

2021 Washington State Energy Code (WSEC) Residential Significant Changes: Additional Energy Efficiency Requirements

BEGINNING JULY 1, 2023

The Additional Energy Efficiency Requirements section of the energy code (WSEC Section R406) goes beyond the base (prescriptive) code requirements and sets a minimum number of credits projects must achieve based on the project size. This section of the code is not new, however multiple changes are made to this section in the 2021 WSEC.

Changes to required credit values (Section R406.3):

- Additions with a cumulative total of less than 150 square feet of conditioned floor area are now exempt from obtaining additional energy efficiency credits
- Minimum credit values required adjusted for most project types, based on adjustments made in the base code language



Once the required number of credits is determined for a project, the home's heating system type is given positive or negative credits in the Fuel Normalization Table (Table R06.2). Credits are awarded to create a base equalization between fuels used to define the equivalent carbon emissions of the heating system types.



Figure 1 Ductless heat pump outside compressor.
Image source: [Ductless \(Mini-Split\) Heat Pumps | Building America Solution Center \(pnnl.gov\)](#)

Changes to heating system types (Table R406.2):

- Supplemental heating type is now considered
- Credits adjusted for most heating system types

After the heating system is evaluated, then the project must select options from a menu that includes seven categories and incorporate those energy efficient elements into the project design. The seven categories remain the same, though options within the categories are modified.

Change to the options menu (Table R406.3):

- Options extensively revised to reflect changes in base code
- Each 0.5 credit is equivalent to a 600 kWh energy savings
- Some options were eliminated due to the fact they are now a part of the base code requirements



2021 WSEC Residential Significant Changes: Additional Energy Efficiency Requirements, continued

Part 1: Changes to required credit values (Section R406.3)

- Additions with a cumulative total of less than 150 square feet of conditioned floor area are now exempt from obtaining additional energy efficiency credits
- Minimum credit values required adjusted for most project types

		2018	2021
1.	Small Dwelling Unit: Dwelling units less than 1500 square feet (SF) in conditioned floor area with less than 300 SF of fenestration area. Additions to existing building that are greater than 500 SF of heated floor area but less than 1500 SF.	3.0	2.5
2.	Medium Dwelling Unit: All dwelling units that are not included in #1, #3, or #4.	6.0	5.0
3.	Large Dwelling Unit: Dwelling units exceeding 5000 SF of conditioned floor area.	7.0	6.0
4.	Dwelling units serving R-2 occupancies	4.5	-
	Dwelling units serving Group R-2 occupancies. See Section R401.1 and residential building in Section R202 for Group R-2 scope.	-	4.5
5.	Additions less than or equal to 500 SF.	1.5	-
	Additions 150 SF to 500 SF.	-	2.0

Part 2: Changes to heating source types (Table R406.2)

- Supplemental heating type is now considered
- System type credits adjusted for most heating system types

	Primary Heating	Supplemental Heating	2018	2021
1.	Combustion heating equipment such as gas, oil, propane furnace or boiler	Any	0	-3.0
2.	Heat pump , including air to water heat pump units	Any	1.0	-
	Heat pump	Electric resistance or Combustion furnace	-	0
3.	Electric resistance only, either forced air or zonal	None	-1.0	-1.0
4.	Inverter-driven ductless mini-split heat pump in the largest zone in the dwelling <u>Or</u> Dwellings with 2 kW or less total installed heating capacity	Electric resistance	0.5	-
	Heat pump , including air to water heat pump units	None	-	1.5
5.	All other heating systems	Any	-1.0	-
	Inverter-driven ductless mini-split heat pump in the largest zone in the dwelling <u>Or</u> Dwellings with 2 kW or less total installed heating capacity	Electric resistance	-	0.5

Please note the required efficiencies of heating systems are omitted from the above comparison table for clarity.

2021 WSEC Residential Significant Changes: Additional Energy Efficiency Requirements, continued

Part 3: Changes to additional energy efficiency options (Table R406.3)

1. Efficient Building Envelope Options

- **Four options** within this category (down from seven options)
- Maximum **1.5 credits possible** from this category (down from 3.0)
- One glazing only option (1.1), down from two (1.1 and 1.2)
- All options revised to reflect increased ceiling and wall requirements of base code

2021	Glazing	Ceiling	Floor	Walls	Slab	OR UA Reduction	Credits
Base Code	U-0.30	R-60	R-30	20+5 or 13+10	10, 4ft	n/a	0
1.1	U-0.22	R-60	R-30	20+5 or 13+10	10, 4ft	n/a	0.5
1.2	U-0.25	R-60	R-38	20+5 or 13+10	R-10 Below entire slab-on-grade and below grade slab	15%	0.5
1.3	U-0.18	Ceiling and single-rafter or joist-vaulted R-60 advanced	R-38	21+12	R-10 Below entire slab-on-grade and below grade slab	22.5%	1.0
1.4	U-0.18	Ceiling and single-rafter or joist-vaulted R-60 advanced	R-48	21+16	R-20 Below entire slab-on-grade and below grade slab	30%	1.5

2. Air Leakage and Efficient Ventilation Envelope Options

- **Three options** within this category (down from four options)
- Maximum **1.5 credits possible** from this category (down from 2.0)
- All options now require a heat recovery ventilation system
- All options revised to reflect decreased air leakage rate requirement of base code

2021	Whole-house ventilation type	Sensible heat recovery efficiency	Air leakage rate	Credits
Base Code	Exhaust fan(s), Supply Fan(s), Balanced system, or Furnace Integrated Supply	N/a	4.0 ACH	0
2.1	Balanced system using heat recovery ventilator	0.65	2.0 ACH	0.5
2.2	Balanced system using heat recovery ventilator	0.75	1.5 ACH	1.0
2.3	Balanced system using heat recovery ventilator, with all ducts located within conditioned space	0.80	0.6 ACH	1.5

2021 WSEC Residential Significant Changes: Additional Energy Efficiency Requirements, continued

3. High Efficiency HVAC Equipment Options

- **Nine options** within this category (up from six options)
- **Maximum 2.0 credits possible** from this category (same as before)

2021	Heating System Type	Certification	Efficiency	Credits
3.1	Heating System Type 1 – Gas or propane furnace	Energy Star	95% AFUE	1.0
	Heating System Type 1 – Gas or propane boiler	Energy Star	90% AFUE	
3.2	Heating System Type 2 – Secondary heating system is air-source centrally ducted heat pump	-	HSPF of 9.5	0.5
	Heating System Type 2 – Secondary heating system is gas or propane boiler	Energy Star	90% AFUE	
3.3	Air source centrally ducted heat pump	NEEP cc ASHP qualified product list (if winter design is 23°F or below)	HSPF of 9.5	0.5
3.4	Closed-loop ground source heat pump	-	COP of 3.3	1.5
	Open loop water source heat pump with max pumping hydraulic head of 150 feet	-	COP of 3.6	1.5
3.5	Ductless mini-split heat pump in largest zone of dwelling unit	-	HSPF of 10	1.5
3.6	Air source centrally ducted heat pump	Cold climate variable capacity heat pump (cc VHP) if winter design is 23°F or below	HPSF of 11	1.0
	Air source centrally ducted cold climate variable capacity heat pump	cc VHP	HPSF of 10	1.0
3.7	Ductless split system with no electric resistance heating with heating loads greater than 24,000	-	HSPF of 10	2.0
	Ductless split system with no electric resistance heating, with heating loads 24,000 or less	-	HSPF of 9	2.0
3.8	Air-to-water heat pump	Rated in accordance with AHRI 550/590	COP of 3.2 @ 47°F	1.0
3.9	Connected thermostat	Energy Star Certified Smart Thermostats / EPA Energy Star specifications	n/a	0.5
<p><i>Note, Option 3.9 can only be used with Options 3.1 and 3.3. To use Option 3.9 with Option 3.3, the system shall be a 1-2 speed heat pump system. Variable capacity heat pumps are ineligible from claiming this option.</i></p>				

4. High Efficiency HVAC Distribution Options

- **One option** within this category (down from two options)
- **Maximum 0.5 credits possible** from this category (down from 1.0)

2021	HVAC Duct requirements	Heating System Type	Credits
4.1	Must be located within conditioned space, as detailed in Section R403.3.2	May not be: Electric resistance, Hydronic heating, Ductless heat pump, or Combustion heating equipment with AFUE less than 80%	0.5

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5. Efficient Water Heating Options

- **Five options** within this category (down from six options)
- **Maximum 3.5 credits possible** from this category (up from 3.0)

2021	Water Heating Type	Certification	Efficiency	Credits
5.1	Any, with Drain Water Heat Recovery capturing wastewater heater from at least two showers (or tub/shower combos)	CSA B55.1 or IAPMO IGC 346-2017	40%, if installed for equal flow	0.5
	Any, with Drain Water Heat Recovery capturing wastewater heater from at least two showers (or tub/shower combos)	CSA B55.1 or IAPMO IGC 346-2017	50%, if installed for unequal flow	0.5
5.2	Any, with Compact Hot Water Distribution	The volume may store not more than 16 ounces of water between the nearest source of heated water and the termination of the fixture supply pipe where calculated using Section R403.5.2	n/a	0.5
<i>To use Option 5.2, the home must have at least 1.5 bathrooms</i>				
5.3	Standard water heater with solar water heating supplemental water heating	Solar water heating must provide a rated minimum savings of 85 therms or 2000 kWh based on the Solar Rating and Certification Corporation (SRCC) Annual Performance of OG-300 Certified Solar Water Heating System		1.0
	Water heated by ground source heat pump meeting Option 3.4	-	COP of 3.3	
5.4	Electric heat pump water heater	NEEA's advanced water heating specification	Tier III	2.0
5.5	Electric heat pump water heater utilizing a split system configuration with the air-to-refrigerant heat exchanger located outdoors	NEEA's advanced water heating specification	Tier IV and UEF of 2.9	2.5

6. Renewable Electric Energy Option

- Clarification that half credits can be achieved, though kWh worth the same number of credits: For each 600 kWh of generation, 0.5 credits can be achieved
- **Maximum 4.5 credits possible** from this category (up from 3.0)

7. Appliance Package Option

- Energy Star versions now referenced for clarity
- Dishwasher must now meet Energy Star “Most Efficient 2021” Or “Compact” rating
- Dryer must now meet Energy Star “Most Efficient 2022” rating
- **Maximum 0.5 credits possible** from this category (same as before)