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

ELECTRIC VEHICLE SUPPLY EQUIPMENT SUPPORT STUDY

NYSERDA PON 2392
Electric Vehicle Supply Equipment (EVSE) Support

Prepared for:
New York State Energy Research and Development Authority
and
Transportation and Climate Initiative

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November 2012

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Of the Northeast and Mid-Atlantic States

NOTICE

This material is based upon work supported by the Department of Energy under Award Number #DE-EE0005586.

TCI is a collaboration of the transportation, energy and environment agencies from the 11 Northeast and Mid-Atlantic states and the District of Columbia (DC), focused on reducing greenhouse gas (GHG) emissions from the transportation sector. Jurisdictions participating in this TCI project are Delaware, Washington, DC, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont, and they are 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.

The research, interviews and analysis in this report was performed by WXY Architecture + Urban Design (Project team Adam Lubinsky, Jennifer Gardner and Paul Salama).

CONTENTS

ACKNOWLEDGEMENTS

Thank you to the following individuals for their experience and insight into planning, regulating and deploying electric vehicle charging infrastructure:

Meg Andrews, Environmental Planning Manager, and **Kristen Weiss**, State Legislative Analyst, MDOT, and Members of the Maryland Electric Vehicle Infrastructure Council

Bruce Bentley, Energy Innovation Center, Green Mountain Power

Joseph Berman, Environmental Certification Specialist, Golub Corporation/Price Chopper

Denis Clements, Electrical Program Chief, Oregon Building Codes Division

Albert Dahlberg, Coordinator, Project Get Ready Rhode Island

Mark W. Earley, P.E., Chief Electrical Engineer, National Fire Protection Association

Omoniyi Giwa, Senior Borough Programme Officer, Transport for London

Ken Frank, Research Scientist, New Jersey Department of Environmental Protection

Jim Jensen, Senior Bioenergy and Alternative Fuels Specialist, Washington State University Energy Program

Ari Kahn, Electric Vehicle Policy Analyst, New York City Office of Long-Term Planning and Sustainability

Brian Kiley, Edgewood Electric

Larry McAuliffe, Sustainability Manager, New York Metropolitan Transportation Council

James McCabe, Senior Director of Standards Facilitation, American National Standards Institute

Patti Miller-Crowley, Washington State Dept. of Commerce and Member of the State EV Taskforce

John Murach, Director of Business Planning and Corporate Performance, BGE. 9/20/2012

Beth Neaman, External Engagement, Advance Technology Group, PEV Readiness Program, Southern California Edison

Michael Pfeiffer, Deputy Senior Vice President, Technical Services, International Codes Council

Joan Rohlfs, Environmental Resources Program Director, Metropolitan Washington Council of Governments

Steve Russell, Alternative Fuel and Vehicle Coordinator, Massachusetts Department of Energy Resources

Greg Seher, Project Analyst, Atlantic County Utilities Authority

Malcolm Shield, Climate Programs Engineer, City of Vancouver Sustainability Group

Howard Slatkin, Director of Sustainability/Deputy Director of Strategic Planning, New York City Department of City Planning

Additional thanks to the **Georgetown Climate Center**, particularly **Cassandra Powers** of the **Transportation and Climate Initiative**, for her guidance and coordinating efforts without which this report and review process would not have been possible, as well as to the **Clean Cities Coordinators** and the **TCI Clean Vehicles and Fuels Workgroup** for their collective review and feedback.

LIST OF ABBREVIATIONS

AC	Alternating Current
ANSI	American National Standards Institute
ANSI EVSP	American National Standards Institute Electric Vehicles Standards Panel
ARRA	American Recovery and Reinvestment Act
BC	British Columbia
COG	Council of Governments
DC	Direct Current
DOE	U.S. Department of Energy
EV	Electric Vehicle
EVIC	Maryland Electric Vehicle Infrastructure Council
EVSE	Electric Vehicle Supply Equipment
GHG	Greenhouse Gas
IBC	International Building Code
ICC	International Code Council
IgCC	International Green Construction Code
IRC	International Residential Code
MPO	Metropolitan Planning Organization
MOU	Memorandum of Understanding
NEC	National Electrical Code
NFPA	National Fire Protection Association
NYMTC	New York Metropolitan Transportation Council
NYSERDA	New York State Energy Research and Development Authority
ODOT	Oregon Department of Transportation
PIP	Plugged-in Places Initiative
PSRC	Puget Sound Regional Council
RFP	Request for Proposals
SAE	Society of Automotive Engineers
SCE	Southern California Edison
SEC	Seattle Electrical Code
TCI	Transportation and Climate Initiative
TfL	Transport for London
UL	Underwriters Laboratory
VAC	Volt Alternating Current

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EXECUTIVE SUMMARY

As an increasingly widespread choice for consumers as well as for government and commercial fleets, all-electric and plug-in hybrid electric vehicles (EVs) will become an important part of the transportation landscape. The full extent of EV charging demand is not yet fully determined; however, there is a clear need to develop a consistent, accessible charging network of EV infrastructure (known as electric vehicle supply equipment, or EVSE). Anticipated growth in the EV sector creates a need to facilitate and encourage the development of a consistent and accessible infrastructure network, including at home, on public streets, and in commercial settings.

EVs offer clear environmental, economic and energy benefits to communities of all sizes. Encouragement of greater EV usage through a more EV-ready environment can bring a range of important benefits to local communities, including: reduction of the consumption of natural resources; reduction of air pollution that can cause cancer and other serious health effects; reduction of greenhouse gas emissions; improvements to soil and water quality; anticipated economic development benefits.

This guide highlights best practices and introduces policy options for public officials and private-sector leaders seeking to prepare their communities, jurisdictions, states or organizations for EVs. The guide will look in-depth at examples and resources from five categories of policy tools that can enable EV-readiness:[1]

1. Zoning
2. Parking
3. Codes
4. Permitting and Inspection
5. Partnerships and Procurement

Key Findings

Zoning

- Zoning is a necessary part of EV-readiness, but has inherent limitations.
- Defining EVs and EVSE as a permissible use in zoning regulations is a first step upon 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 remains largely untested.

Parking

- Regulation of EVSE through parking ordinances can set the scope and enforcement requirements for parking with state or local laws.
- 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.
- 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.

[1] Zoning and parking ordinances, along with codes, permitting and building interagency or business partnerships comprise potential approaches at the local level that can work alone or in combination to implement EV-ready policies. However, legislation, environmental benchmarks, economic development planning, real estate incentives or advocacy-based outreach and education are also critical approaches. These policies should be noted as areas for further study as a part of the emerging EVSE ecosystem.

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 also a useful goal for helping electricians quote prices.

Partnership and Procurement

- Having a diverse set of partners in EV-readiness planning is important as it can strengthen the EV planning process. Expertise and dissemination of information necessary for new technologies to catch-on. This is often best accomplished by working with organizations dedicated to EVs.
- Creative business partnerships may be crucial to the future of EVSE deployment. Many businesses will be attracted to hosing EVSE by branding opportunities. Nurturing business partnerships may reveal new business models that promote EVs and benefit the business community.
- Private sector innovation 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. London, England is an example where city transportation officials partnered with a major parking management firm to ensure enforcement of the city's mandate to provide EV-charging only parking spaces.

This guide looks at EV-ready planning from the local perspective, and the examples and analysis have local government and private sector partners in mind. 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 EV-READY CITIES AND TOWNS: A GUIDE TO EV PLANNING AND POLICY TOOLS

The delivery of a vehicle charging network and electric vehicle supply equipment (EVSE)[2] required by the growing number of electric vehicles (EVs) in the Northeast and Mid-Atlantic states[3] 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 places 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, permitting and the creation of opportunities for both the public and private sectors to partner on and lead EV-ready initiatives. These tools are available to local jurisdictions, a key reason for looking into them in detail to determine how they can be used and how effective they can be in 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 such as cardiovascular and respiratory problems like asthma, especially in children and the elderly;[4]
- Reduction of greenhouse gas emissions that contribute to global warming and exacerbate the heat island effect in support of local, state and federal goals;
- Improvements to soil and water quality through the reduction of pollutants in acid rain and stormwater run-off;[5]
- Anticipated economic development benefits in the form of business and job growth in the EV and transportation equipment industries, reduced losses associated with carbon emissions,[6] and potential property value increases due to air quality improvements[7] 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 infrastructure. The development of a consistent, accessible charging network would enable EV owners and communities to:

- Charge at home, at work and in commercial and public locations;
- Extend vehicle range;

[2] EVSE is more commonly referred to as a charging station; both terms are used in this guide.

[3] 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 U.S.

[4] http://www.epa.gov/pm/health.html

[5] http://www.fhwa.dot.gov/publications/research/infrastructure/structures/98079/runoff.cfm

[6] Interagency Working Group on Social Cost of Carbon, United States Government. *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866*, February 2010

[7] Kenneth Y. Chay and Michael Greenstone, "Does Air Quality Matter? Evidence from the Housing Market," Journal of Political Economy, University of Chicago Press, vol. 113(2), pages 376-424, April 2005.

- Better integrate EVs into regional transportation networks; and
- 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 TCI region, North America and beyond. Best practices are typically defined as those methods or approaches that have consistently generated results in past experience. Planning for EVs and EVSE deployment presents an interesting problem: the approaches are often too new to be sure of their effectiveness. As a result, many of the examples and potential solutions offered by the Guide should be considered closely for their applicability in each town, city or metro area. Because of the chicken-and-egg nature of planning this type of decentralized transportation infrastructure, jurisdictions should 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 TCI region.[8]

The purpose of this guide is to provide discussion and guidance to practitioners from government and the private sector regarding the limitations 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 to them in order to influence the scale and character of EVSE deployment, including working with regional organizations like 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 governments 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 policymaker 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 place-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.[9] Further, the integration of EVSE into the built environment will require engagement from policymakers at different jurisdictional scales. The guide aims to engage the range of levers available to state and local governments and the constituent organizations that use the tools highlighted here—zoning, parking, codes, permitting and inspection and partnerships and procurement.

[8] 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: Delaware, Washington, D.C, Maine, 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.

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

Resource Guide Structure

The next section provides an overview of each of these tools for local jurisdictions, describes the goals of EV-ready planning and introduces a summary analysis of their relative strengths and weaknesses in different types of applications.

Each subsequent section presents a more in-depth look at the five planning tools and their applicability to EVSE:

Tool 1: Zoning (page 7)

Tool 2: Parking (page 12)

Tool 3: Codes (page 16)

Tool 4: Permitting and Inspection (page 19)

Tool 5: Partnership and Procurement (page 25)

In each section, the guide introduces the tools and its potential relevance to planning for EVSE deployment. Next, the sections include key examples from the TCI region and elsewhere as an overview of best practices. Each section ends with a discussion of limitations on each tool that exist at present that point to opportunities and considerations for future planning.

Finally, the report will conclude with key findings, areas for ongoing study and recommend next steps.

POLICY AND PLANNING TOOLS FOR EV-READINESS

Local and state governments have important tools at their disposal that can be used to more successfully and seamlessly integrate EVSE into the planning and administration of states, cities and towns. Each jurisdiction will need to determine the most appropriate lead agencies and offices based on its own needs and assessments of costs and benefits. This section will identify the role of each type of administrative or planning tool and introduce a discussion of EV-readiness at the state or local level that will be taken up in depth in the pages that follow.

EV-readiness in policy and regulation will involve incentivizing or requiring EVSE infrastructure deployment, eliminating procedural barriers, considering potential for financial incentives or mandating pre-wiring for EVSE installation.

A key strategy for capturing the many benefits of EVs will be the development of policies and programs that aim to deploy EVSE infrastructure to meet today's charging needs and prepare cities, towns and regional corridors for growing EV use. Simply put, EV-readiness can be achieved through: zoning that requires EVSE parking in the private realm; parking ordinances that enable EVSE in the public realm; building or electrical codes that require wiring in parking and set new standards for safety; and permitting that streamlines the administrative process.

Despite differences across the region, there are a handful of factors that need to be in place to successfully advance policy, legislation and ordinances relevant to EV infrastructure. EV-ready planning includes creating and implementing solutions to one or more of the following barrier-reducing actions:

- Ensuring that new construction is EVSE-ready;[10]
- Clearing administrative pathways for residential service upgrades and EVSE retrofit;
- Providing safe, consistent and accessible EVSE installations and implementing good site planning and design;
- Ensuring that new construction can support higher electricity demand, with the potential of adding future vehicle battery charging capacity and eventually energy storage devices;
- Enabling dedicated parking spaces for EVs in both public and private realms, with clear protocols for the usage and operation of the spaces and EVSE;
- Aligning EVSE deployment with policy and environmental mandates to achieve emissions reductions, air quality improvements, transportation technology advances and energy independence.

There is no one-size-fits-all policy approach to increasing EV-readiness. Each state or local jurisdiction needs to evaluate the objectives behind any potential new policy, code revision or other change and follow a path that best suits the available and appropriate menu of options for the jurisdiction.

[10] "EVSE-ready" new construction can include a range of possible options for municipalities. From the literature and case studies these include: requirement to install EVSEs; requirement to pre-wire (lay conduit) for a certain percentage or number of parking stalls in new construction for future EVSE installation; require reserved space in the electrical closet for future electrical service capacity; providing regulations that do not inhibit voluntary installation.

Table 1: EV Planning and Policy Tool Summary

ZONING	**Determines where and how EVSE is allowed, incentivized or required** • Zoning establishes allowable uses based on 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 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	**Sets the scope and enforcement requirements for parking with state or local laws** • Parking ordinances apply to publicly-accessible EVSE, including on-street and municipal lots and garages, and is therefore an important part of infrastructure development • Like 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	**Ensure safe EVSE installations and specify the scope of EVSE-ready construction** • 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	**Streamlines the administrative process so that it is uncomplicated, fast and affordable** • 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 and 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
	Works closely with private or quasi-public partners to implement infrastructure in the public realm • Partnerships include working groups, which can unite government agencies with private industry and experts • Regional planning organizations like Metropolitan Planning Organizations and Councils of Government are important for building consensus and getting the word out • Local DOE Clean Cities chapters can offer additional funding and information on EV's. • 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

Limitations to the Tools

There are limitations placed on government policymakers when it comes to promoting EVs and EVSE deployment through the regulatory and administrative tools typically available to the public sector. The applicability of mechanisms such as codes, permitting, zoning, ordinances and partnerships at the state and local levels will of course be determined by jurisdiction of the agency, office or firm or other entity leading the planning effort. As a result, the degree of EV-readiness will depend on the menu of tools each policymaker has at his or her disposal, the time and funding available, the degree of cooperation within the local or state government and the ability to partner with businesses or other private sector organizations.

Evidence indicates that over-regulation in the early stages of the EV market will have a negative effect on the EV industry.[11] Developing business models need space to grow and innovate, and some policymakers in the TCI region have noted that their own state's regulations have been influenced by the understanding that it is too early in the development of the industry to limit EVSE to certain business models.[12] Additionally, the behavior and etiquette of EV drivers around charging stations have yet to be determined. This includes a full understanding of the real demand on publicly-accessible charging in particular as charging and battery technology evolves. Over-regulation also has negative impacts on the development community. By requiring EVSE or EVSE pre-wiring too early or in the wrong instances, officials may place a burden on developers who do not yet see real financial benefits to EV charging. In light of these considerations, government officials are reluctant to regulate emerging markets with a heavy hand. Given the overall recognition that EVs are a developing technology, with a developing market to match, the lack of municipal experience with respect to consumer preference and user behavior including driving patterns and etiquette will limit the degree to which local governments will willingly interfere by over-regulating EVSE deployment. This approach expects consumers and private industry, utilities, OEMs and service networks to drive the development of this new sector.

[11] Stephen Brown, David Pyke and Paul Steenhof, "Electric Vehicles: The Role and Importance of Standards in an Emerging Market," *Energy Policy*38, no. 7 (July 2010): 3797-3806, http://www.sciencedirect.com/science/article/pii/S0314 2151000161.

[12] Meg Andrews and Kristen Weiss, phone interview, 9/18/2012.

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.[13] Zoning ordinances are enacted locally, occasionally in order to comply with state mandates.[14] Zoning regulates land uses and sets parameters for different types and intensity of land uses, and 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.[15] 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.

Zoning is seen to be 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:" zoning alone will not facilitate EVSE deployment, but the potential for zoning 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 have been tested to date. A 2010 EV-readiness study by the Puget Sound Regional Council found at that time no city in the United States had yet adopted any comprehensive building or zoning ordinance that addressed EV charging; it was far more likely for a place to have pursued parking ordinances as a form of regulation.[16] Similarly, in 2011, TCI was not aware of any jurisdiction in the Mid-Atlantic or Northeast region that had adopted zoning ordinances addressing EVSE.[17] However, several municipalities large and small from New York City to Methuen, Massachusetts, were taking steps to introduce EV-specific zoning regulations.

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 , and the use groups[18] for EVs and EVSE;
- Consider relevant comprehensive planning frameworks;

[13] Different types of EVSE may have different zoning implications. Level 1 and 2 charging, illustrated in Appendix A, 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 level 1 and 2 residential and commercial applications. Future technology and business models will shape the ways in which EVSE best fits into zoning districts.

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

[15] 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.

[16] http://psrc.org/assets/4326/EVI_full_appendices.pdf

[17] Cassandra Powers, TCI

[18] Use groups refers to a designated group of uses that are considered to be allowed as-of-right

- 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, where they should be concentrated, and where they should be 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

Often requirements to create plans, such as for transportation, energy efficiency, or reducing greenhouse gas emissions to name a few relevant areas, come from federal and state governments. Federal transportation funding for metropolitan planning organizations (MPOs) is often linked to a long-term plan, for example. Some existing state legislation defines EVs and EVSE and in some cases 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. Greenhouse gas (GHG) or air quality emissions targets are especially relevant and local governments should be aware of how 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 clear distinction was needed—creating clarity in the zoning text to ensure vehicle battery charging was codified as a use distinct from gasoline filling stations. In the NYC Zoning Resolution, this pointed to a need to include battery charging in a distinct use group.[19] The city's "Zone Green" zoning text amendments, enacted by 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 or 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.

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

Level 1 and 2 permitted as accessory uses to parking facilities in all areas

Level 3 or DC fast charge permitted as a principal use in commercial or industrial zones or conditional use in general

See http://www.cityof Methuen.net

[19] Howard Slatkin, iInterview 8/29/12

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, commercial, industrial), special districts and potentially on the level of charge.[20] Including clear definitions and provisions for where EVSE is allowable as-of-right (or by right)[21] 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.

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 allow EVSE and battery swap stations, utilizing local zoning ordinances. 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 zoned for residential or resource use.[22] 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 as they reflect the utility 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, food stores in particular areas and affordable housing units.[23]

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 provided. The 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 will likely not yet be decided on the value of the EVSE or charging station units to the public.

A number of questions remain as to how incentive zoning could be applied to EVSE. First, it is not yet clear that EVSE will be viewed as a significant enough public benefit to justify an exchange for additional floor area. Further, even if EVSE impacts can be effectively monetized or determined to be significantly publicly beneficial, uncertainties exist around whether EVSE charging stations or spaces can be considered exchangeable with floor area or parking reductions.

[20] Please refer to the diagram at the beginning of this section 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.

[21] 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 permit from the local authority. Note: electrical installation permits are a separate tool and process.

[22] Patti Miller-Crawley, phone interview, 7/18/2012; see also Western Washington Clean Cities Coalition and Washington State Plug-In Electric Vehicle Task Force, "Plug-in Electric Vehicle Readiness Plan for the State of Washington," Sept. 2011. http://www.electricdrive.wa.gov

[23] http://www.nyc.gov/html/dcp/html/zone/glossary.shtml

Require EVSE

There are two ways that zoning can create requirements for the installation of EVSE. First, zoning can require the scope of future EVSE deployment through zoning text amendments that specify where and how many parking stalls in future development will include EV-ready wiring or charging stations. Second, zoning resolutions can set standards for EVSE design and use where they are permitted. Examples of both approaches to using zoning tools to require EVSE come from other countries or from other applications. As a result, it is important to consider the way that visionary planning ideas might translate to the growing EV markets in US cities.

A strong example of requiring EVSE through zoning changes comes from a place without zoning: London, UK. The Plan for London, the city's long-range development plan, requires EVSE installation by mandating it in new construction.[24] London's plan requires all new development to include 1 in 5, or 20% of parking stalls to be not only allocated to EVs but also equipped with charging stations in order to encourage the uptake of EVs.[25] This approach has not yet been tested in the United States through zoning; however, building codes and parking regulations, discussed later in this guide, have set similar requirements using different tools.

Zoning can also be used to require certain characteristics of installed EVSE by setting development standards.[26]There are a number of examples of existing resolutions that highlight how zoning can be used to set standards for EVSE design, including:

- EVSE charging stations are reserved for EV parking only, except when located as an accessory to single-family residential uses.[27]
- Signage: ensuring its appropriate use and enforcement is the responsibility of the local jurisdiction.[28]
- Accessibility: zoning can specify that the design and location of EVSE conform with ADA or barrier-free accessibility requirements.[29]

Limitations

Zoning is a primary local tool for implementing EVSE, but it may also be the one with the most limitations for EV-readiness in the immediate future, except for defining areas of permitted use.

Reluctance to Require EVSE through Zoning

Experts and municipal stakeholders have expressed hesitation around over-regulation.[30] Over-regulation can take many forms, but the overall desire is to ensure that industry growth and innovation is not stifled in order to encourage EV adoption on the one hand, and to ensure that no individual or industry is overburdened with requirements intended to support the growth of the EV sector on the other. These ideas apply to zoning because of the limitations and requirements that zoning can be used to place on property owners. In New York City, city planning officials expressed reluctance to create land use requirements that would pressure landlords into the business of owning and operating EVSE.

In many municipalities, the role of zoning is often highly responsive to the development community. Where it is perceived that zoning changes would not be well-received by developers or landlords due to added development or maintenance costs

[24] http://www.london.gov.uk/sites/default/files/LP2011%20Chapter%206.pdf

[25] Omoniyi Giwa, Senior Borough Programme Officer, Transport for London. Interview 9/12/12. London's development strategy is only one part of a comprehensive plan to bring EVs to the city through deployment of 25,000 EVSE by 2015. See also: http://www.london.gov.uk/sites/default/files/uploads/electric-vehicles-plan.pdf

[26] http://www.nyc.gov/html/dcp/pdf/zone/art01c04.pdf

[27] http://www.codepublishing.com/WA/chelan/html/Chelan17/Chelan1763.html

[28] Meg Andrews, Maryland State Department of Transportation. Interview 9/18/2012

[29] http://www.codepublishing.com/WA/chelan/html/Chelan17/Chelan1763.html

[30] Please reference *EVSE Codes for the Built Environment*, the companion white paper that discusses the regulatory role of codes and standards in the EV infrastructure domain.

related to EVSE installation, zoning may not be the most ideal approach for EV-ready planning.

According to Howard Slatkin of the New York City Department of City Planning notes, "zoning cannot be used to compel people into a particular business model."[31]

Public Review Process

To this point, zoning changes must undergo review that takes the development community into account through public process. Zoning changes require some form of public review process, and will be subject to local public input as well as general political will. Any zoning proposal involving EVs and EVSE must pass a public review.

Planning Departments Do Not Enforce or Inspect

As described by NYCDCP, zoning incentives for this type of use are more difficult to enforce. How is the city to tell whether an indoor or underground garage is meeting the requirements for the zoning incentive after development benefits are received? There is obviously no recourse by which to take back the benefit to the developer associated with the incentive.

[31] Howard Slatkin, interview, 8/29/2012

TOOL 2: PARKING

Parking ordinances will apply to publicly-accessible charging stations. EVSE in the public realm, such as on-street locations, municipal lots or 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 players 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: scope of EVSE pre-wiring or installation from a transportation and logistics perspective, on-street EV charging and parking, and can provide guidance on the difficult question of how best to manage user rotation, access and violations.

Parking ordinances will operate hand-in-hand 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

All parking facilities that are available for use by the general public and include at least one hundred parking spaces must designate at least one parking space specifically for PEVs by July 1, 2012, provided that no parking spaces required by the Americans with Disabilities Act Accessibility Guidelines are reduced or displaced. Spaces must be clearly marked and equipped with electric vehicle supply equipment (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-PEVs that park in spaces designated for PEVs. (Reference Senate Bill 2747, 2012, and Hawaii Revised Statutes 291-71 and 291-72)[32]

Local Parking Ordinances

Some local jurisdictions have in fact chosen to regulate with a heavier hand, 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[33]

The city of Lacey, Washington enacted EV infrastructure requirements that restrict as EV

[32] http://www.dmv.ca.gov/pubs/vctop/d11/vc22511.htm; http://www.capitol.hawaii.gov/measure_indiv.aspx?billtype=SB&billnumber=2747; http://energy.hawaii.gov/wp-content/uploads/2011/09/DBEDT-EV-Fact-Sheet-MAR-2012_final.pdf

[33] Syracuse, NY has also taken steps in a similar direction.

charging-only the use of specially designated charging stalls.[34] This local law adds parking enforcement to the zoning regulations required by the Washington State.

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, over 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 don't 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 enforcement of 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 of private entities providing EVSE charging and parking.

Enforcement: Plug-In Electric Vehicle 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 a plug-in electric vehicle unless the vehicle displays a valid state-issued zero emission vehicle (ZEV) decal and is connected for electric charging purposes.[37]

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

Like all traffic statues, statues 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 statue 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 and not appropriate 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 should at minimum limit tripping hazards and other liability concerns, and should also consider ways to meet ADA compliance standards.

[34] http://www.mrsc.org/ords/l32o1351.pdf
[35] Howard Slatkin, interview, 8/29/2012
[36] "EVSE—What Municipalities Need to Know," presentation by Dominion , VA. Unknown date and author.
[37] Reference Assembly Bill 475, 2011, and California Vehicle Code 22511 http://www.afdc.energy.gov/laws/law/CA/9577
[38] Meg Andrews and Kristen Weiss, Maryland State Department of Transportation, interview 9/18/2012

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, Price Chopper, the supermarket chain, has instituted EV-only parking with charging stations that include a marketing-oriented canopy design, but has based their 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 LEED certification are just a few reasons among many 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]

NYSERDA 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 Manhattan, and will gather data to study how such stations are used.

Car Charging Group Inc. will install charging stations at 15 high-traffic locations, 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." NYSERDA, Press Release, June 6, 2012.

[39] Plan for London website; Transport for London interview with Ominiyi Giwa

[40] Joseph Berman, LEED AP, Price Chopper Environmental Certification Specialist, Interview, July 25, 2012

[41] However, 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 cost.

Limitations

Premature Regulation

Overall, case studies have shown a reluctance to regulate prematurely. This is particularly clear for parking restrictions. For parking restrictions, in states with relatively few EVs, state-level legislation is seen as a draconian approach to regulation that may eliminate the ability of local governments to address the appropriate degree of EV-readiness and cost-benefit relationship of enforcement. Even in areas with many EVs, the use and enforcement of signed parking space restrictions may ultimately be more of a parking management issue than one of even a local ordinance.[42] In many cases, use of EV spaces can be managed with signage, regardless of the location.[43]

Host-Operator Agreements

Different ownership and management structures will determine how difficult EVSE installation and maintenance will be, whether on-street or in lots and garages. Business models of the various charging networks or EVSE OEMs will place different requirements on those navigating the owner-manager relationships.

[42] London, Maryland

[43] Meg Andrews and Kristen Weiss, MDOT

TOOL 3: CODES

Codes govern the structural aspect of EVSE installation; codes for EVSE include building and electrical codes as well as those that regulate the communications aspects of EVs and EVSEs at the network scale. However, the toolkit refers to building and electrical codes that set standards for safety and scope of EVSE deployment within the built environment.

These codes are developed at the national or international level in an advisory capacity and are known as model codes. Model codes are adopted by states and local jurisdictions through the legislative process. These include the National Electrical Code (NEC) and the International Building Code (IBC). States and localities generally have latitude to adopt their own building and electrical codes and administrative permitting processes, but typically, some form of the NEC and IBC applies in each state.

A number of states have adopted amended codes specific to EVSE. The scope of best practices for EV-readiness includes codes in two important ways: 1) establishing minimum requirements for EV-ready parking stalls (either pre-wired or with charging station installed), and 2) addressing permitting or other administrative processes.

Change Not Necessary, but Helps Achieve EV-Readiness

While there are no barriers to EVSE installation embedded in the existing national model building and electrical codes, there is room within the codes as adopted by the states to more clearly encourage EV-readiness.

- Despite differences between jurisdictions, the structural codes themselves cover existing safety concerns related to existing automotive and charging technology and permit or facilitate conditions under which EVSE can be installed.
- Neither level 1 nor 2 charging requires significant electrical work so long as the existing circuitry supports the electrical load and connection.
- Each installation presents unique wiring and construction challenges that can drive cost up, but that are typically accounted for by the existing structural codes and standards.

State or local code changes may be required in order to comply with environmental, transportation or clean energy target legislation established at the federal or state level. The building code can include scoping requirements, enabling jurisdictions to self-tailor regulations through a selection of the most appropriate mandatory and optional provisions. Because codes amendments are one of several interrelated strategies to encourage EVSE deployment, in considering changes, it is important to consider what codes can accomplish:

- Codes can specify scoping requirements that set numerical or percentage-based goals or limits for certain features in new construction (e.g. percentage of required parking be built and wired to be EVSE-ready).
- Codes can provide for new permitting or inspection protocols, and encourage the reduction of associated administrative costs.
- Codes are revised regularly and will be adapted at the national level to meet new structural or fire safety concerns, such as those related to new and emerging technologies.

Variations across the TCI region will mean that states will make different choices. States like New Jersey, for example, with a relatively evenly-distributed, dense population and centrally-located transportation corridors may find scoping requirements in the building code to be a good solution. By contrast, Maine's lack of population density and residential concentration around key urban centers may suggest a different approach.

Building Codes and Scope of Infrastructure Deployment[44]

Municipal Code Changes

A number of municipalities have the ability to adapt and adopt their own building and electrical codes locally, making this a useful local tool in those locations. Vancouver took advantage of its unique ability among Canadian cities to modify its building codes in order to require a substantial percentage of parking stalls in new construction be made EV-ready. Vancouver became the first North American city to require EVSE connection in all new development. This was achieved by modifying the city's building by-laws to require EVSE-ready wiring in new single- and multi-family residential construction. 20% of multi-family new construction and 100% of single-family new construction must be built EVSE-ready, according to the new by-laws. New code updates for 2012 will increase the residential service request to 220 volts to accommodate uniform level 2 charging, and will introduce a 10% EVSE-ready parking requirement to new commercial construction.

High-Level Flexibility through Voluntary State Building Code Appendices

Building codes as adopted by the states can offer additional options for voluntary compliance at the local level. California has implemented CALGreen, which sets a high bar as the nation's first mandatory green building code. The code's overall goals deal directly with the state's mandate to reduce GHG emissions, and an EV-ready policy included in the code recognizes the ability of regulation in one high-emissions area (buildings) can impact and incentivize greener consumer behavior in another (transportation). The state's approach to phasing in the code's mandatory provisions shed light on the ways in which other jurisdictions might adopt similar code amendments, and the inclusion of "tiers" of compliance in the voluntary appendices makes it possible for the adopting jurisdiction to choose the level of deployment and enforcement most appropriate for the local market and community.

[44] For a complete discussion of code-specific issues for EVSE and sample code language, please refer to *EVSE Codes for the Built Environment*, a companion to this guide.

Adopted Code Language: CALGreen Green Construction Code[45]

Table A5.106.5.1.2
Tier 2
10% of Total Spaces

Total Number of Parking Spaces	Number of Required Spaces
0–9	1
10–25	2
26–50	5
51–75	7
76–100	9
101–150	13
151–200	19
201 and over	At least 12% of total

Table A5.106.5.1.1
Tier 1
10% of Total Spaces

Total Number of Parking Spaces	Number of Required Spaces
0–9	0
10–25	2
26–50	4
51–75	6
76–100	9
101–150	11
151–200	18
201 and over	At least 10% of total

CALGreen's 2010 edition contains voluntary measures for nonresidential construction that require 10% (tier 1) and 12% (tier 2) of total parking spaces be designated for zero-emissions or fuel-efficient vehicles. Further, electric vehicle supply wiring is required for EV charging stations, for between one and four parking spaces, depending on lot or garage capacity.[46]

[45] California Building Standards Commission, *2010 California Green Building Standards Code* (Sacramento, CA: California Building Standards Commission, January 1, 2011), www.documents.dgs.ca.gov/bsc/CALGreen/2010_CA_Green_Bldg.pdf.

[46] CALGreen Nonresidential Voluntary Measures, A5.106.5.3 requires one 120 VAC 20 amp and one 208/240 V 40 amp, grounded AC outlets or panel capacity and conduit installed for future outlets.

Using State Electrical Code to Ease EVSE Installation and Permitting Process

Targeting the structural codes presented unique opportunities and challenges for the State of Oregon. The state's building codes are different from most other states; codes adopted at the state level set both the minimum requirements for construction statewide and the maximum requirements that local jurisdictions can enforce.[47] State level building code changes would establish a uniform policy for all new construction across the entire state. The state had established a Working Group,[48] which concluded that while building code changes would reduce the construction costs associated with retrofitting buildings to be EVSE-ready in the future, the increased costs for developers at the present moment would be premature.[49]

In this light, finding a way of ensuring a positive user experience, reducing the administrative costs and ensuring a path for emerging technology and its safe installation without adapting the scope or structural aspects of the building code was a challenge to the state in its approach to the supporting EVSE. The solution was to ask the State Building Codes Division (BCD) to develop a home EVSE installation process that could be completed within just a few days of purchase. The inclusion of EVSE in the state's Minor Label Program is described in the next section on permitting.

Municipal Electrical Codes Respond to Local Conditions

In Seattle, Washington, the 2008 edition of the city's adopted version of the electrical code identified and added some notable changes specific to Electric Vehicles, with the purpose of making it easier to install home and commercial EVSE. The Seattle Electrical Code (SED) adds article 625.27 to address required space for physical equipment and space planning in order to install future conduit, panel and disconnect for EVSE. Additionally, provisions in the SEC address outlet load calculations for residential EVSE, as well as feeder and conduit specifications for multi-family residential occupancies. Seattle's electrical code modifications speak to the potential to utilize a jurisdiction's electrical codes to meet localized market demands and projections; the city was planning ahead in the 2008 code edition to account for EVSE installation once the first Nissan LEAF vehicles hit the Seattle market in 2010.[50] Article 625.27 of the SEC may offer best practice guidance to local jurisdictions seeking to plan in advance for EVs, and may also inform the NFPA's next revision of the national model electrical code. The full SEC is available online.[51]

Limitations

The most obvious limitation in using codes to enhance EV-readiness is the fact that the national codes do not require or incentivize EVSE. Codes experts recommend an approach that utilizes voluntary appendices, like California's Green Building Code. Including optional but consistent choices for EVSE in state building codes would be a best practice for consideration in the TCI region. However, the slow revision process (3-year cycles) may pose an additional limit to this goal.

For the development and construction community, there is a need to keep costs low enough to be easily absorbed into overall project costs. However, inclusion of ESVE readiness in the building phase can be more cost-effective than retrofit and increase the value of individual units as well as the community at large.

Codes may impose additional costs in staff time and training on local governments as well. Acknowledging the high costs associated with a major code revision, this report does not at this time recommend changes to the local code revision cycle that would require states or municipalities to update their codes more regularly.

Application and enforcement of codes occurs at the local level through the permitting and inspection process and will require additional cooperation among inspection and enforcement agencies.

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[47] The scope of this research did not include a close examination of the legislative structures in each TCI region state. Oregon's model of setting the minimum and maximum code standards may not apply.

[48] For more on EV working groups, see Partnerships

[49] http://www.psrc.org/assets/3751/W_OregonReport_2010.pdf

[50] https://www.seattle.gov/environment/documents/Electric%20Vehicles%20FAQ_Update_070511.pdf

[51] http://www.seattle.gov/dpd/static/2008%20qr%20complete_latestreleased_dpdp016577.pdf

TOOL 4: PERMITTING

EV advocates and automakers alike have pushed for simplifying and streamlining jurisdictions' electrical permitting processes for EVSE installation, recognizing that local procedural variations add time and cost. These issues can potentially deter EV purchases. Thus the use of the permitting tool will include changes to a jurisdiction's administrative process that streamline filing, application approvals and inspection to make EVSE installation faster, easier and more affordable to home- and business owners.

Electrical permitting is the local enforcement of the electrical code, which, as mentioned in the previous section, is enacted to establish standards to protect both the public and property. Most electrical work in homes and businesses requires a permit, and must generally be performed by an electrician licensed in the relevant state and municipality. Throughout most of the TCI region the permitting process is administered by local jurisdictions, each with distinct forms, fees, electrical code definitions, installer requirements, and inspection operations. A number of different approaches to EV-readiness in permitting have been tried across the country; key examples are detailed in this section.

Most EV-ready permitting efforts focus on the "standard" EVSE installation case, which occur in private garages of single family homes, with the electrical work requiring at most upgraded circuit breakers, and new electrical lines and outlets to accommodate Level 1 or 2 chargers.[52] This focus captures most EV charging needs—nearly all EV owners primarily charge at home, and over 90% of those owners park and charge in a private garage. However, efforts to improve the permitting process should be expanded to other contexts if the goal is to expand the EV market beyond the simplest use case. This is especially true in the TCI region, which has both the oldest housing stock, and the highest percentages of households not living in single family homes with garages in the U.S.[53]

While the EVSE installation process includes several components affected by local permitting procedures, which can be seen in greater detail in Appendix G the focus of this section is on the three main parts of the administrative permitting process: permit filing, installation, and inspection.

Filing a Permit

Different permitting solutions have been attempted across the country, varying in complexity, and their suitability depends heavily on the context. It is important to first look at the existing processes to see if they can accommodate EVSE easily, don't present undue burdens on installers, and generally are sufficiently speedy and reasonably priced. Otherwise a quick, low-cost process should be sought, which removes unnecessary steps such as anything requiring multiple trips to permitting offices or installation locations.[54] A particularly forward-thinking example of process streamlining can be found in Vancouver, Canada, where the municipality decided EVSE installation work is safe and minor enough as to not require any permit filing.[55] Others would caution against this approach, in case homeowners who install their own EVSE do not properly calculate the capacity of their electrical panels.[56]

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[52] Oregon's Building Codes Division further defines standard EVSE installations as those installations within sight of the electrical panel supplying the charging unit, have a branch circuit that does not exceed 40 amps/240 volts and are not located in a damp place. http://www.afdc.energy.gov/case/1000?print

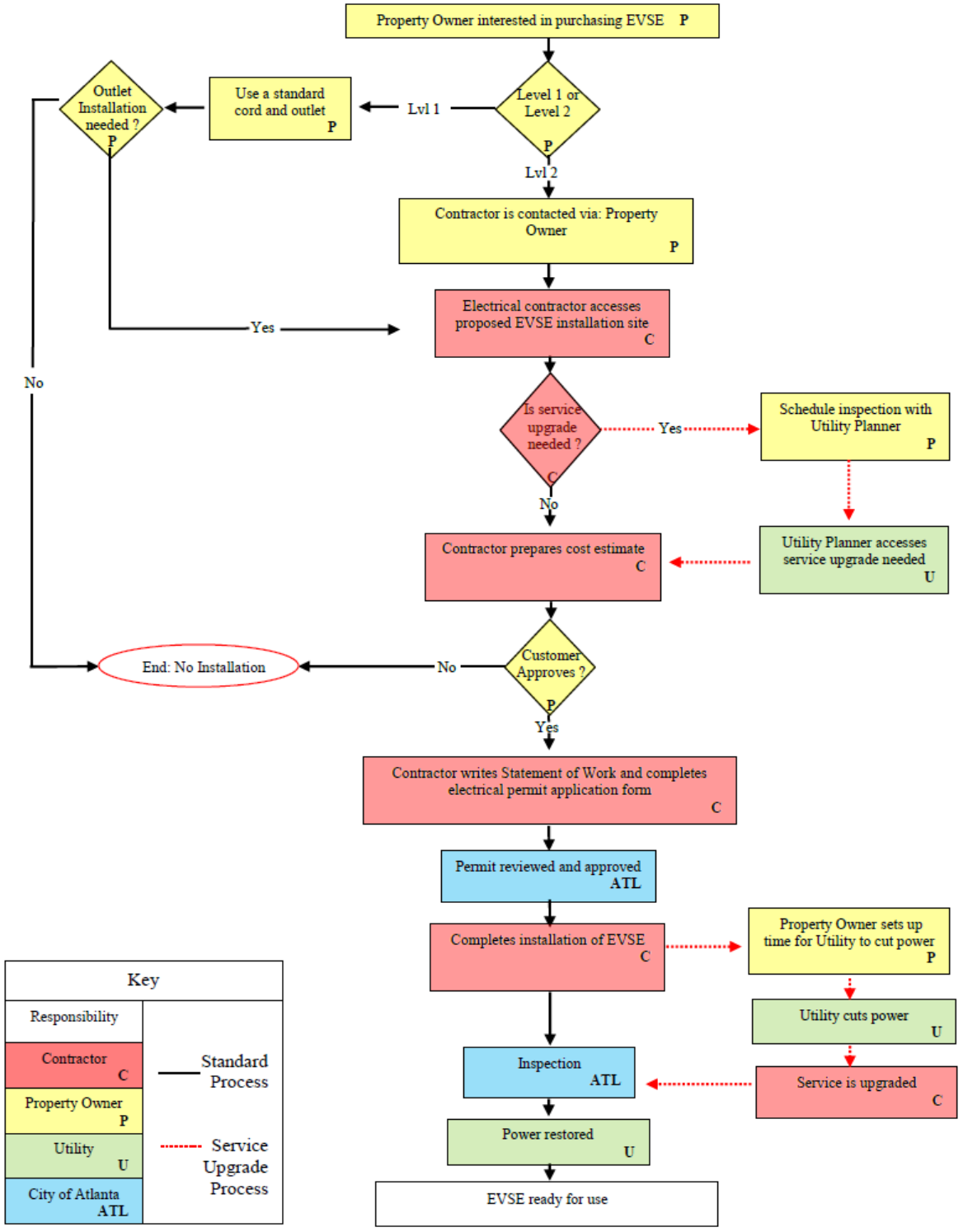
[53] Please reference the companion report, *Assessment of EVSE and EV Deployment*,

[54] California Plug-in Electric Vehicle Collaborative. Streamlining the Permitting and Inspection Process for Plug-In Electric Vehicle Home Charger Installations. Version 2. July 2012

[55] Interview with Malcolm Shield, May 1, 2012

[56] Brian Kiley, , interview7/27/2012; Refer to *EVSE Codes for the Built Environment*, a companion report produced with this study, for more information on the National Electrical Code and the issues associated with the International Residential Code, which regulates many single-family dwellings in the TCI region and across the US.

Typical Permitting Process Flow Chart



Streamlined permitting practices should exist in municipalities. While a uniform process should not necessarily be required across the region or even the states,[57] it should be easy for EV owners to secure a permit to install a charging station in every city or town.

Permitting Costs

Permitting fees and requirements are the greatest source of variation in EVSE installation, which are a visible and potentially prohibitive factor for EV ownership.

EVSE permitting fees vary widely. National survey data from the EVSE installer firm SPX found fees ranging from zero to $624.[58] Generally these fees cover municipalities' administrative and inspection costs, though it is possible to find neighboring municipalities with similar processes, yet vastly different fees. The method for determining and assessing these fees varies as well. In a jurisdiction near Philadelphia, for example, fees were calculated as a percentage of the total job cost, meaning that permit fees would rise along with EVSE labor and capital costs[59]—not an ideal proposition for individuals or businesses. Fee standardization is desirable for electricians providing quotes to potential customers.

Burdensome and unnecessary permitting requirements should be eliminated as these demand more time of the electrician, therefore adding to installation costs.

Existing Minor Work Processes

The easiest way to accommodate EVSE installations into existing permitting is to define EVSE as appliances, and therefore subject to the same permitting requirements. On the whole these installations are similar even though EVSE's lengthy, persistent electrical draw does not compare to other household appliances. Being categorized as an appliance allows EVSE installations to fall under "minor" electrical work, generally subject to the least burdensome permitting processes.

This is often the best solution for simplicity and continuity, and several jurisdictions have taken this route:

- New Jersey defines certain types of straightforward electrical work as "minor work," and a review of the state's electrical code determined that residential EVSE installations qualify. Minor work requires only verbal notification to the local code office prior to installation, followed by submission of the permit application within 5 days of the verbal notification.[60]
- Oregon modified its electrical code to include EVSE installations in the minor label program. This statewide process speeds simple EVSE installations by enabling licensed electricians to pre-purchase permitting minor installation "labels" online and inspecting only one out of ten EVSE installations.[61]
- Raleigh, NC has similarly extended its "walk-through" process to EVSE, where an employee of the city's inspection center takes the installer through permitting process, typically in under an hour.[62]
- New Hampshire allows the homeowner to do the electrical work on their single-family residence without a permit—an example of the requirements set by the International Residential Code.

[57] Recommendations to change the permitting process should recognize the multi-tiered additional costs associated with such changes—from developing and printing forms and labels to updating computer systems and training inspectors on new regulations.
[58] California Plug-in Electric Vehicle Collaborative. Streamlining the Permitting and Inspection Process for Plug-In Electric Vehicle Home Charger Installations. Version 2. July 2012
[59] Tony Bandiero, Philadelphia Clean Cities Coordinator
[60] Ken Frank, NJDEP, interview, 9/19/2012
[61] Dennis Clements, correspondence, 7/27/2012
[62] http://www.afdc.energy.gov/case/1001

Minor Label Programs: Oregon Case Study

In 2008, Oregon's Building Code Division (BCD) adopted statewide permit and inspection protocols through a rule that establishes the types and number of permits and inspections required to install EVSE. One of the central aspects of Oregon's code change is the inclusion of EVSE in the state's minor label program. Oregon's statewide process speeds simple EVSE installations by enabling licensed electricians to pre-purchase permitting minor installation "labels" online and inspecting only one out of ten EVSE installations.

The electrical minor label program allows electrical contractors to use labels in lieu of individual permits for limited, simple installations, repair and maintenance. In examining EVSE, BCD determined that the installation of a simple 40 amp circuit in a residential setting could also fall into this same scope of minor label work. The program defines standard EVSE installations as those installations within sight of the electrical panel supplying the charging unit, have a branch circuit that does not exceed 40 amps/240 volts and are not located in a damp place.[1] Under this program, just one in 10 of the electrician's completed jobs is inspected by BCD. An additional benefit of the program addresses some concerns raised by the electrical safety community around lack of control over residential installation by homeowners: only licensed professionals are permitted to purchase minor labels.

The inclusion of EVSE in the state's minor label program can be considered a best practice that reduces the cost to the state in terms of inspections and to the EV owner, making the installation of at-home charging infrastructure that much more accessible. Each minor label permit costs $14, compared to permitting costs that still reach up to $700 in some areas of the Los Angeles region. The Oregon code amendment emphasizes the potential for states or local jurisdictions to amend the code to create a more pro-EVSE regulatory environment.

Sources: Dennis Clements, correspondence, 7/27/2012; http://www.afdc.energy.gov/case/1000?print

Permitting Template

Where the existing permitting procedures do not properly facilitate EVSE installations, municipalities can use a separate permit specific to EVSE. Having such a permit suggests a jurisdiction has researched the EVSE installation process in general. It should also be noted that in addition to the variance in application fees, the permitting form itself is the most apparent administrative difference between municipalities. Standardizing that form at the metro area, state or even regional level is one of the simplest ways to eliminate errors and confusion for filers, who may be homeowners or electricians who work across jurisdictional boundaries. The Alternative Fuels Data Center at the U.S. Department of Energy has created an EVSE-specific permitting template, and common adoption of it is a step in the right direction.[63]

Online Permitting

Several municipalities utilize online permitting process, which require large initial investment, but generally provide shorter turnaround times and lower administrative costs than paper-based forms. Cities like Houston, San Francisco, and Los Angeles go even further, offering automatic or instantaneous permitting for standard EVSE installs.[64] These online permits are often paired with rapid inspection-by guarantees, as discussed below. On the East Coast, a handful of Virginia jurisdictions have instituted online or same-day fax permitting procedures for EVSE.[65] Cary, North Carolina has instituted an online permitting process specific to EVSE.[66]

Installation

The permitting discussion so far has focused on standard EVSE installations, but more complex installations are of course possible. The type of installation will impact the extent of the expedited

[63] http://www.afdc.energy.gov/pdfs/EV_charging_template.pdf
[64] http://www.afdc.energy.gov/case/1003
[65] http://www.virginiaev.org/?page_id=17
[66] http://www.townofcary.org/Assets/Inspections+$!26+Permits+Department/Inspections+and+Permits+Department+PDFs/Res+Electric+Vehicle+Guide+3-12.pdf

permitting available, as well as the inspection required.[67]

Level 1

The simplest installation scenario is connecting an EVSE to an existing 110/120 V outlet, for either Level 1 EVSE. In those cases it's likely no permitting is required, though municipalities often recommend filing a permit anyway.

Level 2

Level 2 EVSE installations are generally more complex, especially in older building stock that demands upgraded circuitry and panels to support not only the 240V outlets required but also the "bandwidth" or local circuit capacity. Regardless of existing electrical capacity, level 2 chargers are stand-alone or wall-mounted appliances that must be hard-wired to the system. Although the device itself is no more complex than a household clothes dryer, the installation requires more expertise than plugging into a wall outlet.

DC Fast Charge

Not yet in wide application, DC fast charging stations will likely continue to be installed in primarily commercial locations. By definition of the type of heavier power, dedicated panels and hard-wired installation for a device that performs internal AC/DC current conversion, DC fast charging will likely not be a candidate for expedited permitting processes

Other Concerns

At the time of EVSE installation, the home or building owner may want to set up additional capacity, either in the form of additional conduit or panels for future EVSE installation, or maybe more commonly, in the form of sub-, interval-, or smart-metering systems that enable the user to record power usage or set up. This installation, which may or may not be covered by the utility in a given jurisdiction, can cause the work to be considered major.

Training Electricians

Though not generally part of the permitting process, it would be beneficial for electricians performing EVSE installations to be familiar with the hardware and aware of the unique electrical load requirements of EVs when calculating electric panel capacity. It is also important to make sure electricians are aware of alternatives to eliminate having to make expensive panel upgrades and that they are not adding cost to customers by requiring such upgrades. This is especially important in the older building stock of the Northeast.[68]

Training as many electricians as possible in EVSE installations will benefit customers by providing more competition among licensed electricians experienced with EVSE; [69] evidence has shown that OEM-approved installers can charge up to 75% more and may take longer to complete the installation than their independent competitors.[70] Installer training can help to address basic how-to issues and to familiarize electricians with a variety of EVSE devices and best practices for different installation scenarios.

Inspection

Inspection is the last step in the permitting process. Ensuring that any uncertainties or time requirements are minimized is an important part of expediting the permitting process, and several municipalities guarantee inspections within a certain timeframe, even on the same day.[71] Los Angeles provides a 24-hour guarantee but allows usage of the EVSE prior to inspection.

The need for training and professional development has been identified as a key barrier to expedited inspection. Programs like Clean Cities' Electric Vehicle Infrastructure Training Program (EVITP) address other components of inspection, making sure the inspectors are familiar with EVSE equipment and requirements. EVITP facilitators have generally found that inspectors are well-informed, or at least know of an informed party to reach out to in case of any questions.

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[67] For more detail on installation scenarios, see the companion report: *Siting and Design Guidelines for Electric Vehicle Supply Equipment*.

[68] Interview with Steve Russell, September 19 2012

[69] SPX, the installer for Chevy Volts for the EV Project, http://www.plugincars.com/wanted-fair-costs-home-charger-installations-106724.html

[70] From Steve Russell of MA DOER: Aerovironment, which provided EVSE in Massachusetts, recommended installers cost more and took months longer to install than community electricians.

[71] Under a pilot program for single-family residential EVSE; if permit is filed by 12:00 pm, Houston's Code Enforcement Group will complete an inspection that same day.

Further, though permits and processes are local, inspectors often work for a number of municipalities, with third party inspection agencies such as Middle Department Inspection Agency, Inc. working across state lines.[72] These inspectors have found that installation issues aren't unique to EVSE, and are the same as those of any other electrical appliance.[73] An effort in Massachusetts has focused on inspector training and EVSE-awareness, and the program has included traveling workshops with licensing departments around the state conducted through the state's Clean Cities Coalition and Department of Transportation.[74] In Pennsylvania, private (or third party) inspection companies are actually required by law. In such a case, it would be beneficial to ensure that private firms and inspectors are included in any outreach.

Limitations

The expedited permitting processes discussed in this section are only applicable to single family homes, or what is most often considered the "standard" installation. As the EV market matures and less optimal EVSE installation contexts are encountered, municipalities will have to develop and pilot permitting practices for multifamily buildings, office and commercial lots. Many of these contexts are similar to the standard installation, potentially requiring minimal service upgrades, and often in close proximity to electric panel.

Standardization of permitting in commercial fleet scenarios could have a large impact. A high degree of uncertainty exists for commercial fleet permitting, and it also relies heavily on grant funding. One fleet manager suggested EVSE installations at their facilities cost $25,000 each. Any savings found in the installation process would allow funding for additional EVSE, and realization of the benefits from fleet conversions.

Utility Notification

Due to electrical load concerns it is beneficial for utilities to be notified of EVSE installation. This notification can happen via dealerships, EV owners or state departments of motor vehicles. There is an advantage to notification occurring through the permitting process, as it does in Atlanta[75], so that permitting applications and installation specs can inform a utility of potential load requirements that can impact local transformers. A municipality, if necessary, would also have the ability to delay permitting approval until a utility is able to upgrade its infrastructure to handle the load.[76]

[72] http://mdia.us/

[73] John Murach, Director of Business Planning and Corporate Performance, Baltimore Gas & Electric, interview, 9/20/ 2012

[74] Steve Russell,Massachusetts Department of Environmental Resources and Clean Cities Coordinator interview, 9/19/2012

[75] http://www.atlantaga.gov/modules/showdocument.aspx?documentid=538

[76] Some stakeholders believe that this needs to be done earlier .Once a permit is filed, the car has already been bought, and the EV owner may have already started using level 1charging at home. Having the dealership or DMV notify utilities would give the utilities more time to make any needed upgrades..

TOOL 5: PARTNERSHIPS AND PROCUREMENT

Successful local plans for EVSE rollout have been multi-faceted in scope; in order to achieve statewide and local impacts, it is useful for EV proponents in government and the private sector to have a forum for cooperation that can react to specific state and local conditions. According to one NGO stakeholder, Albert Dahlberg, Founder of Project Get Ready Rhode Island, EV infrastructure deployment will require the coordinated support of at least two of the following: public sector leadership; utility leadership; nonprofit leadership. The authority to regulate or enforce different aspects of EV-readiness and EVSE deployment will lie within different state and local agencies, in a combination of actors that will differ from state to state. For example, while NYSERDA leads EV activities in New York, the Department of Commerce leads EV planning in Washington State. In both cases, permitting, codes and zoning all reside under the purview of other departments, and at different levels of government. Thus the reduction of barriers to EVSE deployment will come from collaborative efforts, such as those through large-scale and multi-agency coalitions and working groups, but also public-private partnerships and utility participation, all of which have recently contributed to a broad-based understanding of intersections among local and regional goals in model jurisdictions.

The role of the private sector can be just as important in preparing the region for comprehensive EVSE deployment. Federal and state funding can be allocated to private infrastructure developers (ECOtality's EV Project, for example) to gather data, test business models and pilot high-visibility EV charging. Additionally, as discussed below, the process of vetting vehicles and technology products for procurement by state and local fleets and infrastructure projects is another form of partnership that will accelerate the public sector's ability to act as an early adopter of EVs.

Public-Private Partnerships

Due to the decentralized nature of EVSE deployment, it is critical to note that the expansion of a network of EV charging infrastructure will be heavily dependent on partnerships of all kinds. These include traditional public-private partnerships between government agencies and private businesses, as well as partnerships with employers, multi-dwelling unit residential landlords, homeowners' associations. These partnerships will need to occur at multiple jurisdictional scales. Planning for the region will include collaboration around both site-by-site installations and among organizations and agencies that can help to bridge boundaries.

An established best practice, whether through legislative act or other means of coordination is the creation of a working group or council responsible for the analysis of EV and EVSE feasibility, costs and public benefits.[77]

The Maryland Electric Vehicle Infrastructure Council promotes the use of EVs in the state. It is staffed by the Maryland State Department of Transportation (MDOT), with support from the Maryland Energy Administration and the Maryland Public Service Commission, and is composed of members representing other state agencies, the state legislature, Governor appointees, public and private utilities, professional associations and industry.[78] Maryland's EV Council was enacted through state legislation, and its responsibilities include: development of a statewide action plan; assistance in developing and coordinating statewide standards for permitting and installation of EVSE; recommendation of a statewide infrastructure plan and incentives; and development of targeted fleet policies. [79] Creation

[77] See EVSE Codes for the Built Environment Document for more details.

[78] http://www.mdot.maryland.gov/Office%20of%20Planning%20and%20Capital%20Programming/Electric_Vehicle/Documents/EVC_Fac_Sheet_Final.pdf

[79] "Maryland Electric Vehicle Infrastructure Council" (SB176/HB167, 2011 Session)

of state-level, interagency and cooperative working groups, like Maryland's EVIC, requires enabling or charter legislation for effective establishment.[80]

Another approach to generating regional participation is illustrated by Washington State's legislation requiring that the local regional planning organization, the Puget Sound Regional Council (PSRC) seek federal or private funding in order to plan for EV infrastructure deployment, with priority given to projects that include development of model ordinances and local government guidance.[81]

In London, UK, the transportation planning agency Transport for London (TfL) is leading a consortium of public and private partners involved in a "Plugged-In Places" Initiative (PIP). The city agency-led consortium was awarded approximately $15 million to support EVSE deployment throughout the city, a portion of which is used to provide matching funds for publicly-accessible charging stations.[82]

Regional Planning: Metropolitan Planning Organizations and Councils of Government

MPOs and Councils of Government have also taken coordinating and leadership roles within the TCI region. Larry McAuliffe, Sustainability Manager at the New York Metropolitan Transportation Council (NYMTC) notes that such regional planning organizations are often working to coordinate activities of agencies and authorities that are already quite strong on their own, and many of which are already cooperating.[83]

There are often funding opportunities available to MPOs for transportation planning and compliance with GHG goals. However, the funding available to such organizations may come with specific directives, and often MPOs are unable to pursue programming that does not contribute to an environmental bottom line.

Both MPOs and COGs collect and disseminate information with members. This role makes regional planning organizations an ideal place for developing partnerships across different levels of government, connecting with the needs of municipalities—another key need identified by jurisdictions. For example, the DC area Metropolitan Washington Council of Governments (MWCOG) formed a working group around EVs in order to meet the needs of early-acting member groups. Fairfax County, Virginia, was one local government that had begun to plan for EV-readiness, but wanted to ensure that they were not out of step with other actors in the region, and sought guidance from the COG.[84]

This level of organization represents an important outreach opportunity across the region. According to MWCOG's Environmental Resources Director Joan Rohlfs, "You can't view a local government as a single actor. That's a mistake. We deal with a number of different committees and professionals who work with any given place. [There are] always people to connect with on EVs in municipalities… the transportation director [may be] interested, even if the county administrator is not."

[80] http://www.mdot.maryland.gov/Office%20of%20Planning%20and%20Capital%20Programming/Electric_Vehicle/Documents/Senate_Bill_176.pdf
[81] RCW 47.80.090; HB 1481 (2009)
[82] https://www.sourcelondon.net/; Omoniyi Giwa, Senior Borough Programme Officer, Transport for London, interview, 9/12/12
[83] Larry McAuliffe, Sustainability Manager, NYMTC. Interview, 9/17/2012
[84] Joan Rohlfs, Environmental Resources Program Director, MWCOG. 9/18/2012

EV Working Groups in the TCI Region and Beyond

Connecticut: Similar to Maryland, former Governor M. Jodi Rell mandated the formation of the Connecticut Electric Vehicle Infrastructure Council to produce a report of recommendations per Executive Order 34. Senate Bill 1168, which includes several recommendations for enabling and incentivizing EV adoption, was the result of the Council's report, though is yet to be voted on.

Rhode Island
At a smaller scale, Project Get Ready Rhode Island has led EV-ready planning efforts in the state by utilizing its role in the nonprofit sector to coordinate interested parties in government and to push forward a relationship with National Grid, the only electrical utility in the state.

Vancouver
The BC Electric Vehicle Working Group united interests and expertise from local and provincial government, utilities and energy resources and academia around creating a comprehensive EV-ready and infrastructure deployment strategy. The BC EV Working Group was comprised of 10-12 carefully selected institutional members, representing different levels and agencies within the provincial and city governments, NGOs, the electrical utility and academia. In its bimonthly meetings, the working group sought to understand the large scale questions in the context of what small steps could be taken forward.

London
In London, what is effectively a government-government partnership employs heavy lifting at the city level, allowing for system-wide consistency in the Transport for London Source Network as well as freedom among local borough governments in the implementation and management of EVSE.

Sources: Sierra Club, "Electric Vehicles – Proposed and Passed Legislation & Programs" August 2012; Albert Dahlberg, Director, Project Get Ready Rhode Island. Interview, 9/19/2012; Malcolm Shield, 7/18/2012; Omoniyi Giwa, Senior Borough Programme Officer, Transport for London, interview, 9/12/12

Utility Participation and Local Leadership

Local utility companies can play an important role. In an example from outside the TCI region, Southern California Edison's (SCE) approach to EV-readiness is intensive, and demonstrates potential for utility participation in other localities. The utility, serving much of the Los Angeles' mega-region, recognizes the necessity for proactive approaches to increased EV ownership and the expansion of fast charging facilities.

Some of SCE's concerns include homeowners purchasing and self-installing EVSE from retailers like Home Depot, and the reality that EV early adopters are likely heavy electricity users. SCE also recognizes the contexts specific to their service area, including the need to upgrade EV charging facilities constructed in the previous century, as well as climate and building stock variation. The energy supply for many area homes may only be 40 amps—insufficient for level 2 EVSE.

SCE's mission is to provide safe and reliable electrical service, and this mission drives SCE's involvement in the EV infrastructure space. Uniform messaging on EVs and EVSE is a primary goal; as such SCE has developed outreach programs and pursued comprehensive stakeholder outreach to achieve it.

SCE actively monitors EVSE deployment through several partnerships: with auto manufacturers and dealers to obtain data on electric vehicle orders, with EVSE service providers who sell or lease charging stations, and via municipalities' notification systems indicating EVSE installation permits or electrical service upgrades. The utility itself scrutinizes spikes in energy use, and encourages owner-notification with special EV rates on time-of-use meters.[85]

Finally, SCE leads and partners in energy-related research, most recently with UCLA and UCSB. SCE also aids in the dissemination of reports through transportation and regional planning organizations.

[85] Beth Neaman, Southern California Edison. Interview 8/2/2012

Procurement Policies Link Government Fleets to Private Innovation, Public Benefit

Procurement policies can be utilized either to require that government 1) purchase a certain percentage of EVs (or EV-related services) or 2) consider such a purchase as a part of any procurement process.[86] At minimum, states should encourage state and local governments to adopt LEVs by including EV models and EVSE products on state purchasing lists.[87] Government fleets have been recognized as trendsetters in the EV market, and jurisdictions interested in promoting EV-readiness should consider incorporating EVs and PHEVs into local and state fleets whenever possible. Several states and local jurisdictions have taken steps to require that public sector fleets meet certain environmental standards. Procurement policy is an area where the federal government can also play a role; many local government fleets purchase vehicles from the General Services Administration schedules.

Alternative Fuel and Advanced Vehicle Acquisition Requirements

In Delaware and Vermont, all new light-duty vehicles that state agencies, departments and offices purchase must be hybrid electric, alternative fuel, fuel-efficient or low emission vehicles, unless such a purchase compromises health, safety, or law enforcement needs. Additionally, the state must develop procedures for diesel fleet vehicles to use biodiesel fuel blends of the highest percent content that is practical. (Reference Executive Order 18, 2010)[88]

In Vermont, the Department of Buildings and General Services are required to consider AFVs when purchasing vehicles for state use, as per Vermont Statutes Title 29.[89]

Public-Private Partnerships

Many EV-ready municipalities have begun partnering with industry to develop and vet new design ideas and models for future government procurement. Such partnerships can involve product design and procurement as well as services, and can be a part of innovative strategies or fit within existing RFP or bidding process.

Innovative Partnerships Programs Channel Funding

Oregon demonstrates policy and practice integration across state and local levels. Oregon DOT and the State's Office of Innovative Partnerships and Alternative Funding have worked with industry and government partners on EV projects and pilots, including ECOtality's EV Project, the facilitation of the West Coast Green Highway and administering a Tiger II EV infrastructure grant.

In September 2010, the Oregon Department of Transportation (ODOT) received $700,000 in federal stimulus funding to install up to eight fast charging stations in southern Oregon. In October of the same year, ODOT was awarded an additional $2 million from the TIGER II program in order to enable the state to build necessary infrastructure to support and expand the range of existing EVs.[90] The stations "will be placed no more than 50 miles apart on highways outside of metro areas to create a continuous network."[91]

Limitations

Short-Staffed Planning Organizations

An important but overlooked limitation on the regional planning process is the difficulty of ensuring staff time sufficient to cover initiatives and program development. The Metropolitan Washington Council of Governments has, at the height of the activity of its EV Infrastructure Planning Work Group, been able to devote a significant number of staff hours among five staff members to developing the research, recommendations and data required to put forth a draft plan. Because of the structure of the

[86] Often such policies focus on low or zero emission vehicles, including EVs.
[87] Albert Dahlberg; Ken Frank NJDOT. Interview 9/19/2012
[88] http://www.afdc.energy.gov/laws/law/DE/8665
[89] 29 VSA 903 (g) http://www.leg.state.vt.us/statutes/chapters.cfm?Title=29
[90] Washington State was awarded a similar grant of more than $1.3 million: http://westcoastgreenhighway.com/projects.htm
[91] Press Release, US Department of Transportation, Office of Public Affairs. April 8, 2011. http://www.fhwa.dot.gov/pressroom/fhwa1114.htm

organization, funding for this preliminary research project was possible through COG membership.[92]

Limitations to Procurement

Even areas that require statewide compliance with AFV acquisition requirements may face issues at the local level. Local governments may need additional support in gathering data, reviewing vehicle model or product choices, and finding staff time to vet vehicles or charging stations. These are all challenges that can impede local decision-making and timelines.

To aid local jurisdictions in the procurement process, states can:

- Provide a model RFP
- Develop a vehicle model list
- Negotiate a master price agreement

Of course, funding represents a significant hurdle to every local government. Ensuring that the types of programs described in this section continue to expand to new jurisdictions is an issue of available grant or subsidy funding. To paraphrase frequent responses from public sector stakeholders during the research process: we would do it if we had the money.

In addition to administrative and funding limitations, the growing EV market may simply not be growing fast enough, particularly in the fleet sector. It may not be possible at present for localities to convert to EVs if there is not an appropriate vehicle model available.

However, these limitations to procurement may find at least a partial solution in public-private and business-to-business partnerships and agreements that can help local jurisdictions connect to existing and developing EV sector resources.

[92] Joan Rohlfs, Environmental Resources Program Director, MWCOG. 9/18/2012

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 or permitting, 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 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 type of zoning from the U.S. are few. Furthermore, zoning has not yet been tested in its ability to incentivize EVSE deployment, such as through developer incentives.

Parking

As with zoning, regulating EVSE through parking ordinances can set 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, garages or on the street. Parking regulations can be implemented by localities or by states, like Hawaii's requirement to include 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 and municipal lots and garages, and is therefore an important part of infrastructure development and management. Finally, 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 the 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 in new construction. As a result, code changes will require buy-in from the development community, but precedents from cities like Vancouver indicate that costs will not increase dramatically.

Municipalities 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**.** Updating and streamlining permitting to should first reduce and standardize fees to the consumer. In the TCI region, 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. 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 and 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 their 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 of 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, its 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 like 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 or improving accessibility, among others.

The last three summary categories address implementation, likely partnerships and agency actors, and 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.

EVSE Planning and Policy Tools Summary

CRITERIA	ZONING	PARKING	CODES	PERMITTING
JURISDICTIONAL SCALE				
Municipal	●	●	○	●
State	○		●	●
TOOL POTENTIAL				
Allow	●			
Incentivize		●		●
Require	●	●	●	
EVSE CONTEXTS				
Public Realm		●	●	●
Private Development	●		●	
New Development	●		●	●
Existing Development	○	●		●
Land Use	- Residential - Industrial - Commercial	- Parking - Transportation - Commercial	- Residential - Industrial - Commercial - Parking - Transportation	All But Publicly-Owned
Key Installation Scenarios	- Multi-Family - Retail - Fleets	- On-Street - Municipal CBDs	- Multi-Family Residential	- Single- and Multi-Family Residential
TOOL STRENGTHS	- Specifies Allowable Uses - Sets Development Standards - Updates Existing Rules - Works With Comprehensive Plans	- Is Enforceable - Promotes On-Street EVSE - Influences Accessibility and Design	- Sets Development Standards - Is Enforced - Creates Minimum Parking Requirements	- Reduces Fees to Consumer - Supports Public Safety - Is Enforced - Eases Implementation
TOOL LIMITATIONS	- Is Not Yet Tested as Incentive - Can Be Difficult to Enforce, Inspect - Imposes Developer Costs	- Relies on Developing Business Models - Can Cause Lost Opportunity Costs - May Result in Lost Parking for Non-EVs	- Have Slow Revision Process - Impose Developer Costs - National Model Code Does Not Incentivize or Require EVSE	- Is Not Yet Tested as Commercial Incentive - Adds Costs Due to Professional Training - Cannot be Used to Require EVSE
IMPACTS	- Encourages EVSE in Multiple Land Uses - Raises Visiblity - Can Influence Good Design	- Adds to User Accessiblity, Both ADA and Availability of EVSE - Raises Visibility - Enables EVSE in Public Realm	- Can Require EVSE or Wiring in New Development - Can Create Streamlined Permitting Processes - Help Meet Emissions Reductions Goals	- Implements Public Safety Standards - Reduces Installation Timelines - Reduces Permitting Fees
IMPLEMENTATION	- Agency Initiative - Public Review Process - Private Development	- Agency Cooperation for Enforcement and Ticketing - Host-Operator Agreements - Private Management	- State and Local Agency Oversight - Flexible Voluntary Code Appendices	- Permit Templates - Site Assessment - Inspection - Utility Reporting - Technology Updates - Professional Training
AGENCY OVERSIGHT	- Department of Planning or Zoning - Department of Buildings - Planning Commission or Board	- Department of Transportation - Public Works Department	- Department of Commerce or Building Codes Division - Environmental Compliance - Department of Buildings or Construction - Utility Regulation	- Department of Buildings or Construction
PARTNERSHIP OPPORTUNITY	- Municipal Working Group - Development Community - Comprehensive Planning Org.	- Private Garage Operators - Local Businesses - Charging Networks and OEMs	- Regional Planning/Working Groups - Electrical Utilities and Industry - State and Local Agencies - Code-Setting Bodies	- Inter-Agency Cooperation - Inspection Contractors - Standards and Professional Organizations, Unions
CASE STUDIES	- Washington State Municipalities - Vancouver, CAN - New York, NY - London, United Kingdom	- Hawaii - California - Maryland - London, United Kingdom - Tokyo, Japan	- Oregon - California - Vancouver, Canada - Seattle, WA	- Oregon - New Jersey - Maryland - Raleigh, NC - Houston, TX

Estimated Relative Effectiveness
○ *Somewhat Effective*
● *Effective*

Moving EV-Ready Planning Forward

This guide has identified EV-ready planning and policy tools available for public-sector action. However, the role of the private sector can be just as important in preparing the region for more comprehensive EVSE deployment—something to remember when organizing partnerships and working groups, or when considering charging station or fleet models for procurement. Partnerships that successfully link government agencies, industry and interest groups, and connect ideas and resources will create maximum-impact plans.

Of course, no one-size-fits-all planning approach will successfully incorporate EVSE into local jurisdictions, because each state or local government will present distinct opportunities and challenges. Presenting the tools' opportunities as well as limitations has been intended to help establish realistic plans and move forward on local goals.

In addition to the options and criteria outlined in this guide, the research that produced this guide found that places moving forward on EV-ready policy and plans have almost all been home to an EV champion. Whether that champion is an individual or an agency, planning for a new type of infrastructure with no precedent takes a visionary approach. Further, the ability to invest time and resources, build relationships and spearhead public outreach are all key characteristics of that champion. In short, EV-ready municipalities are those that have recognized the opportunities associated with EVs and as a result have begun to address the challenges and barriers to their widespread adoption using the tools at their disposal.

This guide to policy and planning tools has approached EV-readiness from the local perspective. For the region, translating local policy, law and practice into a connected, cohesive and coordinated infrastructure network poses the next challenge to TCI stakeholders. Activating these tools through a larger policy vision at the city, state and regional level will more effectively enable high-level cohesion and widespread reduction to EVSE barriers. Policy provides incentive to encourage local spending and staff time in service of meeting state and regional goals and requirements.

The TCI region has a need to identify larger-scale opportunities to create boundary-crossing solutions in the EV sector. The decentralized nature of the EV charging infrastructure network is challenging, as is the dynamism of EV and EVSE-related technology. Crafting a cohesive and substantive regional approach for EVSE deployment will depend on stakeholder agreement on what EVSE is, where it can go, how much it should cost to install, how its use will be encouraged or enforced and what parties will be involved in funding, planning and administering the process. These are all questions that relate to the different tools available to cities and towns: zoning, parking, codes, permitting and inspection, partnerships and procurement. At present, varying degrees of interest in embracing EVSE planning among local and regional actors risks a patchwork approach to infrastructure deployment based on ad hoc solutions.

While it is not the goal of this guide to propose in-depth recommendations, an important next step to enable consistent application of the planning and policy tools highlighted here is to create a detailed profile of the TCI region's regulatory framework, including a review of legal requirements like environmental legislation and benchmarks, transportation plans and existing applications of the tools, including the many pilot programs in place throughout the region. Developing a baseline assessment of the regulatory environment specific to EVSE in the region can help stakeholders strategize around common goals and share applicable best practices.

Further, connecting planners, administrators, inspectors, other municipal employees and EV-industry professionals in the region's metro area sub-regions (specifically Washington, D.C.-Baltimore, Philadelphia, New York-New Jersey and Boston) through ongoing work will be important. Holding an annual conference and publishing a dedicated website are two recommendations that would help to establish the Network as a recognizable presence and an ongoing forum for EV advocacy and development. Taking the Network's activities further, establishing additional grant-funded opportunities to promote a working group with participants from

Clean Cities Coalitions is one highly viable approach.

In these and any future initiatives aimed at promoting EVs in the Northeast and Mid-Atlantic, the TCI Northeast Electric Vehicle Network is uniquely poised to act as a leader, connecting government, EV advocacy and industry stakeholders to develop long-term strategy across the region. Other organizations that can contribute directly to policymaking efforts, especially for long-term planning and outreach include, among others:

- Councils of government
- Metropolitan planning organizations
- Regional planning non-profits
- Public authorities (such as the Port Authority of New York-New Jersey)
- Clean Cities Coalitions

Multi-city and -state actors such as those above with means and motivation would be well-positioned play a transformative role in accelerating and broadening EVSE deployment. EV-ready planning in cities and towns across the TCI region will be most successful when done in support of state and regional policy priorities that target the primary benefits of EVs: reduction of the consumption of natural resources; reduction of air pollution that can cause cancer and other serious health effects; reduction of greenhouse gas emissions; improvements to soil and water quality; and anticipated economic development benefits.

At the state and regional levels, a vision for accomplishing each of these goals should clearly articulate the role of EVs and the importance of developing an EV battery charging infrastructure network. In cities and towns across the TCI region, EV-ready planning will make that vision possible.

APPENDIX A: OVERVIEW OF EVSE CHARGING LEVELS

APPENDIX B: GAPS AND OPPORTUNITIES

This section highlights additional opportunities that exist for jurisdictions that wish to become EV-ready. These are opportunities to address central challenges that rose to the top during this process. However, it is important to note that while these gaps affect municipal planning and municipal-level actors, such as local power authorities, decision-making in many of these categories is the responsibility of the states.

First, there are important regulatory gaps that should be addressed. These fall into three primary categories:

- Utility Regulation, Reporting and Access to Information
- Limitations on the Use of Public Property
- Local Program Incentives

Second, incentives for EVSE deployment have not been addressed in this guide. This appendix concludes with a brief overview of these opportunities.

Utility Performance, Regulation and Reporting

Resale of Electricity: NIPSCO's IN-Charge Electric Vehicle Program, Indiana[93] Reduces Electricity Cost

Resulting from a 2011 settlement with the US EPA, Indiana's second-largest electricity provider, NIPSCO, agreed to offer several programs aimed at reducing air emissions or preserving lands potentially impacted by air emissions. These programs resolved allegations that NIPSCO violated the Clean Air Act. Beginning in April 2012, one of these, the IN-Charge Electric Vehicle Program, offers financial incentives for EV purchase and use, including an aggressive time-dependent incentive.

Administered by the EVSE operator 350Green, the program first offers a credit of up to $1,650 to purchase and install residential EVSE, then, in order to facilitate time-of-use billing, it provides a free dedicated meter. Finally, enrollees receive free EV charging during off-peak hours (10 p.m. to 6 a.m. until January 31, 2015. The program is limited to 250 customers or until funding is exhausted (approximately $413,000).

Owner/Operators of EVSE are not Electricity Suppliers or Electrical Utilities

Some jurisdictions have identified as a potential barrier to EVSE installation the regulatory designations that apply to EVSE and the premises on which EV charging stations are installed. Ensuring that individual homeowners or business operators are not classified as a utility provider is one relevant step.

Maryland's EV Council identified the need to make a clear distinction between EVSE and electricity suppliers—i.e. utilities— a priority; without such a distinction in the state's law, it was unclear whether or not EVSE owner/operators would be subject to the same extensive regulations and tariffs as energy suppliers.[94] The EV Council recognized 1) the short-term issue of the excessive cost and market dampening effect of regulating each EVSE operator through the public service commission in the state and 2) the long-term issue of regulating the resale of electricity. This long term issue is highly relevant in many states across the TCI region and nation, but was considered by Maryland's EV Council as secondary to letting the young EV market develop. Acting first on the short-term issue of definitions, Maryland House Bill 1280 and Senate Bill 997 (2012)[95] amended the state's public utilities article, and eliminated the short-term barrier by exempting EVSE operators from regulation as electricity suppliers. Similarly, California's Assembly Bill 631, passed in 2011, stipulates that an entity providing electricity

[93] http://www.nipsco.com/Libraries/Our_Services/NIPSCO_EV_FAQ_FINAL.sflb.ashx

[94] Meg Andrews and Kristen Weiss, Maryland Department of Transportation, Interview 9/18/2012

[95] "Public Utilities - Electric Vehicle Users and Charging Stations - Exclusions" (SB997/HB1280, 2012 Session)

as fuel for light-duty electric vehicles will not be regulated as a public utility. California already had a precedent for the bill regarding compressed natural gas provision. As in the case of the CNG bill, AB 631 followed an earlier decision by the California Public Utilities Commission and extended that decision into law.[96]

Utility Notification

It is a good idea for utilities to be notified of EVSE installation because of el potential local power distribution load concerns. This notification can happen in several ways, from dealerships, EV owners, or state departments of motor vehicles. However, legal and privacy issues remain and absent enabling legislation, in many instances notification is voluntary. There is an advantage to it occurring through the permitting process in that it informs a utility of potential local distribution load requirements. A municipality, if necessary, may also have the ability to delay permitting approval until a utility is able to upgrade its infrastructure to handle the load. However, local permitting agency notification to utilities may not be possible in some areas either because procedural systems are not set up to do so, or there may be privacy concerns.

Plug-In Electric Vehicle Information Disclosure

Access to vehicle registration records has been a barrier for the study of EVs and markets, but also has been identified as a significant service issue for utilities and electricity providers. Representing several electricity suppliers in New England, Northeast Utilities considers notification to be a fundamental component of an optimized EV infrastructure, saying "[We] can accommodate [EVSE] if we know when and where."[97]

The inability for utilities and government departments outside motor vehicle registration offices to easily (or at all) access information regarding the registration and location of EVs is a problem for utilities. It is also a problem for EV planning efforts in general; matching demand to service, right-sizing regulations, developing metrics to determine success of EV-related pilots and programs and understanding then trend thresholds have been reached. Solutions could be developed either at the federal level or by the individual states.

Regulation of utilities includes utility notification of EVSE installation and the larger issue of the limitations on the resale of electricity. States like Maryland and Colorado have addressed reporting through legislation; utilities such as Greater Philadelphia's PECO have also developed companion initiatives in other places that offer monetary bonuses to home and business customers who report an EV purchase or EVSE installation in their home.[98]

Overall grid reliability is a state-regulated issue that drills down to the local level: the need of utilities to know and plan for increased loads on local transformers. In many locations, the motor vehicle registration databases are highly restricted due to privacy restrictions.[99]

In **Maryland**, utility members of the EV Council noted the need to react to the observation that EVs were clustering in certain neighborhoods.[100] House Bill 1279 and Senate bill 998 allows the state Motor Vehicle Association (MVA) to transmit to the utility critical data including the type of electric vehicle and street address of registration, with appropriate privacy provisions. [101] The decision to legislate at a time when there are roughly 700 EVs on the road in the state indicates that concentrated EV charging is a real utility concern that is not premature.
Similar in scope to Maryland's bills, California's Senate Bill 859 allows the state's DMV to disclose an EV owner's address and vehicle type to an electrical corporation or local publicly-owned utility if that information is used exclusively to identify where the EV is registered. The bill also allows such data to be acquired by automakers,

[96] http://www.triplepundit.com/2011/06/california-legislature-fueling-future-electric-vehicles/
[97] http://www.ncsl.org/documents/energy/WCollins-511.pdf

[98] https://www.peco.com/Environment/GreenVehicles/EletricVehicles/Pages/RegisterYourVehicle.aspx
[99] Maryland, Rhode Island and New Jersey are examples in the TCI region cited by interviewees for this project.
[100] Meg Andrews and Kristen Weiss, Maryland Department of Transportation, Interview 9/18/2012
[101] "Motor Vehicle Administration - Plug-in Vehicles - Disclosure of Personal Information" (SB998/HB1279, 2012 Session)

dealerships and individuals for statistical research or reporting purposes.[102]

Limitations on Use of Government Property

EVSE for publicly-owned land, such as national and state parks, highway concessions/public rest areas and municipal installations present permit-free installation opportunities but laws limiting the use of government property include restrictions on the resale of electricity as described above, as well as on commercial uses that may impact the ability for charging networks or EVSE operators to install or operate in certain areas.

Incentives

Other Local Ordinances and Program Incentives

- In addition to parking regulation, local ordinances, including some supporting program incentives, form the basis of local jurisdictions' EV-ready actions.
- EVSE-equipped loading zones or green loading zone designation
- Preferential parking in municipal garages and surface lots
- Metered parking incentives

Non-Financial Public Sector Incentives and Programs

- HOV lane access
- No emissions testing for battery electric vehicles (BEVs)
- Reduced vehicle registration fees
- Toll or congestion pricing exemption
- Preferential loading zones
- Night-time/off-peak delivery incentives for commercial vehicles
- Grace periods for electric delivery vehicles
- Use of noise regulations

Financial Incentives

- EV Sales tax exemption
- EV/EVSE tax credits and rebates
- Reduced registration fees
- Reduced inspection fees

Market-Based and Other Private Sector Approaches

- Queuing incentives for EV-equipped vendors at loading docks
- Reduced vehicle insurance rates for EVs
- Marketing and branding campaigns for early adopter firms, fleets and locations
- Preferential pricing for EVs in private garages[103]
- Reframing EVSE and associated infrastructure as advertising platform
- OEM incentives, such as MOUs to bring vehicles to local markets.

[102] http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0851-0900/sb_859_bill_20110926_chaptered.pdf

[103] See Rudin Management program.