



**NORTHEAST  
ELECTRIC  
VEHICLE  
NETWORK**

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Massachusetts DEP  
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# Transportation and Climate Initiative

- The Northeast Electric Vehicle Network was launched by the Transportation and Climate Initiative in 2011.
- TCI, an initiative facilitated by the Georgetown Climate Center, is a collaboration of eleven Northeast and Mid-Atlantic states and the District of Columbia, who work together to:
  - Reduce greenhouse gases in the transportation sector;
  - Create benefits and funding opportunities for states that are leading the way;
  - Align with federal government actions, goals and emerging inter-agency approaches;
  - Build on existing regional efforts.



# DOE Electric Vehicle Planning Grant

- TCI, together with NYSERDA and 16 of the region's Clean Cities Coalitions, received a nearly \$1 million Electric Vehicle Readiness Grant from DOE in Sept. 2011 to lay the groundwork for the Northeast Electric Vehicle Network.



## THE WALL STREET JOURNAL

### Northeast States Form Electric Vehicle Network

BALTIMORE — Ten states from Massachusetts to Maryland are joining forces to promote electric vehicles.

The Northeast Electric Vehicle Network announced Wednesday it will work to help plan and install charging stations throughout the region as well as attract private investment in clean vehicle infrastructure.

# DOE Electric Vehicle Planning Grant

- Under the DOE grant, the project partners are:
  - Engaging stakeholders, including auto manufacturers, charging station suppliers, utilities, municipalities, and other public and private entities interested in EVs;
  - Conducting a literature review of market barriers, electrical grid impacts, plans for EV rollouts, and other issues specific to the northeast;
  - Creating siting and design guidelines, model permits, building codes, and ordinances tailored to the TCI region;
  - Undertaking education and outreach activities to raise awareness of the benefits of EVs and share the products of this work.



U. S. Department of Energy



# Stakeholder Engagement

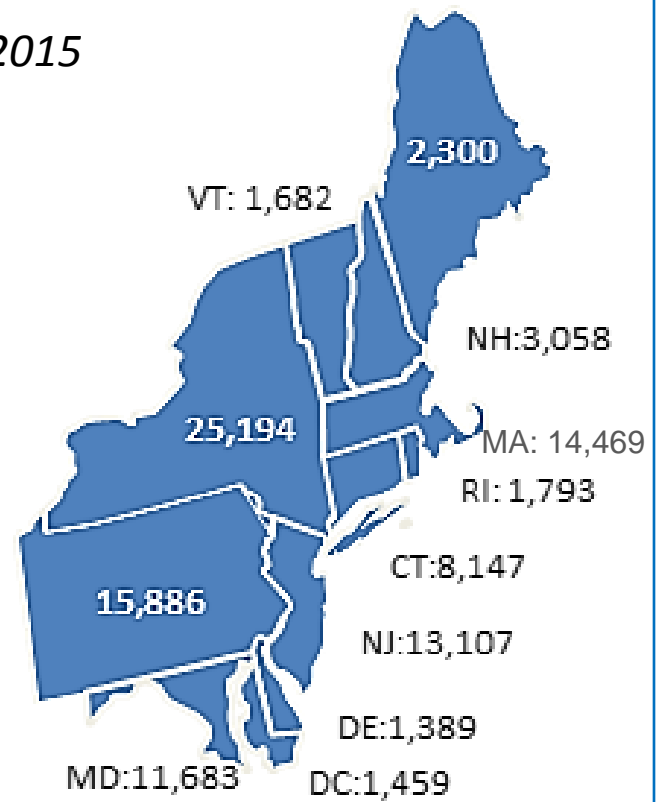
- The project partners have engaged stakeholders at the local and regional level to assess barriers and discuss a vision for EV deployment in the region.
  - The Clean Cities Coalitions have worked with local stakeholders to assess the state of EVs in their jurisdictions.
  - TCI has held regional dialogues with public and private sector stakeholders.
  - TCI and NYSERDA have worked with other DOE EV grant recipients in the region to minimize duplication.



# Literature Review

- TCI's literature review assesses market barriers, electrical grid impacts, plans for EV rollouts, and other issues specific to the Northeast.
- The literature review was prepared by the Center for Climate and Energy Solutions (C2ES) for TCI, the Georgetown Climate Center, and NYSERDA.
- *The report is available on the Northeast Electric Vehicle Website, [www.northeastevs.org](http://www.northeastevs.org)*

*Estimated EVs on the Road by 2015*





# Guidance Documents

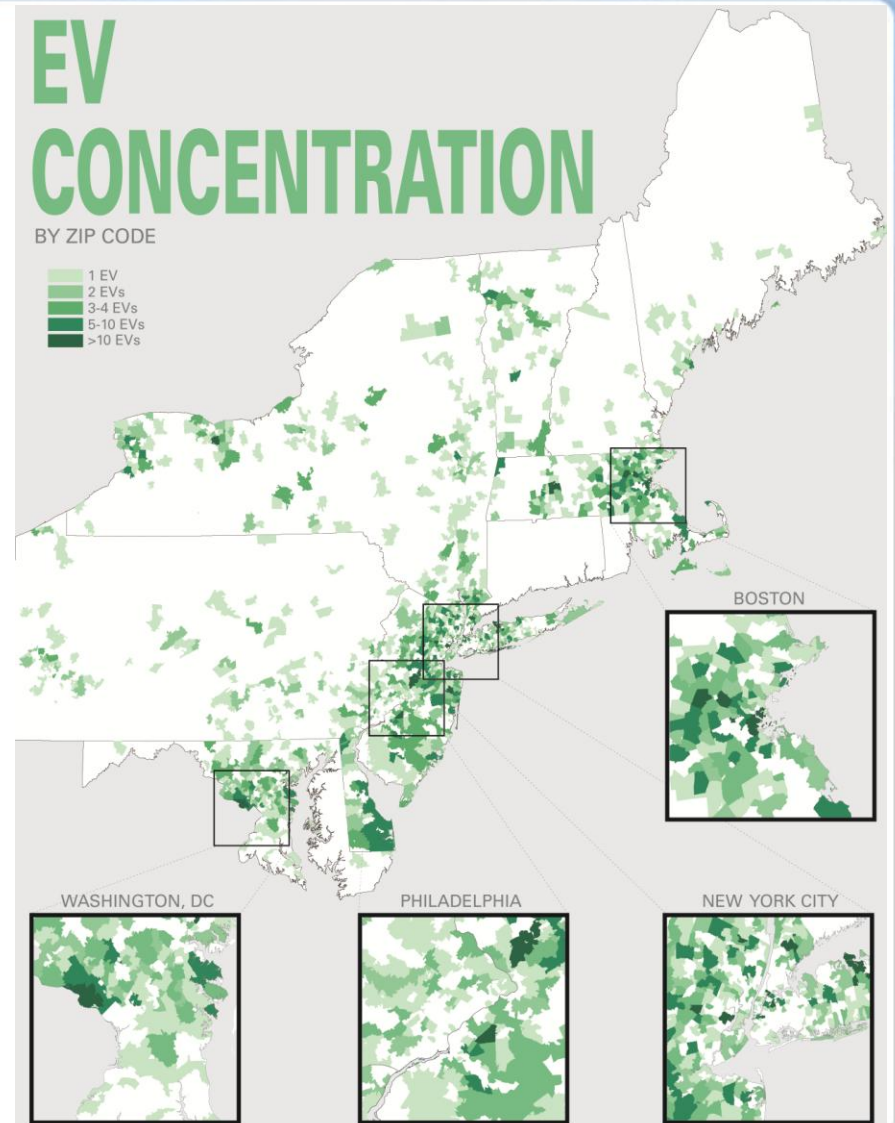
- Consulting team Energetics and WXY is creating a series of EV guidance documents for the TCI region. These documents include:
  1. An “Analysis of Current EV and EVSE Deployment” in the TCI region;
  2. An “EVSE Cluster Analysis;”
  3. “Siting and Design Guidelines for Electric Vehicle Supply Equipment;”
  4. A report on “EV-Ready Codes for the Built Environment;”
  5. And an “EVSE Tool Kit: Administrative and Planning Strategies for Local Jurisdictions.”



# Assessment of Current EV and EVSE Deployment

The deployment assessment:

- Highlights trends in EV ownership and charging station locations;
  - Offers recommendations to maximize the impacts of EVSE installations; and
  - Offers recommendations for further areas of study.
- Map to the right shows the concentration of EVs in the Northeast by zip code.*





# Assessment of Current EV and EVSE Deployment

- The assessment also highlights a number of demographic trends, and finds that:
  - There are large discrepancies in EV ownership on a state-by-state basis;
  - A significant portion of the region's EVSE is located at dealerships; and
  - New charging stations should be located at destinations that are within driving distance of EV communities.

## DEMOGRAPHICS\*

The typical EV community is **YOUNGER**, more **EDUCATED**, **WEALTHIER**, less dense **RURAL & SUBURBAN**, and more **PROFESSIONAL**

All the above characteristics are greater in communities with **THREE OR MORE EVs**

- **YOUNGER**, tech-savvy and eco-conscious

**6%** greater under 45 population

**1.5 Years** younger median age

- **WEALTHIER** and desiring to show off the latest eco-purchase

**38%** higher median household incomes

**47%** more households with income  $\geq$  \$200,000

- **Highly EDUCATED** and more concerned with energy security

**31%** more bachelor's degrees

**47%** more graduate degrees

- **RURAL AREA & SUBURBAN DWELLER** living in stable households

**40%** greater home values

**38%** more homes with four or more bedrooms

- **Diverse occupation base** with high percent in **MANAGERIAL** positions

**21%** more management, business, science and arts roles

**23%** more in professional and scientific industries

\*For ZIP codes and census tracts, based on 2010 Census and American Community Survey data

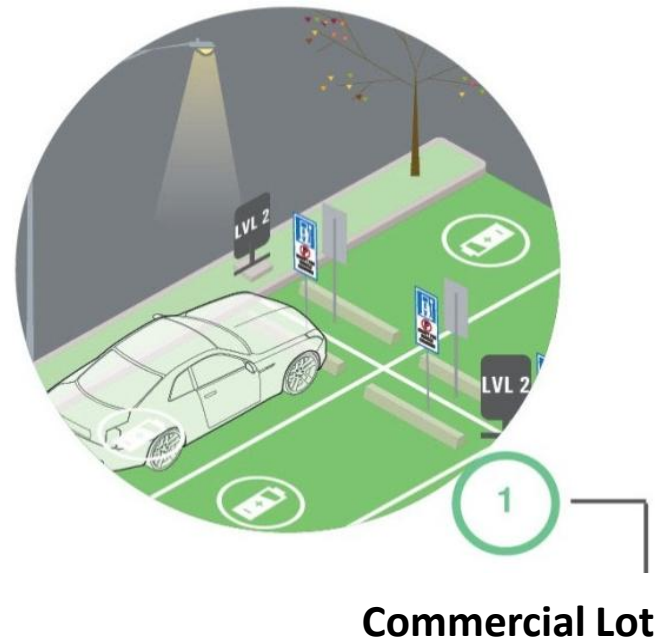
# EVSE Cluster Analysis

- The EVSE Cluster Analysis proposes nine land use “clusters” that are strong areas of current and potential EVSE deployment.
  - These clusters were chosen based on:
    - The behavior of the typical user;
    - The site’s operations;
    - External influences like geography and demographics; and
    - The ability of a cluster to provide benefits to the EVSE host and wider public.
  - The analysis also uses case studies to demonstrate how the clusters can effectively support EV use.

Medical Campus	Downtown
Higher Education	Commercial Office
Retail	Multi-Family
Leisure Destination	Regional Transportation
Fleet and Freight	

# Siting and Design Guidelines

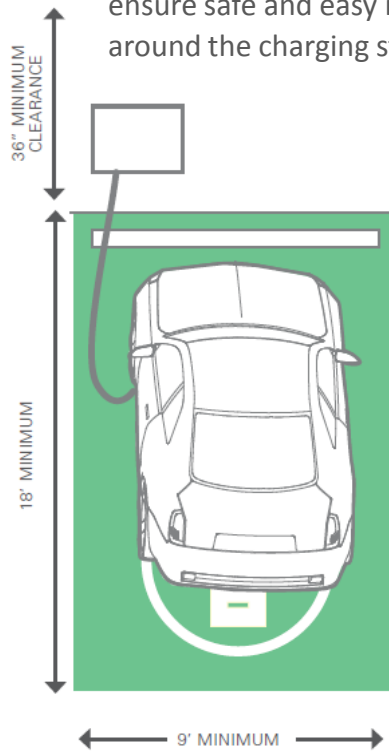
- The guidelines provide siting and design recommendations at the micro level. Specifically, these guidelines:
  - Identify key siting and design issues that are relevant to local governments, developers, homeowners, businesses, utility providers, and other organizations; and
  - Provide an overview of elements of site selection and design and installation scenarios.
- This guide is for installers involved in EVSE deployment at commercial lots, multi-family residences, on-street charging, service station models, and fleets.



# Siting and Design Guidelines

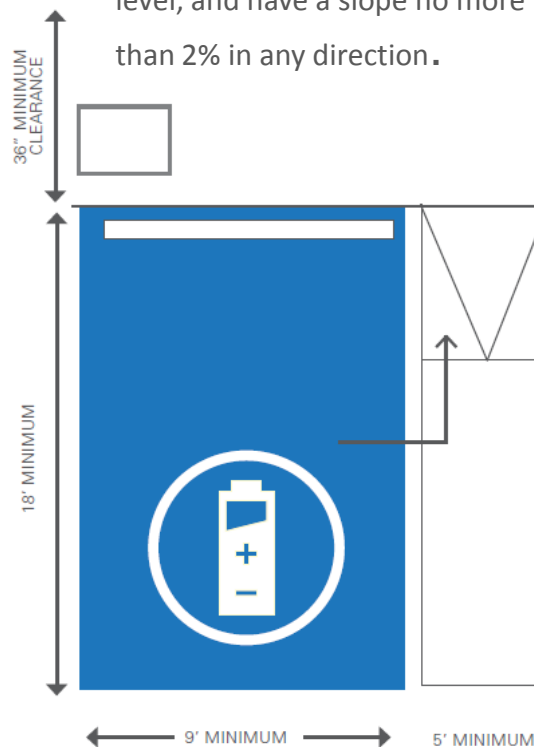
## Standard Parking Space

**Considerations:** More than typical space is required in order to ensure safe and easy movement around the charging station.

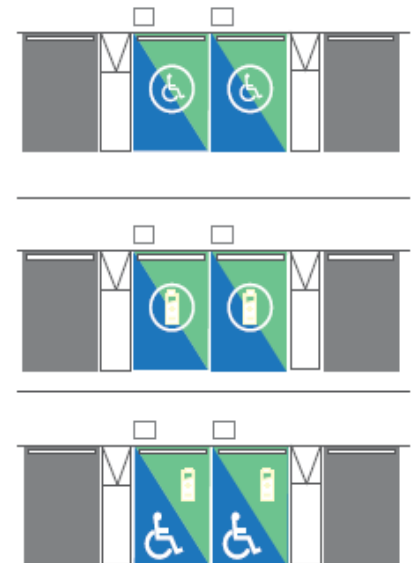


## Parking Space Considerations for Wheelchair Accessibility

**The** ground surface should be firm, level, and have a slope no more than 2% in any direction.

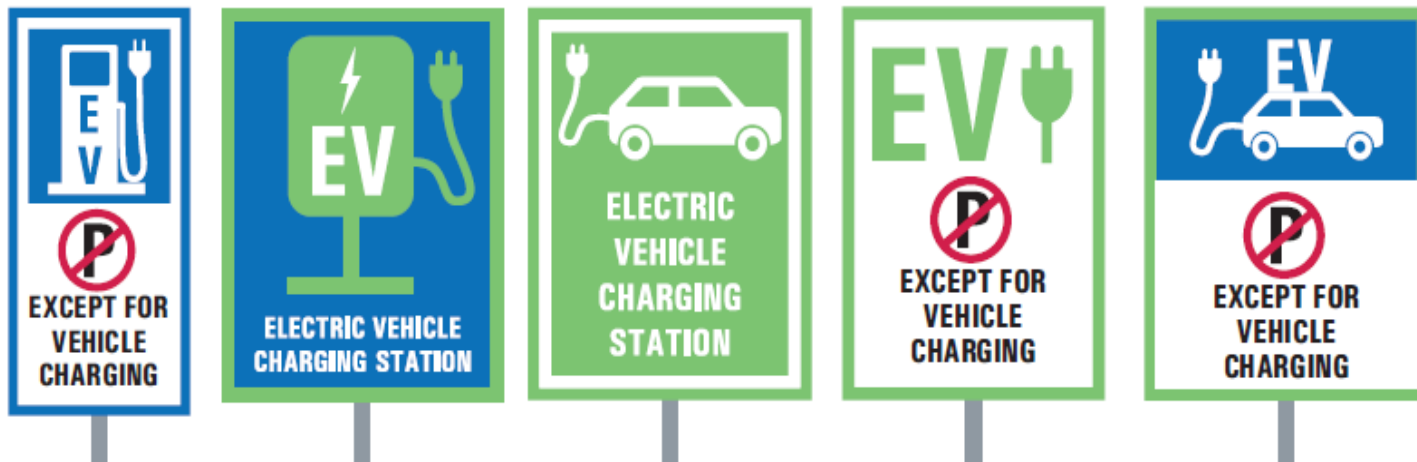


## Possible Variations for Wheelchair Accessible EVSE Charging Spaces



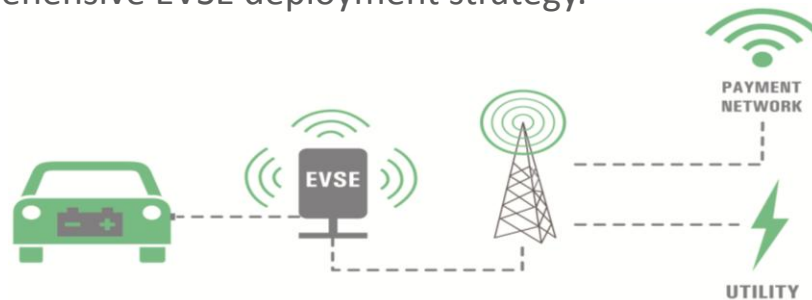
# Siting and Design Guidelines

- A combination of symbol and text is recommended.
- The term “charging” should be used to ensure hybrid vehicles do not use the spaces for parking.
- The selected EV symbol should be larger and more pronounced than the no-parking symbol to avoid confusing messages.



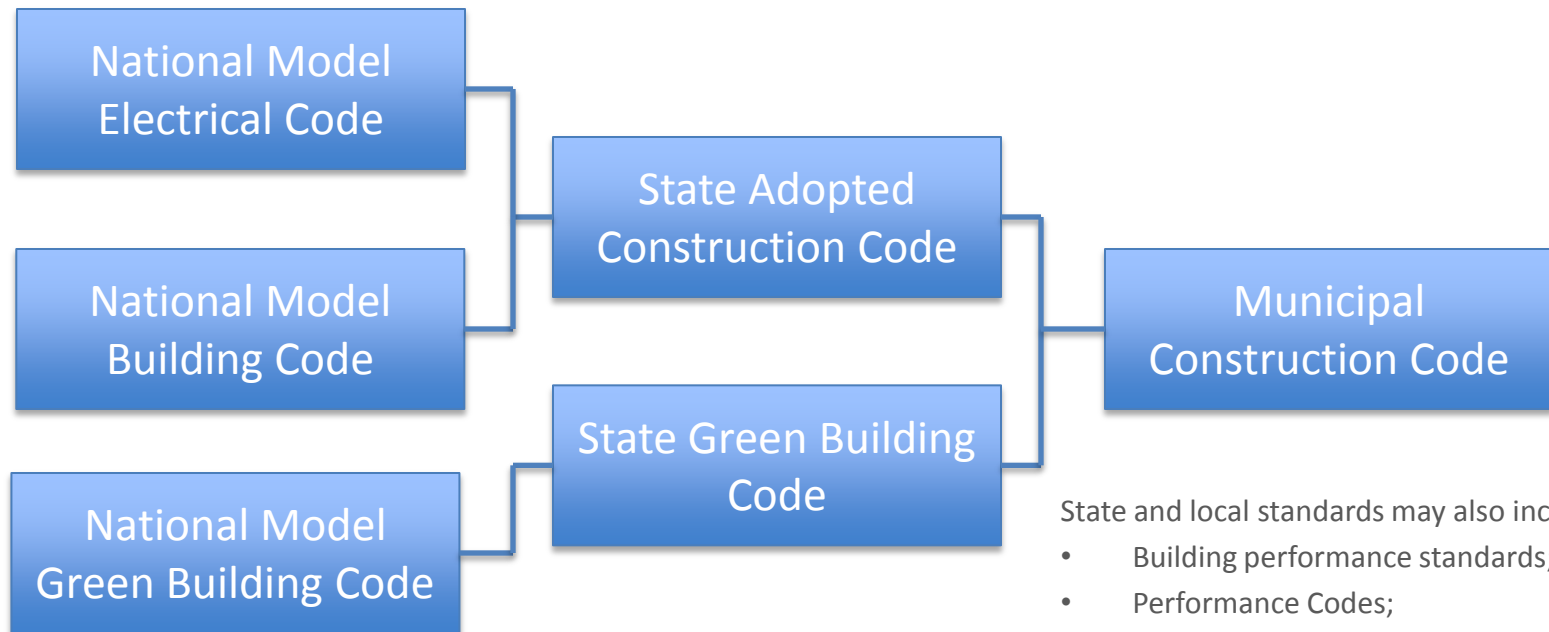
# EV-Ready Codes for the Built Environment

- This report provides an overview of building and electrical codes and their relation to EVs, highlights best practices from around the country, and makes recommendations for jurisdictions in the Northeast and Mid-Atlantic.
- The report draws several conclusions:
  - Existing codes do not present a significant barrier to electric vehicle supply equipment (EVSE) deployment, but there is room within the codes to more clearly encourage EV-readiness;
  - Codes can create a high-level planning framework while retaining flexibility at the local level; and
  - Adopting EV-friendly codes should be part of a collaboration between partners to create a comprehensive EVSE deployment strategy.





# EV-Ready Codes for the Built Environment



State and local standards may also include:

- Building performance standards;
- Performance Codes;
- Building Rehabilitation Codes;
- Accessibility Codes;
- Energy Codes;
- Livability Codes; and
- Property Maintenance Codes.

# EV-Ready Codes for the Built Environment

- Case study: Los Angeles
  - Top-down approach: California adopted CALGreen, the nation's first mandatory green building code, and includes an EV-ready policy.
  - Includes "tiers" of compliance in the voluntary appendices, so that jurisdictions adopting the code can choose the level of enforcement most appropriate for the local market.
  - Los Angeles City and County are likely to soon pass and upgrade the requirements for EV-ready construction (5%).

**Designated Parking.** Provide designated parking, by means of permanent markings or a sign, for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles.

<b>Mandatory</b>	8%
<b>Voluntary (Tier 1)</b>	10%
<b>Voluntary (Tier 2)</b>	12%

**Electric vehicle supply wiring.** For each space, provide one 120 VAC 20 amp and one 208/240 V 40 amp, grounded AC outlets or panel capacity and conduit installed for future outlets.

<b>Total Number of Parking Spaces</b>	<b>Number of Required Spaces</b>
<b>0–50</b>	1
<b>51–200</b>	2
<b>201 and over</b>	4

# EV-Ready Codes for the Built Environment

- Case study: Vancouver
  - Created a collaborative working group to develop EV-readiness strategies to meet long-range GHG reduction goals
  - Vancouver City Council modified its building codes to require a substantial percentage of parking stalls in new construction to be EV-ready
  - First North American city to require EVSE connection in all new development

## Incentivize EVSE Parking

A hypothetical proposal for a new optional appendix to the model building code could include in its scope provisions requiring 10% of parking spaces in new construction residential garages to be EVSE-ready, creating a uniform approach across jurisdictions that adopt that regulation.

# Guide to Planning and Policy Tools

- This report provides guidance to practitioners at all levels of state and local governments wishing to take action to implement EVSE deployment in their jurisdictions. The guide:
  - Provides discussion and guidance regarding the steps to create, administer, and amend planning processes, rules, and regulations;
  - Explores the potential for jurisdictions to encourage EV charging station installation and use; and
  - Examines best practices for promoting EV-friendly zoning regulations, parking ordinances, building codes, permitting practices, and partnership and procurement policies.

Zoning

Parking

Codes

Permitting

Partnerships  
&  
Procurement

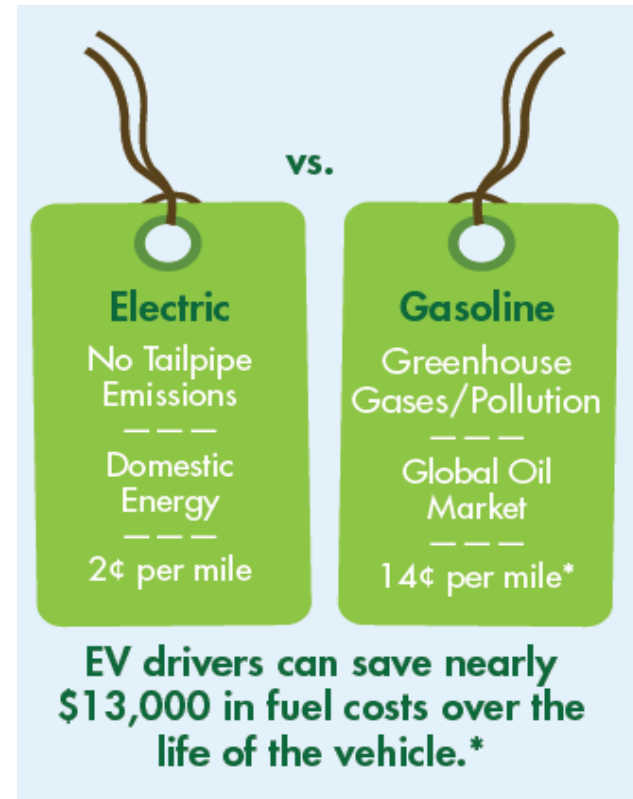
# Education and Communication

- TCI's education campaign will raise EV awareness and disseminate TCI's guidance documents throughout the region. To accomplish this:
  - The Clean Cities Coalitions are holding local-level meetings with dealerships, major employers, multi-unit dwelling stakeholders, utilities, and local policy makers.
  - TCI is holding regional meetings with private sector players and NGOs.
  - TCI is creating educational materials highlighting the environmental, economic, and energy security benefits of EVs.



# The Future is Now: Benefits of Driving an EV

- There are significant economic, environmental, and energy security benefits associated with driving an EV.  
Electric Vehicles:
  - Can save the driver thousands of dollars in fueling costs over the life of the car;
  - Produce zero tailpipe emissions, improving the health of a community;
  - Can save the driver more than 6,000 gallons of gasoline over the life of the car.





# The Future is Now:

## EV Basics

*The vast majority of commuters drive less than 40 miles per day – well within an EV's range.*

EVs can plug directly into any standard wall outlet to recharge, or can be plugged into higher-voltage electric vehicle supply equipment to recharge more quickly.

	BEV	PHEV
RANGE <sup>xii</sup> [in miles]	~60-265	Electric range: ~11-38 Gasoline range: 240+
FUEL SOURCE	Electricity	Electricity and/or gasoline

	BEV	PHEV	
TIME TO RECHARGE*	20+ hours	3-16 hours	LEVEL 1 (standard outlet)
	4-7 hours	1½-6 hours	LEVEL 2
	About 30 minutes	N/A	DC FAST CHARGE†

\*These times assume a fully depleted battery. In most cases, batteries will not be fully depleted and can be charged in a shorter period of time.

†DC Fast Charge will recharge a car to about 80%, and is currently only available for some BEV models.

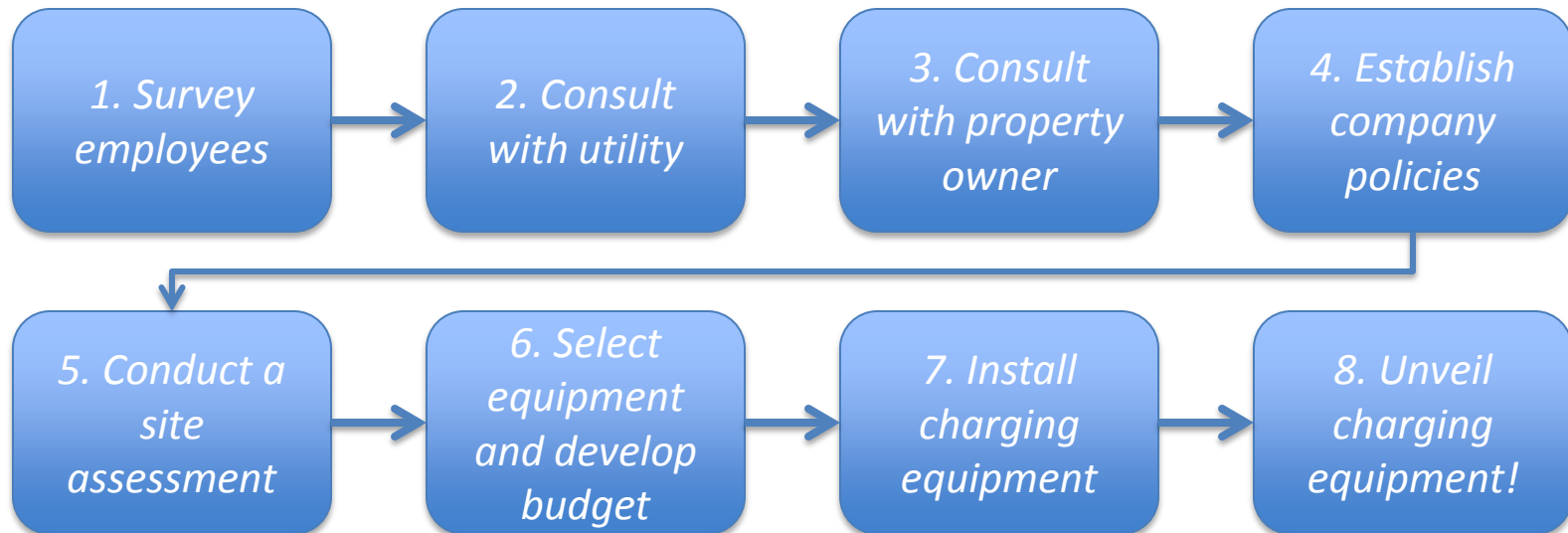
# Information for Employers

- Installing charging stations at a workplace can **attract and retain employees**, **reduce employee commute time**, and **support institutional environmental sustainability goals**.
  - *Companies like Bayer Corporation in Pittsburgh, PA have installed EV chargers for their employees' use.*



Be Part of the Solution

# Information for Employers



Be Part of the Solution

# Information for Local Governments

## Government Actions

- Create an EVSE plan
- Procure EVs for municipal fleet
- Explore public-private partnerships

## Policy Actions

- Streamline permitting and inspections
- Create EV-friendly zoning/parking ordinances
- Adopt EV-friendly building codes
- Offer additional incentives

## Education and Awareness

- Encourage workplace charging
- Offer first responder training
- Conduct a public education campaign



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# Information for Multi-Unit Dwelling Stakeholders

- Nearly one-third of all residents live in multi-unit dwellings in the Northeast and Mid-Atlantic states.
- Many apartment and condominium complexes are installing EV charging stations as an added amenity for their residents.
  - *The Bozzuto Group installed two charging stations for residents and the public at the Fitzgerald, an apartment community located in Baltimore.*



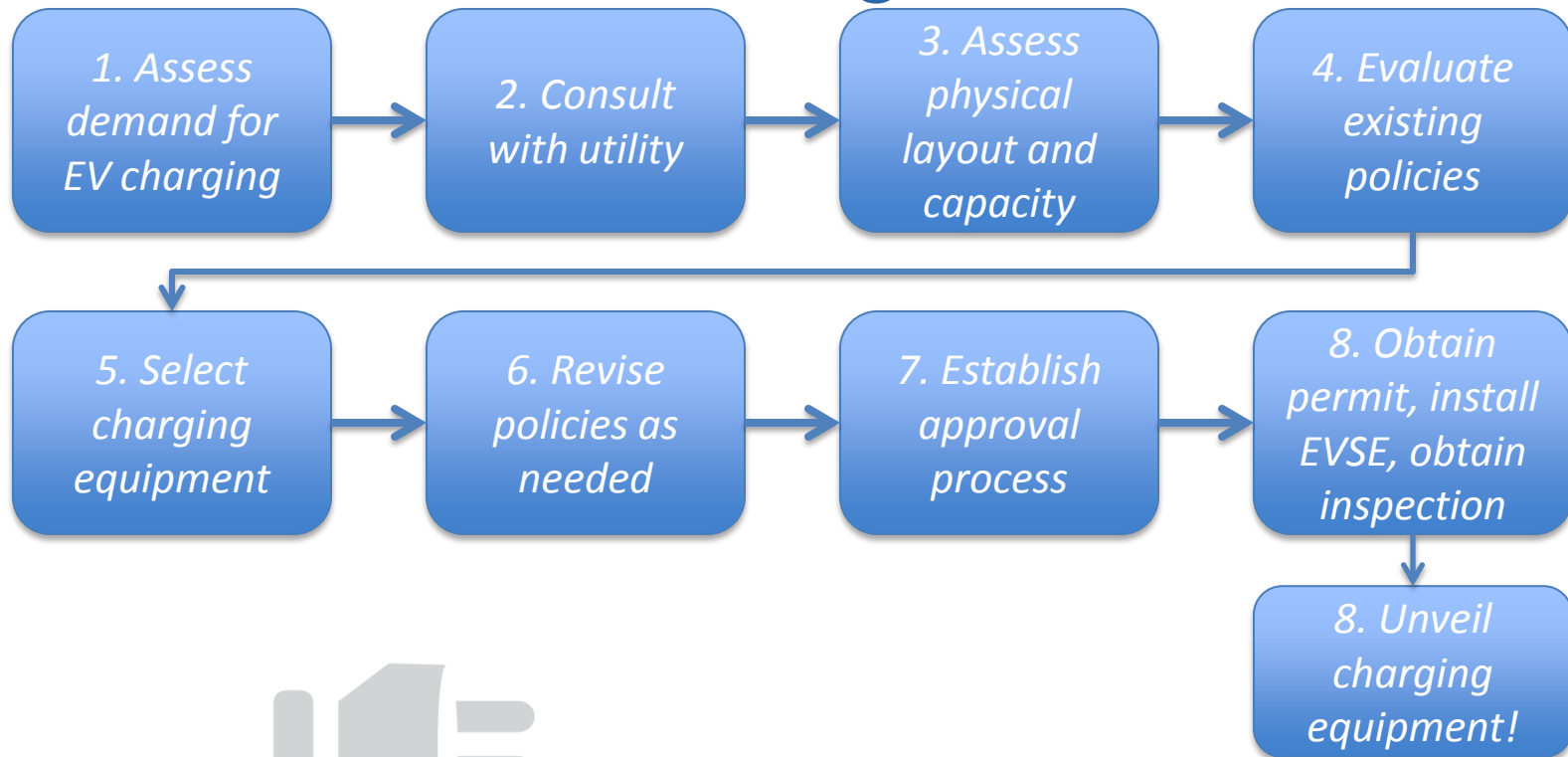
**ANOTHER FIRST FOR THE FITZGERALD**  
Public Parking Garage A New Hub For  
Rechargeable Electric Vehicles

You are invited to join The Bozzuto Group and SemaConnect for a "plug-in" ceremony that will unveil the Mid-Atlantic's first public vehicle electric charging stations in a residential building.



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# Information for Multi-Unit Dwelling Stakeholders



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# Information for Utilities

- Electric utilities in the Northeast and Mid-Atlantic can prepare for this increase in electricity demand by understanding how EVs will affect their service territory, working with local stakeholders, and adopting EV-friendly policies.

*Utilities may wish to reference TCI's EV Guidance Documents when considering electric vehicle supply equipment policies in the Northeast and Mid-Atlantic.*



Be Part of the Solution

*For more information about the  
Northeast Electric Vehicle Network,  
please visit:*

[www.northeastevs.org](http://www.northeastevs.org)



U. S. Department of Energy



**TRANSPORTATION &  
CLIMATE INITIATIVE**

Of the Northeast and Mid-Atlantic States

*Materials prepared on behalf of the Transportation and Climate Initiative*

*Information and documents published under the name Transportation and Climate Initiative (TCI) represent work produced in support of the TCI or its projects. TCI materials do not necessarily reflect the positions of individual jurisdictions or agencies unless explicitly stated.*

# Contact Information

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Thank You

# Guide to Planning and Policy Tools

- Zoning actions can:
  - Permit EVSE in logical locations;
  - Establish clear delimitations and use groups for EV and EVSE;
  - Set out high-level criteria for design, accessibility, and parking enforcement; and
  - Require or incentivize EVSE in certain locations.

**Methuen, Massachusetts** adopted an addendum to the city zoning resolution that specifies permissible use of level 1 and level 2 charging stations in residential zones.

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

DC fast charge permitted as principal use in commercial or industrial zones or conditional use in general.

Zoning

Parking

Codes

Permitting

Partnerships  
&  
Procurement

# Guide to Planning and Policy Tools

- Municipalities can use parking ordinances to:
  - Scope EVSE pre-wiring or installation from a transportation and logistics perspective;
  - Set standards for on-street EV charging and parking; and
  - Provide guidance on how best to manage user rotation, access, and violations.
- Private organizations can also promote EV parking by offering EV-only spots in their lots.

**Price Chopper**, the supermarket chain, has instituted EV-only parking with charging stations that include a marketing-oriented canopy design, and have located their stations near store entrances.

Zoning

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Procurement

# Guide to Planning and Policy Tools

- Building and electrical codes can set standards for safety and scope of EVSE deployment by:
  - Specifying scoping requirements that set numerical or percentage-based goals or limits for certain features in new construction; and
  - Providing for new permitting or inspection protocols.

Zoning

Parking

Codes

## EV Readiness: Phasing and Tiers

**Voluntary/Mandatory:** Requirements included as an optional appendix; voluntary requirements create consistency among jurisdictions that choose to adopt.

**Local and Developer Burdens:** Code language should be enforceable in the local jurisdiction and not cause undue local burdens.

**Tiered Codes:** Optional appendices to the building code should be structured with additional options, or tiers, that set standards for increasing levels of participation and enforcement.

**Pilot Phases:** Test new codes and allow contractors, inspectors, and other local stakeholders to develop a knowledge base prior to full enforcement of any new code.



# Guide to Planning and Policy Tools

- Localities can make it easier to install EVSE by streamlining permitting by:
  - Standardizing permitting across jurisdictions and minimizing permitting cost and procedure;
  - Classifying EVSE installation as “minor work”;
  - Providing a permitting template or online permitting to applicants; and
  - Ensuring that inspections are conducted in a timely manner.

Zoning

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# Guide to Planning and Policy Tools

- Diverse partnerships can strengthen the EV planning process.
  - Private companies, utilities, municipalities and MPOs, and others should be involved to help a community become EV-ready.
- Procurement policies can also be used to require the government to purchase EVs, or consider a purchase as part of any procurement process.

## EV Partnerships include:

*Maryland Electric Vehicle  
Infrastructure Council*

*Project Get Ready Rhode Island*

*Connecticut Electric Vehicle  
Infrastructure Council*

Zoning

Parking

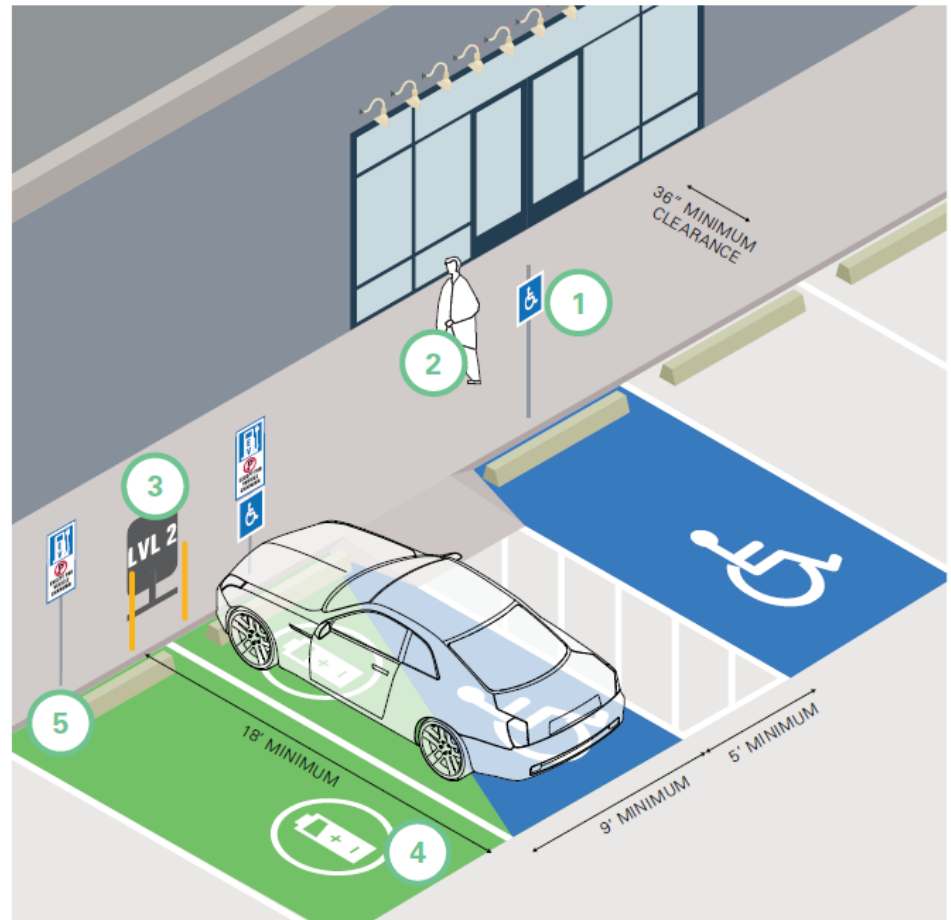
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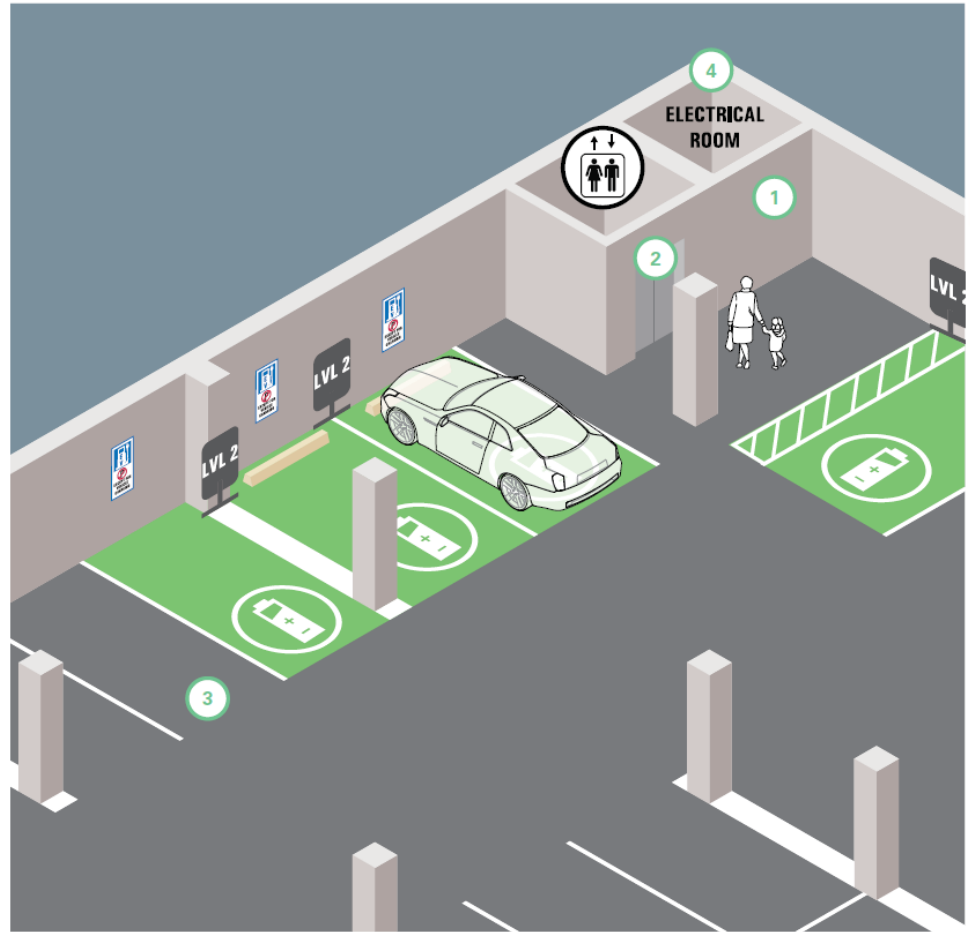
# Siting and Design Guidelines

- Commercial sites
  - Signage is critical for finding stations in a busy lot
  - Allow sufficient room for access pedestrian access, and keep path clear for pedestrians
  - Visible EVSE can help with green branding
  - Carefully site EVSE to minimize cost -may be most cost effective to locate EVSE near electrical panel



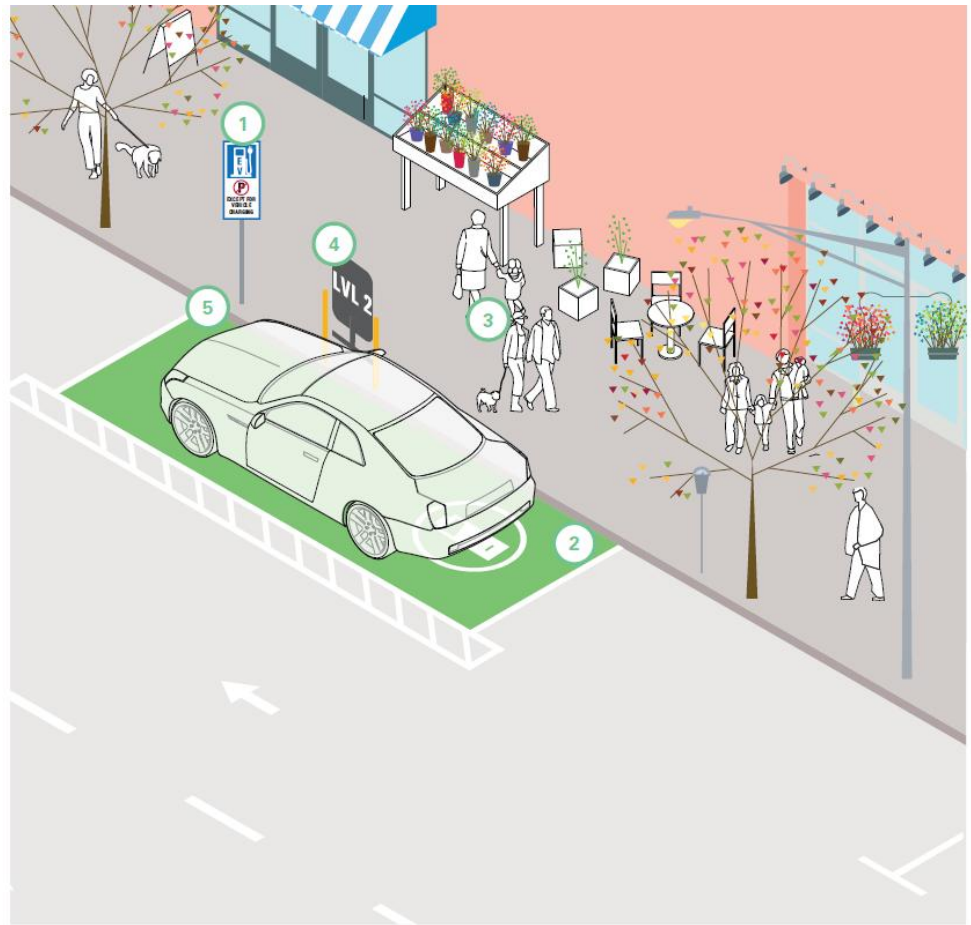
# Siting and Design Guidelines

- Multi-Unit Dwellings
  - Consider how electricity consumption is metered and billed
  - Consider distance to electrical panel and potential push-back from residents when siting EVSE
  - Be creative when locating EVSE in a crowded garage – EVSE can be mounted on a wall when space is tight
  - Check to make sure there is sufficient room in the electrical panel to accommodate EVSE installations



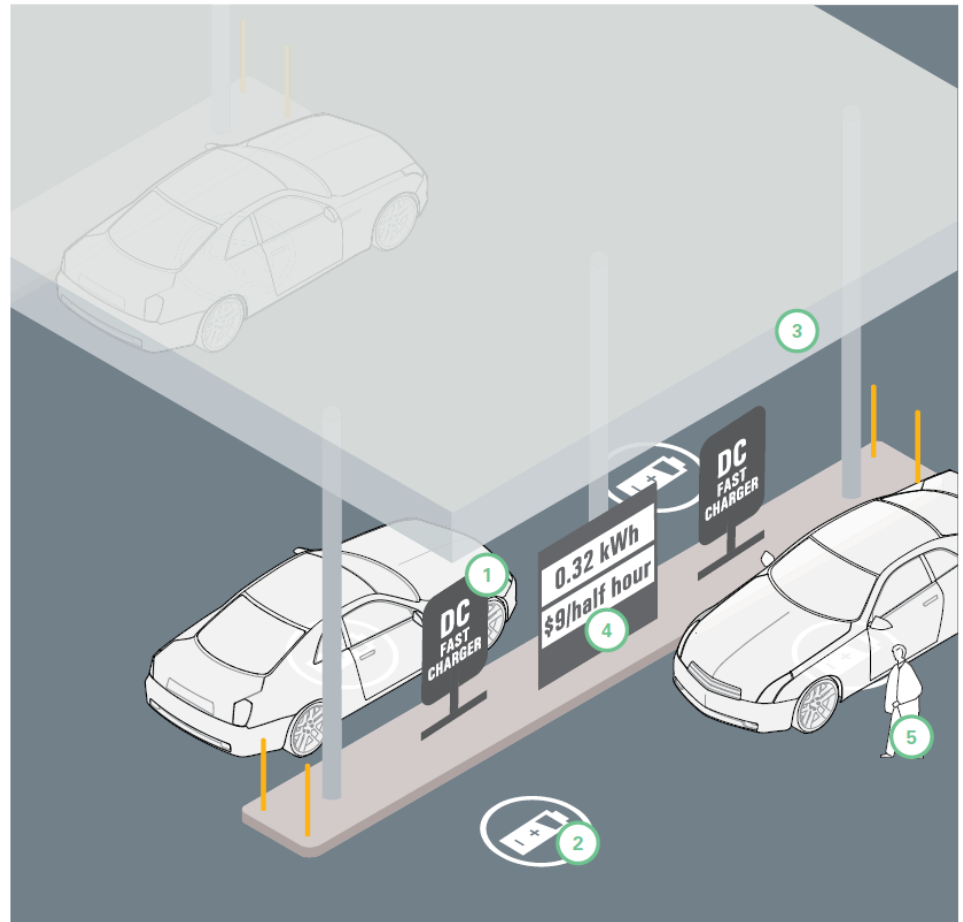
# Siting and Design Guidelines

- On-Street
  - Signage and wayfinding is critical –consider locating EVSE in prominent locations
  - Street markings can help identify EV spaces
  - Space is often limited, so stations with a streamlined and simple design are desirable
  - On street EVSE will need to draw power from a local business or street outlet
  - Allow sufficient space for the driver to plug-in their vehicle



# Siting and Design Guidelines

- Service Station
  - Appropriate for DC fast charging
  - Clear markings are essential to distinguish from gasoline pumps. Important not to block other EVSE or pumps
  - Protect DC fast chargers from the elements
  - Establish an appropriate charge-for-charge model
  - Customer amenities should be provided



# Siting and Design Guidelines

- Fleets
  - Fleets must determine whether proximity to loading zones is crucial, or if EVSE should be located further from building entrances
  - Length of stay will determine appropriate level of charge
  - Work with local utility to ensure necessary upgrades are made

