Discussion of Prohibition of Fossil Fuels in New Construction

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Guiding Policies

Washington State Targets

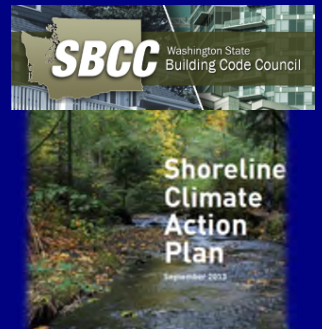
- 70% less building energy use by 2030
- Statewide GHG emission reduction goals:
  - 45% by 2030, 95% by 2050

2013 Shoreline Climate Action Plan, GHG emission reduction goals:

- 25% by 2020, 50% by 2030, 80% by 2050

K4C Policy Commitments

- Adopt codes that lead the way to “net-zero carbon” buildings
- Develop energy codes that support the transition to highly efficient/low carbon non-residential and multifamily buildings through reduced fossil fuels, renewable natural gas, and electrification



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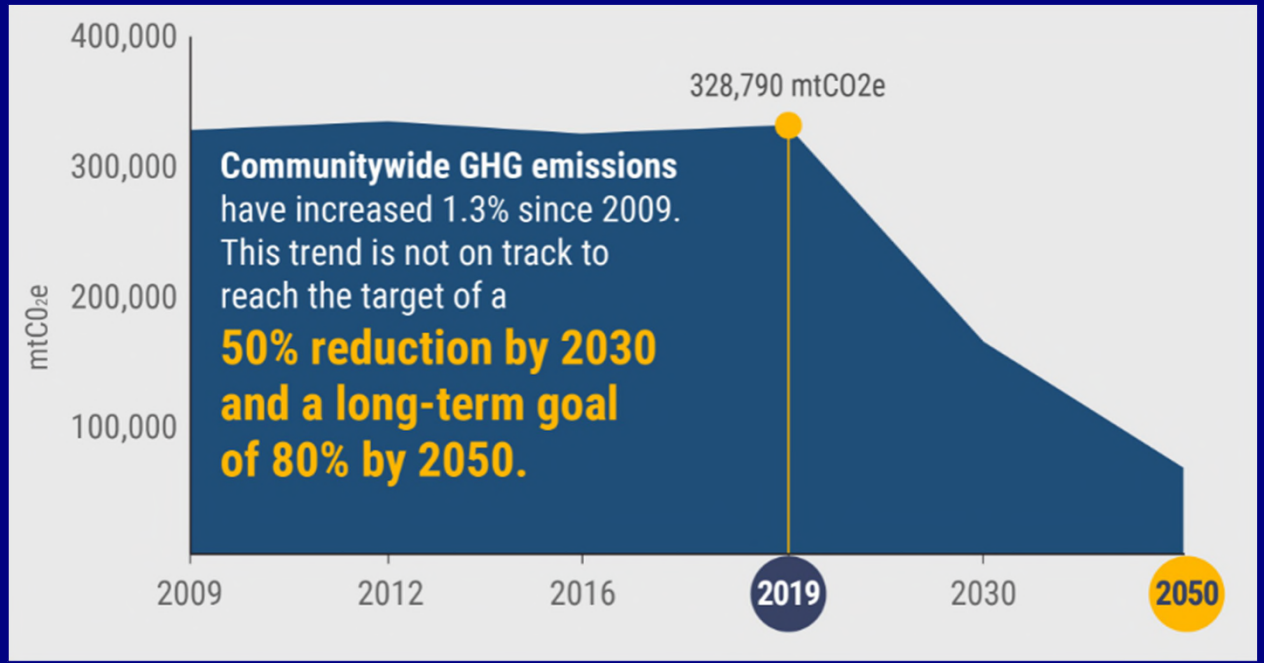
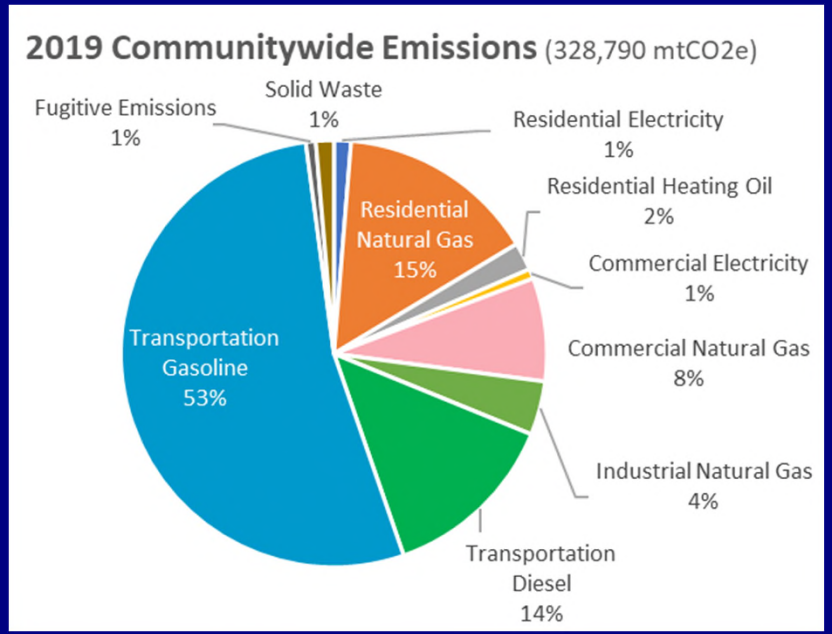
2019 GHG Emissions

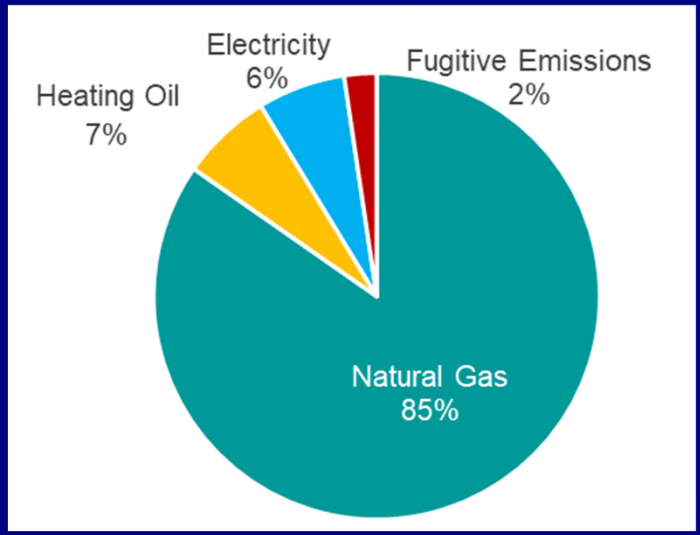
- 1.3% increase since 2009 for Shoreline



2019 GHG Emissions

- 28% from natural gas use in buildings



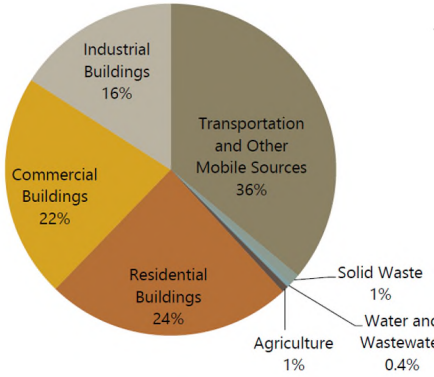


2019 emissions from the built environment

Why Act at Local Level?

- The State will always be more conservative than we need to meet our carbon goals
- Broader adoptions build the case for State adoption
- More of us adopting these provisions removes the fear that development will move to somewhere else
- Equitable Action
- It's doable

Emissions from the built environment are **nearly half of countywide emissions**



Seattle’s Approach

Seattle established guiding principles

- Build great envelope
- Eliminate combustion
- Use electricity wisely
- Generate power

Conducted an extremely comprehensive stakeholder process

- Technical expertise (5 E/M Review Staff + Duane Jonlin)
- Public feedback sessions
- Presentations
- High industry participation & co-development

Context for Tonight

- 2018 WA State Energy Code was published February 2021
- Seattle Energy Code Adoption: March 2021
- King County Ordinance transmittal: July 2021
- These proposed amendments only apply to multifamily and nonresidential buildings

RCC Recommended 2018 Energy Code Amendments

King County is currently proposing to adopt all of Seattle's amendments

Local amendments only apply to multifamily & nonresidential buildings

Amendment Highlights include:

- *Heat Pump Space Heating*
- *Hot Water Heat Pumps*
- *Identified C406 Credits*
- *Electrical Outlets at Gas Appliances*
- *Multi Family Solar Readiness*
- *Renewable Energy Requirement*
- Reduce allowable fenestration U-values
- Total System Performance Ratio (TSPR)
- Lighting Power Allowance
- Heat Recovery
- Demand Control Ventilation
- Cooling System Alterations
- Sub-Standard Envelopes
- Total Building Performance (BPF)
- Thermal Bridging
- Efficiency Package Credits
- Envelope Exemption for Kitchens
- Metering for Existing Buildings
- Service Hot Water
- DOAS

These focus on decarbonization

These are current WSEC requirements where only values have been modified

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Amendment Highlights Focusing Specifically on Decarbonization

WA State's Clean Energy Transformation Act (CETA)

- ***By 2025,*** *utilities must eliminate coal-fired electricity from their state portfolios*
- ***By 2030,*** *utilities can use limited amounts of electricity from natural gas if it is offset by other actions*
- ***By 2045,*** *utilities must supply electricity that is 100% renewable or non-emitting*

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Heat Pump Space Heating

No electric resistance or fossil fuel combustion for space heating in MF/Comm bldgs =

Heat Pump

Installed Costs vary by equipment type

- *Variable Refrigerant Package: $11,500/unit*
- *Air-to-water heat pump: $19,000/unit*

Table 3-1: Greenhouse gas savings achieved in an all-electric home relative to a natural gas-fueled home, tonnes of CO_2e annually saved, and percent reduction relative to gas

	2020	2030	2050
Single family	1.0-2.6 (33%-56%)	1.2-2.7 (52%-72%)	1.4-2.9 (76%-88%)
Low-rise multifamily	0.4-1.4 (25%-46%)	0.6-1.5 (49%-65%)	0.7-1.7 (74%-85%)

Percentages show the percent reduction of GHG emissions achieved in an all-electric home relative to a natural gas-fueled home. Ranges represent the spread across climate zones and across vintages. Homes without AC in the mixed fuel case (new construction in climate zone 3) are excluded.

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Heat Pump Water Heating (HPWH)

- Required for multifamily
- Delayed implementation until 1/1/2022

Cost to change from gas boiler to HWHP (delta)

- *Installed reverse cycle chiller system = $1,900/unit*
- *Installed modular CO2 refrigerant system. = $900/unit*

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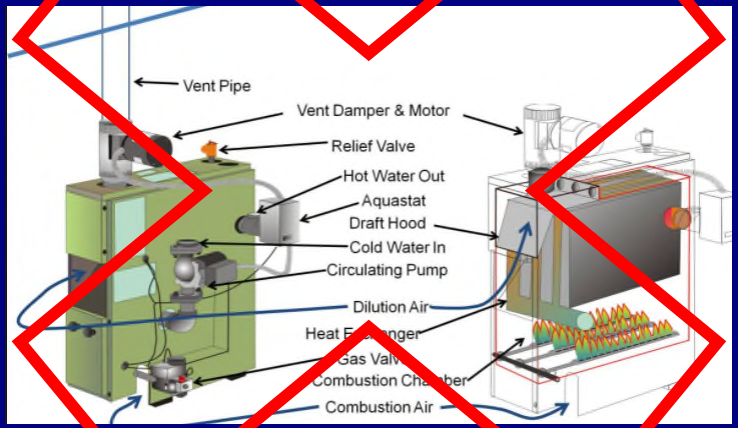
Disallow C406 Credit Achievement for Fossil Fuel Fired Equipment

Associated with:

- Dedicated outdoor air system (DOAS)
- HVAC system selection
- Service water heating



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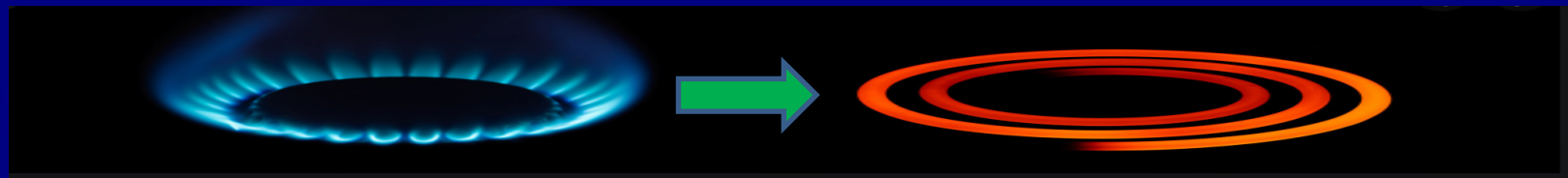
Electrical Outlets at Gas Appliances

- “Where dwelling unit appliances are served by natural gas, an electrical receptacle and circuit shall be provided at each gas appliance with sufficient capacity to serve a future electric appliance in the same location”
- Applies to multifamily only

Cost: $250/receptacle



Onsite Solar Requirements

- Applies only to multifamily & commercial buildings
- New buildings/additions >$5,000
- Required 0.25 W/sf, based on area of all floors
- Affordable housing exempted

Cost: 10,000 sf building = $6,500 after tax credits

How much space does this take up?

Building Stories	Roof Area Required
1	1.8%
2	3.6%
4	7.2%
6	10.9%
8	14.5%
10	18.1%
12	21.7%

Solar-ready Requirements in 2 Codes…

Energy Code Requirement

- Now applies to both commercial and multifamily < 20 stories
- Designate an unobstructed solar zone equal to:
  - 40 percent of roof area
  - 20 percent of electrical service size

Cost: $100

Also adopt Appendix T in the Residential Code

- Requires a solar zone for one- and two-family residential buildings:
- 300 sf for single-family
- 150 sf for duplexes

Cost: $75

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Other Amendment Highlights

Total Building Performance

Seattle's Building performance values are 10% less than WA State

TABLE C407.3(2)

BUILDING PERFORMANCE FACTORS (BPF) TO BE USED FOR COMPLIANCE WITH SECTION C407.3

Building Area Type	Building Performance Factor
Multifamily	((~~0.58~~)) 0.52
Healthcare/hospital	((~~0.54~~)) 0.49
Hotel/motel	((~~0.64~~)) 0.58
Office	((~~0.56~~)) 0.51
Restaurant	((~~0.70~~)) 0.63
Retail	((~~0.47~~)) 0.43
School	((~~0.36~~)) 0.32
Warehouse	((~~0.48~~)) 0.43
All Others	((~~0.54~~)) 0.49

Substandard Building Envelope Limits

Seattle: Modeled envelope UA cannot be more than 10% worse than prescriptive

*WA State: Modeled envelope UA cannot be more than **20% worse** than prescriptive (allowable total UA)*

Allowable Vertical Glazing

Maximum total building vertical fenestration area allowed = 35%

Reduced U-Values

Additional energy efficiency credit requirements

C406: Must achieve 8 credits – an increase from WA State's 6 credits

EFFICIENCY PACKAGE CREDITS

Code Section	Commercial Building Occupancy					
	Group R-1	Group R-2	Group B	Group E	Group M	All Other
	Additional Efficiency Credits					
1. More efficient HVAC performance in accordance with Section C406.2	2.0	3.0	3.0	2.0	1.0	2.0
2. Reduced lighting power: Option 1 in accordance with Section C406.3.1	1.0	1.0	2.0	2.0	3.0	2.0
3. Reduced lighting power: Option 2 in accordance with Section C406.3.2[a]	2.0	3.0	4.0	4.0	6.0	
4. Enhanced lighting controls in accordance with Section C406.4	NA	NA	1.0	1.0	1.0	
5. On-site supply of renewable energy in accordance with C406.5	3.0	3.0	3.0	3.0	3.0	
5.1 1/3 of renewable energy required by C406.5	1.0	1.0	1.0	1.0	1.0	
5.2 2/3 of renewable energy required by C406.5	2.0	2.0	2.0	2.0	2.0	

For an Apartment…

Credit: Duane Jonlin

Getting to 8 Credits
(after 1/1/22)

No.	Credits	Description
#2	1	Lighting
#9	5	Advanced HPWH
#11	2	Reduced air leakage
	8	Total

Lighting Power Allowance

Reduce all interior lighting table values by 10% (from State)

- Except health care facilities, penitentiaries, & facilities for the visually impaired

Change of Occupancy

Where a building/space (permitted prior to 2009) is altered to become a bakery or commercial kitchen/laundry, improvements to the building envelope immediately adjoining the spaces containing that use shall not be required if the proposed design uses only:

- All-electric Energy Star-rated process equipment, and
- Code compliant all-electric HVAC equipment

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Metering for Existing Buildings

Metering required when:

- Area greater than 10,000 SF
- Select individual HVAC parts are added or replaced
  - Electrical meters for certain branch circuits or fan/pump on a variable speed drive
  - Natural gas meters for each new natural gas connection that is rated at 1,000+ kBTU
- Adding/replacing the majority of HVAC equipment in a building
- Tenant space electrical sub-metering for existing buildings

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Amendment Highlights Continued

- Clarify that cooling system alterations must comply with the economizer compliance table, both at the individual equipment level and the total system level.
- Use ASHRAE minimum efficiency requirements table for heat pump/recovery chiller packages*
- The Demand Control Ventilation (DCV) shall now include energy recovery ventilation for spaces > 650 sf, and the threshold reduced from 25 to 15 occupants/1000 sf
- Require service hot water circulation controls and pipe/tank insulation
- Thermal bridging: Provide relaxed requirement for cantilevered concrete decks & add requirements for control of thermal bridging around glazing perimeter
    - Increase the scope of the Total System Performance Ratio (TSPR) to include R-2 MF, medical office, and exempt other service areas

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SMC Title 15

- Local amendments to the State Construction Codes, specifically amending the State Energy Code Commercial Provisions

Questions & Next Steps

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