PROMOTING EV CHARGING STATIONS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS

Information, Incentives, and Installation Guidelines for New York Property Owners & Developers

New York State Energy Research and Development Authority

ENERGETICS

March 2020
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ABOUT US

ENERGETICS

Energetics, a division of Akimeka, LLC, is an engineering and management consulting firm assisting government and industry in developing new solutions in energy, climate, transportation, and security.

WX Y

WXY architecture + urban design is a planning and design firm focused on social and environmental transformation of the public realm at multiple scales.

As a public benefit corporation, NYSERDA offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA advances energy solutions while working to protect the environment.
CONTENTS

1 Intro to EV Charging
2 Developer Incentives
3 EV Building Codes & Guidelines
A Appendix
HIGHLIGHTS

• EV charging needs are growing because EV registrations are increasing as EV options continue to diversify and expand

• EV charging offers benefits for developers, including qualifying for LEED points and tenant retention

• Municipalities are establishing codes and requirements around EV charging

• Planning and preparing for EV charging during design and construction reduces future installation costs
1. EVs & EV CHARGING

- Basics & Background
- EV Market Characteristics
- Charging Station Type Comparison
- EVs & Charging Stations in New York
- EV Global Warming Emissions In The U.S.
- Benefits of Charging Stations
- Charging Station Cost Considerations
- Low Cost Charging Station Installation Strategies
- Charging Station Installation Case Study
### BASICS & BACKGROUND

#### PLUG-IN HYBRID EV (PHEV)

- Battery-powered electric motor (smaller battery) with an internal combustion engine powered by another fuel (gas, diesel, etc.)
- 24 models available in the US, with an average of 22 e-miles, and median price of $55,408*
- 14–47 e-mile range / 6–17 kWh battery pack
- PHEV drivers must charge more frequently

#### BATTERY EV (BEV)

- Battery-powered electric motor (larger battery), must plug into chargers for energy, but uses no gas
- 16 models available in the US, with an average of 220 e-miles and median price of $39,000*
- 58–370 e-mile range / 24–100 kWh battery pack
- BEV drivers rely on public charging to extend the electric range for longer distance travel

*Source: [EVAdoption.com](https://www.evadoption.com), as of May 2019.

| Honda Clarity PHEV | Mitsubishi Outlander PHEV | Chevrolet Bolt | Tesla Model 3 |
EV MARKET CHARACTERISTICS

ENVIRONMENTALLY CONSCIOUS USERS

EVs are an enticing option for consumers concerned about environmentally sustainable transportation.

MUNICIPAL, UNIVERSITY, AND SHARED MOBILITY FLEETS

Many universities and municipalities are procuring EVs, while carshare and rideshare programs are attracted to the low operational costs of EVs.

INCREASING EV OPTIONS AND DIVERSE USERS

New models, better ranges, and lower prices are making EVs an attractive option for diverse users and needs.
ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) COMPARISON

LEVEL OF CHARGE

AC LEVEL 1
- Best for 6 hour+ or overnight charging
- Requires 120 volt supply at 12–16 amps
- Alternating Current (AC) provided at 1.4–1.9 kW
- Minimal peak load/demand charge impacts
- Station hardware $500–$1,000 per port

AC LEVEL 2
- Best for 2–6 hour dwell times
- Requires 208/240V supply at 20–80 amps
- AC provided at 3.3–19.2 kW (6.6 kW most common)
- Minimal peak/load demand charge
- Station hardware $600–$5,000 per port

DC FAST CHARGE
- 30-minute fast charging for high turnover contexts
- Requires 3-phase 480 volt supply at 80–200 Amps
- Direct Current (DC) provided at 40–100 kW
- Station hardware $7,000–$50,000 per port

SUITABLE INSTALLATION CONTEXTS

Single-Family
Multi-Family
Commercial
Municipal/Private Fleet
Municipal/Private Fleet
Public Metro Areas
EV & EVSE IN NEW YORK

NEW YORK STATE
BEV: 20,431
PHEV: 26,556
Total: 46,987
EV Market Share: 0.50%
Charging Stations (EVSE): 1,753

Data: EV Registrations and EVSE locations
EvaluateNY.com 03/2020;

Total Registered EVs in NYS

- Battery Electric Vehicles (BEV)
- Plug-in Hybrid Electric Vehicles (PHEV)
The emissions profile of BEVs is dependent on the electrical grid that powers them.

MPG calculations are the miles an EV can drive for the equivalent emissions of burning one gallon of gasoline.

- An EV driven in any part of the US produces less greenhouse gas emissions than an average conventional gasoline car.
- 94% of Americans live in regions where EVs have lower emissions than a 50 MPG gasoline car.

Map and Data: Union of Concerned Scientists, 2020

© Union of Concerned Scientists
BENEFITS OF CHARGING STATIONS

**OWNER/DEVELOPER**
- LEED points and other sustainability bonuses
- Greater tenant retention
- Stronger garage lease negotiating power

**TENANT**
- Attractive amenity
- Ease of access and reliability of exclusive use
- Enables EV ownership for those without other charging options

**GARAGE OPERATOR**
- Higher revenue potential for charging
- Futureproofed for emerging vehicle technology
LEVEL 2 EVSE COST CONSIDERATIONS

PREPARING FOR FUTURE EVSE INSTALLATIONS CAN SIGNIFICANTLY LOWER COSTS

- Average NYS installation costs are decreasing:
  - NYSERDA Charging Station Deployment Program 2012-2016: $20,000 per dual-port
  - NYSERDA Charge Ready Program 2018-now: $13,300 per dual-port (~$6,000 for hardware and ~$7,000 for installation).
    - Total dual-port costs range from $3,000-$25,000.
  - Preparing site can reduce total installation costs by 33% or $6,700
    - 1”–1.5” conduit run from the electrical panel to the potential EV charging station location
    - Electrical panel with additional capacity and available breaker slots

![Dual Port Charging Station Average Costs Diagram](chart.png)
LOWER COST EVSE STRATEGIES

OPTIONS FOR LONG-DWELL PARKING (MORE THAN 6 HOURS)
- Workplaces
- Commuter Lots
- Airports
- Hotels
- Multi-Unit Dwellings
- All-Day Parking Garages

PLUG SWITCHING
- Configure parking or implement usage policy to allow/require vehicles to move once charged
- Install stations with longer cords that can reach additional charging spaces

LOW POWER CHARGING
- Level 1 stations reduce electrical demand by charging at a lower power level
- An existing circuit for a single-port 6.6 kW Level 2 station can power two or more Level 1 stations or two 3.3 kW Level 2 stations, which allows more EVs to charge without increasing electrical capacity

POWER SHARE/AUTOMATED LOAD MANAGEMENT
- Load management systems can share or control the charging power for each port to limit electrical upgrades
- Existing stations can be managed by an upstream power controller to share available electricity, reduce demand costs, and enable additional stations on existing circuits

EVs have a portable charging cord that plugs into a 110V outlet and a site could provide only outlets for use by these portable cords as a very low cost option. However, EV charging outlets must be on a dedicated circuit and three-prong outlets will experience wear from everyday use (the EV connector was specifically designed for this).
CASE STUDY: ARCHER GREEN APARTMENTS

A LEED Gold mixed-use development in Jamaica, Queens converts a former NYPD garage into 380+ affordable residential units, 60,000sf of commercial, and 15,000sf of community facilities. The 222-unit garage includes 11 EVSE for residential tenants, commercial shoppers, and the NYPD fleet.

Developer: Omni New York, LLC
Garage Type: Two-level covered with valet service
Total Parking: 150 residential/commercial, 72 NYPD
Number of Parking Spaces with EVSE Installed: 5 residential/commercial spaces, 6 NYPD parking spaces
Utility Provider: ConEdison
Trenching: None
Furthest Distance from Electrical Panel: 200ft
Conduit Run Cost: ~$20/LF
Total Cost Per Station: ~ $15k/station
Subsidy/Incentive Programs Used: LEED points
EVSE Operation: Parking operators will cover costs of electricity, maintenance and operation of EVSE. Drivers will be responsible for the cost of parking.
Sustainability Recognition for Charging Stations
LEED Credits
Incentives and Funding Resources
Leveraging Incentives Case Study
SUSTAINABILITY RECOGNITION FOR EVSE

**LEED**

Awards LEED points to new buildings that designate 5% of parking spaces as preferred parking for green vehicles and a for EVSE installations.

**ENERGY STAR**

Excludes energy use for EV charging from total energy consumption calculations so EV charging does not lower overall ENERGY STAR score.

**STARS**

A self-reporting framework for colleges and universities to measure their sustainability performance that awards points for EVSE in the “Support for Sustainable Transportation” category.
**LEED CREDITS**

<table>
<thead>
<tr>
<th>RATING SYSTEM</th>
<th>POINTS</th>
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<tbody>
<tr>
<td><strong>LEED v3 (2009)</strong></td>
<td>3/110</td>
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<tr>
<td>• Category: “Alternative Transportation – Low Emitting and Fuel-Efficient Vehicles (Green Vehicles)”</td>
<td></td>
</tr>
<tr>
<td>• No new projects can be registered under v2009</td>
<td></td>
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<tr>
<td>• Existing projects will have until June 30, 2021 to become certified</td>
<td></td>
</tr>
<tr>
<td><strong>LEED NEW CONSTRUCTION v4 (2013)</strong></td>
<td>1/110</td>
</tr>
<tr>
<td>• Designate 5% parking for green vehicles or 20% discounted parking rate and:</td>
<td></td>
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<tr>
<td>• Option 1: EVSE in 2% of all parking spaces or</td>
<td></td>
</tr>
<tr>
<td>• Option 2: Liquid, gas, or battery facilities in 2% of all parking spaces</td>
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## INCENTIVES & FUNDING RESOURCES

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>INCENTIVE</th>
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<tbody>
<tr>
<td>NYSERDA Charge Ready NY</td>
<td>$4,000 per port for installations in multi-unit dwellings, workplaces, public access (can stack with NYS tax credit, but not other NYS rebates)</td>
</tr>
<tr>
<td>NYS Dept. of Taxation and Finance Alternative Fuels and EV Recharging Property Credit</td>
<td>Tax credit for installation of charging stations equal to the lesser of $5,000 or 50% of the cost of property, less any cost paid from the proceeds of grants</td>
</tr>
<tr>
<td>NYS Department of Environmental Conservation Municipal Zero-emission Vehicle Rebate and Infrastructure Program</td>
<td>Rebates for municipalities to install public EVSE. Rebates also available for the purchase or lease clean vehicles for fleet use.</td>
</tr>
<tr>
<td>New York Power Authority Charge NY</td>
<td>Assistance and incentives for EV Charging stations for municipalities</td>
</tr>
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</table>

Note: All programs are subject to change and funding may be resource or time limited

### RESOURCE

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Department of Energy Alternative Fuels Data Center</td>
</tr>
<tr>
<td>Joint DOT &amp; DOE Guide to Federal Funding &amp; Financing EV/EVSE</td>
</tr>
<tr>
<td>Clean Cities Coalition Network</td>
</tr>
</tbody>
</table>
Charge Ready NY Rebate

NYSERDA offers rebates of $4,000 per qualified Level 2 charging stations. Any public or private entity, such as municipalities, for-profit companies, and non-profit organizations, is eligible.

Eligible Locations and Charging Station Type

- **Public parking lot** with 10 or more parking spaces that is open to the general public at least 12 hours per day and 5 days per week.
- **Workplaces** with 15 or more employees and a parking lot with at least 10 parking spaces that primarily serves employees who work at or near the lot.
- **Multi-unit dwelling** with 5 or more housing units and a parking facility with at least 8 parking spaces that primarily serves the multi-unit dwelling.

Requirements

- Charging stations must be included as a qualified Charge Ready NY station.
- Must be installed after September 18, 2018 and remain in **operation for at least four years**.
- Charge Ready NY rebates **CAN be combined** with the New York State tax credit for installing charging stations.
- The Charge Ready NY rebate **CANNOT be combined** with other New York State charging station rebate programs from NYSERDA, the Department of Environmental Conservation, the New York Power Authority, or other State entities.

More information is available at: [www.nyserda.ny.gov/Charge-Ready-NY](http://www.nyserda.ny.gov/Charge-Ready-NY)
CASE STUDY: HURON CAMPUS

This business campus near Binghamton used multiple funding sources and an optimal site selection to reduce installation costs by nearly 90%. The stations were mounted on an existing structure near the electric service panel which required a very short conduit run with no trenching. They pre-purchased the station networking fees to include in the total project cost for which the incentives were applied, which will save money on these future costs.

Station Owner: Huron Real Estate Associates, LLC

Parking Type: Open surface lot
Total Parking: ~275 spaces
Number of EVSE Installed: Two dual port stations
Make-ready Requirements: Wire run through existing conduit plus ~40 feet in new conduit to an existing structure where stations are mounted

Cost per Station: ~$1,900 (x 4)
Total Installation Costs: ~$2,400
Networking Fees: ~$3,900 pre-purchased for four years
Electrical Costs: ~$6,000
Station Activation Fees: ~ $500
Total Project Cost: ~$20,500
Total Incentive Value: ~ $18,250 ($16,000 from NYSERDA’s Charge Ready NY and 50% of the remaining $4,500 from the NYS Alternative Fuels Property Tax Credit)
NY County EV Building Code Overview
NYC Local Law No. 130 Case Study
Facilitating Installation & Cost Mitigation
Best Practices
## EXAMPLES OF EV/EVSE BUILDING CODES BY COUNTY (NY)

<table>
<thead>
<tr>
<th>Municipality</th>
<th>County</th>
<th>Local Law</th>
<th>Defines EVSE in local code</th>
<th>Establishes permitting process for EVSE</th>
<th>Designates EVSE as traditional parking</th>
<th>Sets design standards for EVSE installations</th>
<th>Sets installation requirements based on site space</th>
<th>% EVSE Required</th>
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<tbody>
<tr>
<td>Cohoes</td>
<td>Albany</td>
<td>Chapter 285 Zoning and Land Use § 285 - 176</td>
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<tr>
<td>Otto</td>
<td>Cattaraugus</td>
<td>§ 6.6 Electric Vehicle Supply Equipment (EVSE)</td>
<td>X</td>
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<td>Brutus</td>
<td>Cayuga</td>
<td>§ 125-110: Electric Vehicle Supply Equipment Regulations</td>
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<td>Redhook</td>
<td>Dutchess</td>
<td>Local Law No. 1-2014</td>
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<td>Brockport</td>
<td>Monroe</td>
<td>Local Law No. 2 of 2016 – Electric Vehicle Charging Stations</td>
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<td>Port Washington North</td>
<td>Nassau</td>
<td>§ 176-213 Electric Vehicle Charging Systems</td>
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<td></td>
<td>X</td>
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<tr>
<td>New York City</td>
<td>New York</td>
<td>Local Law No. 130</td>
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<td>Ithaca</td>
<td>Tompkins</td>
<td>§ 271 - 16 Planned DevelopmentZone No. 15</td>
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<tr>
<td>New Paltz</td>
<td>Ulster</td>
<td>§ 140-52 - Site Plan Review</td>
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<td>X</td>
<td>5%</td>
</tr>
</tbody>
</table>

EV and EVSE regulations and policy are continuing to expand. It is expected that existing regulations will become more aggressive in the amount of EVSE needed and additional jurisdictions will start to adopt these.
### Amendment to 2009 Building Codes

- Concerning parking garages and open parking lots
- When an alteration of a parking garage or an open parking lot includes an increase in the size of the electric service, **such alteration shall include provisions for the installation of EV charging stations**, in accordance with sections 406.2.11 and 406.7.11

### Section 406.2.11 Parking Garages

- Parking garages shall be capable of supporting EVSE for at least 20% of parking spaces and be capable of providing a minimum electrical capacity of 3.1 kW
- Electrical room supplying the garage must be able to accommodate a panel that provides 3.1kW of electrical capacity
- Does **not** apply to mercantile buildings
- Can waive requirement if parking facility will be used **for less than 3 years**
- Affordable housing with over 50% affordable units are **exempt**

### Section 406.7.11 Open Parking Lots

- Open parking lots shall be capable of supporting EVSE for at least 20% of parking spaces and be capable of providing a minimum supply of 11.4 kVA
- Raceway cannot be smaller than 1 inch
- Electrical room supplying the garage must be able to accommodate a panel that provides 3.1kW of electrical capacity for each stall connected with the raceway
- Does **not** apply to mercantile buildings
- Can waive requirement if parking facility will be used **for less than 3 years**
- Affordable housing with over 50% affordable units are **exempt**

Source: NYC, Local Law 130
## FACILITATING INSTALLATION

### CONSIDER THE FOLLOWING IN PLANNING OR INSTALLING EVSE

<table>
<thead>
<tr>
<th>Site Prep</th>
<th>Monitoring</th>
<th>Operations</th>
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</thead>
<tbody>
<tr>
<td>• Consult with licensed electrician and notify your local utility</td>
<td>• Electricity can be monitored by EVSE software, available through network subscription</td>
<td>• Valet parking reduces access issues</td>
</tr>
<tr>
<td>• Place EVSE close to electrical panel</td>
<td>• Network subscriptions are necessary for station pricing/revenue</td>
<td>• Monthly parking reservation system could manage access and payments</td>
</tr>
<tr>
<td>• Use electrical panel with additional capacity and available breaker slots</td>
<td>• Meter accuracy should meet utility billing standard</td>
<td>• Establish system or policy to move fully charged vehicles to regular parking spots</td>
</tr>
<tr>
<td>• Fit design to the required electrical capacity</td>
<td>• Place new meters close to power source to reduce trenching costs</td>
<td>• Use visible signage and pavement markings dictating EVSE user etiquette and terms of use</td>
</tr>
<tr>
<td>• Energy management systems can split power among multiple circuits</td>
<td>• Incentives offered by utilities (i.e. ConEd) may reduce cost of separate meter</td>
<td></td>
</tr>
</tbody>
</table>

Source: US DOE, ChargeNY
BEST PRACTICES

• **Promote EV use** through dedicated partnerships with electric car rental companies or electric ride share programs.

• Organizations may **install charging stations and use EVs** in their fleet to promote EV adoption.

• **Gain LEED credits** through V4 Alternative Transportation Conventional Vehicle Trip Reduction (3-15 Points)

• **Standard signage** helps EV drivers locate stations while also fostering increased EV awareness and advertising a commitment to sustainability.
For More Information

For more information on EVs and EV charging stations, associated programs, and funding opportunities

Visit:  www.nyserda.ny.gov/ChargeNY
Email: transportation@nyserda.ny.gov
### EV & EV CHARGING STATION INFORMATION

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>FORMAT</th>
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<td>NYSERDA</td>
<td>Web <a href="www.nyserda.ny.gov/All-Programs/Programs/ChargeNY">www.nyserda.ny.gov/All-Programs/Programs/ChargeNY</a></td>
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<td>EV Global Warming Potential</td>
<td>UoCS</td>
<td>Web <a href="https://blog.ucsusa.org/dave-reichmuth/are-electric-vehicles-really-better-for-the-climate-yes-heres-why">https://blog.ucsusa.org/dave-reichmuth/are-electric-vehicles-really-better-for-the-climate-yes-heres-why</a></td>
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<tr>
<td>Multi-State Zero-Emission Vehicle (ZEV)</td>
<td>ZEV Task Force</td>
<td>Web <a href="www.zevstates.us">www.zevstates.us</a></td>
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### GRANTS, REBATES & PROGRAMS

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<tr>
<th>AUTHOR</th>
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<td>NYS Dep. Taxation</td>
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<td>Clean Cities</td>
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<td>Climate Smart Communities</td>
<td>DEC</td>
<td>Web <a href="www.dec.ny.gov/energy/76910.html">www.dec.ny.gov/energy/76910.html</a></td>
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<td>Web <a href="www.nyserda.ny.gov/All-Programs/Programs/Drive-Clean-Rebate">www.nyserda.ny.gov/All-Programs/Programs/Drive-Clean-Rebate</a></td>
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<td>NYPA Electric Vehicle Programs</td>
<td>NYS/NYPA</td>
<td>Web <a href="www.nypa.gov/innovation/programs/chargeny">www.nypa.gov/innovation/programs/chargeny</a></td>
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<td>Ulster County Alive! EV Tourism Program</td>
<td>Ulster County</td>
<td>Web <a href="www.ulstercountyalive.com/electric-vehicle-tourism">www.ulstercountyalive.com/electric-vehicle-tourism</a></td>
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<td>Volkswagen Settlement Funds for EV</td>
<td>EPA</td>
<td>Web <a href="www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement">www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement</a></td>
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<td>FORMAT</td>
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<tr>
<td>EV Cluster Analysis</td>
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<td>PDF</td>
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<tr>
<td>EV Ready Codes for the Built Environment</td>
<td>NYSERDA</td>
<td>PDF</td>
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<tr>
<td>EV Tourism in NYS</td>
<td>NYSERDA</td>
<td>PDF</td>
</tr>
<tr>
<td>EVSE Signage Guidance</td>
<td>NYSERDA</td>
<td>PDF</td>
</tr>
<tr>
<td>NY County Local Law 130</td>
<td>NY County</td>
<td>PDF</td>
</tr>
<tr>
<td>NYS EV and EV Charging Station Data Reports</td>
<td>NYSERDA</td>
<td>Web</td>
</tr>
<tr>
<td>Overview of EV deployment in the Northeast</td>
<td>NYSERDA</td>
<td>PDF</td>
</tr>
<tr>
<td>The NYC Electric Vehicle Readiness Plan</td>
<td>Empire Clean Cities</td>
<td>PDF</td>
</tr>
<tr>
<td>LEED Credit Library</td>
<td>USGBC</td>
<td>Web</td>
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</tbody>
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Getting Started
What are the best first steps when considering installing EVSE?
• Contact your local electrician and utility to determine how much power is available at your site to be dedicated to EVSE. Then contact a qualified installer to schedule a site visit. Work with the installer to identify the best location for your station, keeping in mind the distance from the power and trenching through concrete can increase costs.

Does the NYS DOF State Tax Rebate apply to multi-family development?
• This tax credit is available “only when the property is used in a trade or business located in New York State”

Can PSEG’s workplace charge program apply for EVSE in multi-family developments?
• PSEG’s workplace charging program is no longer accepting applications

Earning LEED Points
Regarding LEED points, what does it mean to devote 5% of parking spaces to green vehicles, but only need 2% of parking spaces to be equipped with EVSE?
• Green vehicles are not necessarily all EV, so 5% of parking spaces need to be designated as preferred parking space for all sorts of green vehicles (a discounted parking rate of at least 20% for green vehicles is an acceptable substitute for preferred parking spaces)
• Furthermore, EVSE needs to be installed in at least 2% of all parking spaces used by the project, and these EVSE parking spaces must be provided “in addition to preferred parking spaces for green vehicles”
Frequently Asked Questions

Incentives

What programs or incentives do NYPA and ConEdison offer?

- This presentation contains the most relevant programs and incentives for developers, but for more information on more programs and incentives, this PowerPoint outlines NYSERDA’s and NYPA’s incentives
- ConEdison has various incentives, but only 2 target developers/business owners: their EV Fast Charging Per-Plug Incentive; and their Business Incentive Rate

PACE Financing – is this tool available to finance EVSE developments?

- PACE is a new tool that “offers property owners up to 100% funding for energy efficiency and renewable energy projects that can... reduce energy use and utility bills”
- However, PACE loans will be available for energy efficiency and renewable energy projects in NYC in early 2020; program eligibility guidelines have not yet been released
- Currently NYS has a Commercial Property Assessed Clean Energy (C-PACE) project, managed through Open C-PACE

How does the Charge Ready NY rebate work?

- Sites interested in the Charge Ready NY Rebate will work with a qualified installer to identify a pre-approved station and networking service for their site. After submitting the site plans from the installer, NYSERDA will pre-approve the installation for the rebate. The total approved rebate amount will be reimbursed after the installation is complete.

Can the Charge Ready NY rebate and the NYS Alt. Fuels Property Tax credit be used together?

- The NYS Alternative Fuels Property Tax credit is available to businesses and this credit can be applied to the cost remaining after the Charge Ready NY rebate. Sites interested in pursuing the tax credit should check with their tax preparer to confirm eligibility.
Resource Document Updates

- Frequently Asked Questions added to the Appendix and updated (slide 31 and 32)
- Case Study for New York City Council Local Law 130 added (new slide 22)
- Case Study for Huron Campus added (new slide 19)
- Updated cost information for charging station installations from Charge Ready NY added (slide 12)
- Information on using portable charging cords with an outlet added (slide 13)
- Updated EV registration and EVSE location information based on March 2020 numbers (slide 10)
- Added slide on the MPG data based on the 2020 Union of Concerned Scientists report (slide 11)
- Added slide to direct readers to NYSERDA Charge NY page (slide 26)