C403.2.4 and C503.3.7 Heat Pump Primary (2719)

IECC: C403.2.4, C403.2.4.1, C403.2.4.1.1, C403.2.4.1.2, Table C403.2.4.1.2, C403.2.4.2, C503.3.7

Proponents: Denise Beach, representing American Gas Association (dbeach@aga.org)

2027 International Energy Conservation Code (DRAFT)

Delete without substitution:

~~C403.2.4 Air-to-Air HVAC systems.~~

~~HVAC systems serving spaces that are both heated and cooled and where the cooling load is served by any of the following shall comply with Sections C403.2.4.1 and C403.2.4.3:~~

1. ~~Air-cooled or air-source equipment listed in Tables C403.3.2(1), C403.3.2(2), C403.3.2(8), C403.3.2(9), C403.3.2(12) or C403.3.2(13); or~~
2. ~~Equipment listed in C403.3.2(4).~~

~~Exceptions:~~

1. ~~Where unitary air conditioners with a rated cooling capacity of not less than 65,000 Btu/h (19 kW) are used in Climate Zones 0A, 0B, 1A, 1B, 2A, 2B and 3C.~~
2. ~~Additions where the new spaces are served by existing equipment.~~
3. ~~Multiple zone HVAC system that comply with all of the following:~~
   - 3.1 ~~For each zone in the system, the primary airflow rate in heating does not exceed the rate required to meet the Simplified Procedure ventilation requirements of ASHRAE Standard 62.1 or the ventilation requirements of ANSI/ASHRAE/ASHE Standard 170 as applicable for the zone based on the design minimum outdoor air rate; and~~
   - 3.2 ~~The mixed air temperature on the design heating day at the system design airflow is greater than the maximum supply air temperature required by Section C403.6.5.~~

~~C403.2.4.1 Initial space heating.~~

~~HVAC systems shall comply with Section C403.2.4.1.1 and Section C403.2.4.1.2.~~

~~C403.2.4.1.1 Electric space heating.~~

~~HVAC systems using electricity as the initial space heating source shall comply with one of the following:~~

1. ~~The HVAC system electric heat pump heating capacity rated at 47^{0}F in accordance with the applicable test procedure in Section C403.3.2 shall be no less than the system cooling design load; or~~
2. ~~The HVAC system electric heat pump heating capacity under heating design conditions shall be no less than the system heating design load.~~

~~Exceptions:~~

1. ~~HVAC systems using no heat source other than electric heat pumps, on-site renewable energy, site-recovered energy, or electric resistance or fuel heating where allowed by any exceptions to Section C403.2.4.2.~~
2. ~~Where Buildings are served by a single electric heat pump, the heat pump heating capacity at 47°F shall be permitted to be no less than 90% of the system cooling design load.~~

3. Electric heat pump heating capacity at 47°F shall be permitted to be reduced by the total capacity of electric resistance heat complying with Exceptions 10 through 13 of Section C403.2.4.2.

C403.2.4.1.2 Fuel space heating.

HVAC systems using fuels as the initial space heating source shall include fuel-fired heat pumps sized to meet the heating system design load in accordance with Section C403.1.1 and with a minimum coefficient of performance no less than the applicable values in Table C403.2.4.1.2 at 17°F (-8.3°C) outdoor air temperature when tested in accordance with CSA/ANSI Z21.40.4.

Table C403.2.4.1.2 MINIMUM FUEL-FIRED HEAT PUMP EFFICIENCY

Equipment Sizing Category (Input)	Minimum COP at 17°F (-8.3°C) Outdoor Air Temperature
< 65,000 Btu/h (19 kW)	1.10
≥ 65,000 Btu/h (19 kW)	1.20

C403.2.4.2 Secondary space heating.

HVAC systems shall be configured to use secondary electric resistance or fuel space heating systems and equipment only when systems and equipment meeting the requirements of Section C403.2.4.1, on-site renewable energy or site-recovered energy cannot provide the necessary heating energy to satisfy the heating load.

Exceptions:

1. Where HVAC systems are configured to use secondary space heating systems and equipment when they can provide the necessary heating energy to satisfy the heating load at lower energy cost than the initial space heating systems and equipment and where the building has any of the following:
   1.1 An automatic control device programmed to operate space heating systems and equipment based on the outdoor air temperature and a fixed price or time-of-use price schedule applicable to the building.
   1.2 A DDC system programmed to operate space heating systems and equipment based on the outdoor air temperature and one or more of the following from the building's utility or energy provider:
      1.2.1 A demand response program
      1.2.2 Real-time or next day pricing
      1.2.3 A time-of-use price schedule
      1.2.4 A demand charge
2. Systems that comprise less than 5 percent of the building's total installed heating capacity or that serve less than 5 percent of the building's conditioned floor area.
3. Space heating systems sized and configured for freeze protection in spaces with indoor design conditions of not greater than 40°F (4.5°C), including temporary systems in unfinished spaces.
4. Freeze protection systems complying with Section C403.14.4.

5. Systems and equipment that preheat outdoor air for defrost or to temper air entering an energy recovery device, and that comply with one of the following:

   5.1 Where the system recovers latent energy, where the space is mechanically humidified or has a process application that will maintain the space above 30% relative humidity when the outdoor temperature is not greater than 25°F (-4.0°C), and where the outdoor air is preheated to no greater than 25°F (-4.0°C).

   5.2 Where the system recovers only sensible energy, and where the outdoor air is preheated to no greater than 25°F (-4.0°C).

   5.3 Where outdoor air is preheated to no greater than 5°F (-15°C).

6. Systems and equipment that heat exhaust air for frost control in an exhaust air energy recovery device, and that comply with one of the following:

   6.1 Where the system recovers latent energy, where the space is mechanically humidified or has a process application that will maintain the space above 30% relative humidity when the outdoor temperature is not greater than 25°F (-4.0°C), and where the exhaust air is heated to no greater than 110°F (43°C).

   6.2 Where the system recovers only sensible energy and where the exhaust air is heated to no greater than 110°F (43°C).

   6.3 Where exhaust air is heated to no greater than 90°F (32°C).

7. Hydronic systems without energy recovery ventilation, that do not use freeze protection fluids and where outdoor air is preheated to no greater than 40°F (4.5°C).

8. Where the added heating load of commercial kitchen exhaust system makeup air exceeds the heating capacity of the HVAC system, provided that systems and equipment that do not comply with the requirements of Section C403.2.4.1 are used only to maintain a temperature differential of no more than 10°F (5.6°C) between makeup air and the air in the conditioned space.

9. Systems serving portions of buildings that cannot be served by systems and equipment meeting the requirements of Section C403.2.4.1, as determined and approved by the authority having jurisdiction.

10. Electric resistance heat at HVAC zones of new multiple-zone HVAC systems in Climate Zones 0 through 3 where the primary airflow rate in heating does not exceed the rate required to meet the Simplified Procedure ventilation requirements of ASHRAE Standard 62.1 for the zone based on the design minimum outdoor air rate.

11. New electric resistance heat as a replacement of existing electric resistance heat at HVAC zones in alterations of multiple-zone HVAC systems where the primary airflow rate in heating does not exceed the rate required to meet the Simplified Procedure ventilation requirements of ASHRAE Standard 62.1 for the zone based on the design minimum outdoor air rate.

12. Electric resistance heat at HVAC zones of new multiple-zone HVAC systems in Climate Zones 0 through 3 to meet the ventilation requirements of ANSI/ASHRAE/ASHE Standard 170 or other codes or accreditation standards approved by the AHJ.

13. New electric resistance heat as a replacement of existing electric resistance heat at HVAC zones in alterations of multiplezone HVAC systems to meet the ventilation requirements of ANSI/ASHRAE/ASHE Standard 170 or other codes or accreditation standards approved by the AHJ.

14. Heat that is used only for pre-occupancy building warm-up, installed in series with the cooling coil and controlled to prevent operation when outside air is provided to the space.

C503.3.7 Air-to-air HVAC Systems.

Alterations of HVAC equipment that account for not less than 50% of the capacity serving either the heating or cooling loads of a building or alteration area shall comply with Section C403.2.4.

Reason:

The new requirements would require the installation of heat pumps wherever heating and cooling are required, regardless of climate zone. No evidence was provided to support the Committee statement that "the proposal significantly reduces energy usage associated with air-to-air HVAC systems providing space heating and cooling" in all climate zones. This does not meet the threshold stipulated in the Scope and Intent statement that "Provisions in both the main body of the code and the optional appendices must achieve a reasonable level of energy efficiency that is… lifecycle cost effective, considering economic feasibility, including potential costs and savings for consumers and building owners, and return on investment."

In the June 2025 ASHRAE Journal article "Decarbonizing with Heat Pumps – Most Do, Some Don't,"[1] Dr. Steve Kavanaugh provides evidence and analysis that details the uncertainty related to predicting the performance of Air-Source Heat Pumps (ASHPs) and Ground Source Heat Pumps (GSHPs). Dr. Kavanaugh recommends that "independent and thorough field testing of conventional and advanced technology heat pumps…should be conducted" to "better inform decarbonization efforts and minimize deceptive cold climate heat pump performance specifications."

Until such investigation can be made, there is insufficient evidence to support adoption of this provision in the prescriptive pathway of the IECC.

Adoption of this appendix may also undermine the overarching objective of energy conservation. According to the U.S. Energy Information Administration's 2025 Energy Outlook, natural gas is projected to remain a major source of electricity generation for at least the next two decades, even under optimistic zero-carbon scenarios. Additionally, the repeal of renewable energy incentives under the legislation signed in July 2025 further diminishes the likelihood of achieving low-cost zero-carbon energy.

Finally, it is important to note that adopting this provision into the main body of the code would contravene the Energy Policy Conservation Act (EPCA). EPCA preempts state and local regulations that affect the energy use of federally covered products such as (e.g., gas furnaces, boilers). The proposed sections C403.2.4 and C503.3.7 directly contravene EPCA by mandating the use of heat pumps as the primary space heating source, thus eliminating the option of using other federally approved equipment, such as fuel-fired furnaces or boilers. It is for this, in addition to other reasons, that a similar proposal did not move forward in the ASHRAE 90.1 committee.

1. Decarbonizing with Heat Pumps – Most Do, Some Don't; S. Kavanaugh, Ph.D; ASHRAE Journal Vol. 67, no. 6, June 2025

Cost Impact (Detailed): Decrease

Estimated Immediate Cost Impact: The removal of the heat pump primary requirement would decrease the cost of construction by allowing more affordable, cost-effective equipment to be used.

Estimated Immediate Cost Impact Justification (methodology and variables): The removal of the heat pump primary requirement would decrease the cost of construction by allowing more affordable, cost-effective equipment to be used.

Delete Appendix CK (2765)

IECC: APPENDIXCK, SECTION CK101, 101.2, 101.1, CK102

Proponents: Denise Beach, American Gas Association, representing American Gas Association (dbeach@aga.org)

2027 International Energy Conservation Code (DRAFT)

Delete without substitution:

~~APPENDIX CK~~
~~COMMERCIAL SINGLE CONSERVATION OBJECTIVE~~

~~SECTION CK101~~
~~GENERAL~~

~~**101.2 Applicability.**~~
~~The provisions in this appendix apply to buildings that would be required to comply with Section C401.2.~~

~~**101.1 Scope.**~~
~~This appendix amends the International Energy Conservation Code to set a single baseline for all pathways based on site energy use intensity.~~

~~CK102~~
~~SECTION CK102 DEFINITIONS~~

Reason:

[NOTE: The public comment draft doesn't include the entire appendix. The action is to delete it in its entirety.]

The proposed Annex CK fails to align with the criteria established in the Board of Directors' interpretation of the 2027 Scope and Intent issued in June 2025. The Board stated that "Provisions in both the main body of the code and the optional appendices must achieve a reasonable level of energy efficiency that is safe, technologically feasible, and lifecycle cost effective, considering economic feasibility, including potential costs and savings for consumers and building owners, and return on investment" (emphasis added).

The proposed appendix lacks substantiated evidence demonstrating lifecycle cost-effectiveness. The proponent acknowledged an increase in construction costs without providing data to support corresponding energy savings. The appendix appears to disregard energy costs in evaluating the justification for higher construction expenditures.

The new appendix does not require higher efficiency electric equipment, renewable energy sources, or a higher threshold for energy credits. Therefore, the proposed appendix does not provide "provisions incorporating additional energy efficiency and greenhouse gas reduction resources" as provided for by the Intent. In fact, encouraging the use of minimum-efficiency electric heat pumps is expected to increase demand on the electrical grid, much of which will be met by natural gas-fired power plants. Numerous studies have shown that direct-use natural gas equipment generally results in lower overall energy consumption and emissions compared to electric alternatives reliant on the national grid. As such, the appendix does not offer meaningful improvements in energy efficiency or greenhouse gas reductions.

In addition, this approach contravenes the principle of fuel neutrality as stipulated in the International Energy Conservation Code (IECC). Specifically, the appendix mandates that all proposed designs be evaluated against the site energy usage of minimum-efficiency fuel gas-fired equipment, thereby promoting electric heating technologies.

For many years, the Environmental Protection Agency has advocated using source energy for efficiency determination. Specifically:

> “EPA has determined that source energy is the most equitable unit of evaluation for comparing different buildings to each other. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses. By taking all energy use into account, the score provides a complete assessment of energy efficiency in a building.”
>
> (https://www.energystar.gov/buildings/benchmark/understand-metrics/source-site-difference)

Adoption of this appendix may also undermine the overarching objective of energy conservation. According to the U.S. Energy Information Administration’s 2025 Energy Outlook, natural gas is projected to remain a major source of electricity generation for at least the next two decades, even under optimistic zero-carbon scenarios. Additionally, the repeal of renewable energy incentives under the legislation signed in July 2025 further diminishes the likelihood of achieving low-cost zero-carbon energy.

Finally, the argument that nonmandatory appendices impose no obligations is misleading. These appendices are drafted in mandatory language and are often advocated for adoption at the jurisdictional level, effectively making them compulsory. In this instance, such adoption would impose unnecessary costs on consumers and have adverse environmental consequences.

Cost Impact (Detailed): Decrease

Estimated Immediate Cost Impact: The comment is not editorial in nature, but it will have no impact on the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables): The comment is not editorial in nature, but it will have no impact on the cost of construction.

Table C407.2(2) Source Energy Factors (2766)

IECC: Table C407.2(2)

Proponents: Denise Beach, American Gas Association, representing American Gas Association (dbeach@aga.org)

2027 International Energy Conservation Code (DRAFT)

Revise as follows:

Table C407.2(2) SOURCE ENERGY CONVERSION FACTORS

SOURCE ENERGY	CONVERSION FACTOR
Fossil Fuels Delivered to Buildings	
Natural gas	~~1.216~~1.092
Imported Liquefied Natural Gas	1.426
LPG or propone	~~1.347~~1.151
Fuel oil (residual)	~~1.393~~1.191
Fuel oil (distillate)	~~1.341~~1.158
Coal	~~1.098~~1.048
Gasoline	~~1.1.409~~1.187
Other fuels not specified in this table	~~1.393~~1.048
Electricity	
AKGD-ASCC Alaska Grid	~~2.262~~.47
AKMS-ASCC Miscellaneous	~~0.951~~.35
AZNM-WECC Southwest	~~2.162~~.57
CAMX-WECC California	~~1.48~~1.66
ERCT-ERCOT All	~~1.992~~.32
FRCC-FRCC All	~~2.392~~.78
HIMS-HICC Miscellaneous	~~2.263~~.15
HIOA-HICC Oahu	~~3.053~~.87
MROE-MRO East	~~2.422~~.92
MROW-MRO West	~~1.712~~.21
NEWE-NPCC New England	~~2.202~~.66
NWPP-WECC Northwest	~~1.17~~1.48
NYCW-NPCC NYC/Westchester	~~2.382~~.89
NYLI-NPCC Long Island	~~2.312~~.84
NYUP-NPCC Upstate NY	~~1.701~~.81
PRMS-Puerto Rico Miscellaneous	~~3.023~~.27
RFCE-RFC East	~~2.202~~.90
RFCM-RFC Michigan	~~2.542~~.93
RFCW-RFC West	~~2.292~~.97
RMPA-WECC Rockies	~~1.772~~.16
SPNO-SPP North	~~1.842~~.21
SPSO-SPP South	~~1.732~~.05
SRMV-SERC Mississippi Valley	~~2.602~~.84
SRMW-SERC Midwest	~~2.723~~.09
SRSO-SERC South	~~2.452~~.89
SRTV-SERC Tennessee Valley	~~2.242~~.82
SRVC-SERC Virginia/Carolina	~~2.572~~.91
All other electricity	~~2.162~~.51
Thermal Energy	
Chilled water	0.60
Steam	1.84
Hot water	1.73

Reason:

The revisions to table 407.2(2) represent a combination of two proposals that were based on different methodologies. This presents a logical inconsistency in the Commercial IECC, and a factual inconsistency with the Residential IECC, where a similar proposal was overwhelmingly rejected. The introduction of separate methodologies for fossil fuels and electricity unnecessarily biases Table C407.2(2) in favor of electricity source energy.

In addition, the use of the infinite energy efficiency approach non-combustible renewable energy is technically flawed. This approach assigns a 0 (zero) source energy factor to these sources. Just because there is an infinite supply of a resource does not mean that it is providing energy at an infinite efficiency. A captured energy approach is more reasonable. It assigns 100% efficiency to these renewables even though actual efficiency is in the range of 25-35% for solar and wind.

Therefore, the appropriate action for the Commercial Consensus Committee is to simply undo the changes to Table 407.2(2) and return to the last point of true consensus – the 2024 edition. Returning to the status quo will restore the numbers to a methodology that was understood and agreed upon by the Committee and realign the Commercial and Residential sections of the code.

Cost Impact (Detailed): Decrease

Estimated Immediate Cost Impact: Reinstating the 2024 source energy factors is not an editorial change, but will not impact the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables): Reinstating the 2024 source energy factors is not an editorial change, but will not impact the cost of construction.