



TRANSPORTATION & CLIMATE INITIATIVE

Of the Northeast and Mid-Atlantic States

[HOME](#) [ABOUT](#) [OUR WORK](#) [NEWS](#) [CONTACT US](#)

Home

Creating EV-Ready Towns and Cities: A Guide to Planning and Policy Tools

This report provides guidance to practitioners at all levels of state and local governments wishing to take action to implement EVSE deployment in their jurisdictions. It provides discussion and guidance regarding the steps to create, administer, and amend planning processes, rules, and regulations, and explores the potential for jurisdictions to encourage EV charging station installation and use. Tools to promote EV-friendly zoning regulations, parking ordinances, building codes, permitting practices, and partnership and procurement are explored, and examples of streamlined approaches are provided.

Public Document File:

 [EVSE_Planning_and_Policy_Tool_Guide.pdf](#)

*Selected pages
attached.*



**TRANSPORTATION &
CLIMATE INITIATIVE**
Of the Northeast and Mid-Atlantic States



GEORGETOWN CLIMATE CENTER

CREATING EV-READY TOWNS AND CITIES: A GUIDE TO PLANNING AND POLICY TOOLS

ELECTRIC VEHICLE SUPPLY EQUIPMENT SUPPORT STUDY

Prepared for:

New York State Energy Research and
Development Authority
and
Transportation and Climate Initiative

Prepared by:

WXY Architecture + Urban Design
and
Energetics Incorporated

November 2012

CONTENTS

Acknowledgements	iv
List of Abbreviations	v
Executive Summary	vi
Creating Electric-Vehicle-Ready Cities and Towns:.....	1
A Guide to Electric Vehicle Planning and Policy Tools	1
Policy and Planning Tools for EV Readiness	4
Tool 1: ZONING.....	7
Tool 2: PARKING.....	12
Tool 3: CODES.....	16
Tool 4: PERMITTING.....	19
Tool 5: PARTNERSHIPS AND PROCUREMENT	24
Summary.....	29
Appendix A: Overview of Electric Vehicle Supply Equipment Charging Levels.....	34
Appendix B: Gaps and Opportunities	35
Appendix C: Zoning.....	38
Appendix D: Parking	42
Appendix E: Codes	43
Appendix F: Permitting.....	48

EXECUTIVE SUMMARY

Battery and plug-in hybrid electric vehicles (EVs) are becoming an important part of the transportation landscape. EVs offer clear environmental, economic, and energy benefits to communities of all sizes, and as consumers become aware of these benefits, EV purchases will rise.

Anticipated growth in the EV sector creates a need to facilitate and encourage the development of a consistent and accessible network of EV charging infrastructure (known as electric vehicle supply equipment, EVSE), including at home, on public streets, and in commercial settings. While the full extent of EV charging demand is not yet known, communities can take proactive steps to encourage infrastructure development.

This guide is meant for local governments to use as a resource to help their communities become EV-Ready. The report takes an in-depth look at five policy tools that can enable EV readiness: zoning and parking ordinances, codes, permitting, and building interagency or business partnership. An overview of each of these tools is provided, and best practices are explored.

Key Findings

Zoning

- Zoning is a necessary part of EV readiness, but it has inherent limitations.
- Defining EVs and EVSE as a permissible use in zoning regulations is a first step on which decision makers can build future regulations.
- By setting development standards through zoning ordinances, municipalities can use this tool to shape the scope of EVSE deployment.
- Incentivizing zoning, such as the exchange of development bonuses for the inclusion of EVSE pre-wiring or infrastructure in new development, is a potential method to increase EVSE deployment, but it remains largely untested.

Parking

- Regulation of EVSE through parking ordinances can set the scope and enforcement requirements for parking with state or local laws.
- Parking ordinances can be effective tools in encouraging EVSE in a wide range of installation scenarios, including public and private space as well as new and existing construction.
- Parking ordinances work hand-in-hand with parking management (whether public or private) to enforce regulations on the use of parking spaces, including EV charging-only spots.
- Opportunities exist for private parking management and for developing EV parking incentives, such as preferred parking, which may encourage EV purchases.

Codes

- No changes to the national model codes are currently necessary to ensure user or installation safety for level 1 and level 2 charging.
- Codes can be used to provide consistent and flexible options to regulate for EVSE. This can include setting development standards, such as requirements for a certain number or percentage of EVSE-designated parking stalls.
- Code changes will require buy-in from the development community, but precedents indicate costs will not increase dramatically.
- Municipalities that are able to adopt their own codes benefit from a highly flexible state code—one that provides different standards for different situations.

Permitting

- Several municipalities have found their existing permitting sufficient through defining EVSE installations as “minor” work.
- Most permitting expediting efforts have focused on a “standard” single-family home installation, but future efforts should seek to facilitate more complex installations and installations in multifamily and commercial settings.
- Reducing permitting fees for EVSE should start by eliminating unnecessary administrative and inspection steps.
- Fee standardization benefits consumers and is useful to electricians quoting prices.

Partnership and Procurement

- Having a diverse set of partners in EV-readiness planning is important because it can strengthen the EV markets. Expertise and dissemination of information are necessary for new technologies to catch on. This is often best accomplished by working with public, private and non-governmental organizations dedicated to EVs.
- Creative business partnerships will be crucial to the future of EVSE deployment. Many businesses may be attracted to hosting EVSE because of branding opportunities. Nurturing business partnerships may reveal new business models that promote EVs and benefit the business community.
- Private-sector innovation and investment will continue to shape the EV market.
- The public sector can encourage this development and reduce public expense by establishing procurement programs and policies for equipment and services.

These tools comprise potential approaches at the local level that can work alone or in combination to implement EV-ready policies. For the region, bridging local boundaries to create a coordinated infrastructure network poses the next challenge to meeting the needs of the growing EV sector.

CREATING ELECTRIC-VEHICLE-READY CITIES AND TOWNS: A GUIDE TO ELECTRIC VEHICLE PLANNING AND POLICY TOOLS

The delivery of a vehicle charging network and electric vehicle supply equipment (EVSE)¹ required by the growing number of electric vehicles (EVs) in the Northeast and Mid-Atlantic states² will need to be supported by government and planning organizations, in collaboration with the private sector.

This guide will demonstrate, using examples and ideas from cities and states already making themselves more EV-ready, what policy tools can be utilized to make sure that EVSE is allowed; encouraged through voluntary actions, incentives and easy and affordable administrative processes and, where possible, required in new construction.

The guide considers key regulatory areas—zoning, parking, codes and permitting—and the creation of opportunities for both the public- and private-sectors to work together and lead EV-ready initiatives. As these tools are readily available to local jurisdictions, this guide analyzes each regulatory area in detail to determine how they can be effectively used for EV-ready planning. Identifying the actionable policy and planning levers for local jurisdictions and offering precedents will help the Northeast and Mid-Atlantic states to encourage EV use and to achieve a level of regional cohesion for EV charging.

Why Take Action?

EVs offer clear environmental, economic and energy benefits to communities of all sizes. Action to encourage greater EV usage through a more EV-ready environment can bring the following benefits:

- Reduction of petroleum consumption
- Reduction of air pollution that can cause cancer and other serious health effects including cardiovascular and respiratory problems such as asthma, especially in children and the elderly³
- Reduction of greenhouse gas (GHG) emissions that contribute to global warming, in line with local, state and federal goals
- Improvements to soil and water quality through the reduction of pollutants in stormwater runoff⁴
- Anticipated economic development benefits in the form of business and job growth in the EV and transportation equipment industries, reduced losses associated with carbon emissions⁵ and potential property value increases due to air quality improvements⁶ and sound minimization
- Improvements to the status of national energy independence and fuel cost savings to individuals and jurisdictions

While the full extent of EV charging demand is not yet fully determined, there is a clear need for EV

¹ EVSE is commonly referred to as a charging station; both terms are used in this guide.

² See the companion study, *Assessment of EVSE and EV Deployment*, for more detailed information on the current status of EVs and EVSE in the Northeast and Mid-Atlantic United States.

³ "Particulate Matter: Health," U.S. Environmental Protection Agency, updated June 15, 2012, <http://www.epa.gov/pm/health.html>.

⁴ Federal Highway Administration, "FHWA Environmental Technology Brief: Is Highway Runoff a Serious Problem," updated July 19, 2012, <http://www.fhwa.dot.gov/publications/research/infrastructure/structures/98079/runoff.cfm>.

⁵ Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866* (Washington, DC: U.S. Environmental Protection Agency, February 2010), <http://www.epa.gov/oms/climate/regulations/scc-tsd.pdf>.

⁶ Kenneth Y. Chay and Michael Greenstone, "Does Air Quality Matter? Evidence from the Housing Market," *Journal of Political Economy* 113, no. 2 (April 2005) 376–424.

infrastructure. The development of a consistent, accessible charging network would enable EV owners and communities to accomplish the following:

- Charge at home, at work and in commercial and public locations
- Extend vehicle range
- Better integrate EVs into regional transportation networks
- Encourage more widespread EV adoption

What is the Purpose of the Guide?

The EVSE Resource Guide highlights best practices and new actionable ideas from across the Transportation and Climate Initiative (TCI) region, North America and beyond. Best practices are typically defined as those methods or approaches that have consistently generated the desired results. Relying on best practices for EV and EVSE deployment planning presents an interesting problem: the approaches are often too new to be sure of their effectiveness. As a result, each town, city or metropolitan area should closely consider, based on applicability, many of the examples and potential solutions offered by the guide. Because of the chicken-and-egg nature of planning this type of decentralized transportation infrastructure, jurisdictions must take the lead in clearing regulatory pathways to make room for the adoption of EVs and deployment of the necessary infrastructure in order to ensure the possibility of market uptake of EVs. The primary focus is to identify opportunities for local action in the TCI region.⁷

The purpose of this guide is to provide discussion and guidance to practitioners from government and the private sector regarding the limitations

⁷ TCI is a collaboration of the transportation, energy and environment agencies from the 11 Northeast and Mid-Atlantic states and Washington, D.C., focused on reducing GHG emissions from the transportation sector. The following states have jurisdictions participating in this TCI project: Connecticut, Delaware, DC, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont. They will be referred to throughout this report as the TCI region. TCI states work closely with 16 of the region's Clean Cities Coalitions through the Northeast Electric Vehicle Network.

and opportunities associated with local planning and administrative processes that relate to EVSE deployment, using these tools as a framework for local action.

The guide will demonstrate pathways to EV readiness. For the purposes of this document, EV readiness can be interpreted at minimum as the removal of barriers to easy, safe and cost-effective EVSE installation. At maximum, local jurisdictions can use the tools available in order to influence the scale and character of EVSE deployment, including working with regional entities such as local Clean Cities Coalitions, Councils of Government (COGs) and Metropolitan Planning Organizations (MPOs).

Who Should Use the Guide?

This guide will identify and describe the most relevant tools to local governments and provide guidance to practitioners at all levels of state and local government wishing to take action to encourage EVSE deployment. It will help public and private installers of EVSE, developers and other private-sector actors understand the context of proposals to install EVSE. It will help regional planning organizations working to incorporate EV-ready planning into transportation planning priorities. Finally, it will help private stakeholders understand how their efforts might be bolstered through policy changes.

You will find the guide useful if you are a policy maker who develops, enacts or enforces strategic plans, regulations and legislation or an industry stakeholder or member of an interest group from the private sector.

Unlike location-specific EV-ready plans, the guide takes a wider approach by offering a menu of best practices from across the country and abroad that can be applied to the specific local needs and conditions of the TCI region. Variations such as geography, demographics, administrative structures and presence of existing markets for EVs and EVSE preclude a sweeping regional approach at this stage of EV planning.⁸ Further, the integration of EVSE into the built environment will require engagement from policy makers at

⁸ These demographic and market differences are explored in more detail in the companion report, *Assessment of Current EVSE and EV Deployment*.

Table 1: EV Planning and Policy Tool Summary

ZONING	<p>Determines where and how EVSE is allowed, incentivized or required</p> <ul style="list-style-type: none"> • Zoning establishes allowable uses through the municipal zoning code • Zoning can consider the deployment of EVSE within the larger context of planning and land use • Incentive zoning, such as the exchange of development bonuses for the inclusion of EVSE pre-wiring or infrastructure in new development, is a potential area for EVSE deployment, but it remains largely untested • By setting development standards through zoning ordinances, municipalities can use this tool to shape the scope (how many and where) of EVSE deployment
PARKING	<p>Sets the scope and enforcement requirements for parking with state or local laws</p> <ul style="list-style-type: none"> • Parking ordinances apply to publicly accessible EVSE, including on-street parking and municipal lots and garages, and are therefore an important part of infrastructure development • Similar to zoning, parking ordinances provide a way to require a certain number or percentage of spaces and to restrict the use of charging stalls to EVs • Because parking ordinances apply to the public realm, parking tools can be effective in encouraging EVSE in a wide range of installation scenarios, including public and private space as well as new and existing construction • Opportunities exist for private parking management • Opportunities exist for developing EV parking incentives, such as preferred parking, which may encourage EV purchases
CODES	<p>Ensure safe EVSE installations and specify the scope of EVSE-ready construction</p> <ul style="list-style-type: none"> • Changes to the building and electrical codes are not necessary from a safety standpoint, but codes can help make places EV-ready • State and local codes may need to change to meet certain requirements, such as emissions reduction goals. This is an ideal opportunity to incorporate EVSE • Municipalities that are able to adopt their own codes benefit from a highly flexible state code—one that provides different standards for different situations • Building and electrical codes present different EV-ready opportunities
PERMITTING AND INSPECTION	<p>Streamlines the administrative process so that it is uncomplicated, fast and affordable</p> <ul style="list-style-type: none"> • Updating and streamlining permitting eases implementation of EVSE and reduces fees to the consumer as well as costs to the municipality over the long term • Permitting is a local administrative process. As a result, the process varies across the TCI region, as evidenced by wide variations in permit fees • While the prime inspection venue is provided by cities and state offices, third-party inspection firms offer opportunities for partnership and inspector training throughout the TCI region
PARTNERSHIP AND PROCUREMENT	<p>Works closely with private or quasi-public partners to implement infrastructure in the public realm</p> <ul style="list-style-type: none"> • Partnerships include working groups, which can unite government agencies with private industry and experts • Regional planning organizations such as MPOs and COGs are important for building consensus and getting the word out • Local U.S. Department of Energy Clean Cities chapters can offer additional funding and information on EVs • Governments can procure EVs for municipal and state fleets to increase awareness and meet sustainability goals • The role of the private sector can be just as, if not more, important in preparing the region for more comprehensive EVSE deployment

TOOL 1: ZONING

Zoning is a form of local ordinance that governs the use of property within local jurisdictions. Zoning for EVSE will need to consider the existing methods and technologies available for EV charging, and potentially think ahead to proactively address developing technologies and installation scenarios.¹² Zoning ordinances are enacted locally, occasionally in order to comply with state mandates.¹³ Zoning regulates land uses and sets parameters for different types and intensities of land uses, as well as the requirements asked of developers. As a result, zoning establishes expectations of developers by specifying what types of uses are allowed and the character of new development. In this way, zoning changes impact future construction, with the exception of changes to permissible uses, which allow EVSE as accessory uses in existing development.

As a tool for local governments in infrastructure planning, zoning ordinances are used to indicate where EVSE is allowed or prohibited.¹⁴ Zoning is a long-term tool, not a shortcut to accelerating infrastructure deployment. Because of the long-term nature of zoning changes and the development process, jurisdictions should prioritize zoning changes that may be necessary to allow EVSE in appropriate locations in order to achieve timely results.

¹² Different types of EVSE may have different zoning implications. Levels 1 and 2 charging, illustrated in Appendix A: Overview of Electric Vehicle Supply Equipment Charging Levels, will be the dominant case to consider for zoning today. Level 3 charging is still in development, and will likely be useful in roadside or commercial applications that will require different zoning considerations from levels 1 and 2 residential and commercial applications. Future technology and business models will shape the ways in which EVSE best fits into zoning districts.

¹³ As in the case of Washington State's mandate that local jurisdictions allow EVSE.

¹⁴ In general, zoning ordinances regulate the use of land, setting standards for specific primary and secondary uses, building area and height, lot coverage and street setbacks. Other requirements dictated by zoning include residential density, parking spaces required, open space, signage, the nature of a building's street frontage.

Zoning is seen as one of the bigger “question marks” in planning for EVs and EVSE. The connection between zoning ordinances and EV readiness is not as clear-cut as the other tools described in this guide. Zoning is a “blunt tool”: it alone will not facilitate EVSE deployment, but the potential for it to prohibit or preclude EVSE is a factor every town should consider. Zoning is an important step toward EV readiness, but additional measures are needed. Localities should review local zoning ordinances to ensure that EV charging stations are permitted under existing regulations. Changes to zoning may also assist localities in incentivizing or requiring EVSE or characteristics of EVSE deployment.

There are several examples of EV-specific zoning ordinances that have been tested to date. A 2010 EV-readiness study by the Puget Sound Regional Council (PSRC) found that no city in the United States had adopted any comprehensive building or zoning ordinance that addressed EV charging at that time; it was far more likely for a place to have pursued parking ordinances as a form of regulation.¹⁵ Similarly, in 2011, TCI was not aware of any jurisdiction in the Mid-Atlantic or Northeast regions that had adopted zoning ordinances addressing EVSE.¹⁶ However, several large and small municipalities—from New York City to Methuen, Massachusetts—were taking steps to introduce EV-specific zoning regulations.

¹⁵ Puget Sound Regional Council, *Electric Vehicle Infrastructure: A Guide for Local Governments in Washington State* (Olympia, WA: Washington Department of Commerce, July 2010), http://psrc.org/assets/4326/EVI_full_appendices.pdf.

¹⁶ Cassandra Powers, TCI.

What can Zoning Accomplish?

Zoning actions should include the following to support EVSE and EV readiness in the TCI region:

- Ensure the zoning resolution or ordinance permits EVSE in logical locations
- Establish clear definitions for EVs and EVSE, as well as the use groups¹⁷ for EVs and EVSE
- Consider relevant comprehensive planning frameworks
- Set out high-level criteria for design, accessibility and parking enforcement
- Consider impacts of EVs on GHG and other emissions with respect to environmental review processes

Zoning should function to support any applicable plans that may be in place. A comprehensive plan or EV agenda could be used to indicate where EV charging stations should be allowed, concentrated, and required. In general, zoning ordinances should account for projected development over a long period of time and guide EVSE deployment. Currently, investment and grant funding has provided opportunities for cities, counties and states to prepare EV-readiness plans, and zoning should be a consideration when planning for and locating EVSE.

Compliance with Federal and State Legislation

Requirements to create plans, such as for transportation, energy efficiency or reducing GHG emissions, often come from federal and state governments. For example, federal transportation funding for MPOs is often linked to a long-term plan. Some existing state legislation defines EVs and EVSE, and in some cases it indicates the scope of EVSE deployment.

States considering the requirements of EVs and EVSE have determined that an early step is to clarify what, exactly, these new technologies are and where and how many might be needed. Local jurisdictions planning for EVs will need to comply with or exceed any applicable state requirements. In addition to EVSE-specific rules, states may also establish environmental requirements. GHG or air quality emissions targets are especially relevant and local governments should be aware of how

¹⁷ Use groups refers to a designated group of land uses that are considered to be allowed as-of-right.

opportunities in their jurisdictions fit into the bigger picture of environmental planning.

The Role of Zoning in EVSE Deployment

Planners and other officials can use zoning to allow, incentivize or require EVSE either throughout a municipality's zoning districts or in specific areas. The remainder of this section discusses examples of each approach.

Allow EVSE

Defining EVSE in the local city planning and land use context is a good first step that a handful of jurisdictions have taken to ensure that EVSE installations are allowed. By incorporating language specific to EVSE and/or battery swap stations in the local zoning ordinance, local planning offices can help clear barriers to installation by answering a simple question in the zoning text: What is EVSE?

New York City's Department of City Planning reviewed EV charging and battery swap stations and determined that a distinction was needed to create clarity in the zoning text to ensure vehicle battery charging was codified as a use distinct from gasoline filling stations. In the New York City Zoning Resolution, this pointed to a need to include battery charging in a distinct use group.¹⁸ The city's "Zone Green" zoning text amendments, enacted by the New York City Council in April 2012 defines "electric vehicle charging in conjunction with parking facilities" as an accessory use in the New York City Zoning Resolution. It places EV charging stations and battery swap facilities in a use group for "Auto Service Establishments." This includes such facilities as automobile glass and mirror shops and tire sales establishments but not petroleum fuel filling stations, which allows EVSE in any drive-in property/use in a commercial district. For New York City, this designation supported city efforts to deploy infrastructure without being overly prescriptive.

New York City provides an instructive example, but the type of zoning district and use group categories will differ from place to place. Local resolutions will account for permissible uses, based on zoning districts (e.g., residential,

¹⁸ Howard Slatkin, interview, August 29, 2012.

commercial and industrial), special districts and potentially on the level of charge.¹⁹ Including clear definitions and provisions for where EVSE is allowable as-of-right (or by right)²⁰ will limit barriers associated with development review. These definitions will allow the developer to avoid the costs of seeking special approvals for changes such as by rezoning, special permit or variance, all of which require a public review process.

In the Region: Methuen, Massachusetts in 2011 adopted an addendum to the city zoning resolution that specifies permissible use of levels 1 and 2 charging stations in single-family and multifamily zones.

- Levels 1 and 2 are permitted as accessory uses to parking facilities in all areas.
- Level 3 or DC fast charge is permitted as a principal use in commercial or industrial zones or as a conditional use in general.

See <http://www.cityofmethuen.net> for more information.

State legislation can require local jurisdictions to adopt zoning provisions for EVSE, such as Washington State's requirement that EVSE and battery swap stations be designated as permissible uses in certain types of zoning districts throughout the state. Washington State offers an example of a targeted approach to infrastructure location, requiring local jurisdictions within a buffer zone surrounding the state's primary transportation corridor and population centers to adopt zoning ordinances allowing EVSE and battery swap stations. Jurisdictions in Washington must develop regulations to allow the use of EVSE and battery swapping stations in all areas except for critical areas or those areas

¹⁹ Please refer to Appendix A: Overview of Electric Vehicle Supply Equipment Charging Levels for an overview of charge levels, and to the Siting and Design Guidelines prepared in conjunction with this toolkit for a discussion of site-specific concerns and constraints.

²⁰ As-of-right or by-right development is development conducted in accordance with existing zoning, and which does not require additional review, variance, approval or planning permits from the local authority. Note: electrical installation permits are a separate tool and process.

zoned for residential or resource use.²¹ The regulatory framework stems from research and state-level legislation spearheaded by the Washington Department of Commerce and allows localities to adopt the appropriate changes to zoning in order to be in compliance. Examples of jurisdictions' various responses to this mandate are instructive because they reflect the value of zoning as a local tool.

Incentivize EVSE

Incentive zoning provides a bonus, such as in the form of additional floor area, in exchange for the provision of a public amenity or community improvements. In New York City, for example, bonuses are provided for public plazas, cultural venues, subway improvements, theater preservation, and grocery stores in particular areas and affordable housing units.²²

In the case of EVSE, a developer incentive would be exchanged for EVSE pre-wiring or charging station installation. Typical developer incentives include an increase in allowable floor area or a reduction of required parking. EVSE is the public benefit, and the incentive would be the increased density, reduced parking or other incentive to encourage the inclusion of EVSE in new construction. Zoning ordinances could define priority areas where EVSE may be required and/or supported by programmatic incentives to install EVSE. The nature of the incentive would be outlined in the zoning ordinance as well.

Zoning incentives are an interesting but largely untested area of local regulation for EVSE. Several ideas gleaned from stakeholders are included below; however, in general it should be noted that a lack of clarity in this area is to be expected at this point in the development of the EV market. Jurisdictions and private industry have not completely decided on the value of EVSE or charging station units to the public; Methuen, MA in fact disincentivizes EVSE by counting electric

²¹ Patti Miller-Crawley, phone interview, July 18, 2012. See also the Western Washington Clean Cities Coalition and Washington State Plug-In Electric Vehicle Task Force's "Plug-in Electric Vehicle Readiness Plan for the State of Washington" (September 2010) at <http://www.electricdrive.wa.gov>.

²² Department of City Planning, "Zoning Glossary," City of New York, accessed November 9, 2012, <http://www.nyc.gov/html/dcp/html/zone/glossary.shtml>.

TOOL 2: PARKING

Parking ordinances will apply to publicly accessible charging stations. EVSE in the public realm, such as on-street locations, municipal lots and even privately operated garages will make up an important part of the necessary charging infrastructure for EVs. Parking regulation and enforcement is typically a shared responsibility in municipalities, requiring participation of departments of transportation, law enforcement, public works, permitting and other key players in the management of transportation and traffic. These stakeholders also include neighborhood associations, parking garage managers and others who by law or voluntarily participate in this area of regulation.

The municipal code can utilize parking ordinances and management as a tool to address a number of aspects of EV charging infrastructure: the scope of EVSE pre-wiring or installation from a transportation and logistics perspective; on-street EV charging and parking and how best to manage user rotation, access and violations.

Parking ordinances will operate in close association with management plans for parking lot or garage operators that open to the public. Given the existing subsidies for businesses and private operators and the lack of extensive municipal funding to support EVSE installation, parking managers may take a lead role in making decisions about the way EVSE is made available to the public.

In general, EV charging has become almost synonymous with parking regulation—EVs will need to park in order to charge. A discussion of how parking management contributes to EVSE deployment will engage the following key ideas:

- Incorporation of EVSE in the public right of way
- Safety and accessibility
- User rotation or “linger time” and etiquette
- Violations of posted parking rules and enforcement
- Site design
- Monetization and business models

State Regulations for Scope and Enforcement

Parking regulations impact the scope of EVSE readiness in a given place and can specify how many and where EVSE charging stations are required or encouraged.

Hawaii: Plug-In Electric Vehicle Parking Requirement

In Hawaii, all parking facilities that are available for use by the general public and include at least 100 parking spaces must designate at least 1 parking space specifically for electric vehicles by July 1, 2012, provided that no parking spaces required by the ADA Accessibility Guidelines are reduced or displaced. Spaces must be clearly marked and equipped with EVSE. Owners of multiple parking lots may designate and install EVSE in fewer parking spaces than required in one parking lot, as long as the total number of aggregate spaces for all parking lots is met. Penalties apply for non-EVs that park in spaces designated for EVs.³²

Local Parking Ordinances

Some local jurisdictions have in fact chosen to regulate use more directly; that is, to use the municipal code to establish parking ordinances that prohibit parking in an EV-charging space except for EVs utilizing the charger.

Lacey, Washington

The city of Lacey, Washington, enacted EV infrastructure requirements that restrict the use of specially designated charging stalls as EV charging

³² “Senate Bill 2747 SD1 HD2,” Hawaii State Legislator, accessed November 9, 2012, http://www.capitol.hawaii.gov/measure_indiv.aspx?billtype=SB&billnumber=2747; Department of Business, Economic Development and Tourism, *Hawaii State Energy Office EV Ready Fact Sheet* (Honolulu: Hi, State of Hawaii, March 2012), http://energy.hawaii.gov/wp-content/uploads/2011/09/DBEDT-EV-Fact-Sheet-MAR-2012_final.pdf.

only.³³ This local law adds parking enforcement to the zoning regulations required by the Washington State.³⁴

On-Street Parking

On-street EVSE will require cooperation of the owners of the electrical infrastructure at the installation site—generally the city or the owner of the adjacent building.

Zoning regulations typically do not apply to the public right-of-way, which would fall under a city's department of transportation or other similar agency's purview. In New York City, rules can dictate requirements for accessory parking and public parking, with an "increasingly important gray area in between."³⁵ The issue is that density of development and use generates a need for highly flexible parking. The "gray area" includes on-street parking. In some areas of New York City, more than 50% of residents with cars park on the street. There are important ongoing questions as to how parking ordinances and management can not only maintain order for publicly accessible stations, but also provide home charging solutions for EV drivers who do not have easy access to an outlet or charging station.

Parking Management

There is a need to establish a clear process and determine which agencies will handle the logistics of EVSE charging spaces in the public realm—and in publicly accessible lots and garages.³⁶

Local jurisdictions are primarily responsible for implementing parking and incentive structures most appropriate for local markets. This responsibility includes both enforcing regulations and working with private-sector partners such as garage operators who will enforce regulations on their property. Parking management thus refers to both enforcement in public areas and operations

³³ City of Lacy, *Ordinance No. 1351* (Lacy, WA: City of Lacy, August 16, 2010), <http://www.mrsc.org/ords/l32o1351.pdf>.

³⁴ Syracuse, NY is another municipality that has taken similar steps.

³⁵ Howard Slatkin, interview, August 29, 2012.

³⁶ Mary Doswell, Dominion Resources "What Municipalities Need to Know," presentation, February 4, 2011.

of private entities providing EVSE charging and parking.

Enforcement: EV Parking Regulation

In California, an individual may not stop, stand or park a motor vehicle, or otherwise block access to parking, in a stall or space designated for the exclusive purpose of charging an EV unless the vehicle displays a valid state-issued zero-emission vehicle decal and is connected for electric charging purposes.³⁷

By contrast, after analysis of proposed, similar legislation, some states have determined that in areas where EV markets are not yet strong it is too early to regulate enforcement of EV parking at the state level.

Similar to all traffic statutes, statutes prohibiting parking by non-EVs or non-charging EVs can be enforced in any publicly accessible lot or garage in most municipalities, if such a statute is approved in a jurisdiction. An example from the TCI region that attempted to regulate parking in this way is a bill that was proposed in Maryland that would have made it illegal for a non-EV to park in an EV-designated space. While the bill was being discussed, the concern was raised that an ordinance that restricts parking may deter use at that lot. Upon review by the EV Council in the state, the resolution was determined premature at this point. An important takeaway from Maryland's experience is that there is likely already law on the books that allows a car parked illegally for any reason, based on the signage at a particular location, to be towed.³⁸

Accessibility

It will be necessary to create spaces and routes that are safe and accessible to drivers, who will spend more time than usual maneuvering around a parking space in order to connect and disconnect. Planning for accessibility must at minimum limit tripping hazards and other liability concerns, and should also consider ways to meet ADA compliance standards.

³⁷ California Department of Motor Vehicles, "V C Section 22511 Off-Street Parking: Electric Vehicle," CA.gov, accessed November 9, 2012, <http://www.dmv.ca.gov/pubs/vctop/d11/vc22511.htm>.

³⁸ Meg Andrews and Kristen Weiss, Maryland State Department of Transportation, interview, August 18, 2012.

Private-Sector Participation in Local Parking Options

Parking enforcement for designated EV-charging-only spaces is also a developing function of the private sector, both in cooperation with the public sector and with other private businesses, including EVSE network providers. Retail operators and parking lot managers are particularly well positioned to utilize private parking lots and garages to pilot EV-only parking. Public-private partnerships have manifested in a handful of arrangements. In London, for example, the NCP parking garage company has agreed to enforce EV-only parking based on the citywide initiative laid out in the Plan for London.³⁹ In a more local example of voluntary parking management agreements, experience with other types of designated spaces was considered. In the northeast United States, the supermarket chain Price Chopper has instituted EV-only parking with charging stations that include a marketing-oriented solar-canopy design. The company has based its site design on customer experiences associated with other types of designated parking, such as the store's "New Mom" parking spaces, which are located near store entrances.⁴⁰

Parking as Incentive for Host and User

The management of parking spaces will involve the motivation of the EVSE host: green branding, customer amenity and Leadership in Energy and Environmental Design (LEED) certification are just a few reasons that will determine where and how a parking operator, public or private, will locate the EVSE within the lot or garage.

Parking location can be an important EV user incentive. Accessible and visible charging stations can be amenities to customers.⁴¹

³⁹ The London Plan website, <http://www.london.gov.uk/thelondonplan/>; Ominiya Giwa, Transport for London, interview.

⁴⁰ Joseph Berman, LEED AP, Price Chopper Environmental Certification Specialist, interview, July 25, 2012.

⁴¹ Many stakeholders indicate that choosing spaces near building entrances for EVSE may result in non-EV owner resentment. In addition, locating EVSE-only spaces near front building entrances often results in higher installation costs since the main electric power line to a commercial building is most often in the rear of the building and must be extended at considerable additional costs.

New York State Energy Research and Development Authority Funds Public-Private Pilots

A few examples of the possibilities for public-private partnerships and private-sector participation in providing publicly accessible EVSE come from New York State, where the New York State Energy Research and Development Authority (NYSERDA) has recently announced recipients of \$4.4 million in EV and EVSE grants throughout the state. Among these programs, several pilot projects target parking management:

- Beam Charging LLC will install 28 charging stations, each in a separate public parking garage in New York City, and will gather data to study how such stations are used.
- Car Charging Group Inc. will install charging stations at 15 high-traffic locations in New York City, targeting apartment dwellers. The garages will be those used primarily for monthly parking.
- Access Technology Integration Inc. will install charging stations with innovative reservation and payment systems at seven locations in and around Albany, including a variety of installation contexts, such as hospitals, transportation hubs, universities and retail.

Source: "Governor Cuomo Announces Deployment of 325 Electric Vehicle Charging Stations Across New York State." [governor.ny.gov](http://www.governor.ny.gov), June 6, 2012, <http://www.governor.ny.gov/press/06062012Charging-Stations>.

SUMMARY

The document has highlighted important opportunities and challenges associated with five planning and policy tools for regulating and administering EVSE deployment and installation in local jurisdictions. As described in key examples, EV deployment can be encouraged through zoning, codes, parking, permitting or partnerships, and each policy tool has its own set of opportunities and limitations. The use of these policy and planning tools lays the groundwork for the deployment of EVSE.

Key Findings

Zoning

Defining EVSE as an allowable use in a municipality's zoning districts is a good first step for EV readiness. Cities and towns in the TCI region are beginning to use zoning ordinances to ensure that EVSE is defined as an allowable use in residential and commercial zoning districts.

The use of the zoning tool to establish EV readiness has inherent limitations because it has not yet been widely tested as a practice. For example, zoning could also be appropriate and useful when development standards are needed to shape the scope and qualities of future EVSE deployment by requiring those characteristics in future development. However, zoning text amendments of this nature are rare in the United States. Furthermore, zoning has not yet been tested in its ability to incentivize EVSE deployment, such as through developer incentives.

Parking

As with zoning, parking ordinances can regulate EVSE installation by setting requirements for the number of parking spaces provided by new construction. Parking ordinances also have an enforcement component that can be used to restrict designated EVSE charging spaces in lots, in garages or on the street. Parking regulations can be implemented by localities or states; for example, Hawaii requires at least 1 EVSE charging space per 100 in every newly constructed lot or garage throughout the state. Parking ordinances apply to publicly accessible EVSE, including on-

street parking and municipal lots and garages, and are therefore an important part of infrastructure development and management.

Parking management is a potentially fruitful area for public-private partnerships, and in this context it will be important for localities to work with private parking management firms to ensure regulations are amenable. In public and private scenarios, determining how enforcement (e.g., towing or ticketing) will occur will be an ongoing issue, one that TCI region municipalities have the opportunity to help creatively solve.

Codes

Building and electrical codes ensure that EVSE installations are safe and can be used to specify the scope of EVSE-ready construction. Changes to building and electrical codes are not necessary from a safety standpoint, but codes can help make places EV ready. Local jurisdictions may need to adapt state and local codes in order to meet certain requirements, such as emissions reduction goals. This is an ideal opportunity to incorporate EVSE into new construction. As a result, code changes will require buy-in from the development community, but precedents from cities such as Vancouver indicate that costs will not increase dramatically.

Municipalities that adopt or amend a state code benefit from a highly flexible code that provides different standards for different situations. In general, building and electrical codes present different EV-ready opportunities.

Permitting

For permitting, the goal is streamlining the administrative process so that it is uncomplicated, fast and affordable. Efforts to update and streamline permitting should first target reducing and standardizing fees to the consumer. In the TCI region, several municipalities have determined their existing permitting to be sufficient by defining EVSE installations as "minor" work. Most efforts to expedite permitting have focused on a "standard" single-family home installation, but future efforts should seek to facilitate more complex installations and installations in multifamily and commercial settings. Finally, while

the primary inspection authority is provided by city and state offices, third-party inspection firms offer opportunities for partnership and inspector training throughout the TCI region.

Partnership and Procurement

Diverse partnerships in EV-readiness planning strengthen the EV planning process. Developing expertise and disseminating information is necessary for new technologies to catch on. This shift is often best accomplished by working with organizations dedicated to EVs. In the TCI region, the Northeast EV Network is in a unique position to guide future partnerships at the regional scale, while municipalities will take the lead in generating local interest; both will likely work closely with the EV industry. Indeed, creative business partnerships may be crucial to the future of EVSE deployment. Many businesses will be attracted by branding opportunities. Nurturing business partnerships may reveal new business models that promote EVs and benefit the business community, and private-sector innovation will continue to shape the EV market. Finally, the public sector can take an active role and encourage partnership and private business development through procurement policies that include EVs, EVSE charging stations and support services.

Policy and Planning Tools in Summary

The tools that have been included in this document represent only a starting point in an evolving area for public policy, planning and administration. The matrix on the following page summarizes each of these tools and its respective abilities to influence or regulate EV adoption and EVSE deployment. The relative ability of a tool to achieve local EV readiness has much to do with where the tool is implemented, such as at the local or state level. A tool's potential is measured

based on how adept it is at allowing, incentivizing or requiring EVSE in various contexts and installation scenarios. The best contexts are highlighted for each tool, and the summary matrix focuses on macro issues such as deployment of EVSE in the public or private realm, the tool's ability to include provisions for EVSE in new or existing development or deploy EVSE across different land use categories or ensure EVSE deployment in some of the more challenging installation contexts such as multi-family dwellings.

Another category of "impacts" are those that relate to policy. Jurisdictions planning for EVSE should consider using the tools most appropriate for achieving local goals. Examples of policy impacts include incentivizing EV ownership, reducing GHG emissions, improving public safety or health, regulating EVSE in the public realm and improving accessibility, among others.

The last three summary categories address implementation, likely partnerships and agency actors as well as suggest potential opportunities in these areas for each tool.

Implementation summarizes relationships, required processes and strategies behind implementing EV-ready planning using each tool.

Agency Oversight suggests likely municipal or state agencies and offices that would have responsibility for EV-ready planning using each tool.

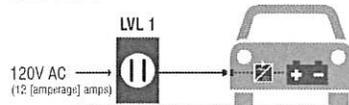
Partnership Opportunity describes for each tool the type of public-private or public-public partnerships that have been shown to advance EV readiness.

Finally, the matrix suggests case studies that were sources for the material in this guide, as well as places that readers should look to for further EV-ready planning precedents.

APPENDIX A: OVERVIEW OF ELECTRIC VEHICLE SUPPLY EQUIPMENT CHARGING LEVELS

LEVELS OF CHARGE: DIAGRAMS AND ATTRIBUTES

LEVEL 1

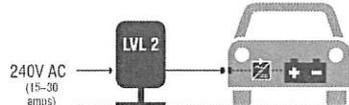


 **8-20+ HOURS CHARGE TIME**

ATTRIBUTES:

- A standard outlet can potentially fully recharge an EV battery in 8–12 hours, though larger batteries, such as on the Tesla Model S, would require between 1 and 2 days
- This level is often sufficient for overnight, home charging
- Standard outlets can also provide an option for “peace of mind” charging using onboard equipment on the go
- Uses standard J1772 coupler
- In-vehicle power conversion

LEVEL 2



 **4-8 HOURS CHARGE TIME**

ATTRIBUTES:

- Free-standing or hanging charging station units mediate the connection between power outlets and vehicles
- Requires installation of charging equipment and often a dedicated 20–80 amp circuit, and may require utility upgrades
- Well-suited for inside and outside locations, where cars park for only several hours at a time, or when homeowners seek added flexibility of use and a faster recharge
- The public charging network will comprise primarily level 2 charging stations
- Public context requires additional design features, such as payment and provider network interfaces or reservation systems
- Uses standard J1772 coupler
- In-vehicle power conversion, charging speed limited by the onboard charger

DC FAST CHARGE



 **30 MINUTES CHARGE TIME**

ATTRIBUTES:

- Free-standing units, often higher profile
- Enable rapid charging of EV battery to 80% capacity in as little as 30 minutes
- Electrical conversion occurs in EVSE unit itself
- Relatively high cost compared to level 2 chargers, but new units on the market are more competitively priced
- Draws large amounts of electrical current, requires utility upgrades and dedicated circuits
- Beneficial in heavy-use transit corridors or public fueling stations
- Standard J1772 coupler approved in October 2012

APPENDIX C: ZONING

Sample Zoning Amendments

As discussed in Tool 1: ZONING, there are three methods to include EVSE planning in zoning: allowance, incentive, and requirement. Below are example texts of EVSE allowance and requirement, as well as zoning text incentivizing car-sharing.

Allow Use

The full EV-relevant edits included in New York City's zone green are shown below in context (*italics ours*):

Article I: Chapter 2: 12-10: DEFINITIONS

"An #accessory use# includes: [...]

(19) An ambulance outpost operated by or under contract with a government agency or a public benefit corporation and located either on the same #zoning lot# as, or on a #zoning lot# adjacent to, a #zoning lot# occupied by a fire or police station.;

(20) *Electric vehicle charging in connection with parking facilities;*

(21) Solar energy systems."

32-16: Use Group 7

"D. Auto Service Establishments

Automobile glass and mirror shops [PRC-B1]

Automobile seat cover or convertible top establishments, selling or installation [PRC-B1]

Electric vehicle charging stations and automotive battery swapping facilities [PRC-B1]

Tire sales establishments, including installation services [PRC-B1]"¹⁰²

¹⁰² "Zone Green Text Amendment (N 120132 ZRY)," City of New York, Enacted April 30, 2012 http://www.nyc.gov/html/dcp/pdf/greenbuildings/adopted_text_amendment.pdf

In the state of Washington, legislation requires EVSE to be allowed in each of the zonings of specific local jurisdictions, providing sample language for fully- and partially-planning jurisdictions.¹⁰³ The city of Woodinville, an example of a fully-planned jurisdiction, enacted a local ordinance adding the following definitions to its zoning text:

"21.06.200 Electric vehicle charging station.

Electric vehicle charging station: a public or private parking space that is served by battery charging station equipment that has as its primary purpose the transfer of electric energy (by conductive or inductive means) to a battery or other energy storage device in an electric vehicle. An electric vehicle charging station equipped with Level 1 or Level 2 charging equipment is permitted outright as an accessory use to any principal use.

21.06.201 Electric vehicle charging station — public.

Electric vehicle charging station — public: an electric vehicle charging station that is (1) publicly owned and publicly available (e.g., Park & Ride parking, public library parking lot, on-street parking) or (2) privately owned and publicly available (e.g., shopping center parking, nonreserved parking in multi-family parking lots).

21.06.202 Electric vehicle charging station — restricted.

Electric vehicle charging station — restricted: an electric vehicle charging station that is (1) privately owned and restricted access (e.g., single-family home, executive parking, designated employee parking) or (2) publicly owned and restricted (e.g., fleet parking with no access to the general public).

21.06.203 Electric vehicle infrastructure.

¹⁰³ For more on the legislation see: http://psrc.org/assets/4328/EVI_report_Sec1_Ordinance.pdf

APPENDIX D: PARKING

Sample Parking Ordinance

With text shown below, Hawaii Senate Bill No. 2747 (2012) requires publically-accessible parking lots and garages to have at least one exclusive EV charging space.¹⁰⁸

Adopted Code Language:

Section 2. Section 291-71, Hawaii Revised Statutes, is amended to read as follows:
"291-71 Designation of parking spaces for electric vehicles; charging system.

- a) Places of public accommodation with at least one hundred parking spaces available for use by the general public shall have at least one parking space near the building entrance designated exclusively for electric vehicles and equipped with an electric vehicle charging system by July 1, 2012. Spaces shall be designated, clearly marked, and the exclusive designation enforced. Owners of multiple parking facilities within the State may designate and electrify fewer parking spaces than required in one or more of their owned properties; provided that the scheduled requirement is met for the total number of aggregate spaces on all of their owned properties."

¹⁰⁸ "SB2747 SD1 HD2," Hawaii State Legislature, accessed October 24, 2012, http://www.capitol.hawaii.gov/measure_indiv.aspx?billtype=sb&billnumber=2747

Ownership and Liability in Multi-Family Housing

One relevant solution is found in California's Senate Bill 209, regarding the shared space of communal interest developments—that is community apartment, condominium, or cooperative development. The bill imposes the EV-owner installing an EVSE with the responsibility of maintaining an umbrella liability coverage policy of \$1,000,000, while naming the common interest development as an additional insured party.¹⁰⁹

SB209 has a worthwhile additional provision prohibiting common interest development from unreasonably restricting or prohibiting the installation or use of EVSE.

¹⁰⁹ Office of Energy Efficiency and Renewable Energy, "Electric Vehicle Supply Equipment (EVSE) Policies for Multi-Unit Dwellings," U.S. Department of Energy, accessed October 24, 2012, <http://www.afdc.energy.gov/laws/law/CA/9579>