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 908 (New)

Title:
(e.g: Footings for wood foundations)
Electric vehicle charging infrastructure

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

Proponent: Kathleen Petrie
Title: Green Building Program Mgr, King County
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 Existing Building Code____ **Section(s)** _New Section 908_____

   Enforceable code language must be used.

Provide a new section to read as follows:

SECTION 908
ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

908.1 Electric vehicle charging infrastructure. *Electric vehicle charging* infrastructure shall be provided in accordance with Section 429 of the *International Building Code* as required for new construction.

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.
- New Section 908 has been added to upgrade substantially altered existing buildings to provide necessary 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.
  - 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.

The following LCCA's have been produced, based on the values in IBC Table 429.2:

REFERENCE: 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*	*10% of total parking spaces*

LCCA for Installed EV Chargers in Multifamily and Commercial Buildings

Modeling References Include:

- 24 Unit multifamily building/commercial building with 24 parking stalls
- Building square footage derived from 24-GP1-068 proposal scenario
- Interest Rate Raised from 4 to 6%
- Lifespan assumed at 10 years per TAG.
- Cost of EV-Installed charger = 6,300 ($5,000/charger + 1,300 for labor and associated electrical)
- Assumes $50 of annual maintenance

- 10% of 24 stalls = 3 stalls

Installed Charger LCCA for New Addition to Multifamily and Commercial Building with 24 parking spaces (Baseline = EV-ready spaces, no chargers included; Alt 1 = installed chargers):

Life Cycle Cost Analysis	BEST		
Alternative	Baseline	Alt. 1	Alt. 2
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!	3.2	#DIV/0!
1st Construction Costs	$ 3,900	$ 18,900	$ 3,900
PV of Capital Costs	$ 13,796	$ 66,856	$ 13,796
PV of Maintenance Costs	$ 1,595	$ 1,595	$ 1,595
PV of Utility Costs	$ -	$ 41,751	$ -
Total Life Cycle Cost (LCC)	**$ 15,390**	**$ 110,201**	**$ 15,390**
Net Present Savings (NPS)	**N/A**	**$ (94,811)**	**$ -**

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	-	309	-
% CO2e Reduction vs. Baseline	N/A	0%	0%
Present Social Cost of Carbon (SCC)	$ -	$ 20,569	$ -
Total LCC with SCC	**$ 15,390**	**$ 130,770**	**$ 15,390**
NPS with SCC	**N/A**	**$ (115,380)**	**$ -**

Installed Charger LCCA for Altered Multifamily and Commercial Building with 24 parking spaces (Baseline = EV-ready spaces, no chargers included ;Alt 1 = installed chargers):

Life Cycle Cost Analysis	BEST		
Alternative	Baseline	Alt. 1	Alt. 2
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!	3.2	#DIV/0!
1st Construction Costs	$ 3,900	$ 33,900	$ 3,900
PV of Capital Costs	$ 13,796	$ 119,916	$ 13,796
PV of Maintenance Costs	$ 1,595	$ 1,595	$ 1,595
PV of Utility Costs	$ -	$ 41,751	$ -
Total Life Cycle Cost (LCC)	**$ 15,390**	**$ 163,261**	**$ 15,390**
Net Present Savings (NPS)	**N/A**	**$ (147,871)**	**$ -**

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	-	309	-
% CO2e Reduction vs. Baseline	N/A	0%	0%
Present Social Cost of Carbon (SCC)	$ -	$ 20,569	$ -
Total LCC with SCC	**$ 15,390**	**$ 183,830**	**$ 15,390**
NPS with SCC	**N/A**	**$ (168,440)**	**$ -**

LCCA Modeling References for EV-Ready Infrastructure in Commercial Buildings:

- 24 Unit multifamily building with 24 parking stalls
- Building square footage derived from 24-GP1-068 proposal scenario
- Interest Rate Raised from 4 to 6%
- Lifespan assumed at 10 years per TAG.
- Cost of all EV-Ready measures to new addition, but no charger = $1300
- Cost of all EV-Ready measures to altered building, but no charger = $6300
- Assumes $50 of annual maintenance
- 10% of 24 stalls = 3 stalls

EV-Ready LCCA for New Addition to Commercial building with 24 parking spaces (LCCA baseline data provided in 24-GP1-122 proposal):

Life Cycle Cost Analysis	BEST	
Alternative	Baseline	
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!	
1st Construction Costs	$	3,900
PV of Capital Costs	$	13,796
PV of Maintenance Costs	$	1,595
PV of Utility Costs	$	-
Total Life Cycle Cost (LCC)	**$**	**15,390**
Net Present Savings (NPS)	**N/A**	

Societal LCC takes into consideration the social cost of carbon dioxide e

(GHG) Social Life Cycle Cost	BEST	
GHG Impact from Utility Consumption	Baseline	
Tons of CO2e over Study Period		-
% CO2e Reduction vs. Baseline	N/A	
Present Social Cost of Carbon (SCC)	$	-
Total LCC with SCC	**$**	**15,390**
NPS with SCC	**N/A**	

LCCA Modeling References for EV-Ready Infrastructure in Multifamily Buildings:

- 24 Unit multifamily building with 24 parking stalls
- Building square footage derived from 24-GP1-068 proposal scenario
- Interest Rate Raised from 4 to 6%
- Lifespan assumed at 10 years per TAG.
- Cost of all EV-Ready measures, but no charger = $1300
- Cost of all EV-Ready measures to altered building, but no charger = $6300
- Assumes $50 of annual maintenance
- 25% of 24 stalls = 6 stalls

EV-Ready LCCA for 24-unit multifamily building with 24 parking spaces (LCCA baseline data provided in 24-GP1-122 proposal):

Life Cycle Cost Analysis	BEST	
Alternative	Baseline	
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!	
1st Construction Costs	$	7,800
PV of Capital Costs	$	27,591
PV of Maintenance Costs	$	1,595
PV of Utility Costs	$	-
Total Life Cycle Cost (LCC)	**$**	**29,186**
Net Present Savings (NPS)	**N/A**	

Societal LCC takes into consideration the social cost of carbon dioxide

(GHG) Social Life Cycle Cost	BEST	
GHG Impact from Utility Consumption	Baseline	
Tons of CO2e over Study Period		-
% CO2e Reduction vs. Baseline	N/A	
Present Social Cost of Carbon (SCC)	$	-
Total LCC with SCC	**$**	**29,186**
NPS with SCC	**N/A**	

EV-Ready LCCA for Altered Commercial building with 24 parking spaces:

Life Cycle Cost Analysis	BEST	
Alternative	Baseline	
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!	
1st Construction Costs	$	18,900
PV of Capital Costs	$	66,856
PV of Maintenance Costs	$	1,595
PV of Utility Costs	$	-
Total Life Cycle Cost (LCC)	**$**	**68,450**
Net Present Savings (NPS)	**N/A**	

ocietal LCC takes into consideration the social cost of carbon dioxide

(GHG) Social Life Cycle Cost	BEST	
GHG Impact from Utility Consumption	Baseline	
Tons of CO2e over Study Period		-
% CO2e Reduction vs. Baseline	N/A	
Present Social Cost of Carbon (SCC)	$	-
Total LCC with SCC	**$**	**68,450**
NPS with SCC	**N/A**	

EV-Ready LCCA for Altered 24-unit multifamily building with 24 parking spaces:

Life Cycle Cost Analysis	BEST		
Alternative	Baseline		
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!		
1st Construction Costs	$	37,800	$
PV of Capital Costs	$	133,711	$
PV of Maintenance Costs	$	1,595	$
PV of Utility Costs	$	-	$
Total Life Cycle Cost (LCC)	**$**	**135,306**	**$**
Net Present Savings (NPS)	**N/A**		**$**

cietal LCC takes into consideration the social cost of carbon dioxide e

(GHG) Social Life Cycle Cost	BEST		
GHG Impact from Utility Consumption	Baseline		
Tons of CO2e over Study Period		-	
% CO2e Reduction vs. Baseline	N/A		
Present Social Cost of Carbon (SCC)	$	-	$
Total LCC with SCC	**$**	**135,306**	**$**
NPS with SCC	**N/A**		**$**

EV-Capable LCCA Reference for EV-Capable Infrastructure in Multifamily and Commercial Buildings:

- 24 Unit multifamily building/commercial building – each with 24 parking stalls
- Building square footage derived from 24-GP1-068 proposal scenario
- Interest Rate Raised from 4 to 6%
- Lifespan assumed at 10 years per TAG.
- Cost of EV-Capable measures, but no charger = $700
- Assumes $50 of annual maintenance
- 10% of 24 stalls = 3 stalls

LCCA Data for EV-Capable Spaces in New Additions to Multifamily and Commercial Buildings:

Life Cycle Cost Analysis	BEST	
Alternative	Baseline	
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!	
1st Construction Costs	$	2,100
PV of Capital Costs	$	7,428
PV of Maintenance Costs	$	1,595
PV of Utility Costs	$	-
Total Life Cycle Cost (LCC)	**$**	**9,023**
Net Present Savings (NPS)	**N/A**	

Societal LCC takes into consideration the social cost of carbon dioxide

(GHG) Social Life Cycle Cost	BEST	
GHG Impact from Utility Consumption	Baseline	
Tons of CO2e over Study Period		-
% CO2e Reduction vs. Baseline	N/A	
Present Social Cost of Carbon (SCC)	$	-
Total LCC with SCC	**$**	**9,023**
NPS with SCC	**N/A**	

LCCA Data for EV-Capable Spaces in Altered Multifamily and Commercial Buildings:

Life Cycle Cost Analysis	BEST	
Alternative	Baseline	
Energy Use Intenstity (kBtu/sq.ft)	#DIV/0!	
1st Construction Costs	$	7,500
PV of Capital Costs	$	26,530
PV of Maintenance Costs	$	1,595
PV of Utility Costs	$	-
Total Life Cycle Cost (LCC)	**$**	**28,125**
Net Present Savings (NPS)	**N/A**	

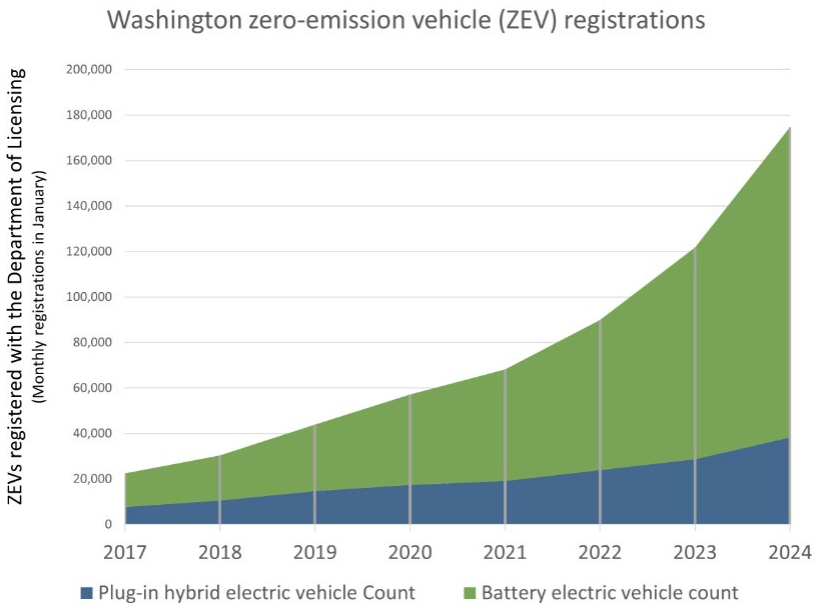
Societal LCC takes into consideration the social cost of carbon dioxide

(GHG) Social Life Cycle Cost	BEST	
GHG Impact from Utility Consumption	Baseline	
Tons of CO2e over Study Period		-
% CO2e Reduction vs. Baseline	N/A	
Present Social Cost of Carbon (SCC)	$	-
Total LCC with SCC	**$**	**28,125**
NPS with SCC	**N/A**	

ADDITIONAL INFORMATION PROVIDED AS REQUESTED FOR 24-GP1-122 & 135:

EV Registrations & Sales:

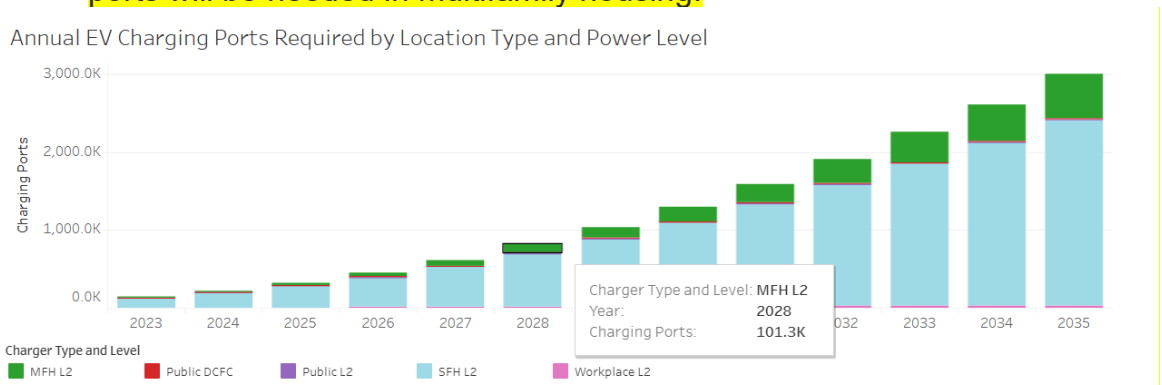
- In 2023, over 20% of all new cars sold in Washington were electric; A substantial increase from 2022 where only 13% of all new cars sold in Washington were electric. The Department of Ecology shows the continued growth in new EV car registrations since 2017:



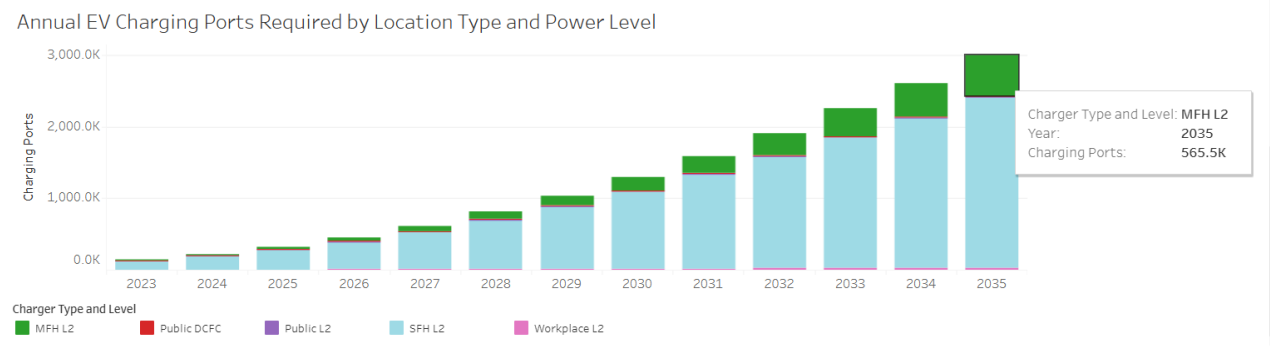
- Washington's Zero Emission Standard kicks in for 2025 model year vehicles, requiring about 8% of new vehicles to qualify. In 2026, however, that standard jumps up to 35% and continues climbing until we reach 100% in 2035.
- An estimated one million vehicles in Washington state must be zero emission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



- 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

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

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.
- 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:

- If small businesses are not financially responsible for a building retrofit, the impacts posed by these modifications will not directly impact the small business tenant. If the small business is financially responsible for the building retrofit, there will not be much of an impact if building falls under an A, E, or M occupancies, perhaps more if it is a different occupancy classification.

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

- There will be additional costs, but these costs could be offset by incentives and funding that is available

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 a 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.