ENERGETICS
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Electric Vehicle Resources and Initiatives

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ENERGETICS
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Sustainable Transportation Solutions

We provide a full range of engineering and management consulting services to help clients solve complex challenges

Delivering solutions that:

- **Increase energy efficiency – fleets, buildings, industry**
- **Diversify energy supply**
- **Measure impacts of new energy technologies**
- **Motivate customers to adopt new technologies and habits**
- **Benchmark energy and carbon footprint**
- **Create consensus around strategic priorities**
- **Modernize infrastructure**

Our Services:

Analysis & Modeling → ***Planning & Roadmapping*** → ***Implementation & Deployment*** → ***Evaluation & Metrics*** → ***Outreach & Communications***

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Transportation Technology Expertise

- ✓ ***Power Electronics***
- ✓ ***Electric Transportation and Charging Infrastructure***
- ✓ ***Plug-In Hybrid Electric and Battery Electric Vehicles***
- ✓ ***Conventional, Hybrid Electric and Hydraulic Powertrains***
- ✓ ***Energy Storage Systems***
- ✓ ***Combustion and Emission Control***
- ✓ ***Petroleum and Alternative Fuels***
- ✓ ***Hydrogen and Fuel Cells***

DOE 21st CENTURY TRUCK PARTNERSHIP

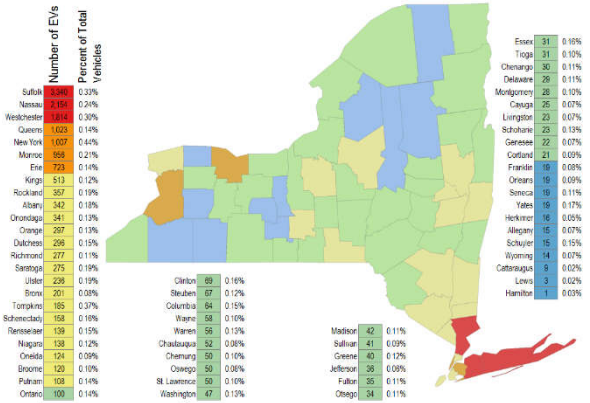
Energetics provides technical information dissemination, strategic planning, market assessments, and partnership development for the group of 16 industry partners, 4 federal agencies, and 12 national labs.

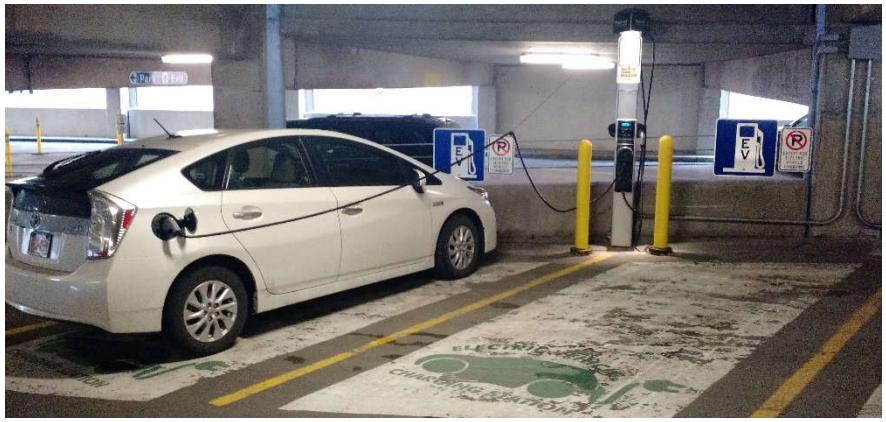
CITY OF RALEIGH FUEL AND FLEET TRANSFORMATION

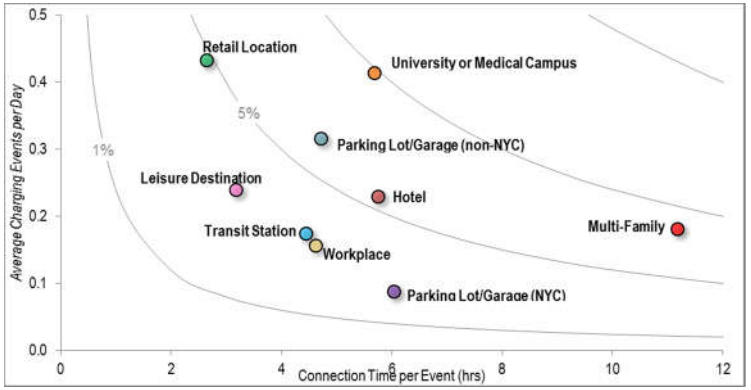
Energetics evaluated existing fleet operations. Recommendations were developed that support the City's path towards reaching its fossil fuel and greenhouse gas reduction goals

Electric Vehicle Experience

- **NYSERDA EVSE Deployment Program (2012-2017)**
  - Research, Studies, Regional Planning
  - Charging Station Installation Oversight and Data Analysis
  - Outreach: Website and Workshops



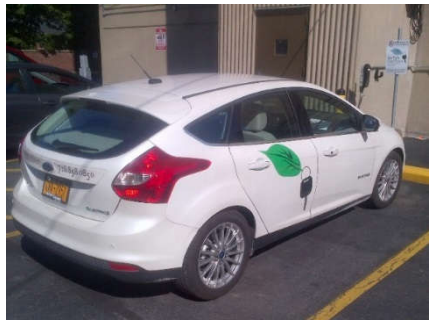


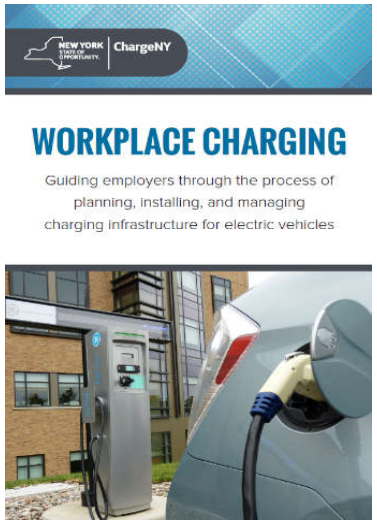


www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Resources/Electric-Vehicle-Charging-Station-Data

Electric Vehicle Experience

- Buffalo Car Share Electric Vehicle Demonstration
- EV Tourism Investigation in the Hudson Valley
- NYC Green Loading Zones Feasibility Study
- I-90 Corridor EV Charging Station Plans
- **Low Cost EVSE Strategies**
- **EV Infrastructure Plan in Tompkins County**
- **Battery Energy Storage for DC Fast Chargers**
- **Enhancing the EV Sales Approach at Dealerships**
- **Promoting Workplace Charging in NYS**
- **Educating Municipal Planning Boards on EVSE**
- **Animating the Electric Vehicle Market in NYS**





Installation Best Practices

Best Practices Guide for Site Owners of Electric Vehicle Charging Stations on Commercial Properties

- Addresses topics such as determining if a location is a good fit for an EV charging station, which type of charging station to purchase, where to place it in the parking lot, who can install it, and how to manage its operations.

Figure 6. These charging station installations (noted by red arrows) are sited in convenient, but not prime parking spaces that minimize conduit runs to reduce costs
Courtesy Energetics Incorporated

Figure 7. Charging stations at parking spaces away from a building require longer trenching through pavement (red lines indicate distance) and could disrupt traffic flow during construction
Courtesy Energetics Incorporated

Figure 8. These examples (see red arrows) show charging stations that were installed in prime parking spaces that were traditionally used by non-EV drivers
Courtesy Energetics Incorporated

is installed in prime parking spaces that often remain vacant because there are few EV drivers. Charging stations in prime parking spaces are also more likely to be occupied by non-EVs, as shown in Figure 8.

Other considerations have less impact on installation costs, but are important to ensure that the charging station is well integrated into the parking lot. Be sure to think about the path of the charging cord when in use so it is not a tripping hazard and consider your parking lot management practices. For example, when selecting a site, be sure the charging station will not impede pavement cleaning or snow plowing. On page 6, Figure 9 shows spaces where snow is piled in the winter or where equipment might be

5

Charging station cluster analysis

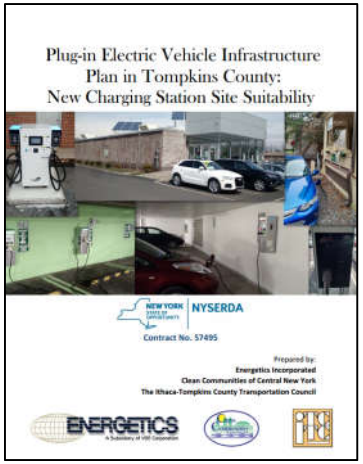
- Location types where EVSE might be installed and which factors make a good EV charging location.

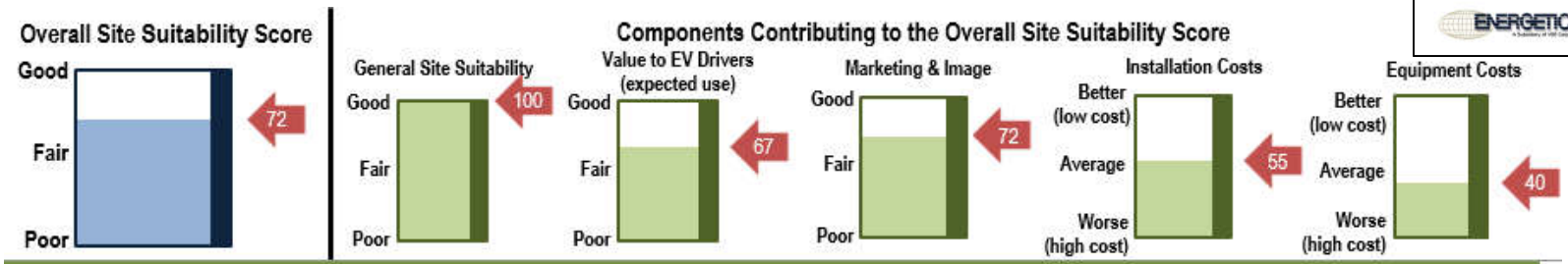
Siting and design guidelines for charging stations

www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Resources

Site Suitability Criteria Tool

This tool was designed to help compare the suitability and viability for installing **AC Level 1 or 2 EV charging stations**. The ratings are based on best practices and analysis of prior EV charging station installations. The tool is best used to **compare relatively similar sites**.





Site Location and Surounding Environment

5. Which venue best describes the proposed EV charging station location?

(5)

- ☐ Business/Office
- ☐ Medical Facility
- ☐ Transportation Hub
- ☐ Retail Outlet
- ☐ Educational Services
- ☐ Park/Recreational Facility
- ◉ Municipal Lot or Garage
- ☐ Entertainment Facility
- ☐ Hotel
- ☐ Multi-dwelling Unit
- ☐ On-street Parking
- ☐ Restaurant
- ☐ Other

Many municipal parking lots offer access to a variety of downtown locations that an EV driver may visit and is likely to be used during the day and in the evening

5B. How many individual venues (e.g., stores or businesses) are within 500 feet of this location?

6. How long do drivers typically park their vehicles at this location?

(6)

- ☐ Less than 1 hour
- ☐ 1 - 2 hours
- ◉ 2 - 4 hours
- ☐ 4 - 8 hours
- ☐ More than 8 hours

This is a good duration to charge for most EV drivers; with PHEVs likely obtaining a full charge and BEVs able to get a substantial charge away from home

www.ccofcny.com/tompkins-county.html

Local Regulation Guidance

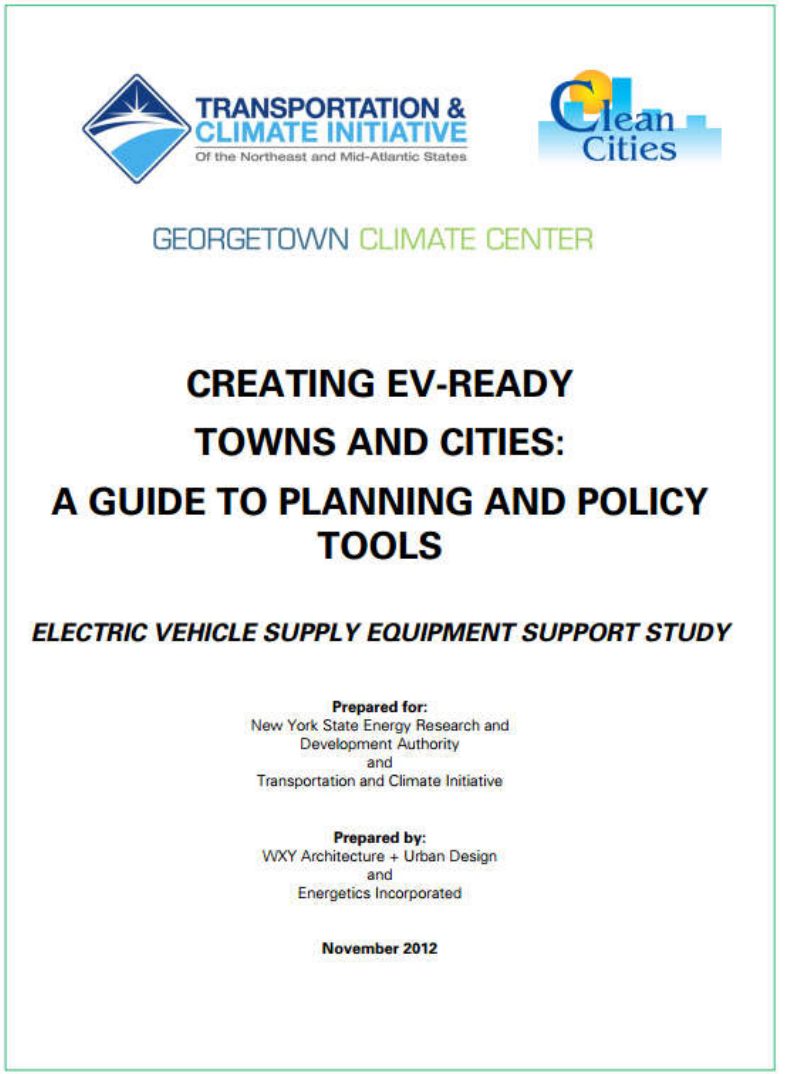
Planning policy tool guide

- Highlights best practices and introduces policy options for public officials to prepare their communities for EVs.

Electric vehicle-ready codes for the built environment

Charging station signage overview

Permit Process Streamlining


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

Clean Cities

GEORGETOWN CLIMATE CENTER

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

ELECTRIC VEHICLE SUPPLY EQUIPMENT SUPPORT STUDY

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

Prepared by:
WXY Architecture + Urban Design
and
Energetics Incorporated

November 2012

www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Resources

Planning Board Resources

- Developing a guidance document (overview slides with links for more information) for planners and planning boards to better support PEV charging station deployment in their jurisdiction.
- Presenting at conferences and serving as a resource for planners and planning board members.

Table of Contents

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New York State Incentives and Discounts for Electric Vehicles (EV) and EV Charging

CHARGING STATIONS	New York State Alternative Fuel Tax Credit	50% (up to $5,000) to commercial and workplaces for the purchase and installation of EV charging stations through December 2017.
	ZEV Clean Vehicle Infrastructure Grant	Rebates for EV charging stations up to $8,000 per port, and for DC fast chargers up to $32,000 per pedestal. Applications due March 31, 2017.
	Cleaner, Greener Communities	Up to $5,000 for incentivizing streamlined permitting and ordinances for EV charging station installations.
	Calstart Charge to Work NYC	Employers are eligible to receive rebate incentives to install Level 2 ChargePoint charging ports at workplaces throughout the five boroughs of New York City, Westchester, and Long Island.
	EV Connect EV Charging Station Financing Project	Low-cost financing and leasing opportunities for EV-Box charging stations with a focus on public and non-profit entities.
	Genesee Region EV Charging Rebate for Public Charging Infrastructure	Financial assistance for the deployment of EV charging stations for governmental organizations, public or nonprofit educational institutions and hospitals in the Genesee-Finger Lakes region.
	NYPA Public Sector Charging Station Program	Discounted Level 2 EV charging stations for New York Power Authority (NYPA) energy customers, as well as any state or local government entity, through EV Connect.
VEHICLES	Federal EV Tax Credit	Up to $7,500 income tax credit for EVs purchased in or after 2010. The credit amount will vary based on the capacity of the vehicle battery.
	State Rebate for Plug-In Vehicle Purchases (coming soon)	Rebate program for plug-in hybrid and electric vehicles coordinated through NYSERDA who has contracted with the Center for Sustainable Energy to implement. Program details should be released soon.
	NY Truck Voucher Incentive Program	Incentives up to $150,000 per vehicle for Class 3 - 8 all-electric trucks, buses, and vehicle conversions. All voucher requests must be redeemed (fully reimbursed) by June 30, 2018.
	Municipal Electric-Drive Vehicle Program	NYPA will provide zero-interest financing to purchase EVs for eligible municipalities and rural electricity cooperatives that currently receive low-cost hydropower from NYPA.
	ZEV Clean Vehicle Municipal Fleet Purchase	Rebates up to $5,000 per vehicle purchase for municipalities. Funds available on a first come-first served basis until March 31, 2017.
OTHER DISCOUNTS	Clean Pass Program (HOV Lane Exemption and Toll Discounts)	EVs may use the Long Island Expressway HOV lanes. The Port Authority Green Pass Discount Plan offers a $6.25 off-peak toll rate and the New York State Thruway's Green Pass Discount Plan also offers a 10% discount on E-Z Pass rates.
	Time-of-Use (TOU) Electricity Rates	ConEdison and National Grid offer discounted rates for electricity use during off-peak hours when EVs typically charge at residences.

Updated **March 1, 2017**. Visit nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Support-and-Discounts for more information.

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Community EV Actions

ACTION ITEMS FOR

EV READY COMMUNITIES

CLEAN ENERGY COMMUNITIES

is a program for local governments in New York State to implement clean energy actions, save energy costs, create jobs, and improve the environment. In addition to providing tools, resources, and technical assistance, the program recognizes and rewards leadership for the completion of clean energy projects. One of the activities municipalities can complete to become a Clean Energy Community is a Clean Fleet project, which includes installing a charging station or adding an EV to the municipal fleet. At no cost to the local government, Clean Energy Communities Coordinators are available to help local leaders to: develop and prioritize clean energy goals; access guidance resources such as templates for legislation, procurement, and contracts; and take advantage of available funding and technical assistance opportunities.

www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Communities

ADOPT A VEHICLE FLEET EFFICIENCY OR EV PROCUREMENT PROGRAM

Advance sustainability measures by adopting a fleet efficiency policy and replacement plan, or incorporate electric vehicle procurement goals into local purchasing policies.

SET GOALS FOR EV DEPLOYMENT

Local and regional governments committed to establishing sustainable and resilient communities are setting goals or requirements for the adoption of EVs in fleets or the deployment of EV charging stations for development through executive orders.

SIMPLIFY THE PERMIT PROCESS FOR EV CHARGING STATIONS

The permitting process for residential and commercial EV charging station installations can take a long time, during which a purchased EV or charging station can not be used. Simplify and streamline the process, and if possible, accept online applications.

BE A ROLE MODEL

Install EV charging stations in municipal parking lots and use EVs in the fleet to convey a commitment to sustainable transportation and set an example for others. There may be funding for these actions and they could also qualify the municipality for additional funding.

TRAIN MUNICIPAL STAFF AND INSPECTORS ON EV CHARGING STATIONS

Inspectors and other municipal staff members should be educated and informed on EV technology so they can explain the recommended installation and safety measures to assist a site host with the successful implementation of EV charging infrastructure.

This document was developed for a project supported by the New York State Energy Research and Development Authority

For more information on EVs visit: www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles

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Site Selection Guide

SITE SELECTION GUIDE FOR EV CHARGING STATIONS

Considering an electric vehicle (EV) charging station installation?
This guide will help determine when to recommend an EV charging station for a particular location.
More information on why these factors contribute to a good EV charging site is found on the other side.

CATALYZING EV CHARGING STATION DEPLOYMENT

A desire, need, or requirement for EV charging can justify the installation of a station.

	Yes / No
Are there mandates or requirements set by the state, regional, or local government requiring EV charging or alternate fuel vehicle technology use?	
Are there EV drivers who regularly park at this location?	
Have there been requests for EV charging by employees, patrons, or visitors?	
Would enhancing sustainability or portraying a "green" image be beneficial to the site host?	

Answering "yes" to any of these questions indicates a potential need and benefit for installing EV charging stations.

PARKING DEMOGRAPHICS

Alternative current (AC) Level 1 stations provide 2-5 miles of electric range per hour of charging, AC Level 2 stations provide 10-20 miles of electric range per hour of charging, and direct current fast charging (DCFC) can fully charge most EVs in less than one hour. Station costs increase significantly with faster charging capabilities.

	Yes / No
Is the average parking event more than two hours?	
Does the proposed site location have excess parking spaces available?	

An AC Level 2 station is suitable if answering "yes" to both of these questions, otherwise DCFC is likely needed.
In locations where vehicles park for extended periods of 8 hours or more, AC Level 1 stations could be considered.

SITE CHARACTERISTICS

Charging stations at workplaces, higher education, medical campuses, larger retail centers (malls), and multi-use lots are typically used more often.

	Yes / No
Is there parking within 200 feet of the electrical panel and no major obstructions to run power to the station?	
Is sufficient power available (120V-20A for AC Level 1, 240V-40A for AC Level 2, 480V-80A for DCFC)?	

Answering "no" to either of these questions will likely result in costly installations.

OTHER CONSIDERATIONS

Many factors influence the installation costs, as well as the expected use of the station by EV drivers.

	Yes / No
Is the parking space covered and does it have lights?	
Can electrical power be run to the station without crossing an impervious surface (sidewalk or pavement)?	
Can the station be placed where it does not impact snow removal or other parking lot maintenance?	
Can EV drivers access the station 24 hours a day and 7 days a week without a permit or fee to park?	

Answering "no" to any of these questions will likely increase the cost of installation or decrease utilization by EV drivers.

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INFLUENCING FACTORS AFFECTING EV CHARGING

LOCAL AND REGIONAL POLICY	Local or regional governments may establish requirements for new developments to include EV charging stations. Facilitating more EV use can help to achieve the sustainability goals of the local Comprehensive Plan and improve local air quality. EV charging stations support Climate Smart and Clean Energy Community Initiatives.
GO GREEN	New developments can use EV charging stations to achieve higher LEED levels or other green building certifications. It also conveys an interest in sustainability.
EMBRACE THIS EVOLVING MODE OF TRANSPORTATION	A network of charging stations will make travel easier for local EV drivers and attract EV tourists. There are a growing number of EV drivers in most NY communities: www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Tools/Electric-Vehicle-Registration-Map **By 2017 there were 16,600 EVs registered in New York**
LOCATION MATTERS	EVs are typically found in clusters with neighbors or colleagues that have similar demographics. EV charging stations have been most used at workplaces, higher education, medical campuses, larger retail centers (malls), and multi-use lots.
PARKING AVAILABILITY	Large parking lots that are regularly used will most likely have some EVs that often use the charging station. However, if parking lots are always full, but end up with vacant EV charging spaces, it can be irritating for non-EV drivers.
STATION PLACEMENT	An EV charging station in prime parking spaces provides good visibility, but could also draw attention to when it is not being used or the special treatment given to EV drivers. Comply with ADA requirements by leaving sufficient passageways on sidewalks when installing stations and consider its potential impact on snow removal or maintenance.
INSTALLATION COSTS	Installation costs can be equal to, or even greater than, the station hardware. Wall mounted stations near the electrical room of a building are least expensive to install. A pedestal station in a parking lot that requires an electrical run under or through pavement will be more expensive. Electrical upgrades also add significant cost.
EQUIPMENT SELECTION	DC fast chargers are costly and intended to mimic conventional vehicle refueling at a convenient store where they can charge numerous EVs per day. In parking lots, AC Level 2 stations are used for charging durations between 2 and 6 hours. AC Level 1 stations may be considered for longer term parking situations. Networked stations track use and allow payments, but require the host site to pay for a subscription.
SIGNAGE AND MANAGEMENT	Signage should be used to clearly make parking spaces for "EV Charging Only", which can be enforced by regulations that ticket or tow non-EVs that park there. Networked stations that can impose fees for EVs parked in these spaces excessively long will help encourage EV drivers to move after fully charging so another EV can charge.
PREPARING FOR FUTURE STATIONS	When renovating a parking lot, encourage the installation of one 1½" rigid conduit for each potential dual-port EV charging station. New electrical panels that service parking lots should include additional capacity for future EV charging station installations.

For more information visit: www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Info/Charging-Station-Hosts

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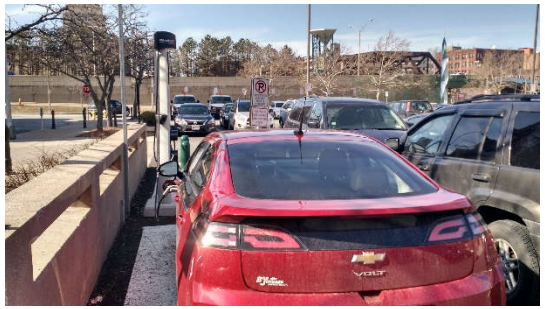
Charging Station Deployment

- Along with support from NYSERDA, discounted rates on charging stations and installations have been secured to carry out the recommendations in the Genesee Region Electric Vehicle Charging Station Plan, which identified areas where electric vehicle charging stations are needed.
- One host site will be chosen from municipalities mentioned in the plan (or a municipality designated host), for the installation of an EV charging station at a municipal parking lot, retail center, entertainment venue, or another location.

Top Priority Locations	Secondary Locations	
Batavia	Brighton	Geneva
Canandaigua	Brockport	Penn Yan
Geneseo	Henrietta	Pittsford
Victor		

EV Deployment Community

- **City of Rochester Initiative**
  - **EV Fleet Deployment**
  - **Charging Station Deployment**
  - **Outreach**



Engage a broad group of stakeholders and car dealerships

Evaluate the current community readiness to support EV deployment

Ensure that the infrastructure, zoning, codes, and other needed steps are in place

Initializing a "Task Force" of community leaders

Launch a broad-based consumer education program

Develop an education program

Create strong consumer experiences

Create a series of programs to provide high profile personalities and consumers with the "electric" experience

Seek to create an incentives program with local businesses to encourage test drives by consumers

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