



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. _____

1. State Building Code to be Amended:

- ☒ International Building Code
- ☐ ICC ANSI A117.1 Accessibility Code
- ☐ International Existing Building Code
- ☐ International Residential Code
- ☐ International Fire Code
- ☐ Uniform Plumbing Code

- ☐ International Mechanical Code
- ☐ International Fuel Gas Code
- ☐ NFPA 54 National Fuel Gas Code
- ☐ NFPA 58 Liquefied Petroleum Gas Code
- ☐ Wildland Urban Interface 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	25% of total parking spaces	25% 10% of total parking spaces

429.2.1 EV charging stations and EV-Ready parking spaces. A minimum of 40-ampere dedicated 208/240-volt branch circuit shall be installed for each EV Ready parking space and each EV Charging Station. The branch circuits shall terminate at a receptacle outlet or EV charger in close proximity to the proposed location of the EV Ready parking space or the EV Charging Station.

429.2.2 EV-Capable parking spaces. A listed raceway capable of accommodating a minimum of 40-ampere dedicated 208/240-volt branch circuit shall be installed for each EV-Capable parking space. The raceway shall terminate into a cabinet, box or other enclosure in close proximity to the proposed location of the EV-Capable parking space. Raceways and related components that are planned to be installed underground, and in enclosed, inaccessible or concealed areas and spaces, shall be installed at the time of original construction.

429.3 Electrical room(s) and equipment. Electrical room(s) and/or dedicated electrical equipment shall be sized to accommodate the requirements of Section 429.

The electrical service and the electrical system, including any on-site distribution transformer(s), shall have sufficient capacity to simultaneously charge all EVs at all required EV Charging Stations, EV Ready parking spaces, and EV-Capable parking spaces at a minimum of 40-amperes each.

EXCEPTION: Automatic Load Management System (ALMS) may be used to adjust the maximum electrical capacity required for the EV-Ready and EV-Capable parking spaces. The ALMS must be designed to allocate charging capacity among multiple future EV Charging Stations at a minimum of 16 amperes per EV charger.

429.4 Electric vehicle charging infrastructure for accessible parking spaces. Ten percent of the accessible parking spaces, rounded to the next whole number, shall be EV Charging Stations. Additional 10 percent of the accessible parking spaces, rounded to the next whole number, shall be EV Ready. Not fewer than one for each type of EV charging system shall be accessible.

The electric vehicle charging infrastructure may also serve adjacent parking spaces not designated as accessible parking. A maximum of 10 percent of the accessible parking spaces, rounded to the next whole number, are allowed to be included in the total number of electric vehicle parking spaces required under Section 429.2.

- 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 and installed EV chargers will help create necessary infrastructure.
- Section 429.2, Exception 1 has been deleted because IBC [Table 1106.2](#) requires one accessible space where 1 – 25 spaces are provided and Section 1107.2.1 refers EV requirements to Section 429.4, therefor, parking for occupancies with 1 to 9 stalls must meet the EV accessibility requirements of 429.4.

- Section 429.2, Exception 2, 2.1, and 2.2 have been deleted because the building code does not regulate employee parking (2.1); The arbitrary requirements of Exception 2.2 were developed as a floor modification during the 2021 SBCC process which was not based on research. Upon reviewing several EV charging codes for this code change proposal, none were found to have omitted A, E, and M occupancies. In fact, the [City of Denver](#) has been specific to attach requirements to these 3 occupancies in lieu of others. When considering that all new vehicles will be plug-in, it is imperative to have spaces at Assembly, Education and Retail occupancies.
- The EV-Capable requirement for multifamily buildings has been increased from 10% to 25%, based on a [letter crafted by industry experts and sent to the SBCC](#) on March 11, 2022, recommending that the EV-capable requirement for multifamily buildings be increased to 25%.
- Section 429.5 was added to reinforce the WAC requiring designated signage/markings, making EVSE spaces more obvious to drivers.

Reason for Increasing the Amount of EV 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.
- At the same time, reliable public charging, especially for drivers without home-charging access and owners of older EVs that have less range, is equally critical to meet the state's ambitious EV adoption targets. According to the State [Transportation Electrification Dashboard](#), in just 5 years, by 2030, Washington will need 8,700 public L2 ports, 243,000 multi-family L2 ports, and 1,078,000 single-family L2 ports, under a "*strong electrification policy*" scenario.
- However, 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.

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 EV-Capable assumed at 10 years per TAG.
- Cost of all EV-Capable measures, but no charger = \$700
- Assumes \$50 of annual maintenance

EV-Capable Proposal: increase from 10% (Baseline: 3 stalls) to 25% (Alt 1 scenario: 6 stalls)

Total Lifecycle (10yr) cost difference = \$7,428. 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	\$ 2,100	\$ 4,200	\$ 2,100
PV of Capital Costs	\$ 7,428	\$ 14,857	\$ 7,428
PV of Maintenance Costs	\$ 1,595	\$ 1,595	\$ 1,595
PV of Utility Costs	\$ -	\$ -	\$ -
Total Life Cycle Cost (LCC)	\$ 9,023	\$ 16,451	\$ 9,023
Net Present Savings (NPS)	N/A	\$ (7,428)	\$ -

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

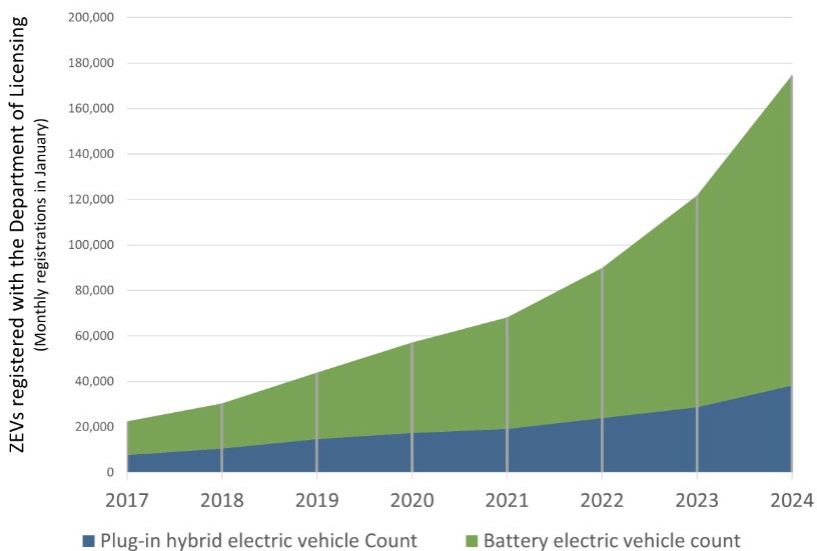
(GHG) Social Life Cycle Cost BEST			
GHG Impact from Utility Consumption	Baseline	Alt. 1	Alt. 2
Tons of CO2e over Study Period	-	-	-
% CO2e Reduction vs. Baseline	N/A	0%	0%
Present Social Cost of Carbon (SCC)	\$ -	\$ -	\$ -
Total LCC with SCC	\$ 9,023	\$ 16,451	\$ 9,023
NPS with SCC	N/A	\$ (7,428)	\$ -

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:

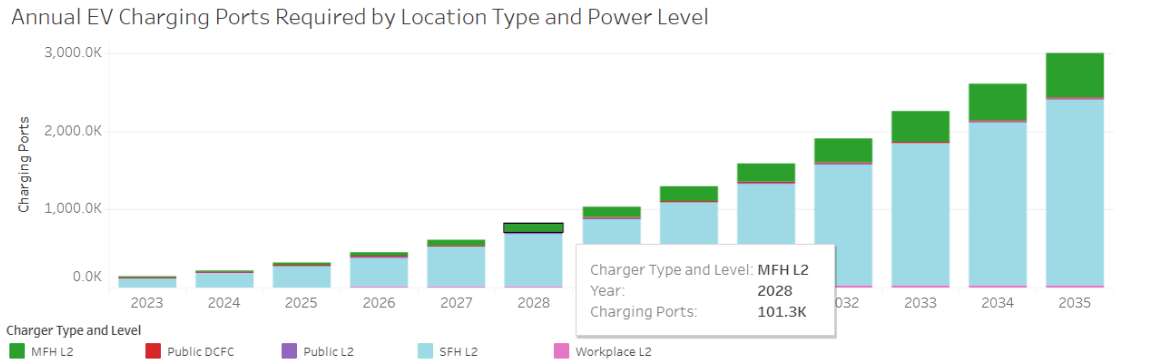
Washington zero-emission vehicle (ZEV) registrations



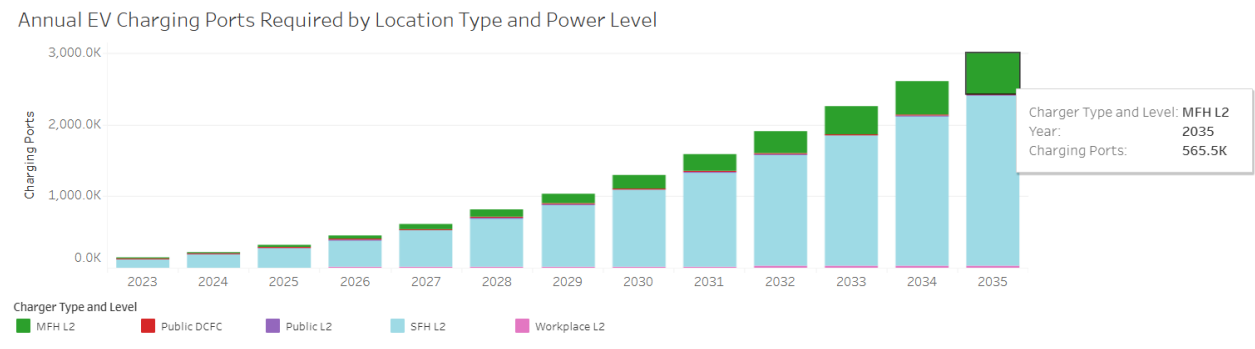
- Washington's [Zero Emission Standard kicks in](#) for 2025 model year vehicles, requiring about 8% of new vehicles to qualify. In 2026, however, that standard jumps up to 35% and continues climbing until we reach 100% in 2035.
- An estimated [one million vehicles in Washington state](#) must be zero 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:



- 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 currently 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-Capable spaces:

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

Number of Units	New Construction Cost		Retrofit Cost		
	Per Parking Stall	%25 of Parking Stalls	Per Parking Stall	%25 of Parking Stalls	
24-unit building (EPA)	\$665	\$3,990 (6 stalls)	\$2,590	\$15,540 (6 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.
- Therefore, increasing EV infrastructure requirements for new construction will result in significantly lower costs than retrofits and should be strengthened further to provide additional costs savings to Washington residents and business owners.

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:

- If small businesses are renting these spaces, the impacts posed by these modifications may affect the building owner but will not directly impact the small business tenant. If the small business owns a new building, the impact will only impact them if the building falls under an A, E, or M occupancy (as well as modest costs for EV-capable infrastructure); assuming the business is modest, the impacts should be relatively small.
- e. ***Housing Affordability.*** Describe economic impacts on housing affordability:
 - Although the cost information shares that an EV-Capable infrastructure costs \$300 per parking space, the Funding/Incentives information provided in the “Construction Costs” section also identifies incentives available 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.