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PROMOTING ELECTRIC VEHICLE CHARGING STATION INSTALLATIONS

Increasing Planner's and Municipal Planning Board's Involvement

Onondaga County Planning Federation Annual Symposium

March 2, 2016

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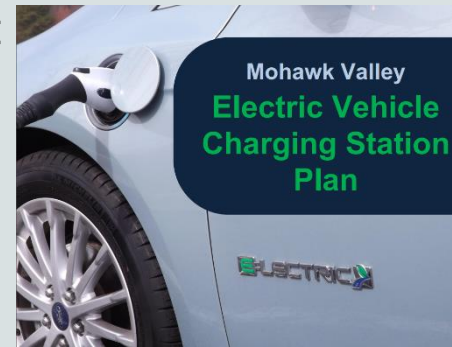
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Energetics Incorporated, headquartered in Columbia, MD with an office in Clinton, NY, is an **engineering and management consulting** firm assisting government and industry in developing new solutions to energy problems.

WXY architecture + urban design is a **planning and design** firm based in New York City focused on social and environmental transformation of the public realm at multiple scales.

EV and EV Charging Station Experience

- EV Planning Resources for the Northeast for Transportation & Climate Initiative
- NYSERDA EV Charging Station Deployment Program Support
- EV Tourism in the Hudson Valley and Catskills
- NYC Green Loading Zones Feasibility Study
- EV Plans for I-90 Regions and Tompkins County
- Electric Pedestals for Food Trucks
- EV Charging Station Deployment and Outreach (EV Tourism, EV Communities)



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APPENDIX RESOURCES

1. Who is this resource for?

Developed primarily for **planning board members** throughout New York State, this may also be helpful for **zoning board members, planners,** and **developers.**

2. How can this resource be used?

View the entire presentation for an **educational overview** on EVs and charging stations, then keep handy as a **reference** when addressing these topics in your community.

3. What comprises this resource?

Information and **reports** on EVs and EV charging stations, municipal **planning tools,** and **case studies** with real-life examples of EV infrastructure deployment initiatives.

Click these buttons to follow external links for more information on each topic!



Website



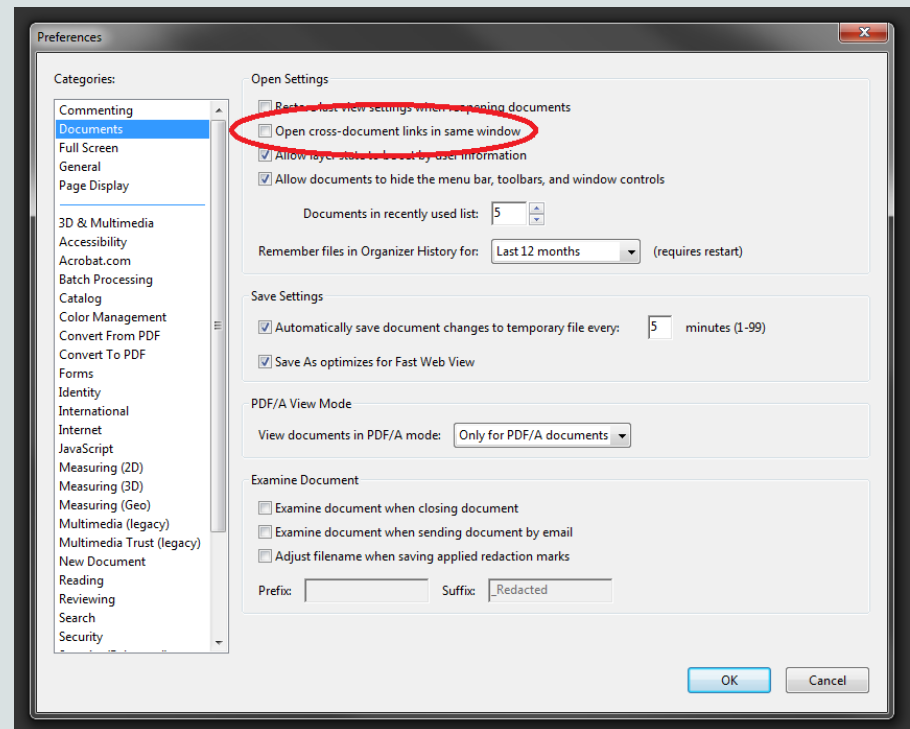
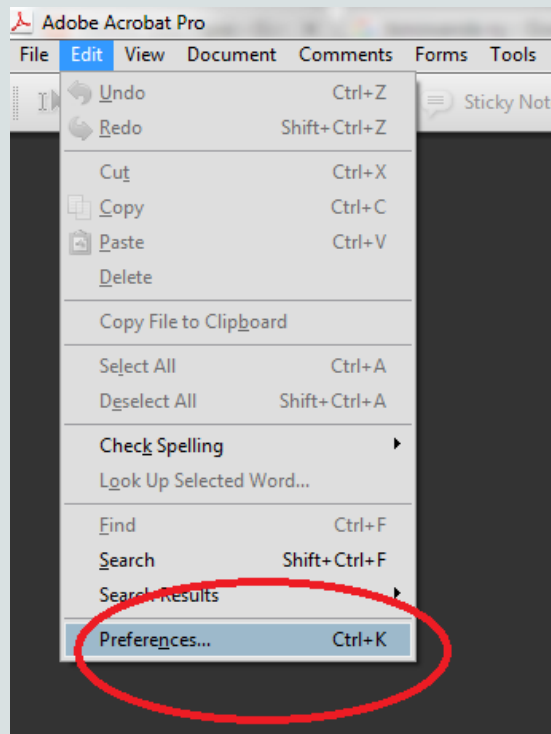
PDF Document

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1. Open **Preferences** from the Edit menu
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<u>EV</u>	<u>Electric Vehicle that charges its batteries by plugging in</u>
PHEV	Plugin Hybrid Electric Vehicle (electric motor and gas engine)
BEV	Battery Electric Vehicle (only electric motor and battery)
kWh	Kilowatt-hours (electrical energy stored by batteries)
<hr/>	
<u>EVSE</u>	<u>Electric Vehicle Supply Equipment or EV Charging Station</u>
AC	Alternating Current (electrical grid)
DC	Direct Current (batteries)
kW	Kilowatt (electrical power of motors or chargers)
<hr/>	
NYSERDA	New York State Energy Research and Development Authority
NYPA	New York Power Authority
NYS DEC	New York State Department of Environmental Conservation
TCI	Transportation and Climate Initiative (Northeast & Mid-Atlantic)
U.S. DOE	United States Department of Energy

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Introduction to EVs and EV Charging Stations



- 1.1 Environmental Benefits of EVs
- 1.2 EV Technology Overview
- 1.3 EV and EV Charging Stations in NYS
- 1.4 Importance of EVs for Municipalities

EVs offer local, regional, and global environmental and economic benefits

More Fuel Efficient

With an efficiency of about 90%, electric motors are about **three times more efficient** than a gas engine. Electric vehicles recover energy while decelerating, and often accelerate faster.



Better for the Environment

Electric driving creates **zero tailpipe emissions** and much of New York State's electricity comes from low-carbon sources.

Lower Operating Costs

Electricity is **less expensive** than gasoline based on energy content and electric vehicles are more efficient.



Vehicle Cost Calculator
(U.S. DOE)



More EV Benefits
(NYSERDA)



eGallon Calculator
(U.S. DOE)



Several EV models are available that can be charged in various ways

EVs Offered in NYS

12 BEVs (Tesla Model S, Nissan Leaf, Chevrolet Bolt, Ford Focus Electric)
 • 60-200 electric miles (16-80kWh)

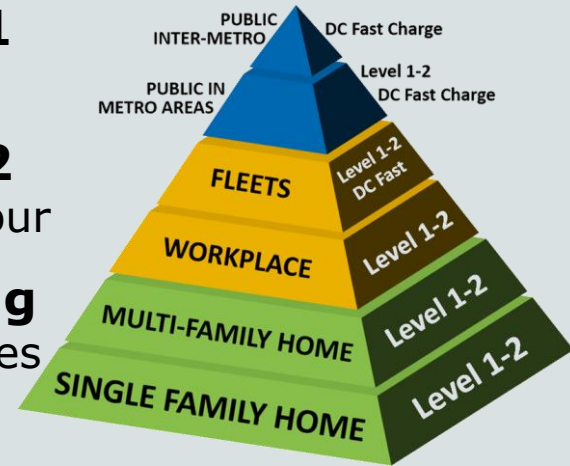
18 PHEVs (Toyota Prius, Ford C-Max and Fusion Energi, Chevrolet Volt)
 • 15-80 electric miles (8-20kWh)

EV Charging Stations (EVSE)

120 V AC Level 1
 • 2-5 E-miles/hour

240 V AC Level 2
 • 10-20 E-miles/hour

DC Fast Charging
 • 80% in 20 minutes



Charging Connectors

Standard J1772 connector
 for AC Level 1 & 2

Multiple connectors
 for DC Fast Charging



Charging Station Options
 (NYSERDA)

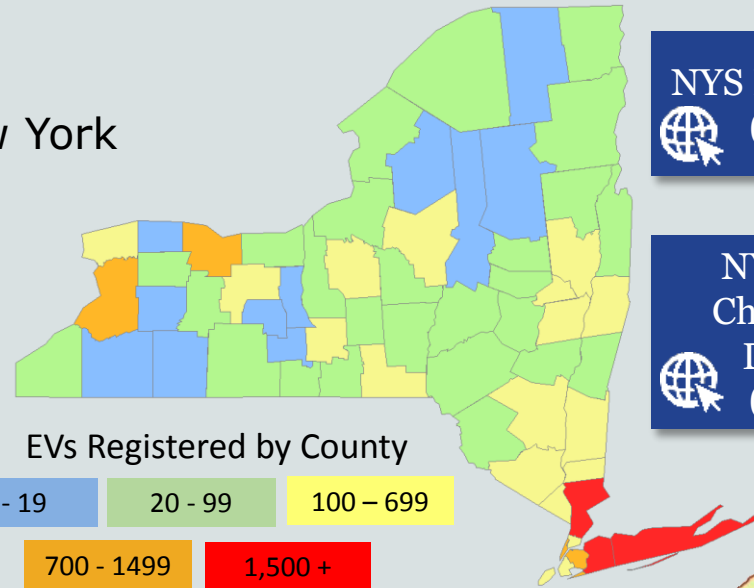
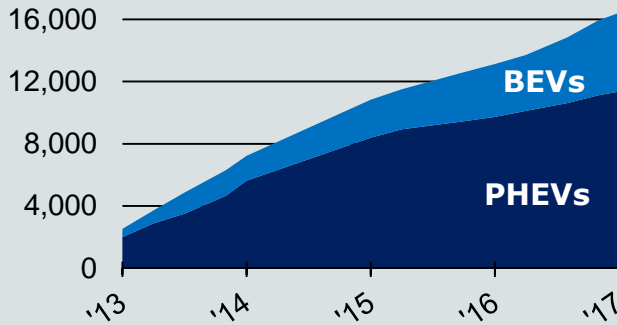
1.3

EVs and EV Charging Stations in NYS

EV ownership is increasing and charging stations expand their range

EV Ownership

16,600 EVs were registered in New York State as of January 1, 2017



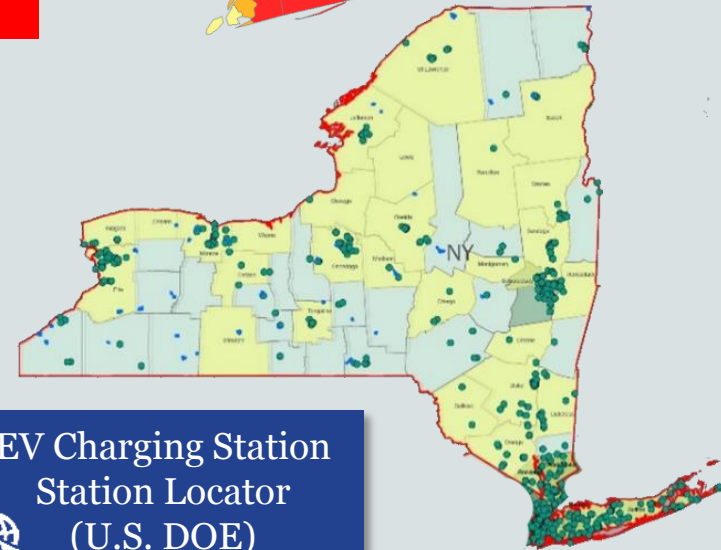
NYS EV Registrations (NYSERDA)

NYS EV and EV Charging Station Data Reports (NYSERDA)

Over 60% of EVs are in **Long Island, Westchester, and New York City**
Most other EVs are near **larger cities**

Charging Stations

New York State has **723** public charging stations



EV Charging Station Station Locator (U.S. DOE)

EV users share environment, health, and economy benefits with their community

Driver Demographics

EV drivers help **boost the local economy** in a variety of ways through **tourism attraction**, **patronizing local merchants**, **job creation**, and attracting a **talented workforce**.

Community Benefits

Investing in EV charging will **attract EV drivers** and **prepare communities for the future** transportation system that incorporates electric technology. EV drivers extend their electric miles by using public charging stations which improves **air quality** and **human health** for the local community. Reducing our reliance on imported petroleum fuels with **electricity generated from domestic and renewable sources** has additional **economic benefits**.

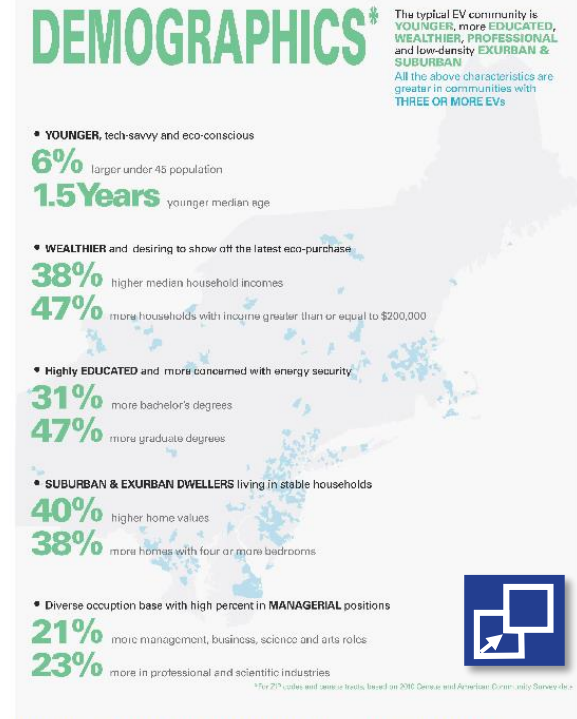


Figure 1.5. Demographics summary of EV communities (source: 2010 Census and American Community Survey)
Assessment of Current EVSE and EV Deployment 14

Overview of EV Deployment
in the Northeast
(TCI)



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Policy Tools to Facilitate EV Adoption



- 2.1 EV Charging Policy Tools
- 2.2 Allowing EV Infrastructure
- 2.3 Incentivizing EV Technology
- 2.4 Requiring EV Stations
- 2.5 Regulating EV Charging
- 2.6 NYS Policy Examples

Zoning

Partnerships &
Procurement

Codes

Permitting

Parking

Planning and policy tools can be used to **allow, require, regulate, and incentivize** EV charging stations. These tools can **lower the cost** and **streamline the administrative process**.

Planning and policy tools can also be used to **set design standards**. This **simplifies installations** for both municipalities and developers. It ensures the **safe installation and operation** of EV charging stations.

EV Resources for Planners
and Municipalities
(NYSERDA)



Preliminary steps to ensure EV charging deployment is not restricted

Zoning

Specifically **define EV and EV chargers** in local planning and land use contexts

Partnerships & Procurement

List EV charging infrastructure in **Use Tables**

Codes

Ensure zoning resolutions and ordinances **allow EV charging in logical locations**

Permitting

Educate staff and inspectors on EV technology and requirements

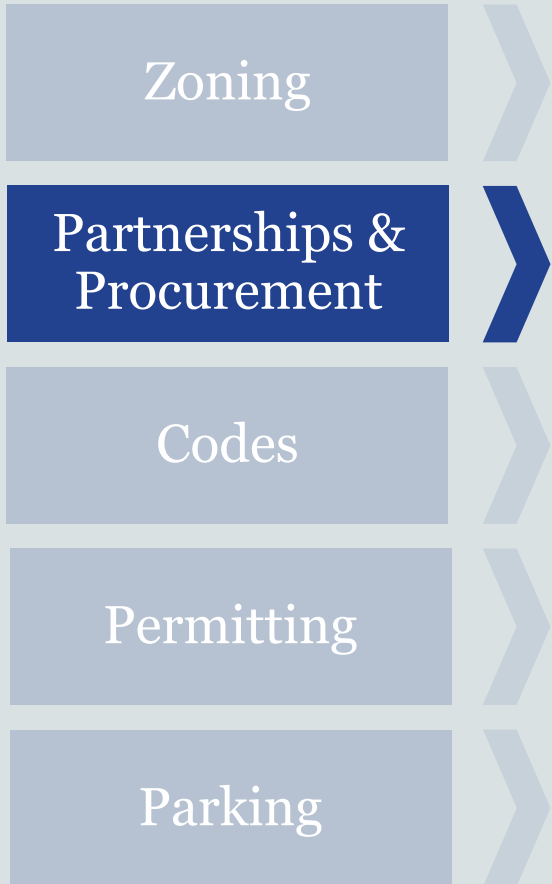
Parking

Standardize and streamline EV charging station installation permitting procedures and costs

Permit Processing
Streamlining Report
(NYSERDA)



Incentives support EV charging station installations and encouraging EV use



Several discounts, incentives, and programs for public and private entities:


- Purchase and operate EVs
- Install EV charging stations
- Streamline permitting and ordinance
- Promote EV adoption

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

Category	Program Name	Description
CHARGING STATIONS	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.
	NYP&A Public Sector Charging Station Program	Discounted Level 2 EV charging stations for New York Power Authority (NYP&A) energy customers, as well as any state or local government entity, through EV Connect.
	VEHICLES	Federal EV Tax Credit
State Rebate for Plug-In Vehicle Purchases		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		NYP&A will provide zero-interest financing to purchase EVs for eligible municipalities and rural electricity cooperatives that currently receive low-cost hydropower from NYP&A.
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 during off-peak hours when EVs typically charge.

Visit nyserdanv.gov/Researchers-and-Policymakers/Electric-Vehicles/Support-and-Discounts for more information.

This project is supported by the New York State Energy Research and Development Authority as part of the ChargeNY Initiative.



Requiring EV infrastructure significantly increases adoption rates

Zoning

Restrict, permit, or require EV charging infrastructure based on zoning districts

Partnerships & Procurement

Establish development standards on the number and type (level) EV charging stations permitted or even required

Codes

Require conduit and sufficient electrical capacity for EV charging in parking lot projects

Permitting

Set **numerical or percentage-based goals** or limits for EV infrastructure in new construction

Parking

Establish **standards for safety and scope** of EV charging stations

A Guide to EVSE Planning
and Policy Tools
(NYSERDA)



Support for EV drivers to charge ensures successful implementation

Zoning

Partnerships & Procurement

Codes

Permitting

Parking

Align EVs with broader **environmental and sustainability initiatives**

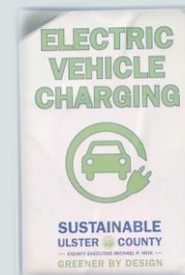
Express EV support through comprehensive plans or executive orders
Participate in regional, state, or federal EV groups

Establish fees to discourage non-EVs from occupying charging spots

Standardize signage

Table 1: EV Planning and Policy Tool Summary

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



Municipalities tailor EV charging policy to the needs of their community

Town of Otto



Town of Brutus



City of Oneida



Port of Washington



Town of New Paltz



- Defined EV charging technology

- Added EV charging equipment installations to accessory use table
- Permits EV charging equipment in all zoning districts

- Defined permitted locations and permitting standard
- Defined design standards for permitted locations

- Permit required from building department
- Set streamlined permitting process
- Waive permitting fees

- Set EV charging parking space requirement
- Authorize planning board to simplify site plan procedure
- Authorize planning board to implement design standard regulations

3

Other Options for Encouraging EV Adoption

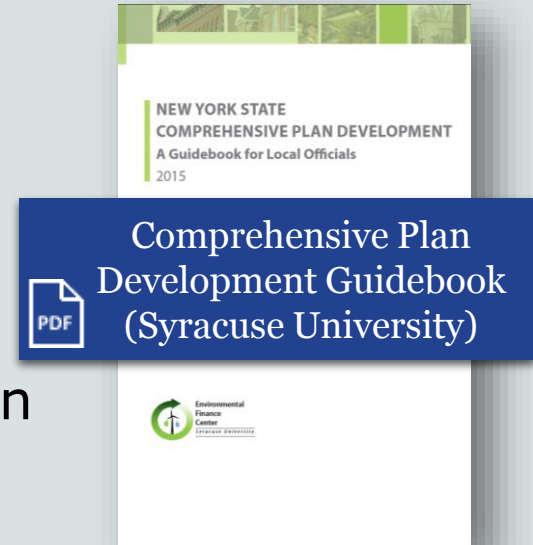


- 3.1 Comprehensive Plans
- 3.2 Executive Action
- 3.3 Participation in Initiatives
- 3.4 Leading by Example

Mentioning EVs in the Comprehensive Plan paves the way for EV-readiness

A Comprehensive Plan:

1. Provides a legal defense for regulation
2. Provides a basis for other actions affecting the development of the community
3. Helps establish policies relating to the creation and enhancement of community assets



Identifying sustainability as an issue and goal early in the Comprehensive Plan development may lead to **EV policy recommendations** that help guide future development.

1. Identify Major Issues

2. Survey And Analysis

3. Establish Goals and Objectives

4. Develop the Plan

5. Review the Plan

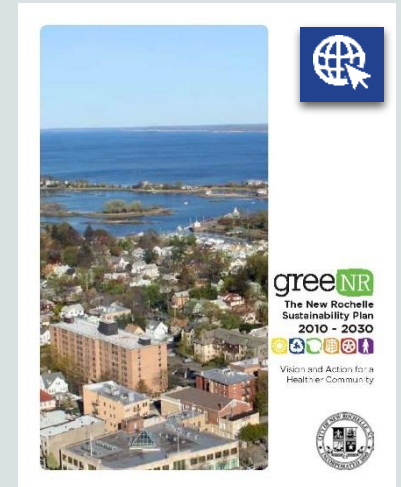
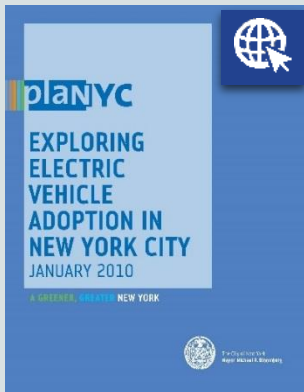
6. Implement and Evaluate

New York City and New Rochelle call for EV support in Multiple Plans

PlaNYC's Exploring EV Adoption investigates how to facilitate early adoption of EV technology that support the goal of **reducing transportation greenhouse gases** by 44%.

The **NYC EV-Readiness Plan** advances EV implementation potential through public outreach to **raise EV awareness**.

EnvisionNR Comprehensive Plan incorporates principles of sustainability using New Rochelle's **GreenNR Sustainability Plan** framework. Recommendations include an expansion of the City's **Green Fleet initiative**, installing more **EV charging stations**, and establishing an **EV shuttle service**.



Official executive action or expressed support can encourage EV adoption

Energy efficiency and sustainability standards are governed by an overlapping set of state laws and Executive Orders.

- NYS Executive Order No. 4 (2008) directs state agencies, public authorities and public benefit corporations to **green their procurements** and to **implement sustainability initiatives**

County executives and municipalities can also encourage EV infrastructure installations and EV use through Executive Orders.




- Ulster County Local Law #3 of 2015, **Establishing A Sustainable Green Fleet Policy** sets a goal of having 5% of the fleet be Green Vehicles by 2020, and after 2020, 20% of new passenger purchases will be Green Vehicles.
 - ✓ 9 EV charging stations at municipal locations with 6 more to be installed in 2017
 - ✓ 8 EVs in the fleet with 12 to be added in 2017

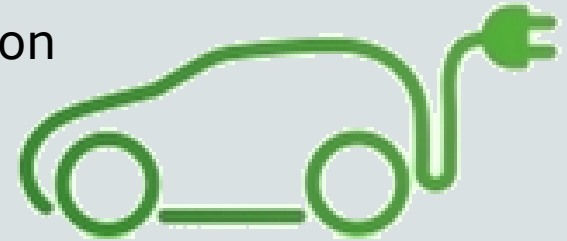
Green Fleet Initiative
(Ulster County)







Recognizing, endorsing, and engaging in EV efforts demonstrates commitment

Understand and follow developments in large EV efforts to identify opportunities to replicate actions locally or leverage for funding technology deployments.

-  Multi-State Zero-Emission Vehicle (ZEV) Action
-  ChargeNY
-  Volkswagen Settlement Funds for EVs



Participate in programs specifically designed for municipalities to implement clean energy actions, address climate change, and improve the environment.

-  Climate Smart Communities
-  Clean Energy Communities
-  Clean Cities
-  Municipal Electric-Drive Vehicle and Public Sector Charging Station Program



3.3.1

Participation in Initiatives Example

Participation in national or state initiatives can help raise EV awareness

National Drive Electric Week

Annual national outreach initiative to heighten EV awareness

Events showcase EV products, with some offering ride and drives

Organized by local co-sponsors with support from Plug-In America, Sierra Club, and Electric Auto Association

2016 NY participants included Delmar, Freeport, Ithaca, Kingston, Pleasantville, Rochester, Syracuse, Jones Beach, and White Plains



Syracuse EV and PV Expo, 2016, co-sponsored by SolarizeCNY, the Central New York Regional Planning and Development Board, and New Yorkers for Clean Power



Delmar Farnet's Market 5th Annual National Drive Electric Event, 2016, (Image: Bethlehem Chamber)

3.4

Leading By Example

Demonstrating EV use or installing EV charging stations encourages others



Action Items for EV Ready Communities

Electric vehicles (EVs) are becoming an important part of our transportation landscape. Municipalities are in a unique position to use planning and policy tools to encourage a simple and successful transition to EVs.



CLIMATE SMART COMMUNITIES

A network of New York communities engaged in reducing greenhouse gas emissions and improving climate resilience. [Climate Smart Communities includes a certification program, one element of which is EV charging stations.](#) The Climate Smart Communities program is jointly sponsored by six New York State agencies: Energy Research and Development Authority; Department of Environmental Conservation; Public Service Commission; Department of State; Department of Transportation; and the Department of Health. www.dec.ny.gov/energy/76483.html

ACTION ITEMS FOR EV READY COMMUNITIES



ADD EV CHARGING LANGUAGE TO THE MUNICIPAL ZONING

Update zoning laws to include EV charging equipment definitions, list EV charging infrastructure in Use Tables, and ensure zoning resolutions and ordinances allow EV charging in logical locations

SUPPORT EV INFRASTRUCTURE DEPLOYMENTS

Incorporate EV readiness into the Comprehensive Plan's sustainability goals, or create an EV Infrastructure Plan to make charging readily available which encourages EV use and helps improve air quality.

ESTABLISH REGULATIONS FOR EV CHARGING USE

Regulations on EV charging station use clarifies the expectations for EV drivers and non-EV drivers. Regulations can impose fines or tow non-EVs parking in EV charging station spaces.

REQUIRE EV CHARGING STATIONS OR PREPARATIONS THROUGH CODE

Require conduit and sufficient electrical capacity for EV charging in parking lot projects, set numerical or percentage-based goals or limits for EV infrastructure in new construction, or establish standards for safety and scope of EV charging stations.

STANDARDIZED EV SIGNAGE

Establish a standard for EV charging station signage so both EV and non-EV drivers can identify charging station locations and understand any applicable regulations.

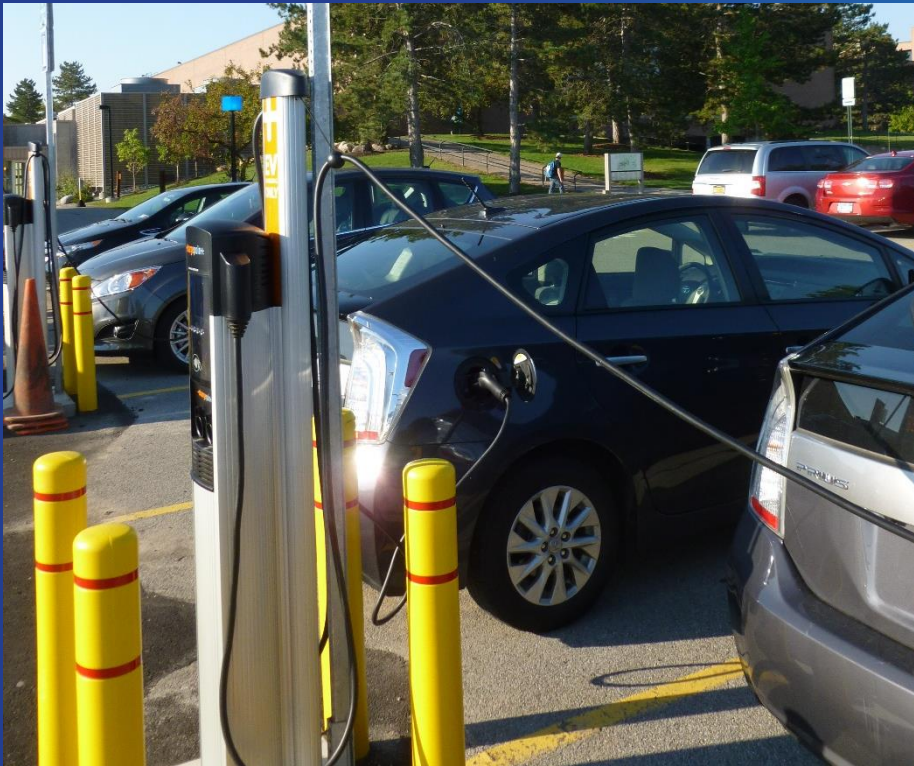
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For more information on EVs visit: www.nysERDA.gov/Researchers-and-Policymakers/Electric-Vehicles



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4 | Planning Board Actions



- 4.1 Facilitating Installations in the Planning Process
- 4.2 When to Suggest EV Charging Stations
- 4.3 How to Include EV Chargers or Conduit in Plans
- 4.4 Bargaining EV Charger Use in Exchange for Variances

Site Selection Guide for EV Charging Stations



SITE SELECTION GUIDE FOR EV CHARGING STATIONS

Considering an electric vehicle (EV) charging station installation?

This guide will help determine if 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 charge over 50 miles 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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March 2, 2017

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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.nyserdanv.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

DCFC 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.nyserdanv.gov/Researchers-and-Policymakers/Electric-Vehicles/Info/Charging-Station-Hosts

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

March 2, 2017

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