



STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

Washington State Energy Code Development Standard Energy Code Proposal Form

Jan 2022

Log No. _____

Code being amended: Commercial Provisions Residential Provisions

Code Section **#R406**

Brief Description: **R406.1 Scope.**

Proposed code change text: (Copy the existing text from the Integrated Draft, linked above, and then use underline for new text and ~~strikeout~~ for text to be deleted.)

This section establishes additional energy efficiency requirements for all new construction covered by this code, including additions subject to Section R502 and change of occupancy or use subject to Section R505 unless specifically exempted in Section R406. Credit from both Sections R406.2 and R406.3 are required.

Exception: New construction utilizing simulated performance alternatives authorized by Section R405.

Purpose of code change:

Removes additional energy efficiency requirements within Section R406. Research has shown that the simulated performance alternative modeling (performed by approved software) has the ability to address the Fuel Normalization Credits, and to design residential structures to the worst-case scenario regarding ACCA Manual J requirements for purposes of documenting a building’s energy efficiency. By using approved software, the design of a structure can demonstrate that it can meet or exceed the required Carbon Emissions Reduction, and the Energy Rating Index (ERI) as referenced in WSEC-R.

Your amendment must meet one of the following criteria. Select at least one:

- Addresses a critical life/safety need.
- Consistency with state or federal regulations.
- The amendment clarifies the intent or application of the code.
- Addresses a unique character of the state.
- Addresses a specific state policy or statute.
(Note that energy conservation is a state policy)
- Corrects errors and omissions.

Check the building types that would be impacted by your code change:

- Single family/duplex/townhome
- Multi-family 4 + stories
- Institutional
- Multi-family 1 – 3 stories
- Commercial / Retail
- Industrial

April 1, 2022



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Your name	Andrea Smith	Other contact name	Click here to enter text.
Your organization	Building Industry Association of Washington	Email address	andreas@biaw.com
		Phone number	360-352-7800 ext. 114

Economic Impact Data Sheet

Is there an economic impact: Yes No

Briefly summarize your proposal's primary economic impacts and benefits to building owners, tenants, and businesses. If you answered "No" above, explain your reasoning.

The economic impact to home builders and home buyers can be significant. Allowing simulated performance alternatives that meet or exceed fuel normalization and carbon emission goals without mandating use of specific building materials, and/or appliances can reduce the overall cost of building housing units.

Provide your best estimate of the **construction cost** (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

[2021 IECC Residential Cost Effective Analysis](#), National Association of Home Builders [June 2021], Climate Zones 4 & 5*:

- Example 1 - HVAC Cost Savings:
 - HVAC equipment option for Gas House with baseline 13 SEER AC (CZ 5-7 for this study)
 - Cost to home buyer = \$1,494
 - Translates to 3,259 households priced-out of homeownership
 - HVAC option for Electric House: variable speed inverter heat pump, rated to -13F (CZ 5-7)
 - Cost to home buyer = \$8,196
 - Translates to 17,883 households priced-out of homeownership
 - Difference as paid by the consumer between gas and electric option = **\$6,702 savings if gas appliance used**
 - Translates to 14,624 households still able to afford a median priced new home

 - HVAC equipment option for Gas House adjusted for baseline 14 SEER AC (CZ 2-4 for this study)
 - Cost to home buyer = \$1,317
 - Translates to 2,873 households priced-out of homeownership
 - HVAC option for Electric House: variable speed inverter heat pump, rated to 7F (CZ 2-4)
 - Cost to consumer = \$5,721
 - Translates to 12,483 households priced-out of homeownership
 - Difference as paid by the consumer between gas and electric option = **\$4,404 savings if gas appliance used**
 - Translates 9,610 households still able to afford a median priced new home

- Example 2 – Water Heater Cost Savings:
 - Water Heater option for Gas House: Tankless Direct Vent Water Heater
 - Cost to home buyer = \$740
 - Translates to 1,614 households priced-out of homeownership
 - Water Heater option for Electric House: 50 gal Heat Pump Water Heater (HPWH)
 - Cost to consumer = \$1,331 - translates to 2,904 households priced-out of homeownership
 - Difference as paid by the consumer between gas and electric option = **\$591 savings if gas appliance used** - translates to 1,290 households still able to afford a median priced new home

Instructions: Send this form as an email attachment, along with any other documentation available, to: sbcc@des.wa.gov. For further information, call the State Building Code Council at 360-407-9255.

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.

*Climate Zones 4&5 figures are referenced as these are the two primary climate zones outlined by [IECC](#) and represent the two primary climate zones referenced in [RCW 19.27A.020\(3\)](#).

Provide your best estimate of the **annual energy savings** (or additional energy use) for your code change proposal?

[Click here to enter text.KWH/ square foot](#) (or) [Click here to enter text.KBTU/ square foot](#)

(For residential projects, also provide [Click here to enter text.KWH/KBTU / dwelling unit](#))

Show calculations here, and list sources for energy savings estimates, or attach backup data pages

Energy savings are hard to quantify since these will vary with each home. Using a simulated performance alternative, such as energy modeling, will provide an assessment as to the energy savings per home designed.

R405.3 currently states if using the simulated performance alternative, "Energy use derived from simulation analysis shall be expressed in pounds of carbon per square foot of conditioned floor area as follows:

1. For structures less than 1,500 square feet of conditioned floor area, the annual carbon emissions shall be less than or equal to 73 percent of the annual carbon emissions of the standard reference design.
2. For structures 1,500 to 5,000 square feet of conditioned floor area, the annual carbon emissions shall be no more than 56 percent of the standard reference design.
3. For structures over 5,000 square feet of conditioned floor area, the annual carbon emissions shall be no more than 50 percent of the standard reference design.
4. For structures serving Group R-2 occupancies, the annual carbon emissions shall be less than or equal to 70 percent of the annual carbon emissions of the standard reference design."

Carbon emission factors per energy source/system and default distribution system efficiency thresholds can be found within Section R405. Other minimum mandatory compliance measures for specific building systems can be found within Chapter 4 of the WSEC-R.

List any **code enforcement** time for additional plan review or inspections that your proposal will require, in hours per permit application:

Code enforcers should save time with simulated performance alternatives since a third-party consultant(s) should be engaged in the process, using approved modeling software, and conducting the following inspections: air seal, insulation, windows and doors, final inspection/testing.

Small Business Impact. Describe economic impacts to small businesses:

According to the National Association of Home Builders' [2021 IECC Residential Cost Effective Analysis](#), home builders can experience cost savings with more choices for building materials and appliances. Should specific options be mandated and be more expensive than the alternatives (see Examples 1 and 2 on the previous page), those costs will be passed onto the home buyer. If the State Building Code Council were to allow the Simulated Performance Alternative pathway without additional credit requirements, any potential cost savings to home builders will be passed onto home buyers in the form of lower sales prices of finished homes compared to a home that is built with the prescriptive compliance methodology.

BIAW hears from many of our high-efficiency, green, and net-zero builders that the 2018 WSEC-R made it more difficult and expensive to build green and net-zero (or even net-positive) homes in Washington state; upwards of \$20,000 simply

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because they're currently required to comply with additional credits that do not help (and sometimes hinder) their energy efficiency. Allowing the technical professionals to simulate performance through approved measures rather than mandating certain systems and materials will allow these professionals to build green and net-zero homes at a lower cost to the company, and thus end-user, the home buyer.

Housing Affordability. Describe economic impacts on housing affordability:

This code change proposal would grant home builders the ability to use simulated performance alternatives without the need for additional energy credits as is currently outlined in the 2018 WSEC-Residential. Provided our construction cost savings on the page two, there could be dramatic savings that are dependent upon the building materials and/or appliances selected. While the prescriptive code is useful for some builders, the builders that specialize in high-efficiency building/green/net-zero building should be provided the opportunity to design and build homes that still meet (or exceed) the WSEC-R. Allowing builders who choose to follow a simulated performance pathway will allow them the flexibility to use or expand their technical knowledge while simultaneously considering the overall costs to the home buyer.

Since the current iteration of the WSEC-R penalizes builders for using certain systems and materials, such as gas appliances, other appliances are thus favored. If a builder gets more credits for using specific materials and appliances such as electric heat pumps, they're more likely to use this system. However well intentioned, this can have a drastic impact on housing affordability. According to the [National Association of Home Builders](#), 76% of Washington households cannot afford a median priced new home (\$565,613). Each \$1,000 added onto the cost of constructing a new home prices out an additional 2,182 households from homeownership. That means the range of HVAC savings in the example on page 2 (\$4,404 - \$6,702) would allow 9,609 – 14,623 households to still qualify for a mortgage that they otherwise would be priced-out of if the electric heat pump option was mandated by additional credits in R406.

Other. Describe other qualitative cost and benefits to owners, to occupants, to the public, to the environment, and to other stakeholders that have not yet been discussed:

All stakeholders – including the environment – will benefit from a simulated performance alternative pathway without additional credit requirements outlined in R406. Energy efficient homes can be built more affordably without strict design requirements. Simulated performance can showcase that these homes can meet or exceed energy code requirements without arbitrarily adding cost.

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