STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

Washington State Energy Code Development

Standard Energy Code Proposal Form

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Log No. 24-GP1-209 Revision 2
Received 5/06/25

Code being amended: ☒ Commercial Provisions ☐ Residential Provisions

Code Section # C503.4.4 & C503.4.4.1

Brief Description: This proposal mandates that air conditioning equipment include a heat pump as the primary heating source at time of replacement.

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.)

C503.4.4 Alterations or replacement of existing cooling systems. Alterations to, or replacement of, existing mechanical cooling systems shall not decrease the building total economizer capacity unless the system complies with either Section C403.3.5 or C403.5. System alterations or replacement shall comply with Table C503.4.~~3~~4 when either the individual cooling unit capacity or the building total capacity of all cooling equipment without economizer does not comply with the exceptions in Section C403.5. Equipment replacements that include space heating shall also comply with Section C503.4.~~6~~7.

C503.4.4.1 Single zone packaged system replacement. New or replacement single zone packaged direct expansion (DX) rooftop systems with rated cooling capacity less than 65,000 Btu/hr shall meet the applicable requirements in Table C503.4.4.1 for the applicable building type or the simulated building performance requirements of Section C407.

Table C503.4.4.1
Applicable System Replacement Options

Occupancy Classification[a]	Inclusions	Replacement Equipment Type
A-3	Libraries	SZHP[b] or SZAC[c]
B	Banks, Barber and Beauty Shops, Clinic Outpatient, Offices, Post Offices, Professional Services,	SZHP or SZAC
E	K-12 Schools	SZHP or SZAC
M	Drug stores, Markets, Retail stores	SZHP or SZAC

a. *Occupancy* classification from the *International Building Code* Chapter 3.
b. SZHP – Single Zone Heat Pump + Economizer in accordance with Section C403.5
c. SZAC – Single Zone Air Conditioner with Furnace + Variable Speed Fan + Economizer in accordance with Section C403.5, or Dual Fuel Heat Pump + Variable Speed Fan + Economizer in accordance with Section C403.5

Air conditioners with furnaces or dual fuel heat pumps complying with Table C503.4.4.1 using variable speed fan and controls shall be designed to vary the indoor fan air flow rate as a function of the load and shall have a minimum of two stages of fan control. The minimum speed at stage 1 shall be set for ventilation only mode and shall be the greater of 50% or the minimum fan speed required to meet the minimum ventilation airflow rate. The fan shall draw no more than 30% of the fan power at full fan speed when operating at 50% speed.

Exception: If the equipment exceeds the minimum circuit ampacity (MCA) of the existing branch circuit conductors or requires an upsize in the existing breaker as demonstrated by submitted electrical load calculations.

Purpose of code change:

Currently, alterations to packaged single zone RTUs are not required to be heat pumps. This measure proposes adding Section C503.4.4.1 to require that alterations in certain existing occupancy groups install packaged single zone heat pump RTUs as specified when replacing or adding single zone packaged RTUs, or a like-for-like single-zone A/C unit equipped with an economizer and variable speed motor.

The requirement applies only to RTUs with cooling capacity <65,000 Btu/hr. An alternative prescriptive option is provided for gas furnace RTUs (in addition to the building performance path) for added flexibility. Gas furnace RTUs can prescriptively comply by being installed with additional efficiency measures that provide cost equivalency to a heat pump RTU baseline. Additional components for installation with gas furnace RTUs are a Variable Speed Fan and an Economizer, or a Dual Fuel Heat Pump with a Variable Speed Fan and an Economizer. These components can be either factory-assembled options or field installed retrofit options without impacting the manufacturer warranty. Specifying these system component options gives contractors and engineers flexibility in adding efficiency measures to gas furnace RTUs with minimum federal appliance standards efficiency.

Building owners, engineers, and contractors have multiple paths to compliance with the heat pump requirement. The proposed regulation includes specific alternative options (prescriptive pathways) and exempts buildings needing new main service panels or transformers due to the upgrade. Single-zone RTUs with gas furnace systems meet the minimum equipment efficiency ratings required by the federal appliance efficiency standards with additional measures to achieve the same energy performance as the heat pump RTU.

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

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

Your name	Nicholas O'Neil	Email address	noneil@energy350.com
Your organization	Energy 350	Phone number	(503) 333-8161
Other contact name	Kevin Rose, NEEA		

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.

This proposal results in energy savings and cost-effectively increases the stringency of the Energy Code. It encourages the installation of efficient heat pumps reducing fossil fuel consumption and supporting Washington's state energy policies, including the Building Performance Standards. It also contributes to the state's economic and environmental health and assists in reducing heating energy costs for building owners through modest investments at time of air-conditioning replacement.

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**)

$-0.129/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

For the heat pump alterations measure, costs were gathered as part of Title 24 efforts for packaged single zone heat pump RTU with nominal capacity of 3 tons, 4 tons, and 5 tons. (Larger-capacity systems that use multiple stages were not in the scope of the analysis.) Equipment costs were taken from distributor cost estimates for multiple manufacturers. These costs were compared against recent studies conducted by other contractors for codes and standards research in California. For the distributor costs, an incremental cost was used if the heat pump had a similar make and model gas-heating counterpart. The raw costs, and costs/sqft are shown below for a 5,500 sqft building. (For reference, Climate Zone 16 in California was found to be most closely related to Climate Zone 4C & 5B in Washington.)

Cost Summary			
	HP	Gas	Incremental Cost
CZ03	$ 16,210	$ 16,684	$ (475)
CZ07	$ 16,210	$ 16,684	$ (475)
CZ09	$ 17,466	$ 17,972	$ (506)
CZ12	$ 16,967	$ 17,695	$ (728)
CZ16	$ 18,089	$ 18,801	$ (712)

Cost/sf			
	HP	Gas	Incremental Cost
CZ03	$ 2.95	$ 3.03	$ (0.09)
CZ07	$ 2.95	$ 3.03	$ (0.09)
CZ09	$ 3.17	$ 3.27	$ (0.09)
CZ12	$ 3.08	$ 3.22	$ (0.13)
CZ16	$ 3.29	$ 3.42	$ (0.13)

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) 11.5 KBTU/ square foot

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

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.

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

Savings were calculated as part of the Title 24 analysis using a small office prototype of 5,500 sqft. The results for CZ16 show that while the heat pump increases electricity use, the gas use to accomplish heating is eliminated, resulting in a net benefit overall.

Iteration		HP		Gas		Difference	
Building	Climate Zone	Electric (kWh)	Gas (therms)	Electric (kWh)	Gas (therms)	Electric (kWh)	Gas (therms)
SmallOffice	CZ03	41,542	-	41,633	218.96	91	219.0
SmallOffice	CZ07	43,855	-	45,729	28.06	1,874	28.1
SmallOffice	CZ09	45,060	-	46,431	85.04	1,370	85.0
SmallOffice	CZ12	47,776	-	46,589	328.51	(1,188)	328.5
SmallOffice	CZ16	51,423	-	42,296	939.90	(9,128)	939.9

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

The proposed measure will result in minimal increase to the demands of compliance officials. The primary incremental work will be in reviewing permit applications to verify installed equipment.

Small Business Impact. Describe economic impacts to small businesses:

Small businesses faced with replacing a unit will incur no additional cost to install a heat pump compared to a gas furnace with the required cost-equivalency features shown above.

Housing Affordability. Describe economic impacts on housing affordability:

N/A

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:

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