

**2018 Seattle Energy Code Amendment Proposals**

Section C202 Definition of Affordable Housing, to coordinate with Office of Housing rules.

**AFFORDABLE HOUSING.** Affordable housing for the purposes of this code shall include buildings which; a) receive or have received public funding or an allocation of federal low-income housing tax credits; and b) are subject to a regulatory agreement, covenant, or other legal instrument recorded on the property title, and enforceable by the City of Seattle, Washington State Housing Finance Commission, State of Washington, King County, U.S. Department of Housing and Urban Development, or other similar entity as approved by the Seattle Director of Housing, that either:

1) Restricts at least 40 percent of the units to occupancy by households earning no greater than 60 percent of median income, and controls the rents that may be charged, for a minimum period of 40 years; or

2) Restricts initial and subsequent sales of at least 40 percent of the residential units to households with incomes no greater than 80 percent of median income, for a minimum period of 50 years. The sale price for sales subsequent to the initial sale shall be calculated to allow modest growth in homeowner equity while maintaining long-term affordability for future buyers.

Section C202 Definition of Continuous Insulation, increase allowable penetration area through continuous insulation for stainless steel penetrations. Thermal conductivity of carbon steel is 3 – 4 times that of stainless steel.

**CONTINUOUS INSULATION (CI).** Insulating material that is continuous across all structural members without metal thermal bridges other than fasteners that have a total cross-sectional area not greater than 0.04 percent (or 0.12 percent for stainless steel penetrations) of the envelope surface through which they penetrate, and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope.

(NOTE: see also Footnotes for Table C402.1.3(i) below)

Section C202 Definitions for Heat Pump Water Heater technology:

**MULTI-PASS.** A heat pump water heater control strategy requiring multiple passes of water through the heat pump to reach the final target storage water temperature.

**SINGLE-PASS.** A heat pump water heater control strategy using variable flow or variable capacity to deliver water from the heat pump at the final target storage water temperature in a single pass through the heat exchanger with variable incoming water temperatures.

**TEMPERATURE MAINTENANCE.** The system used to maintain the temperature of the building domestic hot water delivery system, typically by circulation and reheating or by a heat trace system.

Section C202 Definition of Space Conditioning Category

**SPACE CONDITIONING CATEGORY.** Categories are based on the allowed peak space conditioning output capacity per square foot of conditioned floor area, or the design set point temperature, for a building or space. Space conditioning categories ((from lowest to highest)) include: low energy, semi-heated, conditioned, refrigerated walk-in and warehouse coolers, and refrigerated walk-in and warehouse freezers.

Section C303.1.5.1, correct reference.

**C303.1.5.1 Window wall application.** Where “window wall” or a similar assembly that is discontinuous at intermediate slab edges is used, the slab edge U-value shall be as listed in Appendix Table ((A103.3.7.1(3))) A103.3.7.2 or as determined using an approved calculation.

Section C402.1.3, clarification. (The referenced Section C402.1.2.1 regards standalone elevator hoistways serving uninsulated spaces.)

**C402.1.3 Insulation component R-value method.** *Building thermal envelope* opaque assemblies shall comply with the requirements of Section C402.2 based on the climate zone specified in Chapter 3. For opaque portions of the building thermal envelope intended to comply on an insulation component R-value basis, the R-values for insulation shall not be less than that specified in Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing Group R occupancies shall use the R-values from the "Group R" column of Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing occupancies other than Group R shall use the R-values from the "All other" column of Table C402.1.3.

**Exception:** For stair and elevator shafts that **do not comply with Section C402.1.2.1 and that are located within enclosed garages or other enclosed non-conditioned spaces and without conditioned supply air or cooling or heating appliances rated higher than 2 kW in any shaft, walls enclosing the shafts are permitted to be:**

1. Concrete or masonry with minimum R-5 continuous insulation;
2. Metal studs with R-15 cavity insulation and without continuous insulation; or
3. Other assemblies with a maximum U-value of 0.120.

Table C402.1.3.

1. Change “mass transfer deck slab” from R-5 to N/A, because by definition mass transfer deck slabs cannot be insulated.
2. Change R-4 continuous insulation to R-10, to coordinate with footnote e. Previously, Seattle code was weaker than state code.

**TABLE C402.1.3  
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT  
MINIMUM REQUIREMENTS, R-VALUE METHOD<sup>a, i</sup>**

CLIMATE ZONE	5 AND MARINE 4	
	All Other	Group R
<b>Walls, Above Grade</b>		
Mass <sup>h</sup>	((R-9.5 <sup>e,ei</sup> )) <u>Exterior: R-16 c.i.</u> <u>Interior:</u> <u>R-13 + R-6 ci wood</u> <u>stud, or</u> <u>R-13 + R-10 ci metal</u> <u>stud</u>	((R-13.3 <sup>ei</sup> )) <u>Exterior: R-16 c.i.</u> <u>Interior:</u> <u>R-13 + R-6 ci wood</u> <u>stud, or</u> <u>R-13 + R-10 ci metal</u> <u>stud</u>
Mass transfer deck slab edge	<b>((R-5)) N/R</b>	<b>((R-5)) N/R</b>
Metal building	R-19ci or R-13+13ci	R-19ci or R-13+13ci
Steel framed	R-13 .+ R-10ci	R-19 .+ R-8.5ci

CLIMATE ZONE	5 AND MARINE 4	
	All Other	Group R
Wood framed and other	((R-21 int or R-15+5ci std)) R-13 + R-7.5 ci	R-13+7.5ci std or R-20+3.8ci std or R-25 std
<b>Floors</b>		
Mass <sup>f</sup>	R-30ci	R-30ci
Joist/framing	((R-30 <sup>e</sup> )) Steel frame: R-38 +R-10 ci Wood frame: R-38	((R-30 <sup>e</sup> )) Steel frame: R-38 +R-10 ci Wood frame: R-38

Footnotes for Table C402.1.3(i). Adjust language to account for reduced conductance of stainless steel penetrations.

((This)) These alternate nominal R-value compliance ((option is)) options are allowed for projects complying with all of the following:

- The ratio of the cross-sectional area, as measured in the plane of the surface, of metal penetrations of otherwise continuous insulation to the opaque surface area of the assembly is greater than 0.0004 (0.04%), but less than 0.0008 (0.08%), for use of Column B equivalents, and greater than or equal to 0.0008 (0.08%), but less than 0.0012 (0.12%), for use of Column C equivalents.
  - Where all metal penetrations are stainless steel, Column B is permitted to be used for penetrations greater than 0.12% but less than 0.24% of opaque surface area, and Column C is permitted to be used for penetrations greater than or equal to 0.24% but less than 0.48% of opaque surface area.
- The metal penetrations of otherwise continuous insulation are isolated or discontinuous (e.g., brick ties or other discontinuous metal attachments, offset brackets supporting shelf angles that allow insulation to go between the shelf angle and the primary portions of the wall structure). No continuous metal elements (e.g., metal studs, z-girts, z-channels, shelf angles) penetrate the otherwise continuous portion of the insulation.
- Building permit drawings shall contain details showing the locations and dimensions of all the metal penetrations (e.g., brick ties or other discontinuous metal attachments, offset brackets, etc.) of otherwise continuous insulation. In addition, calculations shall be provided showing the ratio of the cross-sectional area of metal penetrations of otherwise continuous insulation to the overall opaque wall area.

For other cases where the proposed assembly is not continuous insulation, see Section C402.1.4 for determination of U-factors for assemblies that include metal other than screws and nails.

Table C402.1.4. Change Seattle U-value for mass floors back to 0.031, to match appendix A value.

**TABLE C402.1.4**  
**OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, U-FACTOR METHOD<sup>a, f</sup>**

	CLIMATE ZONE 5 AND MARINE 4	
	All Other	Group R
<b>Floors</b>		
Mass <sup>e</sup>	U-0.031	U-0.031

Joist/framing	<del>((U-0.029))</del> U-0.029 steel joist U-0.025 wood joist	<del>((U-0.029))</del> U-0.029 steel joist U-0.025 wood joist
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Section C402.2. Change reference sections to include Seattle amendments.

**C402.2 Specific building thermal envelope insulation requirements.** Insulation in building thermal envelope opaque assemblies shall comply with Sections C402.2.1 through ~~((C402.2.6))~~ **C402.2.10** and Table C402.1.3. Where this section refers to installing insulation levels as specified in Table C402.1.3, assemblies complying with Section C402.1.4 and buildings complying with Section C402.1.5 are permitted to provide alternate levels of insulation provided that the U-factor of the insulated assembly is less than or equal to the U-factor required by the selected compliance path.

Where this section refers to installing insulation levels as specified in Section C402.1.3, assemblies complying with Section C402.1.5 are allowed to install alternate levels of insulation so long as the U-factor of the insulated assembly is less than or equal to the U-factor required by the respective path.

Table C403.2.3(1)B. Correct “EER” to “IEER”

**TABLE C403.2.3(1)B  
MINIMUM EFFICIENCY REQUIREMENTS:  
ELECTRICALLY OPERATED VARIABLE REFRIGERANT FLOW AIR CONDITIONERS**

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
VRF Air Conditioners, Air Cooled	<65,000 Btu/h	All	VRF Multi-split System	13.0 SEER	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.2 EER 15.5 IEER	
	≥135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.0 EER 14.9 IEER	
	≥240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	10.0 EER <b>13.9 IEER</b>	

Section C403.2.12. Change threshold for VSD fan and pump motors from 7.5 to 5. This was a 2012 Seattle amendment that was inadvertently not carried over into the 2015 code.

**C403.2.3 Variable flow capacity.** For fan and pump motors **5** ~~((7.5))~~ hp and greater including motors in or serving custom and packaged air handlers serving variable air volume fan systems, constant volume fans, parking garage ventilation fans, heating and cooling hydronic pumping systems, pool and service water pumping systems, domestic water pressure-booster systems, cooling tower fan, and other pump or fan motors where variable flows are required, there shall be:

Section C403.4.1, exception 2. Clarify what “permanent opening” means in this context.

**C403.4.1 Thermostatic controls.** The supply of heating and cooling energy to each *zone* shall be controlled by individual thermostatic controls capable of responding to temperature within the *zone*. Controls in the same *zone* or in neighboring *zones* connected by openings larger than 10 percent of the floor area of either *zone* shall not allow for simultaneous heating and cooling. At a minimum, each floor of a building shall be considered as a separate *zone*. Controls on systems required to have economizers and serving single *zones* shall have multiple cooling stage capability and activate the

economizer when appropriate as the first stage of cooling. See Section C403.5 for further economizer requirements. Where humidification or dehumidification or both is provided, at least one humidity control device shall be provided for each humidity control system.

**Exceptions:**

(exceptions 1 and 3 not shown here)

2. ~~((Any interior zone open to a perimeter zone shall have set points and dead bands coordinated so that cooling in the interior zone shall not operate while the perimeter zone is in heating until the interior zone temperature is 5°F (2.8°C) higher than the perimeter zone temperature, unless the interior and perimeter zones are separated by a partition whose permanent openings are smaller than 10 percent of the perimeter zone floor area.))~~ Where an interior zone is open to a perimeter zone with permanent openings that are larger than 10 percent of the floor area of either zone, cooling in the interior zone is permitted to operate at times when the perimeter zone is in heating and the interior zone temperature is at least 5°F (2.8°C) higher than the perimeter zone temperature. For the purposes of this exception, a permanent opening is an opening without doors or other operable closures.

Section C403.6.10. Clarify that the high-efficiency-VAV system can't substitute for either of the two C406 DOAS credits, now that there are two of them. Also, change the occupant density threshold in item 12 to 15 occupants per 1000 sf, to coordinate with Section C403.7.1.

**C403.6.10 High efficiency variable air volume (VAV) systems.** For HVAC systems subject to the requirements of Section C403.3.5 but utilizing Exception 2 of that section, a high efficiency multiple-zone VAV system may be provided without a separate parallel DOAS when the system is designed, installed, and configured to comply with all of the following criteria in addition to the applicable requirements of Sections C403.8.6 through C403.8.8. This exception shall not be used as a substitution for a DOAS per Section C406.6 or C406.7.

(Items 1 – 11 unchanged)

12. Spaces that are larger than 150 square feet (14 m<sup>2</sup>) and with an occupant load greater than or equal to ~~((25))~~ 15 people per 1000 square feet (93 m<sup>2</sup>) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*) shall be provided with all of the following features:
- 12.1. A dedicated VAV terminal unit capable of controlling the space temperature and minimum ventilation shall be provided.
  - 12.2. Demand control ventilation (DCV) shall be provided that utilizes a carbon dioxide sensor to reset the ventilation set point of the VAV terminal unit from the design minimum to design maximum ventilation rate as required by Chapter 4 of the *International Mechanical Code*.
  - 12.3. Occupancy sensors shall be provided that are configured to reduce the minimum ventilation rate to zero and setback room temperature set points by a minimum of 5°F, for both cooling and heating, when the space is unoccupied.

Section C403.11. Clarify that the “outside a building” rule also includes unheated interior spaces. Also, reduce 1-hour time out to 20 minutes.

**C403.11 Mechanical systems located outside of the building thermal envelope.** Mechanical systems providing heat outside of the thermal envelope of a building shall be configured to comply with Section C403.11.1 through C403.11.3.

**C403.11.1 Heating outside a building or in unheated spaces.** Systems installed to provide heat outside a building or in unheated spaces shall be radiant systems.

Such heating systems shall be controlled by an occupancy sensing device or a timer switch, so that the system is automatically deenergized when no occupants are present in the area heated by each individual device for a period not to exceed 20 minutes.

Section C403.14. Clarify that “no loss” drains in 2015 code means “no air loss” drains.

**C403.14 Compressed air and vacuum air.** Compressed air and vacuum air systems shall comply with all of the following:

**EXCEPTION:** Compressed air and vacuum air systems used for medical purposes are exempt from this section.

1. Air Compressors (50-150 PSI), General: Air compressors operating at 50-150 PSI shall comply with the following:
  - a. All water drains shall be “no air loss” drains.
  - b. Timed unheated desiccant air driers shall not be allowed.

Section C405.2.1.1. Eliminate additional Seattle requirement for 15-minute occupant sensor timer setting, because the WA rule has been reduced from 30 minutes to 20 minutes, and it’s not worth having a separate Seattle rule for just a 5-minute timer difference.

**C405.2.1.1 Occupant sensor control function.** Occupant sensor controls shall comply with all of the following:

1. They shall be configured to automatically turn off lights within 20 minutes of all occupants leaving the space. At initial installation, occupancy sensor controls shall be set to turn lights off after 15 minutes unless other thresholds required for safety, security or operational considerations are specifically set out in the approved construction documents.
2. They shall be manual on or shall be configured to automatically turn the lighting on to not more than 50 percent power.

**Exception:** Full *automatic*-on controls shall be permitted to control lighting in public corridors, stairways, restrooms, primary building entrance areas and lobbies, parking garages, and areas where manual-on operation would endanger the safety or security of the room or building occupants.
3. They shall incorporate a manual control to allow occupants to turn lights off.

Section C405.2.1.3. Add pointer back to new requirements for open plan offices, to eliminate conflict.

**C405.2.1.3 Occupant sensor control function in open plan office areas.** Occupant sensor controls in open plan office spaces less than 300 square feet (28 m<sup>2</sup>) in area shall comply with Section C405.2.1.1. Occupant sensor controls in all other open plan office spaces shall be configured to comply with all of the following:

1. General lighting is controlled separately in control zones with floor areas not greater than 600 square feet (55 m<sup>2</sup>) within the open plan office space.
2. Automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the open plan office space.
3. General lighting power in each control zone is reduced by not less than 80 percent of the full zone general lighting power within 20 minutes of all occupants leaving that control zone. Control functions that switch control zone lights completely off when the zone is unoccupied meet this requirement.
4. Daylight responsive controls activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected.

5. Lighting controls in open plan office areas larger than 5,000 square feet must also comply with Section C405.2(1).

Section C405.2.3. Move existing prohibition from general lighting controls (C405.2) to manual controls.

**C405.2.3 Manual controls.** Stairwells and parking garages are not permitted to use wall-mounted manual switches. All other lighting shall have manual controls complying with the following:

1. They shall be in a location with *ready access* to occupants.
2. They shall be located where the controlled lights are visible, or shall identify the area served by the lights and indicate their status.
3. Each control device shall control an area no larger than a single room or 2,500 square feet, whichever is less, if the room area is less than or equal to 10,000 square feet; or one-quarter of the room or 10,000 square feet, whichever is less, if the room area is greater than 10,000 square feet.

**Exceptions:**

1. A manual control may be installed in a remote location for the purpose of safety or security provided each remote control device has an indicator pilot light as part of or next to the control device and the light is clearly labeled to identify the controlled lighting.
2. Restrooms.

Section C405.5.3. Rephrase restriction regarding parking garage lighting, to fit with revised code text.

**C405.5.3 Exterior lighting power allowance.** The total exterior lighting power allowance is the sum of the base site allowance plus the individual allowances for areas that are to be illuminated by lighting that is powered through the energy service for the building. Covered parking garage lighting is not considered exterior lighting for the purposes of this calculation. Lighting power allowances are as specified in Table C405.5.3(2). The lighting zone for the building exterior is determined in accordance with Table C405.5.3(1) unless otherwise specified by the *code official*.

Section C405.10. Informative note clarifying that simply renaming space types cannot be used to evade the controlled receptacles requirements.

**C405.10 Controlled receptacles.** At least 50 percent of all 125 volt 15- and 20-ampere receptacles installed in private offices, open offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, individual workstations and classrooms, including those installed in modular partitions and modular office workstation systems, shall be controlled as required by this section. In rooms larger than 200 square feet (19 m<sup>2</sup>), a controlled receptacle shall be located within 72 inches (1.8 m) of each uncontrolled receptacle. Controlled receptacles shall be visibly differentiated from standard receptacles and shall be controlled by one of the following automatic control devices:

1. An occupant sensor that turns receptacle power off when no occupants have been detected for a maximum of 20 minutes.
2. A time-of-day operated control device that turns receptacle power off at specific programmed times and can be programmed separately for each day of the week. ...

**SDCI Informative Note.**

The requirements of this section also apply to rooms and spaces that have substantially similar functions to those listed even when they are labeled with different names. For example, an area designed for office functions that is labeled "work room," or a room used as a classroom that is labeled "student learning" would each be required to provide controlled receptacles.

Section C406.4. Clarifies that this credit is not available for open office areas, since they are already required to provide either LLLC fixtures or a digital lighting control system.

Section C406.4. Clarify that open office areas that are already required to use LLLC or digital lighting controls are not eligible for this credit.

**C406.4 Enhanced digital lighting controls.** ~~((No))~~ Not less than 90 percent of the total installed interior lighting power within the whole building, building addition or tenant space shall comply with Section C406.4.1. **Open office areas subject to Section C405.2(1) are not permitted to take credit for this option.**

Section C406.10. Correct “exception 1” to “exception 3” in Seattle amendment.

**C406.10 Enhanced envelope performance.** The Proposed Total UA of the thermal envelope of the whole building or building addition shall be 15 percent lower than the Allowable Total UA for an area of identical configuration and fenestration area in accordance with Section C402.1.5 and Equation 4-2. Where **exception 3** for Section C412 is also being used, the UA shall be 30 percent lower than the maximum allowable UA.

Table C407.2. Add TPP to title, and add four lines to table.

**TABLE C407.2**  
**MANDATORY COMPLIANCE MEASURES FOR TOTAL BUILDING PERFORMANCE METHOD AND**  
**TARGET PERFORMANCE PATH**

Section	Title	Comments
<b>Envelope</b>		
C402.5	Air Leakage	
<b>Mechanical</b>		
C403.1.2	Calculation of heating and cooling loads	
C403.1.3	Data centers	
<u>C403.1.4</u>	<u>Use of electric resistance and fossil fuel-fired heating equipment</u>	
C403.2	System design	
C403.3.1	Equipment and system sizing	
C403.3.2	HVAC equipment performance requirements	
C403.3.6	Ventilation for Group R occupancy	
<u>C403.3.7</u>	<u>Hydronic system flow rate</u>	
C403.4	HVAC system controls	
C403.4.1	Thermostatic controls	Except for C403.4.1.4
C403.4.2	Off-hour controls	Except for Group R
C403.4.7	Combustion heating equipment controls	
C403.4.8	Group R-1 hotel/motel guestrooms	See Section C403.7.6
C403.4.9	Group R-2 and R-3 dwelling units	
C403.4.10	Group R-2 sleeping units	
C403.4.11	Direct digital control systems,	
<u>C403.4.12</u>	<u>Pressure independent control valves</u>	
C403.5.5	Economizer fault detection and diagnostics (FDD)	
C403.7	Ventilation and exhaust systems	Except for C403.7.6
C403.8	Fan and fan controls	



C403.9.1	Heat rejection equipment	Specifically, the prohibition on single-pass cooling systems is mandatory
C403.9.1.1	Variable flow controls	For cooling tower fans $\geq$ 7.5 hp
C403.9.1.2	Limitation on centrifugal fan cooling towers	For open cooling towers
C403.10	Construction of HVAC elements	
C403.11	Mechanical systems located outside of the building thermal envelope	
C403.15	Commercial food service	
(remainder of table unchanged)		

Section C407.2.1 Cap on vertical fenestration area. (2015 Seattle amendment)

This section is deleted, due to the proposed new requirement for envelope UA values to not be any worse than prescriptive code.

Section C407.3. Clarify that limit on modeling credit for renewable energy is in addition to the prescriptive baseline requirement.

**C407.3 Performance-based compliance.** Compliance with this section requires compliance with ASHRAE Standard 90.1 Appendix G, Performance Rating Method, in accordance with Standard 90.1 Section 4.2.1 with the following modifications.

1. The mandatory requirements of Section G1.2.1a of Standard 90.1 are not required to be met.
2. The reduction in annual carbon emissions of the proposed building design associated with on-site renewable energy shall not be more than 3 percent of the total carbon emissions of the baseline building design, **in addition to the renewable energy required by Section C412.**

Section C409.3. Clarify healthcare exception and correct one section reference.

**C409.3 End-use metering.** Meters shall be provided to collect energy use data for each end-use category listed in Sections C409.3.1 through C409.3.7. These meters shall collect data for the whole building or for each separately metered portion of the building where not exempted by the exception to Section C409.1. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections C409.3.1 through C409.3.6 is permitted to be excluded from that end-use data collection. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections C409.3.1 through C409.3.6 is permitted to consist of loads not part of that category. Multiple meters may be used for any end-use category, provided that the data acquisition system totals all of the energy used by that category. Full-floor tenant space submetering data shall be provided to the tenant in accordance with Section C409.7, and the data shall not be required to be included in other end-use categories.

**Exceptions:**

1. HVAC and service water heating equipment serving only an individual dwelling unit or sleeping unit does not require end-use metering.
2. Separate metering is not required for fire pumps, stairwell pressurization fans or other life safety systems that operate only during testing or emergency.
3. End use metering is not required for individual tenant spaces not exceeding 2,500 square feet in floor area when a dedicated source meter meeting the requirements of Section C409.4.1 is provided for the tenant space.
4. Healthcare facilities with loads in excess of 150 kVA are permitted to have submetering that measures electrical energy usage in accordance with the normal and essential electrical systems **as identified in Section 517 of the Seattle Electrical Code** except that submetering is required for the following load categories:

- 4.1. HVAC system energy use in accordance with the requirements of Section C409.3.1.
- 4.2. Service water heating energy use in accordance with the requirements of Section C409.3.2.
- 4.3. Process load system energy in accordance with the requirements of Section ~~((C409.3.5))~~ **C409.3.6** for each significant facility not used in direct patient care, including but not limited to, food service, laundry and sterile processing facilities, where the total connected load of the facility exceeds 100 kVA.
5. End-use metering is not required for electrical circuits serving only land guest suites within Group R-1 occupancies. This exception does not apply to common areas or to equipment serving multiple sleeping rooms.

Section C410.2. Clarify application of rule.

**C410.2 Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers.** *Refrigerated warehouse coolers, refrigerated warehouse freezers, and all walk-in coolers and walk-in freezers including site assembled, site constructed and prefabricated units shall comply with the following. **Where they comprise any portion of the thermal envelope of the building,** they shall comply with the requirements of Section C402, using the R-values or U-values listed in this section. Section C402.1.5 component performance alternative is permitted to be used where *approved by the code official.**

Sections C411 & C412. Renumber solar readiness and renewable energy sections so that they conform to new state code numbering.

Since the state code now has Solar Readiness as its new Section C411, rather than C412 as in the 2015 Seattle code, we are switching the Seattle code section numbering to match. So Solar Readiness is now C411, and Renewable Energy is C412.

Section C411.1. Include multifamily buildings in solar readiness requirement

**C411.1 General.** ~~((A))~~ *In addition to the requirements of C411, a solar zone shall be provided on **((non-residential))** buildings that are 20 stories or less in height above grade plane. The solar zone shall be located on the roof of the building or on another structure elsewhere on the site. The solar zone shall be in accordance with Sections C411.2 through C411.8 and the *International Fire Code.**

Section C502.2.2. Strike one option that appears to be an error carried over from 2015 WA code.

**C502.2.2 Skylight area.** *Additions with skylights that result in a total building skylight area less than or equal to that specified in Section C402.4.1 shall comply with Section ~~((C402.4))~~ C402. Additions with skylights that result in a total building skylight area greater than that specified in Section C402.4.1 shall comply with one of the following:*

1. ~~((Vertical fenestration alternate per Section C402.4.1.1 or C402.4.1.3 for the addition area of the building only))~~
2. Component performance alternative with the target area adjustment per Section C402.1.5 for the addition area of the building only.
3. Existing building and addition area combined to demonstrate compliance with the component performance alternative for the whole building.
4. Total building performance in accordance with Section C407 for the addition area of the building only.
5. Total building performance for the whole building.

Section C502.2.6. Section reference fix.

**C502.2.6.2 Exterior lighting power.** The total exterior lighting power for the addition shall comply with Section ~~((C405.5.1))~~ C405.5.2 for the addition alone, or the existing building and the addition shall comply as a single building.

Section C503.3.1. Clarify that insulation is required for roof replacements on buildings that have no existing roof insulation at all.

**C503.3.1 Roof replacement.** *Roof replacements* shall comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is part of the *building thermal envelope* and contains no insulation or contains insulation entirely above the roof deck.

C503.3.2. Correct errors in State code text for items 1 & 3, and rewrite exception language for clarity.

**C503.3.2 Vertical fenestration.** The addition of *vertical fenestration* that results in a total building vertical fenestration area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.4. Alterations that result in a total building vertical fenestration area greater than specified in Section C402.4.1 shall comply with one of the following:

1. Vertical fenestration alternate in accordance with Section C402.4.1.3 for the new vertical fenestration added, where the calculation of vertical fenestration area and gross above-grade wall area shall include only those areas ((in the addition)) of the building involved in the alteration.
2. ~~((Vertical fenestration alternate in accordance with Section C402.4.1.1 for the area adjacent to the new vertical fenestration added.))~~ (Reserved)
3. Existing building and ~~((alternation))~~ alteration area are combined to demonstrate compliance with the component performance alternative with target area adjustment in accordance with Section C402.1.5 for the whole building. The Proposed Total UA is allowed to be up to 110 percent of the Allowed Total UA.
4. Total building performance in accordance with Section C407 for the whole building. The total annual carbon emissions from energy consumption of the proposed design is allowed to be up to 110 percent of the annual carbon emissions from energy consumption allowed in accordance with Section C407.3.

**Exception:** ~~((Additional))~~ Where approved by the code official, additional fenestration is permitted where sufficient envelope upgrades beyond those required by other sections of this code are included in the project so that the addition of vertical fenestration does not cause an increase in the overall energy use of the building. ~~((a reduction in overall building energy efficiency, as approved by the code official.))~~

Section C503.3.2.1. Clarify existing Seattle code amendment by changing 2015 term “overall” to “area-weighted.”

**C503.3.2.1 Application to replacement fenestration products.** Where some or all of an existing *fenestration* unit is replaced with a new *fenestration* product, including sash and glazing, the replacement *fenestration* unit shall meet the applicable requirements for *U*-factor and *SHGC* in Table C402.4. In addition, the area-weighted U-value of the new fenestration shall be equal to or lower than the U-value of the existing fenestration.

Section C503.6. Clarify that the rules in this section apply to receptacles generally, not just controlled receptacles..

**C503.6 Lighting, ((controlled)) receptacles and motors.** Alterations or the addition of lighting, ~~((controlled))~~ receptacles and motors shall comply with Sections C503.6.1 through C503.6.6.

Section C503.6.1. Clarify that Seattle 20% rule for lighting power in alterations applies equally to garages and exterior lighting.

**C503.6.1 Luminaire additions and alterations.** Alterations that add, alter or replace ~~((50))~~ 20 percent or more of the luminaires or of the lamps plus ballasts alone in a space enclosed by walls or ceiling-height partitions, replace ~~((50))~~ 20 percent or more of parking garage luminaires, or replace ~~((50))~~ 20 percent or more of the total installed wattage of exterior luminaires shall comply with Sections C405.4 and C405.5. Where less than ~~((50))~~ 20 percent of the fixtures in an interior space enclosed by walls or ceiling-height partitions or in a parking garage are added or replaced, or less than ~~((50))~~ 20 percent of the installed exterior wattage is replaced, the installed lighting wattage shall be maintained or reduced.

Footnotes for Section C503.4 (economizer rules for alterations). Clarify terminology and values.

- a. Minimum equipment efficiency shall comply with Section C403.3.2 and Tables C403.3.2(1) through C403.3.2(12).
- b. All separate new equipment and replacement equipment shall have air economizer complying with Section C403.5 including both the individual unit size limits and the total building capacity limits on units without economizer. It is acceptable to comply using one of the exceptions to Section C403.5.
- c. Reserved.
- d. Equipment shall have a capacity-weighted average cooling system efficiency that is 5 percent better than the requirements in Tables C403.3.2(1) and C403.3.2(2) (1.05 x values in Tables C403.3.2(1) and C403.3.2(2)).
- e. Equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(1)A and C403.3.2(2) (1.10 x values in Tables C403.3.2(1)A and C403.3.2(2)).
- f. Minimum of 50 percent air economizer that is ducted in a fully enclosed path directly to every heat pump unit in each *zone*, except that ducts may terminate within 12 inches of the intake to an HVAC unit provided that they are physically fastened so that the outside air duct is directed into the unit intake. If this is an increase in the amount of outside air supplied to this unit, the outside air supply system shall be configured to provide this additional outside air and be equipped with economizer control.
- g. Water-source heat pump systems shall have a flow control valve to eliminate flow through the heat pumps that are not in operation and variable speed pumping control complying with Section C403.4.3 for that heat pump.
  - When the total capacity of all units with flow control valves exceeds 15 percent of the total system capacity, a variable frequency drive shall be installed on the main loop pump.
  - As an alternate to this requirement, the capacity-weighted average cooling system efficiency shall be 5 percent better than the requirements in footnote e for water-source heat pumps (i.e. a minimum of 15 percent better than the requirements in Table C403.3.2(2) (1.15 x values in Table C403.3.2(2)).
- h. Water economizer equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(8) and C403.3.2(9) (1.10 x values in Tables C403.3.2(8) and C403.3.2(9)).
- i. Air economizer is not required for systems installed with water economizer plate and frame heat exchanger complying with previous codes between 1991 and June 2016, provided that the total fan coil load does not exceed the existing or added capacity of the heat exchangers.
- j. For water-cooled process equipment where the manufacturers specifications require colder temperatures than available with water-side economizer, that portion of the load is exempt from the economizer requirements.
- k. The air-cooled chiller shall have an IPLV efficiency that is a minimum of 10 percent greater than the IPLV requirements in EER in Table C403.3.2(7) (1.10 x IPLV values in EER in Table C403.3.2(7)).
- l. The air-cooled chiller shall be multistage with a minimum of two compressors.
- m. ~~((The water-cooled chiller shall have full load and part load IPLV efficiency that is a minimum of 5 percent greater than the IPLV requirements in Table C403.3.2(7) (1.05 x IPLV values in Table C403.3.2(7)).))~~
- n. The water-cooled chiller shall have an IPLV value that is a minimum of 15 percent lower than the IPLV requirements in Table C403.3.2(7), 0.85 ~~((4.45))~~ x IPLV values in Table C403.3.2(7)). Water-cooled centrifugal chillers designed for non-standard conditions shall have an NPLV value that is at least 15 percent lower than the adjusted maximum NPLV rating in kW per ton defined in Section C403.3.2.1 0.85 ~~((4.45))~~ x NPLV).

- o. Economizer cooling shall be provided by adding a plate-frame heat exchanger on the water-side with a capacity that is a minimum of 20% of the chiller capacity at standard AHRI rating conditions.
- p. Reserved.
- q. Systems installed prior to 1991 without fully utilized capacity are allowed to comply with Option B, provided that the individual unit cooling capacity does not exceed 90,000 Btuh.

Section C503.4.6 Link alteration rules to 2018 restrictions on electric resistance and fossil fuel heating, in place of the 2015 rules that linked to the choice between heat pump heating and high-performance glazing.

**C503.4.6 New and replacement HVAC heating system equipment.** For substantial alterations as defined in Section C503.8.1, or where a building's central HVAC heating system equipment is augmented or replaced, **the building shall comply with Section C403.1.4.**

Section C503.6.1 Correct percentages for lighting alterations threshold.

**C503.6.1 Luminaire additions and alterations.** Alterations that add, alter or replace ~~((50)) 20~~ percent or more of the luminaires or of the lamps plus ballasts alone in a space enclosed by walls or ceiling-height partitions, replace ~~((50)) 20~~ percent or more of parking garage luminaires, or replace ~~((50)) 20~~ percent or more of the total installed wattage of exterior luminaires shall comply with Sections C405.4 and C405.5. Where less than ~~((50)) 20~~ percent of the fixtures in an interior space enclosed by walls or ceiling-height partitions or in a parking garage are added or replaced, or less than ~~((50)) 20~~ percent of the installed exterior wattage is replaced, the installed lighting wattage shall be maintained or reduced.

Section C503.8 General clarifications. Clarify that for substantial alterations, applicants must show documentation at the pre-submittal conference that they have already met with utilities regarding incentive programs. Clarify that C406 is part of compliance with code for option 2. Modify options 3 and 4 to coordinate with 2018 energy modeling terminology.

**C503.8.2 Pre-submittal conference.** The applicant shall attend a pre-submittal conference to discuss the selected compliance path. Prior to this conference, the applicant shall meet with each energy utility serving the building to determine whether technical assistance or financial incentives are available for energy efficiency upgrades, and shall submit documentation of these meetings **at the pre-submittal conference.**

**C503.8.3 Energy Efficiency.** Buildings undergoing substantial alterations shall comply with Section C503.4.6 and one of the following:

1. **Full code compliance.** Fully comply with the requirements of this code for new construction, including Section C406.
2. **Envelope thermal performance within 15 percent of code.** Demonstrate that heat loss through the building envelope is no more than 15 percent greater than allowed by the Seattle Energy Code, using the Component Performance Building Envelope Option in Section C402.1.5, and meet all other prescriptive requirements of the Seattle Energy Code for new construction, including Section C406.
  - 2.1. **Default U-values.** The values listed in Appendix A and Section C303 shall be used as the default U-values for existing building envelope components. For buildings whose original construction permits were applied for after January 1, 1992, existing building

envelope components are deemed to meet the minimum U-values required by the edition of the Seattle Energy Code in effect at the time of permit application, where visual inspection by the *code official* reveals that those components appear to be equal to or better than code-compliant components.

2.2. **Disproportionality.** Where *approved* by the code official, the cost of required thermal improvements to the building envelope are not required to exceed 20 percent of the valuation of the substantial alterations project, determined in accordance with the Fee Subtitle, when using this envelope thermal performance compliance method. Envelope improvement costs shall be documented using standard cost estimating software and methodology.

3. **Total building performance within 10 percent of code.** Demonstrate that the Building Performance Factor is no more than 10 percent higher than that permitted by Table C407.3.2.

4. **Operating energy alternative.** The *code official* is permitted to allow calculated building performance factor 20 percent greater than the baseline building design calculated in accordance with the Total Building Performance methodology in Section C407, provided that:

Section C506.3 Clarify that only one tenant space metering display is required for a multi-floor tenant.

**C506.3 Tenant space electrical sub-metering for existing buildings.** For tenant improvements in which a single tenant will occupy a full floor or multiple floors of a building, the electrical consumption for the tenant space on that floor shall be separately metered, and the metering data provided to the tenant with a display system per the requirements of Section C409.4.3. For the purposes of this section, separate end use categories need not be segregated.

**Chapter 6, Referenced Standards** Update WA reference from 2016 version of ASHRAE 90.1 to show 2019 version, to incorporate latest refinements in Appendix G. The 2019 edition of Appendix G in ASHRAE 90.1 resolves some technical issues with the 2016 edition.

90.1—((2016)) 2019	Energy Standard for Buildings Except Low-rise Residential Buildings (ANSI/ASHRAE/IESNA 90.1—((2016)) 2019)	Table C402.1.3, Table C402.1.4, C406.2 ((Table C407.6.1))
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Appendix D, Section C201. Clarify status of renewable energy for TSPR calculation, with footnote in table.

**D201 Compliance.** Compliance based on HVAC total system performance ratio requires that the provisions of Section C403.3 are met and the HVAC total system performance ratio of the proposed design is more than or equal to the HVAC total system performance ratio of the standard reference design. The HVAC TSPR is calculated according to the following formula:

HVAC TSPR = annual heating and cooling load /annual carbon emissions from energy consumption of the building HVAC systems

Where: Annual carbon emissions from energy consumption of the building HVAC systems = sum of the annual carbon emissions in pounds for heating, cooling, fans, energy recovery, pumps, and heat rejection calculated by multiplying site energy consumption by the carbon emission factors from Table C407.1

Annual heating and cooling load = sum of the annual heating and cooling loads met by the building HVAC system in thousands of Btus.

**TABLE C407.3(1)  
CARBON EMISSIONS FACTORS**

Type	CO2e (lb/unit)	Unit
Electricity	0.70	kWh
Natural Gas	11.7	Therm
Oil	19.2	Gallon
Propane	10.5	Gallon
Other <sup>a</sup>	195.00	mmBtu
On-site renewable energy <sup>b</sup>	0.00	

- a. District energy systems may use alternative emission factors supported by calculations approved by the *code official*
- b. The TSPR calculation does not separately account for the use of renewable energy.

Appendix E, modeling reporting format, eliminate entirely

Since we are completely changing our approach to energy modeling, the old reporting format will no longer be relevant. We will instead establish a Director’s Rule that will make use of electronic reporting formats developed by DOE and others.