



PHIUS 2021 Annual Conference  
**Passive House Compliance in  
the Current Washington State  
Residential Energy Code**

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# WSEC & PHIUS—R407

## 2018 WSEC R404 – Passive House

- Patterned on the IECC above code program but specifically calls out passive house certifications
- "Mandatory" requirements that apply to all compliance paths must be met as usual
- WSEC-R Hotline has received over 2,500 requests for code assistance so far in 2021 but we have not yet heard from anyone using PHIUS R407 path

## WSEC & PHIUS—R407 (cont.)

- Pre-certification required by AHJ for permit
- Final certification required by AHJ for certificate of occupancy
- Building official's added workload is to be lighter:
  - Confirm submission of the pre-certification and final certification notices/letters/certificates
  - Verify certification status in online project databases

# This section of IECC model code was the catalyst

## IECC R102.1.1 Above code programs

### **R102.1.1 Above code programs.**

The *code official* or other authority having jurisdiction shall be permitted to deem a national, state or local energy-efficiency program to exceed the energy efficiency required by this code. *Buildings approved* in writing by such an energy-efficiency program shall be considered to be in compliance with this code. The requirements identified as “mandatory” in Chapter 4 shall be met.

# Text for PH compliance added as Section R407 in WSEC-R

## SECTION R407 CERTIFIED PASSIVE HOUSE

**R407.1 General.** Projects shall comply with Section R407.2 or R407.3.

**R407.2 Passive House Institute U.S. (PHIUS).** Projects shall comply with PHIUS+ 2018 Passive Building Standard, including its USDOE Energy Star and Zero Energy Ready Home co-requisites, and performance calculations by PHIUS-approved software. Projects shall also comply with the provisions of Table R405.2.

**R407.2.1 PHIUS documentation.** Prior to the issuance of a building permit, the following items must be provided to the *code official*:

1. A list of compliance features.
2. A PHIUS precertification letter.

Prior to the issuance of a certificate of occupancy, the following item must be provided to the *code official*:

1. A PHIUS+ 2018 (or later) project certificate.

**R407.3 Passive House Institute (PHI).** Projects shall comply with Low Energy Building Standard, version 9f or later, including performance calculations by PHI-approved software. Projects shall also comply with the provisions of Section R401 through R404.

**R407.3.1 PHI documentation.** Prior to the issuance of a building permit, the following items must be provided to the *code official*:

1. A list of compliance features.
2. A statement from a passive house certifier that the modeled energy performance is congruent with the plans and specifications, and that the modeled performance meets said standard.

Prior to the issuance of a certificate of occupancy, the following item must be provided to the *code official*:

1. A PHI Low Energy Building project certificate.

# WSEC “Mandatory” section tags in IECC are removed, with sections listed in WSEC-R Table R405.2

TABLE R405.2  
MANDATORY COMPLIANCE MEASURES FOR SIMULATED PERFORMANCE ALTERNATIVE

Section	Title	Comments
<b>General</b>		
R401.3	Certificate	
<b>Envelope</b>		
R402.4	Air leakage	
R402.5	Maximum fenestration U-factor	
<b>Systems</b>		
R403.1	Controls	
R403.1.2	Heat pump supplemental heat	
R403.3.2	Sealing	
R403.3.1	Equipment and system sizing	
R403.3.3	Duct testing	
R403.3.4	Duct leakage	
R403.3.5	Building cavities	
R403.4	Mechanical system piping insulation	
R403.5.1	Heated water circulation and temperature maintenance system	
R403.6	Mechanical ventilation	
R403.7	Equipment sizing and efficiency rating	
R403.8	Systems serving multiple dwelling units	
R403.9	Snow melt system controls	
R403.10	Pool and permanent spa energy consumption	
R403.11	Portable spas	
<b>Electrical Power and Lighting</b>		
R404.1	Lighting equipment	
R404.1.1	Lighting equipment	
<b>Other Requirements</b>		
R406	Additional energy efficiency requirements	

# WSEC & PHIUS—Background

2018 WSEC effective in February 2021:

- Typically 20,000 to 40,000 units (SF/MF) a year (2018-19)
  - 3 single family submitted for PHIUS certification
  - 5 multifamily submitted for PHIUS certification
- Uncertain if they are:
  - Pre-certified
  - Final certification
  - WSEC-R 407 Passive House
- Uncertain if the compliance path or 2018 WSEC-R Code Compliance Calculator (C3) was used—or both?

# WSU Energy Program Code Support Services

Technical support we provide in Washington:

- Training (in-person, live webinars, videos)
- Phone and email inquiry hotline support
- Energy code compliance tool development
- WSU website with educational resources:  
[energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx](http://energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx)
- Building department site visits



# Energy Code Support in Washington

## Residential

WSU Energy Program

360-956-2042

[energycode@energy.wsu.edu](mailto:energycode@energy.wsu.edu)

[www.energy.wsu.edu/code](http://www.energy.wsu.edu/code)

*Mike Lubliner, Melinda Spencer,  
Carolyn Roos*

## Non-residential

Evergreen Technology Consulting

360-539-5202

[com.techsupport@waenergycodes.com](mailto:com.techsupport@waenergycodes.com)

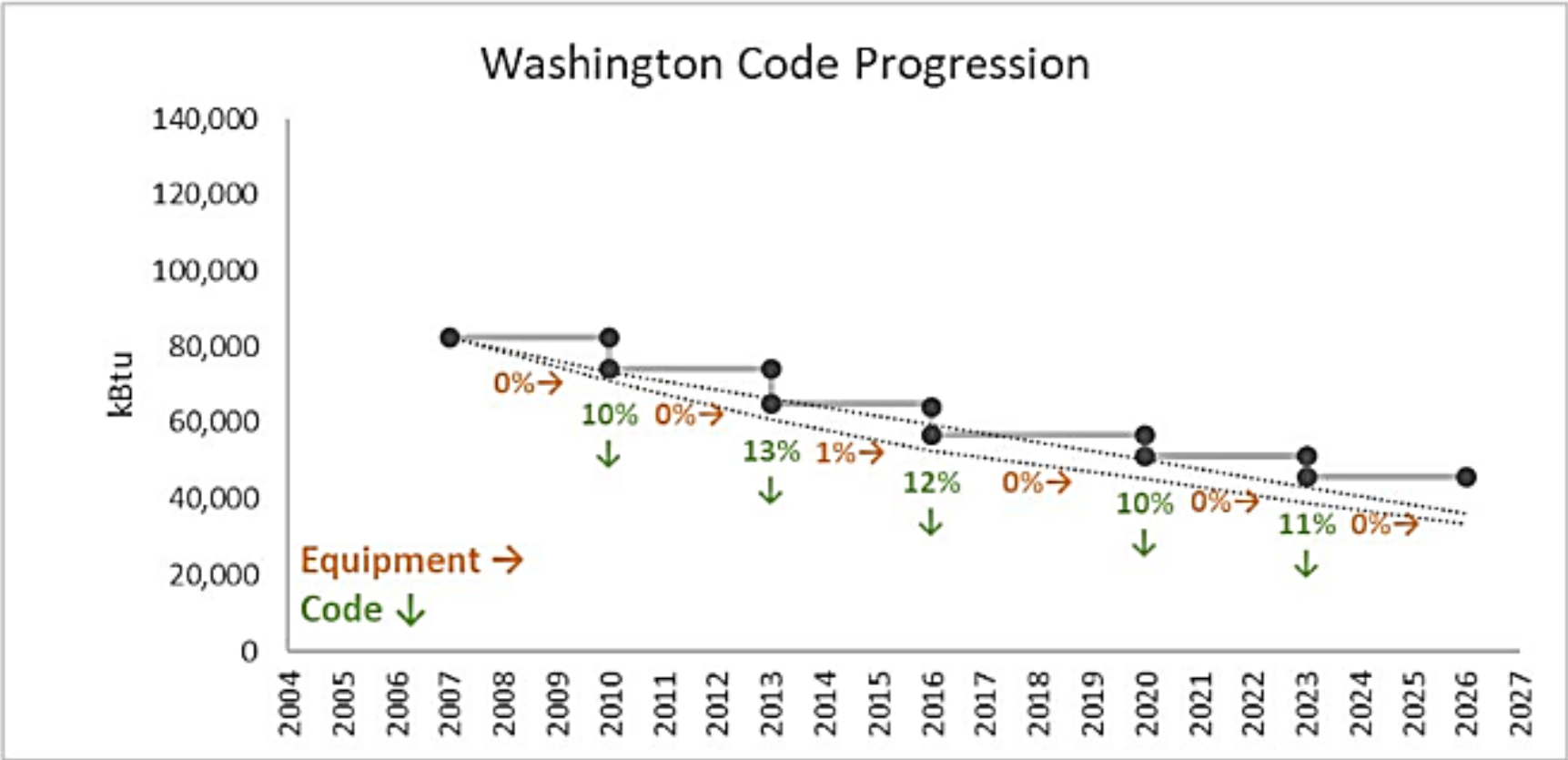
<http://waenergycodes.com>

*Lisa Rosenow*

Spend an hour on our web page!

The screenshot shows the WSU Energy Program Building Efficiency website. The header includes the WSU logo and the text 'Energy Program Washington State University' and 'WSU Energy Program Building Efficiency'. The main content area is titled '2018 Washington State Energy Code' and includes a link for 'New to the energy code? Please read this'. Below this, there are two bullet points: one for permits submitted on or after February 1, 2021, and another for permits submitted before that date. A 'For assistance and updates:' section lists email, phone, and distribution list options. There are also sections for '2018 WSEC-R Training Opportunities', 'Questions About Commercial Portions of the WSEC?', and 'Permit Application Documents'. A search bar is visible in the left sidebar.

# Code Progression in Washington



# Overview—WSEC-R Changes

## Single Family:

R406 additional energy efficiency requirements

- New credit requirements
- Fuel normalization credit

Up from  
3.5 credits

**SECTION R406  
ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS**

**R406.1 Scope.** 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.

**R406.2 Carbon emission equalization.** This section establishes a base equalization between fuels used to define the equivalent carbon emissions of the options specified. The permit shall define the base fuel selection to be used and the points specified in Table R406.2 shall be used to modify the requirements in Section R406.3. The sum of credits from Tables R406.2 and R406.3 shall meet the requirements of Section R406.3.

**R406.3 Additional energy efficiency requirements.** Each dwelling unit in a residential building shall comply with sufficient options from Table R406.2 so as to achieve the following minimum number of credits:

1. Small Dwelling Unit: ..... 3.0 credits Dwelling units less than 1500 square feet in conditioned floor area with less than 300 square feet of fenestration area. Additions to existing building greater than 500 square feet of heated floor area but less than 1500 square feet.
2. Medium Dwelling Unit: ..... 6.0 credits All dwelling units that are not included in #1, #3 or #4.
3. Large Dwelling Unit: ..... 7.0 credits Dwelling units exceeding 5000 square feet of conditioned floor area.
4. Dwelling units serving R-2 occupancies: ..... 4.5 credits
5. Additions less than or equal to 500 square feet: ..... 1.5 credits

The drawings included with the building permit application shall identify which options have been selected and the point value of each option, regardless of whether separate mechanical, plumbing, electrical, or other permits are utilized for the project.

# Fuel Normalization Credits

**TABLE R406.2  
FUEL NORMALIZATION CREDITS**

System Type	Description of Primary Heating Source	Credits	
		All Other	Group R-2
1	Combustion heating equipment meeting minimum federal efficiency standards for the equipment listed in Table C403.3.2(4) or C403.3.2(5)	0	0
2	For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) <b>or</b> Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590	1.0	1.0
3	For heating system based on electric resistance only (either forced air or Zonal)	-1.0	-1.0
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	0.5	N/A
5	All other heating systems	-1	-0.5

# Fuel Normalization Credit—Challenge

*Solar Electricity*

**89%**

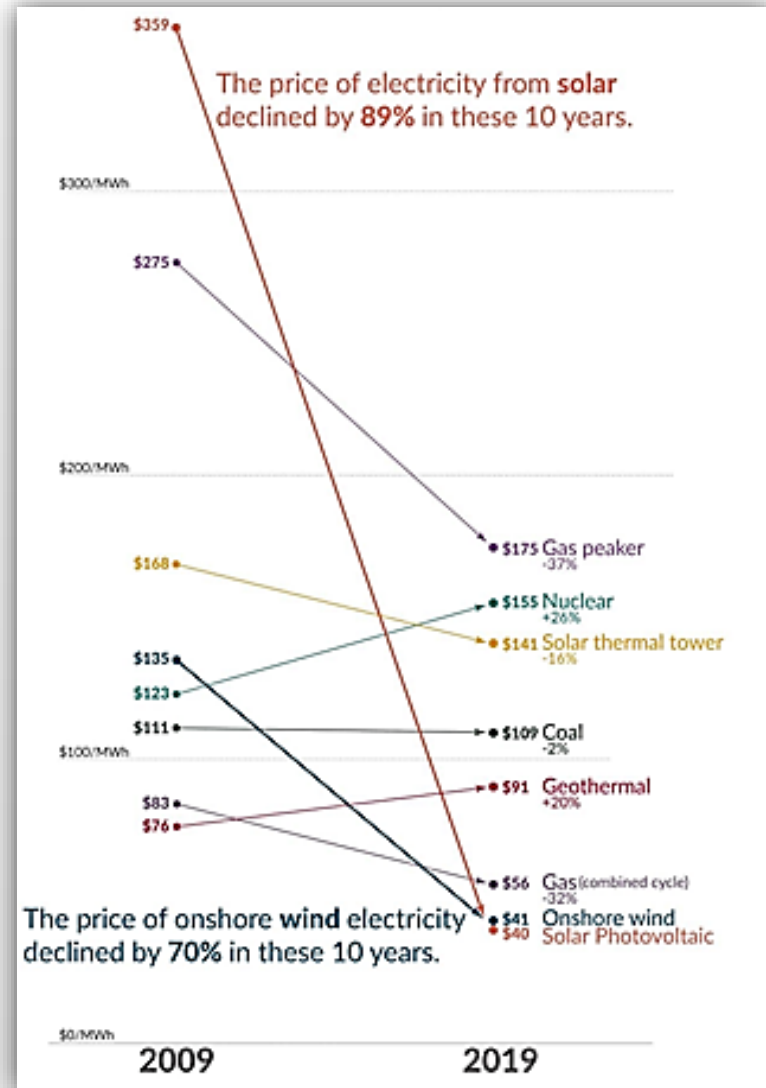
**Price Drop**



*Wind Electricity*

**70%**

**Price Drop**



# Energy Credits

TABLE 406.3  
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
<b>1. EFFICIENT BUILDING ENVELOPE OPTIONS</b>			
Only one option from Items 1.1 through 1.7 may be selected in this category. Compliance with the conductive UA targets is demonstrated using Section R402.1.4, Total UA alternative, where $[1 - (\text{Proposed UA} / \text{Target UA})] > \text{the required \%UA reduction}$			
1.1	Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.24.	0.5	0.5
1.2	Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.20.	1.0	1.0
1.3	Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.28 Floor R-38 Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total conductive UA by 5%.	0.5	N/A
1.4	Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.25 Wall R-21 plus R-4 ci Floor R-38 Basement wall R-21 int plus R-5 ci Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total conductive UA by 15%.	1.0	1.0
1.5	Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.22 Ceiling and single-rafter or joist-vaulted R-49 advanced Wood frame wall R-21 int plus R-12 ci Floor R-38 Basement wall R-21 int plus R-12 ci Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total conductive UA by 30%.	2.0	1.5

TABLE 406.3 (continued)  
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
1.6	Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.18 Ceiling and single-rafter or joist-vaulted R-60 advanced Wood frame wall R-21 int plus R-16 ci Floor R-48 Basement wall R-21 int plus R-16 ci Slab on grade R-20 perimeter and under entire slab Below grade slab R-20 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total conductive UA by 40%.	3.0	2.0
1.7	Advanced framing and raised heel trusses or rafters Vertical Glazing U-0.28 R-49 Advanced (U-0.020) as listed in Section A102.2.1, <i>Ceilings below a vented attic</i> and R-49 vaulted ceilings with full height of uncompressed insulation extending over the wall top plate at the eaves.	0.5	0.5
<b>2. AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION OPTIONS</b>			
Only one option from Items 2.1 through 2.4 may be selected in this category.			
2.1	Compliance based on R402.4.1.2: Reduce the tested air leakage to 3.0 air changes per hour maximum at 50 Pascals or For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.3 cfm/ft <sup>2</sup> maximum at 50 Pascals and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a high efficiency fan(s) (maximum 0.35 watts/cfm), not interlocked with the furnace fan (if present). Ventilation systems using a furnace including an ECM motor are allowed, provided that they are controlled to operate at low speed in ventilation only mode.  To qualify to claim this credit, the building permit drawings shall specify the option being selected, the maximum tested building air leakage, and shall show the qualifying ventilation system and its control sequence of operation.	0.5	1.0

# Energy Credits

TABLE 406.3 (continued)  
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
2.2	<p>Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum at 50 Pascals</p> <p>or</p> <p>For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.25 cfm/ft<sup>2</sup> maximum at 50 Pascals</p> <p>and</p> <p>All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.65.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</p>	1.0	1.5
2.3	<p>Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum at 50 Pascals</p> <p>or</p> <p>For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.25 cfm/ft<sup>2</sup> maximum at 50 Pascals</p> <p>and</p> <p>All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.75.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</p>	1.5	2.0
2.4	<p>Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.6 air changes per hour maximum at 50 Pascals</p> <p>or</p> <p>For R-2 Occupancies, optional compliance based on Section R402.4.1.2: Reduce the tested air leakage to 0.15 cfm/ft<sup>2</sup> maximum at 50 Pascals</p> <p>and</p> <p>All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> or Section 403.8 of the <i>International Mechanical Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.80. Duct installation shall comply with Section R403.3.7.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</p>	2.0	2.5

TABLE 406.3 (continued)  
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
<b>3. HIGH EFFICIENCY HVAC EQUIPMENT OPTIONS</b>			
Only one option from Items 3.1 through 3.6 may be selected in this category.			
3.1 <sup>a</sup>	<p>Energy Star rated (U.S. North) Gas or propane furnace with minimum AFUE of 95%</p> <p>or</p> <p>Energy Star rated (U.S. North) Gas or propane boiler with minimum AFUE of 90%.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.0	1.0
3.2 <sup>a</sup>	<p>Air-source centrally ducted heat pump with minimum HSPF of 9.5.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.0	N/A
3.3 <sup>a</sup>	<p>Closed-loop ground source heat pump; with a minimum COP of 3.3</p> <p>or</p> <p>Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.5	1.0
3.4	<p>Ductless mini-split heat pump system, zonal control: In homes where the primary space heating system is zonal electric heating, a ductless mini-split heat pump system with a minimum HSPF of 10.0 shall be installed and provide heating to the largest zone of the housing unit.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.5	2.0
3.5 <sup>a</sup>	<p>Air-source, centrally ducted heat pump with minimum HSPF of 11.0.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.5	N/A
3.6 <sup>a</sup>	<p>Ductless split system heat pumps with no electric resistance heating in the primary living areas. A ductless heat pump system with a minimum HSPF of 10 shall be sized and installed to provide heat to entire dwelling unit at the design outdoor air temperature.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected, the heated floor area calculation, the heating equipment type(s), the minimum equipment efficiency, and total installed heat capacity (by equipment type).</p>	2.0	3.0

# Energy Credits

TABLE 406.3 (continued)  
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
<b>4. HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM OPTIONS</b>			
4.1	<p>All supply and return ducts located in an unconditioned attic shall be deeply buried in ceiling insulation in accordance with Section R403.3.7.</p> <p>For mechanical equipment located outside the conditioned space, a maximum of 10 linear feet of return duct and 5 linear feet of supply duct connections to the equipment may be outside the deeply buried insulation. All metallic ducts located outside the conditioned space must have both transverse and longitudinal joints sealed with mastic. If flex ducts are used, they cannot contain splices.</p> <p>Duct leakage shall be limited to 3 cfm per 100 square feet of conditioned floor area.</p> <p>Air handler(s) shall be located within the conditioned space.</p>	0.5	0.5
4.2	<p>HVAC equipment and associated duct system(s) installation shall comply with the requirements of Section R403.3.7.</p> <p>Locating system components in conditioned crawl spaces is not permitted under this option.</p> <p>Electric resistance heat and ductless heat pumps are not permitted under this option.</p> <p>Direct combustion heating equipment with AFUE less than 80% is not permitted under this option.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and shall show the location of the heating and cooling equipment and all the ductwork.</p>	1.0	N/A
<b>5. EFFICIENT WATER HEATING OPTIONS</b>			
Only one option from Items 5.2 through 5.6 may be selected in this category. Item 5.1 may be combined with any option.			
5.1	<p>A drain water heat recovery unit(s) shall be installed, which captures waste water heat from all and only the showers, and has a minimum efficiency of 40% if installed for equal flow or a minimum efficiency of 54% if installed for unequal flow. Such units shall be rated in accordance with CSA B55.1 or IAPMO IGC 346-2017 and be so labeled.</p> <p>To qualify to claim this credit, the building permit drawings shall include a plumbing diagram that specifies the drain water heat recovery units and the plumbing layout needed to install it. Labels or other documentation shall be provided that demonstrates that the unit complies with the standard.</p>	0.5	0.5
5.2	<p>Water heating system shall include one of the following: Energy Star rated gas or propane water heater with a minimum UEF of 0.80.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency.</p>	0.5	0.5

TABLE 406.3 (continued)  
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
5.3	<p>Water heating system shall include one of the following: Energy Star rated gas or propane water heater with a minimum UEF of 0.91 or Solar water heating supplementing a minimum standard water heater. Solar water heating will 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 Systems or Water heater heated by ground source heat pump meeting the requirements of Option 3.3.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.</p>	1.0	1.0
5.4	<p>Water heating system shall include one of the following: Electric heat pump water heater meeting the standards for Tier I of NEEA's advanced water heating specification or For R-2 Occupancy, electric heat pump water heater(s), meeting the standards for Tier I of NEEA's advanced water heating specification, shall supply domestic hot water to all units. If one water heater is serving more than one dwelling unit, all hot water supply and recirculation piping shall be insulated with R-8 minimum pipe insulation.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency.</p>	1.5	2.0
5.5	<p>Water heating system shall include one of the following: Electric heat pump water heater meeting the standards for Tier III of NEEA's advanced water heating specification or For R-2 Occupancy, electric heat pump water heater(s), meeting the standards for Tier III of NEEA's advanced water heating specification, shall supply domestic hot water to all units. If one water heater is serving more than one dwelling unit, all hot water supply and recirculation piping shall be insulated with R-8 minimum pipe insulation.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency.</p>	2.0	2.5



# Energy Credits

TABLE 406.3 (continued)  
ENERGY CREDITS

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
5.6	<p>Water heating system shall include one of the following:</p> <p>Electric heat pump water heater with a minimum UEF of 2.9 and utilizing a split system configuration with the air-to-refrigerant heat exchanger located outdoors. Equipment shall meet Section 4, requirements for all units, of the NEEA standard <i>Advanced Water Heating Specification</i> with the UEF noted above</p> <p>or</p> <p>For R-2 Occupancy, electric heat pump water heater(s), meeting the standards for Tier III of NEEA's advanced water heating specification and utilizing a split system configuration with the air-to-refrigerant heat exchanger located outdoors, shall supply domestic hot water to all units. If one water heater is serving more than one dwelling unit, all hot water supply and recirculation piping shall be insulated with R-8 minimum pipe insulation.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency.</p>	2.5	3.0
<b>6. RENEWABLE ELECTRIC ENERGY OPTION</b>			
6.1	<p>For each 1200 kWh of electrical generation per housing unit provided annually by on-site wind or solar equipment a 1.0 credit shall be allowed, up to 3 credits. Generation shall be calculated as follows:</p> <p>For solar electric systems, the design shall be demonstrated to meet this requirement using the National Renewable Energy Laboratory calculator PVWATTS or approved alternate by the code official.</p> <p>Documentation noting solar access shall be included on the plans.</p> <p>For wind generation projects designs shall document annual power generation based on the following factors:</p> <p>The wind turbine power curve; average annual wind speed at the site; frequency distribution of the wind speed at the site and height of the tower.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall show the photovoltaic or wind turbine equipment type, provide documentation of solar and wind access, and include a calculation of the minimum annual energy power production.</p>	1.0	1.0
<b>7. APPLIANCE PACKAGE OPTION</b>			
7.1	<p>All of the following appliances shall be new and installed in the dwelling unit and shall meet the following standards:</p> <p>Dishwasher – Energy Star rated</p> <p>Refrigerator (if provided) – Energy Star rated</p> <p>Washing machine – Energy Star rated</p> <p>Dryer – Energy Star rated, ventless dryer with a minimum CEF rating of 5.2.</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall show the appliance type and provide documentation of Energy Star compliance. At the time of inspection, all appliances shall be installed and connected to utilities. Dryer ducts and exterior dryer vent caps are not permitted to be installed in the dwelling unit.</p>	0.5	1.5

a. An alternative heating source sized at a maximum of 0.5 Watts/ft<sup>2</sup> (equivalent) of heated floor area or 500 Watts, whichever is bigger, may be installed in the dwelling unit.

# Energy Credits Summary

Category	Credit range SF	Credit range MF
Efficient building envelope	0.5 – 3.0	0.5 – 2.0
Air leakage control & efficient ventilation	0.5 – 2.0	1.0 – 2.5
High efficiency HVAC equipment	1.0 – 2.0	1.0 – 3.0
High efficiency HVAC distribution system	0.5 – 1.0	NA
Efficient water heating	0.5 – 2.5	0.5 – 3.0
Renewable electric energy	1.0 – 3.0	1.0 – 3.0
Appliance package	0.5	1.5

**Note: For medium and large homes, you will likely need points from each of the first five categories to comply**

# How will you do it?

## Efficient Building Envelope Options - pick one

Number	Description	SF Points	MF Points
1.1	0.24 windows	0.5	0.5
1.2	0.20 windows	1.0	1.0
1.3	UA 5% reduction	0.5	NA
1.4	UA 15% reduction	1.0	1.0
1.5	UA 30% reduction	2.0	1.5
1.6	UA 40% reduction	3.0	2.0
1.7	0.28 + advanced framing	0.5	0.5



# How will you do it?

## Air Leakage Control & Efficient Ventilation Options

Number	Description	SF Points	MF Points
2.1	3 ACH + high-efficiency ventilation	0.5	1.0
2.2	2 ACH + heat recovery ventilation (HRV)	1.0	1.5
2.3	1.5 ACH + HRV medium efficiency	1.5	2.0
2.4	0.6 ACH + HRV high efficiency	2.0	2.5



# How will you do it?

## High Efficiency HVAC Equipment Options

Number	Description	SF Points	MF Points
3.1 <sup>a</sup>	Annual Fuel Utilization Efficiency (AFUE) 95% gas	1.0	1.0
3.2 <sup>a</sup>	Heating seasonal performance factor (HSPF) 9.5 ASHP	1.0	N/A
3.3 <sup>a</sup>	GSHP 3.3/3.0 COP	1.5	1.0
3.4	HSPF 10 DHP	1.5	2.0
3.5 <sup>a</sup>	HSPF 11 ASHP	1.5	N/A
3.6 <sup>a</sup>	HSPF 10 DHP no ER	2.0	3.0

a = alt heat source maxed at 0.5 watt/sf or 500 watts, whichever is larger

# How will you do it?

## High Efficiency HVAC Distribution System Options

Number	Description	SF Points	MF Points
4.1 <sup>a</sup>	Deeply buried ducts	0.5	0.5
4.2 <sup>b</sup>	Ducts inside	1.0	N/A

a = Duct leakage must be reduced to 3 cfm/100 sf

b = Cannot claim with DHP



Image source: <https://www.insulation4less.com>

# How will you do it?

## Efficient Water Heating Options

Number	Description	SF Points	MF Points
5.1 <sup>a</sup>	DWHR 40% eff	0.5	0.5
5.2 <sup>b</sup>	UEF 0.80 gas	0.5	0.5
5.3 <sup>b</sup>	UEF 0.91 gas <sup>c</sup>	1.0	1.0
5.4	Tier I HPWH	1.5	2.0
5.5	Tier III HPWH	2.0	2.5
5.6	Split HPWH	2.5	3.0

a = can be combined with other water heating options

b = must be ENERGY STAR rated

c = or solar water heater or ground source water heater



# How will you do it?

## Renewable Electric Energy Option

Number	Description	SF Points	MF Points
6.1	1,200 kWh solar PV	1.0	1.0
	2,400 kWh solar PV	2.0	2.0
	3,600 kWh solar PV	3.0	3.0





# How will you do it?

## Appliance Package Option

Number	Must include	SF Points	MF Points
7.1	Dishwasher	0.5	0.5
	Refrigerator <sup>a</sup>		
	Washing machine		
	Dryer – CEF 5.2		

a = only if provided

All equipment must be ENERGY STAR rated

Dryer must be ventless model



# Single Family—Scenarios 1 & 2: Electric space heat, electric water heat



0.5 credit

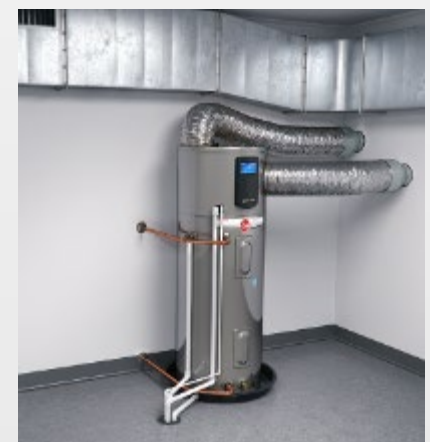
0.5 credit



1 credit + 1 credit (fuel norm.)

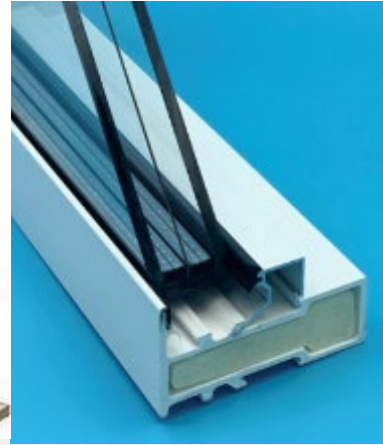
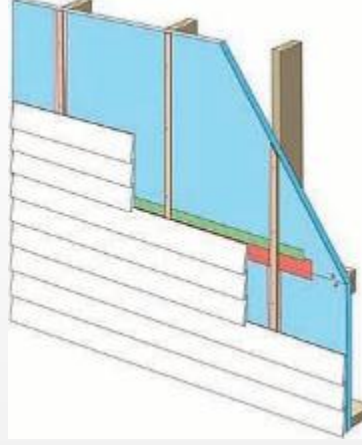


1 credit



2 credits

# Single Family—Scenario 3: Electric space heat, gas water heat



1 credit

0.5 credit



1.5 credit + 1 credit (fuel norm.)

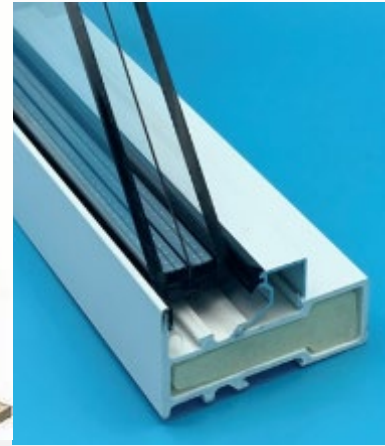
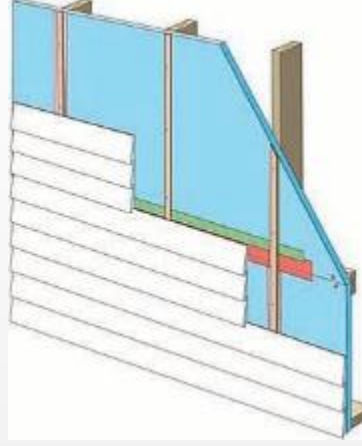


1 credit



1 credit

# Single Family—Scenario 4: Gas space heat, electric water heat



1 credit

0.5 credit



1 credit



1 credit



0.5 credit

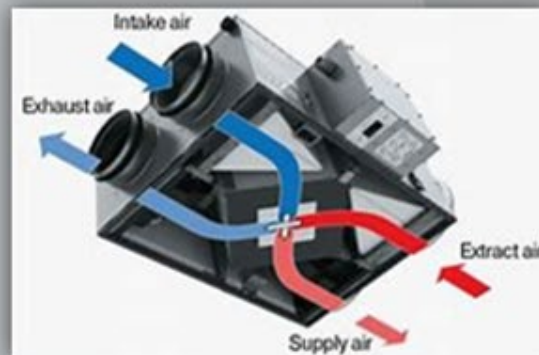


2 credits

# Multifamily Low-Rise R2—Scenario 1: DHP + Electric Heat

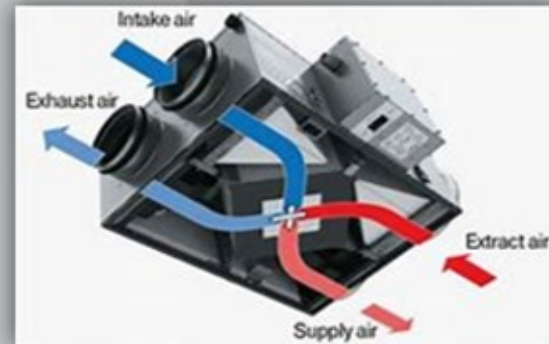


Option	Description	Credits
1.2	Triple-pane window U-0.22	1.0
2.1	0.25 cfm50/sf unit surface area (or 2 ACH <sub>50</sub> ) + 65% HRV/ERV - tested	1.5
3.4	DHP with electric resistance	2.0
<b>Total</b>		<b>4.5</b>



# Multifamily Low-Rise R2—Scenario 2: HSPF 10 VRF-HP

Option	Description	Credits
2	Fuel normalization - HP	1.0
2.2	0.25 cfm50/sf unit surface area (or 2 ACH <sub>50</sub> ) + 65% HRV/ERV - tested	1.5
3.6	All HSPF 10 (ducted cassette)	3.0
	<b>Total</b>	<b>5.5</b>



# New WSEC-R Compliance Certificate

## 2015 Compliance Certificate

## 2018 Compliance Certificate & Instructions

**2015 WSEC Residential Energy Compliance Certificate**

Property Address: \_\_\_\_\_

Conditioned Floor Area \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Builder or registered design professional: \_\_\_\_\_

Signature: \_\_\_\_\_

**R Values**

Ceiling: Vaulted R-\_\_\_\_ Floors: Over unconditioned space R-\_\_\_\_  
 Attic R-\_\_\_\_ Slab on grade floor R-\_\_\_\_

Walls: Above grade R-\_\_\_\_ Doors: \_\_\_\_\_ R-\_\_\_\_  
 Below, int. R-\_\_\_\_ \_\_\_\_\_ R-\_\_\_\_  
 Below, ext. R-\_\_\_\_ \_\_\_\_\_ R-\_\_\_\_

**U-Factors and SHGC**

NRFC rating (or) Windows U-\_\_\_\_ SHGC- N/A  
 Default rating (Appendix A WSEC 2015) Skylights U-\_\_\_\_ SHGC- N/A

Table 406.2 Option(s) \_\_\_\_\_ Total 406.2 Credits \_\_\_\_\_

Heating, Cooling & Domestic Hot Water		
System	Type	Efficiency
Heating		
Cooling		
DHW		

**Duct & Building Air Leakage**

All ducts & HVAC in conditioned space ( yes / no ) Insulation R-\_\_\_\_  
 Air handler present ( yes / no )  
 Test Target \_\_\_\_\_ CFM@25Pa Test Result \_\_\_\_\_ CFM@25Pa  
 Building air leakage target:  $ACH_{50} < 5.0$  - Tested leakage:  $ACH_{50} =$  \_\_\_\_\_

**Onsite Renewable Energy Electric Power System**

System type: \_\_\_\_\_ Rated annual generation \_\_\_\_\_ Kwh

**2018 WSEC Residential Energy Compliance Certificate (Effective February 1, 2021)**

Property address: \_\_\_\_\_

Builder/registered design professional name: \_\_\_\_\_  
 Builder/reg. design pro. signature: \_\_\_\_\_

Conditioned floor area: \_\_\_\_\_ ft<sup>2</sup> (per building permit)

**R-Values (R303.1.1)**

Ceiling/ Vaulted R-\_\_\_\_ Floors: Over unconditioned space R-\_\_\_\_  
 Attic: Attic R-\_\_\_\_ Slab-on-grade floor R-\_\_\_\_

Walls: Above grade R-\_\_\_\_ Fully insulated slab? Y/N (Circle one)  
 Below, int. R-\_\_\_\_ Doors: R-\_\_\_\_ R-\_\_\_\_ R-\_\_\_\_  
 Below, ext. R-\_\_\_\_ \_\_\_\_\_ R-\_\_\_\_

**U-Value of Windows, Skylights and Doors (R303.1.1.3)**

Average area weighted U-value from Glazing Worksheet Average U-\_\_\_\_

**Fuel Normalization (Tables R406.2) and Energy Credits (Table R406.3)**

System Type Number (1 to 5) \_\_\_\_\_ (Select one)  
 Energy Credits selected (1 to 7) \_\_\_\_\_  
 Fuel Normalization Credit \_\_\_\_\_ + Total Energy Credits \_\_\_\_\_ = Total Credits \_\_\_\_\_

Heating, Cooling and Domestic Hot Water		
System	Type (Manufacturer and Model Number)	Efficiency
Heating		
Cooling		
DHW		
Drain water heat recovery		

**Onsite Renewable Energy Electric Power System**

System type \_\_\_\_\_ System design capacity \_\_\_\_\_ kW  
 Rated annual generation \_\_\_\_\_

Dish washer \_\_\_\_\_  
 Refrigerator \_\_\_\_\_  
 Washer \_\_\_\_\_  
 Dryer \_\_\_\_\_  
 Vented gas fireplace / heating stove Heating or Decorative? \_\_\_\_\_

HVAC System Duct Leakage Testing (R403.3)		Circle one
All ductwork and air handler in conditioned space? (See Option 4.2)		Y or N
All ductwork in unconditioned spaces buried and tested at 3% total leakage, and air handler in conditioned space? (See Option 4.1)		Y or N
All ductwork & air handler outside conditioned space insulated to minimum R-8?		Y or N
Air handler present at duct leakage test? (Total leakage 4% if yes, 3% if no)		Y or N
HVAC leakage to outside test conducted at final?		Y or N
Do HVAC duct leakage tests include GPS and time stamp verification?		Y or N
HVAC system leakage test calculated design target:	_____ CFM @ 25 Pa	
HVAC system leakage test measured results:	_____ CFM @ 25 Pa	

Building Leakage Testing (R402.4.1.2)		Circle one
Dwelling unit leakage test calculated design target:	_____ ACH @ 50 Pa	
Dwelling unit leakage test, measured results:	_____ ACH @ 50 Pa	
Whole Building Leakage test (R2 corridor only) design target:	_____ CFM/sf @ 50 Pa	
Whole Building Leakage test (R2 corridor only) measured:	_____ CFM/sf @ 50 Pa	
Do building leakage tests include GPS and time stamp verification?		Y or N

Whole House Ventilation System Measured Flow Rates (M1503.4 IRC-WA)		Circle one
Are the system controls correctly labeled?		Y or N
The Whole House Ventilation (WHV) system operation and maintenance (O&M) instructions were provided to the building owner?		Y or N
Provided to: _____ on _____ (date)		

Whole House Ventilation System Type: (Circle one)  
 (1) Whole house exhaust fan, location \_\_\_\_\_  
 (2) Balanced HRV/ ERV, location \_\_\_\_\_  
 For R2 low-rise, serves more than one unit? \_\_\_\_\_ Y or N  
 (3) Supply or HRV WHV integral to the air handler. Describe system control sequence of operations or reference to design submittal: \_\_\_\_\_

### Fuel Normalization (Table R406.2) and Energy Credits (Table R406.3)

Each dwelling unit shall include sufficient options from Table R406.3 to achieve a certain number of energy credits, which varies depending on the size and type of the dwelling unit. The fuel normalization credit, selected from Table R406.2, is an adjustment to account for the carbon emission differences between fuels.

**Fuel Normalization (Tables R406.2) and Energy Credits (Table R406.3)**

System Type Number (1 to 5) \_\_\_\_\_ (Select One)  
 Energy Credits selected (1 to 7) \_\_\_\_\_  
 Fuel Normalization Credit \_\_\_\_\_ + Total Energy Credits \_\_\_\_\_ = Total Credits \_\_\_\_\_

Enter the primary heating system type number (1-5) from Table R406.2. List all the Energy Credit Options implemented by number (1-7) per Table R406.3. Add the fuel normalization credit and the total energy credits to obtain the total credits.

# New WSEC-R Code Compliance Calculator

## WSU Code Compliance Calculator - WSEC 2015 & 2018

(C) 2021

Washington State University Energy Program

For assistance contact: [energycode@energy.wsu.edu](mailto:energycode@energy.wsu.edu)

### Welcome to the WSU Code Compliance Calculator

This worksheet is designed to document the qualification of building designs by the (1) R402.1.1 prescriptive path, including the R406.3 UA percent trade off for Option 1 envelope measures, and (2) R402.1.4 Total UA Alternative (component performance). These are both based on the requirements of the 2015 and the 2018 editions of the Washington State Energy Code (WSEC). This tool can also calculate Efficient Building Envelope Options 1.3 – 1.6 for 2018 and Options 1a to 1c for 2015.

**We appreciate your feedback!** Send us your suggestions, comments and bug reports to the email above.

**ENABLE MACROS: Macros must be enabled for this tool to function properly.**

**Office 365 Users: Save this file to your LOCAL drive.**

**Calculator tabs will open when macros are enabled.**

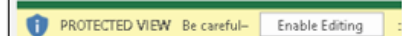
#### If the tool does not open:

- \* **Have you enabled editing? Have you enabled macros? Have you saved to your harddrive?**
  - See the text box "Excel Start Up Tips" to the right
  - If you missed clicking "Enable Macros" just below the Excel ribbon, close this file and open again.
- \* **What is your Excel version? This tool has not been tested on Excel for Mac or fully tested on Office 365.**
  - Include your Excel version when you email us

### Accept Terms of Use & Open Tool

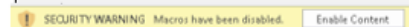
#### Excel Start Up Tips

If you open this file from an email, you will be prompted to Enable Editing and then to save to your computer.



If you are using Office 365, save the file to your local drive.

Next Excel will prompt you to enable macros, usually just below the Excel ribbon. Click Enable Content.



Next click OK to accept the Terms of Use when prompted.



When exiting, you will be prompted to save this file, even if you already have. This will

[www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx](http://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx)

*How-to video: Using C3 to print PDF forms:*

[http://www.energy.wsu.edu/videos/wsec-using\\_c3\\_to\\_print\\_pdf\\_forms/](http://www.energy.wsu.edu/videos/wsec-using_c3_to_print_pdf_forms/)



# Discussion

**We have not yet heard of anyone using the PHIUS R407 compliance path in 2018 WSEC-R, even though:**

- The WSEC-R hotline has received over 2,500 requests for assistance so far in 2021
- Our webinars have trained thousands on the new code

**We are looking for PHIUS examples in C3 for future training:**

- Completed WA projects using PHIUS compliance path as case studies: single family, ADU and R2 low-rise MF

**Other WSEC/PHIUS questions and/or comments?**



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Thank you!