

Seattle Department of Transportation

# Electric Vehicle Charging in the Right-of-Way Permit Pilot (EVCROW): 1.0 Evaluation Report



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Department of  
Transportation

## BACKGROUND

The [Electric Vehicle Charging in the Right-of-Way \(EVCROW\) Permit Pilot](#) allows the installation of Electric Vehicle (EV) charging stations<sup>1</sup> at curbside locations in the public right-of-way that meet pilot program requirements. The Seattle Department of Transportation (SDOT) manages the EVCROW pilot in partnership with the Office of Sustainability & Environment (OSE) and Seattle City Light (SCL). SDOT does not own or have any legal interest in EV charging stations installed through EVCROW. This pilot is part of the [Drive Clean Seattle Implementation Strategy](#) that aims to leverage Seattle's clean electricity to power the transportation sector and help our City reach carbon neutrality by 2050<sup>2</sup>.

Through this pilot, SDOT assessed the permitting process, installation challenges, EV charging behavior, and equity considerations in advance of potentially developing another pilot or a permanent SDOT permitting program. The EVCROW permit pilot has been operational since July 2017 and will end at or before December 31, 2019.

## PILOT VISION

Three key barriers to the adoption of electric vehicles are (1) High cost of vehicles, (2) Lack of charging access, and (3) Limited range of EV batteries. EVCROW works to address one of these three—lack of charging access— by providing diverse charging options to meet the needs of more potential EV drivers, including those who don't have home charging access. EVCROW stations can also serve high-mileage drivers, such as rideshare drivers, who need to re-charge during their work shift. EVCROW must be deployed in parallel with other efforts that address remaining barriers to increase EV adoption. EVCROW should focus on serving priority communities<sup>3</sup> to ensure transportation and health benefits of EV adoption equitably benefit these communities<sup>4</sup>.

## SUMMARY STATISTICS

**Evaluation Period:** July 2017–December 2018

**Applications Received:** 68

**Applicants:** Seattle City Light, Greenlots, and Eluminocity

**# of Chargers Installed:** 2 Direct Current (DC) Fast Chargers installed by Seattle City Light

**Average # of Charging Sessions per Day:** 3.2 sessions

**Average Session Length:** 37 minutes

**Estimated Electric Miles Enabled\*\*:** 58,500 miles

**Estimated GHG Avoided\*\*\*:** 11 metric tons

**% Surveyed applicants interested in applying for future permits:** 100%

### What interested applicants about the EVCROW permit pilot?

Access to curbspace charging locations, testing the business case for ROW charging, avoiding private host agreements, high visibility of curbspace charging locations

\*Based on the energy specifications of a 2018 Nissan Leaf.

\*\*Based on EPA's Greenhouse Gas Equivalencies Calculator.

<sup>1</sup>Also referred to as Electric Vehicle Supply Equipment (EVSE) and EV charging infrastructure.

<sup>2</sup>City of Seattle Resolution 31312 was adopted by council in October 2011. This Resolution adopts new climate protection and adaptation goals for Seattle and outlines the process for updating the Seattle Climate Action Plan to achieve those goals. The Seattle Climate Action Plan was formally adopted by council in June 2013 through Resolution 31447.

<sup>3</sup>Defined here as communities of color, immigrants, refugees, people with low incomes, youth, indigenous populations, and limited-English proficient individuals.

<sup>4</sup>See the EVCROW Racial Equity Toolkit for further detail on desired equitable outcomes and strategies.

## DATA ANALYSIS

### Application Processing Data

SDOT received 68 EVCROW applications from July 2017–December 2018, resulting in one successful permit. Generally, applications were unsuccessful because they did not meet EVCROW permit requirements, bringing electricity to the site was too expensive, there were conflicting ROW demands, or applicants experienced unexpected business changes. More detail is provided in Table 1.

**TABLE 1.** EVCROW application funnel describing where applications encountered challenges with the permitting process.

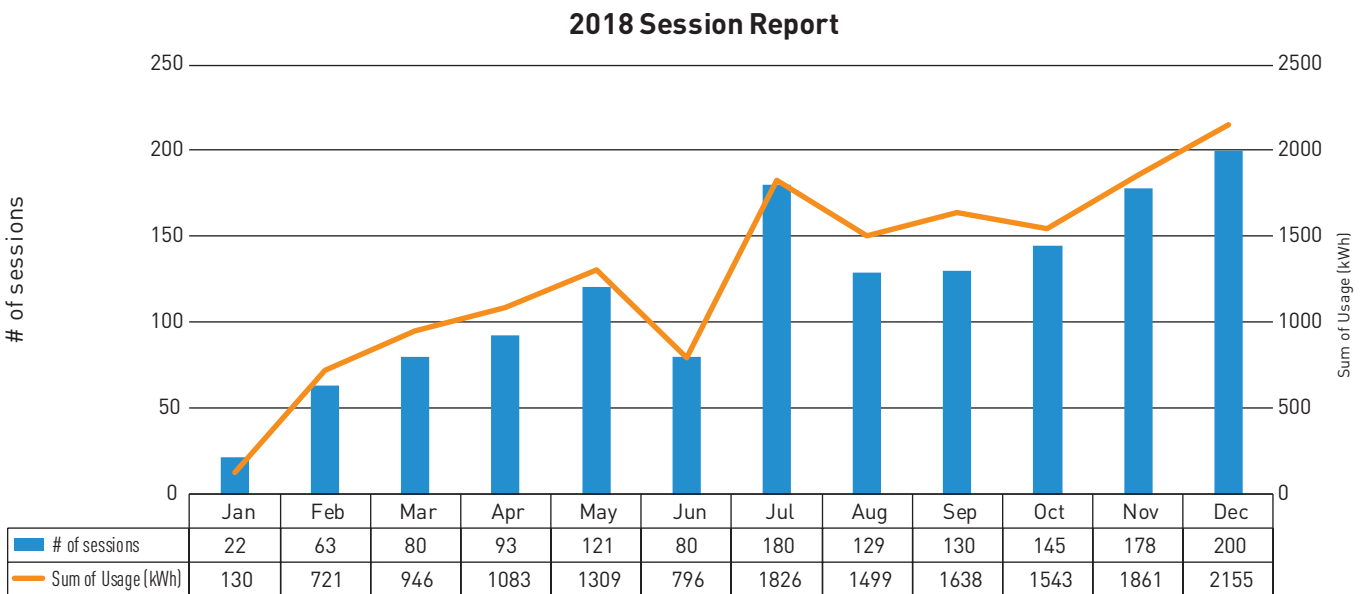
EVCROW Application Permitting Process Step	# of Applications that Reached this Step	Reasons Applications Stopped at this Step
Step 1: Submit Request for Installation	68	N/A, all applications proceeded to preliminary review
Step 2: City of Seattle Staff Review	68	<ul style="list-style-type: none"> <li>• Site did not meet EVCROW requirements such as sidewalk width, parking lane width, or accessibility requirements</li> <li>• Bringing electricity to the site was cost prohibitive</li> <li>• Site conflicted with other planned uses of the ROW, such as large upcoming construction projects or future transit-only lanes</li> <li>• Applicant experienced unexpected business changes, including changes (e.g. changes to funding availability and company dissolution)</li> </ul>
Step 3: Apply for Street Use Permit & Electrical Service Connection Application	3	<ul style="list-style-type: none"> <li>• Previously unknown physical barriers prevented EVSE installation, including overhead trolley wires and underground water pipes</li> <li>• Electrical service and construction needs were cost prohibitive due to site-specific challenges mentioned above</li> <li>• ROW demands for EVSE installation conflicted with demands for transit, biking, and pedestrian access</li> <li>• Public expressed lack of support for EVSE installation at the location, primarily due to conflicting ROW demands mentioned above</li> </ul>
Step 4: SDOT Sends Applicant Final Approval	1	N/A
Step 5: Begin Construction	1	N/A

## STATION USAGE DATA

This analysis is based on station data collected<sup>5</sup> from January 29th – December 31st, 2018 for the two Direct Current Fast Charging stations installed through EVCROW on the 2500 block of 16th Avenue S near the Beacon Hill Light Rail Station. Station usage increased by 18% over 2018 with an average of 3.2 charging sessions per day. While 260 drivers used the station, there were a handful of frequent users who appear to be using the stations as their primary charging point. For example, two return users charged their vehicles over 20 times in December 2018. This indicates that EVCROW may provide access to reliable charging for EV drivers who do not have access to at-home charging, though further research is needed to validate this assumption.



**FIGURE 1.** Seattle City Light's two Direct Current Fast Chargers located on the 2500 block of 16th Avenue S near the Beacon Hill Light Rail station.



**FIGURE 2.** 2018 EV Charging Session Report for EVCROW stations. This data is derived from Seattle City Light's two Direct Current Fast Chargers located on the 2500 block of 16th Avenue S near the Beacon Hill Light Rail station.

<sup>5</sup>Per the EVCROW permit requirements SDOT collects limited station usage data on a monthly basis. Data sharing is limited to purposes related to managing the electrical grid and implementing energy efficiency programs, including assessing impacts and charging behaviors of different electric vehicles (including shared mobility vehicles), and analyzing the impact of EV adoption on public EV charging and transportation electrification to inform planning and designing City Light's electrical systems to serve the future load from the electrification of shared mobility services.

## EVALUATION METHODOLOGY

The EVCROW evaluation process took into account a variety of qualitative and quantitative data from a diverse group of stakeholders and staff to assess key themes and opportunities for improvement. Applicant feedback was collected via surveys and one-on-one applicant meetings. Internal feedback was collected via multiple internal process review meetings with SDOT, OSE, and SCL staff. SDOT also identified key themes from public comment, the Environmental Justice Committee's feedback on Drive Clean Seattle, and results of the pilot evaluation scorecard and Racial Equity Toolkit recently completed for EVCROW. SDOT's Human Centered Design Study on Equitably Expanding the EV Charging Network and Electric Vehicle Supply Equipment Roadmap for Shared Mobility Hubs ("EVSE Roadmap")<sup>6</sup> also informed the evaluation.

## KEY TAKEAWAYS

Staff reviewed information from activities and resources described above to identify Key Takeaways in five categories: Site Selection, Equitable Deployment, Permit Requirements, Technological Considerations, and Application Processing. Staff also identified multiple future considerations to address barriers and challenges described. These key takeaways and potential solutions should inform the development of any future EVCROW permit pilot.

The following Key Takeaways were primarily derived from the following information sources:

1. EVCROW applicant and potential applicant feedback;
2. Internal review and comment on EVCROW, including written guidance submitted by the Office of Sustainability & Environment;
3. External review and comment (including public comment received);
4. The Environmental Justice Committee's Drive Clean Seattle reviews from November 2016 and March 2017<sup>7</sup>;
5. SDOT's Human Centered Design Study on Equitably Expanding the EV Charging Network;
6. SDOT's Racial Equity Toolkit (RET) for EVCROW; and
7. SDOT's Electric Vehicle Supply Equipment (ESVSE) Roadmap for Shared Mobility Hubs ("EVSE Roadmap").

### Site Selection- identifying locations to install ROW EV charging stations

- Right-of-way allocation should prioritize safety, equity, and access to transit and other active forms of transportation in the right-of-way. EVCROW site selection should align with this prioritization and proactively work to avoid conflicts. Permits should not be issued for sites directly adjacent to transit hubs, sites located in already congested areas, and sites in areas with high pedestrian and bicycle activity. (2,3)
- SDOT should reevaluate the use of limited ROW space for EV charging infrastructure and consider the use of off-street alternatives (e.g. private parking lots).

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<sup>6</sup>In Fall 2018, SDOT developed an EVSE Roadmap to provide improved connections to public transit via electrically-powered shared mobility services. This work included a GIS-based Dynamic Electric Vehicle Supply Equipment (EVSE) Siting Model which can be used to prioritize EVSE deployments throughout the City based on a variety of metrics across four prioritization areas: EV Network Development, Equity & Environmental Justice, Shared Mobility Demand, and Gaps in Transit Access. More information about the model can be found in SDOT's EVSE Roadmap for Shared Mobility Hubs: <http://evsharedmobility.org/resource/evse-roadmap-for-shared-mobility-hubs/>.

<sup>7</sup>The Environmental Justice Committee comprises twelve individuals, all deeply connected to communities of color, Native peoples, immigrants, refugees, and people with low incomes and/or organizations who work closely with these communities or environmental justice issues. The committee was formed in 2017 as part of the Equity & Environment Agenda which is housed under Seattle's Office of Sustainability & Environment.

- Sites should continue to be screened against modal plans to avoid potential conflicting ROW demands, including protected bike lanes and transit-only lanes. (2,3)
- Site guidance should align with the City and Department policies including Vision Zero, the New Mobility Playbook, the Climate Action Plan, and the Comprehensive Plan. (2)
- There is strong EV driver interest in Level 2 ROW charging in residential areas to serve EV owners without home charging access. (3)
- EVSE installers will require sites with high utilization potential to capture a return on their investment. (1)
- Future considerations:
  - Consider off-street alternatives for EV charging infrastructure, particularly in areas with limited ROW space and parking availability,
  - Preselect available sites for EVCROW,
  - Update the existing EVSE Roadmap GIS prioritization model to integrate guidance mentioned above,
  - Incentivize private investment in gap areas - identified through the EVSE Roadmap GIS prioritization model and stakeholder feedback - to help meet the City's climate and equity goals,
  - Investigate a future residential EVCROW solution.
- Expanding access to EV charging addresses some, but not all, barriers to EV adoption. Remaining barriers include vehicle cost and vehicle range. Equitably supporting EV adoption will require solutions to overcome all barriers for priority communities. (4,5,6)
- Potential barriers for equitable access to EV charging stations in priority communities include technology, payment, language, and cultural barriers. (4,5,6)
- Information gaps persist around electric vehicle technology, cost, and benefits. (5)
- Some expressed concerns around individual and community safety around individual and community safety associated with EV charger usage and concerns around racial profiling while using public EV charging stations. (5)
- Future considerations:
  - Work with local law enforcement to explain what an EV charging station is and its users expected behavior,
  - Consider a community co-design approach coupling ROW EV charging with other mechanisms to tie benefits of investments back to priority communities,
  - Partner with related efforts at the City and elsewhere working to address remaining barriers to EV adoption,
  - Establish feedback loops for community members to easily report issues and concerns with EV chargers,
  - Develop a ROW EVSE Equity Toolkit to accompany future EVCROW permit pilot requirements, providing guidance to EVSE installers and encouraging them to implement toolkit strategies as feasible,
  - Initiate and resource early conversations and outreach activities around potential ROW EV charging station deployment in priority communities.

### **Equitable Deployment- guiding EVSE network development to benefit priority communities**

- There is concern that installing ROW EV charging stations will remove parking for residents and exacerbate gentrification and displacement in priority communities and areas experiencing high displacement risk. (5,6)
- Communities strongly desire access to reliable and affordable transportation, including public transit. (4,5,6)

## Permitting Mechanism- including requirements, type, and agreement length

- The current annually renewed street use permit mechanism may not facilitate private investment unless the City assumes some of the risk associated with having to move the chargers due to conflicting ROW demands. Generally, companies desire a 3-5+ year agreement term to invest in ROW charging. (2,3)
- Accessibility guidelines require further review to ensure clarity, ADA compliance, and feasibility. (2,3)
- Technical criteria for site selection are limiting and confusing including requirements for sidewalk width, parking lane width, and accessibility. It is very difficult to find sites that meet all current criteria. (1,2,3)
- There are data gaps in understanding the use-case for EVCROW stations, particularly how ROW charging may serve shared mobility drivers and those without home charging access. (2)
- Permit requirements should consider different types of chargers and their unique spatial and electrical needs. These needs are changing rapidly as the technology continues to evolve. (1)
- Future considerations:
  - Preselect available sites for EVCROW,
  - Offer a pre-application consultation and/or an EVCROW information session for potential applicants,
  - Seek an alternative to the annual street use permitting mechanism with a longer agreement term, and/or seek ways to minimize investment risk in ROW charging,
  - Revise accessibility guidelines through a Citywide conversation that includes ROW and non-ROW charging,
  - Revisit data sharing requirements and other creative avenues for data collection to further understand EVCROW station customers and use-cases,

- Update format and language of the permit requirements document to enhance clarity.

## Technological Considerations- including allowable technologies for ROW charging facilitation

- EV charging speed and location needs differ by user groups, which include carshare companies, ride-hail drivers, freight and goods delivery drivers, and private vehicle owners. (7)
- EV charging companies expressed interest in DC Fast Charging and Level 2 ROW charging in areas with high potential utilization. (1)
- Companies generally prefer areas with head-in parking and three-phase power accessibility. (1)
- There is strong EV driver interest in Level 2 ROW charging in residential areas. (3)
- Emerging mobility options are increasingly electric, including e-bike share and other electric micromobility options which may have different electrical and spatial requirements. (1)
- EV charging stations require accompanying wayfinding signage to create easy access to charging stations. (5,7)
- Consider how to future-proof EVCROW sites, taking into account market trends including increasing vehicle range, decreasing personal vehicle ownership, and emerging shared, automated, and connected mobility options. (1, 2)
- Future considerations:
  - Identify priority use-cases based on policy goals and develop potential EVCROW solutions to serve these use-cases,
  - Coordinate EV charging station installations with ROW construction to reduce cost and decrease potential for future conflicts,

- Consider innovative charging configurations including light-pole charging, Level 2 outlets, smart charging cables, and other e-micromobility charging solutions,
- Request technology roadmap from companies addressing how their technology can evolve with future market trends.

## Application Processing – moving through the steps to obtain an EVCROW permit

- More upfront guidance on feasible sites is necessary to limit staff time spent on site review and application processing. (1,2)
- Navigating the permit process was difficult and communication was not always streamlined. (1,2)
- Future considerations:
  - Consider an EVCROW application processing fee to fund dedicated staff time for reviewing applications,
  - Allow companies to process multiple permits at once and/or submit multiple potential sites under one application,
  - Communicate regularly with companies about the status of their applications, potentially through an EVCROW checklist,
  - Investigate opportunities to expedite the current permit process for EV charging infrastructure,
  - Consider a competitive process to select 1-3 companies to participate in EVCROW and work with them closely through all steps of the permitting process.

## DISCUSSION

EVCROW aims to provide diverse charging options to meet the needs of more potential EV drivers, including those who don't have home charging access. Preliminary data supports that some EV drivers used EVCROW stations as their primary charging point and that EVCROW solutions may serve as an alternative to at-home

charging. Further data is needed to validate this assumption and could be collected in a future iteration of EVCROW. Generally, EV charging stations showed increasing demand across the evaluation period.

The evaluation process revealed challenges with the existing EVCROW permit pilot and opportunities to improve service for EVSE installers, partners, and EV drivers. It also confirmed continued interest in ROW charging solutions from these groups if adjustments are made to address existing challenges. A future version of EVCROW could address a growing market demand and spur private sector investment to create a more robust and equitable EV charging network across the City.

**Prioritize ROW charging where off-street charging isn't available.** Where feasible, SDOT and City partners should utilize off-street spaces for EV charging and use ROW space for other transportation priorities including transit and active transportation. In areas where off-street EV charging is not available or not able to provide adequate support, ROW charging may be an appropriate solution to help drive clean vehicle adoption and achieve the City's climate goals. SDOT should explore ROW charging to serve residential neighborhoods, including multi-unit dwellings, where off-street parking and/or charging isn't available.

**Coordination and collaboration are keys to future EVCROW success.** EVCROW station locations should avoid potential conflicting ROW demands and prioritize the needs of people walking, biking, and taking public transit. SDOT could direct investment in this way by enhancing its pre-screening process for potential EVCROW sites. Pre-screening can also address confusion and difficulty in finding sites that meet all permit requirements. Generally, a next iteration of EVCROW should enhance internal and external coordination strategies and align with parallel conversations on SDOT's broader climate strategy.



**Identify the desired use-case and design with the appropriate end-user in mind.** Future EVCROW solutions should be designed to serve use-cases that align with the City's transportation, climate, and equity priorities. A human-centered design approach centers on community and customer needs first, then finds technology solutions to meet those needs. SDOT could take a human-centered design approach to the next iteration of EVCROW, remaining open to alternative business models and charging technologies during the pilot development phase. Due to public demand, SDOT should consider a residential EVCROW solution to serve EV drivers without home charging access.

Future introduction of ROW charging infrastructure should focus on expanding EV charging equitably, in a way that provides benefits to host communities and does not exacerbate displacement risk. A ROW EVSE Equity Toolkit can accompany future EVCROW permit pilot requirements, providing guidance to EVSE installers and encouraging them to implement toolkit strategies as feasible. SDOT should also seek resources to further support the implementation of these strategies, including community co-design strategies in areas of high displacement risk.

As part of the 2020 budget process, SDOT is considering reducing its free-floating car share annual vehicle permit fee for EVs. This could help lower barriers to EV access and increase demand for ROW charging. SDOT could also work to develop partnerships with car share companies, Seattle Housing Authority, and other community-based organizations to enable access to EVs with convenient EV charging options in priority communities. This work could also help the EVCROW program build trust and remain accountable to priority communities by fostering strong relationships with the organizations these communities already work with and trust.

**Revisit the permit structure, requirements, and application process.** The permitting process for ROW EV charging infrastructure is complex

and site specific. Future process guidelines should aim to provide clarity and set general cost and timing expectations upfront, while also allowing flexibility to refine site selection and configurations based on information provided throughout the permit process. SDOT should consider working with fewer providers through a competitive selection process. Staff could dedicate more time to fewer applicants to help with the steep learning curve. Applicants could also submit general areas of interest, as opposed to specific sites, and work with City staff to identify feasible sites. SDOT could collect an EVCROW permit fee to help cover staff time needed to facilitate this approach.

Private companies continue to express interest in ROW charging, though none expressed interest in applying under the annually renewed public space management permit. SDOT could address this by issuing a permit with a longer agreement length, covering some installation costs, or a combination of both. This issue must be addressed for any future version of EVCROW to be successful.

Finally, the cost of ROW construction, particularly bringing electricity to the ROW, can be high. The City of Seattle should continue researching potential ways to reduce the cost of bringing electricity to the ROW, particularly in areas identified as priorities for EV charging installation based on SDOT's recently completed EVSE Roadmap. Future legislation could create significant financial mechanisms to enable this work, particularly for the electric utility which must continue to be a key partner in any future iteration of EVCROW.

## NEXT STEPS

SDOT will integrate key takeaways from this evaluation with further community feedback, policy synthesis, and internal and external stakeholder review to decide if it will develop the next iteration of its EVCROW permit pilot.

If you have any ideas or questions, please email us at [newmobility@seattle.gov](mailto:newmobility@seattle.gov).

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