



## Attachment B: EV Readiness Background Report

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### Introduction

To support the development of an EV Ready building code amendment in Bellevue, ESI staff put together this Background Report to provide additional data, context, and information for Council and stakeholders. This is intended as supplemental material to the Agenda Memo provided to Council for the Study Session on November 19, 2024. The Background Report covers EV market growth and projections from the EV Roadmap, technical details on EV Readiness, an overview of prior draft recommendations shared with stakeholders, and a cost summary for EV Readiness based on a sample building in Bellevue.

### Background

#### *EV Market Growth & Adoption*

The Bellevue EV Roadmap describes a path toward transportation electrification in Bellevue and identifies a series of strategies the city can implement to align Bellevue's resources with its goals for a rapid pace of EV adoption. The plan forecasts EV growth in Bellevue between to 2050, projects the number of total chargers needed across the city to support that number of EVs in the city, then identifies the city's role in this transition. While the EV Roadmap contains a comprehensive analysis and description of the current and future EV market in Bellevue, several select datapoints have been included here as especially pertinent to EV Readiness.

1. Observed EV Market Trends

Worldwide, EV markets follow a similar pattern as how societies adopt new technologies: slow adoption at first, then rapid growth towards mass adoption. This "tipping point" between slow and fast adoption typically occurs around 5% market share of a new technology. EV market share in Bellevue is currently at 25%.

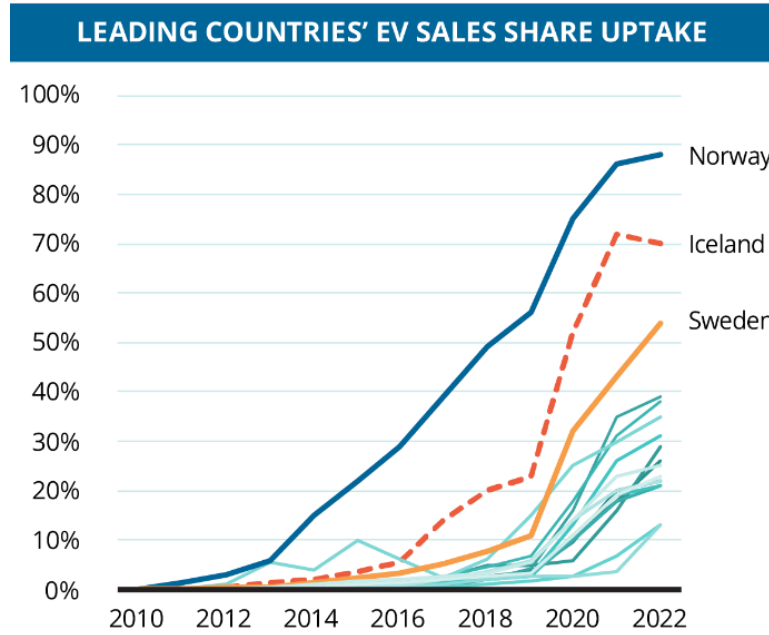
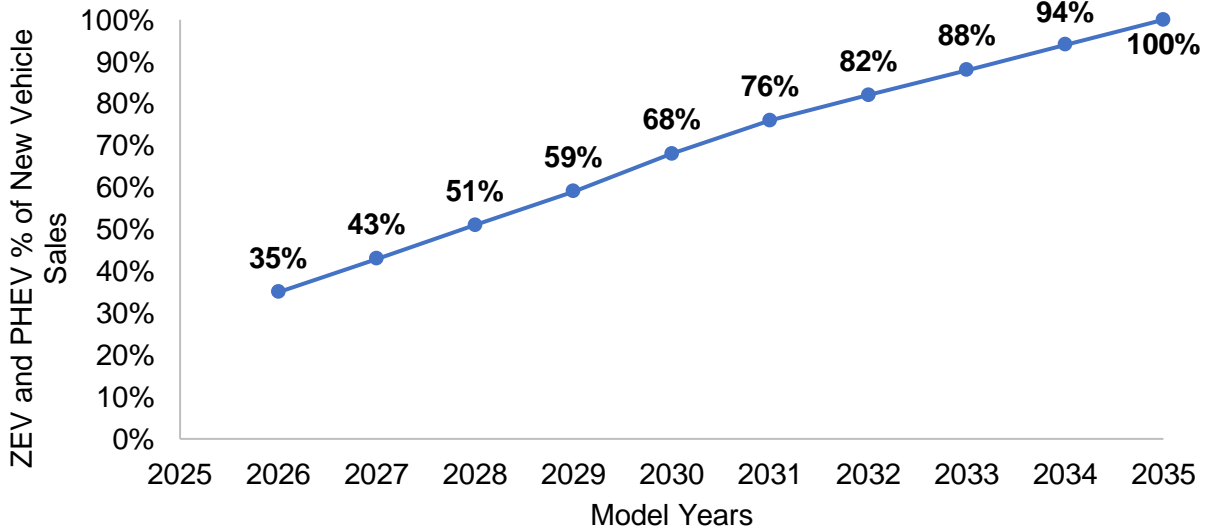


Figure 1: Worldwide market growth of EVs in 20 countries with greater adoption than the U.S.

2. Washington State EV Sales Regulation

In December 2022, the Washington State Department of Ecology adopted California's Advanced Clean Cars II regulation, mandating that for model years 2035 and beyond, 100% of new vehicle sales be zero emission. This regulation first comes into effect in 2026, when 35% of new vehicles sales in Washington must be zero emission.





**Figure 2:** A summary chart of the step-up schedule for Washington’s Advanced Clean Cars II regulation, adopted from California in December 2022. For vehicle model years 2035 and beyond, 100% of new vehicle sales will be zero emission vehicles.

3. Projected EV Adoption in Bellevue, 2030-2050

The EV Roadmap combines the market data and the impact of the state regulation on EV sales to forecast total estimated adoption of EVs in Bellevue out to 2050. It is estimated that Bellevue will reach 50% EVs on the road in the early 2030s and 100% in 2050.

Year	Bellevue EV Adoption Rate
2030	35%
2035	60%
2040	76%
2045	92%
2050	100%

**Table 1:** EV adoption projections from the EV Roadmap. It is projected that Bellevue will reach 100% EV adoption by 2050.

*EV Charging Technologies & Performance Levels*

There are three broad categories of EV charging: Level 1, Level 2, and DC Fast Charging. EV Readiness applies to Level 2 charging only, as it is a) broadly deemed to be the most appropriate for residential and workplace charging and b) the Washington State building code requirements are similar to Level 2 charging in terms of energy required. The table below summarizes these three types of charging.

Charging Level	Typical Power Output	Approximate Time to Charge EV from Empty	Typical Charging Location
Level 1	1 kW	40-50 hours	Home
Level 2	7-19 kW	4-10 hours	Home, Workplace, Public
DC Fast Charging	50-350 kW	20 minutes – 1 hour	Public

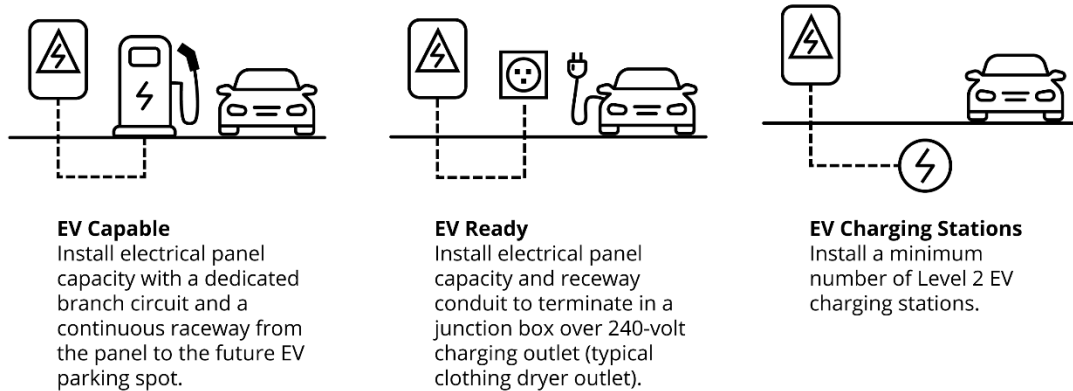
**Table 2:** The three levels of EV charging including power needed, time to charge, and typical location. EV Readiness only applies to Level 2 charging.

*EV Readiness Categories*

EV Readiness is broadly broken down into a progression of three categories: EV Charging Stations, EV-Ready parking spaces, and EV-Capable parking spaces. EV Capable has the panel space and conduit installed to support a future 40-ampere, 208/240-volt branch circuit; EV



Ready has the capacity and an outlet; EV Charging Stations includes the capacity, and a charging unit.<sup>1</sup> Figure 1 provides a simplified explanation.



**Figure 3:** EV Readiness includes three categories of parking spaces, EV Charging Stations, EV Ready, and EV Capable. EV Capable is the electrical capacity and wiring, EV Ready includes an outlet, EV Installed includes an installed charging station. *Adopted from City of Edmonds.*

Washington State dictates the installation requirements for these categories as follows:

**ELECTRIC VEHICLE (EV) CAPABLE PARKING SPACE.** A parking space provided with a conduit, electrical panel and load capacity to support future installation of EV charging equipment.

**ELECTRIC VEHICLE (EV) CHARGING STATION.** EV Ready parking space with installed EV charger.

**ELECTRIC VEHICLE (EV) READY PARKING SPACE.** A parking space provided with a receptacle outlet allowing charging of electric vehicles.

### *Current Washington State Regulations*

In March 2024, Bellevue adopted the 2021 Washington State Building Code which included updated standards for EV Readiness in new construction. These standards are described in Table 429.2 of the 2021 International Building Code, below. This code update requires that 10% of parking in all new commercial spaces be EV Charging Stations, EV-Ready parking spaces, and EV-Capable parking spaces, for a total of 30% of all parking in these new buildings. For residential buildings with two or fewer dwelling units and for residences that include private garages, the requirement is one EV-Ready parking space per dwelling unit. Finally, for all other residential buildings, the requirements are that 10% of new parking will be EV Charging Stations, 25% will be EV-Ready parking spaces, and 10% will be EV-Capable parking spaces,

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<sup>1</sup> The state code additionally specifies that Automatic Load Management can be used to adjust the maximum capacity down to a minimum of 16 amperes per EV charger.



for a total of 45% of all parking affected. A compiled list of other state and municipal building codes for multifamily EV Readiness can be found in **Appendix A**.

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	Total New EV Parking <sup>2</sup>
Group A, B, E, F, H, I, M, and S occupancies <sup>3</sup>	10% of total parking spaces	10% of total parking spaces	10% of total parking spaces	30% of total parking spaces
<i>Group R occupancies<sup>4</sup></i>				
<i>Buildings that do not contain more than two dwelling units</i>	<i>Not required</i>	<i>One for each dwelling unit</i>	<i>Not required</i>	<i>--</i>
<i>Dwelling units with private garages</i>	<i>Not required</i>	<i>One for each dwelling unit</i>	<i>Not required</i>	<i>--</i>
<i>All other group R occupancies</i>	10% of total parking spaces	25% of total parking spaces	10% of total parking spaces	45% of total parking spaces

**Table 3:** The current state standards for EV Readiness in Washington. In new multifamily buildings, 45% of parking is affected.

**Previous EV Readiness Proposals**

*January 2024*

In January 2024, staff developed and presented an initial draft of an EV Ready building code across departments and to certain key stakeholders, including King County, PSE, and the Bellevue Development Committee. This initial proposal was based on the best available information at the time and was largely based on the code update completed by the City of Edmonds. Note that in this and the following draft proposals, the table was presented in a simplified version without the full list and details of building occupancy classifications

<sup>2</sup> The “Total New EV Parking” column is not included in Table 429.2 of the IBC but has been added to this and subsequent tables for ease of understanding.

<sup>3</sup> These occupancy classifications include Assembly, Business, Educational, Factory, High-Hazard, Institutional, Mercantile, and Storage but can more commonly be understood as commercial uses.

<sup>4</sup> The group R occupancy classification refers to Residential buildings.



January 2024 Initial Draft Proposal				
Occupancy	EV Charging Stations	EV Ready	EV Capable	% of Total New EV Parking
<b>Non-Residential</b>	<b>15%</b> of total parking spaces	<b>10%</b> of total parking spaces	<b>40%</b> of total parking spaces	<b>65%</b> of Total Parking
<b>Single Family</b>	--	One for each dwelling unit	--	--
<b>Multifamily</b>	<b>15%</b> of total parking spaces	<b>40%</b> of total parking spaces	<b>20%</b> of total parking spaces	<b>75%</b> of Total Parking

**Table 4:** The initial staff proposal for EV Ready building code amendment presented to various stakeholders in January 2024. This proposal included increasing multifamily EV Readiness requirements up to 65% total for non-residential buildings and 75% for multifamily buildings.

*June 2024*

Over the summer, as work continued on the EV Roadmap and in preparation for a Council presentation in the fall, staff developed and presented two new options for an EV Ready building code to stakeholders. These two options were based on cities in California (San Jose and Santa Monica) with comparable EV adoption to Bellevue that had previously adopted higher EV Readiness standards. Each option only proposed changes to the multifamily category and each included increases up to 65% of total parking for this category.

The changes in this proposal from the initial version in January 2024 were based on three key takeaways from engagement on the EV Roadmap in spring 2024 and from stakeholder feedback on the initial draft in January:

- Multifamily Requirements Only
  - Nationally, 80% of all EV charging today occurs at home and in an EV Roadmap survey of Bellevue EV drivers, 85% stated they would prefer to charge at home over any other location, including public charging, charging at workplaces, and more. In response to this data and less certainty around the need for charging in all non-residential buildings, all future iterations of staff recommendations are only focused on multifamily buildings.
- Emphasis on EV Capable & EV Ready
  - The January 2024 initial proposal included requirements to increase the proportion of EV Charging Stations in both non-residential and residential buildings. Both based on present EV adoption in Bellevue and community



feedback, subsequent drafts only include recommendations to increase requirements for EV Capable and/or EV Ready spaces.

- Decreased Overall Requirements
  - The Bellevue Development Committee raised concerns around the potential increase in development costs for the initial proposal, particularly given generally high development and construction costs in the current economic climate. As such, the June 2024 draft proposal decreased the overall requirements in multifamily buildings from 75% to 65% of all parking.

The two options developed in June and discussed with stakeholders between June and September are as follows:

June 2024 Option 1: "San Jose Lite"				
Occupancy	EV Charging Stations	EV Ready	EV Capable	% of Total New EV Parking
<b>Non-Residential</b>	<b>10%</b> of total parking spaces	<b>10%</b> of total parking spaces	<b>10%</b> of total parking spaces	<b>30%</b> of Total Parking
<b>Single Family</b>	--	One for each dwelling unit	--	--
<b>Multifamily</b>	<b>10%</b> of total parking spaces	<b>25%</b> of total parking spaces	<b>30%</b> of total parking spaces	<b>65%</b> of Total Parking

June 2024 Option 2: "Santa Monica"				
Occupancy	EV Charging Stations	EV Ready	EV Capable	% of Total New EV Parking
<b>Non-Residential</b>	<b>10%</b> of total parking spaces	<b>10%</b> of total parking spaces	<b>10%</b> of total parking spaces	<b>30%</b> of Total Parking
<b>Single Family</b>	--	One for each dwelling unit	--	--
<b>Multifamily</b>	<b>10%</b> of total parking spaces	<b>45%</b> of total parking spaces	<b>10%</b> of total parking spaces	<b>65%</b> of Total Parking

**Tables 5 & 6:** Two options presented to stakeholders between June and September 2024 for feedback. Each option was based on a city in California with high EV adoption and that has done a similar building code update.





In addition to the percentage of parking affected in these tables, staff also included additional draft requirements as follows:

- These EV Readiness requirements would apply in the cases of a “Substantial Improvement” or “Parking Area Expansion.”
- EV Readiness requirements cannot be construed to modify any minimum parking requirements.
- EV-Ready parking spaces must be marked as such.

Between June and September, staff met with over 80 stakeholders including developers, property managers, affordable housing providers, climate advocates, building owners, and more. Specifically, this period included a series of presentations to various groups with significant expertise or insight into this topic including the Bellevue Development Committee, the Chamber of Commerce’s PLUSH Committee, the Bellevue 2030 District members, the People for Climate Action, Climate Solutions, and other ad hoc presentations to similar stakeholders.

Staff received feedback from a wide array of perspectives on the issue – ranging from environmental organizations advocating for 100 percent EV readiness to developers advocating to let the market drive any investments beyond the requirements in the code. Staff also heard concerns about increasing development costs and decreasing affordability with any increased requirements, while also hearing a desire from the affordable housing community to ensure Bellevue’s lower income households are not left behind in the EV transition, aligning with Washington state goals and the current EV leases available to low-income households.<sup>5</sup> This input, and additional and refined EV Roadmap data, was used to inform future options for an EV Ready building code in Bellevue. Major changes moving forward include a) decreasing the total amount of parking affected to 60% b) focusing on the EV Ready category and c) removing the additional requirement around “Substantial Improvements” and “Parking Area Expansions.”

### **EV Readiness Costs: New and Retrofitted**

To understand the implications of an EV Ready building code in Bellevue, staff conducted research into both upfront and retrofit cost estimates per parking space for EV Charging Stations, EV-Ready parking spaces, and EV-Capable parking spaces. All existing research on the topic reaches the same broad conclusion, that while EV Readiness requirements incur additional upfront costs for developers, the cost of retrofitting existing buildings is many times more expensive. This conclusion is corroborated the experiences of many Bellevue property managers and building owners staff spoke with as part of the EV Roadmap process.

In 2016, the City of Oakland estimated that the installation of an EV Ready parking space costs \$1,330 for surface parking and \$1,380 for enclosed parking. The same study, however, found that retrofit costs range from two to eight times initial installation costs, largely due to “breaking and repairing walls, upgrading electric service panels, breaking and repairing parking surfaces and/or sidewalks, more expensive methods of conduit installation and additional permitting and

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<sup>5</sup> Seattle Times: [Get ‘em while you can: WA set to run out of EV rebates next month](#)





inspections.” To develop Bellevue-specific cost estimates, staff compiled the table below, based on work by King County and Energy Solutions, a research firm in the Bay Area. All costs were adjusted for inflation using an industry-specific inflation calculator.

EV Readiness Upfront vs. Retrofit Costs	New Construction, per space	Retrofit, per space
EV Charging Station	\$ 4,521	\$ 13,910
EV-Ready parking space	\$ 2,087	\$ 8,763
EV-Capable parking space	\$ 1,755	\$ 6,012

Table 7: Upfront and retrofit cost estimates for the three levels of EV Readiness. These estimates were used to develop full-building estimates below.

Using the city’s draft Affordable Housing Policy Analysis, staff were able to model the total upfront and retrofit costs for the two options from June. based on a typical building that is expected in Bellevue, a 250-unit midrise multifamily building. For simplicity, it was assumed that this building would have one parking space per dwelling unit. In this model, the retrofit costs are nearly four times greater than the upfront construction cost.

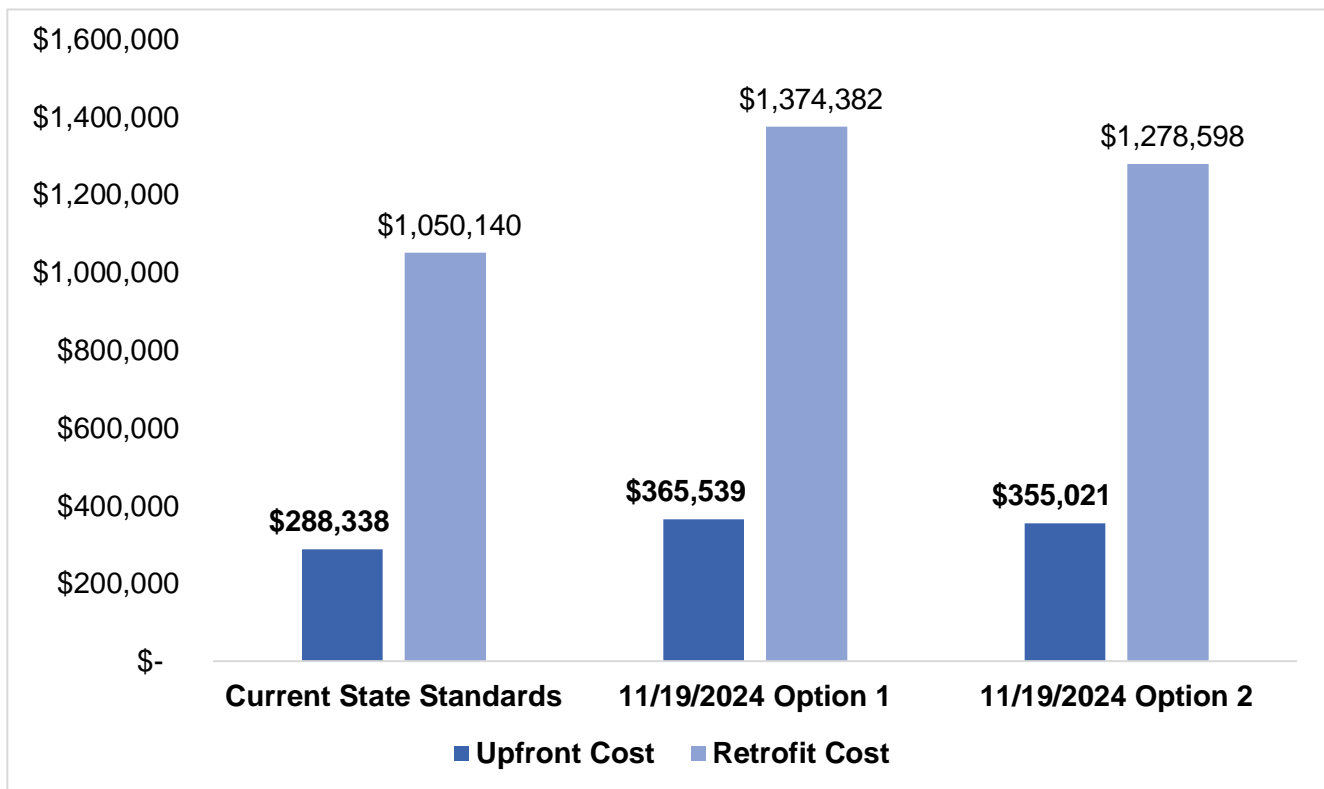


Figure 4: Upfront and retrofit costs for the current state EV Readiness standards compared to Option 1 and Option 2 in the 11/19 Agenda Memo for Council.



To further put these costs into perspective, staff modeled the upfront cost of EV Readiness to the total cost of development for the same model building. In this model, the state requirements represent 0.25% of the total cost compared to 0.32% for Option 1 and 0.31% for Option 2.

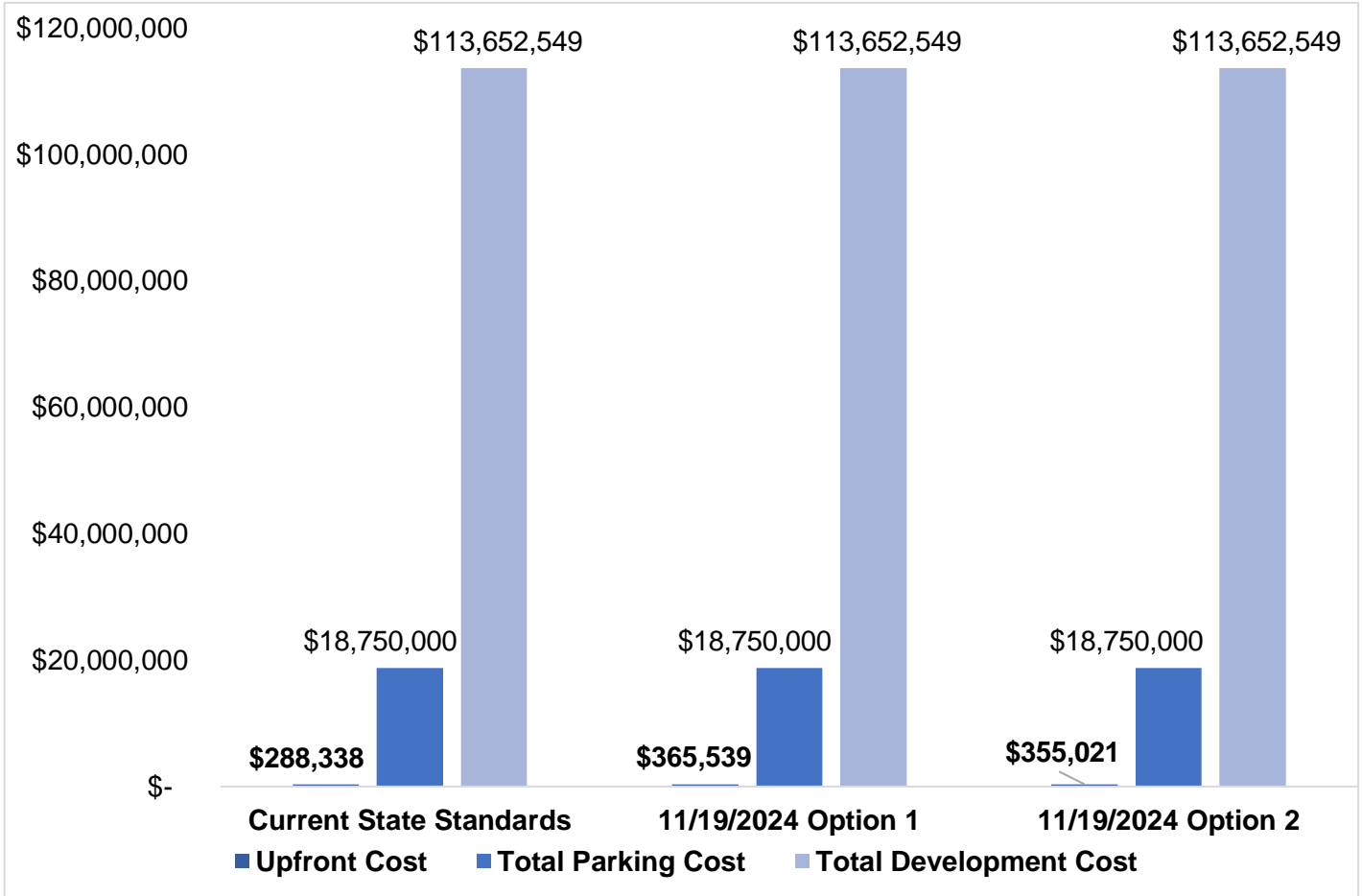


Figure 5: Upfront costs of EV Readiness for the current state standards, Option 1, and Option 2 compared to the total parking and total development cost from the sample building.

### Funding Options & Technical Assistance

At present, there are a number of funding sources currently available and expected in the future to help offset the cost of installing EV charging infrastructure in Bellevue. These options include, but are not limited to, federal tax credits, state tax credits, state tax exemptions, utility programs such as Puget Sound Energy’s Up & Go program,<sup>6</sup> as well as many federal and state grants. City staff are committed to expanding access to EV charging for all in the Bellevue community.

<sup>6</sup> Puget Sound Energy, [Up & Go Electric for Multifamily](#); [Up & Go Electric for Workplace](#).



City of Bellevue

Community Development

While not all funding sources will apply to EV Ready and Capable parking spaces, through the EV Roadmap planning process, staff intend on providing help connecting organizations to funding and providing technical assistance in navigating these funding options to both offset costs and expand charging access.



**Appendix A: Multifamily EV Readiness Code Examples**

Jurisdiction	State	Year	EV Capable	EV Ready	EV Charging Stations	% of Total New EV Parking
Vancouver	BC	2019	0%	100%	0%	100%
Palo Alto	CA	2017		Resident Parking: 100%	Guest Parking: 5%	Resident Parking: 100% Guest Parking: 25% total, 5% of which must be EV Charging Stations
San Francisco	CA	2023	10%	25%	5%	40%
San Jose	CA	2019	70%	20%	10%	100%
Santa Monica	CA	2022	10%	60%	5%	75%
Denver	CO	2022	40%	5%	15%	60%
Orlando	FL	2021	20%	0%	50+ Parking Spaces: 2%	20%
Atlanta	GA	2017	20%	0%	0%	20%
Honolulu	HI	2020	0%	25%	0%	25%
Chicago	IL	2023	0%	100%	0%	100%
New York	NY	2013	20%	0%	0%	20%
Portland	OR	2023		1-6 Parking Spaces: 100% >6 Parking Spaces: 50%		N/A
Edmonds	WA	2022	40%	40%	10%	90%
Issaquah	WA	2021	0%	30%	10%	40%
King County	WA	2021	0%	25%	10%	35%
Seattle	WA	2019	0%	1-6 Parking Spaces: 100% >7 Parking Spaces: 20%	0%	N/A
Washington State	WA	2024	10%	25%	10%	45%