Electric Vehicle Charging Access for Renters: A Guide to Questions, Strategies, and Possible Next Steps

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PREPARED FOR

The Urban Sustainability Directors Network

AUTHORS

Kelly Kneeland, Nikhita Singh, Jesse Way, and Megan Lynch, with guidance from Philip Kreycik and Farrah Andersen (The Cadmus Group)

USDN ENABLING TENANT ACCESS TO ELECTRIC VEHICLE CHARGING PROJECT

Supported by the USDN Innovation Fund, this guidebook is the result of the Enabling Tenant Access to EV Charging project, a USDN city-led initiative to provide cities with stakeholder-tested and context-grounded strategies that local governments can use to overcome common challenges and enable access to EV charging for renters in existing buildings within their cities. The project also produced an inventory of identified barriers and strategies for EV charging access for renters. Four core USDN cities from the U.S. were involved throughout the project, as well as seven U.S. and Canadian observer cities who participated in calls and project progress conversations. Throughout the project, each core city engaged with a local Advisory Committee composed of representatives whose work or lived experiences could ground the research.

The four core municipalities and the associated representatives who directed this project are:

- Jennifer Green and Katie Dorey, City of Burlington, VT (Lead Municipality)
- Hannah Payne, City of Somerville, MA
- Bronwyn Cooke, City of Cambridge, MA
- Ingrid Fish and Marty Stockton, City of Portland, OR

The seven observer cities and associated representatives who participated in regular check-in calls and conversations about the project are:

- Bill Eger, City of Alexandria, VA
- Samantha Devine, City of Boston, MA
- Camille Pollan, Jonathan Rhodes, and Daniel Jatres, City of New Orleans, LA
- Ariana Vito and Shannon Parry, City of Santa Monica, CA
- Maxwell Sykes, City of Surrey, British Columbia
- Leslie Ng, City of Vancouver, British Columbia
- Robyn Eason, City of West Hollywood, CA

The following contacts participated in Interviews as part of the strategy identification process:

- Brendan McEwan: Director of Mobility & Low Carbon Strategies, AES Engineering
- Suzanne Goldberg: Canadian Public Policy Director, ChargePoint
- Brian Ross: Senior Program Director Sustainable Development, Great Plains Institute
- Leslie Aguayo: Environmental Equity Program Manager, and Roman Partida-Lopez: Environmental Equity Legal Counsel, Greenlining Institute
- Josh Cohen: Policy Director, and Erick Karlen: Policy Advisor, Greenlots

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Introduction

EVs are critical to achieving city climate goals and providing co-benefits

Numerous cities, states, and provinces across North America have committed to ambitious greenhouse gas (GHG) emissions reduction targets.[1] Meeting these targets will require reducing GHG emissions from the transportation sector -- one of the largest sources of GHG emissions in the U.S., accounting for approximately 28% of emissions[2] A critical component to achieving these GHG targets will be to electrify the transportation sector by transitioning from internal combustion engine (ICE) vehicles fueled by gasoline to electric vehicles (EVs) powered by electricity from an increasingly decarbonized grid.

Furthermore, EVs deliver additional environmental benefits, including reduced emission of harmful air pollutants, such as ground-level ozone and fine particulate matter ($PM_{2.5}$). Since both of these pollutants cause negative health impacts, such as respiratory problems and heart attacks, the displacement of these pollutants can have public health benefits for community members.[3] These climate and broader environmental and public health benefits are particularly important for Black, Indigenous, and People of Color (BIPOC) communities, as these communities have been disproportionately impacted by the adverse impacts of air pollution and climate change.[4,5,6]

Increasing charging for renters can facilitate broad and equitable EV adoption

Access to charging that is reliable, convenient, and affordable is critical to enabling EV ownership. Some sources estimate that over 80% of charging occurs at home.[7] However, rental housing tenants often lack the ability to access or install a charger where they park at home due to a lack of dedicated off-street parking, an inability to afford the expense of charger installation, or a property owner's unwilling to install a charger.

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[1] Center for Climate and Energy Solutions. (September 2020). U.S. State Greenhouse Gas Emissions Targets. Retrieved from: https://www.c2es.org/document/greenhouse-gas-emissions-targets

[2] United States Environmental Protection Agency. (n.d.). Fast Facts on Transportation Greenhouse Gas Emissions. Retrieved from: https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions

[3] United States Environmental Protection Agency. (n.d.). Health Effects of Ozone Pollution. Retrieved from: https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution; and United States Environmental Protection Agency. (n.d.). Health and Environmental Effects of Particulate Matter (PM). Retrieved from: https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm

[4] National Association for the Advancement of Colored People. (n.d.). Environmental and Climate Justice. Retrieved from: https://naacp.org/issues/environmental-justice/

[5] Curti, J., Andersen, F., & Wright, K. (2018). A Guidebook on Equitable Clean Energy Program Design for Local Governments and Partners. USDN.

[6] Union of Concerned Scientists. (2019). Inequitable Exposure to Air Pollution from Vehicles in California. Retrieved from: https://www.ucsusa.org/sites/default/files/attach/2019/02/cv-air-pollution-CA-web.pdf

[7] Office of Energy Efficiency & Renewable Energy. (n.d.). Charging at Home. United States Department of Energy. Retrieved from: https://www.energy.gov/eere/electricvehicles/charging-home

Renter access to EV charging infrastructure is key to scaling EV deployment and ensuring equitable access as approximately 36% of households in the United States are renters (See Box 1 for USD's definitions of equity.) In many cities, the percentage of renters is higher than the national average, in some cases exceeding 60% of households.[9] Renters also represent a greater portion of low- and moderate-income (LMI) and Black, Indigenous, and People of Color (BIPOC) households.[10] To date, these households have largely been unable to benefit from electric vehicles. Most EV ownersare higher income single-family homeowners that are able to install a private, dedicated charger at home, while many LMI and BIPOC households face challenges in attaining the resources needed to participate in the clean energy transition as a result of structural and institutional racism.[11]

Without targeted interventions, these groups are at risk of remaining locked out of the EV transition. If renters are left out of the EV transition, ambitious climate targets and EV deployment goals will not be achieved and inequities in access to the benefits of the clean energy transition will be perpetuated. Additionally, renters who do own EVs may be limited in future housing choices based on proximity to EV charging. This is particularly problematic for renters because they tend to move more frequently than homeowners. Targeted action is also needed to ensure that structural and distributional inequities are corrected as communities transition to cleaner technologies. By focusing on the renter population, this project seeks to expand access to EV charging for these traditionally underserved communities. Furthermore, while the strategies discussed in this guide are

Box 1: Four Dimensions of Equity:
This guide uses the USDN definition of equity,[8] which includes four components for sustainability planning, decision making, and program and policy design, outlined below:

- **Procedural (Inclusion):** Inclusive, accessible, authentic engagement and representation in the process to develop or implement policies.
- **Distributional (Access):** Programs and policies result in fair distributions of benefits and burdens across all segments of a community, prioritizing those with highest need.
- **Structural:** Decision-makers institutionalize accountability; decisions are made with a recognition of the historical, cultural, and institutional dynamics and structures that have routinely advantaged privileged groups in society and resulted in chronic cumulative disadvantage for subordinated groups.
- **Transgenerational:** Decisions consider generational impacts and do not result in unfair burdens on future generations.

[8] Park, A. (September 2014) An Equity Scan of Local Government Sustainability Programs. USDN. Retrieved from: https://www.usdn.org/uploads/cms/documents/usdn_equity_scan_sept_2014_final.pdf

[9] Governing. (n.d.) Renter Population Data by City. Retrieved from: https://www.governing.com/gov-data/census/city-renter-population-housing-statistics.html

[10] Joint Center for Housing Studies of Harvard University. (2017). Renter Households. Retrieved from: https://www.jchs.harvard.edu/sites/default/files/02_harvard_jchs_americas_rental_housing_2017.pdf

[11] Curti, J., Andersen, F., & Wright, K. (2018). A Guidebook on Equitable Clean Energy Program Design for Local Governments and Partners. USDN.

focused on providing solutions for renters, the outcomes of the strategies can benefit non-renters as well, many who face similar challenges to EV charging access at home.

Box 2: EV Deployment Goals

Expanding access to EV charging is becoming increasingly urgent as states and auto manufacturers commit to ambitious EV deployment targets. For example:

- **California** recently announced a phase-out of the sale of fossil fuel burning passenger vehicles by 2035.[12]
- **Oregon** quickly followed suit with a similar announcement and may be joined by other progressive states who have worked extensively with California and Oregon on joint efforts to promote EV deployment. [13]
- **Toyota** aims to have electric vehicles account for half of its global sales by 2025.[14]
- **Volkswagen** announced it will sell one million EVs by 2023 and 1.5 million by 2025.[15]
- **Volvo** expects that 50% of sales will be fully electric by 2025 and that it will put one million EVs on the road by 2025.[16]

It should be noted that access to EV charging is not the only barrier to EV ownership among the renter population, however it will become increasingly important as the market for EVs matures. EVs have generally made up a small portion of new car sales and the renter population tends to own fewer cars than homeowners. While the high cost of EVs has been a barrier to entry for some renters, EV prices will continue to decrease and used EVs will be increasingly available on market. As the EV market develops and EVs become more affordable, access to EV charging will quickly replace the cost of the vehicle as the primary barrier for renters.

About this Guide:

This guide outlines a process cities can follow to increase access to EV charging for renters. It focuses on strategies that increase the availability of charging for renters in the places they park when at home. The guide is specifically designed for city staff who seek opportunities to facilitate an equitable transition among all residents from gasoline-powered cars to electric vehicles. The guide provides a process to select

[12] Office of Governor Gavin Newsom. (2020). Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change. Retrieved from: https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-drastically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/

[13] State of Oregon Newsroom. (2020). Governor Kate Brown Issues Statement on California Zero-Emission Vehicle Announcement. Retrieved from: https://www.oregon.gov/newsroom/Pages/NewsDetail.aspx?newsid=37419

[14] Buckland, K & Tajitsu, N. (2019). Toyota Speeds Up Electric Vehicle Schedule as Demand Heats Up. Reuters. Retrieved from: https://www.reuters.com/article/us-toyota-electric/toyota-speeds-up-electric-vehicle-schedule-as-demand-heats-up-idUSKCN1T806X

[15] Lambert, F. (2019). Volkswagen Accelerates Electric Car Plans, Now Aims for 1.5 Million EVs in 2025. Electrek. Retrieved from: https://electrek.co/2019/12/27/volkswagen-accelerates-electric-car-plans/

[16] Volvo. Taking the Lead: Embracing a Cleaner Mobility. Retrieved from: https://group.volvocars.com/company/innovation/electrification

and implement strategies to increase access to EV charging for residents who live in rental buildings, including:

- An overview of the **background work** that cities should conduct at the outset of this process;
- **Common barriers** cities face in increasing access to EV charging for renters; and
- **Actionable strategies** to overcome barriers and increase access to EV charging that were highlighted by the four core cities who participated in the Enabling Tenant Access to EV Charging project that underlies the findings of this guide (more information in Box 3 below).

Box 3: Four Core Cities and the Enabling Tenant Access to EV Charging Project
This guide was developed with input from four core cities, including Burlington (VT), Cambridge (MA), Portland (OR), and Somerville (MA), and with research and logistical support from Cadmus.

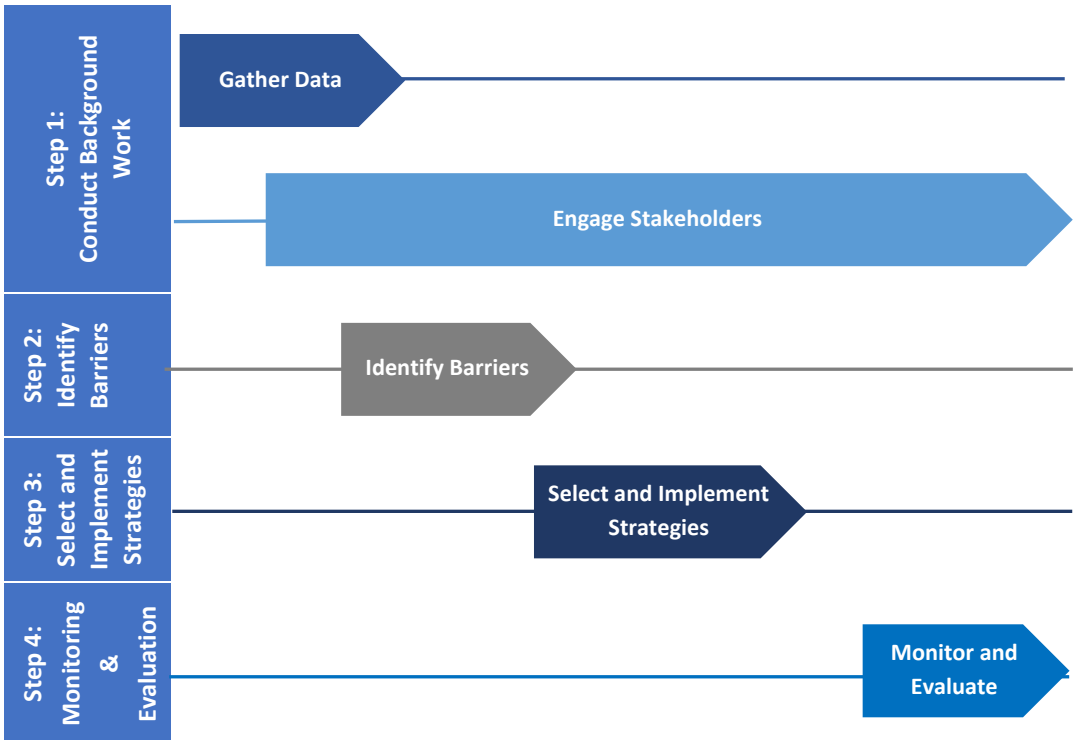
Creating an inventory of barriers and strategies was informed by desk research and interviews with subject matter experts. To identify key barriers and select strategies specific to each city, the core cities convened and engaged with advisory groups consisting of local stakeholders. This guide summarizes the findings from the desk research, expert interviews, and advisory group process.

Proposed Approach and Process for Increasing Renter Access to Charging

Overview

This section of the guide outlines a proposed approach and process for increasing renter access to EV charging. Key steps in this process are illustrated in Figure 1 below.

Figure 1: Process for Increasing Access to EV Charging for Renters



Step 1: Conduct Background Work

Cities should conduct background data gathering, research, stakeholder engagement, and analysis to better understand their local EV charging and renter context. This will lay the foundation for targeted action that aligns with stakeholder interests and expectations.

Gather Data

To better understand and successfully meet renters' charging needs, cities will need to establish a baseline understanding of the situation in their city. Gathering data provides valuable information to help a city determine which strategies would be most impactful within their unique context. Cities can better understand renter populations, differentiated needs among disparate populations, the specific barriers they need to overcome, and gain a baseline understanding of the equitable distribution of EV chargers. A series of questions on which cities should gather data follows below.

1. Where do renters live?

Cities should understand where in their city renters reside. Key questions include: Are there particular areas with high populations of renters? What type of rental housing is most common in various parts of the city? Are they mostly 2-4 unit buildings, apartment buildings with 50 or more units, or somewhere in between?

- *Purpose/how to use resulting information:* Determining where renters live is the first step in identifying gaps between where renters park and where charging is readily available, reliable, and affordable. This will help determine where interventions should be targeted. The predominant type of rental housing may also influence strategy selection and implementation. For example, the challenges faced by the owner of a 2-4 unit house will be different than a building with 50 or more units, so any guidance provided to building owners will need to be tailored to the specific challenges faced by different building types.
  Where to find information: The American Community Survey (ACS) and the American Housing Survey (AHS) provide data that can help cities determine where renters live by census tract. Cities should also explore local sources of data such as rental registries, assessors, and building permit data.

Box 4: Workplace and Corridor Charging

In some city contexts, providing access to charging in the places where renters park when they are at home may be challenging, and overcoming those challenges may have a long-time horizon. In these situations, cities may want to consider targeting programs towards workplace charging or interstate fast charging, especially if the barriers are easier to overcome and it can increase equitable access to charging more quickly. While pursuing workplace or interstate charging may be an appropriate strategy for providing renters charging access in some contexts, this guide focuses on increasing charging access in the places where renters park when they are at home.

2. What type of parking do renters have?

Cities should understand the type of parking residents have at their homes. Key questions include: What type of parking is most common in neighborhoods with a high number of renters within a given city? Is it dedicated off-street parking, shared off-street parking, or on-street parking? For example, in the Cities of Cambridge and Somerville, most renters use on-street parking, while in Burlington most renters use off-street parking.

- *Purpose/How to use resulting information*: Understanding what type of parking renters have will inform which strategies may be most appropriate within the city's specific context. This question can also help uncover differences in where control of parking lies. Off-street parking is most frequently controlled by a third-party such as the owner of the associated multi-unit dwelling property. On-street parking is most frequently controlled by the municipality. Therefore, cities with predominantly on-street parking will likely need to explore strategies that focus on public charging.
- *Where to find information*: The availability and sources of useful data will vary from city to city. Some cities are doing comprehensive inventories of parking resource and regulations, whereas others maintain records to enforce parking caps. Cities should work with internal departments like Parking or Transportation to determine reasonable data sources. For example, cities could consider examining

records on residential parking permits. While this would include some non-renters, it will provide a reasonable proxy.

3. *How reliable, convenient, and affordable is the existing electric vehicle supply equipment (EVSE) network?*

Cities should understand the degree to which the existing EVSE network in their city is reliable, convenient, and affordable. Key questions include: Are the chargers easy to access? How frequently are they broken or otherwise unavailable? Is the pricing set at a price that allows EV drivers to achieve cost savings over a gasoline-powered vehicle?

- *Purpose/How to use resulting information*: Understanding the adequacy of the current network of EV chargers in the city will help identify the need for additional chargers. If paired with data on renter location, it can also help identify geospatial gaps in reliable, convenient, and affordable access to EV chargers for renters.
- *Where to find information*: Current charger locations could be found by looking at resources such as PlugShare[17] or the Alternative Fuels Station Locator.[18] PlugShare can also be used to find crowd-sourced information on pricing, reliability, and convenience of accessing the charger. However, speaking to existing EV owners will likely be the best source of information.

4. *Who else is vested in increasing EV charging access at/near where renters park when at home?*

Cities should understand who has vested interest in increasing EV charging access near where renters park when at home. EV chargers can be built, owned, and operated by a range of stakeholders, including the utility, the municipality, the state, the building owner, the tenant, or even a third party (e.g. EVSE providers). In the current market, the most common ownership structures include private chargers owned and operated by the building owner and public chargers owned by the municipality.[19] Funding sources for installation of EV chargers in areas with renters could include state or utility incentives, direct utility investment, city budget appropriations, or private third-party funding (e.g., building owner or EVSE provider).

- *Purpose/How to use resulting information*: Understanding who may have a vested interest in increasing EV charging access near where renters park at home will inform which stakeholder groups are critical to engage throughout the process and where targeted outreach and education may be most impactful.
- *Where to find information*: Determining who has a vested interest in increasing EV charging access near where renters park at home could be achieved by contacting local site hosts or speaking to

[17] PlugShare. Retrieved from: https://www.plugshare.com/

[18] United States Department of Energy. Energy Efficiency and Renewable Energy. Alternative Fuels Data Center. Alternative Fueling Station Locator. Retrieved from: https://afdc.energy.gov/stations/#/analyze?fuel=ELEC&show_map=true

[19] Public chargers refer to those that are available to the general public. These chargers can be owned by public or private entities.

electric vehicle supply equipment (EVSE) providers who are prevalent in the city or in nearby cities.[20] The resources mentioned above, Plugshare and the Alternative Fuels Station Locator, contain information on the EVSE provider associated with public chargers. If funding sources exist, they can be found by speaking to the local utility and state agency staff (usually the energy or environmental agency) or visiting their websites. If there is a local Clean Cities representative,[21] they would also be able to serve as a resource.

Engage Stakeholders

Stakeholder engagement serves several purposes and should occur often throughout the process outlined in this guide to ensure stakeholder buy-in, as well as effective program design and/or strategy implementation. From a process perspective, this involves engagement at all stages, including (1) early in the planning process to enhance information gathering and to facilitate buy-in, (2) throughout the barriers and strategy identification process as stakeholders can provide valuable insight and local context, and (3) during the implementation and ongoing monitoring and evaluation process to ensure stakeholder feedback is reflected in program design and evaluation. In terms of content, stakeholders may provide input on the overarching process and strategies, as well as on targeted strategy refinement and implementation.

Establish an Advisory Group

For the ongoing process, one potential strategy for conducting effective stakeholder engagement is the creation of an advisory group. An advisory group is a small subset of stakeholders that can provide input throughout the process outlined in this guide, as well as consistency and continuity throughout strategy development and implementation. During the identification of barriers and strategies, a key role this group can play is to ground-truth findings and ensure they accurately reflect the views of community members. More information on potential questions to discuss with an advisory group can be found in Box 5.

Box 5: Questions to Discuss with an Advisory Group

Cities that establish an advisory group to support this process could consider highlighting the following questions for discussion to inform strategy identification and implementation:

- What are the barriers to accessing EV charging for renters? What barriers are specific to this community?
- What would be needed to increase access to EV charging for renters? Given local barriers, what are the best strategies?
- Given the strategies, who are the local stakeholders who need to be included? What is the best way to include them?

[20] EV charger is the common vernacular for electric vehicle supply equipment. The two are used interchangeably in this guide.

[21] United States Department of Energy. Energy Efficiency and Renewable Energy. Clean Cities Coalition Network. Retrieved from: https://cleancities.energy.gov/

One avenue to improve the equity of the advisory group process is to provide a stipend to those who participate in the advisory group, particularly in a capacity that is not connected to an existing paid position. This stipend can increase community members' ability to participate by helping to pay for childcare, transportation, and other costs associated with attending the meetings.

Conduct Targeted Outreach

As strategies are selected, refined, and implemented, stakeholder engagement will likely need to be expanded beyond the advisory group to include targeted outreach to stakeholders who can provide input on specific strategy refinement or implementation. While there is overlap in the stakeholders that may be included in an advisory group versus in targeted outreach, the breadth and depth of their participation will differ. It should be noted that the extent to which a particular stakeholder participates as part of an advisory group and/or to provide targeted feedback, will depend on the specific strategy and needs of the city.

Key Internal and External Stakeholders

For more information on the set of stakeholders that cities may want to include as a member of an advisory group and/or to provide targeted outreach, please see Table 1. For information on the set of internal departments that will likely need to be engaged and consulted throughout the process, please see Table 2.

Table 1: External Stakeholders

Stakeholder	Reason for Engaging
Renters who are current or prospective EV owners/users	The strategies will ultimately serve this stakeholder group, so their opinions and insights are fundamental to strategy development and implementation.
Community members	Community members can articulate any concerns or needs related to the installation of EV chargers at or near their homes.
Community organizations	These groups can provide information about local context and can help identify charging locations that best meet the needs of their respective communities. Importantly, they can also elevate the voices of BIPOC households in the dialogue and ensure that input is included from a cross section of the renter community. They may also be able to lend resources and garner public support.
Owners of parking lots and garages	These stakeholders own the property on which chargers could be installed to provide access to renters.
Commercial and residential property owners, managers, and developers	These stakeholders will be critical for several reasons. Strategies should be vetted with these groups to ensure they meet their needs. These stakeholders additionally need to be educated on installing and managing EVSE.
State-wide landlord associations or property owner associations	These stakeholders can provide credibility with building owners, as well as offer additional guidance or model resources to support strategy implementation. These groups can also be effective outreach channels to reach a large group of property owners.
Affordable housing developers	These stakeholders can ensure the program adequately meets the needs of targeted demographic groups.

Stakeholder	Reason for Engaging
Nearby municipalities	Other nearby municipalities may be interested in building a coalition to strengthen the effort to expand access to EV charging.
Electric utilities	Engaging with utilities will be important for multiple reasons. First, utilities play a key role in supplying electricity. This can range from making panel upgrades for the installation of a single EV charger to undertaking system wide capacity planning. Second, depending on the regulatory context, utilities may have a financial incentive to increase the use of electricity in transportation and, therefore, may have a vested interest in ensuring the success of efforts to increase renter access to EV charging. Lastly, utilities can directly fund EV charging or make changes to their rate structure to enhance the operating cost savings from electric vehicles. Engaging with utilities to explore these actions is discussed as a discrete strategy later in this guide.

Table 2: Internal Stakeholders

Example City Functions	Reason for Engaging
Transportation, Mobility	EV charging deployment may align with current and planned transportation initiatives. The city's transportation department can think strategically about how EV charging relates to transportation improvement projects, how it might compete for space in the public right of way, and how multi-modal transportation electrification needs can factor into city EV planning.
Parking	EV charging implementation may impact parking availability and enforcement, and the politics of parking/access to parking can be highly contentious. The parking department will need to be consulted to ensure adequate rule changes and parking enforcement training, as well as helping the group anticipate or navigate any conflict.
Sustainability, Environment	EV charging deployment may align with current and planned environmental or sustainability initiatives, and the city's sustainability department will be aware of how EVSE fits into larger decarbonization goals.
Public Works	In some cases, this department may be made responsible for maintenance of public chargers. They can help anticipate and plan for challenges such as snow removal or construction impacts (e.g., appropriate mitigation measures can be planned if major projects take charging out of service).
Parks and Recreation	In some cities the parks department controls some or all of the public parking lots at their parks and other facilities that could be used as sites for public chargers.
Housing	This department may have valuable information about the housing supply, rental populations, renter needs, and other relevant details. They could assist with outreach materials and/or be an avenue to connect with building owners, residential real estate firms, affordable housing developers, and other important housing groups within the city. If they distribute money to affordable housing developers, housing

	departments can also establish green building policies that include EV charging infrastructure.
Planning, Community Development	City planners may provide valuable input about future redevelopment and/or masterplans, opportunities for integration of EV strategies within community plans, and opportunities for zoning policy changes to enable more streamlined deployment of chargers that would support renters.
Management and Finance	This department will need to be consulted for strategies that involve direct expenses for the city.
Communications	This department will likely aid in the development of outreach materials and can assist with conducting outreach.
Electrical, Engineering, Inspectional Services	This department can provide information on the current permitting process for EVSE, how it could be improved, and whether data is available that would support planning efforts for EV charging.

Step 2: Identify Barriers

Overview

After completing the foundational work outlined above, cities should next identify the key barriers that prevent renters from accessing EV chargers at or near where they park at home. Identifying prominent barriers within a given city context is an important step of the process, as it will help inform which strategies will be the most impactful in increasing renter access to EV charging.

While a full list of barriers identified throughout this project can be found in Appendix A, the following section highlights eight barriers that strongly resonated with the four core cities and their advisory groups. These barriers are further organized into two categories, including barriers to installing chargers at home and barriers to installing and using existing public chargers. These barriers are listed below.

#	Barriers
Barriers to Installing Home Charging	
1	Lack of Dedicated Off-Street Parking
2	Split Incentive
3	Upfront Cost of Home Charging
4	Lack of Actionable Information for Property Owners
Barriers to Installing and Using Existing Public Chargers	
5	Unclear Payback for Installing and Maintaining Public Chargers
6	Cost of Using Public Chargers
7	Unclear and Inconsistent Price Structures
8	Technological Divide and Cash-Based Communities

Barriers to Installing Home Charging

Installing a charger at home is difficult for most renters. The following highlights some of the key barriers to installing a charger at home:

1. Lack of Dedicated Off-Street Parking

Renters often lack access to off-street parking where they could install or access an EV charger. Even if renters have access to off-street parking, they often do not have a dedicated parking spot where they have the authority to install an EVSE. Without access to dedicated off-street parking, renters often need to rely on publicly accessible or workplace charging to meet their needs.

2. Split Incentive

For renters with access to dedicated off-street parking, EV charging, like many other energy efficiency improvements, faces a split incentive problem in which neither party has the incentive to take an action

that would provide a net benefit.[22] Renters are often unwilling to invest in capital improvement projects to the property because they will not be able to recoup their investment. Landlords may also be unwilling to invest in charging infrastructure on their properties without certainty that EV charging will add enough value to their property to incentivize the investment.

3. Upfront Cost of Home Charging

The cost to purchase, install, and operate EVSE both at multi-unit dwellings and in public locations can be a barrier. For example, networked Level 2 residential charging stations can cost $500 - $2,220 per station for the units and $1,200 - $3,300 for installation.[23] Installation costs for a Level 2 charger are high because it may require the electrician to make electrical upgrades. These upgrades can become increasingly expensive if additional trenching is required to run wires below the surface and connect the charger to the panel.[24] Finally, for large multifamily buildings with sizable parking assets, these stations sometimes require additional staff time to monitor and operate. Without financial incentives, property owners may find it difficult to justify an investment in EV chargers.

4. Lack of Actionable Information for Property Owners

Many building owners lack the necessary information to pursue installing EV charging. This manifests in two related challenges. First, building owners may either be unaware that installing an EV charger could be an option for them or may not understand the associated potential benefits. Second, a building owner who is interested in installing a charger may not be sufficiently equipped with the knowledge of how to do so. There is often not reliable and clear guidance readily available on the steps to installing EV charging. Without connection to this information, property owners will likely not install EV chargers.

Barriers to Installing and Using Existing Public Chargers

The following barriers describe the challenges preventing proliferation of public charging and the challenges that renters face in using existing public chargers. While these barriers focus on public charging, many of these challenges exist for shared charging at multi-unit dwellings as well, particularly if the owner requires payment via smartphone or credit card.

5. Unclear Payback for Installing and Maintaining Public Chargers

There currently is not a clear payback pathway for owning public chargers. This is driven by high upfront costs, ongoing costs, and low utilization. First, the total cost for installation of public chargers (including labor, materials, permits, and tax) has been estimated at about $3,000 for a site with two level 2 chargers

[22] Bird, S., & Hernández, D. (2012). Policy options for the split incentive: Increasing energy efficiency for low-income renters. Energy policy, 48, 506–514. https://doi.org/10.1016/j.enpol.2012.05.053

[23] HomeAdvisor. (2020). Install an Electric Vehicle Charging Station. Retrieved from: https://www.homeadvisor.com/cost/garages/install-an-electric-vehicle-charging-station/

[24] Castellano, J., Smith, M., (2015) Costs Associated with Non-Residential Electric Vehicle Supply Equipment, Office of Energy Efficiency & Renewable Energy, Department of Energy, Retrieved from: https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf

installed.[25] There are also ongoing maintenance costs, warranty fees, network fees, and electric costs. Lastly, low utilization rates for the chargers, as a result of few EVs on the road makes it difficult to recoup costs.

6. *Cost of Using Public Chargers*

Renters who do not have access to charging at home must rely on public charging, which tends to be more costly, particularly when owned by private entities.[26] The necessity of recouping costs incurred by the site host to install and maintain the charger leads to costs being passed on to the user. A host may determine they get unquantified value out of providing charging and decide not to pass the full cost along. However, as discussed above, the costs of installing and maintaining a public charger are non-trivial. Additionally, a big part of the cost is utility rates, which tend to have a higher cost per kWh than home charging for several reasons, including:

- the load profile of users at public charging may algin with higher cost time of use (TOU) periods;[27]
- public charging may be on commercial rates, which often include demand charges;
- utilization of public chargers is sporadic, leading to demand charges being a higher percent of the total bill; and
- a higher rate of charging can exacerbate these costs, as seen with direct current fast charging (DCFC), which draws power from the grid at a rate of 50-350 kilowatts.[28]

This barrier highlights the importance of developing *affordable* public charging options, which may not happen without municipal intervention.

7. *Unclear and Inconsistent Price Structures*

Renters using public charging may not have a clear understanding of what value they are getting for the money spent. Some stations charge per minute, others per kWh, and many have a connection fee per session added. Some pass along different prices by time of day to more closely align with an underlying TOU structure, if applicable. Some have penalties for exceeding certain time limits. Ultimately, the user needs to understand whether their cost per mile is comparable to the cost per mile of using gasoline, and these payment schemes can make it difficult to understand. These factors can reduce, and in some cases eliminate, the cost advantages of fueling with electricity instead of gasoline, making EV purchases/leases

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[25] Nicholas, M. (2019). Estimating Electric Vehicle Charging Infrastructure Costs Across Major U.S. Metropolitan Areas. The International Council on Clean Transportation (ICCT).

[26] Although some public charging has historically been provided for free, cities appear to be moving away from this model for their municipally owned chargers.

[27] (2018) Electric Vehicle Driving, Charging, and Load Shape Analysis: A Deep Dive Into Where, When, and How Much Salt River Project (SRP) Electric Vehicle Customers Charge. Palo Alto, CA: EPRI. Retrieved from http://mydocs.epri.com/docs/PublicMeetingMaterials/ee/000000003002013754.pdf

[28] McFarlane, D., Prorok, M., Jordan, B. & Kemabonta, T. (2019). Analytical White Paper: Overcoming Barriers to Expanding Fast Charging Infrastructure in the Midcontinent Region. The Great Plains Institute. Retrieved from: https://www.betterenergy.org/wp-content/uploads/2019/08/GPI_DCFC-Analysis.pdf

a challenging proposition for renters who must rely on public infrastructure and who are trying to save money.

8. Technological Divide and Cash-Based Communities

People who do not own smartphones or have bank accounts are often unable to access public or shared EV chargers that require payment. To date a majority of public EV chargers require payment via a credit or debit card, oftentimes via a smartphone application. There are millions of drivers, often belonging to lower-income households, who rely on cash instead of debit or credit cards to make payments, and many who do not own smartphones. As a result, this type of payment requirement significantly limits the accessibility of the charger and may discourage residents from adopting EVs.

Step 3: Select and Implement Strategies

After identifying the most prominent barriers, cities should consider which strategies best address those barriers. There are a wide range of strategies that cities could consider pursuing to overcome barriers and increase access to EV charging for renters. While a full list of strategies identified throughout the project can be found in Appendix B, this guide specifically focuses on five priority strategies that were identified by the four core cities and their advisory groups. These five strategies, listed below, were prioritized for a variety of reasons, including (but not limited to) relevance to identified barriers, potential for increasing EV charging access for renters, and ease of implement in the near-term.

#	Strategies
1	Right-of-Way (ROW) Charging
2	Multi-Use Parking Arrangements
3	Education and Outreach for Building Owners and Property Managers
4	Update Building Codes and Zoning Ordinances
5	Encourage Utility Investment in EV Infrastructure

For each of these five strategies, this section of the guide will detail the following information:

Strategy Overview	
Description	High-level description of the strategy
Barriers Addressed	Specific barriers from Step 2: Identify Barriers that the strategy will address
How Renters are Targeted	Brief overview of how the strategy serves renters
City Role	Brief overview of the role the city will play in implementing the strategy
Implementation Considerations	Key steps and considerations related to the implementation of the strategy
Equity Considerations	Key steps and considerations related to ensuring the strategy is equitable
Strategy Enhancements	Additional related actions that could broaden or deepen the impact of the strategy

Finally, as noted in Step 1, strategy selection and implementation should be conducted in close collaboration with relevant stakeholders.

Strategy 1: Right-of-Way (ROW) Charging

Strategy Overview	
Description	• This strategy involves installing chargers in parking located in the public right-of-way, such as along street curbs, in alleys, or other locations owned or controlled by the city or another governmental agency.
Barriers Addressed	• Barrier 1: Lack of dedicated off-street parking • Barrier 6: Cost of using public chargers • Barrier 7: Unclear and inconsistent price structure
How Renters are Targeted	• Public charging is critical for renters who do not have access to private charging. • This strategy would primarily target renters and other residents without access to dedicated off-street parking, as well as those who have access to dedicated off-street parking but cannot install EVSE.
City Role	• Cities play a large role in the deployment of ROW charging due to their authority over the ROW. In the short term, cities will likely need to be responsible for the ownership and management of the charging stations. However, in the future, utilities or other third-party actors (e.g. EVSE providers) may have interest in owning and operating EV chargers. If the market shifts in this direction, the city will want to retain decision making authority over the ROW, including how EVSE is installed and managed in the ROW.
Implementation Considerations	• **Location identification**: Early in the process, cities should consider parameters for allowable locations for this type of charging. Potential locations may include curbside parking, municipal lots, or other parking locations that provide overnight parking for residents. Cities should also leverage data gathering from foundational work to conduct a screening process to identify priority locations for public chargers (discussed further in Equity Considerations). The City of Somerville noted it is important to consider other priorities when considering locations. When not sited strategically, EV chargers installed on curbs may interfere with other city initiatives such as tree planning bike lanes, stormwater management, and many other potential public uses. • **Updates to parking rules and regulations**: Implementation of this strategy may also need to include adjustments to and enforcement of local parking rules and regulations to allow for installation of chargers in the ROW. For example, if installed in parking spaces that normally allow long dwell times, new parking rules may need to be created and enforced to ensure higher turnover to create reliable access to more users. • **Business Model and Ownership Structure:** Cities will also need to consider potential business models and fees. Business models could include the city owning and operating the charging stations directly, or leasing allowable spaces to third parties to own and/or operate chargers (e.g. EVSE providers or utilities). For example, the City of Cambridge shared that in the near-term, the City plans to own and operate stations until a proof of concept for a viable business model has been established, which would hopefully attract third party owners when it comes to fruition.
Equity Considerations	• **Siting:** The siting of chargers will be critical to ensuring that residents in low income and predominantly BIPOC communities are in proximity of ROW

	charging. The screening process mentioned above can help identify priority locations by including parameters such as distance from existing chargers, proximity to environmental justice neighborhoods, percentage of multifamily housing, percentage of parcels without off-street parking, percentage of renter occupied versus owner occupied units, and percentage of commutes by car. • **Pricing Structure**: The prices charged to drivers for use of the equipment must be affordable and straightforward.
Strategy Enhancements	• **Serving residents instead of visitors:** This strategy could be designed to better benefit renters and other residents by prioritizing locations that require a city parking permit and/or are in residential areas to ensure that the chargers are serving residents instead of visitors.

Strategy 2: Multi-Use Parking Arrangements

Strategy Overview	
Description	• This strategy involves the promotion of multi-use parking arrangements where cities work with the owners of non-residential parking lots (e.g., public lots, places of worship, workplaces, retail locations, municipal garages, etc.) to install EV chargers. These lots can serve customers and employees during the day but also residential users at night, when the lots would otherwise be empty.
Barriers Addressed	• Barrier 1: Lack of dedicated off-street parking • Barrier 6: Cost of using public chargers • Barrier 7: Unclear and inconsistent price structure
How Renters are Targeted	• Public charging is critical for renters who do not have access to private charging. • This strategy would primarily benefit renters and other residents without access to dedicated off-street parking, as well as those who have access to dedicated off-street parking but cannot install EVSE.
City Role	• The city's role in implementing this strategy will largely depend on the lot type and ownership model that is pursued. Given the lack of a clearly profitable business model for owning an EV charger, it is likely that the city will need to fund chargers in public or private lots. However, the city could also be more focused on working with private stakeholders to facilitate the deployment of chargers in private lots, particularly if profitable business models emerge as the market evolves.
Implementation Considerations	• **Conduct stakeholder engagement:** A key initial step in implementing this strategy will be to gauge the level of interest from parking lot owners. This step could include conversations with lot owners that have already installed an EV charger to better understand their objectives, needs, and concerns. • **Update to rules and regulations**: Cities interested in this strategy may need to remove regulatory barriers, such as restrictions that disallow parking lot owners from charging a fee for use of the lot, as well as make any necessary zoning changes to allow for this kind of use within privately-owned parking lots. • **Develop guidance for lot owners**: If cities seek to spur private investment in shared parking lots, they will need to consider developing installation and siting guidance that would provide the information necessary for lot owners to install chargers on their own. Cities could also develop guidelines for EV charger management on private property. • **Provide financial support**: If private lot owners are reluctant to make the financial investment in EVSE, cities could provide financial support to organizations for installing and managing EV chargers in lots that are close to residential neighborhoods, particularly ones with limited off-street parking.
Equity Considerations	• **Location:** The extent to which this strategy is equitable will largely depend on the location of the lots (e.g. proximity to predominantly LMI and BIPOC communities). Cities will have greater ability to target certain locations by directly funding charger deployment. Cities can also target outreach and education to areas with large LMI and BIPOC communities.

	• **Pricing Structure:** Lot owners may seek to maximize profitability of chargers, reducing affordability for residents. If providing funding for charger installations, cities could consider creating rules to ensure that the fees charged for use of these charging stations are affordable and straightforward. Alternatively, a city could consider providing a subsidy for low-income residents for charging in these locations.
Strategy Enhancements	• **Education and outreach:** As chargers are installed in lots, it may not be immediately apparent to residents that the chargers are available for use. A certain level of marketing, education, and outreach would be helpful to increase awareness among residents.

Strategy 3: Education and Outreach for Building Owners and Property Managers

Strategy Overview	
Description	• Develop a guidebook for property owners that lays out the key information they need to make the decision to install an EV charger and to effectively navigate the installation process on their own property. • Conduct outreach to raise awareness for the guidebook.
Barriers Addressed	• Barrier 4: Lack of actionable information for property owners
How Renters are Targeted	• Building owners are often unfamiliar with the process to orchestrating EVSE on their property and may not know where to start. As a result, the process can be confusing and overwhelming to building owners. An education guide and associated outreach are key to providing this information. • This strategy could benefit renters who park in off-street lots owned by building owners or property managers.
City Role	• The city's role in implementing this strategy will be to develop and distribute the guidebook, including conducting outreach to building owners and tenants.
Implementation Considerations	• **Gather information**: The city will need to gather key pieces of information including: o The electrical requirements and process to assess electrical needs, including if a new meter would need to be installed o The cost of equipment and installation o Details on the permitting process o The legality and liability of peer-to-peer EV charger sharing platforms o Identification of any incentives from utilities and other financing options • **Tailor content**: Cities should tailor the information to common building types within their city, as the installation process and logistics would be different for a small multifamily building (2-3 units) than they would be for a larger apartment complex. • **Develop the guide**: This guide could cover a wide range of topics, outlined below. Cities should vet these ideas with building owners before moving forward: o A flow chart and toolkit for property owners to walk them through the process from start to finish o Different options for landlords to consider, such as embedding the cost into rent, setting EVSE up for peer-to-peer sharing, and metering separately o Benefits and added value of energy management systems o Information on the permitting process, financing options, and vendors o A list of frequently asked questions (FAQs) that property owners might want to know from installers and vendors o Assistance in selecting the right equipment to meet the use case • **Distribute the guide:** The information could be compiled into print and web materials and distributed via a diverse range of communication channels, such as mailers, outreach through partner organizations, signage around public charging stations, or information when someone registers an EV for a parking permit.

Equity Considerations	• **Prioritize outreach:** Prioritize outreach to affordable housing developers and other building owners with low-income and minority tenants. • **Highlight financing opportunities for affordable housing:** Affordable housing will face additional financial challenges as compared to market-rate apartments. As such, cities could seek to identify specific financing opportunities for affordable or low-income housing to support installation of EV chargers in these buildings. • **Target tenants:** The city should ensure the information is accessible to tenants in addition to building owners. This type of outreach will allow tenants to have conversations with their building owner and advocate for an installation process that might otherwise not happen.
Strategy Enhancements	• **Develop a technical assistance program**: The city could also consider creating a more hands-on approach by supplementing the guide with direct technical assistance for building owners. • **Complement existing programs**: An educational program could complement existing energy efficiency and electrification programs available to multi-unit dwelling owners or renters in the city. For example, Somerville's advisory group indicated that cities could consider hiring an "EV coach," similar to the coaching roles used in the Solarize and Heat Smart/Cool Smart campaigns.[29] Additionally, there is opportunity to combine an EV program with these existing programs or develop them in tandem.

[29] These campaigns are efforts to increase adoption of solar panels and air source heat pumps, respectively, by streamlining the permitting process, providing the necessary information for installation, and aggregating demand for competitive procurements

Strategy 4: Update Building Codes and Zoning Ordinances

Strategy Overview	
Description	• Update building codes and/or zoning laws to enable an expedited and more cost-effective installation process for new construction. These updated building codes can cover both residential and commercial buildings.
Barriers Addressed	• Barrier 2: Split Incentive • Barrier 3: High upfront cost
How Renters are Targeted	• EV-ready building codes add a modest cost to new construction in the near-term, but help avoid costly retrofits to install EVSE in the future.[30] • This strategy can benefit renters who will live in new apartment buildings with off-street parking or those who will live close to other new construction with off-street parking.
City Role	• Cities play a direct role in this strategy by facilitating stakeholder engagement, conducting research on best practices, and drafting updates to building codes and/or zoning laws. • In some jurisdictions, building codes are implemented at the state level, limiting the authority of cities to adopt these requirements. In these cases, the city will need to engage with the state to encourage state-level policy changes.
Implementation Considerations	• **Assess local context and levers of influence:** A key first step to implementing this strategy is to conduct research on best practices in other locations, and develop an assessment of current local building codes and zoning ordinances. With this information, cities should identify what power they have to change building codes and determine the process to change zoning and/or parking ordinances. o The City should also consider how to enforce these changes and define the timeline over which to expect compliance from property owners and developers. Internal processes, protocols, and fees will need to be structured to ensure inspections are aligned with the new requirements. • **Building codes** can include protocols to require that new construction is EV-ready or even require the installation of chargers. In some cases, building codes can be enforced for major renovations, expanding this strategy beyond new construction. • **Zoning ordinances** can be leveraged to formally define EVSE and ensure that installation is permissible at single and multi-family dwellings as well as commercial and industrial zones. They can also create incentives to install EV chargers, such as allowing an EV charger parking space to count as two spaces

[30] Canova, T. (2017). The Contractor's Guide to EV Ready Building Codes. Retrieved from: https://www.chargepoint.com/blog/contractors-guide-ev-ready-building-codes/

	toward meeting off-street minimum parking requirements.[31] Cities can also clarify in their zoning ordinances that EV chargers are an accessory use to the primary use of the site where they are installed, which can remove the barrier of needing to receive zoning board approval for EV charger installation in already-developed lots.[32]
Equity Considerations	• **Cost-Impacts**: Engagement may need to be conducted with affordable housing developers to understand the near-term impact of this strategy on development costs, and whether a state or local incentive may be warranted to offset the higher cost.
Strategy Enhancements	• **Monitor program:** Cities should ensure that new building codes and zoning ordinances are adhered to and that no unanticipated issues have arisen from the implementation of the new building codes or zoning ordinances.

[31] O'Grady, E. & Way, J. (2019). Preparing Our Communities for Electric Vehicles: Facilitating Deployment of DC Fast Chargers. NESCAUM. Retrieved from: http://www.nescaum.org/documents/dcfc-permit-streamlining-whitepaper-final-5-14-19.pdf/download

[32] Ibid.

Strategy 5: Encourage Utility Investment in EV Infrastructure

Strategy Overview	
Description	Engage with the local electric utility and public utility commission (or equivalent regulatory authority) to encourage utility investment in the deployment of public EV infrastructure that meets the needs of renters. There are multiple levels in which an electric utility may invest in and support EVSE deployment:[33] • **Business as Usual**: The utility can invest in upgrades to-the-meter (TTM), which include the distribution network, the utility transformer, and the meter. The site host invests in the electric capacity upgrades, including any construction required to connect the charger to the panel, and the EV charger. Without approval from the PUC to rate-base EVSE deployment, this is the most likely scenario. • **Make-Ready**: The utility invests in the upgrades required to make the site ready for the customer to install an EV charger (covering both TTM and behind-the-meter [BTM] upgrades). The site host is only responsible to invest in the charger. • **Owner-Operator**: In addition to the TTM and BTM upgrades, the utility installs, owns, and operates the EV charger. • **Utility Incentive**: The utility is responsible for the behind-the-meter upgrades and provides site hosts with an incentive payment to support their investment in the electric capacity upgrades and the EV charger. Utilities can either approach the public utilities commission (PUC) with a plan, which the PUC would then decide whether to approve, or the PUC could mandate that the utility come up with a plan.
Barriers Addressed	• Barrier 3: Upfront cost of home charging • Barrier 5: Unclear Payback for Installing and Maintaining Public Chargers Barrier 6: Cost of using public chargers
How Renters are Targeted	• Public charging is essential to meeting the needs of many renters, and utilities currently have the strongest business case for owning and operating EVSE. • This strategy can provide benefits for all renters by increasing the availability of public chargers for those who lack dedicated off-street parking and reducing the cost of charging for everyone.
City Role	• Given that cities are not the primary drivers of utility programs, they need to be strategic to find ways to influence increasing utility investment in EV infrastructure and impacting rate design.

[33] Cadmus (2019) Energy and Economic Development in Missouri: Unleashing Private Capital, The Energy Foundation Retrieved From https://cadmusgroup.com/wp-content/uploads/2019/02/Private_Capital_Missouri_Cadmus_02.01.2019.pdf?hsCtaTracking=e43ca9bc-45a5-417f-b201-8eac0493d48a%7Cb1cb5680-1131-4078-85a6-d15cdd901898

Implementation Considerations	Cities can influence utility investment in EV infrastructure through a variety of avenues including the following: • **Engage at the state level**: For state-level engagement, the city should identify existing municipal coalitions or other like-minded municipalities to partner with. Once a coalition has been established, the city could monitor public utility proceedings to identify opportunities to discuss EV charger deployment. • **Engage the utility directly**: Alternatively, the city, or a group of cities, could engage directly with the utility to encourage the utility to propose a rate-based EV charger deployment program to the public utility commission (PUC). For example, Portland engaged with the utility through its advisory group, who expressed openness to extend some of their existing programs to multifamily buildings. • **City-utility working groups**: Cities can elevate the needs of those who live in multi-unit dwellings through direct engagement with utilities in the form of collaborative working groups that consist of city and utility staff.
Equity Considerations	• **Encourage equitable program requirements.** Cities can encourage the integration of equitable program requirements, such as fair and accessible pricing structures on utility-owned EVSE. Cities may opt to take an active approach and engage with other local and state departments to ensure their needs are considered when decisions are being made. • **Influence equitable service delivery**: Partnership between the city and the utility should strive for equitable service delivery. Cities bring knowledge of the community, its needs, and its demographics to a utility project, while utilities can bring additional resources to support EVSE buildouts. When the two are combined, these elements can lead to a robust and equitable distribution of EV charging throughout the city. Because Investor-Owned Utilities (IOUs) have the unique ability to recover their investment costs through their rate payers, the burden on site hosts or cities to invest in EV chargers can be significantly reduced, allowing for lower-income areas to see higher deployments of EV chargers.

Program Enhancements	• **Electric rate design:** While the primary goal of utility engagement should focus on encouraging investment in EV infrastructure, cities could also advocate for more favorable rate design through the implementation of time of use (TOU) rates[34] and the mitigation of demand charges. • **Reduce soft costs:** In the absence of a utility program,[35] cities can continue to work with their utility to reduce soft costs. For example, the city could streamline the EV charger permitting process[36] or work with the utility to navigate the permitting process if another authority-having jurisdiction (AHJ) oversees the process, such as a county government. This collaboration could entice the utility to site charging in the city over other locations in their service territory.

Box 6: Example Utility Programs

San Diego Gas & Electric (SDG&E), an investor-owned utility, was one of the first examples of a successful rebate program in which the utility supported the deployment of a network of EV chargers across their territory and funded the investment through their ratepayers. Launched in 2016, their pilot program provided rebates to support the installation of more than 3,000 charging stations at 255 locations, including apartments, condominiums, and workplaces across their service territory. The program set a target to have 40% of their total installations in MUDs, and 10% in disadvantaged communities (DACs). This first phase of their pilot cost $70 million in ratepayer funds, and in 2019, SDG&E proposed a continuation of this pilot and requested an additional $58.4 million to install 2,000 more chargers.

Burlington Electric Department (BED), a municipal utility, is offering a limited-time pilot program with EVmatch that provides free electric vehicle charging stations to multifamily property owners. EVmatch is an app-based platform that enables the property owners to "rent out" EV chargers. The platform handles the payment process, offers a reservation feature, and enables the property owner to limit access to select user groups. For example, the owner of an apartment building could provide access to the general public during the day, but limit access at night so only residents can use it. The pilot program is limited to 15 EV chargers, and BED will offer an additional $500 to help cover installation of each charger that the owner agrees to make publicly available from 9am-5pm.

[34] TOU rates create varied rates throughout the day based on the anticipated supply and demand of electricity. These rates can be beneficial for EV drivers, because they often offer lower rates overnight, when demand for electricity is low. Given that the most convenient time to charge an EV for most divers is overnight, TOU rates allow EV owners to charge at lower costs in comparison to typical electricity rate structures, such as a flat rate.

[35] A utility program might not be implemented for a number of reasons, including a lack of interest from the utility, the failure of the PUC to require the utility to create a program, or the rejection from the PUC of a program submitted by the utility.

[36] Eckerle, T., Vacin, G. (2019). Electric Vehicle Charging Station Permitting Guidebook. California Governor's Office of Business and Economic Development. Retrieved from: https://business.ca.gov/industries/zero-emission-vehicles/plug-in-readiness/

Step 4: Monitoring and Evaluation

Once implementation has begun, it is important to begin the monitoring and evaluation process to support course adjustments and strategy improvements to most effectively increase renter access to EV charging.

The monitoring and evaluation process will vary by strategy, but some key best practices for designing an effective process include:

- **Identify key metrics**: At the outset of this process, cities should identify the key metrics that will enhance evaluability of each strategy and determine the best process for obtaining this data. Metrics could include things like EV uptake among renter population, percent of renters with access to home charging, percent of renters within a half mile of a public charger, and utilization of chargers over time.
- **Involve community members**: Cities could consider models that integrate community members into the monitoring and evaluation process. As an alternative to a more traditional evaluation process, cities could leverage participatory action research where community members lead the research and data evaluation process. In addition to empowering community members, this approach can provide important strategy feedback or insights and build trust among the community, local government, and implementation partners. It will be important for the city to engage all members of the community in this process, not just those who own an EV or even just those that own a car. These strategies will impact a broader audience and those voices should be included.
- **Communicate evaluation results transparently:** After the monitoring and evaluation results have been collected and analyzed, it is important to communicate and interpret these results in collaboration with key stakeholders. Depending on local circumstances, cities may wish to also report out results to decisionmakers, such as the planning commission or city council. Communicating results is most effective if they are shared in clear and straightforward messaging.
- **Involve community stakeholders in refining the approach based on evaluation findings:** Cities should work collaboratively with stakeholders to create an actionable plan to refine the strategy. This could involve community meetings, town halls, or other means of engaging the community where they can voice opinions on how best to modify the program in response to the findings.

Conclusion

Numerous cities and states across the U.S. have committed to ambitious GHG emissions reduction targets. Given that the transportation sector is one of the largest sources of GHG emissions in the U.S., a critical component to achieving these targets will be to electrify the transportation sector by transitioning from internal combustion engine vehicles fueled by gasoline to electric vehicles powered by electricity from an increasingly decarbonized grid.

Access to reliable, convenient, and affordable charging is critical to enabling EV ownership. As renters make up a significant portion of households in the United States and represent a greater portion of LMI and BIPOC households, ensuring renter access to EV charging infrastructure is key to scaling EV deployment and ensuring equitable access to the benefits of EVs. However, renters often face challenges in accessing charging due to a wide range of barriers. Without targeted interventions, many renters are at risk of being locked out of the EV transition, which creates a risk that ambitious climate and EV deployment targets will not be achieved and existing structural and distributional inequities will be perpetuated.

This guide aims to address these challenges by outlining a proposed approach and process cities can follow to increase access to EV charging for renters. It provides a proposed process to select and implement strategies to increase access to EV charging for residents who live in rental buildings, and relevant examples highlighted by the four core cities who participated in the "Enabling Tenant Access to EV Charging" project that underlies the findings of this guide. The strategies outlined in the guide include right-of-way charging, multi-use parking arrangements, education and outreach for building managers, updating building and zoning codes, and encouraging utility investment in EV infrastructure. These strategies range in the level of direct control or influence cities have over implementation and, in all cases, effective implementation of the strategies would involve collaboration with other stakeholders throughout the process.

Of course, there is not one perfect solution to increasing EV access for renters that applies to all cities. However, collectively, these strategies offer cities a starting list of options to consider as they evaluate how best to improve EV charging for renters in their local context, and thereby take steps to addressing climate change in the transportation sector. Although EV deployment remains limited in 2020, it is widely expected that EV deployment will accelerate significantly as more used EVs come on the market and the price of EVs decreases over time. Cities remain at the forefront of preparing for a transition to high levels of EV deployment and can prepare as an opportunity to strengthen advancement toward climate and equity goals.

Appendix A. Barriers Identified

Technology Barriers	
Electrical Capacity	Installing electric vehicle supply equipment (EVSE) in some buildings can require expensive electrical and infrastructure upgrades and coordination with the utility
Rate of Innovation	EV and battery technologies are still very new and expected to change/evolve quickly, leading to caution about investment in EVSE
Inconsistencies in EV Design	Charging port location across EV models is not consistent, and designing charging to accommodate a number of different designs is difficult
Metering	There are a number of different ways to meter EVSE in shared parking scenarios and this can affect cost allocations
Plug & Play Infrastructure	Few charging solutions that can be readily deployed in public EVSE scenarios
Regulatory Barriers	
Rights for Charging	Some EV drivers have encountered legal barriers to installing a charger or to accessing an outlet in a common area in their rental home
Limited Role of the Municipality	Local roles for EV charging are still unclear and municipalities often have limited authority to move unilaterally on these issues
Building Codes	Cities have differing levels of authority over building codes and zoning ordinances, and in some cases, these regulations could be regulated at the state or local level
Policy Barriers	
Tenant Charging Policy	A lack of a policy to address legal and governance barriers, e.g. right-to-charge policies.
Rental Data	Lack of information on rental properties' location and parking availability
Local Sensitivities	Every city has different priorities and any new policy to aid charger buildout should be sensitive to that (ex. parking in green spaces, avoiding crowding around chargers, avoiding loss of space for bicycle and pedestrian infrastructure, unique parking constructs)
Logistical/Practical Barriers	
Lack of Parking Spaces	Many renters do not have access to a dedicated parking space
Lack of Access to Charge (Physical)	Most renters do not have access to a regular outlet in their parking space to use Level 1 charging
Parking Space Configuration	Renters with EVs might not have parking spots next to each other to make charging easier

Parking/Car Culture	In many cities, cars have long dwell times in their parking spots which is not conducive to limited EVSE parking/charging spots
Extreme Weather Preparedness	Local weather preparedness will vary between communities (hurricanes vs wildfires vs blizzards) and will affect hardware and installation requirements
Stakeholder Engagement	Changes in multi-family buildings generally require cooperation among more stakeholders
Parking Enforcement	How can MUD owners ensure that parking spots for charging are only used by EVs and do not get "iced" - when an ICE Vehicle parks in a charging parking spot.
Equity Barriers	
Adequate Demand	Most low-income households don't consider clean vehicles as an option (due to cost and awareness) when purchasing a car and without demand in these communities it may be difficult to make the argument for public investment in charging
Community Awareness	Lack of community awareness of and access to EV models. Location of charging stations may not be as common in places frequented by low-income populations.
Internet Access	Lack of access to internet can limit low-income communities' awareness about EVs and locations for public charging
Community Uniqueness	Barriers vary significantly between communities and each solution has to be unique to a community's context, ideally involving impacted community members' input and empowerment
Financial Barriers	
Cost	EVs and EVSE cost more than traditional options available
Cash-Based Communities	A reliance on cash or lack of credit history can make it difficult to pay for charging or register with a charging service
Upfront Cost, Split Incentive	Many renters are likely to face cost barriers to installing EVSE or be unable/unwilling to invest in a capital improvement when it's not their own home; Landlords may also be unwilling to invest in charging infrastructure on their properties
Utility Rate Structures	Different electricity rates and how the EVSE is metered can significantly impact the cost to charge for residents
Transition Barriers	
Permitting Coordination	Lack of clarity on who has jurisdiction to install public EVSE, who can administer permits, and if inspections are necessary
Unclear Regulation & Liability	In some states, property owners cannot forbid residents from installing EVSE, but issues arise when determining cost allocations and residents being expected to have $1M of umbrella liability insurance
ADA Compliance	ADA compliance requirements for EV parking spots are unclear and code requirements can reduce total space available for charging infrastructure

Parking/Car Culture	In many cities, cars have long dwell times in their parking spots which is not conducive to limited EVSE parking/charging spots
Ownership of EVSE	It is difficult to decide who should own (and therefore pay) for EVSE installation and who is responsible for operations and maintenance (like snow removal in winter)
Implementation Understanding	Rental property managers and site-based facility personnel do not always understand the systems on their properties for deploying electric vehicle system equipment projects
Lack of Commercial Solutions	In the current state of the market, there are few commercial solutions with necessary features that are economically viable for public and MUD housing parking and EV charging

Appendix B. Strategies Identified

Renter Protection Policy

Description: Work with state lawmakers to develop and pass a policy that enables residents in multi-unit dwellings (e.g., rental buildings, HOAs, Condos) to install EVSE if they cover the costs and there is adequate parking available. This policy could be passed state-wide or give specific powers to the city to enforce the policy.

Role of the City: Depending on state's policy context, develop a Home Rule Petition (or similar action) that would implement a "Right-to-Charge" law in the city. A Home Rule Petition is typically an official request submitted by a city to the state legislature that would give the city a new type of power. Alternatively, the city will work with state lawmakers to pass a similar state-wide policy.

Barriers Addressed through this Strategy:
- Regulatory Barriers – Rights for Charging
- Policy Barriers – Tenant Charging Policy
- Transition Barrier – Unclear Regulation & Liability

This type of policy clearly defines who is responsible for paying for the charger and gives clear rights to renters to move forward with an installation.

Challenges with Implementation:
- Ultimately the state's legislature will likely need to approve the policy

Key Examples:
- In 2019, the state of Massachusetts signed into law the Home Rule Petition for the City of Boston, which allows Boston condo unit owners to install EV charging station adjacent to their parking spaces.
- CA Assembly Bill 2565 requires that, for any lease executed, renewed, or extended, the lessor approve a written request by the lessee to install an EV charging station in the lessee's parking spot, in accordance with the lessor's requirements. Residential properties with less than 5 parking spots are exempt from this rule.

Expanded Level 1 Access

Description: Provide guidance on how to utilize an approved cover to lay a charging cord associated with a Level 1 charger across the sidewalk in residential areas to enable curbside charging and update municipal ordinances to negate the need for a Street Use (or similar) permit.

Role of the City: Develop and release guidance on approved cover for charging cord, educate city staff on the approved use of the equipment, update ordinances, and effectively disseminate information.

Barriers Addressed through this Strategy:
- Technology Barriers – Plug & Play Infrastructure
- Financial Barriers – Cost
- Transition Barriers – Implementation Understanding; Lack of Commercial Solutions

This strategy offers a low-cost solution that is easy to understand and implement.

Challenges with Implementation:
- Issues around snow removal or other maintenance of sidewalks.
- Requires alignment across city departments on guidelines.
- Practicality regarding safety and accessibility will vary and might need to be addressed through pilot programs

Key Examples:
- Seattle released a guidance document that provides instructions on installing Level 1 charging in single family and multi-family zones. This allows residents to lay extension cords across sidewalks to charge their EV in the residential right of way using a Level 1 charger which they are responsible for providing. Charging cord covers must be highly visible, stable, and safe. If a resident complies with the requirements in the guidance document, then an additional Street Use permit is not required to charge an EV that is parked on the street. Residents need to adhere to all existing local parking regulations; failure to comply may result in removal of the equipment. The guidance document can be found here: http://www.seattleeva.org/wp/wp-content/uploads/2019/11/Seattle-curbside-charging-rules-10-1-19.pdf

This strategy offers a low cost and technologically simple solution that can be prioritized in low income communities and communities of color.

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EVSE Permitting Coordination

Description: Establish a workgroup comprised of the local utility and all state and city agencies involved in permitting and installing public infrastructure to facilitate effective coordination for an expedient buildout.

Role of the City: Establish and facilitate workgroup, provide guidance on strategies to streamline the permitting process.

Barriers Addressed through this Strategy:
- Technology Barriers - Electrical Capacity
- Transition Barriers - Permitting Coordination

By aligning all relevant stakeholders in the permitting process, the city will create clear governance guidelines, ensure adequate electrical infrastructure at potential sites, and simplify the process for installers.

Challenges with Implementation:
- Staff time will be needed to convene workgroup and attain alignment across various stakeholders.

Key Examples:
- California Governor's Office of Business and Economic Development released the "Electric Vehicle Charging Station Permitting Guidebook", which outlines key actions that local governments can take to streamline the permitting process for EVSE. See: https://static.business.ca.gov/wp-content/uploads/2019/12/GoBIZ-EVCharging-Guidebook.pdf
- California's Assembly Bill 1236 (2015) requires all local jurisdictions to adopt an ordinance with an expedited, streamlined process for permits for Electric Vehicle Charging Stations. Also requires jurisdictions to publish a Checklist that is based on the Governor's Office of Planning and Research "Plug-In Electric Vehicle Infrastructure Permitting Checklist" of the "Zero-Emission Vehicles in California: Community Readiness Guidebook".

Workgroup participation can prioritize representatives of low-income or communities of color, and/or permitting actions that prioritize building in these neighborhoods first.

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Updated Building Codes or Zoning Laws

Description: Update zoning laws or building/energy code to include EV-readiness in buildings and parking spaces where possible, and/or create a new code chapter for electrification. Advocate for EV-ready building codes at the state-level, if the city does not have authority. The new requirements should apply to major renovations in existing building and parking lots, in addition to new developments.

Role of the City: Determine authority to implement EV-ready zoning ordinances and building/energy codes. Implement ordinances and codes where possible and work with state staff where city does not have authority.

Barriers Addressed through this Strategy:
- Technology Barriers – Electrical Capacity
- Regulatory Barriers – Limited role of the Municipality; Building Codes

Adopting EV-ready requirements into building codes and zoning ordinances will reduce the cost of installing EVSE by ensuring adequate electrical capacity in affected buildings and parking spaces.

Challenges with Implementation:
- Updating zoning laws or codes can be difficult in existing areas or units of ownership; often they are grandfathered in or will receive a variance through a board of zoning appeal.

Key Examples:
- St. Paul, MN's EV-readiness plan states that a minimum of 10% of new, expanded, or reconstructed parking spots in residential and commercial areas must be EV ready.
- "Atlanta City Council has passed ordinance 17-0-165… The ordinance requires 20 percent of the spaces in all new commercial and multifamily parking structures be EV ready; it also requires that all new development of residential homes be equipped with the infrastructure needed to install EV charging stations, such as conduit, wiring and electrical capacity." See: https://www.atlantaga.gov/Home/Components/News/News/10258/1338?backlist=/

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Incentive Programs

Description: Advocate for a state or utility financial incentive program or design and develop a local incentive program to drive down the costs to install and operate EVSE.

Role of the City: Coordinate internally to locate/procure funding and develop an incentive program; or advocate for state-level action; or advocate for utility action.

Barriers Addressed through this Strategy:

- Financial Barriers – Cost

Direct financial incentives decrease the upfront cost of installing an EV charging station.

Challenges with Implementation:

- Cities will require time and capacity to identify and apply for potential opportunities.
- Allocating funding for incentives might require public funding constraints elsewhere.

Key Examples:

- Baltimore Gas & Electric (BGE) will rebate 50% of the cost of a Level 2/DC Fast Charging station and installation for use at a multifamily property. The maximum rebate is $5,000 per Level 2 port, $15,000 for a DC Fast Charger, and $25,000 per site.
- Maryland's Energy Administration Electric Vehicle Recharging Equipment Rebate Program 2.0 offers a rebate of 40% of purchase and installation costs. There is a maximum of $700 for residential, $4,000 for commercial, and $5,00 for a retail service station.
- The City of Palo Alto Utilities offers EV Charger rebates to school, multifamily, mixed-use, and non-profit owners up to $80,000 for installing Level 2 EVSE for multiple users.
- Los Angeles Department of City and Power has developed the Charge Up LA! Program, which offers rebates for office and multifamily properties for Level 2 EVSE. Rebates offer up to $5,000 per level 2 charging station and up to $75,000 per DC fast charging station.
- If the city develops its own incentive program, there are several key considerations that could help with program design:
  - Is the applicant prepared to operate the equipment in the long term?
  - Are expectations for revenue generation and utilization reasonable?
  - Will the investment be protected?
  - Does the applicant have a plan to ensure internet connectivity at the site?

Incentive programs that target low income communities can alleviate one of the primary barriers to EVSE development: the upfront cost to purchase and install the equipment.

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Creative Funding Opportunities

Description: Determine if any non-traditional funding opportunities are well suited for local communities, such as community development financial institutions (CDFIs) or Property Assessed Clean Energy (PACE) financing. CDFIs are private financial institutions that provide affordable lending for low-income and other disadvantaged people and communities, including in commercial real estate. PACE programs allow property owners to borrow money to pay for qualifying clean energy improvements and repay the amount borrowed as additional property taxes through a special assessment on the property. The loans are tied to the property instead of the owner. PACE financing is authorized at the state-level but programs are developed and implemented by local governments.

Role of the City: Explore whether there are any local CDFIs or if your state allows PACE financing. Engage with CDFIs to encourage investment in EV charging stations. Engage with city council members to opt into PACE and ensure EV charger installations are eligible for PACE financing.

Barriers Addressed through this Strategy:
- Financial Barriers – Cost; Cash-Based Communities

Through the development of unique financing mechanisms, this strategy would overcome financial barriers, particularly for communities with poor or limited credit history.

Challenges with Implementation:
- Cities will require time and capacity to identify the appropriateness of creative funding opportunities.
- Creating funding for PACE loans might require public funding constraints elsewhere.

Key Examples:
- Dublin, CA offers PACE financing for property owners to borrow funds to pay for the purchase and installation of EVSE.
- Oregon has made EV charging infrastructure eligible for PACE financing.

CDFIs focus lending efforts on low-income and other disadvantaged communities.

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Utility Investments

Description: Work with local utility to determine the feasibility of utility investment in a large-scale network build-out for multi-family residential and workplace EVSE installations. Support open Public Utility Commission (PUC) proceedings that could help reduce costs for EVSE installations or operations. This investment will spread costs across all electric customers of the utility.

Role of the City: Advocate for utility investment in electric vehicle charging infrastructure through open PUC proceedings and other public venues.

Barriers Addressed through this Strategy:
- Technology Barriers – Electrical Capacity
- Equity Barriers – Adequate Demand
- Financial Barriers – Cost, Upfront Cost/Split Incentive

A robust rate-based EV charger deployment by a utility could provide charging for disadvantaged communities that would otherwise be left behind by private investment.

Challenges with Implementation:
- City has little control over whether utility program is approved.

Key Examples:
- After receiving approval from the California PUC, San Diego Gas & Electric plans to install 3,500 EV chargers located at 350 businesses and multifamily communities throughout the region. 10% of those chargers will be located in disadvantaged communities.
- Baltimore Gas and Electric's EVSmart program will install 500 new charging stations, the first of which was installed in Annapolis, MD. BG&E is working with state, municipality, and county government agencies to implement the program.
- PG&E received approval from the PUC for 35% of their 7,500 new EV stations to be utility-owned stations in disadvantaged communities and multifamily residences.

Utility investment plans in EV Charging Infrastructure can be designed to have a specific portion of new charging stations be installed in low-income communities.

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Outreach Targeted at Building Owners

Description: Develop an outreach program that is tailored to the needs and perspective of MUD Owners. The program would cover a wide range of topics (e.g., recommended vendors list, opportunities in peer-to-peer EV charging matching programs, benefits and added value of energy management systems, business trainings to help MUD owners find value in EVSE, training on emerging business models, and low cost methods of facilitating on-site charging).

Role of the City: Identify impactful outreach venues, generate educational materials, and conduct stakeholder engagement.

Barriers Addressed through this Strategy:
- Technology Barriers – Electrical Capacity
- Equity Barriers – Community Awareness, Community Uniqueness
- Financial Barriers – Upfront cost/split incentive

The outreach program will provide valuable information to building owners about how to install and maximize use of EV chargers, making it more financially appealing for them.

Challenges with Implementation:
- There will be staff time involved in the development and delivery of the program.
- Building owners may be reluctant to participate in outreach activities.

Key Examples:
- Both Eversource and Pacific Gas & Electric have developed preferred vendor lists for EVSE installations.
- The California Plug-in Electric Vehicle Collaborative developed a EV Charging Guide for Property Owners, Managers and Homeowners Association of Multi-unit Dwellings. See: https://www.veloz.org/wp-content/uploads/2017/08/MuD_Guide_1_final.pdf
- EVMatch is a peer-to-peer network for sharing and renting private EV stations. Members can reserve nearby charging stations to get extra charge around town, near their travel destination, or at home. EVSmart also has an app that allows members to find and reserve charging stations.

This strategy can target affordable housing and MUD owners in low-income communities and help raise awareness and find value in EVSE deployments in their buildings

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Outreach Targeted at Renters/Residents

Description: Develop an outreach program that engages local communities, gauges interest in different charging options, and provides information to MUD residents about charging options (e.g. peer-to-peer EV charging network options, case studies of successful EV ownership at MUDs, right-to-charge laws, how to approach a landlord about charging, level 1 options).

Role of the City: Identify impactful outreach venues, generate educational materials, and conduct stakeholder engagement.

Barriers Addressed through this Strategy:
- Equity Barriers – Community Awareness; Community Uniqueness
- Policy Barriers – Local Sensitivities

The outreach program will increase community awareness about EVs and EV charging and allow the city to engage with communities to understand their unique needs.

Challenges with Implementation:
- Requires staff time to design program and conduct effective stakeholder engagement.

Key Examples:
- National Drive Electric Week in Watts, Los Angeles, CA was preceded by three months of organizing in the community. This outreach was supported by a local councilman and involved attending church and other religious services, where the organizers were allowed to briefly speak about the upcoming event. The event itself included ride and drives, announcements about EV charger installations, and other information on EVs.

Outreach can be prioritized among affordable housing and MUD residents to help raise awareness and find value in EVSE deployments in their buildings.

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EV Infrastructure Workforce Development Program

Description: Work with other government agencies to support the development of a program that would utilize state or local funding to create standardized accredited curricula for MUD EV infrastructure assessments and to train and certify a workforce that can complete these assessments.

Role of the City: The city can be instrumental in facilitating local workforce connections, especially to low-income communities and communities of color. The city can also assist in the development of the curricula.

Barriers Addressed through this Strategy:

- Transition Barriers – Implementation Understanding, Lack of Commercial Solutions

The program would provide a relatively low-cost option for property owners to better understand how electric vehicle charging could be deployed on their property.

Challenges with Implementation:

- Requires that the city has local workforce development connections or an ability to make those connections quickly.
- Requires participation by other agencies.

Key Examples:

- Electric Vehicle Infrastructure Training Program (EVITP) is a collaboration of industry stakeholders including: Automakers, EVSE Manufacturers, Educational Institutions, Utility Companies, Electrical Industry Professionals and key EV Industry Stakeholders… [it] was designed to provide installers/electricians with the most comprehensive classroom and hands-on training available in the EV market today. All EVITP Certified Installers must pass a certification exam for proof of knowledge and skill. https://evitp.org/
- As part of their EV Readiness Blueprint, Contra Costa held workforce training seminars to enable electricians to safely and effectively install EVSE. The curriculum for the program drew from the EVITP.

Workforce development, particularly for skilled labor, can be targeted toward people who have been unemployed, are veterans, women, people of color, people who didn't finish high school, people with a first language that is not English, or people who had past involvement with the criminal justice system.

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Utility Infrastructure Tracking Program

Description: Coordinate with local utility to develop a program to track and support deployments of utility infrastructure investments in low-income and disadvantaged communities, with an emphasis on multi-unit dwellings, to identify impacts and potential to enable the EV market in these areas.

Role of the City: Advocate in appropriate venues (e.g. PUC proceedings) for utility investment in electricity distribution infrastructure in low-income and disadvantaged communities.

Barriers Addressed through this Strategy:
- Technology – Electrical Capacity
- Financial Barriers – Cost; Upfront Cost/Split Incentive

By installing infrastructure upgrades the program would reduce the cost of installing charging stations by obviating the need for expensive electrical upgrades.

Challenges with Implementation:
- Requires staff time for advocacy.
- Requires participation by the local utility, and possibly approval of the utility regulator.

Key Examples:
- No direct examples, but some options for cities to consider:
  - Regional advocacy
  - Intervening in/commenting on PUC dockets
  - Presenting compelling case opportunities for pilots and/or finding willing hosts for them
  - The threat of municipalization

Tracking utility investments can help to identify gaps in access within communities and prioritize electricity distribution infrastructure in low-income and disadvantaged communities.

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Multi-Purpose Lots

Description: Retail, office, and municipal garages and lots can serve multi-use charging, supplying residential users at night when they'd otherwise be empty.

Role of the City: The city could remove regulatory barriers and support EVSE companies in installing EV chargers in municipal garages and lots that are in close proximity to residential neighborhoods, particularly ones with limited off-street parking. Additionally, if the city plans to financially support the deployment of public charging infrastructure, they could work with lot owners and give priority to retail and workplace locations that could serve residential neighborhoods at night.

Barriers Addressed through this Strategy:

- Logistical & Practical Barriers – Lack of Parking Spaces; Parking/Car Culture

By locating public chargers in locations that can serve two or more use-cases, the city will reduce the total number of chargers needed and can match the natural turnover of vehicles as they transition from work to home and vice-versa.

Challenges with Implementation:

- Staff time needed to identify appropriate locations for charging that can serve multiple use-cases
- Local parking politics

Key Examples:

- To provide charging for residents with no off-street parking, Boston is planning to install charging stations in six lots across the city.

Lots that are closer to disadvantaged communities, particularly those with limited off-street parking, can be prioritized. Cities could work with commercial lot owners to prioritize access to local residents at night.

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Right-of-way Charging

Description: Establish a program for installing EVSE in ROW parking spots that includes parameters for allowable locations, business models, fees, and adjustments to parking rules and regulations

Role of the City: The city could allow EVSE companies to install EV chargers in right-of-way parking or could directly fund this type of charging. The city could also make the necessary adjustments to parking rules and regulations

Barriers Addressed through this Strategy:

- Logistical & Practical Barriers – Lack of Parking Spaces; Parking/Car Culture

Locating public charging in right-of-way parking will provide overnight charging to drivers without off-street parking.

Challenges with Implementation:

- Without direct funding from the cities, chargers may not be installed. Any chargers installed by EVSE companies are likely to be in more affluent communities.
- There may be pushback in communities that are parking-constrained.
- Staff time needed to adjust parking rules and regulations

Key Examples:

- "Seattle, Washington's Electric Vehicle Charging in the Right-of-way (EVCROW) program was launched in mid-July 2017 and seeks to deploy charging equipment in the public right-of-way, especially in areas that lack off-street parking. Since its launch, Seattle has installed two curbside charging stations operated by Seattle City Light (SCL) and several additional applications are in process… The EVCROW program targets dense, transit-rich districts along major roadways… and favors locations with low penetration of EVs and EVSE, as well as sectors burdened with poor air quality. The initiative also provides guidance on street tree protection, lighting, ADA compliance, coordination with other city projects, and metering." Source: https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Transportation/19-11-Curb-Enthusiasm.pdf
- Philadelphia allows residents to install EVSE in the residential ROW through their Electric Vehicle Parking Space program. The residents needs to pay for all expenses related to the EVSE and receive approval from all neighbors who may be impacted from the installation of the equipment.

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Study Portfolio of Charging Opportunities

Description: Commission a joint charging and parking study to address questions of turnover, availability/reliability, cost, equity, and other factors.

Role of the City: The city would commission and direct the study and supply data as required by the consultant.

Barriers Addressed through this Strategy:
- Logistical & Practical Barriers – Lack of Parking Spaces; Parking/Car Culture

The study would help cities understand their specific barriers around parking dwell times, turnover, and other key factors for public charging infrastructure. This will help inform the most effective charging station solutions and locations.

Challenges with Implementation:
- It may be costly to commission the study and data may not be readily available.
- Implementation of recommendations could be politically challenging due to contentious nature of local parking policy.

Key Examples:
- WXY Studio put together this report on Planning Framework and Deployment Guidelines to offer New York City a strategy for balancing market considerations, geographic distribution concerns, technical feasibility, and urban design implications.

Studies can prioritize questions of turnover, availability, demand, and cost in more disadvantaged communities.

Community Data Gathering & Understanding

Description: Establish contextual baselines through the compilation of data and geospatial analysis to better understand renter population, differentiated needs among disparate populations, the specific barriers they need to address, and to track the equitable distribution of EVSE. Additionally develop a program to collect data on rental property locations and level of access to EV charging for each location to determine priority areas for EVSE deployment.

Role of the City: Gather data and conduct analysis

Barriers Addressed through this Strategy:
- Equity Barriers - Community Uniqueness
- Policy Barriers - Local Sensitivities; Rental Data

This action will provide valuable insight for the city on the individual needs for communities, including the location of rental properties and the availability of parking.

Challenges with Implementation:
- Requires significant staff time to gather, organize, and analyze data in a meaningful way.
- Data may be difficult to attain.

Key Examples:

While this analysis could take many forms, the city could consider sourcing data from the American Communities Survey, American Housing Survey, National Household Travel Survey, and Alternative Fuels Data Center to develop information on the density of existing charging and to create an index to identify the most suitable locations for future charger installations.

- Berkeley: As part of its Electric Mobility Roadmap, the City of Berkeley conducted a comprehensive Needs Assessment to understand it's current state and how to move forward. This Needs Assessment involved conducting an online survey of residents, interviewing representatives from underserved communities, scanning existing EV initiatives at all governmental levels, and creating a technical model with scenario analyses/geospatial analysis.
- Contra Costa EV Readiness Blueprint: To analyze current EV infrastructure landscape, Contra Costa Transit Authority mapped existing conditions and charging gaps/demographic gaps and conducted an electricity demand analysis, which involved scenario modeling to estimate EV adoption, forecasting out to 2050. The three scenarios that were modeled were the EIA Annual Energy Outlook for the Pacific Region, 80x50, and Carbon Neutral.

This type of data gathering can focus on MUDs for renters, affordable housing, and communities of color.

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Identify & Engage Stakeholders

Description: Identify the necessary stakeholders to represent each renter population and then develop workgroups to engage with them to best understand their differentiated needs and the specific barriers that need to be addressed.

Role of the City: Identify stakeholders and conduct engagement activities.

Barriers Addressed through this Strategy:
- Logistical & Practical Barriers – Stakeholder Engagement
- Equity Barriers – Community Uniqueness

This action will provide valuable insight for the city on the individual needs for communities and may provide a forum for MUD owners and renters to engage with each other towards common solutions.

Challenges with Implementation:
- Requires significant staff time to identify stakeholder groups and conduct engagement activities.
- Getting sufficient stakeholder participation can be challenging because low-income households may not have time and resources to attend events.

Key Examples:
Each city will have its own unique set of stakeholders, but some examples include: community development corporations, property management companies, landlord associations, homeowners associations, local housing authorities, and tenant coalitions.

- In developing their Electric Mobility Road Map, the City of Berkeley met with residents and community representatives as a key first step towards understanding mobility gaps for a range of stakeholders.

There is significant opportunity to work more closely and on a longer-term basis to understand individual contexts associated with barriers and potential strategies in individual MUDs, affordable housing units, and other disadvantaged rental properties. Each renter faces their own challenges and priorities associated with individual lifestyles and local context. CADMUS