Group 3 2021 Written Testimony Received

Washington State Energy Code – EPCA Considerations

Testimony received as of 5 p.m. on 11/22/2023

Name	Group if applicable	Subject	Summary
Jay Arnold		**Modification** HB 1042 – existing bldg. exemption	More closely match the language of the bill by removing added sentence to C501.1.1 and adding a new section with the statutory language.

C501.1.1 Existing buildings. Except as specified in this chapter, this code shall not be used to require the removal, *alteration* or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code. ~~Unaltered portions of existing buildings used for residential purposes shall not be required to comply with this code.~~

C501.1.2 Conversion of existing buildings. For buildings that received a certificate of occupancy at least three years prior to a permit application to add dwelling units:
1. New dwelling units created within the existing building must meet the requirements of the current energy code.
2. Unaltered portions of existing buildings shall not be required to comply with this code.

Greg Davenport	Mitsubishi	Efficiency metric **Modification**	Change the HSPF 1 to HSPF 2, and fix typo in section 3.6

3.3[a,c,d]	Air-source centrally ducted heat pump with minimum HSPF of ~~9.5~~ 8.1. In areas where the winter design temperature as specified in Appendix RC is 23°F or below, a cold climate heat pump found on the NEEP cc ASHP qualified product list shall be used.	0.5	N/A

Name	Group if applicable	Subject	Summary
	To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.		
3.4[a,d]	Closed-loop ground source heat pump; with a minimum COP of 3.3 **or** Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.5	1.0
3.5[d]	Ductless mini-split heat pump system, zonal control: In homes where the primary space heating system is zonal electric heating, a ductless mini-split heat pump system with a minimum HSPF2 of ~~10.0~~ 9.0 shall be installed and provide heating to the largest zone of the housing unit. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.5	2.0
3.6[a,d]	Air-source, centrally ducted heat pump with minimum HSPF2 of ~~11.0~~ 9.35. A centrally ducted air source cold climate variable capacity heat pump (cc VHP) found on the NEEP cc VCHP qualified product list with a minimum of ~~10~~ 8.5 HSPF2 may be used to satisfy this requirement. In areas where the winter design temperature as specified in Appendix RC is 23°F or below, an air source centrally ducted heat pump shall be a cold climate variable capacity heat pump as listed on the NEEP qualified product list. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.0	N/A

Name	Group if applicable	Subject	Summary
Kevin Duell	NW Natural	**Modification;** Impossible to comply – does not meet EPCA	Builders and energy modelers have reported the additional energy credits are too high to be achieved. Failing to provide a pathway where the buildings can install EPCA-covered gas appliances would violate EPCA.

(Equation 4-17)

$$AEC_{RRa} = AEC_b \times \frac{\sum(REF \times RR_t) - RR_r}{RR_b \times PGFA}$$

Where:

AEC_{RRa}	=	Section C406.2.5 achieved energy credits for this project as calculated in accordance with Equation 4-17, limited to 50 percent of the required credits in Section C406.1.
RR_t	=	Actual total rating of on-site and off-site renewable energy systems (W) for each type of renewable energy source in Table C411.2.1.
RR_r	=	Rating of renewable energy systems required by Section

Name	Group if applicable	Subject	Summary
		C411.1, other sections in this code, or used to qualify for exceptions in this code (W). RR_b = 0.1 W/square foot (1.08 W/m^2) PGFA = Project gross floor area, square feet (m^2). $AEC_{~~0.1b~~}$ = Section C406.2.5 base credits from Table C406.2(1). REF = Renewable Energy Factor from Table C411.2.1.	
Ardel Jala	Seattle DCIS	Commercial Option 1, with **modification**	Seattle supports Option 1 and the removal of the "electrification readiness" section.
	~~**C401.3.6 Electrification readiness.** Additionally, the following provisions shall be required for new construction:~~ ~~1. Provide a spare electrical branch circuit conduit to that appliance sized to support an equivalent heat pump appliance.~~ ~~2. Provide spare electrical service entrance conduits for the purpose of upgrading the main electrical service to support all heat pump appliances throughout the building.~~ ~~3. The main electrical room has sufficient space to accommodate increasing the main electrical service's size to support all heat pump appliances throughout the building.~~ ~~4. Additional accommodations for the utility equipment comprised of transformer(s) and other equipment necessary to support an electrical service upgrade. These accommodations shall include adequate space on the site. If the utility equipment is located in a transformer vault, that vault must include not only the space but the additional cooling for larger transformer(s).~~		
Jonny Kocher	RMI	**Modifications** (x7) to Commercial Option 1	RMI supports Option 1 with the 7 amendments noted.
	C403.1.4 Use of electric resistance and fossil fuel-fired HVAC heating equipment. HVAC heating energy shall not be provided by electric resistance or fossil fuel combustion appliances. For the purposes of this section, electric resistance HVAC heating appliances include, but are not limited to, electric baseboard, electric resistance fan coil and VAV electric resistance terminal reheat units and electric resistance boilers. For the purposes of this section, fossil fuel combustion HVAC heating appliances include, but are not limited to, appliances burning natural gas, heating oil, propane, or other fossil fuels.		

Name	Group if applicable	Subject	Summary

EXCEPTIONS:

1. **Low heating capacity.** Buildings or areas of buildings, other than *dwelling units* or sleeping units, that meet the interior temperature requirements of Chapter 12 of the *International Building Code* with a total installed HVAC heating capacity no greater than 8.5 Btu/h (2.5 watts) per square foot of *conditioned space* are permitted to be heated using electric resistance appliances.
2. **Dwelling and sleeping units.** Dwelling or sleeping units are permitted to be heated using electric resistance appliances as long as the installed HVAC heating capacity in any separate space is not greater than:
   2.1. Seven hundred fifty (750) watts in Climate Zone 4, and 1000 watts in Climate Zone 5 in each habitable space with fenestration.
   2.2. One thousand (1,000) watts in Climate Zone 4, and 1300 watts in Climate Zone 5 for each habitable space that has two primary walls facing different cardinal directions, each with exterior fenestration. Bay windows and other minor offsets are not considered primary walls.
   2.3. Two hundred fifty (250) watts in spaces adjoining the *building thermal envelope* but without fenestration.

   For the purposes of this section, habitable space is as defined in the International Building Code. For buildings in locations with exterior design conditions below 4°F (-16°C), an additional 250 watts above that allowed for Climate Zone 5 is permitted in each space with fenestration.
3. **Small buildings.** Buildings with less than 2,500 square feet (232 m^2) of *conditioned floor area* are permitted to be heated using electric resistance appliances.
4. **Defrost.** Heat pumps are permitted to utilize electric resistance heating when a heat pump defrost cycle is required and is in operation.
5. **Air-to-air heat pumps.** Buildings are permitted to utilize ((~~internal electric resistance heaters to supplement heat pump~~)) electric resistance supplemental heating ~~sources~~ for air-to-air heat pumps that meet all of the following conditions:
   5.1. Internal electric resistance heaters have controls that prevent supplemental heater operation when the heating load can be met by the heat pump alone during both steady-state operation and setback recovery.
   5.2. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F (-8°C) or lower except when in defrost.

   EXCEPTIONS TO 5.2:

   1. Packaged terminal heat pumps (PTHPs) that comply with the minimum heating efficiency requirements in Table C403.3.2(4) are exempt from heating pump controls capable of operating the compressor as the first stage of heating down to an outdoor air temperature of 17°F (-8°C) or lower.
   2. Heat pumps whose minimum efficiency is regulated by NAECA and whose ratings meet the requirements shown in Table C403.3.2(2) and include all usage of internal electric resistance heating are exempt from heat pump controls

Name	Group if applicable	Subject	Summary

capable of operating the compressor as the first state of heating down to an outdoor air temperature of 17°F (-8°C) or lower.

5.3. The heat pump complies with one of the following:

5.3.1. Controlled by a digital or electronic thermostat designed for heat pump use that energizes the supplemental heat only when the heat pump has insufficient capacity to maintain set point or to warm up the space at a sufficient rate.

5.3.2. Controlled by a multistage space thermostat and an outdoor air thermostat wired to energize supplemental heat only on the last stage of the space thermostat and when outdoor air temperature is less than 32°F (0°C) except when in defrost.

5.3.3. The minimum efficiency of the heat pump is regulated by NAECA, its rating meets the requirements shown in Table C403.3.2(2), and its rating includes all usage of internal electric resistance heating.

5.4. The heat pump rated heating capacity is sized to meet the heating load at an outdoor air temperature of 32°F (0°C) or lower and has a rated heating capacity at 47°F (8°C) no less than 2 times greater than supplemental ((~~internal electric resistance~~)) heating capacity in Climate Zone 4 and no less than the supplemental ((~~internal electric resistance~~)) heating capacity in Climate Zone 5, or utilizes the smallest available factory-available internal electric resistance heater.

6. **Air-to-water heat pumps.** Buildings are permitted to utilize electric resistance (for Climate Zone 4 or 5) or fossil fuel-fired (for Climate Zone 5) auxiliary heating to supplement heat pump heating for hydronic heating systems that meet all of the following conditions:

6.1. Controls for the auxiliary ((~~electric resistance or fossil fuel-fired~~)) heating sources are configured to lock out the supplemental heat when the outside air temperature is above 36°F (2°C), unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.

6.2. The heat pump controls are configured to use the compressor as the first stage of heating down to the lowest exterior design temperature for which the equipment is rated except during startup or defrost operation.

6.3. The heat pump rated heating capacity at 47°F (8°C) is no less than 75 percent of the design heating load at 29°F (-2°C).

7. **Ground source heat pumps.** Buildings are permitted to utilize ((~~electric resistance auxiliary heating to supplement~~)) electric resistance supplemental heating ~~sources~~ for heat pump heating for hydronic heating systems with ground source heat pump equipment that meets all of the following conditions:

7.1. Controls for the auxiliary ((~~resistance~~)) heating sources are configured to lock out the supplemental heat when the equipment source-side entering water temperature is above 42°F (6°C), unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.

7.2. The heat pump controls are configured to use the compressor as the first stage of heating.

Name	Group if applicable	Subject	Summary

7.3. The ground source heat exchanger shall be sized so that the heat pump annual heating output is no less than 70 percent of the total annual heating output in the final year of a 30-year simulation using IGSHPA listed simulation software.

8. **Small systems.** Buildings in which electric resistance or fossil fuel appliances, including decorative appliances, either provide less than 5 percent of the total building HVAC system heating capacity or serve less than 5 percent of the *conditioned floor area*.
9. **Specific conditions.** Portions of buildings that require fossil fuel or electric resistance space heating for specific conditions *approved* by the *code official* for research, health care, process or other specific needs that cannot practicably be served by heat pump or other space heating systems. This does not constitute a blanket exception for any occupancy type.
10. **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 using fossil fuel in Climate Zone 5 or electric resistance in Climate Zone 4 or 5.
11. **District energy.** Steam or hot water district energy systems that utilize fossil fuels as their primary source of heat energy, that serve multiple buildings, and that were already in existence prior to the effective date of this code, including more energy-efficient upgrades to such existing systems, are permitted to serve as the primary heating energy source.
12. **Heat tape.** Heat tape is permitted where it protects water-filled equipment and piping located outside of the *building thermal envelope*, provided that it is configured and controlled to be automatically turned off when the outside air temperature is above 40°F (4°C).
13. **Temporary systems.** Temporary electric resistance heating systems are permitted where serving future tenant spaces that are unfinished and unoccupied, provided that the heating equipment is sized and controlled to achieve interior space temperatures no higher than 40°F (4°C).
14. **Pasteurization.** Electric resistance heat controls are permitted to reset the supply water temperature of hydronic heating systems that serve service water heating heat exchangers during pasteurization cycles of the service hot water storage volume. The hydronic heating system supply water temperature shall be configured to be 145°F (63°C) or lower during the pasteurization cycle.
15. **Freeze protection.** Heating systems sized for spaces with indoor design conditions of 45°F (7°C) and intended for freeze protection are permitted to use electric resistance. The building envelope of any such space shall be insulated in compliance with Section C402.1.
16. **DOAS ERV auxiliary heat.** Dedicated outdoor air systems with energy recovery ventilation are permitted to utilize fossil fuel for Climate Zone 5 or electric resistance in Climate Zone 4 or 5 for auxiliary heating to preheat outdoor air for defrost or as auxiliary supplemental heat to temper supply air to 55°F (13°C) or lower for buildings or portions of buildings that do not have hydronic heating systems.

Name	Group if applicable	Subject	Summary

17. **Low-carbon district energy systems.** Low-carbon district energy systems that meet the definitions of *low-carbon district energy exchange system* or *low-carbon district heating and cooling or heating only systems*.
18. **Essential facilities.** Groups I-2 and I-3 occupancies that by regulation are required to have in place redundant emergency backup systems.

Add the following section and changes from Option 2 to Option 1:

C404.2.1.1 Primary heat pump system sizing. The ~~system shall include a primary service output of~~ primary heat pump service water heating system shall be sized to deliver no less than 50 percent ~~load~~ of the calculated demand for service hot water production during the peak demand period. Demand shall be calculated using the equipment manufacturer's selection criteria or another *approved* methodology with entering dry bulb or wet bulb outdoor air temperature at 40°F (4°C) ~~dry bulb or wet bulb outdoor air temperature~~ for air-source heat pumps, or 44°F (7°C) ground temperature for ground-source heat pumps ~~that provides sufficient hot water as calculated using the equipment manufacturer's selection criteria or another *approved* methodology~~. Electric air source heat pumps shall also be sized to deliver no less than 25 percent of the calculated demand for service hot water production during the peak demand period when entering dry bulb or wet bulb outdoor air temperature ~~of~~ is 24°F (-4°C). The remaining primary service output may be met by fossil fuel, electric resistance, or heat pump water heating systems.

EXCEPTION: Twenty-five percent sizing at entering dry bulb or wet bulb air temperature of 24°F (-4°C) is not required for air-source heat pumps located in a below-grade enclosed parking structure or other ventilated and unconditioned space that is not anticipated to fall below 40°F (4°C) at any time.

C404.2.1.4 Supplemental water heating. Total supplemental water heating equipment shall not have an output capacity greater than the total summed capacity of all primary water heating equipment. For the purposes of determining this supplemental water heating allowance, the capacity of primary water heating equipment shall be evaluated at 40°F (4°C) entering dry bulb or wet bulb outdoor air temperature for air-source heat pumps, ~~or~~ 44°F (7°C) ground temperature for ground-source heat pumps, and at the nameplate input rate for all other water heater system types. Supplemental heating is permitted for the following uses:

1. *Temperature maintenance* of heated-water circulation systems, physically separate from the primary service water heating system. ~~*Temperature maintenance* heating capacity shall be no greater than the primary water heating capacity at 40°F (4°C) dry bulb or wet bulb outdoor air temperature for air-source heat pumps or 44°F (7°C) ground temperature for ground-source heat pumps.~~
2. Defrost of compressor coils.

Name	Group if applicable	Subject	Summary

3. Heat tracing of piping for freeze protection or for *temperature maintenance* in lieu of recirculation of hot water.

4. Backup or low ambient temperature conditions, where all of the following are true:

4.1. ~~The supplemental heating capacity is no greater than the primary service water heating capacity at 40°F (4°C) dry bulb or wet bulb outdoor air temperature for air-source heat pumps or 44°F (7°C) ground temperature for ground-source heat pumps.~~

~~4.2~~. During normal operations, the supplemental heating is controlled to operate only when the entering air temperature at the air-source HPWH is below 40°F (4°C), and the primary HPWH compressor continues to operate together with the supplemental heating.

~~4.3~~4.2. The primary water heating equipment cannot satisfy the system load due to equipment failure or entering air temperature below 40°F (4°C).

C406.2.6.3 Heat pump ~~service~~ water heating. Projects shall achieve credits through compliance with Section C406.2.6.3.1.

C406.2.6.3.1 Heat pump water heater. Credit shall be achieved where ~~service hot water system capacity is 82,000 Btu/h (24kW) or less and is served using heat pump technology with no more than 4.5 kW of resistance supplemental heating and meets one of the following~~ the primary heat pump service water heating system is sized to deliver no less than 100 percent of the net calculated demand for service hot water production during the peak demand period with entering dry bulb or wet bulb outdoor air temperature at 40°F (4°C) for air-source heat pumps, or 44°F (7°C) ground temperature for ground-source heat pumps, as calculated using the equipment manufacturer's selection criteria or another *approved* methodology. For this credit, the net calculated demand shall be the gross building demand less any portion of the demand complying with the exceptions to Section C404.2.1. Supplemental heating is permitted in accordance with Section C404.2.1. but cannot use fossil fuels. Heat pump water heaters shall comply with one of the following:

1. The COP rating shall be a minimum COP of 3.0 reported at the design leaving heat pump water temperature with an entering air temperature of 60°F (16°C) or lower. For water-source equipment, the COP rating will be reported at the design leaving load water temperature with an entering load water temperature of 74°F (23°C) or lower.

2. The uniform energy factor (UEF) shall be a minimum of 3.40 rated based on U.S. Department of Energy requirements.

Excerpt from **Table C406.2(1) Efficiency Measure Credits**

17. Heat pump water heating	C406.2.6.3	~~81~~ 72	~~261~~ 54	~~17~~ 1	~~33~~ 13	~~(Grocery)~~ ~~95~~[e] 5	~~(A-2)~~ ~~95~~[f] 29

Name	Group if applicable	Subject	Summary

C401.3.6 Electrification readiness. Additionally, the following provisions shall be required for new construction for each fossil fuel space heating or service water heating appliance installed:

1. Provide a spare electrical branch circuit conduit to that appliance sized to support an equivalent heat pump appliance.
2. Provide spare electrical service entrance conduits for the purpose of upgrading the main electrical service to support all heat pump appliances throughout the building.
3. The main electrical room has sufficient space to accommodate increasing the main electrical service's size to support all heat pump appliances throughout the building.
4. Additional accommodations for the utility equipment comprised of transformer(s) and other equipment necessary to support an electrical service upgrade. These accommodations shall include adequate space on the site. If the utility equipment is located in a transformer vault, that vault must include not only the space but the additional cooling for larger transformer(s).

C406.2 Additional energy efficiency credit measures. Each energy efficiency credit measure used to meet credit requirements for the project shall include efficiency that is greater than the energy efficiency required for the building type and configuration requirements in Sections C402 through C405. Measures installed in the project that meet the requirements in Sections C406.2.1 through C406.2.14 shall achieve the credits listed for the measure and occupancy group in Table C406.2(1) or table C406.2(2) or where calculations required by Sections C406.2.1 through C406.2.14 create or modify the table credits, the credits achieved shall be based upon the section calculations. Projects that chose to comply with either fossil fuel pathway in Section C406.1.3 shall use Table C406.2(2) to achieve credits.

For mixed fuel space heating systems, the number of space heating energy efficiency credits available for measures with a prorating flag "Heat" are calculated using the following equation:

$$C_{SH} = CHP_{SH} \times B/C + CFF_{SH} \times (1 - B/C)$$

Where:

C_{SH} = Blended credits for mixed fuel systems.
CHP_{SH} = Credits available in Table 406.2(1).

Name	Group if applicable	Subject	Summary

CFF_{SH} = Credits available in Table 406.2(2).
B = Installed space heating capacity in kBTU/h of space heating appliances that comply with any of the exceptions to Section C403.1.4.
C = Total installed space heating capacity in kBTU/h of all space heating appliances.

For mixed fuel service water heating systems, the number of service water heating energy efficiency credits available for measures with a prorating flag "SWH" are calculated using the following equation:

$$C_{WH} = CHP_{WH} \times B/C + CFF_{WH} \times (1 - B/C)$$

Where:

C_{WH} = Blended credits for mixed fuel systems.
CHP_{WH} = Credits available in Table 406.2(1).
CFF_{WH} = Credits available in Table 406.2(2).
B = Installed service water heating capacity in kBTU/h of service water heating appliances that comply with any of the exceptions to Section C404.2.1.
C = Total installed service water heating capacity in kBTU/h of all service water heating appliances.

Replace Tables C406.2(1) and C406.2(2) with updated tables as noted in written testimony.

C401.3.3.1 HVAC credit modification. The number of HVAC heating energy efficiency credits required by Table C401.3.3 is permitted to be decreased according to the following equation:

$$CR = A - (A \times B/C)\ A \times C/D\ (1 - B/C)$$

Where:

CR = Additional credits required, rounded to the nearest whole number.

A = Baseline HVAC heating credits from Table C401.3.3.

Name	Group if applicable	Subject	Summary
B = Installed ~~HVAC heating~~ fossil fuel space heating capacity in kBTU/h of ~~HVAC heating~~ space heating appliances that comply with any of the exceptions to Section C403.1.4. C = Total installed fossil fuel space heating capacity in kBTU/h of all HVAC heating appliances. D = Total capacity in KBtu/h of all types of space heating appliances. **C401.3.3.2 Service water heating credit modification.** The number of service water heating energy efficiency credits required by Table C401.3.3 is permitted to be decreased according to the following equation: CR = A – (A × B/C) A × C/D (1 – B/C) Where: CR = Additional credits required, rounded to the nearest whole number. A = Baseline credits from Table C401.3.3. B = Installed service water heating appliances capacity in kBTU/h of service water heating appliances that comply with any of the exceptions to Section C404.2.1. C = Total installed fossil fuel service water heating capacity in kBTU/h of all service water heating appliances. D = Total capacity in kBTU/h of all types of service water heating appliances.			
Erik Olnon	MacDonald-Miller	Commercial Option 1 with **modifications** (x7)	The MacDonald-Miller Facility Solutions engineering team prefers Option 1 but recommends edits to minimize confusion.
Option 1: C401.3.1 provides a central location of “modification of code requirements” but could cause issues if people who are not aware of that clarifying section, then go on to read other sections in the code where the original language banning fossil fuel remains. The particular sections referenced in C401.3.1 should be modified at their respective locations directly. • C403.1.4. – Space Heating: Recommend directly striking the phrase “…or fossil fuel combustion…” from the first sentence of Section C403.1.4.			

Name	Group if applicable	Subject	Summary

• Section C404.2.1 – Service Water Heating: Recommend directly revising the first sentence of Section C404.2.1 to read: "Service hot water shall be provided by fossil fuel water heating equipment, electric air-source heat pump water heating equipment, electric resistance water heating equipment, or a combination of these equipment types meeting the requirements of this section or any combination of the two."

• Section C406.2.5 – Renewable Energy: Recommend directly striking the phrase "…limited to 50% of the required credits in Section C406.1" in the definition of the factor AEC_{RRa}.

• Table C406.2 – Efficiency Measure Credits: Recommend directly replacing Table C406.2(1) credit values with Table C406.2(2) values.

Options 1 and 2:

C101.1 Title. This code shall be known as the *Washington State Energy Code*, and shall be cited as such. It is referred to herein as "this code."
The 2021 edition of the Washington State Energy Code is hereby adopted. The Washington State Energy Code adopted under chapter 51-11C WAC shall become effective in all counties and cities of this state on ((~~July 1, 2023~~)) March 15, 2024.

Option 1 C401.3.6 (This comment also applies to Option 2): C401.3.6 notes electrification readiness requirements for "New Construction." It is recommended "New Construction" be defined for added clarity. A possible suggestion is below.

New Construction – For the purpose of C401.3.6, New Construction is defined as a new building, major renovation, or addition that complies with all the following:

1. Will be adding new or will be upsizing/replacing the main electrical service entrance. 2. Will be adding new or upsizing/replacing the main electrical room.

3. Will be adding new or upsizing/replacing the transformer vault and transformer vault cooling system.

Recommend rewriting item 1. The location of the replacement HP appliance may not be in the same location as the boiler being replaced. A possible suggestion is below.

1. Provide a spare electrical branch circuit conduit to the location of a future replacement heat pump appliance to support an equivalent heating capacity.

Name	Group if applicable	Subject	Summary

C503.4.6 states that where a mechanical heating appliance is added, the added appliance shall comply with specific code sections (C401.3, C403.1.4, or alternate compliance table). However, C503.4.1 states that all new mechanical systems and equipment in existing systems shall comply with C403 plus other specific code sections.

- Recommend adding a line in section C503.4.1 for new mechanical systems and equipment in existing buildings to comply with C403 unless specifically using a compliance path otherwise allowed by chapter 5. There could also be definitions of what is a new mechanical system vs. added mechanical equipment if there is intended to be a difference in how these are viewed from a code perspective.

C503.4 only notes that components of existing mechanical systems that are altered or replaced shall comply with Section C403 or Section C407, unless specifically exempted in this section.

- Need to define what is meant by "this section". I assume it is referring to C503.4 in its entirety, but I could see this being interpreted differently.

The language is confusing stating that systems shall comply with Section C403 or Section C407, then stating unless specifically exempted in this section, then stating "and" sections C408.2, C409.5, C501.2.2, etc. It is not clear whether the "and" is intended to note that building mechanical systems are also required to comply with the sections lister after or if it is stating that the exceptions to these sections can be used.

- Recommend breaking this up a bit to state that systems shall comply with C403 or C407 unless exempted in this section or following subsections of C503.4.
- Recommend stating that compliance is also required with sections C408.2, C409.5, C501.2.2, C501.6, and C503.4.2 through C503.4.6 unless using a noted exception to those sections.

This section lists compliance with C503.4.2 through C503.4.5, however it appears the intent is to also include C503.4.6.

- Recommend changing the section reference to C503.4.2 through C503.4.6.

Issue: code reference in section C503.4.3 states that equipment replacements that include space heating shall also comply with Section C503.4.3. Is this intended to be C503.4.6?

- Recommend changing the code reference to C503.4.6.

Name	Group if applicable	Subject	Summary
Issue: C503.4.6 option 1 notes that appliances shall comply with Section C401.3. However, C406 credits are not applicable in Chapter 5 for alterations (per C503.4) • Recommend removing the reference to C401.3. Issue: C503.4.6 requirements for mechanical heating appliances do not seem in alignment with the requirements for C503.5 service water heating equipment. It is much more stringent to add new service water heating equipment in an existing building using gas or electric resistance. • Recommend adding exceptions for new/added service water heating equipment to exception 2 in section C503.5 and/or adding an alternative compliance option table similar to table C503.4.6. Some instances where an exception is needed for new equipment in an existing building: small break rooms and/or restrooms added in existing office and retail spaces, an existing retail space changing from retail to food service. Issue: C503.4.6.1 references complying with section C403.3.7.2, but this code section does not exist (or at least I haven't seen this section in the drafts). • Recommend updating the code section for the intended reference.			
Angela Rozmyn	Natural and Built Environments	HB 1042, **Modification**	Suggest adding the definition for existing building as stated in the legislation.
C501.1.1 Existing buildings. Except as specified in this chapter, this code shall not be used to require the removal, alteration or abandonment of, nor prevent the continued use and maintenance of, lawfully existing building or building system. Unaltered portions of existing buildings shall not be required to comply with this code. For the purpose of this section, "existing building" means a building that received a certificate of occupancy at least three years prior to the permit application to add housing units.			
Andrea Smith	BIAW	**Modification** Changes do not comply with EPCA	Forego the 2021 energy code, keeping the 2018 energy code in effect until the next cycle. The code changes still favor electric heat pumps at the expense of gas appliances. Support the mods

Name	Group if applicable	Subject	Summary
			suggested by Cascade Natural Gas, including excluding the change to the above grade wall U-factor. Add credit to the air leakage and ventilation options for achieving 3 ACH.

2. AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION OPTIONS
Only one option from Items 2.1 through 2.3 may be selected in this category.

2.1	Compliance based on R402.4.1.2: Reduce the tested air leakage to 3.0 air changes per hour maximum at 50 Pascals **or** For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.3 cfm/ft2 maximum at 50 Pascals **and** All whole house ventilation requirements as determined by Section M1505.3 of the *International Residential Code* or Section 403.8 of the *International Mechanical Code* shall be met with a high efficiency fan(s) (maximum 0.35 watts/cfm), not interlocked with the furnace fan (if present). Ventilation systems using a furnace including an ECM motor are allowed, provided that they are controlled to operate at low speed in ventilation only mode. To qualify to claim this credit, the building permit drawings shall specify the option being selected, the maximum tested building air leakage, and shall show the qualifying ventilation system and its control sequence of operation.	0.5	0.5
~~2.1~~2.2	Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum at 50 Pascals **or** For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.25 cfm/ft^2 maximum at 50 Pascals **and** All whole house ventilation requirements as determined by Section M1505.3 of the *International Residential Code* or Section 403.8 of the *International Mechanical Code* shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.65.	((~~0.5~~)) 1.0	1.0

Name	Group if applicable	Subject	Summary	
	To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.			
~~2.2~~2.3	Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum at 50 Pascals **or** For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.20 cfm/ft^2 maximum at 50 Pascals **and** All whole house ventilation requirements as determined by Section M1505.3 of the *International Residential Code* or Section 403.8 of the *International Mechanical Code* shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.75. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.	((~~1.0~~)) 1.5	1.5	
~~2.3~~2.4	Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.6 air changes per hour maximum at 50 Pascals **or** For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.15 cfm/ft^2 maximum at 50 Pascals **and** All whole house ventilation requirements as determined by Section M1505.3 of the *International Residential Code* or Section 403.8 of the *International Mechanical Code* shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.80. Duct installation shall comply with Section ((~~R403.3.7~~)) R403.3.2. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.	((~~1.5~~)) 2.0	2.0	

Name	Group if applicable	Subject	Summary
Eric Vander Mey		**Modifications** (x5)	Editorial comments in both Options

C401.3.1 Modification of code requirements. For use of this compliance path only, the following changes shall be made to this code:

1. **Section C403.1.4 - Space heating.** Strike the phrase "...or fossil fuel combustion..." from the first sentence of Section C403.1.4.
2. **Section C404.2.1 - Service water heating.** Revise the first sentence of Section C404.2.1 to read: "Service hot water shall be provided by fossil fuel water heating equipment, electric air-source heat pump water heating equipment, electric resistance water heating equipment, or a combination of these equipment types meeting the requirements of this section ~~or any combination of the two~~."
3. **Section C406.2.5 - Renewable energy.** When determining renewable energy credits in Equation 4-17 of Section C406.2.5, strike the phrase "...limited to 50 percent of the required credits in Section C406.1" in the definition of the factor AEC_{RRa}.
4. **Table C406.2 - Efficiency measure credits.** Use Table C406.2(2) credit values in place of Table C406.2(1) credit values.

C401.3.4 Renewable energy credit limit. No more than 80 percent of the efficiency credits required by Sections ~~C401.3.2.1~~C401.3.3.1 and ~~C401.3.3.1~~C401.3.3.2 are permitted to be renewable energy credits defined in Section C406.2.5.

C401.3.6 Electrification readiness. Additionally, the following provisions shall be required for new construction:

1. Provide a spare electrical branch circuit conduit to that appliance sized to support an equivalent heat pump appliance.
2. Provide spare electrical service entrance conduits for the purpose of upgrading the main electrical service to support all heat pump appliances throughout the building.
3. The main electrical room has sufficient space to accommodate increasing the main electrical service's size to support all heat pump appliances throughout the building.
4. Additional accommodations for the ~~utility~~ equipment comprised of transformer(s) and other equipment necessary to support an electrical service upgrade. These accommodations shall include adequate space on the site. If the ~~utility~~ equipment is located in a transformer vault, that vault must include not only the space to support electrical service upgrade but ~~the~~ also include accommodations for additional cooling for larger transformer(s).

Name	Group if applicable	Subject	Summary

C503.4.6 Addition or replacement of heating appliances. Where a mechanical heating appliance is added or replaced, the added or replaced appliance shall comply with Section C401.3, Section C403.1.4, or with an alternate compliance option in Table C503.4.6.

EXCEPTIONS:

1. Terminal unit equipment including, but not limited to, hydronic VAV boxes, electric resistance VAV boxes, electric duct heaters, water source heat pumps, fan coils, or VRF indoor units that are served by an unaltered central system.
2. Air handling equipment with hydronic coils.
3. Air handling equipment designed for 100 percent outdoor air that is not subject to the requirements in Section C403.3.5 or that qualifies for an exception to Section C403.3.5.
4. Replacement of existing oil-fired boilers.
5. Replacement of existing steam boilers with steam distribution to terminal units and the associated boiler feed equipment.
6. Where compliance with Section C403.1.4 would trigger an unplanned utility electrical service upgrade based on the NEC 220.87 method for determining existing loads.
7. ((~~Like-for-like replacement of a single heating appliance is permitted where that appliance is failing, requires immediate replacement, and where no other HVAC work is planned.~~)) Replacement of ~~like-for-like heating appliances~~ equipment that is the same type where the rated capacity of the new equipment does not exceed the rated capacity of the existing equipment.

C403.1.4 Use of electric resistance and fossil fuel-fired HVAC heating equipment. Commercial buildings shall comply with one of the following:

1. **Fossil fuel space heating pathway:** HVAC heating provided by a fossil fuel appliance shall comply with Section C406.1.3. Fossil fuel combustion appliances are permitted for HVAC heating, and shall comply with the applicable efficiency standards referenced in Section C403.3.3.2. Additionally, the following provisions shall be required for new construction:

1.1. Provide a spare electrical branch circuit conduit to that appliance sized to support an equivalent heat pump appliance.

1.2. Provide spare electrical service entrance conduits for the purpose of upgrading the main electrical service to support all heat pump appliances throughout the building.

1.3. The main electrical room has sufficient space to accommodate increasing the main electrical service's size to support all heat pump appliances throughout the building.

Name	Group if applicable	Subject	Summary
1.4. Additional accommodations for the ~~utility~~ equipment comprised of transformer(s) and other equipment necessary to support an electrical service upgrade. These accommodations shall include adequate space on the site. If the ~~utility~~ equipment is located in a transformer vault, that vault must include not only the space to support electrical service upgrade but ~~the~~ also include accommodations for additional cooling for larger transformer(s). 2. **Heat pump space heating pathway:** HVAC heating energy shall not…..			