



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. _____

1. State Building Code to be Amended:

- | | |
|---|---|
| <input checked="" type="checkbox"/> International Building Code | <input type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

(e.g.: Section: R403.2)

Section 429

Title:

(e.g: Footings for wood foundations)

Electric vehicle charging infrastructure

2. Proponent Name (Specific local government, organization or individual):

Proponent: Ross Freeman

Title: EV Program Mgr, King County Executive Climate Office

Date: September 19, 2024

3. Designated Contact Person:

Name: Kathleen Petrie

Title: Green Building Program Mgr, King County

Address: 201 S. Jackson St, Suite 5701, Seattle WA 98104

Office Phone: (206) 477-2482

Cell: ()

E-Mail address: kpetrie@kingcounty.gov

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code, additional pages may be attached.

Clearly state if the proposal modifies an existing amendment or if a new amendment is needed. If the proposal modifies an **existing amendment**, show the modifications to the existing amendment by underlining all added language and striking through all deleted language. If a new amendment is needed, show the modifications to the **model code** by underlining all added language and striking through all deleted language.

Code(s) _____ International Building Code _____ Section(s) _____ 429 _____

Enforceable code language must be used.

Amend section to read as follows:

429.1 General. The provisions of this section shall apply to the construction of new buildings and accessory structures, including parking lots and parking garages.

Electric vehicle supply equipment (EVSE) shall be installed in accordance with applicable requirements of chapter 19.28 RCW and the National Electrical Code, Article 625.

EXCEPTION: Electric vehicle charging infrastructure is not required if any of the following conditions are met:

1. There is no public utility or commercial power supply.
2. Dwelling units without garages or other on-site parking.

429.2 Electric vehicle (EV) charging infrastructure. Buildings and accessory structures shall be provided with EV charging stations, EV-Ready parking spaces, and EV-capable parking spaces in accordance with Table 429.2. Calculations shall be rounded up to the nearest whole number. Where a building contains more than one occupancy, the electric vehicle charging infrastructure percentages of Table 429.2 shall be applied to the number of spaces required for each occupancy.

EXCEPTIONS:

1. Except for Group A, Group E, and Group M occupancies, on-site parking with less than 10 parking spaces shall not be required to comply with Section 429.2.
2. Group A, Group E, and Group M occupancies shall comply with one of the following, whichever is greater:
 - 2.1. The provisions of Section 429.2 shall apply only to designated employee parking spaces.
 - 2.2. One of each 200 parking spaces or fraction thereof shall be EV Ready. One of each 200 parking spaces or fraction thereof shall be an EV Charging Station.

Table 429.2 Electric Vehicle Charging Infrastructure

Occupancy	Number of EV Charging Stations	Number of EV-Ready Parking Spaces	Number of EV-Capable Parking Spaces
Group A, B, E, F, H, I, M, and S Occupancies	10% of total parking spaces	10% of total parking spaces	10% of total parking spaces
Group R Occupancies			
Buildings that do not contain more than two dwelling units	Not required	One for each dwelling unit	Not required

Dwelling units with private garages	Not required	One for each dwelling unit	Not required
All other Group R occupancies	10% of total parking spaces	40% 25% of total parking spaces	10% of total parking spaces

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Reason for Proposed Code Modifications:

- A unique character (criteria point) of Washington is that we are a Zero-emission Vehicle state (ZEV). Washington [Senate Bill 5811](#), the Motor Vehicles Emissions Law, directs the state Department of Ecology to adopt California’s emissions standards; [California’s Zero-emission vehicle requirements within ACC II](#) requires all new vehicles to reach 100% zero-emission and clean plug-in hybrid-electric in California by the 2035 model; thereby precluding the sale of new combustion engine vehicles. Preparing our new and existing buildings now with an increase in EV-Ready spaces will help to create necessary infrastructure.
- Federal studies estimate that about 70-80% of charging today occurs at home, because it allows access to the cheapest rates and is the most convenient, typically accomplished overnight. Therefore, codes that accelerate this access, especially for residents of multi-family buildings, will be critical to developing sufficient charging infrastructure.
- Current totals are not on track to achieve these targets. According to the federal [Alternative Fuels Data Center](#), Washington has only 4,501 public L2 ports statewide available today. And although there is no reliable published count of non-public residential chargers in WA, if we assume that approximately 70% of the state’s 152,000 EVs currently registered have access to home charging, that equates to only 105,000 ports in residential settings.
- [California code](#) currently requires 10% EV-installed chargers and 40% EV-ready stalls. If Washington is modeling California’s Zero Emission requirements, then then it is pertinent to modify Washington’s Building Code EV-ready infrastructure requirements to reflect 40%, as well.
- City-specific ordinances in [San Jose](#), [Chicago](#), and [Vancouver BC](#) push further to require 90%-100% of EV-ready spaces in multifamily buildings.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

If no, state reason:

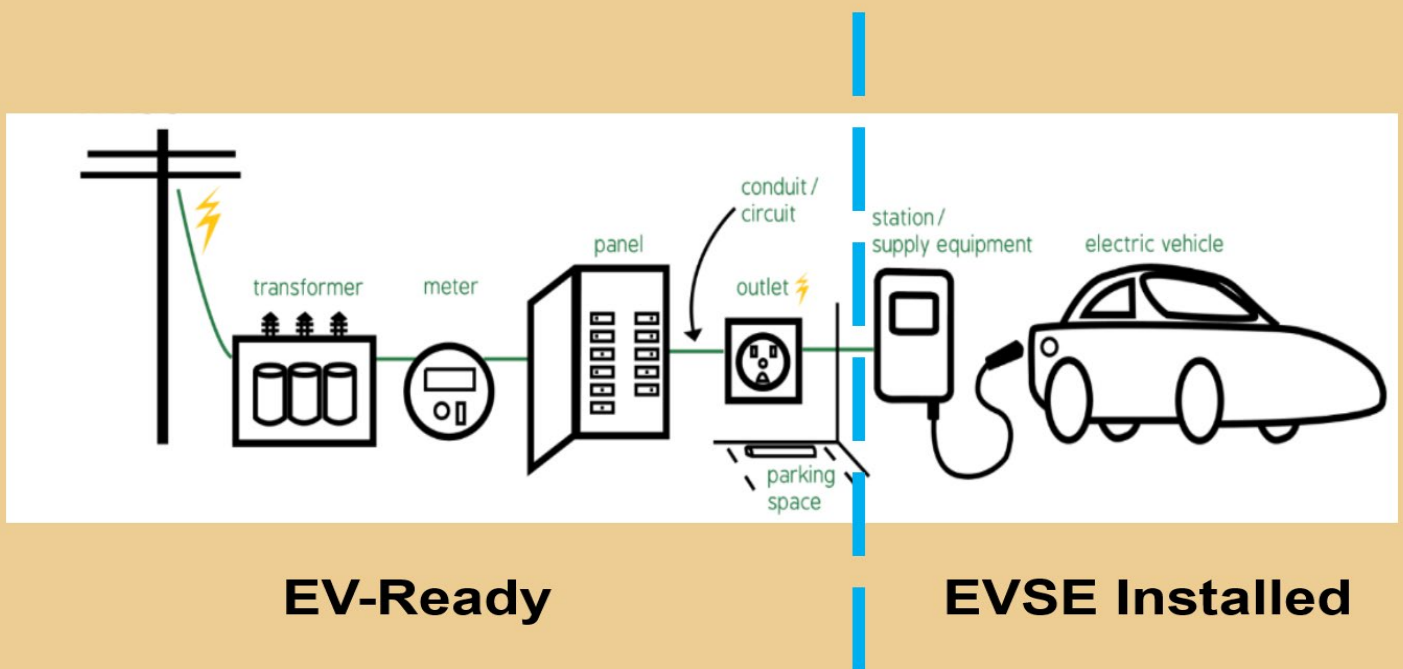
If yes, provide economic impact, costs and benefits as noted below in items a – f.

- a. **Life Cycle Cost.** Use the OFM Life Cycle Cost [Analysis tool](#) to estimate the life cycle cost of the proposal using one or more typical examples. Reference these [Instructions](#); use these [Inputs](#). Webinars on the tool can be found [Here](#) and [Here](#)). If the tool is used, submit a copy of the excel file with your proposal submission. If preferred, you may submit an alternate life cycle cost analysis.

LCCA Modeling Reference - 18 Nov 2024

- 24 Unit Bldg with 24 parking stalls
- Baselines are based on current code (therefore 6 EV-Ready Stalls and 3 EV-Capable)
- Bldg Sq Footage derived from BIAW Scenario
- Interest Rate Raised from 4 to 6%
- Lifespan of EVSE assumed at 10 years per TAG.
- Cost of all EV-Ready measures, but no charger = \$1300
- Assumes \$50 of annual maintenance
- Per code requirement, our install cost for an EV-Ready stall includes only wire, conduit, labor, outlet, but not charger. [Note: BIAW model looks at costs involved if all EV-Ready stalls had chargers installed]

Electric Vehicle Infrastructure



LCCA Output (24-unit MF building with 24 stalls)

EV-Ready Proposal: increase from 25% (Baseline: 6 stalls) to 40% (Alt 1 scenario: 10 stalls)

Total Lifecycle (10yr) cost difference = \$18,294. Does not include costs for required EV-installed parking spaces

Life Cycle Cost Analysis		BEST		
Alternative	Baseline	Alt. 1	Alt. 2	
Energy Use Intensity (kBtu/sq.ft)	#DIV/0!	#DIV/0!	#DIV/0!	
1st Construction Costs	\$ 7,800	\$ 13,000	\$ 7,800	
PV of Capital Costs	\$ 27,591	\$ 45,985	\$ 27,591	
PV of Maintenance Costs	\$ 1,595	\$ 1,595	\$ 1,595	
PV of Utility Costs	\$ -	\$ -	\$ -	
Total Life Cycle Cost (LCC)	\$ 29,186	\$ 47,580	\$ 29,186	
Net Present Savings (NPS)	N/A	\$ (18,394)	\$ -	

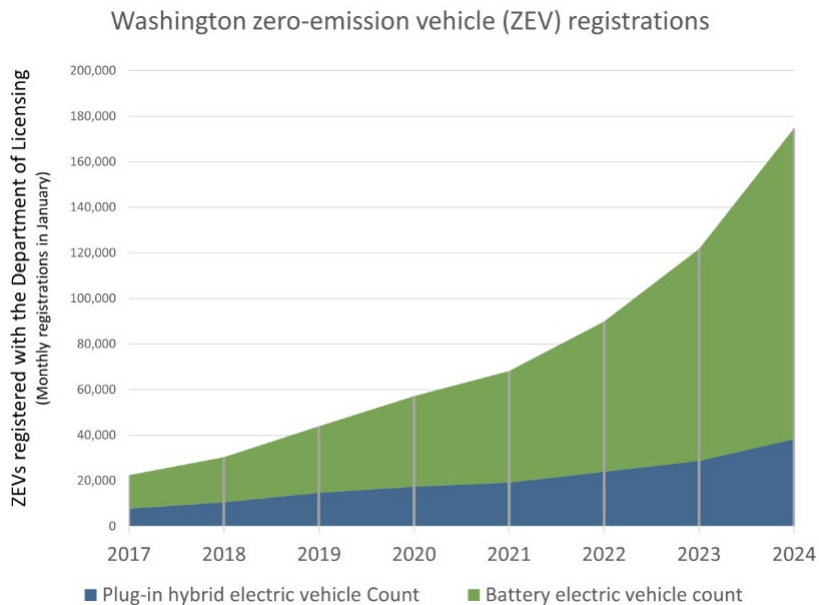
Societal LCC takes into consideration the social cost of carbon dioxide emissions caused by operational energy consumption

(GHG) Social Life Cycle Cost		BEST		
GHG Impact from Utility Consumption	Baseline	Alt. 1	Alt. 2	
Tons of CO2e over Study Period	-	-	-	
% CO2e Reduction vs. Baseline	N/A	0%	0%	
Present Social Cost of Carbon (SCC)	\$ -	\$ -	\$ -	
Total LCC with SCC	\$ 29,186	\$ 47,580	\$ 29,186	
NPS with SCC	N/A	\$ (18,394)	\$ -	

ADDITIONAL INFORMATION REQUESTED BY THE TAG:

EV Registrations & Sales:

- In 2023, over 20% of all new cars sold in Washington were electric; A substantial increase from 2022 where only 13% of all new cars sold in Washington were electric. The Department of Ecology shows the continued growth in new EV car registrations since 2017:

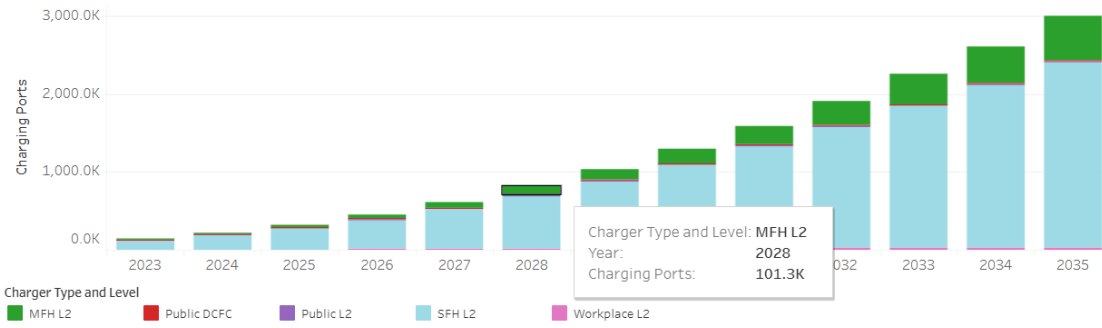


- Washington's Zero Emission Standard kicks in for 2025 model year vehicles, requiring about 8% of new vehicles to qualify. In 2026, however, that standard jumps up to 35% and continues climbing until we reach 100% in 2035.
- An estimated one million vehicles in Washington state must be zero emission by 2030, and over 2 million by 2035, to meet the state's deep decarbonization goals.

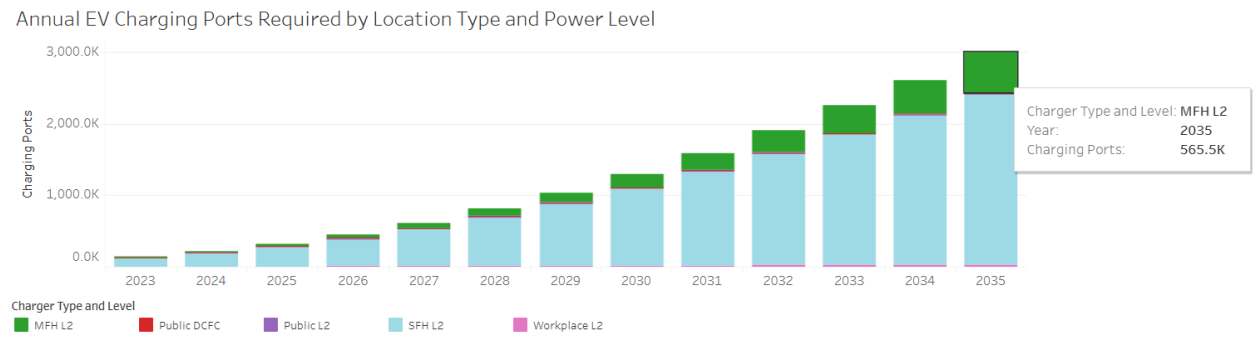
EV charging port infrastructure in multifamily buildings:

- According to the Washington Transportation Electrification Strategy, by the time the 2024 Washington State Building Code is superseded by the 2027 code, over 101,000 charging ports will be needed in multifamily housing:

Annual EV Charging Ports Required by Location Type and Power Level



By 2035 (100% zero emission sales), over 565,000 charging ports will be needed:



b. **Construction Cost.** Provide your best estimate of the construction cost (or cost savings) of your code change proposal.

\$Click here to enter text./square foot

(For residential projects, also provide \$Click here to enter text./ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

The SBCC LCCA tool link does not work (email to SBCC requesting a hard copy was made but have not yet received), so below we have provided additional cost information for EV-Ready costs:

Relative Costs for EV-Readiness vs Retrofit in Multi-Family Construction

Number of Units	New Construction Cost		Retrofit Cost		
	Per Parking Stall	%40 of Parking Stalls	Per Parking Stall	%40 of Parking Stalls	
60-unit building (California State)	\$790-1,485	\$18,960-\$35,640 (24 stalls)	\$4,443	\$106,632 (24 stalls)	Link
24-unit building (City of Denver)	\$1,300	\$13,000 (10 stalls)	\$6,300	\$63,000 (10 stalls)	Link

Funding/Incentives available:

- The State Department of Commerce is taking the apparent deficit of chargers seriously, especially in the case of public and multi-family settings. As of August 2024, its [EV Charging Program](#) has awarded \$54 million for 792 new public chargers and \$28 million for 3,118 new multi-family chargers. Non-profit organizations and affordable housing providers were eligible to apply for funds, and many did: 97 of the 200 multi-family sites funded for L2

charging are also located in overburdened areas. Future rounds of funding in this new program are anticipated.

- Other sources of funding available to housing providers include the federal [Charging and Fueling Infrastructure](#) grant program, which now allows proposals not only along travel corridors, but also on commercial property, and even in gated private parking areas as long as there is public access.
- Some power utilities in Washington also offer generous rebate funding for multi-family property owners to install EV charging, and often will cover 100% of retrofit costs for properties where approximately half of residents are low-income or Tribal residents; for example Puget Sound Energy's [Empower Mobility incentives](#), and Seattle City Light's [Multifamily EV Charging Program](#).
- All this available funding helps to offset costs (below).

Costs:

- Average costs to retrofit a new 2-port Level 2 charger vary depending on the features, network connections, and range of payment options accepted, as well as the distance to a suitable existing power supply and amount of trenching involved (if any). In the best case, for simpler installation scenarios, \$15,000 is a reasonable ballpark figure to install one such 2-port networked charger, and this aligns with the per-port rebate caps offered by PSE and SCL.
- It is also important to note that load management software can reduce a retrofit's implementation costs up to 60% by avoiding the need for circuit and panel upgrades. These systems, often built into modern chargers, determine how much power to allocate among all active ports based on the number of vehicles plugged in at a given time, how "empty" they are, and the pre-set limits of the main power supply. This can be set up in a number of ways, as discussed in [this article](#).
- In general, however, retrofit installations of EV chargers into existing buildings and parking lots costs much more than planning and executing this work during the construction phase. After 5 years under California's stricter EV infrastructure building codes, a 2019 study found that each EV-capable parking space installed in a multi-family dwelling during new construction saved \$2,040-4,635 over the retrofit scenario – given today's post-COVID increases in equipment and labor costs, this delta is assumed to be even greater. Research for Denver's [2022 EV Readiness ordinance](#) provides additional insight into the average estimated costs for EV-capable and EV-ready parking spaces installed during new construction, as compared to retrofits. An EV-capable stall costs \$300 during new construction vs. \$2,500 during retrofit, while a full EV-ready stall costs \$1,300 during new construction vs. \$6,300 during retrofit.

c. **Code Enforcement.** List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

- No anticipated impacts to staff.

d. **Small Business Impact.** Describe economic impacts to small businesses:

- None.

e. **Housing Affordability.** Describe economic impacts on housing affordability:

- Per the Funding/Incentives information provided in the "Construction Costs" section of this document, there are many avenues of funding support to help mitigate the impacts of added infrastructure
 - Although the cost information shares that an EV-Ready infrastructure costs \$1,300 per parking space, the Funding/Incentives information provided in the "Construction Costs"

section also identifies incentives available to offset these costs for new construction and retrofits.

- f. ***Other.*** Describe other qualitative cost and benefits to owners, to occupants, to the public, to the environment, and to other stakeholders that have not yet been discussed:
- Renters are dependent on the amenities provided by the building developer or owner. Requiring infrastructure ensures an EV owner is not limited in housing because their apartment does not have charging capabilities; nor does it force a renter to purchase a combustion engine vehicle because their existing building does not have charging capabilities.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.