



2024 IECC

NOW IS THE TIME TO BUILD THE FUTURE

Commercial 2024 International Energy Conservation Code (IECC-C) Proposals to the Second Public Comment Draft

Why this is important right now:

- Building codes and performance policies are one of the most effective ways to reduce the carbon emissions driving the climate crisis.
- The U.S. does not have a national energy code. 96 percent of U.S. states and some cities refer to the model code published by the International Code Council (ICC) when developing local requirements for their building codes. The International Energy Conservation Code (IECC) is updated every three years — often referred to as a “code cycle.”
- The provisions adopted into the 2024 IECC are critical for achieving the energy and carbon reductions we need to keep temperature rise below 1.5°-degrees Celsius and avoid the worst impacts of climate change.
- NBI is submitting two amendments to clarify and strengthen the optional electrification amendments in the 2024 IECC that were approved after the first public comment period.

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Electrification Proposals

Electric-Ready Modifications

Amend Appendix CH as follows:

APPENDIX CH ELECTRIC-READY COMMERCIAL BUILDING PROVISIONS SECTION CH101 GENERAL

CH101.1 Intent. The intent of this Appendix is to amend the International Energy Conservation Code to reduce future retrofit costs by requiring new commercial buildings and substantial improvements with combustion equipment to install the electrical infrastructure for electric equipment.

CH101.2 Scope. The provisions in this appendix are applicable to commercial buildings. New ~~construction~~ commercial buildings shall comply with Section CH103. Where required by Section CG104, substantial alterations shall comply with Section CH103.

SECTION CH102 DEFINITIONS

APPLIANCE. A device or apparatus that is manufactured and designed to utilize energy and for which this code provides specific requirements.

COMBUSTION EQUIPMENT. Any equipment or *appliance* used for space heating, *service water heating*, cooking, clothes drying or lighting that uses a fossil fuel.

COMMERCIAL COOKING APPLIANCES. *Any appliance* used in a commercial food service establishment for heating or cooking food and which produce grease vapors, steam, fumes, smoke or odors that are required to be removed through a local exhaust ventilation system. Such appliances include deep fat fryers, upright broilers, griddles, broilers, steam-jacketed kettles, hot-top ranges, under-fired broilers (charbroilers), ovens, barbecues, rotisseries, and similar appliances.

SECTION CH103 NEW COMMERCIAL BUILDINGS

CH103.1 Additional electric infrastructure. Electric infrastructure in buildings that contain *combustion equipment* shall be installed in accordance with this section.

CH103.1.1 Combustion space heating. Spaces containing *combustion equipment* for space heating shall comply with Sections CH103.1.1.1, CH103.1.1.2 and CH103.1.1.3.

CH103.1.1.1 Designated exterior locations for future electric space heating equipment. Spaces containing *combustion equipment* for space heating shall be provided with designated exterior location(s) shown on the plans and of sufficient size for outdoor space heating heat pump equipment, with a chase that is sized to accommodate refrigerant lines and electrical conductors between the exterior location and the interior location of the space heating equipment, and with natural drainage for condensate from heating operation or a condensate drain located within 3 feet (914 mm) of the location of the future exterior space heating heat pump equipment.

CH103.1.1.2 Dedicated branch circuits for future electric space heating equipment. Spaces containing combustion space heating equipment with a capacity not more than 65,000 Btu/h shall be provided with the following:

1. A dedicated 240-volt, branch circuit ~~with an ampacity of not less than 50~~ rated and sized in accordance with Section CH103.1.1.3.
2. The branch circuit shall terminate within ~~6 feet (1829 mm)~~ 3 feet (914 mm) of the space heating equipment and be in a location with *ready access*.
3. Both ends of the branch circuit shall be labeled with the words “For Future Electric Space Heating Equipment” and be electrically isolated.

Spaces containing *combustion equipment* for space heating with a capacity of not less than 65,000 Btu/h shall be provided with the following:

1. A dedicated branch circuit rated and sized in accordance with Section CH103.1.1.3, ~~and~~
2. The branch circuit shall terminate ~~ing~~ in a junction box within 3 feet (914 mm) of the location the space heating equipment in a location with *ready access*.
3. Both ends of the branch circuit shall be labeled “For Future Electric Space Heating Equipment.”

Exceptions:

- ~~1. Where a branch circuit provides electricity to the space heating *combustion equipment* and is rated and sized in accordance with Section CH103.1.1.3—~~
1. Where a branch circuit provides electricity to space cooling equipment and is rated and sized in accordance with Section CH103.1.1.3.
2. Where future electric space heating equipment would require three-phase power and the space containing *combustion equipment* for space heating is provided with an electrical panel with a label stating, “For Future Electric Space Heating Equipment” and with a bus bar rated and sized in accordance with Section CH103.1.1.3.
3. Buildings where the 99.6 percent design heating temperature is not less than 50°F (10°C)

CH103.1.1.3 Additional space heating electric infrastructure sizing. Electric infrastructure for future electric space heating equipment shall be sized to accommodate not less than one of the following:

1. Where a branch circuit is required by CH103.1.1.2 for spaces containing combustion space heating equipment with a capacity not more than 65,000 Btu/h, the branch circuit shall have an ampacity of not less than 50.
2. An electrical capacity not less than the nameplate space heating *combustion equipment* heating capacity multiplied by the value in Table CH103.1.1.3

$$VA_s = Q_{com} \cdot P_s$$

Where:

VA_s = The required electrical capacity of the electrical infrastructure in volt-amps

Q_{com} = The nameplate heating capacity of the combustion equipment in kBtu/h

P_s = The VA per kBtu/h from Table CH103.1.1.3 in VA/kBtu/h

3. An electrical capacity not less than the peak space heating load of the building areas served by the space heating *combustion equipment*, calculated in accordance with Section C403.1.1, multiplied by the value for the 99.6 percent design heating temperature in Table CH103.1.1.3—per the equation below, or

$$VA_s = Q_{design} \cdot P_s$$

Where:

VA_s = The required electrical capacity of the electrical infrastructure in volt-amps

Q_{design} = The 99.6 percent design heating load of the spaces served by the *combustion equipment* in kBtu/h

P_s = The VA per kBtu/h from Table CH103.1.1.3 in VA/kBtu/h

4. An *approved* alternate design that uses no energy source other than electricity or *on-site renewable energy*.

Table CH103.1.1.3 ALTERNATE ELECTRIC SPACE HEATING EQUIPMENT CONVERSION FACTORS (VA/kBtu/h)

99.6% Heating Design Temperature		P_s
Greater Than (°F)	Not Greater Than	VA/kBtu/h
50	N/A	N/A
45	50	94
40	45	100
35	40	107
30	35	115
25	30	124
20	25	135
15	20	149
10	15	164
5	10	184
0	5	210
-5	0	243
-10	-5	289
-15	-10	293

CH103.1.2 Combustion service water heating. Spaces containing *combustion equipment* for *service water heating* shall comply with Sections CH103.1.2.1, CH103.1.2.2 and CH103.1.2.3.

CH103.1.2.1 Dedicated branch circuits for low-capacity future electric heat pump water heating equipment. For each piece of Spaces containing combustion equipment for water heating with an input capacity of not more than 75,000 Btu/h, the following electrical infrastructure is required shall comply with the following:

1. An individual 208/240-volt branch circuit with an ampacity of not less than 30 shall be provided ~~and~~.
2. The branch circuit shall terminate within 6 ft (2 m) 3 feet (914 mm) of the water heater and shall be in a location with ready access.

3. The branch circuit overcurrent protection device and the termination of the branch circuit shall be labeled "For future electric water heater".
4. The space for containing the future water heater shall include the space occupied by the *combustion equipment* and shall have a height of not less than 7 ft (2 m), a width of not less than 3 feet (1 m), a depth of not less than 3 feet (1 m) and with a volume of not less than 700 ft³ (20 m³).

Exception to CH103.1.2.1: Where the space containing the water heater is provided with air ducts or transfer openings for air circulation sufficient for the operation of a heat pump water heater, the minimum room volume shall not be required.

CH103.1.2.2 Designated locations for future electric heat pump water heating equipment. Spaces containing *combustion equipment* with a capacity of greater than 75,000 Btu/h for water heating shall be provided with one of the following:

1. Designated exterior location(s) shown on the plans and of sufficient size for outdoor water heating heat pump equipment, with a chase that is sized to accommodate refrigerant lines between the exterior location and the interior location of the water heating equipment.
2. An interior location with a minimum volume the greater of 700 cubic feet (2000 L) or 7 cubic feet (200 L) per 1,000 Btu/h *combustion equipment* water heating capacity. The interior location shall include the space occupied by the *combustion equipment*.
3. An interior location with air ducts or transfer openings which provide sufficient airflow to exhaust cool air from future water heating heat pump equipment. ~~provided by no less than one 16-inch (406 mm) by 24-inch (610 mm) grill to a heated space and one 8-inch (203 mm) duct of no more than 10 feet (3048 mm) in length for cool exhaust air.~~

CH103.1.2.3 Dedicated branch circuits for other future electric heat pump water heating equipment. Spaces containing *combustion equipment* for water heating with a capacity of greater than 75,000 Btu/h shall be provided with the following:

1. a A dedicated branch circuit rated and sized in accordance with Section CH103.1.2.4 ~~and~~
2. The branch circuit shall terminate in a junction box within 3 feet (914 mm) of the location the water heating equipment in a location with *ready access*.
3. Both ends of the branch circuit shall be labeled "For Future Electric Water Heating Equipment."

Exception: Where future electric water heating equipment would require three-phase power and the main electrical service panel has a reserved space for a bus bar rated and sized in accordance with Section CH103.1.2.4 and labeled "For Future Electric Water Heating Equipment."

CH103.1.2.4 Additional water heating electric infrastructure sizing. Electric infrastructure water heating equipment with a capacity of greater than 75,000 Btu/h shall be sized to accommodate one of the following:

4. An electrical capacity not less than the *combustion equipment* water heating capacity multiplied by the value in Table CH103.1.2.4 plus electrical capacity to serve recirculating loads as shown in the equation below.

$$VA_w = (Q_{capacity} \cdot P_w) + \left(Q_{recirc} \cdot 293 \frac{VA}{Btu/h} \right)$$

Where:

VA_w = The required electrical capacity of the electrical infrastructure for water heating in volt-amps

$Q_{capacity}$ = The water heating capacity of the *combustion equipment* in kBtu/h

P_w = The VA per kBtu/h from Table CH103.1.2.4 in VA/kBtu/h

Q_{recirc} = The capacity required for temperature maintenance by recirculation, if applicable, in Btu/h

2. An alternate design that complies with this code, that is approved by the authority having jurisdiction, and that uses no energy source other than electricity or *on-site renewable energy*.

TABLE CH103.1.2.4 ALTERNATE ELECTRIC WATER HEATING EQUIPMENT CONVERSION FACTORS (VA/kBtu/h)

99.6% Heating Design Temperature		P_w
Greater Than (°F)	Not More Than	VA/kBtu/h
55	60	118
50	55	123
45	50	129
40	45	136
35	40	144
30	35	152
25	30	162
20	25	173
15	20	185
10	15	293
5	10	293
0	5	293
Less than 0 °F (-17.8°C)		293

CH103.1.3 Combustion cooking. Spaces containing combustion equipment for cooking shall comply with either CH103.1.3.1 or CH103.1.3.2

CH103.1.3.1 Commercial cooking. Spaces containing *commercial cooking appliances* shall be provided with the following:

1. a A dedicated branch circuit with a minimum electrical capacity in accordance with Table CH103.1.3.1 based on the *appliance* in the space.
2. The branch circuit shall terminate within 3 feet (914 mm) of the *appliance* in a location with *ready access*.

3. Both ends of the branch circuit shall be labeled with the words “For Future Electric Cooking Equipment” and be electrically isolated.

TABLE CH103.1.3.1 COMMERCIAL COOKING MINIMUM BRANCH CIRCUIT CAPACITY

Commercial Cooking <i>Appliance</i>	Minimum Branch Circuit Capacity
Range	114 VA/kBtu/h
Steamer	469 VA/kBtu/h
Fryer	200 VA/kBtu/h
Oven	266 VA/kBtu/h
Griddle	195 VA/kBtu/h
All other commercial cooking <i>appliances</i>	114 VA/kBtu/h

CH103.1.3.2 All other cooking. Spaces containing all other cooking equipment not designated as *commercial cooking appliances* shall be provided with the following:

1. a A dedicated branch circuit in compliance with NFPA 70 with sufficient capacity for an equivalent electric cooking equipment. Section 422.10.
2. The branch circuit shall terminate within ~~6 feet (1829 mm)~~ 3 feet (914 mm) of fossil fuel ranges, cooktops and ovens and be in a location with *ready access*.
3. Both ends of the branch circuit shall be labeled with the words “For Future Electric Cooking Equipment” and be electrically isolated.

CH103.1.4 Combustion clothes drying. Spaces containing combustion equipment for clothes drying shall comply with either CH103.1.4.1 or CH103.1.4.2

CH103.1.4.1 Commercial drying. Spaces containing clothes drying equipment, and end-uses for commercial laundry applications shall be provided with the following:

1. eConduit that is continuous between a junction box located within 3 feet (914 mm) of the equipment and an electrical panel.
2. The junction box, conduit and bus bar in the electrical panel shall be rated and sized to accommodate a branch circuit with sufficient capacity for an equivalent electric equipment with an equivalent equipment capacity.
3. The electrical junction box and electrical panel shall ~~have~~ labels stating shall be labeled with the words, “For Future Electric Clothes Drying Equipment.”

CH103.1.4.2 Residential drying. Spaces containing clothes drying equipment, *appliances*, and end-uses serving multiple *dwelling units* or sleeping areas with a capacity less than or equal to 9.2 cubic feet shall be provided with the following:

1. a A dedicated 208/240-volt branch circuit with a minimum capacity of 30A, and
2. The branch circuit shall terminate within 6 feet (1829 mm) 3 feet (914 mm) of fossil fuel clothes dryers and shall be in a location with *ready access*.
3. Both ends of the branch circuit shall be labeled with the words “For Future Electric Clothes Drying Equipment” and be electrically isolated.

CH103.1.5 Onsite Transformers. Enclosed spaces and underground vaults containing onsite electric transformers on the *building* side of the electric utility meter shall have sufficient space to accommodate transformers sized to serve the additional electric loads identified in CH103.1.1, CH103.1.2, CH103.1.3 and CH103.1.4.

CH103.2 Hydronic Heating Design Requirements. For all hydronic space heating systems, the design entering water temperature for coils, radiant panels, radiant floor systems, radiators, baseboard heaters, and any other device that uses hot water to provide heat to a space shall be not more than 130°F (55°C).

CH103.3 Construction Documentation. The construction documents shall provide details for additional electric infrastructure, including branch circuits, conduit, pre-wiring, panel capacity, and electrical service capacity, as well as interior and exterior spaces designated for future electric equipment.

Reason Statement: This proposal is intended to ensure the language in Appendix CH is both clear and enforceable. This proposal includes the following:

- The proposal clarifies that the appendix applies to new buildings unless otherwise specified by a revision proposed by NBI to the all-electric appendix where it would also apply to substantial alterations.
- This proposal clarifies that both 208V or 240V branch circuits meet branch circuit requirements because commercial buildings can operate on either 208V or 240V.
- This proposal clarifies that the branch circuit should terminate 3 feet from the combustion equipment which is consistent with Addendum ac to ASHRAE 189.1.
- This proposal lists requirements instead of leaving them in paragraph form to improve clarity.
- This proposal clarifies the branch circuit requirements for low capacity space heating equipment.
- This proposal renumbers tables so that they are located in the correct section of the code.
- This proposal ensures consistency with airflow requirements for heat pump water heaters internally and with Addendum ac to ASHRAE 189.1

Cost Impact: This proposal has no impact on the cost of construction.

All-Electric Appendix Modifications

Revise Appendix as follows:

APPENDIX CG ALL-ELECTRIC HEAT PUMP PERFORMANCE-LEVEL COMMERCIAL BUILDING PROVISIONS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

User note:

About this chapter: Appendix CG provides cities and states an appendix to the Commercial Provisions of the 2024 International Energy Conservation Code® (IECC®) that would result in either all-electric commercial buildings with heat pump performance levels for electric space heating and water heating, or buildings with combustion equipment achieving the same site energy use intensity as buildings using heat pump equipment for space and water heating and that comply with the electric-ready provisions in Appendix CH. Jurisdictions have the prerogative to adopt the appendix in support of policy goals related to carbon emission reductions. The provisions contained in this appendix are not mandatory unless specified as such in the jurisdiction's adopting ordinance.

~~Whether an all-electric buildings is less expensive to construct and operate depends heavily on climatic and market variables. Therefore, before adopting this appendix, jurisdictions should carefully consider the local climate and market conditions such as utility costs, local equipment costs and local workforce and equipment availability.~~

SECTION CG101 GENERAL

CG101.1 Intent. The intent of this Appendix is to amend the *International Energy Conservation Code* to reduce greenhouse gas emissions from buildings and improve the safety and health for commercial building occupants by ensuring buildings using fossil fuel equipment are as efficient as buildings using efficient electric heat pump equipment and have the electric infrastructure for future electric equipment.~~requiring new all-electric buildings and efficient electrification of existing buildings.~~

CG101.2 Scope. The provisions in this appendix are applicable to commercial buildings. New construction shall comply with Section CG103. *Additions, alterations, repairs and changes of occupancy* to existing buildings shall comply with Chapter 5 and Section CG104.

SECTION CG102 DEFINITIONS

CG102 ALL-ELECTRIC BUILDING. A *building* using no *purchased energy* other than electricity when utility power is available.

CG102 APPLIANCE. A device or apparatus that is manufactured and designed to utilize energy and for which this code provides specific requirements.

CG102 COMBUSTION EQUIPMENT. Any equipment or *appliance* used for space heating, *service water heating*, cooking, clothes drying, humidification, or lighting that uses a *fossil fuel*.

CG102 PURCHASED ENERGY. Energy or power purchased for consumption and delivered to the building site.

CG102 SUBSTANTIAL IMPROVEMENT. Any *repair*, reconstruction, rehabilitation, *alteration*, *addition* or other improvement of a building or structure, the cost of which equals or is more than 50 percent of the market value of the structure before the improvement. Where the structure has sustained *substantial damage*, as defined in the International Building Code, any repairs are considered substantial improvement regardless of the actual *repair* work performed. Substantial improvement does not include the following:

1. Improvement of a *building* required to correct health, sanitary or safety code violations ordered by the *building official*, or
2. *Alteration* of a *historic building* where the *alteration* will not affect the building's designation as a *historic building*.

SECTION CG103 NEW COMMERCIAL BUILDINGS

CG103.1 Application. New commercial buildings shall comply with C401.2.1 or C401.2.2 and one of the following:

1. New commercial buildings shall be all-electric buildings and comply with Sections C401.2.1 or C401.2.2.
2. New commercial buildings shall comply with CG103.2 and Appendix CH.

Exceptions:

1. *Purchased energy* other than electricity shall be permitted to comply with CG103.1(1) where it has been demonstrated to the building official that the building is required by an applicable law or regulation to provide space heating with an emergency power system or a standby power system.
2. *Purchased energy* other than electricity shall be permitted to comply with CG103.1(1) for an emergency power system or a standby power system.

CG103.2 Advanced Energy Credit Package requirements. The requirements of this section supersede the requirements of Section C406.1.1. Projects shall comply with measures from C406.2 to achieve the minimum number of required efficiency credits from Table CG103.2(1) based on building occupancy group and climate zone. Projects with multiple occupancies, unconditioned parking garages and buildings with separate shell-and-core and build-out construction permits shall comply as follows:

Where a project contains multiple occupancies, credits in Table CG103.2(1) from each building occupancy shall be weighted by the gross floor area to determine the weighted average project

energy credits required. Accessory occupancies shall be included with the primary occupancy group for purposes of Section C406 and Appendix CG.

Exceptions:

1. Unconditioned parking garages that achieve 50 percent of the credits required for use groups S-1 and S-2 in Table CG103.2(1).
2. Portions of buildings devoted to manufacturing or industrial use.
3. Where a building achieves more renewable and load management credits in Section C406.3 than are required in Section C406.1.2, surplus credits shall be permitted to reduce required energy efficiency credits as follows:

$$EEC_{red} = EEC_{tbl} - \{ \text{the lesser of: } (SRLM_{lim}, SRLM_{adj} \times [RLM_{ach} - RLM_{req}]) \}$$

EEC_{red} = Reduced required energy efficiency credits

EEC_{tbl} = Required energy efficiency credits from Table CG103.2(1)

SRLM_{lim} = Surplus renewable and load management credit limit from Table CG103.2(2)

SRLM_{adj} = 1.0 for all-electric or all-renewable buildings (excluding emergency generation)
0.7 for buildings with fossil fuel equipment (excluding emergency generation)

RLM_{ach} = Achieved renewable and load management credits from Section C406.3

RLM_{req} = Required renewable and load management credits from Section C406.1.2

TABLE CG103.2 (1) Energy Credit Requirements by Building Occupancy Group

<u>Building Occupancy Group</u>	<u>Climate Zone</u>																		
	<u>0A</u>	<u>0B</u>	<u>1A</u>	<u>1B</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>	<u>3C</u>	<u>4A</u>	<u>4B</u>	<u>4C</u>	<u>5A</u>	<u>5B</u>	<u>5C</u>	<u>6A</u>	<u>6B</u>	<u>7</u>	<u>8</u>
<u>R-2, R-4, and I-1</u>																			
<u>I-2</u>																			
<u>R-1</u>																			

<u>B</u>																				
<u>A-2</u>																				
<u>M</u>																				
<u>E</u>																				
<u>S-1 and S-2</u>																				
<u>All Other</u>																				

TABLE CG103.2 (2) LIMIT TO ENERGY EFFICIENCY CREDIT CARRYOVER FROM RENEWABLE AND LOAD MANAGEMENT CREDITS

<u>Building Occupancy Group</u>	<u>Climate Zone</u>																			
	<u>0A</u>	<u>0B</u>	<u>1A</u>	<u>1B</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>	<u>3C</u>	<u>4A</u>	<u>4B</u>	<u>4C</u>	<u>5A</u>	<u>5B</u>	<u>5C</u>	<u>6A</u>	<u>6B</u>	<u>7</u>	<u>8</u>	
<u>R-2, R-4, and I-1</u>																				
<u>I-2</u>																				
<u>R-1</u>																				
<u>B</u>																				

<u>A-2</u>																			
<u>M</u>																			
<u>E</u>																			
<u>S-1 and S-2</u>																			
<u>All Other</u>																			

CG103.32 Electric resistance heating equipment. The sole use of electric resistance equipment and appliances for space and water heating shall be prohibited other than for *buildings* or portions of *buildings* that comply with not less than one of Sections CG103.32.1 through CG103.32.8.

CG103.32.1 Low space heating capacity. Electric resistance appliances or equipment shall be permitted in buildings or areas of buildings not served by a mechanical cooling system and with a total space heating capacity not greater than 4.0 BTU/h (1.02 watts) per square foot of *conditioned space*.

CG103.32.2 Small systems. Buildings in which electric resistance *appliances* or equipment comprise less than 5 percent of the total system heating capacity or serve less than 5 percent of the *conditioned floor area*.

CG103.32.3 Specific conditions. Portions of buildings or specific equipment and appliances that require electric resistance heating that cannot practicably be served by electric heat pumps as *approved*.

CG103.32.4 Kitchen make-up air. Make-up air for commercial kitchen exhaust systems required to be tempered by Section 508.1.1 of the International Mechanical Code is permitted to be heated by electric resistance.

CG103.32.5 Freeze protection. Use of electric resistance heat for freeze protection shall comply with Sections CG103.32.5.1 through CG103.32.5.2.

CG103.32.5.1 Low indoor design conditions. Space heating systems sized for spaces with indoor design conditions of not greater than 40°F (4.5°C) and intended

for freeze protection, including temporary systems in unfinished spaces, shall be permitted to use electric resistance. The building envelope of any such space shall be insulated in compliance with Section C402.1.

CG103.32.5.2 Freeze protection systems. Freeze protection systems shall comply with Section C403.14.413.3.

CG103.32.6 Pre-heating of outdoor air. Systems with energy recovery ventilation shall be permitted to utilize electric resistance to preheat outdoor air for defrost or temper air entering the energy recovery device to not more than 45°F (7.2°C). Hydronic systems without energy recovery ventilation shall be permitted to utilize electric resistance to temper air entering the energy recovery device to not more than 40°F (4.5°C).

CG103.32.7 Small buildings. Buildings with a conditioned floor area of not more than 250 square feet (23.2 m²) and not served by a mechanical space cooling system shall be permitted to use electric resistance *appliances* or equipment for space heating.

CG103.32.8 Supplemental heat. Electric resistance heat shall be permitted as supplemental heat when installed with heat pumps sized in accordance with Section CG103.43 and when operated only when a heat pump cannot provide the necessary heating energy to satisfy the thermostat setting.

CG103.43 Heat pump sizing for space heating. Heat pump space heating systems shall be sized to meet the *building* heating load at the greater of 0°F (-18°C) or the 99 Percent Annual Heating Dry-Bulb for the nearest weather station provided in the ASHRAE Handbook of Fundamentals. The ~~heat pump~~ space heating system shall not require the use of supplemental electric heat at or above this temperature other than for defrosting. Lower capacity heat pumps that operate in conjunction with thermal storage shall be permitted if the system meets the requirements of this section.

CG103.54 Heat pump sizing for water heating. Heat pump *service heating systems* shall be sized to meet not less than the *building service water heating* load at the greater of 15°F (-9.5°C) or the 99 Percent Annual Heating Dry-Bulb for the nearest weather station provided in the latest edition of the ASHRAE Fundamentals Handbook. Supplemental electric heat shall not be required at or above this temperature other than for temperature maintenance in recirculating systems and defrosting.

CG103.65 Heating outside a building. Systems for heating outside a building shall comply with C403.13.1.

~~**CG103.6 Low capacity cooling equipment.** Air conditioners with capacity less than 240,000 Btu/hr (70 kW) shall be electric heat pump equipment sized and configured to provide both space cooling and space heating.~~

SECTION CG104

EXISTING COMMERCIAL BUILDINGS

CG104.1 Combustion equipment in additions. *Additions shall comply with one of the following:*

1. The addition shall use no purchased energy other than electricity and new equipment installed to serve additions shall use no purchased energy other than electricity. Where existing systems using purchased energy other than electricity serve an addition, the existing building and addition together shall use no more purchased energy other than electricity than the existing building alone.
2. The addition shall comply with Section CG104.1.1 and Appendix CH.

CG104.1.1 Additional energy efficiency credits. *Additions using purchased energy other than electricity and additions with new equipment installed to serve the addition that use purchased energy other than electricity shall comply with measures from Sections C406.2 and C406.3 to achieve not less than 50 percent the number of required efficiency credits from Table CG103.2(1) based on building occupancy group and climate zone. Where a project contains multiple occupancies, credits in Table CG103.2(1) from each building occupancy shall be weighted by the gross floor area to determine the weighted average project energy credits required. Accessory occupancies shall be included with the primary occupancy group for purposes of this section. Alterations to the existing building that are not part of an addition, but permitted with an addition, may be used to achieve the required credits.*

Exceptions:

1. Buildings in Utility and Miscellaneous Group U, Storage Group S, Factory Group F, High-Hazard Group H.
2. Additions less than 1,000 ft² (92 m²) and less than 50 percent of existing floor area.
3. Additions that do not include the addition or replacement of equipment covered by Tables C403.3.2(1) through C403.3.2(16) or Section C404.2.
4. Additions that do not contain conditioned space.
5. Where the addition alone or the existing building and addition together comply with Section C407.

CG104.2 Substantial improvement. Buildings undergoing *substantial improvements* shall be ~~all-electric buildings~~, comply with C402.5, and meet a site EUI by building type in accordance with ASHRAE Standard 100 Table 7-2, and shall comply with one of the following:

1. Buildings undergoing substantial improvements shall be all-electric buildings.
2. Buildings undergoing substantial improvements shall comply with Appendix CH.

Exception: Compliance with Standard 100 shall not be required where Group R-2 occupancies achieve an ERI score of 80 or below without on-site renewable energy included in accordance with RESNET/ICC 301, for each dwelling unit.

CG104.3 Cooling equipment. ~~New and replacement air conditioners shall be electric heat pump equipment sized and configured to provide both space cooling and space heating. Any existing space heating systems other than existing heat pump equipment that serve the same zone as the new equipment shall be configured as supplementary heat in accordance with Section CG104.6.~~

CG104.4 Service water heating equipment. ~~Where water heaters are added or replaced, they shall use no purchased energy other than electricity.~~

CG104.5 Furnace replacement. ~~Newly installed warm air furnaces provided for space heating shall only be permitted as supplementary heat controlled in accordance with Section CG104.6.~~

CG104.36 Heat pump supplementary heat. Heat pumps having *combustion equipment* or electric resistance equipment for supplementary space or *service water heating* shall have controls that limit supplemental heat operation to only those times when one of the following applies:

1. The heat pump is operating in defrost mode.
2. The vapor compression cycle malfunctions.
3. For space heating systems, the thermostat malfunctions.
4. For space heating systems, the vapor compression cycle cannot provide the necessary heating energy to satisfy the thermostat setting.
5. The outdoor air temperature is less than the design temperature determined in accordance with Section CG103.43.
6. For *service water heating*, the heat pump *water heater* cannot maintain an output water temperature of not less than 120°F (49°C) .
7. For temperature maintenance in *service water heating* systems.

New supplementary space and *service water heating* systems for heat pump equipment shall not be permitted to have a heating output capacity greater than the heating output capacity of the heat pump equipment.

Reason:

On April 17, 2023, a three judge panel from the United States Court of Appeals for the Ninth Circuit issued an opinion stating that Berkeley’s ban on the installation of natural gas infrastructure in new construction violated federal preemption by the Energy Policy and Conservation Act (EPCA). The opinion states that EPCA preempts state and local regulations from regulating natural gas use by covered products in matters that have no nexus with the efficiency of the product. The proponents of this change do not agree with the court's interpretation of EPCA – it is not consistent with pre-existing federal agency interpretations or the original intent of EPCA [1] – and we are confident the ruling will not hold upon further

hearing. However, we also know that this opinion has had a chilling effect on the adoption of all-electric requirements by jurisdictions both within the ninth circuit where the opinion is in effect and out of the ninth circuit where the opinion has no effect.

As it could take a year to several years for the case to be finally adjudicated, the proponents are submitting this modification in order to provide jurisdictions with an option that will both meet their policy goals to reduce carbon emissions from buildings while addressing concerns about the legal vulnerability of all-electric requirements in light of the ninth circuit's current interpretation of EPCA pre-emption.

1. We have revised the proposal to allow the use of both federally minimum natural gas and electric appliances while ensuring buildings that comply with this appendix meet heat pump levels of performance. Buildings that choose to install fossil fuel equipment will have to achieve heat pump levels of performance through improved energy efficiency by achieving additional energy credits or by achieving additional renewable or load management credits. It should be noted that the analysis to determine the appropriate number of credits required to achieve equivalent levels of performance will be submitted at a later date once the analysis is complete.
2. In addition, new buildings and substantial improvements that choose to install fossil fuel equipment must comply with the electric-ready provisions in Appendix CH so that building owners will have the choice to install all-electric appliances in the future.
3. The proponents removed sections of the Appendix that explicitly do not allow natural gas appliances.
4. The proponents also revised the existing building section to allow buildings that choose to install natural gas equipment in additions to achieve equivalent levels of performance through energy credits or renewable and load management credits.

Cost Impact: The code change proposal will neither increase nor decrease the cost of instruction because buildings that complied with the original Appendix will also comply with this modified Appendix.

Bibliography:

[1] California Restaurant Association v. City of Berkeley, 21-16278 (9th Cir. 2023).
<https://cdn.ca9.uscourts.gov/datastore/opinions/2023/04/17/21-16278.pdf>.



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