement applications. The proposal allows for extra fan power on replacement applications intended to account for existing ductwork deficiencies, but that extra power is almost entirely consumed by the pressure drop induces by a curb adapter – a necessary component on many replacement projects. If replacement rooftops require completely new support structure, rather than a curb adapter, then the cost to building owners will be significant. This cost has not been accounted for in the CASE report.¹⁹ To account for this situation, AHRI recommends doubling the allowance for fan power in replacement applications to allow for the continued use of cost-effective conversion curbs and to account for existing ductwork.

These comments also apply to the proposal included in Section 170.2, which addresses high rise residential buildings. While AHRI is not opposed to the introduction of new sections to address multifamily buildings if this change helps designers, builders, and code officials, we are concerned with the possibility for diverging requirements in future editions of Title 24. If any of AHRI's proposed revisions to Section 140.4(c) are not made to Section 170.2, AHRI requests that CEC maintain and make public a table to track conflict/divergence between sections of similar requirements.

E. Prescriptive Requirements for Space Conditioning Systems – Section 140.4 (e)

Section 140.4(e) proposes the reduction of the economizer threshold to apply to equipment from 54,000 Btu/h to 33,000 Btu/h. While requirement appears to offer energy savings, we question how cost effective it would be in practice. AHRI's concerns persists regarding (1) cost effectiveness with the proposed decoupled DOAS when paired with terminal equipment such as variable refrigerant flow (VRF), water source heat pumps, and small chilled-water coils; and (2) the limitation of implementation options with certain types of equipment, mainly VRF. The required inclusion of a DOAS or higher-airflow

¹⁹ TN237695_20210506T095207_High Performance Ducts and Fan Systems CASE Report

capability in an energy recovery ventilator in conjunction with the terminal heating and cooling equipment stands to increase the cost of the system. VRF systems with heat recovery modules are also able to facilitate exchange of energy between different individual space conditioning zones to provide simultaneous cooling and heating, thereby increasing energy use effectiveness for this product. The use of economizers compromises this energy recovery from individual zones, and therefore is unable to deliver that same level of effectiveness and efficiency. The 45-day language also does not allow for an integrated outside air approach to be used with space-conditioning systems. For regions (climate zones) and applications that do not need 100% dedicated outside air to be brought into the space-conditioning zone, it would make sense for CEC to consider providing an option for an integrated outside air approach to be used.

Economizers were designed to be implemented on outdoor equipment, whereas challenges exist in indoor implementation. AHRI would not oppose limiting the requirement to extend economizer requirement down to 33,000 Btu/h if it was only applied to outside units.

AHRI requests CEC to remove the proposal to require economizers on indoor fan coils and limit the expansion economizer requirements to outdoor products.

F. Data Center Requirements – Section 140.9

Data centers are essential to public and private business operations and are considered to be mission critical. The facilities must operate around the clock for the entire year, without disruption. As such, reliability, redundancy, and simple design are key design principles for the architecture and mechanical systems in these spaces. Due to their high intensity and constant energy use, data centers are prime-candidates for energy-efficient design measures that can save money and reduce electricity consumption. It is therefore crucial that energy reduction measure proposals acknowledge and adhere to the key design principles of reliability, redundancy, and simple design.

AHRI supports the data center proposal as written in the Express Terms for the 2022 Energy Code, Title 24 Parts 1 and 6. The inclusion of refrigerant economizers as an additional prescriptive requirement reinforces the technology-neutral intent of Title 24. Further, adding refrigerant economizers as a prescriptive requirement provides data center owners with greater options to select the most suitable economizer given the data center's particular climate zone and surrounding air quality. CEC rightly recognized inherent differences between air and water/refrigerant economizers and AHRI agrees with the agency's decision to establish different temperature thresholds for these technologies.

AHRI reminds CEC that as a state agency it must follow the procedures and requirements set forth in the California Administrative Procedure Act (APA) (Government Code § 11340 et seq.) and rules adopted by the Office of Administrative Law (OAL). CEC has stated the next planned step for the Title 24-2022 process is publication of 15-day Express Terms prior to the adoption of the Energy Code at the August Business Meeting.

If CEC were to introduce into 15-day comments the proposed federal-preempted energy efficiency minimums for refrigerant economizer in the CASE team comments,²⁰ it would constitute a breach of the APA. The introduction of new energy efficiency minimums for these products would not be reasonably foreseeable based on the NOPA and is therefore a substantial change requiring the publication of another 45-day notice in the Notice Register. Thus, without sufficient opportunity for stakeholder engagement, CEC should not include the energy efficiency minimums for refrigerant economizers at this late stage in the process.

G. Insulation for Piping and Tanks – Section 150.0(j)1 and Section 160.4(f)

AHRI appreciates the CEC addressing the concern raised during the public hearing, Section 150.0(j)1 regarding the potential conflict with the federal standard for unfired hot water storage tanks (UFHWST). The federal energy efficiency standards for UFHWST are established with an insulation of R-12.5. AHRI agrees with CEC's response that insulation wrap is a longstanding Title 24 requirement and does not conflict with federal efficiency standards as proposed language does not prevent use of an R-12.5 federally rated tank or require manufacturers to supply an insulation wrap as the requirement applies to additional insulation added by the installer. However, we were unable to locate justification for increasing the wrap to R-16 in the CASE report. This change will yield only a small benefit, when calculated using time dependent valuation (TDV), perhaps not enough to cost justify the burden of the installation. AHRI recommends CEC reexamine increasing the stringency of the insulation wrap requirement.

H. Ventilation and IAQ – Section 150.0(o)1K, Section 150.0(o)3, and Section 120.1(b)2C, Section 160.2(b)2Axb

In new Section 150.0(o)1K, CEC has proposed to ban the use of atmospherically vented or solid fuel burning appliances installed inside the pressure boundary in single family, multifamily dwelling, and attached dwelling units less than 1,000 sqft of floor area. California homeowners in smaller homes will no longer be able to install the most common type of residential gas water heaters, an atmospherically vented furnace or water heater, a pellet stove, or even install a wood-burning fireplace. During the public hearings, CEC explained that this code change has been proposed because of the increase in minimum kitchen range hood airflow rate requirements. CEC also stated that higher airflow on the kitchen exhaust creates the possibility of backdraft. The CASE report²¹ does not indicate if the prohibition on atmospherically vented appliances was due to safety or energy concerns. AHRI requests that CEC reconsider implementing measures that would ban the use of federally compliant appliances in buildings.

Lastly, AHRI suggests it would be easier for stakeholders to review code changes and for builders to comply with indoor air quality requirements if relevant sections from

²⁰ TN238233_20210616T134150_Statewide CASE Team - Comment on Integrated Pump Refrigerant Economizer Ene. Posted to the Docket 21-BSTD-01 on June 16, 2021

²¹ TN237702_20210506T101522_Multifamily Indoor Air Quality CASE Report

ASHRAE 62.2 were included in Title 24, rather than readers being required to purchase the standard. It is not possible to assess the code proposal, “all dwelling units shall meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to amendments specified in Section 150.0(o)” without having purchased ASHRAE 62.2. Likewise, a builder would be unable to comply with mandatory requirements in Title 24 without having purchased this standard.

I. Prohibition of Electric Resistance Heating for Single and Multi-family Residential Buildings, Additions and Alterations – Sections 150.2(b)1G and 180.2(b)2Av

Section 150.1(c)6 (and Table 150.1-A COMPONENT PACKAGE – Single- Family Standard Building Design) includes existing requirements for new construction space conditioning systems that CEC has proposed extending to replacement systems through new section 150.2(b)1G. These requirements appear to impact electric resistance heating included in heat pumps. It is common for strip heat to be installed as emergency backup in the event the heat pump becomes inoperable during the heating season. In freezing temperatures, emergency strip heat would prevent pipes from bursting. Experts recommend that the heat strip be able to deliver at least 70-percent of the heat the heat pump does – between 3kW to 25kw for most homes.²² Exceptions are noted in 150.1(c)6, Table 150.1-A, and Section 150.2(b)1G indicating, “A supplemental heating unit may be installed in a space served directly or indirectly by a primary heating system, provided that the unit thermal capacity does not exceed 2 kW or 7,000 Btu/hr and is controlled by a time-limiting device not exceeding 30 minutes.” The sizing exception is smaller than most homes would require for back up resistance heating in heat pumps. During the May 24 public hearing, CEC staff confirmed the intent of the language in these sections are not to prohibit electric resistance heat in heat pumps; however, AHRI remains concerned that the language may need clarification to clearly exclude heat pumps. We request that CEC revisit the language proposed in Section 150.2(b)1G (and 180.2(b)2Av in the new multifamily section). If this situation is not remedied, the inadvertent elimination of resistance heat and strict reliance on the heat pump could result in systems oversized in cooling and without proper redundancy.

Secondly, nearly all manufactured housing heating systems are electric furnaces. Duct work in mobile homes are too small to allow a regularly sized furnace to be installed or safely used. CEC staff confirmed during the May 24 public hearing that complicated ties exist between Title 24 and CCR Title 25 - Housing and Community Development. AHRI requests the CEC staff investigate and confirm that the proposed revisions in Section 150.2(b)1G will not prohibit the replacement of electric resistance heating systems in manufactured housing.

J. Expected 15-day language clarification for Multifamily Buildings – Additions – Section 180.1 – Exceptions

²² PickHvac Cooling and Heating Guide. *What are Electric Heat Strips? Should I Install it for My Heat Pump.* Article available, here: <https://www.pickhvac.com/heat-pump/electric-heat-strips/>

During the May 27 public hearing, CEC noted that a 15-day edit will be added to clarify, “that new systems serving additions can be a heat pump or gas heating system.”²³ AHRI looks forward to reviewing this proposed change. During the hearing, CEC clarified that the 15-day language will also include an option for gas instantaneous water heating equipment to be used in multifamily additions. AHRI encourages CEC to also include an option to allow gas water heaters for new systems serving additions. There are cases where the gas line would need to double in size to accommodate a new instantaneous gas water heater and a gas water heater would be the most cost-effective solution.

Other AHRI Issues

A. CEC should remove barriers to the installation of space heat pumps

AHRI recommends CEC evaluate certain provisions within Title 24 to further increase the adoption of space heat pumps. Residential Appendix Rated Heat Pump Capacity Verification, RA 3.4.4.2, imposes requirements for verification of system performance are based on 350 cfm per *nominal* ton; however, AHRI has consistently advocated that instead, these requirements should be based on *rated* capacity. The 350 cfm per nominal ton minimum airflow requirement is not an accurate representation of airflow rates at which systems operate. While most residential HVAC systems do operate in the 350-450 cfm per rated ton range, and most HVAC manufacturers do design their systems to operate somewhere in that range, there are some outliers to this nominal range. The optimal airflow rate for an HVAC system depends on many factors, such as the option for several different indoor coils, which can change the rated airflow for the system. Certified capacity and airflow rates are publicly available on the AHRI Certification Directory. Inspectors can easily find rated capacity and airflow rates in the AHRI Certification Directory, the same place CEC permits for the look up of heat pump capacity at 17°F. CEC should allow airflow rates that are utilized to achieve federally mandated minimum efficiency performance.

AHRI urges CEC to address the artificially low performance required when modeling variable capacity heat pumps (VCHP) in the Alternative Calculation Method (ACM) Reference Manual and the residential California Building Energy Code Compliance (CBECC-Res) performance compliance software used for demonstrating compliance with the Performance Standards specified in Title 24, Part 6, Section 150.1(b). CEC responded to five years of AHRI advocacy by adopting modest credits for heating and cooling; however, modeling ductless heat pumps as barely more efficient than a split system equivalent to the standard design with default duct conditions (minimum efficiency) is misrepresentative and presents a barrier to California consumers adopting more efficient technologies. CEC should consider permitting the use of rated efficiencies for these products in the ACM and CBECC-Res performance compliance software program.

²³ Slide 101 of May 27 Presentation, TN238043_20210528T132836_May 27, 2021, Staff Presentation at the Lead Commissioner Hearing

Lastly, in response to CEC’s recent Flexible Demand Appliance Standards December 14, 2020, stakeholder workshop,²⁴ AHRI noted that harmonization with industry standards, such as AHRI Standard 1380 (I-P/2019): Demand Response through Variable Capacity HVAC Systems in Residential and Small Commercial Applications (AHRI 1380), will allow manufacturers the ability to produce heat pumps for a broader market. Again, AHRI urges CEC’s efforts be geared towards incentivizing the adoption of DR-products (e.g., performance compliance credits) and to not limit product availability for consumers.

B. Refrigeration Systems Opportunities

ASHRAE 90.1-2019 includes updates to Table 6.8.1-7 Performance Requirements for Heat Rejection Equipment—Minimum Efficiency Requirements, adding requirements for dry cooler minimum efficiency and test procedures. The 90.1 addendum was made in In response to a consensus proposal from ASHRAE TC8.6, Technical Committee for Cooling Towers and Evaporative Condensers, Subcommittee on Standards and Codes. The minimum efficiency for axial fan, air cooled fluid coolers, better known as dry coolers, has been added to the Table using CTI ATC-105DS, Acceptance Test Code for Dry Fluid Coolers, as the test standard. No significant, measurable economic impact was anticipated based on the introduction of these updates to ASHRAE 90.1, and likewise, we do not expect adverse economic impact if harmonized requirements are introduced into Title 24. The introduction of the Test Code will assist purchasers of dry coolers confirm the actual rated capacity that was specified in their system design. Therefore, AHRI recommends CEC update *TABLE 110.2-G PERFORMANCE REQUIREMENTS FOR HEAT REJECTION EQUIPMENT* to completely harmonize with ASHRAE 90.1-2019, as follows:

Table 110.2 G, *Performance Requirements for Heat Rejection Equipment* as follows:

Equipment Type	Total System Heat Rejection or Rated Conditions	Subcategory or Rating Condition	Performance Required^c	Test Procedure
<u>Propeller or axial fan dry coolers (air-cooled fluid coolers)</u>	<u>All</u>	<u>115°F entering water</u> <u>105°F leaving water</u> <u>95°F entering air db</u>	<u>≥4.5 gpm/hp</u>	<u>CTI ATC-105DS</u>

In the same table, AHRI notes the addition of footnote “c” from ASHRAE 90.1 is required to be added as well. It reads:

²⁴ AHRI Comments in Response to the December 14, 2020, Lead Commissioner Workshop on Senate Bill 49 Flexible Demand Appliance Standards and December 9, 2020 Staff Paper, Introduction to Flexible Demand Appliance Standards [Docket Number 20-FDAS-01]

^c For purposes of this table, dry cooler performance is defined as the process water flow rating of the unit at the given thermal rating condition divided by the total fan motor nameplate power of the unit and air-cooled condenser performance is defined as the heat rejected from the refrigerant divided by the total fan motor nameplate power of the unit.

AHRI appreciates CEC consideration of the technical comments and urges the Commission to withdraw proposals that exceed its statutory authority. If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'LPG', with a long horizontal flourish extending to the right.

Laura Petrillo-Groh, PE
Senior Regulatory Advisor
Direct: (703) 600-0335
Email: LPetrillo-Groh@ahrinet.org