

# 2021 Seattle Energy Code: Public Meeting #6: Review



**Seattle** Department of  
Construction & Inspections

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# The question is *how* we'll reach these targets



## Washington state:

70% less building energy use by 2030

- Zero-carbon buildings
- Gov says move faster

## Washington state:

45% reduction in GHG emissions by 2030

- 95% reduction by 2050

## Seattle:

Carbon-neutral buildings & transportation by 2050

- ...or sooner with Green New Deal

# Carbon-neutral Seattle by 2050

## 1. Build great envelope

- Start towards triple glazing

## 2. Eliminate combustion

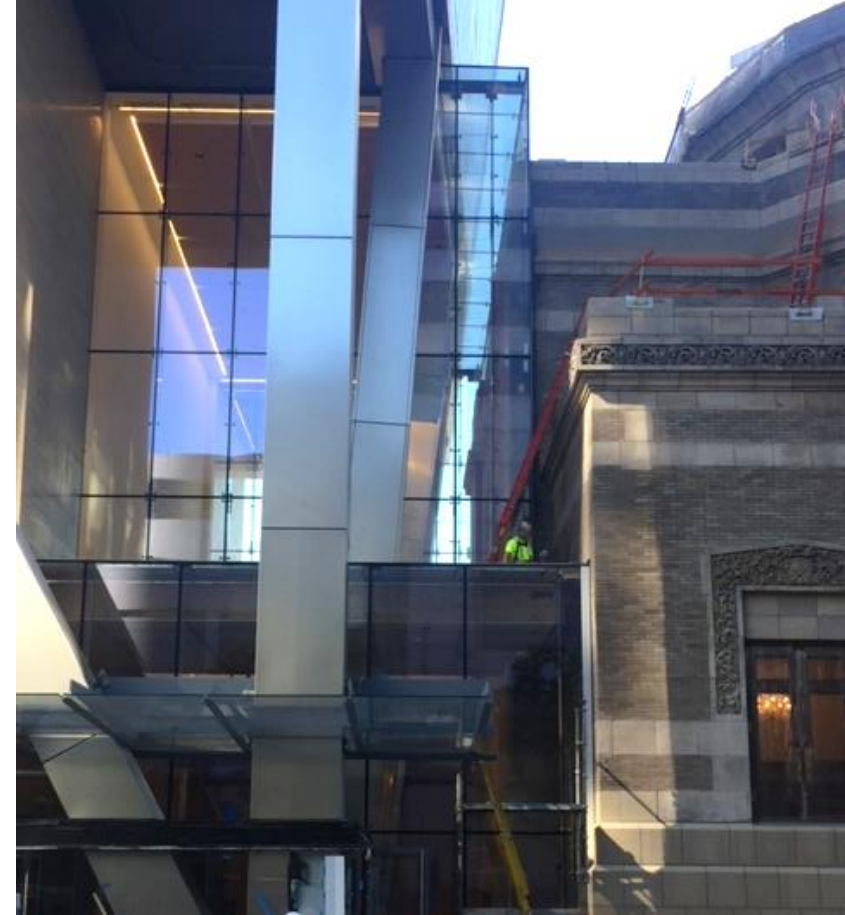
- Move existing buildings to heat pump
- Electric-ready commercial kitchens

## 3. Use electricity wisely

- Reduce lighting power

## 4. Generate power

- Increase on-site renewables



Build so that no “major surgery” for buildings is required for 2050

# Where are we headed? Rough guess:

Building Type	2018 SEC EUI (guess)	12% lower (2021 SEC target)	Best local examples	2030 Target EUI	WA BPS target
High-rise office	38	33	37	28	63-69
Mid-rise office	34	30	16, 21	22	63-69
Mid-rise multifamily	32	28	17, 19	20	--
Elementary school	28	25	16, 18 - 20	19	49
Warehouse, conditioned	18	16		12	36

# 20% of glazing triple (or equivalent)

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- **Curtain wall U-0.24**
- **Punched openings U-0.20**
- Max glazing area baseline based on ASHRAE list:
  - 40% large office
  - 22% School
  - 27% Hospital
  - ~~11-22%~~ Retail
  - 35% Multifamily up to 7 stories
  - 40% Multifamily 8 stories and taller
  - 6% Warehouse

# Max Fenestration Area

**C402.4.1 Maximum area.** Proposal to set maximum allowable glazing area by occupancy and use type, rather than a straight 30 or 35%. This gives large office and multifamily a 40% baseline. Grocery and standalone retail percentages were doubled (from ASHRAE baseline) to allow for exceptional circumstances.

<u>Occupancy</u>	<u>Building Area Type</u>	<u>Max %</u>
<u>Group A-2 or B</u>	<u>Restaurant (quick service)</u>	<u>34</u>
<u>Group A-2 or B</u>	<u>Restaurant (full service)</u>	<u>24</u>
<u>Group B</u>	<u>Healthcare (outpatient)</u>	<u>21</u>

<u>Group B</u>	<u>Office (5000 ft<sup>2</sup> or smaller)</u>	<u>19</u>
<u>Group B</u>	<u>Office (5000 to 50,000 ft<sup>2</sup>)</u>	<u>31</u>
<u>Group B</u>	<u>Office (larger than 50,000 ft<sup>2</sup>)</u>	<u>40</u>
<u>Group B</u>	<u>University or college</u>	<u>30</u>
<u>Group E</u>	<u>School (primary and secondary)</u>	<u>22</u>
<u>Group I-2</u>	<u>Hospital</u>	<u>27</u>
<u>Group M</u>	<u>Grocery Store</u>	<u>7-15</u>
<u>Group M</u>	<u>Retail (standalone)</u>	<u>11-20</u>
<u>Group M</u>	<u>Retail (strip mall)</u>	<u>20</u>
<u>Group R-1</u>	<u>Hotel/motel (75 or fewer rooms)</u>	<u>24</u>
<u>Group R-1</u>	<u>Hotel/motel (more than 75 rooms)</u>	<u>34</u>
<u>Group R-2</u>	<u>Multifamily 7 stories or less</u>	<u>35</u>
<u>Group R-2</u>	<u>Multifamily 8 stories or taller</u>	<u>40</u>
<u>Group S-2</u>	<u>Warehouse (non-refrigerated)</u>	<u>6</u>
	<u>All other</u>	<u>30</u>

# Mechanical

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- **Occupied standby controls for ventilation:** reduces ventilation airflow and slightly sets back temperature when no one's around
  - Extensive coordination editing
- Fractional HP fan efficiency: Extend requirement from  $<1/12$  HP to  $<1.0$  HP.
  - Extensive cleanup editing
  - ERV/HRV efficacy extended from 1.2 cfm/W to 1.7 cfm/W, per CA code
- Max DOAS fan power reduced from 1.0 to 0.8 W/cfm
- HRV for R-2 multifamily dwelling units: 67% sensible effectiveness (vs. 60%)
- Clean water pumps: Hydraulic Institute “Energy Rating” (ER) greater than zero

# Lighting & Electrical

- **Dimming controls.** Provide dimming for space types in this table:
- **Lighting power.** Reduce allowable lighting power about 5%
- **Retail.** Reduce allowance for additional retail display lighting
- **Electric-ready at commercial kitchens:** 12 kVA of electric capacity for future appliances per kBTU of gas cooking appliance capacity.
  - Added exception for existing buildings without sufficient main panel service size

1 Classroom / lecture hall / training room.

2 Conference / multipurpose / meeting room.

3 In a dining area for bar/lounge or leisure, family dining.

4 Laboratory.

5 Lobby.

6 Lounge / Break Room.

7 Offices.

8 Gymnasium / fitness center.

9 Library reading room.

10 In a health care facility for imaging rooms, exam rooms, nursery, and nurses' station.

11 Spaces not provided with occupant sensor controls complying with Section C405.2.1.1.



# Whole Building

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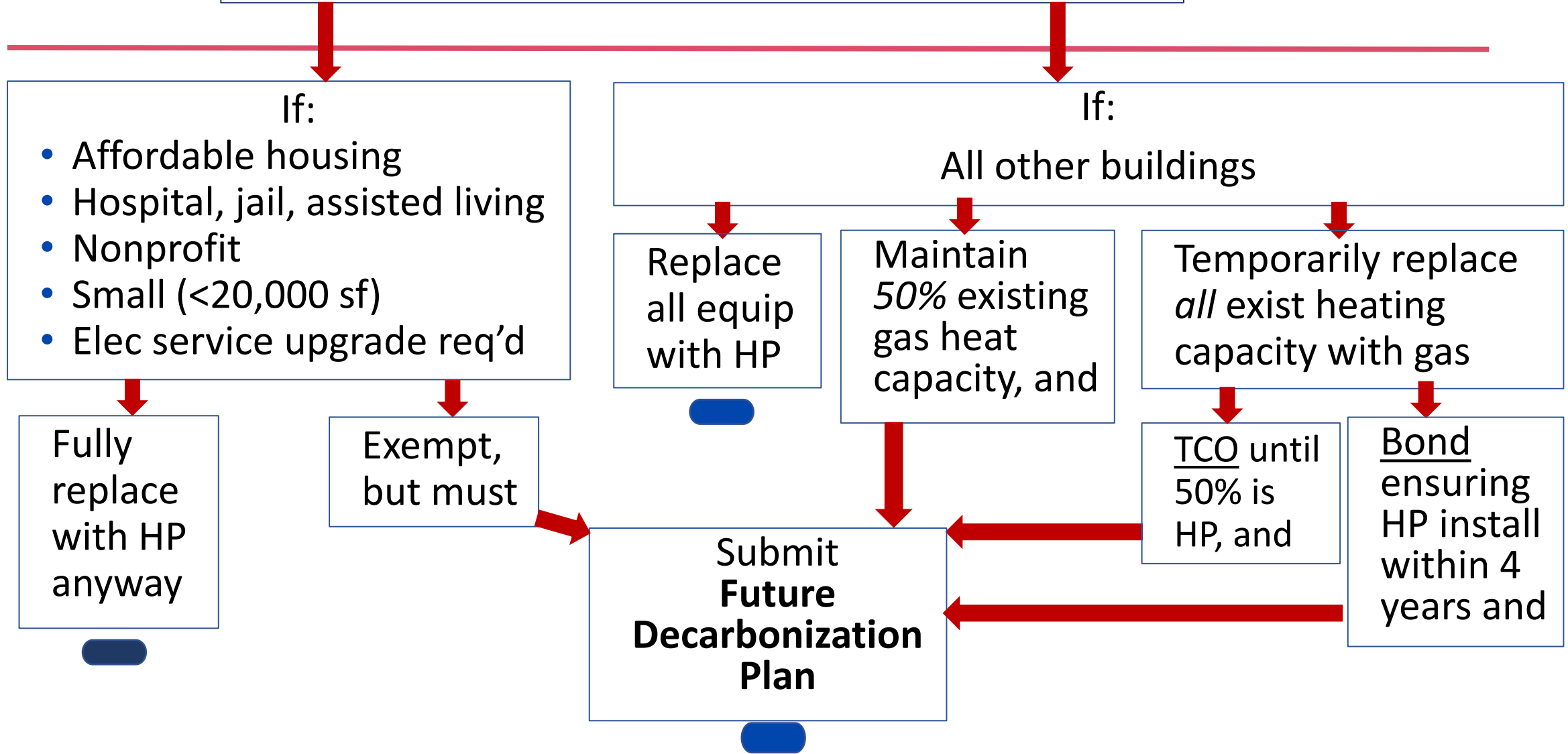
- **Additional efficiency credits.** Require 10% more credits than state code.
  - 2018 Seattle code increased required credits from 6 up to 8 credits (33% increase)
  - PNNL still working on Group M value
- **Energy modeling.** Set site energy and emissions targets 10% below WA code
  - Allow energy modeling credit for *approved* “unregulated loads”
- **“Commissioning compliance”** routine to ensure commissioning gets done
  - Including post-occupancy commissioning completion
- **Renewable energy.** Increase from 0.25 W/ft<sup>2</sup> up to **0.75** W/ft<sup>2</sup>

# Existing Buildings

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- **Replacement HVAC heating equipment.** See diagram next slide
  - Exempts affordable housing, hospitals, non-profits, small (<20,000 sf) buildings
  - Exempts buildings that would need electrical utility service upgrade
  - Allows 50% of existing gas heating capacity to remain as supplementary heat
  - “Emergency replacement” equipment limited to 4 years
  - All of the above require “Future Decarbonization Plan”
- **Chiller replacement as trigger for heat pump upgrade.** Similar to rules for HVAC heating equipment replacement.
  - **Now limited to replacement of air-cooled chillers, w/ existing fossil fuel heating equipment**
- **Replacement water heating equipment.** Similar to rules for replacement of HVAC heating equipment

Replacement central space heating equipment must be heat pump



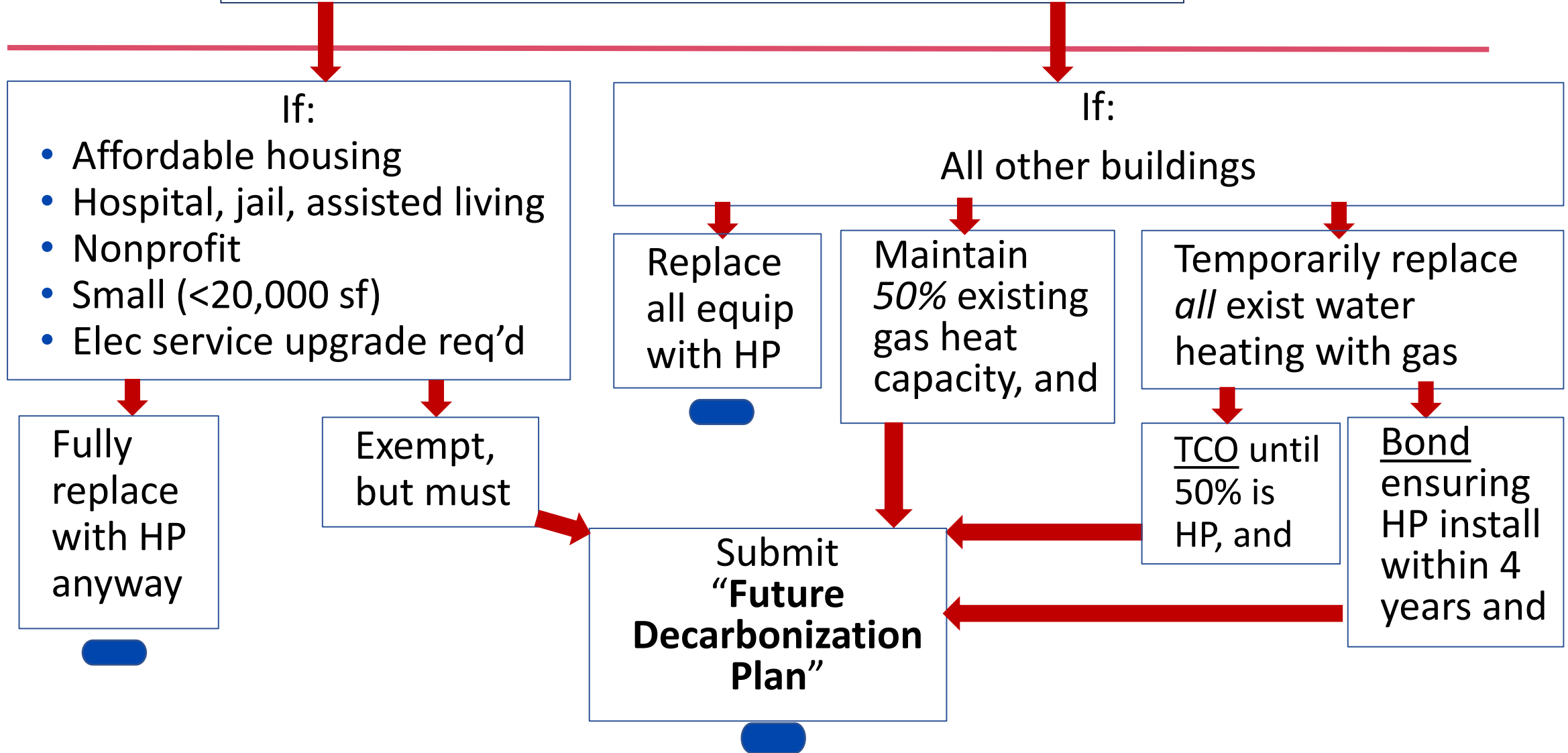
# Future Decarbonization Plan (schematic)

Prepared by PE, not stamped or signed, no obligation for future work

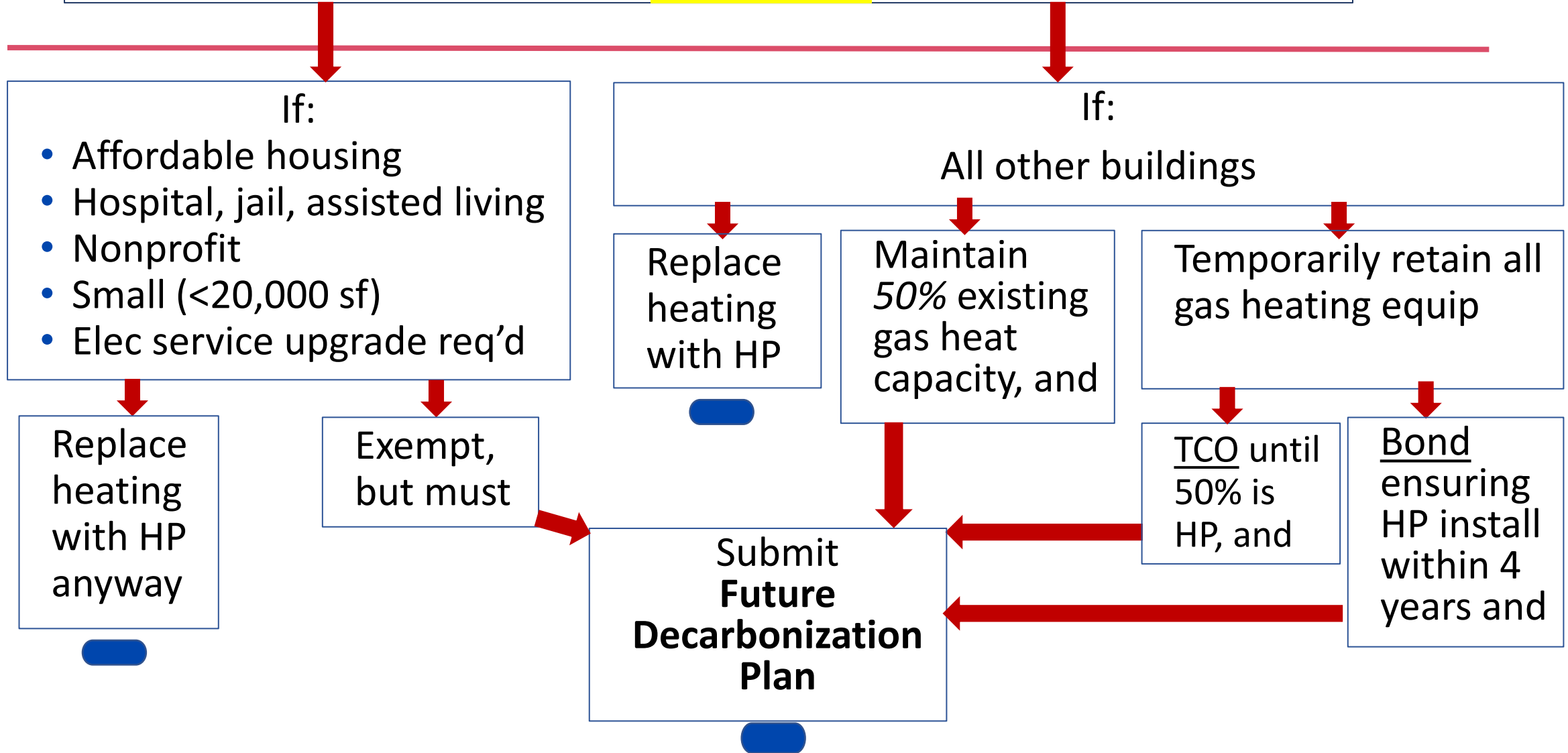
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- a. Completed SDCI **decarbonization planning form**, available on the SDCI website
- b. **One-line system diagrams**, showing only the impacted portions of systems
- c. Equipment **sized and laid out to scale** on plans of the existing facility. Only the impacted areas need be depicted, at a simple schematic level of detail.
- d. Required **louvers, ducts, and air handling** equipment
- e. Required **structural** modifications
- f. Required **partitions, doors**, and other architectural modifications
- g. Required **electrical** infrastructure, including any electrical service upgrade and vault
- h. Allowable roof coverage area and mechanical equipment height according to Seattle land use code, and whether departures are required
- i. Schematic-level **cost estimate**, AACE Level 5, ROM, or equivalent, including separate line items for structural, mechanical, electrical, architectural, and utility costs.
- j. Applicable **compliance dates** for Washington State Clean Buildings Performance Standards and Seattle Building Performance Standards, w max allowable energy use index (EUI) & carbon emissions

Replacement central service water heating equipment must be heat pump




Upgrade central service fossil fuel space heating equipment to heat pump at time of air-cooled chiller replacement



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...and you make Seattle a leader