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**DEPARTMENT OF COMMERCE**  
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Jeremiah Williams  
Building Technologies Office  
U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy  
1000 Independence Avenue SW, EE-5B,  
Washington, DC 20585

RE: Washington State Certification of Residential and Commercial Building Energy Codes

In compliance with Title III of the Energy Conservation and Production Act (ECPA) of 1976, as amended, this letter is to certify that the State of Washington has adopted the 2021 Edition, Washington State Energy Code (WSEC), which meets or exceeds the 2021 version of the International Energy Conservation Code (IECC) for low-rise residential buildings, as well as ASHRAE Standard 90.1-2019 for nonresidential buildings.

Codes are adopted in Washington by the State Building Code Council (SBCC or council). A state statute directs the SBCC on the details of code adoption and provides direction specific to the development of the energy code. Washington State legislation requires updates to the energy code to show a substantial reduction in energy use each code cycle. Two sections of our legislative statute noting this obligation are noted here:

RCW 19.27a.020 "(2) The council shall follow the legislature's standards set forth in this section to adopt rules to be known as the Washington state energy code. The Washington state energy code shall be designed to: (a) Construct increasingly energy efficient homes and buildings that help achieve the broader goal of building zero fossil-fuel greenhouse gas emission homes and buildings by the year 2031;"

RCW 10.27a.160 "residential and nonresidential construction permitted under the 2031 state energy code must achieve a seventy percent reduction in annual net energy consumption, using the adopted 2006 Washington state energy code as a baseline".

The SBCC is required to provide reporting on the progress toward these goals to the legislature. The report to the legislature for the 2021 code was published in March 2023, informed by cost-effectiveness analyses performed by the Pacific Northwest National Laboratory (PNNL). The SBCC did make subsequent changes to both the residential and commercial 2021 WSEC following the publication of this legislative report, but these changes are not expected to change the ultimate conclusion of the report, which was that: "The 2021 WSECs are an incremental improvement over the 2018 codes. The 2021

WSECs are predicted to achieve approximately 57.6% in Residential buildings and approximately 47% in Commercial buildings compared to the 2006 WSEC.” This entire report has been included as an attachment.

To provide the U.S. Department of Energy with a comparison of the 2021 WSEC and the national model codes, Commerce created some simple comparisons. These are included in the attached document, “Code Comparisons, 2021 WSEC and the National Reference Codes”. This includes some simple comparisons developed by Commerce. Further analysis regarding a comparison between the 2021 WSEC-Commercial and ASHRAE 90.1-2019 are expected to be made available later on in 2024 from PNNL.

If anything further is required as evidence of Washington’s compliance with the requirements of Title III of ECPA, please advise Washington State Department of Commerce, State Energy Office at 564-233-1324 or by contacting Amy Wheelless, Federal Policy & Program Alignment Manager at [amy.wheelless@commerce.wa.gov](mailto:amy.wheelless@commerce.wa.gov)

Sincerely,

A handwritten signature in blue ink that reads "Michelle W. Fuge". The signature is written in a cursive style.

Washington State Energy Office  
Washington State Department of Commerce

CC/ Dustin Curb, Interim Managing Director, Washington State Building Code Council

## **Code Comparisons, 2021 WSEC and the National Reference Codes:**

The Washington State Department of Commerce (Commerce) has developed the following summary comparing the 2021 Washington State Energy Codes with the national reference code standards. This is a simple comparison of key differences between the codes.

### **Residential Energy Code**

Washington State begins the residential code development process with the most recent edition of the IECC. We then add in all the existing state code changes (i.e., from the 2018 WSEC) that are more rigorous than the IECC. From this base we proceed with the development of additional code changes required to meet our legislative mandates for code improvement. Proposals to change the base code are submitted to a technical advisory group, who then reviews and then amends, approves, or declines each proposal in turn. A package of proposals is then provided to the SBCC for final approval.

We have not completed a line by line comparison between the 2021 WSEC and the 2021 IECC residential code sections, but instead highlight here the primary differences impacting energy use.

Thermal performance:

IECC more stringent for small glazing manufactures. – In WA, we provide relief to small glazing manufactures by allowing them to use a special U-factor default table rather than NFRC test procedures. Reduces energy efficiency for a very small population of windows.

R402.1.1 Insulation and fenestration criteria:

- WSEC more stringent -Slightly better wall R and U factors.
- WSEC - more stringent - Mass walls are the same as all other walls, increasing efficiency.
- WSEC more stringent – Crawl space wall insulation section deleted. Results in the same heat loss as all other floors increasing efficiency compared to the IECC.
- WSEC more stringent – Basement wall description includes slab edge thermal break increasing energy efficiency.
- WSEC more stringent -Total UA performance includes a 15% cap on the glazing area in the target case, reducing energy use in homes with above average glazing areas.

R402.4.1.2 (air leakage) Testing:

- IECC more stringent: Air leakage control standard in the WSEC is 4.0 ACH50. IECC is 3 ACH50.
- See also air leakage control in WSEC C406 extra credits.

WSEC –More stringent (WSEC R406) – Additional Energy Efficiency Credits. This section requires homes to demonstrate an additional energy efficiency gains obtained from a selection of energy efficiency measures. Estimated additional savings for most homes, 25%. Similar method to code change adopted for the next IECC. This approach is best detailed in the document, *Modeling the Washington State Energy Code - 2006 & 2018 Baseline Energy Consumption* (Ecotope 2020).

IECC – R406. –WSEC does not adopt the ERI method.

To support this report, Commerce modeled several homes for ERI compliance using the NREL software, BEopt. The results demonstrate that the majority of new homes built in Washington will result in ERI that are 18% less than required by the IECC.

The ERI comparison is based on modeling results of a 2200 square foot two story home over crawl space. The model includes the mandatory prescriptive measures and additional energy efficiency features required by WSEC Section R406. Result could vary by home size and features. But we expect these variations would be much less than the 18% margin identified by this model.

Energy Rating Index			
	2018 IECC	2018 WSEC Gas <i>80% of Homes</i>	2018 WSEC HP <i>20% of homes</i>
Zone 4 <i>86% of population</i>	62	51.3	57.6
Zone 5 <i>14% of population</i>	61	47.5	57

WSEC SECTION R407 CERTIFIED PASSIVE HOUSE or later is an approved alternate to the base code. Must also comply with all WSEC prescriptive sections as well.

WSEC R505.1 More Stringent - Change in occupancy or use. Any space converted from non-residential to residential energy shall be brought into full compliance with this code. IECC only states that the energy use intensity may not increase.

WSEC – Appendix A – Default U-factor tables. WA requires the use of an extensive reference for U-factors. This assures accurate use of this method. IECC is somewhat supported through RESCHECK and RESENET approved software, but value vary between the methods.

### Commercial Energy Code

Washington State begins the commercial code development process with the most recent edition of the IECC. We then add in all the existing state code changes (i.e., from the 2018 WSEC) that are more rigorous than the IECC. From this base we proceed with the development of additional code changes required to meet our legislative mandates for code improvement. A very common approach is to review the most recent ASHRAE 90.1 committee documents for advancements. For example, WA adopted the 90.1-2018 lighting tables prior to final publication by ASHRAE. Proposals to change the base code are submitted to a technical advisory group, who then reviews and then amends, approves, or declines each proposal in turn. A package of proposals is then provided to the SBCC for final approval.

We have not completed a line by line comparison between the 2021 WSEC and ASHRAE 90.1 2019. Here we highlight a few advancements.

#### Building Envelope:

- Opaque U-factors: WA more efficiency for most buildings. In WA most construction occurs in climate zone 4C, yet most U-factors approach the 90.1 5C values. WA code is more stringent in 4C, less stringent in 5b.

- Block Wall: 90.1 more efficient
- Vertical Fenestration: WA more efficient. WA has lower U than 90.1 5C.
- Air Leakage Testing. WA more efficient. WA requires testing to result in 0.25 cfm/ft<sup>2</sup> or less leakage. 90.1 requires 0.40 cfm/ft<sup>2</sup>.

#### Systems:

- WA Total Systems Performance Ratio; more efficiency, carbon reduction objectives compared to 90.1. This new approach developed by PNLL, measures full system performance rather than simply specifying each system components efficiency. This is not a trade. Equipment, fan/duct pump, etc. requirements are still in place. Under TSPR all systems are compared to a defined baseline performance. The comparison is a total carbon emissions target.
- Adoption of 90.1 Appendix G – with state modifications. The WSEC adopted the methodology of appendix G, but modified the target values specific to state efficiency and carbon emissions reduction requirements. The base case system design assumes a high efficiency heat pump and dedicated outdoor air system. This results in lower base case energy use than 90.1.
- WA Data Center Energy: WA incorporates 90.4 data center requirements providing an incentive to enable productive heat recovery.
- Systems Analysis: Washington State adopted the ASHRAE 2019 appendix G method, with modifications. The appendix G targets are based on best available systems WA code targets.

Lighting power: WA saves more energy than 90.1-2019. WA adopted the ASHRAE 90.1-2019 lighting values with decreased lighting power allowances for some occupancy types. The exterior lighting power allowance is reduced approximately 40% below that of ASHRAE 90.1-2019.

WA C406 Extra Efficiency Requirements: WA more efficient than 90.1. Not part of 90.1. IECC has more recently adopted this approach as well.

WA C408 Metering: WA enhancement. Sub-metering by system type required. HVAC, Service Water Heating, Lighting, Plugs, Process, EV, individual tenant spaces. Serves to improve future building operations and retro commissioning.