



**FIRCREST CITY COUNCIL/PLANNING COMMISSION
SPECIAL MEETING AGENDA**

**TUESDAY, JANUARY 29, 2019
6:00 P.M.**

**COUNCIL CHAMBERS
FIRCREST CITY HALL, 115 RAMSDELL STREET**

- 1. CALL TO ORDER**
- 2. PLEDGE OF ALLEGIANCE**
- 3. ROLL CALL**
- 4. NEW BUSINESS**
 - A. Introductions
 - B. [Green Building Codes/Solar Energy](#)
 - C. [S. 19th Street/Mildred Street W Planning Area:](#)
 - Narrows Plaza Update
 - Tacoma Housing Authority Update – James Center North
 - Countywide Center Opportunity
- 5. ADJOURNMENT**



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**FIRCREST PLANNING/BUILDING DEPARTMENT
STAFF MEMO**

***City Council – Planning Commission
Joint Study Session***

January 29, 2019

BACKGROUND:

Resolution No. 809 sets the first Tuesday of February each year as the date for an annual meeting between the City Council and the Planning Commission. For 2019, the City Council set the date for January 29, 2019. The meeting is intended to discuss items of common interest and review community visioning.

SUMMARY OF AGENDA:

Based on the 2019 Planning Commission work plan and items of interest suggested by the City Council, the agenda for the joint meeting will focus on two topics:

- Green Building Codes/Solar Energy
- 19th and Mildred Planning Area

The format this year will be for staff to present a general overview of the topic and then open it up for discussion. Staff has included some overarching questions in the PowerPoint presentation (attachment 1). They are meant to help focus the topic, but are not intended to limit discussion. The goal is to come away with a strong understanding of the direction the City Council would like the Planning Commission and staff to explore this year.

Attachment:

1. PowerPoint Presentation
2. Residential Energy Code Worksheet
3. State Building Code Appendix U- Solar Ready

2019

Joint Meeting

City Council – Planning Commission



Agenda

6:00 Roll Call

6:02 Introductions

6:15 Green Building Codes

- Councilmember Jamie Nixon – Intro
- Staff Research
- Discussion

7:00 19th and Mildred

- Narrows Plaza
- Tacoma Housing Authority – James Center North
- Joint Planning/Countywide Center

Format: Brief Presentation
Discussion



Green Building Codes

Introduction
Staff Research
Discussion

Green Building Codes

Primary Question:

Is there interest in pursuing green building codes, specifically solar power requirements for new residential and/or commercial?

Secondary Question:

Is there interest in pursuing other green measures and/or policies, i.e. electric vehicles, electric vehicle parking requirements, increased commercial energy code requirements?



Green Building Codes

Current Energy Code

Mandated statewide to provides minimum and maximum requirements for energy code compliance

Goal: Regulate design and construction of buildings for the effective use and conservation of energy over the useful life of each building

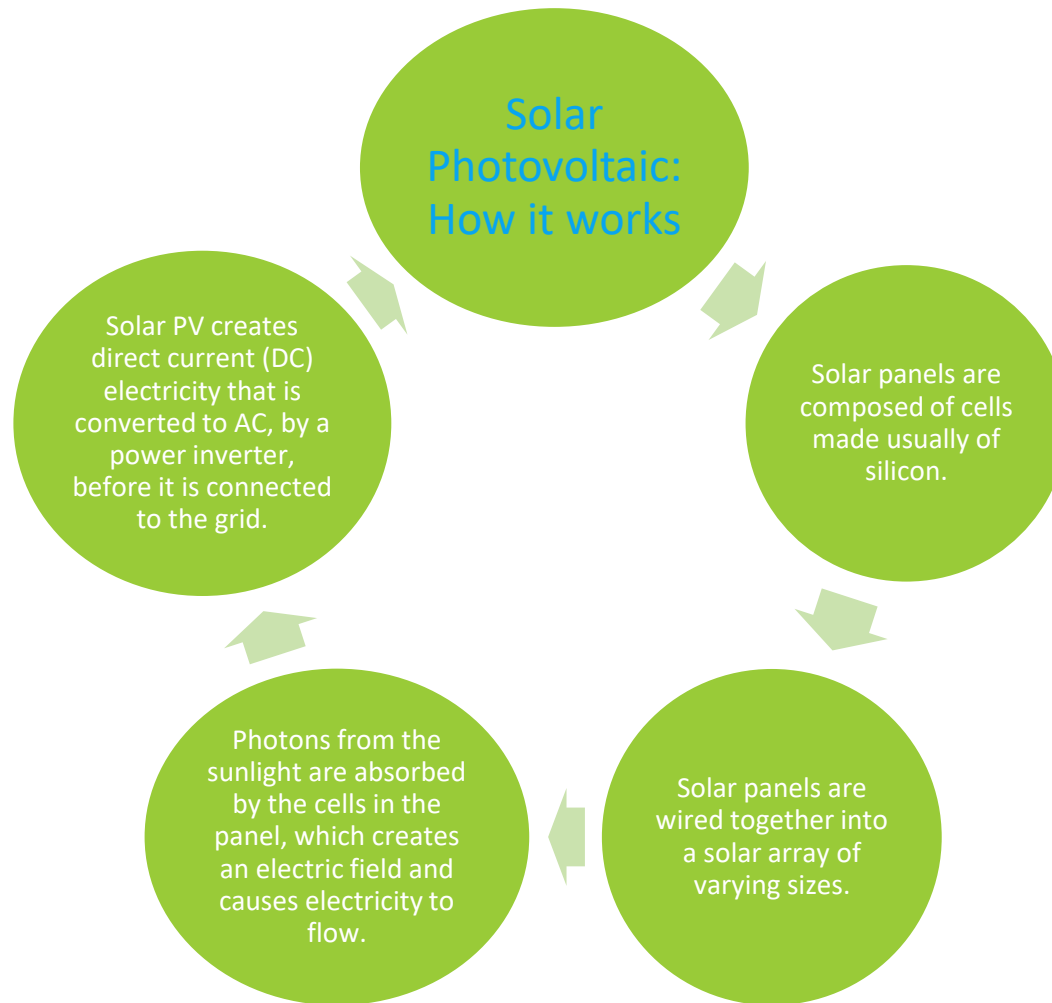
[Additional info](#)

Attachment #2: Residential Prescriptive
Energy Code Worksheet and Table

[Energy Code Link](#)



Green Building Codes



Green Building Codes

Current Solar Codes

- State has reduced requirements and created a checklist for local jurisdictions to use for retrofitting solar PV systems
- Leased solar panel system do not qualify for production incentive payments in the State of Washington
- Solar PV qualifies as an energy credit
- Net metering allows owner to earn credits during the summer to use in the winter
- TPU requires application, special meter and agreements
- IRC Appendix “U” (Attachment #3) has been approved by the State Building Code Council (SBCC) for local jurisdictions that wish to designate a “solar ready zone” - *Require that a zone on the house be reserved and designed for solar access*



Green Building Codes



Green Building Codes

Environmental Benefits

- Renewable source of energy
- Doesn't produce any air, water, or noise pollution
- Doesn't emit any greenhouse gases
- Reduces dependency on fossil fuels
- Reduces carbon footprint
- Adds to the power grid



Green Building Codes

Cost of Panels in Tacoma WA

Residential 5 kW system

Estimated system cost: \$20,950

(-) Federal tax credit: 30% with no maximum

Final cost after tax credits: \$14,665

Est. energy savings per year: \$585

Cost recover: 25 years 1 month

30-year earnings (*savings – cost*): \$2,885

Commercial 50 kW system

Estimated system cost: \$193,500

(-) Federal tax credit: 30% with no maximum

Final cost after tax credits: \$135,450

Est. energy savings per year: \$5846

Cost recovery: 23 years 2 months

30-year earnings (*savings – cost*): \$39,940

Source: www.decisiondata.org/solar-by-city/Tacoma-wa/

Their solar data is based on actual solar radiation hitting the ground. This takes into account latitude, longitude, altitude, and cloud cover. We then factor in the cost of electricity where you live to deliver city-specific calculations and recommendations.



Green Building Codes

Local Experience

Two residents have installed a solar panel system

Both motivated by desire to be energy efficient (green)

Both properties were ideal candidates: low grade roof, south facing, no shade

Installed 32 & 30 panels (maximized roof)

Cost \$30,000 & \$44,000 before 30% Federal Tax Credit

Resident #1 has paid zero in electric bills and received cash back at end of year; expects to be paid for in 5 years

Resident #2 has seen their electric bill drop 80-90% and their gas bill drop 50-60%; expects to be paid for in 15 years

Both have positive experiences but stated there are a multitude of variables to consider to make it feasible

Both hoped the City would do more education by promoting incentives and ease of process



Green Building Codes

Other Things to Consider

WA electrical costs are 2nd lowest in nation, but electrical costs +13% in last 5 years

Cost of solar panels decreased from \$6.50/w to \$4.20/w since 2010

New technology

Minimal maintenance cost

Washington State incentives rank #19 out of 50; some need to be renewed

152 average sunny days versus US average of 205

Our location north of the 45th parallel provides long sunny and clear daylight hours in the summer that can produce large amounts of electricity

Solar panels do produce power on cloudy days



Green Building Codes

Primary Question: Is there interest in pursuing green building codes, specifically solar power requirements for new residential and/or commercial?

Secondary Question: Is there interest in pursuing other green measures and/or policies, i.e. electric vehicles, electric vehicle parking requirements, increased commercial energy code requirements?



19th and Mildred

Intro

Narrows Plaza Update

Tacoma Housing Authority Update

Countywide Center Opportunity

Discussion



19th and Mildred - UP

Update on University Place Narrows Plaza Plan

Jeff Boers

19th and Mildred - THA

Tacoma Housing Authority James Center North

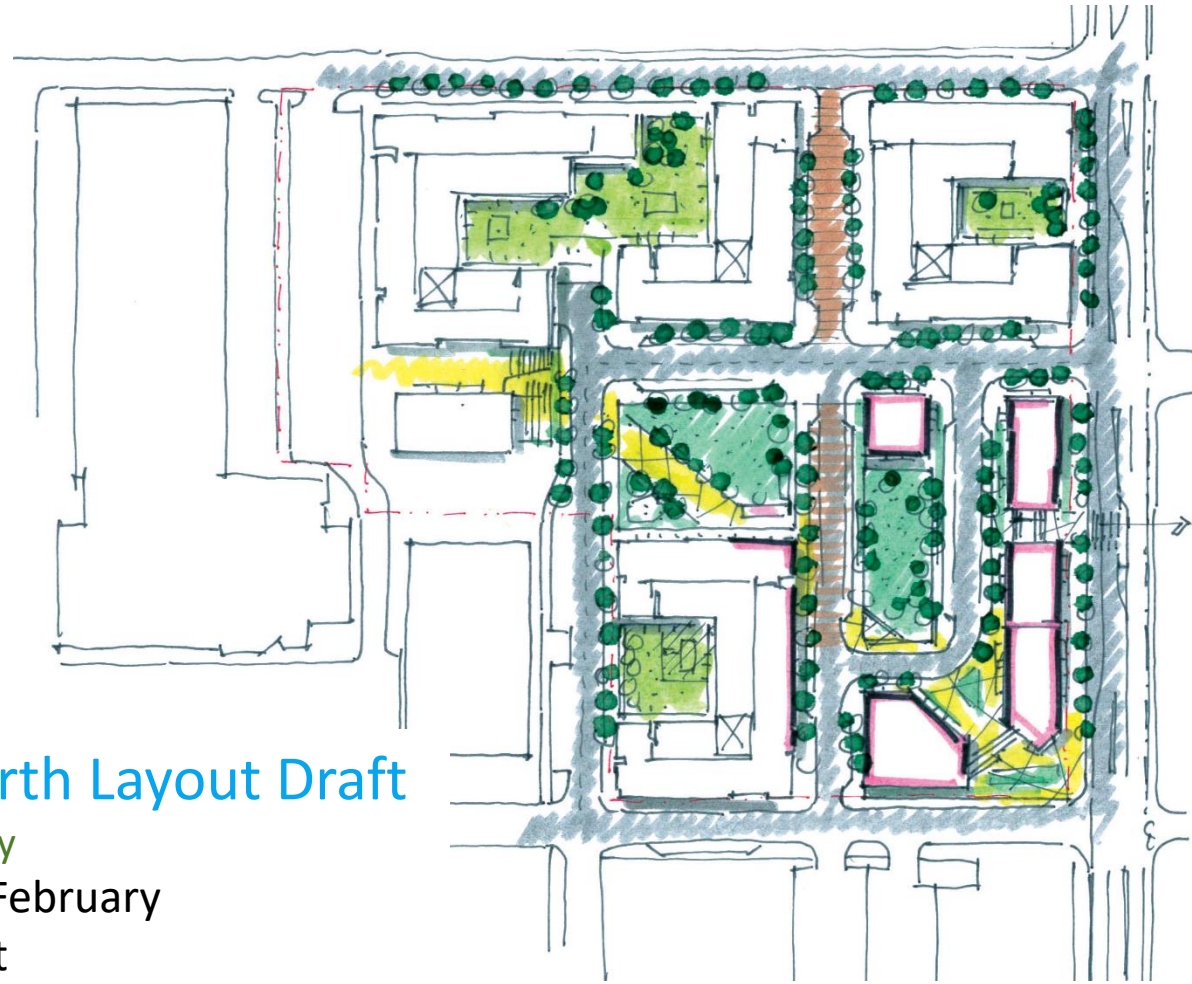
*a mix of uses and incomes that will be implemented in
phased development approach over a multi-year period by
both private and non-profit developers*

- ❖ Focus on being an asset to the West End
- ❖ Serve students of Tacoma Community College

<https://www.tacomahousing.net/james-center-north>



19th and Mildred - THA



S. Mildred Street

James Center North Layout Draft

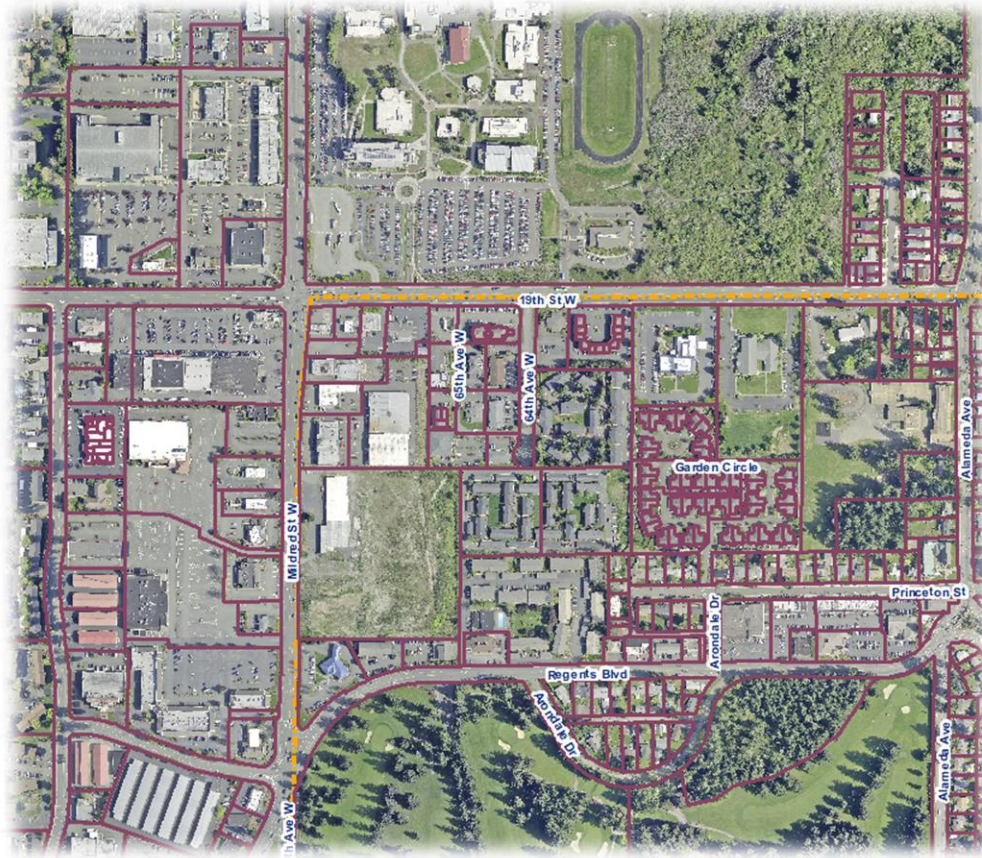
Tacoma Housing Authority

Next Meeting: TBD in February

Plan Share: April target

19th and Mildred - Centers

Joint Planning Opportunity



19th and Mildred - Centers

What is a Center?

Centers are areas of **concentrated employment and/or housing** ... which serve as the hubs of transit and transportation systems ... conserve resources and create additional transportation, housing, and shopping choices.

Centers are the focal points for growth within the county and are areas where public investment is directed.



19th and Mildred

Thoughts, ideas, questions?

- Narrows Plaza
- Tacoma Housing Authority
- Joint Planning with UP and COT
- Countywide Center Designation
- Other?

2019

Joint Meeting

City Council – Planning Commission



Prescriptive Energy Code Compliance for All Climate Zones in Washington

Project Information

Contact Information

This project will use the requirements of the Prescriptive Path below and incorporate the the minimum values listed. In addition, based on the size of the structure, the appropriate number of additional credits are checked as chosen by the permit applicant.

Authorized Representative _____ Date _____

All Climate Zones		
	R-Value ^a	U-Factor ^a
Fenestration U-Factor ^b	n/a	0.30
Skylight U-Factor	n/a	0.50
Glazed Fenestration SHGC ^{b,e}	n/a	n/a
Ceiling ^k	49 ^j	0.026
Wood Frame Wall ^{g,m,n}	21 int	0.056
Mass Wall R-Value ⁱ	21/21 ^h	0.056
Floor	30 ^g	0.029
Below Grade Wall ^{c,m}	10/15/21 int + TB	0.042
Slab ^d R-Value & Depth	10, 2 ft	n/a

*Table R402.1.1 and Table R402.1.3 Footnotes included on Page 2.

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: 1.5 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 that are greater than 500 square feet of heated floor area but less than 1500 square feet.
- ☐ **2. Medium Dwelling Unit: 3.5 credits**
All dwelling units that are not included in #1 or #3. **Exception:** Dwelling units serving R-2 occupancies shall require 2.5 credits.
- ☐ **3. Large Dwelling Unit: 4.5 credits**
Dwelling units exceeding 5000 square feet of conditioned floor area.
- ☐ **4. Additions less than 500 square feet: .5 credits**

Table R406.2 Summary

Option	Description	Credit(s)	
1a	Efficient Building Envelope 1a	0.5	<input type="checkbox"/>
1b	Efficient Building Envelope 1b	1.0	<input type="checkbox"/>
1c	Efficient Building Envelope 1c	2.0	<input type="checkbox"/>
1d	Efficient Building Envelope 1d	0.5	<input type="checkbox"/>
2a	Air Leakage Control and Efficient Ventilation 2a	0.5	<input type="checkbox"/>
2b	Air Leakage Control and Efficient Ventilation 2b	1.0	<input type="checkbox"/>
2c	Air Leakage Control and Efficient Ventilation 2c	1.5	<input type="checkbox"/>
3a	High Efficiency HVAC 3a	1.0	<input type="checkbox"/>
3b	High Efficiency HVAC 3b	1.0	<input type="checkbox"/>
3c	High Efficiency HVAC 3c	1.5	<input type="checkbox"/>
3d	High Efficiency HVAC 3d	1.0	<input type="checkbox"/>
4	High Efficiency HVAC Distribution System	1.0	<input type="checkbox"/>
5a	Efficient Water Heating 5a	0.5	<input type="checkbox"/>
5b	Efficient Water Heating 5b	1.0	<input type="checkbox"/>
5c	Efficient Water Heating 5c	1.5	<input type="checkbox"/>
5d	Efficient Water Heating 5d	0.5	<input type="checkbox"/>
6	Renewable Electric Energy	0.5	<input type="checkbox"/>
			*1200 kwh

Total Credits

0.0
0.00

*Please refer to Table R406.2 for complete option descriptions

Table R402.1.1 Footnotes

For SI: 1 foot = 304.8 mm, ci = continuous insulation, int = intermediate framing.

^a R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the compressed R-value of the insulation from Appendix Table A101.4 shall not be less than the R-value specified in the table.

^b The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

^c "10/15/21.+TB" means R-10 continuous insulation on the exterior of the wall, or R-15 on the continuous insulation on the interior of the wall, or R-21 cavity insulation plus a thermal break between the slab and the basement wall at the interior of the basement wall. "10/15/21.+TB" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the wall. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. "TB" means thermal break between floor slab and basement wall.

^d R-10 continuous insulation is required under heated slab on grade floors. See R402.2.9.1.

^e There are no SHGC requirements in the Marine Zone.

^f Reserved.

^g Reserved.

^h Reserved.

ⁱ The second R-value applies when more than half the insulation is on the interior of the mass wall.

^j Reserved.

^k For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38.

^l Reserved.

^m Int. (intermediate framing) denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.

Table R402.1.3 Footnote

^a Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source or as specified in Section R402.1.3.

Table 406.2

Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
1a	<p>EFFICIENT BUILDING ENVELOPE 1a: 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 UA by 5%.</p>	0.5	
1b	<p>EFFICIENT BUILDING ENVELOPE 1b: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.25 Wall R-21 plus R-4 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 UA by 15%.</p>	1.0	
1c	<p>EFFICIENT BUILDING ENVELOPE 1c: 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 UA by 30%.</p>	2.0	
1d ^a	<p>EFFICIENT BUILDING ENVELOPE 1d: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Vertical fenestration U = 0.24</p>	0.5	
2a	<p>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2a: Compliance based on R402.4.1.2: Reduce the tested air leakage to 3.0 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> shall be met with a high efficiency fan (maximum 0.35 watts/cfm), not interlocked with the furnace fan. 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 and shall specify the maximum tested building air leakage and shall show the qualifying ventilation system.</p>	0.5	
2b	<p>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2b: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.70. 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	

Table 406.2

Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
2c	<p>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2c: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.85. 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	
3a ^b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3a: Gas, propane or oil-fired furnace with minimum AFUE of 94%, or Gas, propane or oil-fired boiler with minimum AFUE of 92% 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	
3b ^b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3b: Air-source heat pump with minimum HSPF of 9.0 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	
3c ^b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3c: Closed-loop ground source heat pump; with a minimum COP of 3.3 or Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6 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	
3d ^b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3d: Ductless Split System Heat Pumps, Zonal Control: In homes where the primary space heating system is zonal electric heating, a ductless heat pump system shall be installed and provide heating to the largest zone of the housing unit. 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	
4	<p>HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM: All heating and cooling system components installed inside the conditioned space. This includes all equipment and distribution system components such as forced air ducts, hydronic piping, hydronic floor heating loop, convectors and radiators. All combustion equipment shall be direct vent or sealed combustion. For forced air ducts: A maximum of 10 linear feet of return ducts and 5 linear feet of supply ducts may be located outside the conditioned space. 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. Flex duct connections must be made with nylon straps and installed using a plastic strapping tensioning tool. Ducts located outside the conditioned space must be insulated to a minimum of R-8. Locating system components in conditioned crawl spaces is not permitted under this option. Electric resistance heat and ductless heat pumps are not permitted under this option. Direct combustion heating equipment with AFUE less than 80% is not permitted under this option. 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	

Table 406.2

Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
5a	<p>EFFICIENT WATER HEATING 5a:</p> <p>All showerhead and kitchen sink faucets installed in the house shall be rated at 1.75 GPM or less. All other lavatory faucets shall be rated at 1.0 GPM or less.^c</p> <p>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum flow rates for all showerheads, kitchen sink faucets, and other lavatory faucets.</p>	0.5	
5b	<p>EFFICIENT WATER HEATING 5b:</p> <p>Water heating system shall include one of the following:</p> <p>Gas, propane or oil water heater with a minimum EF of 0.74</p> <p>or</p> <p>Water heater heated by ground source heat pump meeting the requirements of Option 3c.</p> <p>or</p> <p>For R-2 occupancy, a central heat pump water heater with an EF greater than 2.0 that would supply DHW to all the units through a central water loop 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>	1.0	
5c	<p>EFFICIENT WATER HEATING 5c:</p> <p>Water heating system shall include one of the following:</p> <p>Gas, propane or oil water heater with a minimum EF of 0.91</p> <p>or</p> <p>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</p> <p>or</p> <p>Electric heat pump water heater with a minimum EF of 2.0 and meeting the standards of NEEA's Northern Climate Specifications for Heat Pump Water Heaters</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>	1.5	
5d	<p>EFFICIENT WATER HEATING 5d:</p> <p>A drain water heat recovery unit(s) shall be installed, which captures waste water heat from all the showers, and has a minimum efficiency of 40% if installed for equal flow or a minimum efficiency of 52% if installed for unequal flow. Such units shall be rated in accordance CSA B55.1 and be so labeled.</p> <p>To qualify to claim this credit, the building permit drawings shall include a plumbing diagram that specified the drain water heat recovery units and the plumbing layout needed to install it and labels or other documentation shall be provided that demonstrates that the unit complies with the standard.</p>	0.5	

Table 406.2
Energy Credits (2015 Code)

OPTION	DESCRIPTION	CREDIT(S)	Estimated Cost
6	<p>RENEWABLE ELECTRIC ENERGY:</p> <p>For each 1200 kWh of electrical generation per each housing unit provided annually by on-site wind or solar equipment a 0.5 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. 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>	0.5	



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

APPENDIX U

**SOLAR-READY PROVISIONS – DETACHED ONE-AND TWO-FAMILY DWELLINGS,
MULTIPLE SINGLE-FAMILY DWELLINGS (TOWNHOUSES)**

(The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.)

SECTION U101 SCOPE

U101.1 General. These provisions shall be applicable for new construction where solar-ready provisions are required.

SECTION U102 GENERAL DEFINITIONS

SOLAR-READY ZONE. A section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar water heating system.

SECTION U103 SOLAR-READY ZONE

U103.1 General. New detached one- and two-family dwellings, and multiple single-family dwellings (townhouses) with not less than 600 square feet (55.74 m²) of roof area oriented between 90 degrees and 270 degrees of true north shall comply with sections U103.2 through U103.10.

Exceptions:

1. New residential buildings with a permanently installed on-site renewable energy system.
2. A building where all areas of the roof that would otherwise meet the requirements of Section U103 are in full or partial shade for more than 70 percent of daylight hours annually.

U103.2 Construction document requirements for solar-ready zone. Construction documents shall indicate the solar-ready zone.

103.3 Solar-ready zone area. The total *solar-ready zone* area shall be not less than 300 square feet (27.87 m²) exclusive of mandatory access or set back areas as required by this code . New multiple single-family dwellings (townhouses) three stories or less in height above grade plane and with a total floor area less than or equal to 2,000 square feet (185.8 m²) per dwelling shall have a *solar-ready zone* area of not less than 150 square feet (13.94 m²). The *solar-ready zone* shall be composed of areas not less than 5 feet (1.52 m²) in width and not less than 80 square feet (7.44 m²) exclusive of access or set back areas as required by this code or the applicable

provisions of the *International Fire Code*. No portion of the *solar zone* shall be located on a roof slope greater than 2:12 that faces within 45 degrees of true north.

U103.4 Obstructions. *Solar-ready zones* shall be free from obstructions, including but not limited to vents, *chimneys*, and roof-mounted equipment.

[W]U103.5 Shading. The *solar-ready zone* shall be set back from any existing or new permanently affixed object on the building or site that is located south, east, or west of the *solar zone* a distance at least two times the object's height above the nearest point on the roof surface. Such objects include but are not limited to taller portions of the building itself, parapets, chimneys, antennas, signage, rooftop equipment, trees and roof plantings.

[W]U103.6 Capped roof penetration sleeve. A capped roof penetration sleeve shall be provided adjacent to the solar zone when the solar-ready zone has a roof slope of 2:12 or less. The capped roof penetration sleeve shall be sized to accommodate the future photovoltaic system conduit but shall have an inside diameter of not less than 1 ¼ inches.

U103.57 Roof load documentation. The structural design loads for roof dead load and roof live load shall be clearly indicated on the construction documents.

U103.68 Interconnection pathway. Construction documents shall indicate pathways for routing of conduit or plumbing from the *solar-ready zone* to the electrical service panel or service hot water system.

U103.79 Electrical service reserved space. The main electrical service or feeder panel for each dwelling shall have a reserved space to allow installation of a dual pole circuit breaker for future solar electric installation and shall be labeled "For Future Solar Electric". The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.

U103.810 Construction documentation certificate. A permanent certificate, indicating the *solar-ready zone* and other requirements of this section, shall be posted near the electrical distribution panel, water heater or other conspicuous location by the builder or registered design professional.