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January 2, 2024

Dominic Sims, CBO
Chief Executive Officer
International Code Council
200 Massachusetts Ave, NW
Suite 250
Washington, DC 20001

**Re: AHRI Appeal of the 2023 Proposed Change to the 2024 Edition of the International Energy Conservation Code - Commercial (IECC-C) - Sections C406.1.1.1 and C502.3.7.2**

Dear Mr. Sims:

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI)[1] respectfully submits the following appeal to the International Code Council Appeals Board in response to the 2023 Proposed Change to the 2024 International Energy Conservation Code-Commercial (IECC-C) regarding new Sections C406.1.1.1 and C502.3.7.2 that was approved in the Final Results of Changes to Public Comment Draft #2 Process (11/3/23).[2, 3]

AHRI is concerned that Sections C406.1.1.1 and C502.3.7.2 penalize buildings/additions not served by heat pumps with higher energy credit requirements. And these new sections require coordination with Section C406.2.3.1.2 W02 Heat Pump Energy Credit that are not feasible to earn the energy credits with the new sections. In addition, there are technical and cost effectiveness concerns that arise from the coordination of these sections. AHRI is concerned that Sections C406.1.1.1 and C502.3.7.2 are not cost effective, and the requirements of these sections cannot feasibly be met by commercial water heaters available on the market.

AHRI respectfully requests that the Appeals Board strike Sections C406.1.1.1, C502.3.7.2, and all references to these sections from the 2024 IECC-C due to the technical and cost effectiveness flaws in these new sections.

[1] AHRI represents more than 330 manufacturers of air-conditioning, heating, and refrigeration equipment. It is an internationally recognized advocate for the HVACR 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 approximately $256 billion. In the United States alone, AHRI member companies, along with distributors, contractors, and technicians employ more than 1.3 million people.
[2] https://www.iccsafe.org/wp-content/uploads/IECC-COMMERCIAL-COMMITTEE-FINAL-REPORT-ON-PCD2-BALLOTING.pdf.
[3] AHRI submitted an appeal on October 6, 2023 to ICC for these sections, pursuant to ICC's Council Policy 49-21 for federal preemption by U.S. federal law, specifically, the Energy Policy and Conservation Act (EPCA), after the disapproval of proposal CE2D-54-23 (Buildings/additions not served by heat pumps). AHRI Letter to ICC on IECC-C Preemption Concerns.

## I. Background on Energy Credits

Energy codes include mandatory provisions, or requirements that must be met by all buildings to comply with the code. Energy codes have two main paths for such compliance—the prescriptive path and performance path. The prescriptive path is simpler and can be achieved without the aid of any software. Energy codes introduce some flexibility into the prescriptive path, which otherwise requires builders to follow a set of specific requirements and limitations without any deviation. Compared to the prescriptive path, a whole-building performance path requires equivalent energy performance to the prescriptive path, offers much more flexibility, but requires complex computer simulation.

To fit into the existing code structure, additional energy credits constitute a new prescriptive requirement; however, instead of all measures being required, the building designer can select from various options to achieve a defined level of energy performance. To maintain equivalent energy impact, whole building performance paths must be adjusted to reflect the impact of the required energy credits.

For 2024, energy credits were expanded from the 15 measures in 2021, to over 40 energy efficiency and load management/renewable measures. In addition to expanding the number of available credits, the credit points were adjusted to be 0.10% (rather than 0.25%). The 2021 single credit table was separated into energy efficiency credits, based on site energy savings, and load management/renewable energy credits, based on energy cost saving for 2024. For 2024, each energy efficiency credit is 0.10% site energy savings and each load management/renewable credit is 0.10% energy cost saving.

Commercial buildings constructed to 2024 IECC must meet both energy efficiency credits threshold in Table 406.1.1(1) and the load management/renewable credit threshold in Table 406.1.1(3). In cases where the energy efficiency credits threshold in Table 406.1.1(1) cannot be met using federal minimum efficiency covered equipment, extra load management credits are permitted to offset the deficit in energy efficiency credits required. The maximum surplus load management/renewable credits that may be used to offset the deficit is specified in Table 406.1.1(2). [4] Overall, the number of energy credits required to comply with the prescriptive path increased in stringency from 2.5% savings of total building energy cost to approximately 7.5% savings.[5]

In 2021, energy credits recognizing reduced energy use in service water heating were included in Section C406.7. This section saves energy by reducing the energy used to heat service hot water, using three optional systems: recovered or renewable water heating, efficient

[4] Per the reason statement for CED1-190-22 (As Modified), the carryover limits (i.e., credits in Table 406.1.1(2)) were "determined specifically for each occupancy group and climate zone to better reflect the need for carryover credits, rather than the original across the board percentage allowance. A minimum carryover of 5 points is allowed across the board, and to account for round-down, 2 points are added to the carryover needed to meet efficiency credit requirements with minimum efficiency equipment. The carryover limit is adjusted for buildings that use fossil fuels (excluding emergency generation) by a factor of 0.7 to reflect the fact that the renewable and load management credits are based on cost rather than energy for the efficiency credits, and gas costs less per site Btu than electricity."
[5] Hart, Reid. Presentation: Energy Efficiency Credits An Expansion of C406. February 23rd, 2022 IECC Energy Credit Working Group. PNNL-SA-1695

fossil fuel water heater, and heat pump water heater. This credit only applied to certain building types, in certain climate zones. The 2021 IECC-C heat pump water heater credit (C406.7.4) applied only to where electric resistance water heaters are allowed. It required all service hot water system heating requirements to be met using heat pump technology with a combined input-capacity weighted-average EF of 3.0. Further, air-source heat pump water heaters are not permitted to draw conditioned air from within the building, except exhaust air that would otherwise be exhausted to the exterior.

## II. Technical Concerns with Section C406.2.3.1.2 W02 Energy Credit

The 2024 C406.2.3.1.2 W02 heat pump water heater energy credit modifies the 2021 credit. The purpose of the credit remains to incentivize preheating of service water heating systems. Because the intent of the W02 credit is limited to incentivize preheating of service water heating systems – and was not intended to serve the purpose of the Sections C406.1.1.1 and C502.3.7.2 that penalize buildings/additions not served by heat pumps – not all heat pump water heating technologies comply with the credit as written. Commercial HPWHs that can comply with W02 are extremely limited – essentially just high efficiency, single-pass split systems that are intended for use with an electric or gas storage water heater to maintain temperature. This same system, by virtue of using gas or electric storage water heaters for temperature maintenance, would not meet requirements put in place by Section C406.1.1.1.

To obtain the W02 credit, air-source heat pump water heaters need to meet at least 30 percent of design end use service water heating requirements, *only* using heat pump heating at an ambient condition of 67.5° F, db, without supplemental electric resistance or fossil fuel heating. Further, for a heat pump water heater with supplemental electric resistance heating, the heat pump only capacity is deemed at 40 percent of first hour draw. First hour draw is only applicable to residential water heaters. If this credit were written for commercial equipment, the heat pump only capacity would be a percentage of the first hour rating (FHR).

There are two equations included in W02, equation 4-18 and 4-19. One equation, 4-19, may have been included in error; however, the 2024 IECC Commercial Public Comment Draft #1, dated May 8, 2023, included both. Equation 4-18 inflates available W02 where heat pump only capacity exceeds 50 percent of the design end use load excluding recirculating system losses. End load use is defined as end use peak hot water load, excluding load for heat trace or recirculation and “heat pump only capacity” is defined as the heat pump only capacity at 50ºF (10ºC) entering air and 70ºF (21ºC) entering potable water without supplemental electric resistance or fossil fuel heat. The heat pump only capacity introduces a testing point at 50ºF entering air that must be met in addition to the 67.5ºF db entering air condition in requirement 1, below.

Additionally, W02 requires the heat pump service water heating system to comply with the following requirements:

1. For systems with an installed total output capacity of more than 100,000 Btu/ hr (30 kW) at an ambient condition of 67.5ºF (19.7ºC), db a preheat storage tank

with greater than or equal 0.75 gallons per 1000 Btu/hr (≥9.7 L/kW) of design end use service water heating requirements shall be heated only with heat pump heating when the ambient temperature is greater than 45ºF (7.2ºC).

2. For systems with piping temperature maintenance, either a heat trace system or a separate water heater in series for recirculating system and final heating shall be installed.
3. Heat pump water heater efficiency shall meet or exceed one of the following:
    3.1. Output-capacity-weighted-average UEF of 3.0 in accordance with 10 CFR 430 Appendix E.
    3.2. Output-capacity-weighted-average COP of not less than 4.0 tested at 50ºF (10ºC) entering air and 70ºF (21ºC) entering potable water in accordance with AHRI standard 1300.

Requirement 1, above, requires the preheat storage tank to be heated only with heat pump water heating when the ambient temperature is greater than 45ºF. This would eliminate many high-efficiency multi-pass split-systems that use integral electric resistance heat.

The complex requirements are ill suited to allowing a broad range of HPWHs to earn energy credits. Requirement 3.1, states that the "Output-capacity-weighted-average COP of not less than 4.0 tested at 50ºF (10ºC) entering air and 70ºF (21ºC) entering potable water in accordance with AHRI Standard 1300" excludes many commercial split-system HPWHs. Also, there is no outlet temperature specified in AHRI Standard 1300, so manufacturers may report equipment performance at different conditions. Consumers would likely be interested in seeing outlet water temperatures in the 120°F- 150°F range. AHRI Standard 1300 also has two mandatory Entering Water Temperature (EWT) requirements for rating and labeling: EWT 70.0°F and EWT 110.0 °F are mandatory, and EWT 130.0°F is optional. Multi-pass HPWHs would have more favorable ratings at EWT 110.0 °F, and likely would be unable to meet the EWT 70.0°F outlined in Requirement 3.1.

The complex W02 requirements mean that integrated commercial HPWHs and multi-pass split system HPWHs are unable to earn W02 credits, as written. Product classes are not a menu from which builders and consumer select; rather they are tools used to classify products based on technology and application. Generally, one class, one type, and one size of water heating is the best fit for a specific application in a given climate, geographic area, building type, etc. More options need to be added to energy credits to allow commercial HPWHs to earn credit. If technical concerns are addressed with W02 to allow commercial HPWHs to truly comply, cost effectiveness concerns need to be addressed, as well. Unfortunately, this will need to wait until the 2027 IECC-C.

## III. Technical Conflicts between Section C406.2.3.1.2 W02 and Sections C406.1.1.1/C502.3.7.2 Limit Compliance Options

Because W02 was created to incentivize pre-heating of service heater heating systems, the only compliant commercial HPWH that earns W02 credits would be high efficiency, single-pass split systems that are intended for use with an electric or gas storage water heater to

maintain temperature. Systems requiring a temperature maintenance tank would not comply with Sections C406.1.1.1/C502.3.7.2.

The ICC has adopted Sections C406.1.1.1 and C502.3.2.7 in the 2024 IECC-Commercial Code.[6] New Section C406.1.1.1 requires new buildings using renewable biomass fuels,[7] fossil fuels, or electric resistance for space or service water heating equipment[8] to increase the total energy efficiency credit threshold (Table 406.1.1(1)) by 1.25 for Climates Zones 3-8. It applies parallel requirements in Section C502.3.7.2 for additions and alterations. These provisions disadvantage fossil fuel space and water heating equipment, electric resistance space and water heating equipment, and certain commercial heat pump water heater systems by imposing a "penalty" of requiring more credits to be achieved with their use.

Based on analysis by Pacific Northwest National Lab (PNNL), the Table 406.1.1(2) surplus carry over credits were corrected to allow additional offsets to cover the base credit increase in Section C406.1.1.1, but because the heat pump water heating credit (W02) has significant limitations for commercial HPWHs, no commercial HPWHs that comply with Section C406.1.1.1 would earn W02 credits. The W02 credit was created with the intent of moving the market in the direction of HPWHs by giving full credit, with ample points, to systems that could offset 30% of the service water load with HPWHs. Commercial applications are more challenging than consumer applications but are advancing.[9] Systems requiring piping temperature maintenance will need HPWHs to be coupled with an electric resistance storage tank – which would comply with W02 but would still incur the C406.1.1.1 energy credit penalty. Because only one of the two standard rating points is referenced, only a single-pass split-system commercial HPWH would be able to comply with W02. The complex requirements mean that integrated commercial HPWHs and multi-pass split system HPWHs will not earn W02 credits, but those would be the only commercial system types that would escape C406.1.1.1 energy credit penalties. The conflict between C406.1.1.1 and W02 creates a no-win situation for parties who are relying on these provisions. One can earn W02 credits for installing HPWHs, but still be penalized with the C406.1.1.1 energy credit increase, or one can attempt to meet 100% of the service hot water load with commercial HPWHs and get no W02 credits.

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[6] Originally introduced in CED1-191-22. The Modeling subcommittee (SC) approved CED1-191 as modified (7-5-2). CECD1-18-22 was discussed at the 3/27/23 Modeling SC approved as modified (3-1-6). CECD1-18 was voted on by the IECC-C Consensus Committee (E4C) on 4/12/23 and approved (22-10-3.) AHRI staff was unable to participate in the 4/12/23 vote due to a conflict.

[7] The Federal government gives grants to install biomass boilers where the US Forest Service deems a need for local better forest management. Several recent examples of USDA grants used for renewable biomass boilers are cited, here: https://www.rd.usda.gov/newsroom/news-release/usda-invests-critical-infrastructure-lower-costs-create-jobs-and-combat-climate-change-across-rural-0

[8] There are limited exemptions for electric resistance space heating for buildings but not exceptions for water heating.

[9] In DOE's Energy Conservation Standards Final Rule for Commercial Water Heating Equipment (Pre-published 7/18/23), DOE notes that "[it] did not consider commercial integrated heat pump water heaters in this final rule. DOE found only one such model on the market, at a single storage volume and heating capacity. Given the wide range of capacities and stored water volumes in products currently on the market, which are required to meet hot water loads in commercial buildings, it is unclear based on this single model whether heat pump water heater technology would be suitable to meet the range of load demands on the market. Similarly, based on the information currently available and comments regarding the performance of heat pump water heaters as compared to electric resistance water heaters in commercial settings, it is uncertain if split-system heat pump water heaters can serve all the applications currently filled by electric instantaneous water heaters." (p.53)

## IV. Concerns Raised by the Manipulation of C406.2.3.1.2 W02 Cost Effectiveness to Justify Sections C406.1.1.1/C502.3.7.2

To demonstrate cost effectiveness for energy credits, Pacific Northwest National Laboratory (PNNL) created measure packages by building types and climate zones. As outlined in PNNL's Technical Support Document (TSD), this "base package is designed to be achievable across a broad range of building types and situations."[10] Costs are compared to expected savings and evaluated using the ASHRAE 90.1 Scalar Method (Hart and Liu 2015).[11] The cost-effectiveness demonstration package was finalized in May 2022.[12] A heat pump water heating system meeting 30% of the water heating load, which would achieve full W02 credits, was applied to all climate zones for healthcare, hotel/motel, and restaurant; climate zones 0-5 for retail; and climate zone 3 for warehouse.

The cost effectiveness procedure is described in the PNNL 90.1 Energy Credit TSD Appendix C.[13] The cost source cited in the 90.1 TSD for W02 (Table E-15), are "Various models from 40 to 80 gallons at Home Depot." These are *residential products.* Taking outpatient healthcare in climate zone 5B as an example, this prototype building is 40,946 $ft^2$,[14] has one natural gas water heater with a storage capacity of 793 gallons and a peak load to 30 gallons/hr.[15] The incremental cost of the 30% HPWH system (90.1 TSD Appendix C) was determined to be \$0.012/ $ft^2$, or a \$491.35 for the measure. This incremental cost is not representative of the commercial HPWH necessary for the outpatient healthcare building type.[16]

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[10] Hart, R., McNeill, J., Tillou, M., Cejudo, C., Nambiar, C., Nagda, H., Maddox, D., Lerond, J., Rosenberg, M. July 2021. *Expanded Energy Credits in Energy Codes Technical Brief.* PNNL-31572, Pacific Northwest National Laboratory for U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.

[11] Hart R. and B. Liu. 2015. *Methodology for Evaluating Cost-effectiveness of Commercial Energy Code Changes.* PNNL-23923, Rev. 1, Pacific Northwest National Laboratory for U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. https://www.energycodes.gov/development/commercial/methodology

[12] Refer to the spreadsheet dated 12-16-2022 accompanying C406 Energy Credit Carryover Allowance (CED1-190) for the complete list of Measures used in May 2022 Cost-effective Demonstration Package.

[13] Hart, R., McNeill, J., Tillou, M., Franconi, E., Cejudo, C., Nambiar, C., Nagda, H., Maddox, D., Lerond, J., Rosenberg, M. January 2022. *90.1 Energy Credits Analysis Documentation 90.1-2019 Addendum AP.* PNNL-325216, Pacific Northwest National Laboratory for U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.

[14] Zhang, J., Rosenberg, M., Lerond J., Xie, L., Nambia. C., Chen, Y., Hart, R., Halverson, M., Maddox, D., Goel, S., July 2021. *Energy Savings Analysis: ANSI/ASHRAE/IES Standard 90.1-2019.* Pacific Northwest National Laboratory for U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. Refer to Table 3-1. Commercial Prototype Building Models for floor area.

[15] Thornton, B.A., Rosenberg, M., Richman, E.E., Wang, W., Xie, Y., Zhang, J., Cho, H., Mendon, V.V., Athalye, R.A., Liu, B. May 2011. *Achieving the 30% Goal: Energy and Cost Savings Analysis of ASHRAE Standard 90.1-2010.* PNNL-20405. Pacific Northwest National Laboratory for U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.

[16] \$491 as an incremental cost for the three 80-gallon HPWHs that are needed to offset 30% of the 793-gallon system used in the prototype is extremely low. Per the PNNL Technical Brief for the Residential IECC, ". *The average cost for a 50-gallon electric resistance heater is \$400, while the average cost for a 50-gallon HPWH is \$1,300 at local home improvement stores (Salcido et al. 2021)."* Refer to Section 2.0 of the Residential Technical Brief, located, here: https://www.energycodes.gov/sites/default/files/2021-10/TechBrief_GEB_Oct2021.pdf.

Using cost data from the U.S. Energy Information Administration (EIA), the equipment cost for a Commercial HPWH[17] in new construction in 2022 dollars is $55,406, and the cost of the 100-gallon Commercial Gas-Fired Storage Water Heater is $3,850.[18] Translating the total cost for the systems to a cost per gallon basis yields $465.60/gallon for the HPWH and $38.50/gallon for the gas storage system. Applying the cost per gallon to 30% of the 793-gallon system yields a more realistic incremental cost of $2.48/ft$^2$. This is a **20,679% increase** over the $0.012/ft$^2$ incremental cost used to cost justify the measure and puts outpatient healthcare buildings in climate zone 5B at the edge of cost effectiveness.[19]

## V. Sections C406.1.1.1 and C502.3.7.2 are not Cost Effective, Violating the Intent of IECC-C

Under Section C406.1.1.1 as written, the above examples show that when the appropriate cost of a commercial HPWH system is considered, the Ratio of Scalar Limit is 0.922 – below the 1.0 ratio required for the based demonstration package to be cost effective for a healthcare building in climate zone 5B. This shows that meeting 100% of the load with commercial HPWH cannot be cost effective.

The cost impact in CECD1-18-22, the proposal that introduced Sections C406.1.1.1 and C502.3.7.2, relies entirely on manipulating PNNLs Energy Credit cost effectiveness, stating, "further analysis using the outputs of PNNL's cost-effectiveness analysis and the U.S. Department of Energy (DOE) prototype models indicates that an additional 25% higher energy efficiency credits would have to cost an average of 12.2 times the upfront cost of the base credits to violate the cost-effectiveness criteria with a 9.3% nominal discount rate (16.6 times the base credits' upfront cost with a 5.3% nominal discount rate, as shown in Fig. 2)." The assumed "room" in the PNNL cost analysis to cost justify the 1.25x credit increase simply does not exist when representative commercial HPWH systems are considered and applied to 100% of the load. In the case of outpatient healthcare in 5B, the incremental cost becomes $8.27/ft$^2$ or $338,687.63 - a 68,930% increase over the protype gas system. The Ratio of Scalar Limit becomes 0.47, squarely not cost effective.

AHRI used one tangible example, but the many flaws in Sections C406.1.1.1 and C502.3.7.2 can only be addressed by deleting Sections C406.1.1.1 and C502.3.2.7, including all

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[17] 119-gallon integrated HPWH used for this analysis.

[18] March 2023. *Updated Buildings Sector Appliance and Equipment Cost and Efficiencies*. U.S. Energy Information Administration. https://www.eia.gov/analysis/studies/buildings/equipcosts/pdf/full.pdf.

[19] Per Table E-5 in Appendix C of the 90.1 TSD, the Ratio of Scalar Limit or Threshold to Scalar Payback for Healthcare in 5B is 5.1, based on a Base Demonstration Package Scalar Limit or Threshold of 19.3 (Table E-4) and 3.8 as the Base Demonstration Package Scalar Payback (Table E-3). The Base Demonstration Package Cost Savings was assumed to be 144 $/thousand ft2, as listed in Table E-1, because the HPWH system AHRI analyzed was also intended to serve 30% of the hot water load. Using $2.48 $/ft2 for the W02 incremental cost, the Base Demonstration Package Incremental Cost becomes $3,014/thousand ft2. The Base Demonstration Package Scalar Payback becomes 20.9 thrusting the Ratio of Scalar Limit to 0.922 - just below the 1.0 ratio required for the base demonstration package to be cost effective for that building and climate zone.

references to these sections.[20] If Sections C406.1.1.1 and C502.3.7.2 are deleted, Table 406.1.1(2) can revert to the lower credit offset levels, shown prior to CE2D-51-23.

Section C101.3 outlines the intent of the IECC-C, and states that, "The International Energy Conservation Code-Commercial provides market-driven, enforceable requirements for the design and construction of commercial buildings, providing minimum efficiency requirements for buildings that result in the maximum level of energy efficiency that is safe, technologically feasible, and **life cycle cost effective**, considering economic feasibility, including potential costs and savings for consumers and building owners, and return on investment." Sections C406.1.1.1 and C502.3.7.2 violate both the code's adoptability and the cost effectiveness criteria. The inappropriate manipulation of the energy credit cost left the consensus committee with the incorrect information to consider in CECD1-18-22. The cost effectiveness statement should have been, "this proposal will *increase* the cost of construction."

## VI. Procedural Concerns at the Subcommittee and Committee Meetings

AHRI requests the Appeals Board review the subcommittee and committee meetings to ensure that interested stakeholders are given an opportunity to present on issues relevant to the committee before final actions are taken. In addition, AHRI requests the Board of Directors ensure the subcommittees are balanced and votes are conducted in accordance with parliamentary procedure. On August 7, 2023, AHRI provided legal, economic, and technical issues to the Modeling subcommittee. However, AHRI is concerned that the vote at the Modeling subcommittee was not conducted in accordance with parliamentary procedure.[21] In addition, AHRI is concerned that the Modeling subcommittee is not balanced with the appropriate number of stakeholders.

On September 6, 2023, AHRI raised issues to the IECC-C Consensus Committee (E4C) and the vote to disapprove was presented as a subcommittee action. The E4C voted to disapprove CE2D-54-23 and CE2D-52-23, which proposed to strike the same sections. At the September 13, 2023 E4C meeting, AHRI was prepared to provide a presentation to address specific technical and cost information, and to recommend Sections C406.1.1.1 and C502.3.7.2 and Section C406.2.3.1.2 W02 to be stricken. And, AHRI would have requested reconsideration of CE2D-54-23.

Unfortunately, the Committee did not hear this information, thus, AHRI is filing an appeal in accordance with ICC CP#1-03. If given the opportunity to present the information, AHRI would have requested that the ICC strike Sections C406.1.1.1 and C502.3.7.2, as proposed by CE2D-54-23, from the 2024 Edition of the International Energy Conservation Code.

[20] Striking Sections C406.1.1.1 and C502.3.2.7, including all references to these sections would also resolve the issue with Appendix CD noted in AHRI's CP-49 appeal.
[21] The Modeling Subcommittee voted to disapprove. (8 in favor, 1 against, and 6 abstentions)

## VII. Conclusion

AHRI respectfully requests that the Appeals Board strike Sections C406.1.1.1, C502.3.7.2, and all references to these sections from 2024 IECC-C because these sections suffer from fatal technical and cost effectiveness flaws. These sections are also preempted by federal law, as detailed in AHRI's CP-49 appeal.

Sincerely,

Laura Petrillo-Groh
Senior Director of Regulatory Affairs

**Exhibit-1 – Parties with Interest in Appeal**

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