

Summary of Changes for the 2021 Washington State Energy Code, Commercial Provisions

Please Note: Sections that had no changes are not shown in this filing and remain in effect as shown in the 2018 Washington State Energy Code.

Chapter 1

Section C101.1: A new paragraph was added to clarify the effective date of the new edition of the code.

Section C102.1: **IECC CHANGE** - Changes made to the model code for consistency throughout the International Code family.

Section C130.1: **IECC CHANGE** - Change to the model code allowing digital submittal of construction documents.

Section C103.2: **IECC CHANGE** - Change to the model code requiring the compliance path to be shown on the construction documents.

Sections C104-112: The Fees section was moved to Section C104 from C107 for consistency with the model code. The Inspections section was moved to C105, and former sections C104.7 and C104.7.1 became Section C106, Notice of Approval. Subsequent sections were renumbered to accommodate the additional section, but no additional changes were made, except for minor editorial changes to C109.

Section C109: **IECC CHANGE** - Minor editorial changes for consistency throughout the International Code family.

Chapter 2

The following definitions were changed or added at the model code level: Above-grade wall, Biogas, Biomass, Computer room, Corridor, Data center, Data center systems, Demand recirculation water system, Direct digital control, Enthalpy recovery ratio, Fan, embedded, Fan array, Fan efficiency grade (deleted), Fan energy index, Fan system electrical input power, Fault detection and diagnostics system, Skylights, General lighting, Greenhouse, Information technology equipment, Internal curtain system, Large diameter ceiling fan, Networked guest room control system, On-site renewable energy, Renewable energy resource, Testing unit enclosure area, Thermal distribution efficiency, Visible transmittance, annual, and Wall.

The following definitions were changed or added via a proposed state amendment:

Alternating current—output uninterruptible power supply 137

Attic and other roofs – Editorial changes for clarity

Automatic control device – New definition added to provide some clarification.

Building entrance – Editorial changes for clarity

Building thermal envelope – Definition modified to include reference to other pertinent terms to provide clarification

Ceiling fan – Added the ASHRAE definition for ceiling fan to differentiate from *large diameter ceiling fan*

- Commercial boiler** – Added definition to coordinate with the changes in Section C403.3.4 and differentiate from *process boiler*
- Community renewable energy system** – One of three terms added to coordinate with the changes in Section C407 on use of renewable energy
- Compressed air system** – One of three terms added to coordinate with new Section C412 regulating compressed air systems
- Conditioned space** – Incorporates language from Seattle clarifying that some spaces used to transfer air are considered conditioned spaces for the purpose of *building thermal envelope* requirements
- Continuous insulation** – Added sentence to coordinate with the allowance of stainless steel fasteners in Table C402.1.3
- Controlled plant growth environment** – Added clarification this only applies if the space is used exclusively for plant production
- Controlled receptacle** – Added definition to clarify intent
- Dedicated outdoor air system** – a general definition of DOAS was added
- Demand control kitchen ventilation** – New term added as part of the changes in Section C403.7.7.1.3.
- Demand response signal, Demand responsive control** – Two new definitions added to support proposed changes to C403.4.1.7 and C404.14 requiring demand responsive controls on water heaters
- Desiccant dehumidification system** – One of three added definitions to support the proposed requirement in Section C403.15 for dehumidification for indoor plant growth
- Directly owned off-site renewable energy system** – One of three terms added to coordinate with the changes in Section C407 on use of renewable energy
- Door, garage** – Clarification added to differentiate garage doors and to coordinate with the change to Table C402.1.4 added line and footnote for garage doors with up to 50% glazing
- Electrical load coefficient** – This term was eliminated as it is no longer referenced in the data center requirements in ASHRAE 90.4
- Fan electrical input power, Fan system, Fan system, complex, Fan system, exhaust/relief, Fan system, multi-zone variable air volume, Fan system, return, Fan system, single cabinet, Fan system, supply only, Fan system, single-cabinet, and Fan system airflow** – all modifications and additions support the revisions to Section C403.8.1 and the new fan power allowance tables
- Historic buildings** – This definition was modified to match the language in the International Energy Conservation Code, which was the work of a collective involving, among others, the AIA and the National Trust of Historic Preservation; the language in Section C501.6 also defaulted back to the base IECC language
- Integrated HVAC system** – One of three added definitions to support the proposed requirement in Section C403.15 for dehumidification for indoor plant growth.5
- Largest net capacity increment** – One of three terms added to coordinate with new Section C412 regulating compressed air systems
- Low carbon district energy exchange system, Low carbon district heating and cooling or heating only system** – These two terms were added to support the changes in Sections C404 and C407 regulating the utilization of district energy

Luminaire-level lighting control – Clarification that either local or central wireless control is acceptable for LLLC systems.

Mass transfer deck slab – Clarification to the existing definition from the Seattle code and corresponds with the change proposed in Table C402.1.3 clarifying how this detail is accounted for in the thermal performance calculations

Mechanical room – A definition was added to help clarify the intent of Section C403.5, exception 1

Multi-pass – One of the three added definitions to support the proposal for heat pump water heating

Photosynthetic photon efficacy – A new definition added to support the plant growth lighting efficiencies in Section C405.3

Primary storage – One of three terms added to coordinate with new Section C412 regulating compressed air systems

Process boiler – Added definition to coordinate with the changes in Section C403.3.4 and differentiate from *commercial boiler*

Renewable power purchase agreement – One of three terms added to coordinate with the changes in Section C407 on use of renewable energy

Semi-heated space – Editorial changes to clarify the definition

Single-pass – One of the three added definitions to support the proposal for heat pump water heating

Solar zone – A new definition added to help clarify the requirements in Section C411

Stand-alone dehumidifier – One of three added definitions to support the proposed requirement in Section C403.15 for dehumidification for indoor plant growth.

System – A new definition from ASHRAE 90.1 to support and help clarify the requirements in C403.4.11 on when DDC controls are required

Temperature maintenance – One of the three added definitions to support the proposal for heat pump water heating

Unconditioned space – Definition based on ASHRAE 90.1 to help clarify building thermal envelope requirements

Chapter 3

Section C303.1.2: **IECC CHANGE** – Added guidance on how to identify products that have no R-value markings

Section C303.1.3: **IECC CHANGE** – Clarification on rating and measuring tubular daylighting devices

Chapter 4

Section C401.2: **IECC CHANGE** – Editorial change to label the compliance paths

Section C401.2.1: The IECC modified this section and made it an exception to C401.2. The WSEC used the modified language but kept it as a subsection for better consistency with the state code

Section C401.2.2: This section was added to pull together all of the sections that reference requirements for process equipment elsewhere in the code.

Section C401.3: **IECC CHANGE** – This section was added to require a permanent certificate with all pertinent information on the building thermal envelope to be posted, similar to that required by the residential provisions

Section C402 Envelope

Section C402.1.1.1: This change clarifies that areas must meet the definition of an enclosed space to be considered a low energy building, making it clear that parking garages are not considered low energy buildings

Section C402.1.1.2: The semi-heated building provisions contains several proposed changes. The specification for other than electric resistance heating was removed to clarify that the previously allowed electric infrared heating equipment must also meet the limitations defined for semi-heated spaces. This also provides some clarity for the use of heat pumps with cooling disabled. Clarification is also proposed to specify that fenestration is still required to meet the code and is not considered part of the opaque wall. The term “standard reference” was updated to “baseline building design.” The exceptions were modified to correlate with the other changes.

Section C402.1.1.3: Terms within the greenhouse requirements were updated to conform with the new section adopted in the IECC. The table was also updated to the current IECC standards, but retaining the 2018 WSEC value for vertical fenestration.

Section C402.1.2: Editorial correction to item 2 and the citation of the efficiency table was updated to the 2021 IECC revisions; the former Table C403.3.2(2) was split into two separate tables consistent with ASHRAE 90.1

Table C402.1.3: There are two options offered for both opaque thermal envelope tables. Option 1 modifies the mass wall footnote c, limiting the application of the exception single wythe concrete block walls exposed on both sides. Option 2 removes the exception.

Other changes in this section (in both options) include increases in various R-values (**IECC CHANGE**), moving the opaque door requirement to Table C402.1.4, and adding a footnote to the mass transfer deck slab edge row stating that buildings with this feature must use the component performance method and deleting the table R-value. Footnote j was modified to include values for stainless steel penetrations. New footnote l adds a maximum area allowed for through-the-wall mechanical equipment using the R-value table.

Section C402.1.3: **IECC CHANGE** – language added to provide guidance on the correct procedure to calculate layered insulation thermal values.

Sections C402.1.4.1-C402.1.4.1.2: **IECC CHANGE** – New sections to clarify the use of area weighted average U-factor option.

Section C402.1.4.3: New section requires heat loss for PTAC, PTHP and other through-wall mechanical equipment to be calculated as part of the envelope using the U-factor compliance method.

Table C402.1.4: There are two options offered for both opaque thermal envelope tables. Option 1 modifies the mass wall footnote d, limiting the application of the exception single wythe concrete block walls exposed on both sides. Option 2 removes the exception.

Other changes in this section (in both options) include increases in various U-factors (**IECC CHANGE**), moving the opaque door requirement from Table C402.1.3, adding a new line for garage doors with glazing between 14 and 50%, and adding a footnote to the mass transfer deck slab edge row on how to address the detail using the component performance method. A footnote is also added referencing Section C402.1.4.3 for through the wall PTACs and similar mechanical equipment.

Section C402.1.5.1: Editorial change, adding a reference to F-factors into the paragraph.

Section C402.2: Editorial changes.

Sections C402.2.1-C402.2.1.4: **IECC CHANGE** – The continuous insulation sentence was moved from this section to new section C402.1.4.1.2. Exception 1 was deleted and addressed in new section C402.2.1.1 with less confusing language. Other new subsections provide guidance on various roof insulation details with content reorganized and renumbered.

Section C402.2.2: Above grade walls section was just renumbered, no change.

Section C402.2.3: Floors section (and above grade walls) was just renumbered, no change.

Section C402.2.6: Slab on grade section (and below grade walls) was renumbered, with some editorial changes for clarity coming from IECC changes.

Section C402.2.5: Below grade walls section (and floors) was renumbered with no changes.

Section C402.2.6: Insulation of radiant heating systems (and slab on grade perimeter insulation) was renumbered with no changes.

Section C402.2.7: Airspaces has some editorial changes for clarity.

Sections C402.2.8, C402.2.9: New sections to provide guidance on control of thermal bridging at concrete balconies (C402.2.8) and fenestration frames (C402.2.9).

Section C402.4: Corrected reference.

Table C402.4: Window U-factors are reduced, a U-factor is added for operable windows under "...all others." Window orientation has been changed to fixed and operable to align with the IECC, and the footnote struck.

Section C402.4.1.1.2: The high performance fenestration U-factors were decreased and the SHGC adjusted to correlate with the new values in Table C402.4.

Section C402.4.2: The minimum skylight area was amended to better match the ASHRAE 90.1 language and requires skylights in any space under a roof that meets the criteria, not just single story spaces.

Section C402.4.2.1: Editorial change.

Section C402.4.2.2: Adds tubular daylighting devices to the skylight exception.

Section C402.4.2.3: Editorial change.

Section C402.4.4: For the 2021 edition, the IECC turned this into three subsections and divided the door types between the two envelope tables. To match the changes in the WSEC moving all of the door types into Table C402.1.4, this was edited back into one section and simplified.

Section C402.5.1: Editorial changes for clarity.

Section C402.5.1.2-C402.5.3: The IECC changed the model code to require air barrier testing, as has been required by the WSEC for the last few code cycles. The new language was further modified to conform to existing WSEC requirements. The existing WSEC exception allowing up to 0.30 cfm per square foot leakage with corrective action is deleted and testing must not exceed the 0.25 cfm per square foot rate.

Section C402.5.4: Editorial section corrections.

Section C402.5.5: Renumbered; and the duct insulation value in 2.5 was increased to match the requirement in Section C403.10.1.1.

Sections C402.5.6-C402.5.8: Renumbered only, no changes.

Section C402.5.9: Renumbered; new exception to exempt doors accessing only outdoor seating areas.

Section C402.5.10: Renumbered, no changes.

Section C402.5.11: The IECC added a section requiring operable openings to be interlocked with the HVAC system. The language was modified to correlate with the existing WSEC requirement in Section C403.4.1.6.

Section C403 Mechanical

Section C403.1: The exception was revised to correlate with the change made to **Section C401.2.2** to more clearly show which code provisions applied to process equipment.

Section C403.1.1: The HVAC TSPR section was modified to include residential occupancies and provides clarifications based on interpretation questions. An exception was also added for HVAC systems connected to a low-carbon district energy exchange system.

Section C403.1.3: The requirements for data centers were revised for consistency with the most recent requirements of ASHRAE 90.4. There is no longer a need to modify the inputs.

Section C403.1.4: A new section is added to disallow the use of electric resistance and fossil fuel-fired heating equipment, except for small loads and as supplemental heating, and for fossil fuel auxiliary heat in climate zone 5 under certain conditions.

Section C403.2.1: Clarifications were made to the zone isolation requirements for ease of use and understanding.

Section C403.2.2.1: Clarification was added in Exceptions 1 and 2, and a fifth exception was added to allow overventilation for indoor air quality with efficiency energy recovery ventilation.

Section C403.2.3: **IECC CHANGE** – New section/requirement for fault detection and diagnostics in new buildings over 100,000 square feet, except residential occupancies, to reduce efficiency degradation of the HVAC system.

Section C403.2.4: Renumbered, and the threshold for variable speed drive requirements was decreased from 7.5 hp to 5.0 hp.

Tables C403.3.2(1)A through (12) (2018 Code) were reordered and reorganized into Tables C403.3.2(1) through (15) (2021 Code). They were moved to fall into correct numerical order within the WAC (WAC 51-11C-40332X rather than 51-11C-40323X).

ICC reorganized the tables to be more in line with the ASHRAE 90.1 order and content, and the footnotes now point to the corresponding ASHRAE table number. Where appropriate, the tables were updated to the latest federal standards.

Section C403.3.2: ICC CHANGE – This section was updated in conjunction with the change in efficiency table numbering.

Section C403.3.2.1/C403.3.2.2– These sections were broken out of Section C403.3.2, with gas-fired and oil-fired furnaces and high-capacity cooling equipment becoming new subsections. C403.3.2.2 also includes text previously codified as C403.6.7, moving it into the equipment selection section where it more logically belongs.

Section C403.3.2.3: This section was renumbered to accommodate the two new subsections above.

Section C403.3.2.4/C403.3.2.5: IECC CHANGE – This section was updated by ICC to coordinate with the efficiency table extract from ASHRAE 90.1. Renumbered to coordinate with the reformat of Section C403.3.2.

Section C403.3.2.6: Requires packaged and split systems providing heating and cooling, or cooling only, to be heat pumps. The requirement previously applied to packaged systems with both heating and cooling.

Section C403.3.4 through C403.3.4.4: New sections with criteria for combustion air controls and minimum stake gas oxygen concentration levels for boiler systems, applicable to building and process boilers. Also adds associated definitions.

Section C403.3.4.5 through C403.3.4.5.2: Adds requirements from ASHRAE 90.1 for high capacity gas-fired hot water boiler systems to have condensing boilers.

Section C403.3.5: Updates the language and reformats the heat/energy recovery requirements with DOAS to improve clarity. It also provides a calculation procedure for watts per cfm and clarifies which fans are required to be included in this calculation. Also adds a definition of DOAS.

Section C403.3.5.1/C403.3.5.2: Increase the ERV effectiveness to 60 percent enthalpy recovery effectiveness or 68 percent minimum sensible recovery effectiveness, from the previous values of 50/60 percent. The exception is also limited to 650 square feet, with a smaller allowance for occupant load. Clarifies the application of the demand control ventilation exception to the requirement for energy recovery with DOAS. Incorporates the AHRI 1060 calculation for sensible recovery effectiveness.

Section C403.3.5.5: New section adding requirements for supplemental heating and cooling capacity sizing and control requirements in DOAS.

Section C403.3.5.6: Editorial changes for clarity.

Section C403.3.6: Clarification of requirements, with a reference back to the new AHRI calculation for sensible recovery effectiveness and an exception added to allow HVI 920 as an alternate for residential and light commercial H/ERVs.

Section C403.3.7: A new section and table are added to incorporate requirements from ASHRAE 90.1 limiting the flow rate in critical circuits of hydronic systems to minimize flow resistance.

Section C403.3.8/C403.3.8.1/C403.3.8.3: A new section is added based on ASHRAE 90.1 to require minimum temperature difference for hydronic coils for increased pump efficiency and primary equipment efficiency.

Section C403.4.1: Exception 2 was rewritten for clarity.

Section C403.4.1.1: The exception for supplemental heat in PTHPs was revised to correlate with the new requirement in Section C403.3.2.4 to require a heat pump with defrost and the ability to operate in heat pump mode whenever the air temperature is over 25 degrees and the unit is not in defrost.

Section C403.4.1.4: Editorial change to the title to correlate with section content.

Section C403.4.1.6: Correlation language with the new IECC scoping for operable opening interlocks in Section C402.5.11.

Section C403.4.1.7: Adds a requirement for demand responsive controls for thermostats in all buildings except health care and assisted living. It does not require participation in any demand response programs.

Section C403.4.2.3: IECC CHANGE – ICC added language regulating automatic stop controls using language nearly identical to the existing WSEC language. A few correlating changes were made to mirror the ICC language.

Section C403.4.4: An exception was added to the part load controls for hydronic systems with thermal energy storage.

Section C403.4.11.1: Correlation with the new requirement in Section C406 for load management.

Section C403.4.11.2/C403.4.11.3: Editorial changes.

Section C403.4.11.4: Clarify that, for example, standalone mini-split heat pump and PTHPs installed in a residential apartment building that have no need for an interface between each other require a central DDC system. This change would require water source heat pumps or water source VRF systems (for example) that are part of a central system to have central DDC Controls. Correlating definitions from 90.1-2019 were also added to Chapter 2.

Section C403.4.12: Requires pressure independent control valves where the flow rate over coils is over 5 gallons per minute.

Section C403.5: Exception 1 for Economizers clarifies that it is for other than Group R-2 occupancies. Exception 5 was modified to clarify that the supply fan is not required to be installed outside the building thermal envelope. The equipment efficiency table references throughout have been updated.

Section C403.5.5: IECC CHANGE – Updated references to the equipment efficiency tables.

Section C403.6.1: Editorial change.

Section C403.6.4: IECC CHANGE – Specific requirements related to dehumidification control interaction are added to clarify requirements for supply air temperature reset.

Section C403.6.7 was moved to C403.3.2.2.

Section C403.6.10: Editorial changes to correlate with the fan system updates in Section C403.8.

- Section C403.7.1 through C403.7.1.2:** The demand control ventilation section is reformatted. The energy recovery exception is removed, and the various thresholds are reduced. Gas sensors are required in spaces and systems required to have VSD control.
- Section C403.7.3:** Coordinating modifications to the sizing and control requirements for DOAS heating and cooling in Section C403.3.5.5.
- Section C403.7.4.1: **IECC CHANGE** – Clarifications of requirements for guest room temperature control.
- Section C403.7.4.2:** Changes the threshold of when HVAC controls shut off in an occupied guest room from 30 minutes to 20 minutes.
- Section C403.7.5:** Clarifies that the requirements include repair garaged and require variable frequency drives on all fan motors 5 hp and greater.
- Section C403.7.5.1:** Clarify that the function of the ventilation system shall be activated by the sensors.
- Section C403.7.5.2:** Exception is removed to correlate with the mechanical code requirements for parking garage ventilation.
- Section C403.7.6 through C403.7.6.2:** The IECC language was modified to align with the ASHRAE 90.1 requirements for energy recovery ventilation, including breaking it out into dwelling unit and other than dwelling unit requirements. This language was integrated into the WSEC language, retaining the Group R-2 designation. This proposal increases the enthalpy recovery ratio from 50 to 60 percent for other than R-2 occupancies.
- Section C403.7.7.1.3:** Requires demand control kitchen ventilation on hoods over 2,000 cfm and clarifies the existing language. An associated definition for demand control kitchen ventilation was added in Chapter 2.
- Section C403.7.8.1: **IECC CHANGE** – Under exception 2, the allowance for gravity dampers was reduced from a design capacity of 400 cfm to 300 cfm.
- Section C403.8:** The requirement for Group R exhaust fans to comply with efficacy requirements was changed to all low capacity ventilation fans.
- Section C403.8.1 through C403.8.4 (and associated tables):** Updates the approach to fan power limitations and aligns with the Title 24 method. It also moves the threshold down to cover smaller nameplate HP fans. Group R exhaust fans were switched to low capacity ventilation fans—fans with motors less than 1/12 hp. Associated definitions related to fan systems were also added to Chapter 2, and a correlating change was made to Section C503.4.
- Section C403.8.6: **IECC CHANGE** – Added testing standards for large-diameter ceiling fans.
- Section C403.9.1: **IECC CHANGE** – Editorial; updating efficiency table references.
- Section C403.9.2.1/C403.9.2.4:** Editorial; clarification of title to match section content.
- Section C403.9.2.2:** Editorial; language clarification for steam condensate systems.
- Section C403.10.1.1:** Editorial changes to the duct requirements. Updating the section title to match the section content. Content broken into paragraphs for clarity. Exception 2 was deleted as it conflicted with other duct insulation requirements.

Section C403.10.1.2: **IECC CHANGE** – New requirement for underground ducts using thermal distribution efficiency to be listed and labeled with such. A definition for TDE was also added to Chapter 2.

Section C403.10.2: Clarifications added to define terms used in the duct construction sections.

Section C403.10.3: Clarifications on when piping is exempt from the pipe insulation requirements.

Section C403.10.3.1: Clarifications on required protection of pipe insulation exposed to weather.

Section C403.10.4: New section with requirements specific to HVAC system refrigerant piping insulation and protection to differentiate from the general requirements.

Section C403.12: Changing the term “fan system bhp” to “fan power budget” to correlate with the changes in Section C403.8. Efficiency table references are also updated.

Section C403.13: New section with requirements for dehumidification efficiency for indoor growing facilities. (Note: there is a typo in the section number. The CR102 has this as Section C403.15, but coming before C403.14)

Section C403.14: Relocation of the previous Section C403.13, no change.

Section C404 Service Water Heating

Section C404.1: An exception is added to correlate with the change in Section C401.2.2. This language was previously located in C401 but is more usefully located within the service water heating section.

Section C402.2: There are two options offered under this section. Two different sets of code change proposal were put forward for public hearing. The Council is seeking testimony on the preferred option:

Option 1: The existing WSEC requirements for water heaters are updated to reference UEF rather than EF, with updates drawn from ASHRAE 90.1 reflecting the 2017 DOE requirements. An exception to the requirements for high input-rated service water heating systems for systems utilizing district energy was also added.

Option 2: The existing WSEC language is struck and new language requires heat pump water heating rather than fossil fuel or electric resistance water heating in commercial buildings to provide a reduction in carbon emissions. Exceptions are provided to allow electric resistance heating for hand washing facilities.

Table C404.2: The water heater efficiency table is updated to the most recent federal requirements.

Table C404.3.1: Allows 8 feet of pipe length between circulating pipe and lavatory, instead of just 1 or 2 to permit circulating piping to run in ceiling cavity.

Section/Table C404.3.2.1: **IECC CHANGE** – This adds an allowance to use the internal volume of water distribution tubing as an alternative to using the water volume from Table C404.3.1.

Section C404.4: Editorial clarification.

Section C404.6.1: Requires thicker insulation for service water heating storage tanks designed for storage temperatures over 130 degrees.

Section C404.7: Correlation change associated with Section C404.2, Option 2.

Section C404.7.1 through C404.7.1.3: Requires ECM motors for all SWH circulation pumps. Require service water circulation systems with multiple risers or zones and variable flow circulation pumps to use self-actuating thermostatic balancing valves. Also, where electronic thermostatic mixing valves are used, configure valves to remain closed or maintain current valve position upon power loss.

Section C404.7.3.1: New section to require thicker insulation for service water system piping in the circulation loop.

Section C404.11.1: Requires heat pump water heaters on heated pools over 2000 gallons.

Section C404.14: New section to add demand response requirements for water heaters between 40 and 120 gallons to provide grid flexibility as a step towards decarbonization.

Section C404.15: Move and renumbering only, no change.

Section C405 Lighting & Power

Section C405.1/C405.1.1: The paragraph on dwelling units was deleted to remove conflicts. The IECC added the language on general lighting to set a standard for the lighting control requirements and includes language formerly found in the definition. An exception was added to correlate with the changes in Section 401.2.2 to clarify application to process equipment. The IECC made some simplifying and clarifying changes to C405.1.1.

Section C405.2: The requirements for LLLC were moved to a standalone section as referenced. The exception for uncontrolled egress lighting was reduced from 0.02 to 0.02 watts per square foot.

Section C405.2.1: The CR102 shows text from an early version of the code change proposal, not the one that was ultimately moved forward to public hearing. The intent was to clarify the control requirements for various space types, and library stacks was added to the list. The section should read:

C405.2.1 Occupant sensor controls. Occupant sensors shall be installed to control luminaires in the space types listed in Table C405.2.1, and shall comply with the requirements listed in the table.

- Exceptions:**
1. Corridors in manufacturing facilities.
 2. General lighting and task lighting in shop and laboratory classrooms.
 3. Luminaires that are required to have specific application controls in accordance with Section C405.2.6 unless specifically required to comply with this section by Section C405.2.6.

TABLE C405.2.1

OCCUPANT SENSOR COMPLIANCE REQUIREMENTS FOR SPACE TYPES

Space Type	Comply with Section
Classrooms/lecture/training rooms	C405.2.1.1
Conference/meeting/multipurpose rooms	C405.2.1.1
Copy/print rooms	C405.2.1.1
Lounge/breakrooms	C405.2.1.1
Enclosed offices	C405.2.1.1

Open plan office areas	C405.2.1.3
Restrooms	C405.2.1.1
Storage rooms	C405.2.1.1
Locker rooms	C405.2.1.1
Other spaces 300 square feet (28 m ²) or less that are enclosed by floor-to-ceiling height partitions	C405.2.1.1
Warehouse storage areas	C405.2.1.2
Library stacks	C405.2.1.2
Enclosed fire rated stairways	C405.2.1.5
Corridors	C405.2.1.6

Section C405.2.1.1: Language is simplified and correlated with the change to C405.2.1.

Section C405.2.1.2: Library stacks are added to this section, and the language is clarified.

Section C405.2.1.3: Clarification of lighting function in open office areas. Added requirement for LLC or digital lighting controls for open office areas larger than 5,000 square feet. (Note: there is a typo in this requirement—it should reference Section C405.2.8, not C405.2.7)

Section C405.2.1.4: This section was deleted to correlate with the changes to Section C405.2.8 to provide control requirements for parking garages equivalent to ASHRAE 90.1.

Section C405.2.1.6: **IECC CHANGE** – Provides uniform occupant sensor control requirements for corridor lighting. An exception is provided for corridors with less than 2 footcandles of lighting.

Section C405.2.2: Clean up of the time switch control requirements correlating to the change in C405.2.1 Exception 3.

Section C405.2.3.1: Rather than being a subsection of manual controls, light reduction controls was moved to C405.2.4.

Sections C405.2.4/C405.2.4.1: **IECC CHANGE** – The light reduction controls section was moved and reformatted, separating out the scoping and technical requirement section.

Section C405.2.5: Daylight responsive controls was renumbered with a few editorial changes. Additionally, the threshold of two lighting fixtures was changed to more than 75 watts of general lighting.

Section C405.2.5.1: **IECC CHANGE** – Specifications were added to ensure controls work together to achieve maximum energy savings.

Section C405.2.5.2: The IECC adopted the primary and secondary daylighting approach for the 2021 code. The WSEC language was modified to align better with the model code language. Rooftop monitors were moved from the toplit zone into the sidelit zone.

Section C405.2.5.4: **IECC CHANGE** – This section adopts the IECC language for establishing daylighting zones in multistory atriums.

Section C405.2.6: Additional lighting controls is renumbered, with some editorial changes. Lighting for plant growth was changed to life support of non-human life forms to cover both plant and animal uses. The language on dwelling unit controls was deleted to eliminate confusion.

Section C405.2.7: Renumbered only, no changes.

Section C405.2.8: The LLLC requirements were moved into this section from Section C405.2, and an option for networked lighting was incorporated. Requirements were also added for high end trim.

Section C405.2.9: Exterior lighting controls was renumbered

Section C405.2.9.3 The lamp wattages for luminaires required to have activity sensor control was decreased. (Note: there are some errors in the filed text. “all of” in the first sentence should be struck; items 1 and 2 should be reversed with “All other lighting shall” added to the beginning of former item 1. The height in the former item 2 should be 24 feet.)

Section C405.2.9.4: Renumbered only.

Section C405.2.10: Correlation of the parking garage occupant sensor controls with the ASHRAE 90.1 requirements. This section takes the place of former Section C405.2.1.4 requirements for parking garages.

Section C405.3: A new section is added to provide a new metric for lighting for plant growth. The base language is from the 2021 IECC, but the metric is changed to photosynthetic photon efficacy from photon efficiency and the exemption is lowered from 40 kW of lighting load to 10 kW.

Section C405.4.1: Editorial changes to correlate with the new language on general lighting—redundant requirements are removed. A new exception is added for antimicrobial lighting for disinfection.

Section C405.4.2: Clarification is added that when lighting power allowance is being determined for only a portion of a building, the space by space method shall be used.

Section C405.4.2.1/C405.4.2.2: Clarifications on using the building area method and space by space method. Space by space now includes provisions on multi-use spaces.

Section C405.4.2.2.1: Along with changes to the footnotes in Table C405.4.2(2), clarifications and guidance on using the ornamental and display lighting allowance increases.

Table C405.4.2(1): The footnotes are all removed from the table as part of the clarification on lighting in dwelling units.

Table C405.4.2(2): The footnotes are cleaned up, removing all “reserved” footnotes. The footnotes for additional lighting power allowance for display and ornamental lighting are updated. An additional footnote is added for unfinished spaces.

Section C405.5.1: Lowers the threshold for lighting efficacy requirements from 50 watts to 25 watts and simplifies the language.

Section C405.5.3: Updates the exterior lighting tables in response to changes in technology, with an approximate 40 percent reduction across the board.

Section C405.5.3.1: IECC CHANGE – Simplification of the additional exterior lighting power language.

Tables C405.3(2).C405.5.3(3): Updates the exterior lighting tables in response to changes in technology, with an approximate 40 percent reduction across the board.

Section C405.7.1: New section requires electrical receptacles at dwelling unit gas appliances, to enable future installation of electric appliances.

Section C405.9.2.1: **IECC CHANGE** – The escalator energy recovery requirements were simplified. (Note: the second sentence of this section was removed by IECC errata and will be removed from the WSEC.)

Section C405.10: **IECC CHANGE** – The 2021 IECC added a section on automatic receptacle control that was essentially the same as the WSEC controlled receptacles section. The IECC language was adopted in place of the WSEC language to better align with the model code.

Section C405.11: **IECC CHANGE** – Clarification of the requirement for voltage drop, and extending the requirements to customer-owned service conductors.

Section C405.12: New section that adds uninterruptible power supply efficiency requirements for computer rooms based on ENERGY STAR requirements.

Section C405.13: Renumbered only, no changes.

Section C406 Additional Efficiency & Load Management

Section C406 is reformatted, and the credit requirements differ by occupancy type. The metric was changed to carbon emission and a standard of 0.1% reduction per point was set as the basis. The table has two options included that depend on the final action of the council. The required number of energy efficiency credits to be achieved has been increased by 16 percent, if the heat pump water heating proposal is adopted, and by approximately 33 percent if it is not.

A number of new options were added to C406 by proposals: Low-Carbon district energy, Heat pump dryers, Enhanced Commercial Kitchen equipment, High performance temperature maintenance system, High efficiency circulation systems, Low flow showerheads for R-1 and R-2 occupancies, Clarification of service water heat pump efficiencies, Offsite Renewables

Adds load management requirements for new buildings to prepare buildings to interact efficiency with the evolving electrical grid in the future. Corresponding change also made to Section C403.4.11.1.

Section C407 Total Building Performance

Section C407.2/Table C407.2: Editorial clarifications on the modeling process, with the mandatory compliance table updated with the new measures in the 2021 code, both from the IECC and state amendments.

Section C407.3: Increases the stringency of the building performance factors used to set emissions targets which are based on regulated loads only by 10% over the previous code. Note that if the carbon emissions factors in Table C407.3(1) are updated during development of the 2022 code, the Building Performance Factors in Table C407.3(2) should be updated by PNNL to match the intent of this proposal—this will be done via public testimony.

A second metric for compliance has been added based on site energy performance that includes all loads (regulated and unregulated). The target for this new site energy metric is based on a tiered improvement from the 2018 WSEC to a 0.3 site energy use

performance index by 2030 compared to the Appendix G Standard 90.1-2004 baseline (see table and graph below). This is meant to meet the intent of the Washington State policy goal of having a code in 2030 that will result in new buildings that use 30% of the site energy of a building built to the 2006 WSEC.

A subsection was added on how to utilize low carbon district energy systems in the total building performance path.

Section C408 Building Commissioning

The thresholds for required commissioning in Section C408.1 were lowered.

Section C409 Metering

There were editorial changes for clarity throughout this section.

Section C410 Refrigeration Systems

The IECC completely restructured the refrigeration sections for the 2021 code. The result here is a hybrid of the changes to the 2021 code, including the new tables and modifications to retain some of the existing WSEC language to retain requirements for some federally unregulated applications.

Section C411 Renewable Energy

Section C411 was renamed from Solar Readiness to Renewable Energy.

Section C411.1: Requires on-site renewable energy generation for commercial buildings over 10,000 square feet at 0.5W per square foot.

Section C411.1.1: Details on how on-site renewables interacts with Section C406, Additional efficiency requirements.

Section C411.2: Details on how renewable energy works with Section C407, Total building performance method.

Section/Table C411.2.1: Off-site renewable energy requirements and weighting factors. (Note: table is mis-numbered as C411.3.1)

Section C411.2.2: Requirements for off-site renewables documentation.

Section C411.2.3: Requirements for RECs.

Section C411.3: Renumbering of existing solar readiness provisions. The first exception has been clarified, and a second exception added to provide guidance on application to existing buildings.

Section C411.3.1: Clarification that area covered by mechanical equipment is not included in the percentage calculation.

Section C412 Compressed Air Systems NEW

This is a new section proposed to regulate compressed air systems comprised of language from the Seattle code and California's Title 24 (2022 edition). This would apply to process loads

Chapter 5

Section C501: This section was rearranged slightly by ICC, with a few editorial changes.

Section C501.6: The state amendment to this section was removed and it reverted back to the IECC language for historic buildings.

Section C502: Various clarifying amendments were made throughout this section. Specific guidance was added in Section C502.1.1 and C502.1.2 on how to apply requirements for additional energy efficiency credits and renewable energy requirements to additions.

Section C503: Various clarifying amendments were made throughout this section.

Section C503.2: This section was moved to C505 and should have been struck.

Section C503.4: There are two options proposed for Section C503.4 and subsections. Some of the proposals approved for inclusion in the proposed rule Option 1 does not include the heat pump space heating provisions from 21-GP1-103. Option 2 includes provisions from 21-GP1-103.

An allowance of 0.6 in. wg for supply systems and 0.3 in. wg for exhaust/return/relief systems (where the combined total equals 0.9 in. wg) is allowed for additions/alterations. In addition, an extra allowance is provided where an adapter curb is needed.

Section C503.5: There are two options proposed for Section C503.5, depending on the final action on provisions included in 21-GP1-136. Option 1 includes revisions that would be made if the heat pump water heater proposal is not adopted, and are editorial in nature. Option 2 would require replacement water heaters to be heat pump water heaters unless they qualify for one of the exceptions.

Section C503.6: A new scoping section is added for replacement of components in pools and spas.

Section C507: The lighting section was reformatted and renumbered. A subsection on new lighting was added to clarify that it needs to comply with all applicable lighting and commissioning provisions in the code. Section C503.7.2 requires alterations replacing 20 percent or more of existing lighting fixtures to comply with the lighting power allowance in Section C405. The previous threshold was 50 percent. The rest of the changes provide clarification only.

Section C505: The IECC moved the change of space conditioning requirements to the C502 Additions section. It was felt that rather than being contained in that section or the current C503 Alterations section, it would make sense to move it to Section 505 and change the name to change of space conditioning, occupancy or use. So provisions from C503 were moved to C505 but makes no technical changes.

Chapter 6 Referenced Standards

Various referenced standards were updated, and new standards added based on added provisions in the 2021 energy code.

Appendix D – HVAC TSPR Calculation

The calculation procedure has been updated and clarified based on interpretation requests received, and additional system parameters were added to Table D601.11.2

Appendix E – Renewable Energy

This appendix was removed as this requirement is part of the code text in Section C411 as of the 2018 Washington State Energy Code.

Appendix F – Outcome Based

The energy budget tables were updated based on the prototypes and findings in the [2018 Baseline Energy Consumption Report](#)