

ELECTRIC VEHICLES and CHARGING STATIONS

*New York State
Energy Research and
Development Authority*





Create management and technology solutions that inspire our clients and contribute to a sustainable world

- Increase **energy efficiency** – fleets, buildings, industry
- **Diversify** energy supply
- Support **new technologies**
- **Modernize** infrastructure

- ✓ **Measure impacts** of new energy technologies
- ✓ **Motivate customers** to adopt new technologies and habits
- ✓ **Benchmark** energy and carbon footprint
- ✓ **Create consensus** around strategic priorities

Strategic Planning
& Roadmapping

Analysis and
Modeling

Program and
Project
Management

Metrics and
Evaluation

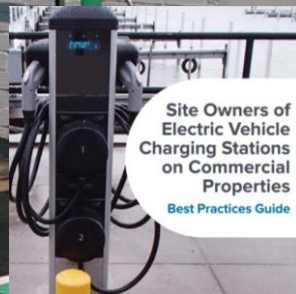
Communications
and Outreach

Tech Transfer
Investment and
Financing

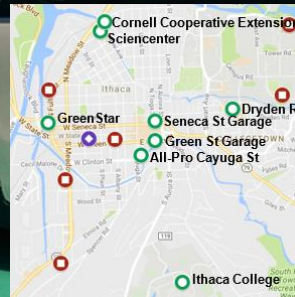
ENERGETICS EV EXPERIENCE



**EVSE Deployment
Program Support
(700+ Charging
Ports)**



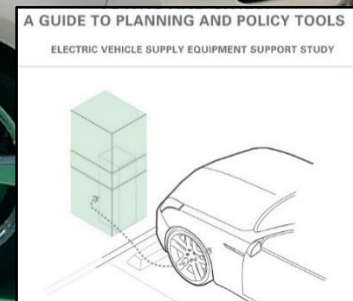
**Best Practices
for EV Charging**



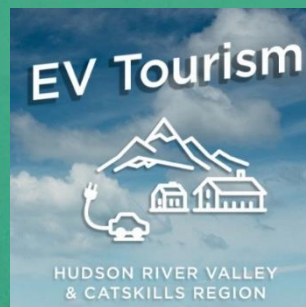
**Tompkins County EV
Infrastructure Plan**



**Promoting Workplace
Charging**



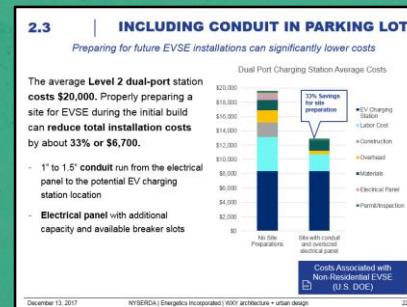
**Creating EV-Ready
Towns and Cities**



**EV Tourism in
New York State**



EV Plans for I-90 Regions



**EV Education and Tools for
Planning Board Members**



Animating the EV Market

1 | Introduction to Electric Vehicles



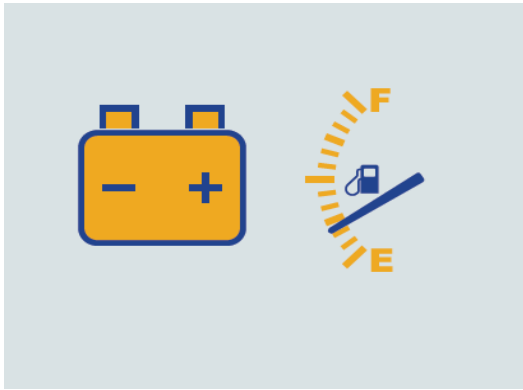
New York State has a goal to reduce statewide greenhouse gas emissions 40 percent by 2030.

Increased use of zero-emissions vehicles will play a critical role in meeting that goal.

BENEFITS OF EVs

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

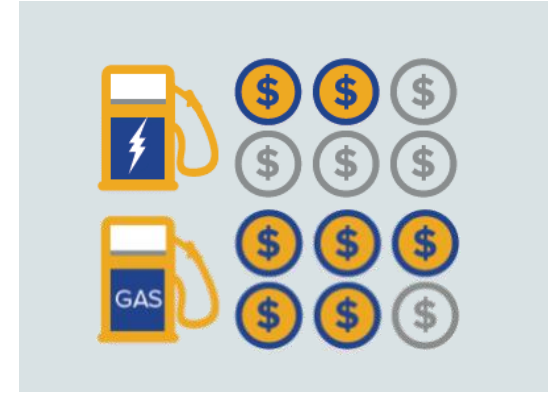
Fuel Efficient



Environmental Benefits



Cost Savings



With an efficiency of about 90%, electric motors are about **three times more efficient** than a gas engine. EVs recover energy while decelerating.

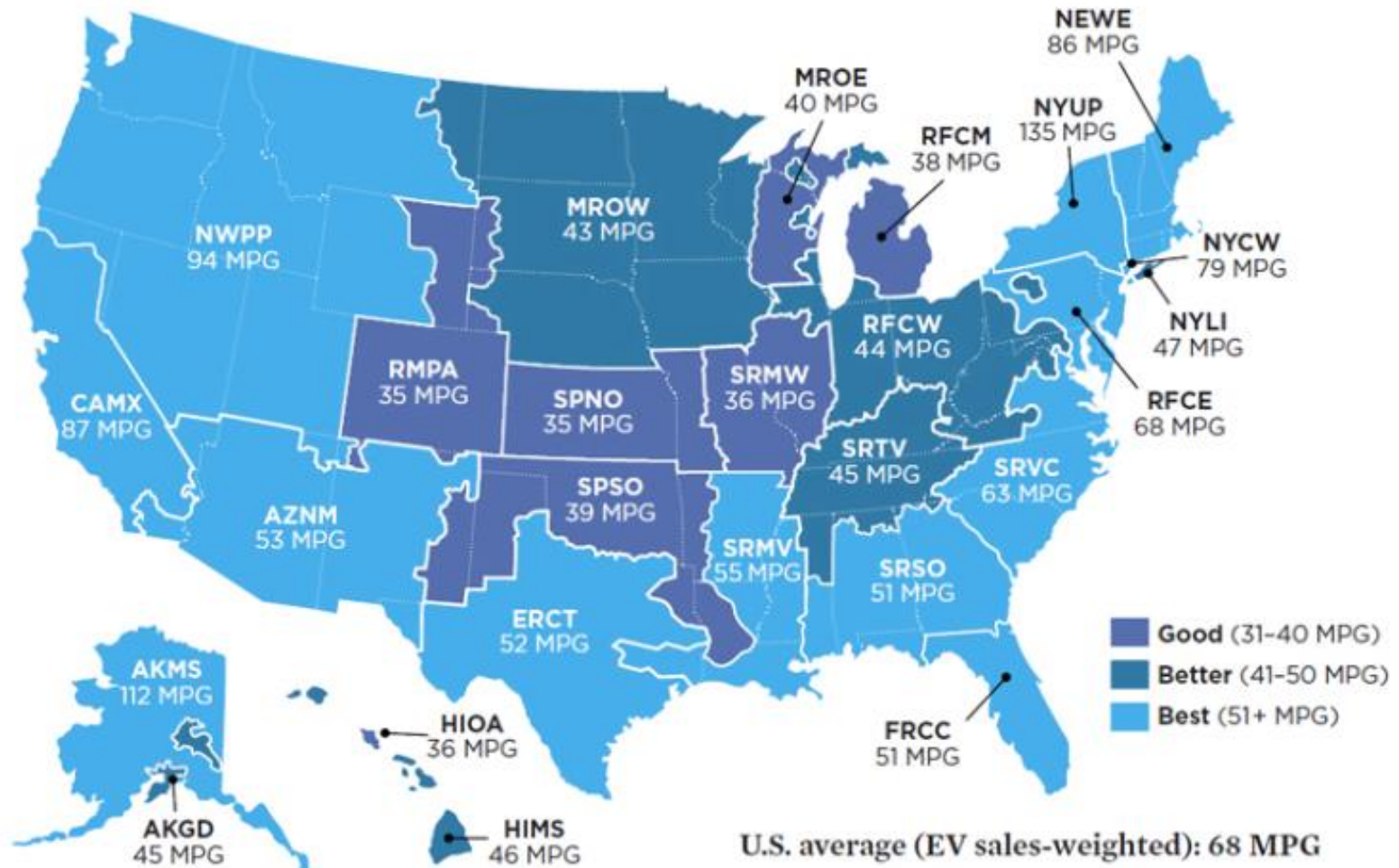
Electric driving creates **zero tailpipe emissions**. Much of New York State's electricity comes from low-carbon sources (hydro, nuclear, wind, solar).

Electricity is **less expensive** than gasoline based on energy content and EVs require less maintenance.

BENEFITS OF EVs

Upstate NY is the best area in all the US to have an EV

Electric Vehicle Global Warming Pollution Ratings and Gasoline Vehicle Emissions Equivalents by Region



BENEFITS OF EVs

How Clean is *Your* Electric Vehicle?



Electric cars tend to produce less carbon pollution than gas-powered ones—but just how much less? Enter your ZIP code below to see how different types of vehicles stack up in your area. Entering a make, model, and year will narrow results to a specific EV model.

[CLEAR FILTERS](#)

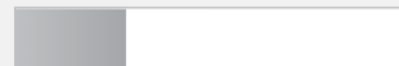
A **2017 Chevrolet Volt** charged in **14534** produces about as much global warming pollution as a gasoline vehicle getting **106 miles per gallon**.

SHARE



102

GRAMS
OF CO₂e
PER MILE



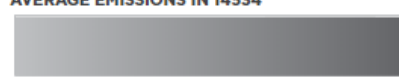
GASOLINE-ONLY

Conventional cars run on gasoline and tend to be dirtier and more expensive to fuel than EVs.



381

GRAMS
OF CO₂e
PER MILE



AVERAGE EMISSIONS IN 14534

PLUG-IN HYBRID ELECTRIC

Plug-in hybrids use both gasoline and electricity and can be recharged from an outlet.



155

GRAMS
OF CO₂e
PER MILE



BATTERY ELECTRIC

Battery electric vehicles run on electricity and are some of the cleanest and cheapest cars to drive.



54

GRAMS
OF CO₂e
PER MILE



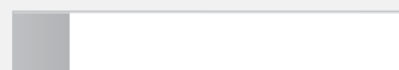
A **2017 Nissan LEAF (30 kWh)** charged in **14534** produces about as much global warming pollution as a gasoline vehicle getting **214 miles per gallon**.

SHARE



51

GRAMS
OF CO₂e
PER MILE



EV TECHNOLOGY OVERVIEW

There are many EV models available in NYS that meet varied user needs

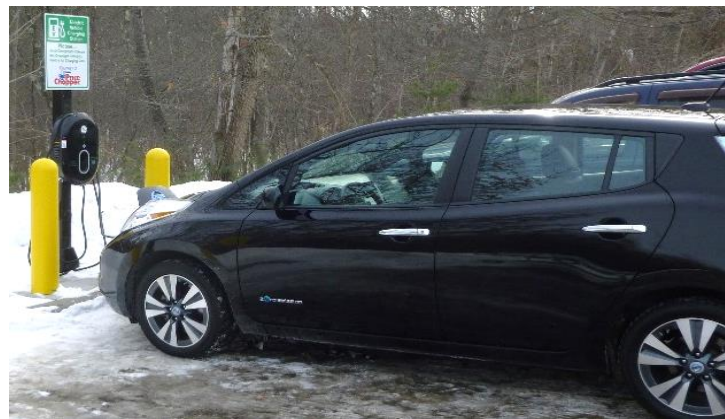
Plug-in Hybrid Electric Vehicles (PHEV)

- Battery-powered electric motor (smaller battery) with an internal combustion engine powered by another fuel (e.g., gas, diesel)
- 15-80 electric miles / 8-20 kWh
- 25+ offered in NYS, including:
 - Ford Fusion Energi (21 e-miles)
 - Toyota Prius Prime (25 e-miles)
 - Honda Clarity (48 e-miles)
 - Chevrolet Volt (53 e-miles)
 - BMW i3 w/ Range Extender (97 e-miles)



Battery Electric Vehicles (BEV)

- Battery-powered electric motor (larger battery)
- Battery charged by plugging into charging outlet
- 80-300 electric miles / 20-100 kWh
- 15+ offered in NYS, including:
 - Kia Soul EV (111 e-miles)
 - Volkswagen e-Golf (125 e-miles)
 - Nissan Leaf (150 e-miles)
 - Chevrolet Bolt (238 e-miles)
 - Tesla Model S (265 e-miles)



AVAILABLE EV MODELS

Light-duty, battery electric vehicle options

BMW i3 BEV ²⁰¹⁹

Starting MSRP: \$44,450
Potential Incentive: \$9,200
MPG Equivalent: 113
Electric Range (miles): 153

Chevrolet Bolt ²⁰¹⁹

Starting MSRP: \$36,620
Potential Incentive: \$9,500*
MPG Equivalent: 119
Electric Range (miles): 238

Fiat 500e ²⁰¹⁹

Starting MSRP: \$34,290
Potential Incentive: \$9,200
MPG Equivalent: 112
Electric Range (miles): 84

Ford Focus Electric ²⁰¹⁸

Starting MSRP: \$29,120
Potential Incentive: \$9,200
MPG Equivalent: 107
Electric Range (miles): 115

Honda Clarity ²⁰¹⁹

Starting MSRP: \$36,620
Potential Incentive: \$9,500
MPG Equivalent: 114
Electric Range (miles): 89

Hyundai Ioniq ²⁰¹⁹

Starting MSRP: \$29,815
Potential Incentive: \$9,500
MPG Equivalent: 136
Electric Range (miles): 124

Hyundai Kona ²⁰¹⁹

Starting MSRP: \$34,450
Potential Incentive: \$9,500
MPG Equivalent: 120
Electric Range (miles): 258

Jaguar I-Pace ²⁰¹⁹

Starting MSRP: \$70,495
Potential Incentive: \$8,000
MPG Equivalent: 76
Electric Range (miles): 234

Kia Niro EV ²⁰¹⁹

Starting MSRP: \$38,000
Potential Incentive: \$9,200
MPG Equivalent: 112
Electric Range (miles): 239

Kia Soul EV ²⁰¹⁹

Starting MSRP: \$33,950
Potential Incentive: \$9,200
MPG Equivalent: 108
Electric Range (miles): 111

Nissan Leaf ²⁰¹⁹

Starting MSRP: \$29,990
Potential Incentive: \$9,200
MPG Equivalent: 112
Electric Range (miles): 150

Smart Electric Drive ²⁰¹⁹

Starting MSRP: \$23,800
Potential Incentive: \$9,200
MPG Equivalent: 108
Electric Range (miles): 58

Tesla Model 3 ²⁰¹⁹

Starting MSRP: \$35,000
Potential Incentive: \$5,750**
MPG Equivalent: 130
Electric Range (miles): 220

Tesla Model S 75 ²⁰¹⁹

Starting MSRP: \$74,500
Potential Incentive: \$4,250**
MPG Equivalent: 98
Electric Range (miles): 259

Tesla Model S 100D ²⁰¹⁹

Starting MSRP: \$135,000
Potential Incentive: \$4,250**
MPG Equivalent: 102
Electric Range (miles): 335

Tesla Model X 75D ²⁰¹⁹

Starting MSRP: \$79,500
Potential Incentive: \$4,250**
MPG Equivalent: 93
Electric Range (miles): 238

Tesla Model X P100D ²⁰¹⁹

Starting MSRP: \$140,000
Potential Incentive: \$4,250**
MPG Equivalent: 85
Electric Range (miles): 289

Volkswagen e-Golf ²⁰¹⁹

Starting MSRP: \$30,495
Potential Incentive: \$9,500
MPG Equivalent: 119
Electric Range (miles): 125

AVAILABLE EV MODELS

Light-duty, plug-in hybrid vehicle options

Audi A3 Sportback e-tron ²⁰¹⁸

Starting MSRP: \$39,500
Potential Incentive: \$5,002
MPG Equivalent: 83
Electric Range (miles): 16

Cadillac CT6 PHEV ²⁰¹⁸

Starting MSRP: \$75,095
Potential Incentive: \$500
MPG Equivalent: 62
Electric Range (miles): 31

Hyundai Sonata PHEV ²⁰¹⁹

Starting MSRP: \$33,400
Potential Incentive: \$6,019
MPG Equivalent: 99
Electric Range (miles): 28

Mitsubishi Outlander PHEV ²⁰¹⁹

Starting MSRP: \$34,595
Potential Incentive: \$6,936
MPG Equivalent: 74
Electric Range (miles): 22

Volvo XC60 T8 ²⁰¹⁹

Starting MSRP: \$52,900
Potential Incentive: \$5,502
MPG Equivalent: 58
Electric Range (miles): 17

BMW i3 Range Extender ²⁰¹⁹

Starting MSRP: \$48,300
Potential Incentive: \$9,200
MPG Equivalent: 100
Electric Range (miles): 126

Chevrolet Volt ²⁰¹⁹

Starting MSRP: \$33,520
Potential Incentive: \$9,200*
MPG Equivalent: 106
Electric Range (miles): 53

Kia Niro PHEV ²⁰¹⁹

Starting MSRP: \$27,900
Potential Incentive: \$6,019
MPG Equivalent: 105
Electric Range (miles): 26

Porsche Cayenne E-Hybrid ²⁰¹⁸

Starting MSRP: \$79,900
Potential Incentive: \$5,836
MPG Equivalent: 47
Electric Range (miles): 14

Volvo XC90 T8 ²⁰¹⁹

Starting MSRP: \$66,300
Potential Incentive: \$5,502
MPG Equivalent: 58
Electric Range (miles): 17

BMW X5 xDrive40e ²⁰¹⁸

Starting MSRP: \$63,750
Potential Incentive: \$5,168
MPG Equivalent: 56
Electric Range (miles): 14

Chrysler Pacifica ²⁰¹⁹

Starting MSRP: \$39,995
Potential Incentive: \$8,600
MPG Equivalent: 84
Electric Range (miles): 33

Kia Optima PHEV ²⁰¹⁹

Starting MSRP: \$35,290
Potential Incentive: \$6,019
MPG Equivalent: 103
Electric Range (miles): 29

Porsche Panamera E-Hybrid ²⁰¹⁸

Starting MSRP: \$99,000
Potential Incentive: \$5,252
MPG Equivalent: 46
Electric Range (miles): 16

BMW 330e ²⁰¹⁸

Starting MSRP: \$45,600
Potential Incentive: \$4,501
MPG Equivalent: 71
Electric Range (miles): 14

Ford Fusion SE Energi ²⁰¹⁹

Starting MSRP: \$33,400
Potential Incentive: \$5,107
MPG Equivalent: 103
Electric Range (miles): 26

Mercedes GLC350e ²⁰¹⁹

Starting MSRP: \$66,700
Potential Incentive: \$4,585
MPG Equivalent: 56
Electric Range (miles): 10

Subaru Crosstrek PHEV ²⁰¹⁹

Starting MSRP: \$34,995
Potential Incentive: \$5,002
MPG Equivalent: 90
Electric Range (miles): 17

BMW 530e ²⁰¹⁹

Starting MSRP: \$53,400
Potential Incentive: \$5,168
MPG Equivalent: 72
Electric Range (miles): 16

Honda Clarity PHEV ²⁰¹⁹

Starting MSRP: \$33,400
Potential Incentive: \$9,200
MPG Equivalent: 110
Electric Range (miles): 48

Mercedes C-Class PHEV ²⁰¹⁸

Starting MSRP: \$47,900
Potential Incentive: \$3,000
MPG Equivalent: 51
Electric Range (miles): 9

Toyota Prius Prime ²⁰¹⁹

Starting MSRP: 27,300
Potential Incentive: \$5,602
MPG Equivalent: 133
Electric Range (miles): 25

BMW 740e ²⁰¹⁹

Starting MSRP: \$90,700
Potential Incentive: \$4,688
MPG Equivalent: 64
Electric Range (miles): 14

Hyundai Ioniq PHEV ²⁰¹⁹

Starting MSRP: \$25,350
Potential Incentive: \$5,643
MPG Equivalent: 119
Electric Range (miles): 29

Mini Cooper ALL4 ²⁰¹⁹

Starting MSRP: \$36,900
Potential Incentive: \$4,507
MPG Equivalent: 65
Electric Range (miles): 12

Volvo S90 T8 ²⁰¹⁹

Starting MSRP: \$63,650
Potential Incentive: \$5,502
MPG Equivalent: 71
Electric Range (miles): 21

AVAILABLE EV MODELS

Heavy-duty vehicle options

Pickup Trucks (Class 1-2)



Make	Model	Payload Capacity	Towing Capacity	Drivetrain	Electric Range
Workhorse	W-15 Pickup (PHEV)	2,200 lbs	5,000 lbs	AWD	80 miles
XL Hybrids	F-150 (PHEV)	2,311 lbs	5,000+ lbs	2WD / 4WD	Increased MPG

Chassis/Vans/Box Trucks (Class 3-6)



Make	Model	Payload Capacity	Towing Capacity	Drivetrain	Electric Range
BYD	Class 6	10,500 lbs	-	RWD	124 miles
BYD	Class 5	6,500 lbs	-	RWD	155 miles
Chanje Energy	V8100	6,000 lbs	-	RWD	150 miles
First Priority	ABLE	1,100 lbs	2,000 lbs	RWD	40—120 miles
First Priority	Box Cargo Trucks	19,500 lbs	-	RWD	100 miles
First Priority	Walk-In Vans	19,500 lbs	-	RWD	100 miles
First Priority	Utility Vehicles	16,500 lbs	-	RWD	40 miles
Lightning Systems	Ford Transit 350HD	2,000—4,000 lbs	-	RWD	50—100 miles
Motiv Power Systems	EPIC 4 (E-450)	8,900 lbs	-	RWD	75 miles
Motiv Power Systems	EPIC 5 (F-59)	10,000 lbs	-	RWD	90 miles
Motiv Power Systems	EPIC 6 (F-59/F-53)	15,000 lbs	-	RWD	90 miles
Unique Electric Solutions LLC	Class 4-6 chassis	Varies	Varies	RWD	40—125 miles
Zenith	Promaster	3,800 lbs	-	RWD	80—130 miles
Zenith	Delivery Van	6,000 lbs	-	RWD	85—95 miles

AVAILABLE EV MODELS

Heavy-duty vehicle options

Transit/School Busses



Make	Model	Payload Capacity	Towing Capacity	Drivetrain	Electric Range
BYD	Transit/Coach Buses	22—57 persons	-	RWD	124—200 miles
First Priority	eLion	71 persons	-	RWD	50—100 miles
NewFlyer	Xcelsior CHARGE	65—123 persons	-	RWD	260 miles
Proterra	FC, XR, E2 Series	28 persons	-	RWD	67—302 miles
Zenith	Passenger Bus	16 persons	-	RWD	100 miles

HD Trucks (Class 7+)



Make	Model	Payload Capacity	Towing Capacity	Drivetrain	Electric Range
BYD	Class 8	-	120,000 lbs	RWD	92 miles
BYD	Terminal Tractor	-	102,000 lbs	RWD	15 hours
Orange EV	T-Series	-	81,000 lbs	RWD	Varies

EV Incentives

State and federal incentives vary based on all electric range and battery capacity

Incentive	Description
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.
Drive Clean Rebate	A point-of-sale rebate towards the purchase of a new electric or plug-in hybrid car. Discounts of up to \$2,000 are available based on electric range and vehicle cost.
ZEV Clean Vehicle Municipal Fleet Purchase	DEC has provides rebates for costs associated with the purchase or lease (at least 36 months) of eligible clean vehicles.
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.


Charge NY

THE DRIVE CLEAN REBATE

For Electric Cars in New York State

A rebate of up to \$2,000 is available
Ask your dealer for more information

Quick Pick-Up

Fun

Quiet
Fuel-Efficient

REBATE AMOUNTS

Electric range of 120+ miles	\$2,000 OFF
Electric range of 40-119 miles	\$1,700 OFF
Electric range of 20-39 miles	\$1,100 OFF
Electric range under 20 miles	\$500 OFF
Electric cars with MSRP >\$60,000*	\$500 OFF

* Regardless of electric range

For more information, visit: nyserda.ny.gov/Drive-Clean-Rebate

New York State Governor Andrew M. Cuomo
New York State Energy Research and Development Authority
Richard L. Kauffman, Chair | John B. Rhodes, President and CEO

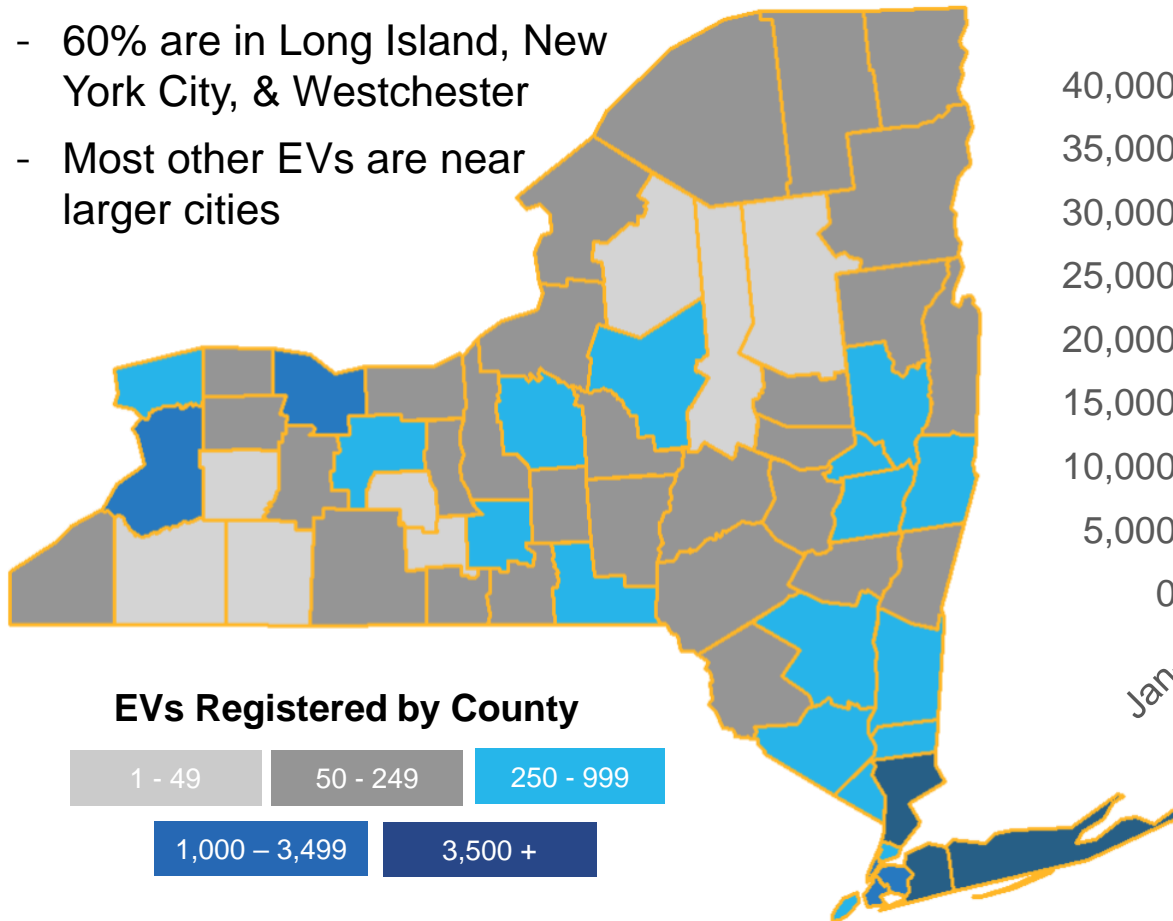
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EVs IN NEW YORK STATE

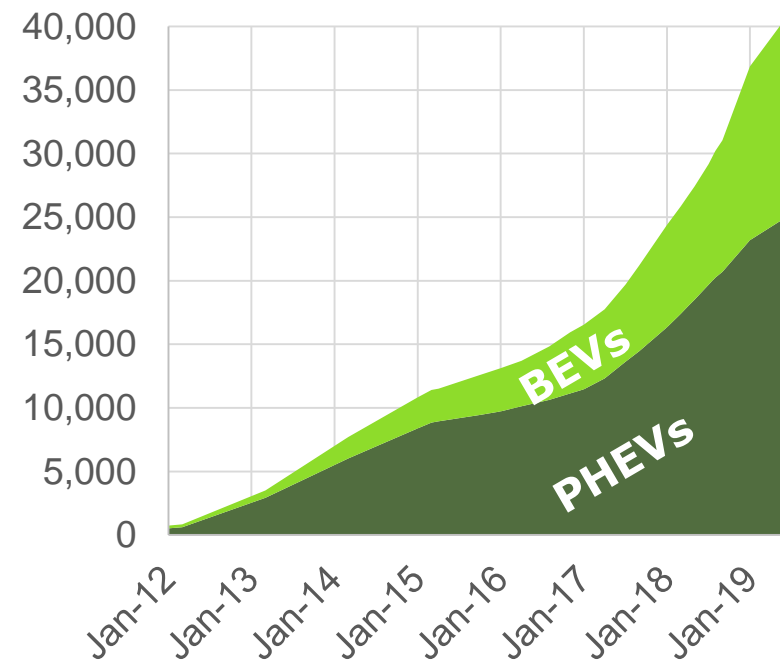
EV ownership is increasing and share of BEVs is growing

40,000+ registered EVs in NYS as of May 2019

- 60% are in Long Island, New York City, & Westchester
- Most other EVs are near larger cities



6-11% quarterly increase in EV registrations



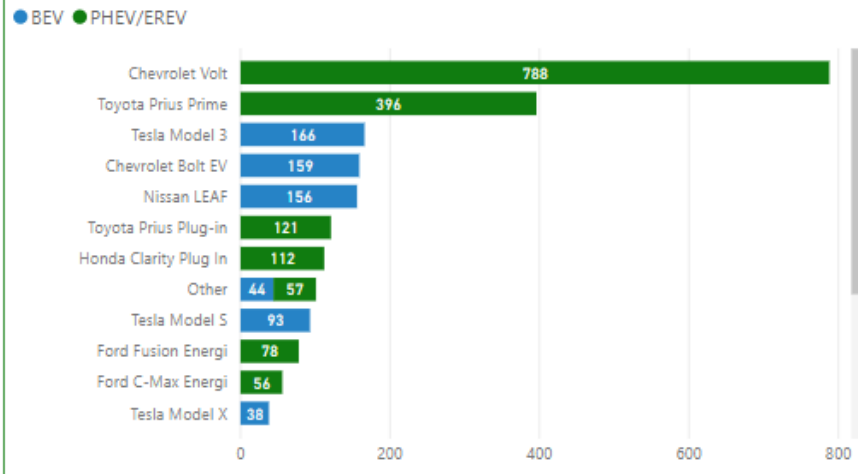
EVs IN MONROE COUNTY

Large growth in EV population recently

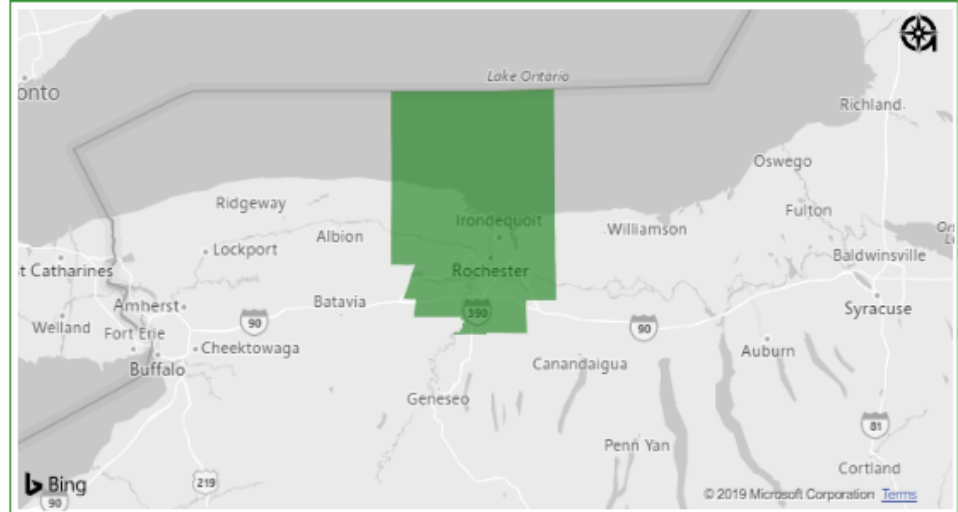
Original EV Registrations



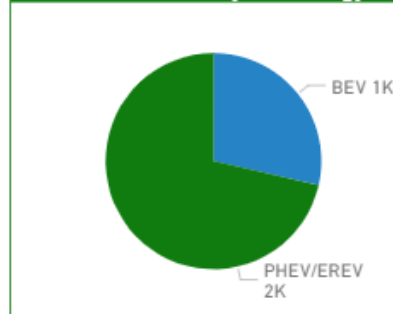
EVs on the Road by Vehicle Name



EVs on the Road



EVs on the Road by Technology



Key Metrics

0.91
BEVs per 1k People

2.28
PHEVs per 1k People

683.00
BEVs per DCFC Location

17.08
EVs per Level 2 Port

EVs on the Road

2,391

EV Market Sha...

0.40%

Last Updated

DATA.NY.GOV
(6/01/2019)

2

Introduction to Electric Vehicle Charging



EV CHARGING STATIONS (EVSE)

The level of charge determines the duration of charging

DC FAST CHARGE

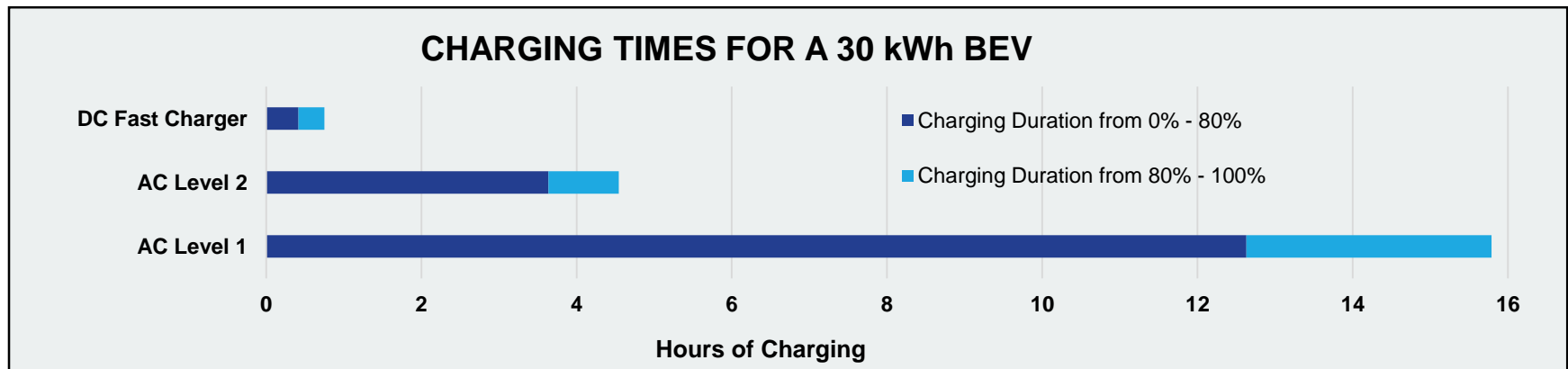
- Direct Current (DC) provided at 40-100 kW
- 80% charge in 20 minutes
- Requires 480V supply at 80-200 A
- Station cost is \$15,000-\$40,000 per port
- J1772 Combo, CHAdeMO, or Tesla connector

AC LEVEL 2

- Alternating Current (AC) provided at 3.3-19.2 kW (6.6 kW most common)
- 10-20 electric miles per hour
- Requires 208/240V supply at 20-80 A
- Station cost is \$600-\$5,000 per port
- J1772 or Tesla connector

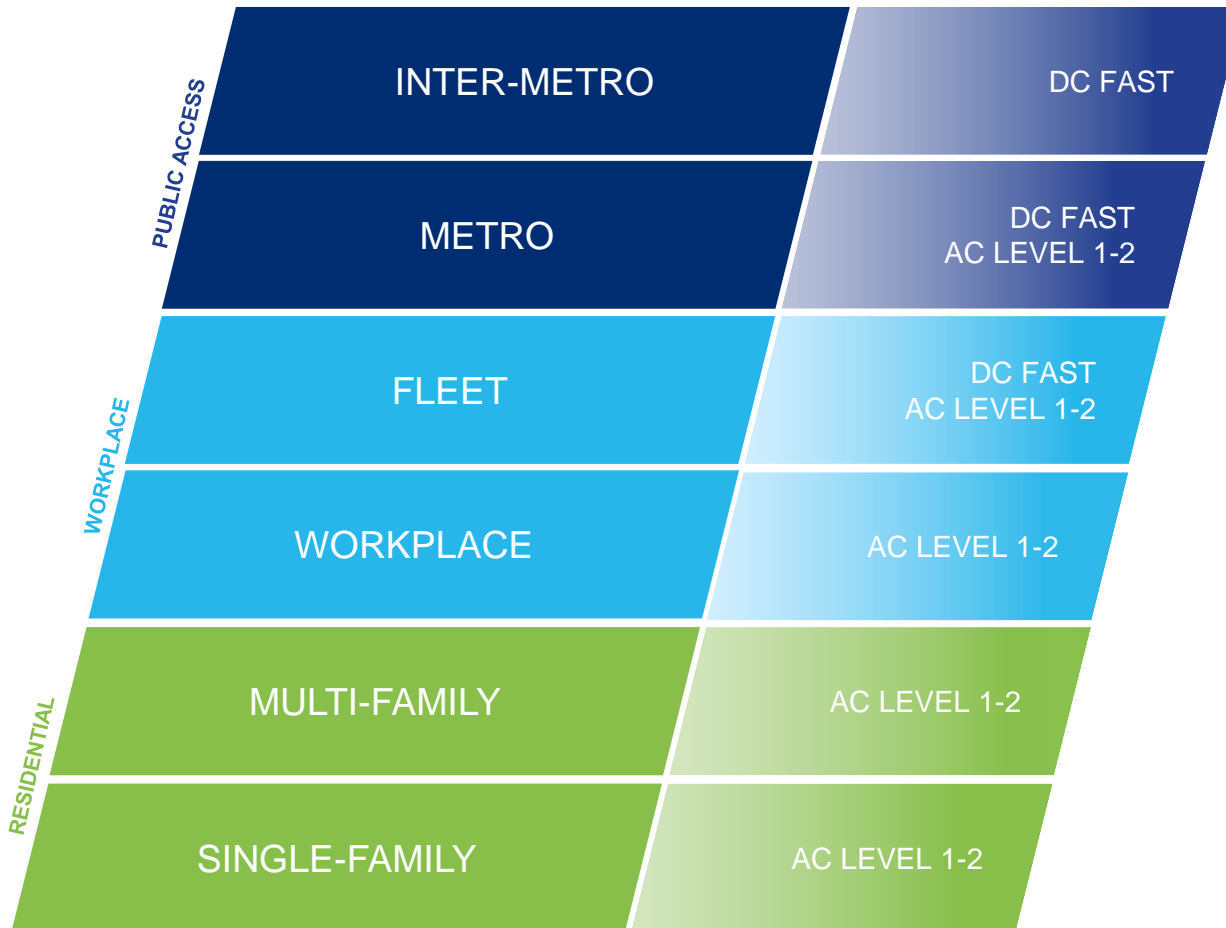
AC LEVEL 1

- Alternating Current (AC) provided at 1.4-1.9 kW
- 2-5 electric miles per hour
- Requires 120V supply at 12-16 A
- Station cost is \$500-\$1,000 per port
- J1772 or Tesla connector



EV CHARGING STATIONS (EVSE)

The installation context helps determine the appropriate level of charge



DC FAST CHARGE stations are suitable for quick charging with high turnover, such as fleets or for public use in a metro area.

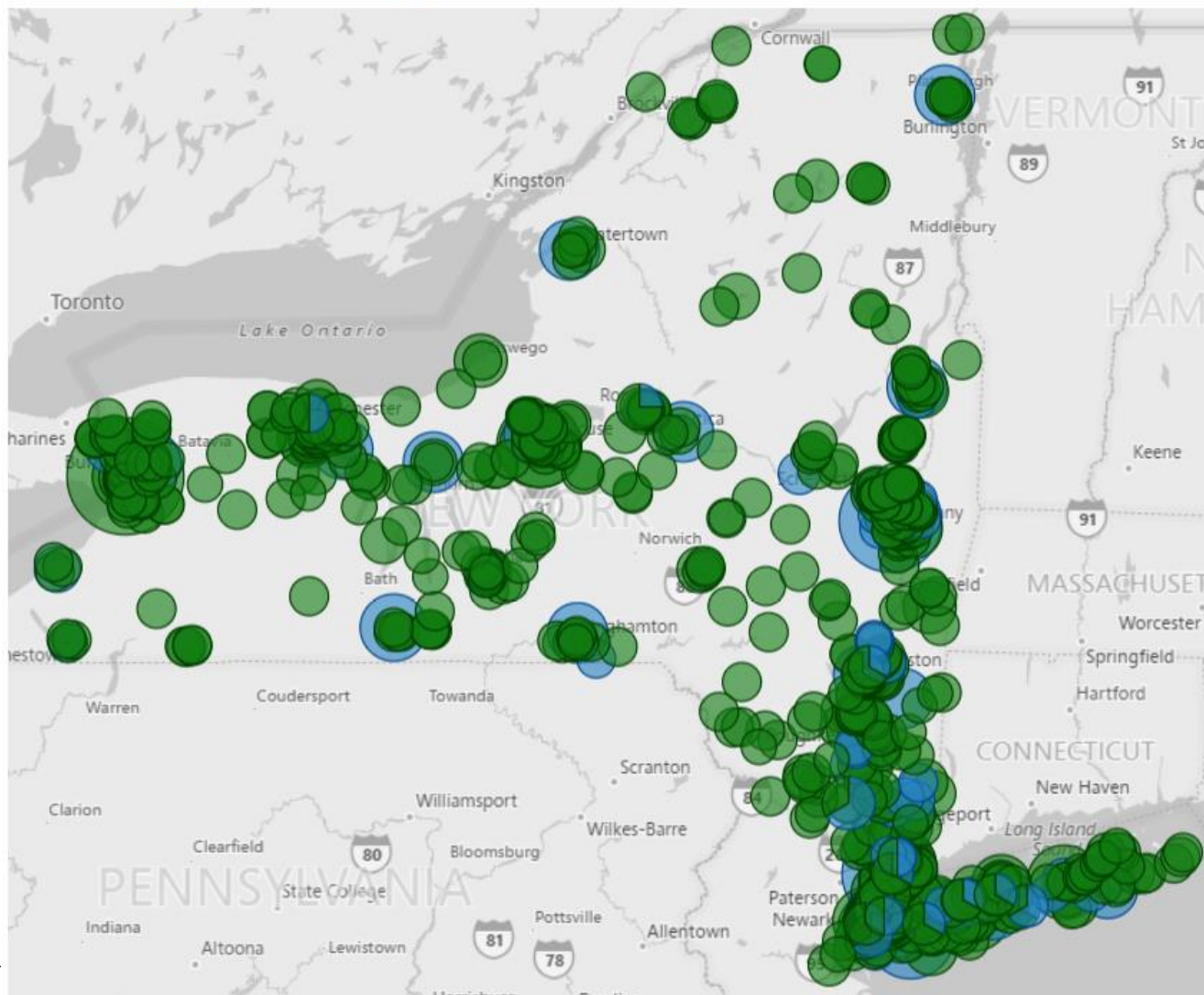
AC LEVEL 2 stations are suitable for 2 to 6 hour dwell times, such as retail, municipal parking lots, businesses, and tourist or leisure destinations.

AC LEVEL 1 stations are suitable for very long dwell times, such as overnight charging at a residence or all day charging at a workplace

EV CHARGING STATIONS IN NYS

EV drivers are finding more opportunities to charge away from home, which extends the use of a BEV or provides more electric miles for a PHEV

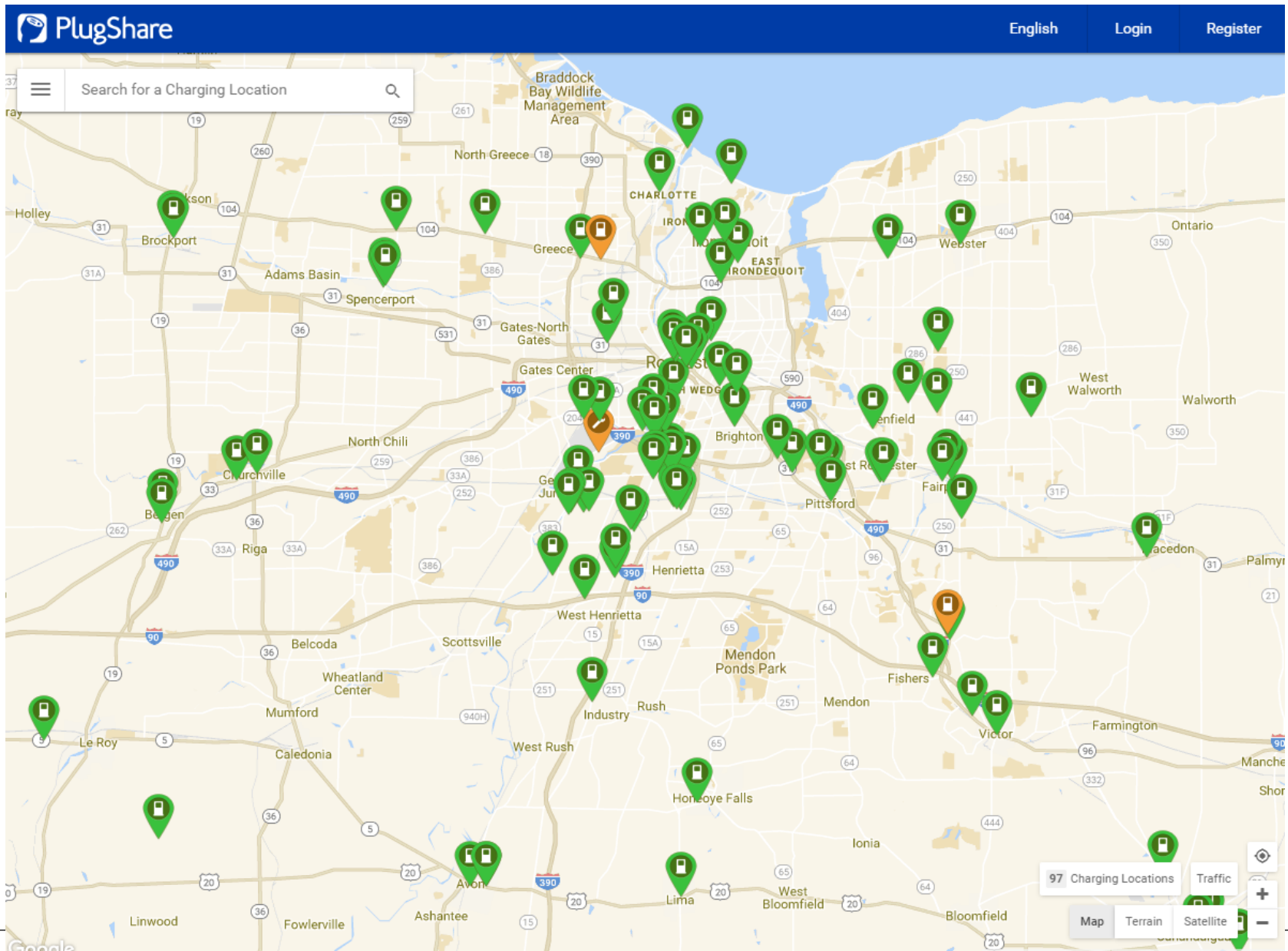
Charging Level ● DC Fast Charge Ports ● Level 2 Ports



2,500+ Level 2
public charging
ports in NYS.

350+ DC Fast
charging public
ports in NYS.

EV CHARGING STATIONS IN MONROE



EV Charging Station Incentives

State and federal incentives vary based on all electric range and battery capacity

Incentive	Description
NYSERDA Charge Ready NY	NYSERDA provides rebates of \$4,000 per charging port for Level 2 charging stations installed at public, workplace, and multi-unit dwelling parking lots.
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 2022
Municipal ZEV Clean Vehicle Rebate	DEC has provided rebates for the installation of eligible infrastructure that supports public use of clean vehicles.
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.

New York State Electric Vehicle Charging Station Rebate

NYSERDA's Charge Ready NY offers rebates of \$4,000 per qualified Level 2 charging station port at public parking facilities, workplaces, and multifamily apartment buildings. Any public or private entity, such as municipalities, for-profit companies, and non-profit organizations, is eligible.

Save 30% to 80% on station and installation costs!

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.

i Charging stations must be connected to a network that can collect data.

i Charging stations may be networked or non-networked.

Requirements

Owners must install charging stations that are listed on the Charge Ready NY qualified list. Charging stations must be installed after September 18, 2018 and must 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 but 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.nyserdera.ny.gov/Charge-Ready-NY

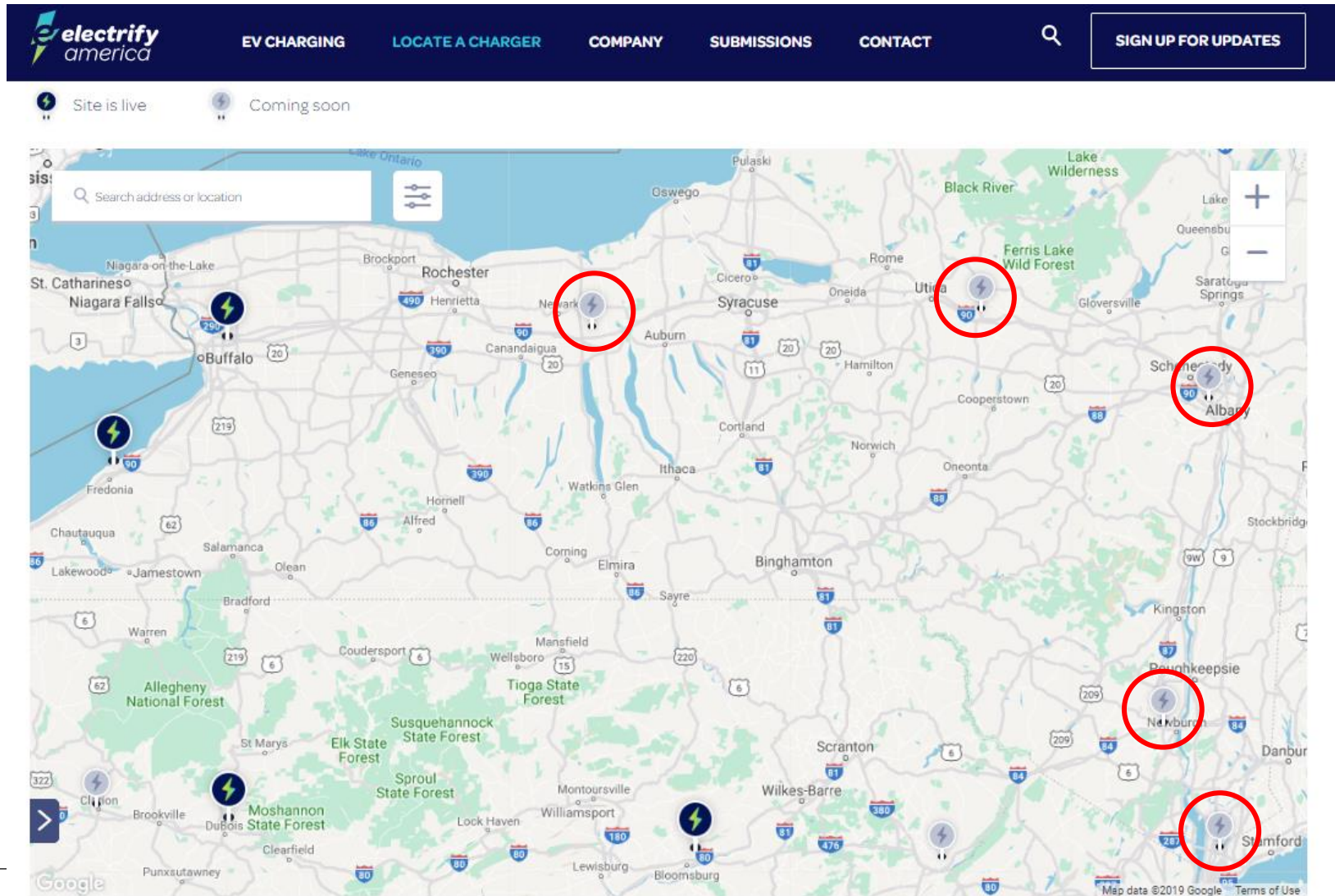
DC Fast Charger Expansion

Over a 10-year period ending in 2027, Electrify America will invest \$2 billion in ZEV infrastructure, access, and education programs in the United States.



DC Fast Charger Expansion

Over a 10-year period ending in 2027, Electrify America will invest \$2 billion in ZEV infrastructure, access, and education programs in the United States.

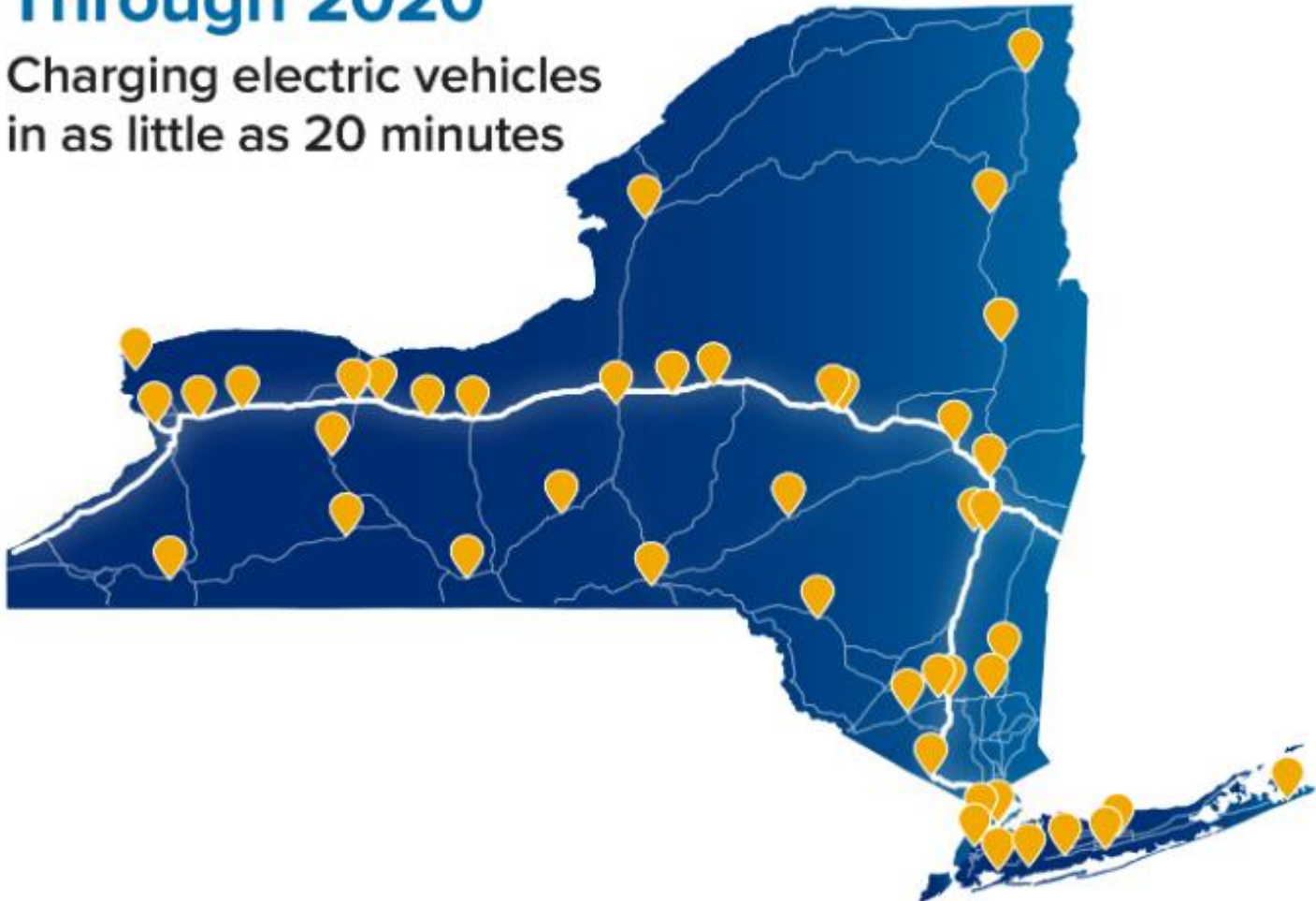


DC Fast Charger Expansion

Through EVolve NY, NYPA has committed up to \$250 million through 2025 - to invest in EV infrastructure, services, and consumer awareness efforts.

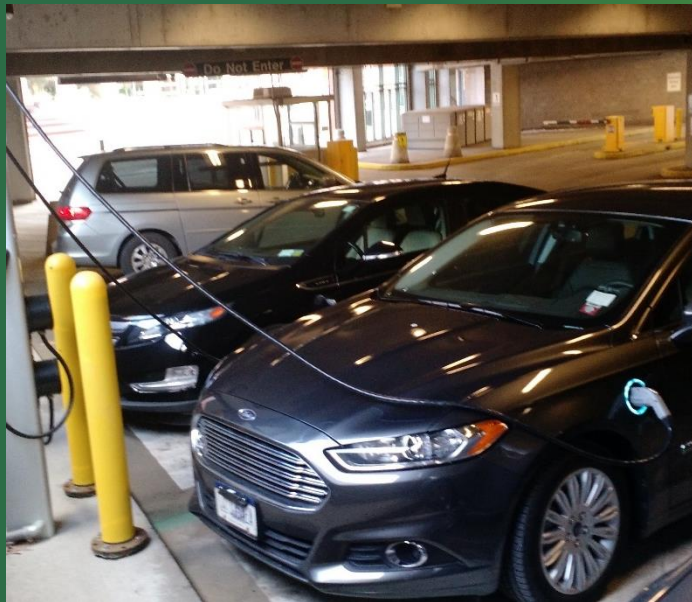
EVolve NY Fast Charger Expansion Through 2020

Charging electric vehicles
in as little as 20 minutes



3

Charging Station Installation Considerations



EV BENEFITS FOR MUNICIPALITIES

There are environmental, health, and economic benefits associated with EVs

EV Drivers tend to be...

- Tech savvy and eco-conscious
- Highly educated

EV Charging stations...

- Attract EV drivers and encourage local spending, a potential to boost local economies
- Enhance “green” status & promote “green” tourism

Electric Vehicles...

- Have zero or low tailpipe emissions and improve air quality
- Lead to reduced reliance on imported fuels
- Use electricity generated from domestic and renewable sources
- Reduce reliance on oil and adds resiliency to our communities

EV charging **attracts EV drivers** and **prepares communities** for the electrified future of transportation.



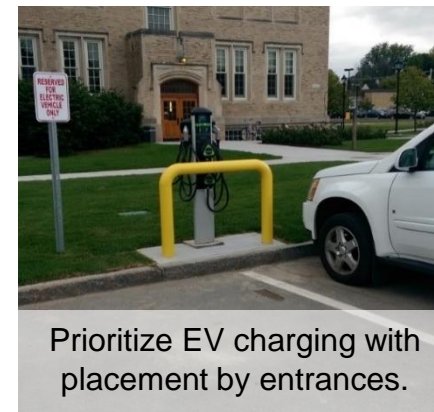
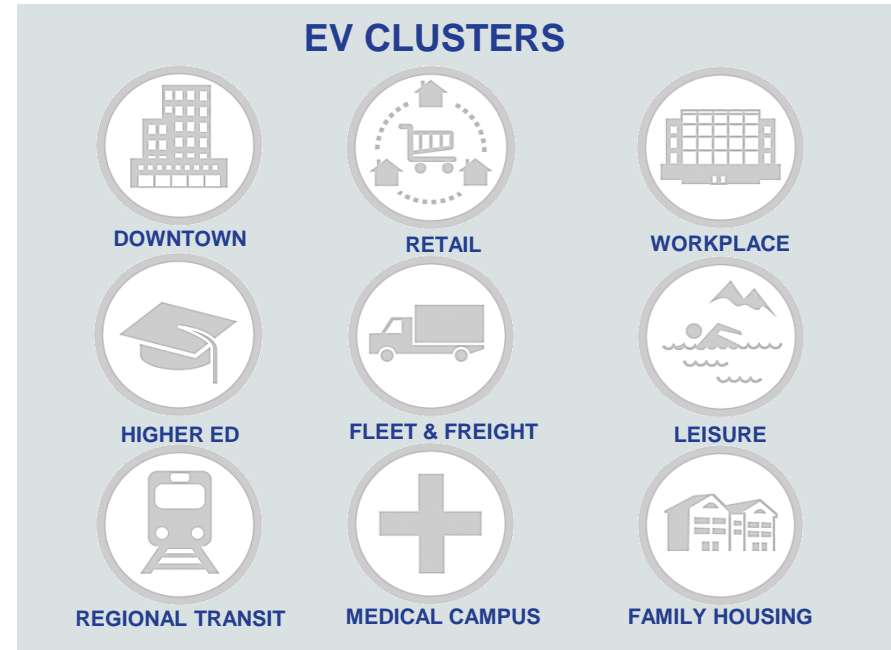
EV SITE CONSIDERATIONS

Recognize opportunities to incorporate EV charging stations in new developments

Charging stations in key EV Clusters are likely to have higher utilization and **foster increased use** of EVs.

Look for cost-effective Level 2 **sites** that increase value to EV drivers:

- Dwell times between 2 to 4 hours
- 240V power near parking spaces
- Easily accessible and open 24 hours
- Larger parking lots with excess spaces
- “Green” image value to host/community
- Easy to find along major roadways
- Lighting at night
- Protected from harsh environmental conditions



FACILITATING EVSE INSTALLATIONS

Many elements influence cost and utilization of EV charging

Every EV charging station installation is **unique**, but all should use **certified equipment** and a **licensed electrician**. Complying with **industry best practices** for siting, design, and installation will help lower costs and increase value to EV drivers.

Site elements to consider:

1. **Location:** visibility/preferred parking, parking lot management, station mounting, wire run
2. **Wire run:** distance and obstructions between panel and station, need for boring/trenching
3. **Electrical Supply:** power capacity, panel up to code, potential to use an existing subpanel
4. **EVSE:** mounting type (wall or pedestal), cord management, networking, certification, make
5. **Permitting:** process, cost, local experience
6. **Other:** protection, signs, maintenance



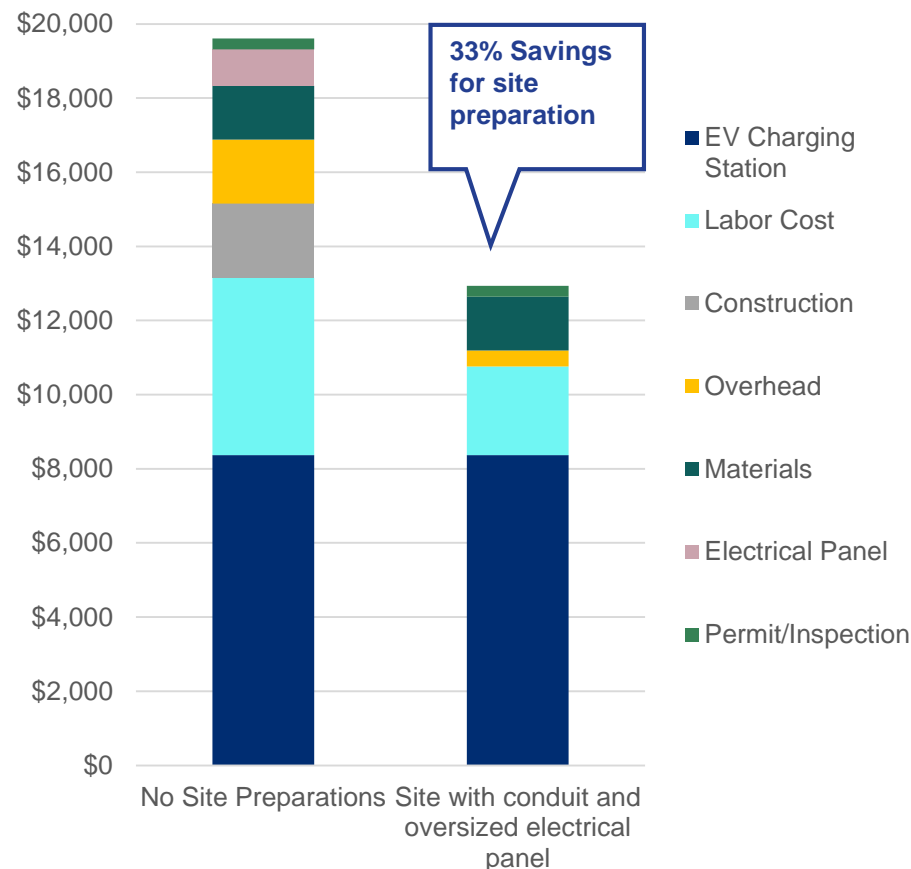
INCLUDING CONDUIT IN PARKING LOTS

Preparing for future EVSE installations can significantly lower costs

The average **Level 2 dual-port** station costs **\$20,000**. Properly preparing a site for EVSE during the initial build can **reduce total installation costs** by about **33% or \$6,700**.

- 1" to 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



SUSTAINABILITY RECOGNITION

LEED



Consider EV charging as an energy use that can be excluded from total energy consumption, so that EV charging doesn't lower the overall ENERGY STAR score.

ENERGY STAR



Certification designates points to new buildings that designate 5% of parking spaces as preferred parking for green vehicles *and* EV charging stations.

STARS



Allows for colleges and universities to measure their sustainability performance. EV chargers can contribute to points through the "Support for Sustainable Transportation" category.

PARKING CONSIDERATIONS

Support for EV drivers to charge ensures successful implementation

Incentivize

- Provide preferential parking spots for EV drivers

Regulate

- Use standardized signage to mark EV-only spots
- Enforce fees when non-EVs occupy EV-only spots



Without proper signage and regulation, non-EVs may block EV users from charging



Signage and clear marking can be used to communicate EV parking policy.

SITE SELECTION GUIDE FOR EVSE

www.energetics.com/s/EV-Site-Checklist-v12-06.pdf

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.

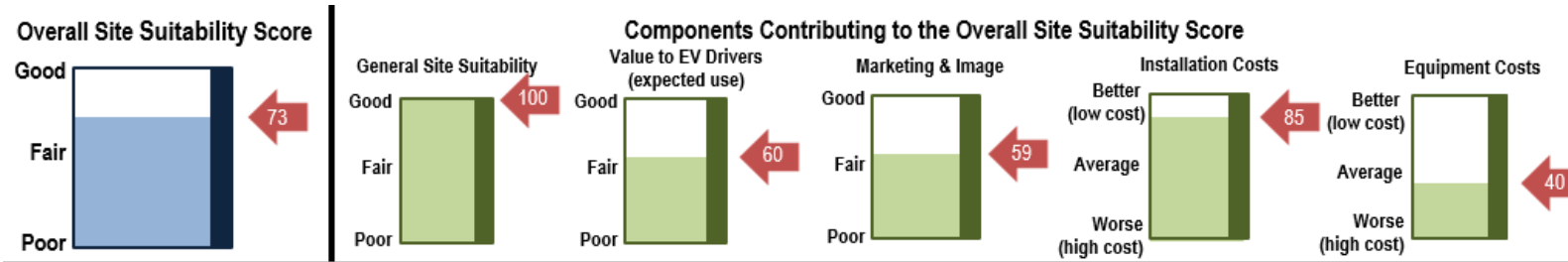
SITE SELECTION GUIDE FOR EVSE

Influencing Factors Affecting EV Charging Sites

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 <div>In August 2017, there were 21,400 EVs registered in New York State.</div>
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.

SITE SELECTION TOOL FOR EVSE

Comparing Site Suitability at various locations



Electric Vehicle (EV) Charging Station Site Suitability Criteria Tool

Version Date: 10/4/2016

Site Name:

Address:

Site Suitability Factor Importance

1. How important are the following factors to the site owner for an EV charging station installation?

(1A)	Likely to be used by Current EV Drivers:	<input type="radio"/> Not at All Important	<input type="radio"/> Slightly Important	<input checked="" type="radio"/> Important	<input type="radio"/> Very Important	<input type="radio"/> Most Important
(1B)	Marketing for Potential EV Buyers:	<input type="radio"/> Not at All Important	<input type="radio"/> Slightly Important	<input checked="" type="radio"/> Important	<input type="radio"/> Very Important	<input type="radio"/> Most Important
(1C)	Positive Image for the Organization:	<input type="radio"/> Not at All Important	<input type="radio"/> Slightly Important	<input checked="" type="radio"/> Important	<input type="radio"/> Very Important	<input type="radio"/> Most Important
(1D)	Purchase and Installation Cost:	<input type="radio"/> Not at All Important	<input type="radio"/> Slightly Important	<input checked="" type="radio"/> Important	<input type="radio"/> Very Important	<input type="radio"/> Most Important

Site Ownership and Zoning

2. Do you own or lease the parking lot where the EV charging station will be installed?

(2)

☒ Own ☐ Lease

Owning the parking lot simplifies the EV charging station installation process

3. Do you own or lease the building where electricity will be drawn for the EV charging station?

(3)

☒ Own ☐ Lease

Owning the building and paying the electricity bill simplifies the EV charging station installation process

4 | The BIG Picture

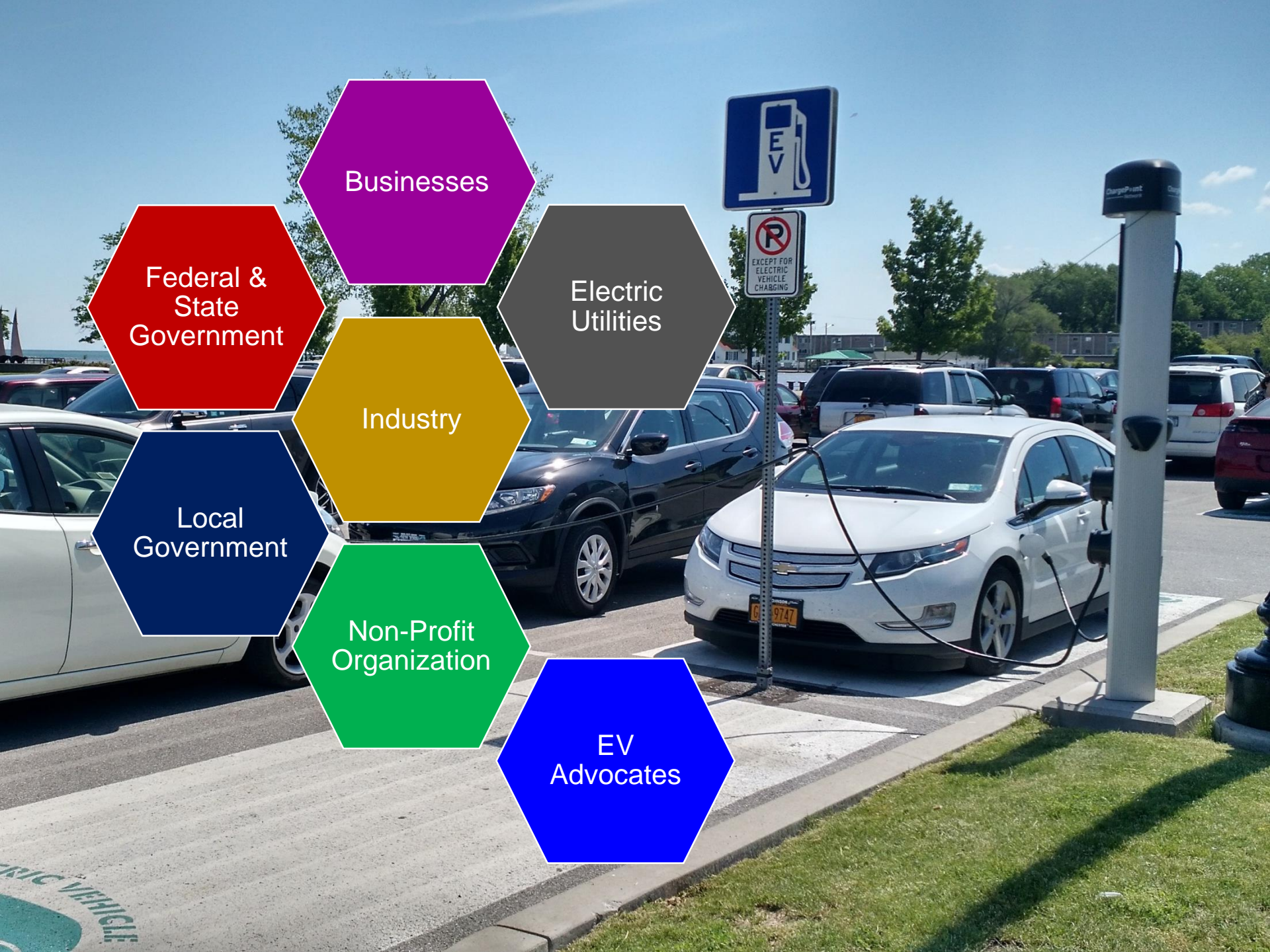




Make
owning EVs
more
Affordable

Make
driving EVs
more
Convenient

Raise
Awareness with
non-EV drivers



Businesses

Federal &
State
Government

Electric
Utilities

Industry

Local
Government

Non-Profit
Organization

EV
Advocates

Creating Awareness Through First-hand Experiences



Other Considerations

Charging Infrastructure

- Is there a sustainable business model?

Push towards all-electric vehicles

- Should we try to support all miles being driven on electric power?

Autonomous Vehicles

- Can EVs handle the increased power demand?

Shared Economy

- Will EVs be parked long enough to charge?

Questions

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