2016 Annual Data Summary:
New York State Electrical Vehicle (EV) Charging Station Deployment Program

NEW YORK STATE OF OPPORTUNITY. | Charge NY

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NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.

Mission Statement:

Advance innovative energy solutions in ways that improve New York's economy and environment.

Vision Statement:

Serve as a catalyst – advancing energy innovation, technology, and investment; transforming New York's economy; and empowering people to choose clean and efficient energy as part of their everyday lives.

Cover Image: General Electric, Niskayuna, NY. Courtesy of Energetics

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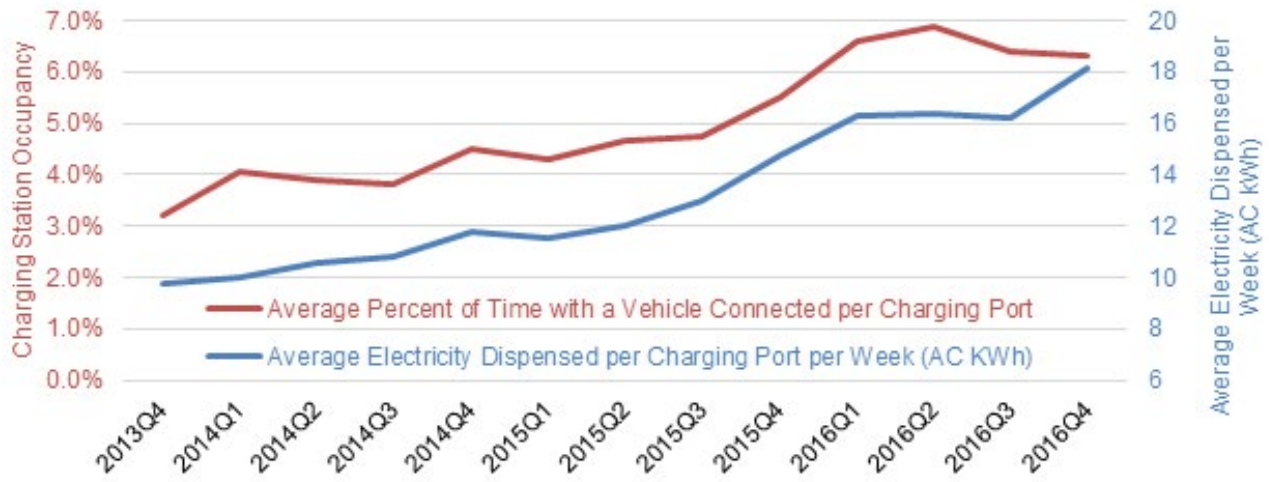
Key Observations to Date

Final installations from the New York State EV Charging Station Deployment Program were completed in 2016. While there were fewer new installations in 2016, station use continues to increase. A peak in the average percentage of time EVs were plugged into a charging station occurred in the second quarter of 2016, while the average electricity dispensed continued to rise as shown in Figure 1. This demonstrates a more efficient use of the chargers as more active charging is occurring at the stations with less time plugged in. This may be attributed to an increased demand for public charging stations because more EVs are on the road, which encourages EV drivers to disconnect from the station after fully charging.

Figure 1. Average Connection Time and Energy Dispensed per Charging Port



There are several ways to gauge a successful charging station:

- Occupancy – The top 5% of charging stations (24) had an EV plugged in more than 20% of the time in 2016. These stations were located at five universities, five parking facilities outside of New York City, five parking facilities in New York City, four medical facilities, three multifamily dwellings, and two transit stations.
- Number of charging events – The top 5% of charging stations (24) averaged one or more charging events per day in 2016. They were located at 16 retail locations, four universities, three parking facilities in downtown Rochester, and one medical facility.
- Energy dispensed – The top 5% of charging stations (24) dispensed 50 kWh or more per week in 2016. These stations were located at eight parking facilities in New York City, six universities, four parking facilities outside of New York City, three multifamily dwellings, two medical facilities, and one retail location.

Only five stations were in the top 5% for all three of these criteria: two parking facilities in downtown Rochester, two universities (University at Buffalo and College of Nanoscale Science and Engineering in Albany), and one medical facility (Peconic Bay Medical Center in Riverhead).

Charging stations under this program were installed at a variety of venues: 126 parking lots facilites in New York City, 128 university or medical campuses, 107 parking facilities outside of New York City, 92 retail locations, 91 workplaces, 44 transit hubs, 40 hotels, 26 leisure destinations, and 22 multifamily dwellings. However, based on the profile of use shown in Figures 2 and 3, the stations have the highest occupancy between 9:00 a.m. and 5:00 p.m. on weekdays with the majority of charging being initiated at 9:00 a.m. Therefore, despite the range of venues where these stations were installed, it seems that most charging occurs during typical workdays by employees plugging in for their entire shift.

Figure 2. Range of Percentage of Charging Ports with an EV Plugged In

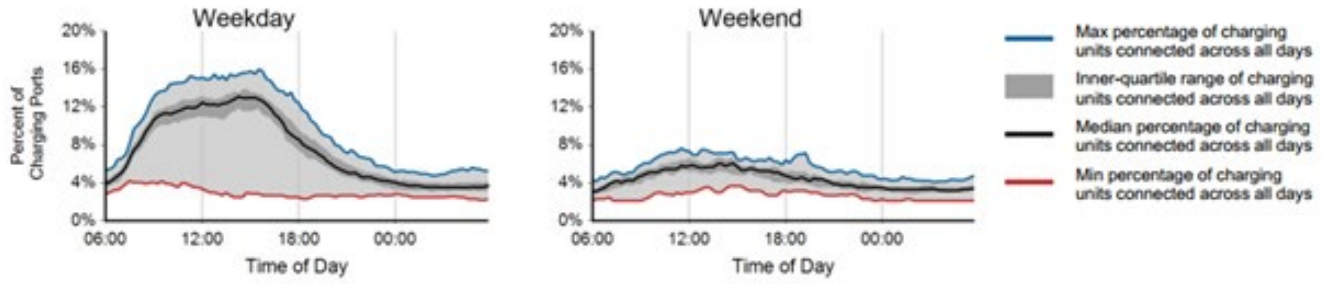
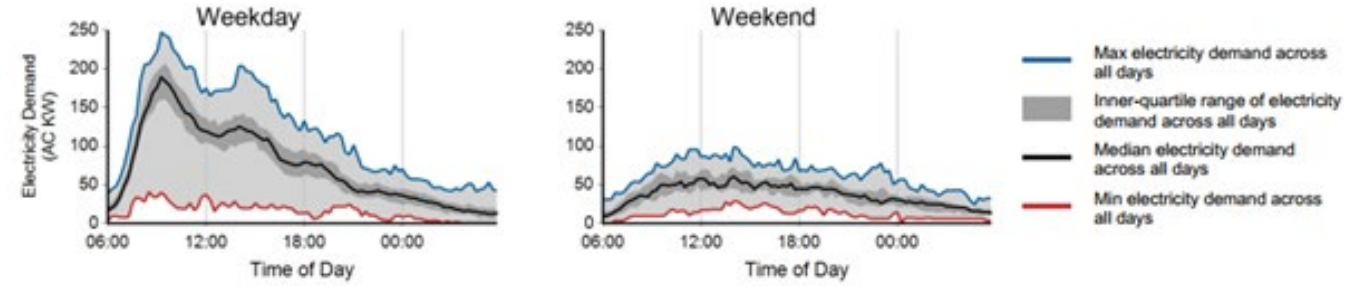
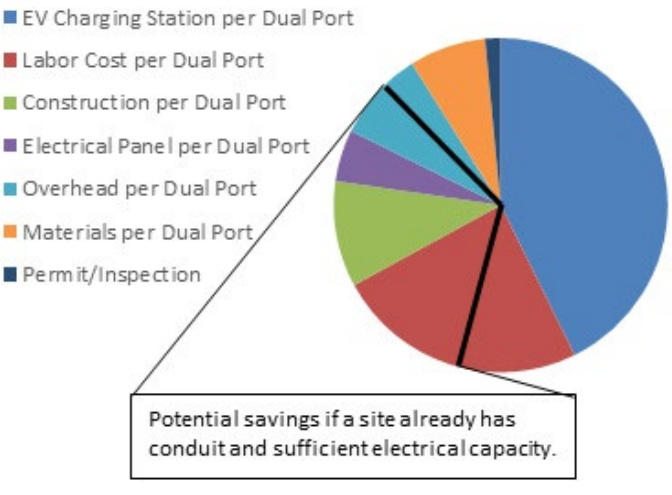


Figure 3. Range of Aggregate Electricity Demand vs. Time of Day



The average installed cost for a dual-head networked AC Level 2 charging station in this program was $17,550, comprised of the cost elements shown in Figure 4. Properly preparing a site for a charging station installation with conduit and electrical panel capacity during the construction of a parking lot can reduce the costs to install a charging station in the future by about 33% or approximately $6,000.

Figure 4. Dual Port Installation Cost Breakdown



1,508 Public Level 2 EV charging outlets in New York State

- **43** L2 EV charging outlets added in 2016 through NYSERDA's Deployment Program
- **671** total L2 EV charging outlets installed through NYSERDA's Deployment Program
- **402** L2 EV charging outlets added in 2016 by other entities

150 Public DC Fast Charging Outlets in New York State

162 Private EV Charging Outlets in New York State

Charter Communications
401 W 219th St, New York

Price Chopper Supermarket
10 Glenwood Drive, Binghamton

New York State EV Charging Stations

Figure 5. Upstate New York EV Charging Stations

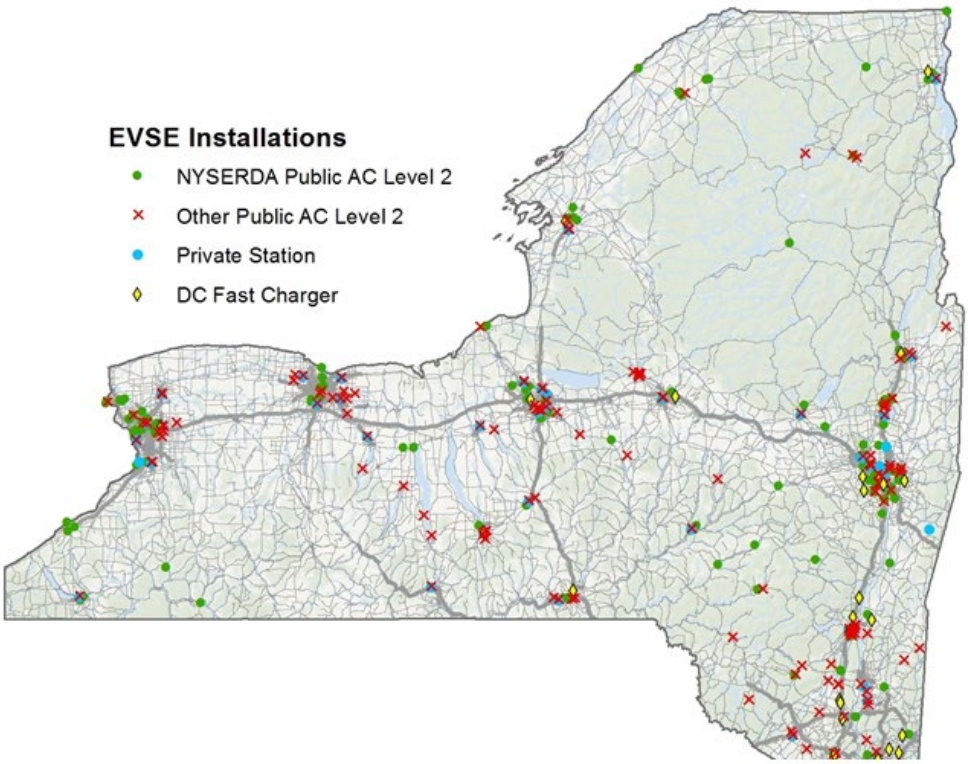
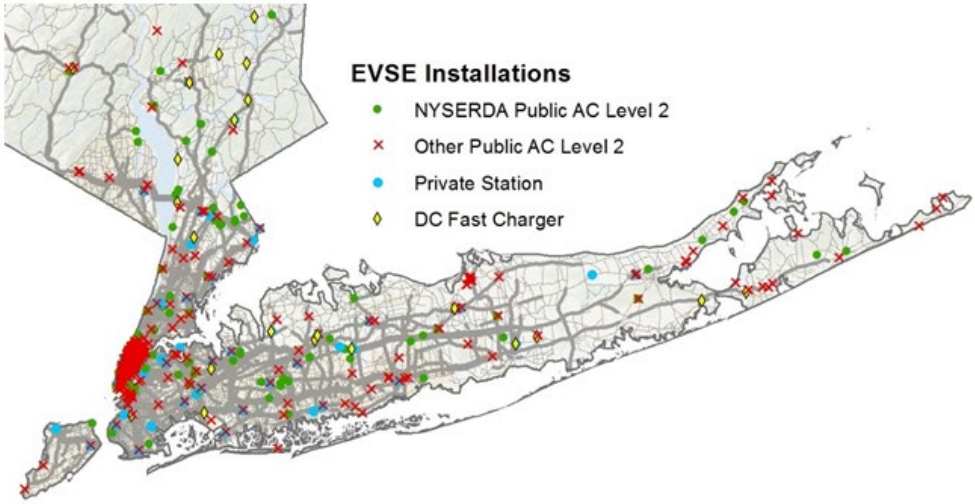


Figure 6. New York City and Long Island EV Charging Stations



Adirondack Museum
9097 NY 30: Blue Mountain Lake

Mastercard Parking Garage
Purchase

Hilton, Long Island
598 Broadhollow Rd: Mellville

Installations Supported by the NYSERDA Deployment Program During 2016

Municipal Facilities

- Lexington Grove West Garage
- New Rochelle
- NYNJ Port Authority Bus Terminal
- NYSDOT Clarkstown Park & Ride
- Village of Sleepy Hollow
- Village of Freeport
- Yonkers Parking Garage

Universities

- Hofstra
- Queens College

Hotels andLeisure Destinations

- Adirondack Museum
- Huntington Hilton

Medical Campuses

- Northwell Health

Retail

- Price Chopper

Workplaces

- Brooklyn Navy Yard
- Charter Communications
- Mastercard
- Delaware County Electric Coop in Delhi
- Village of Margaretville
- Village of Hobart

Plug-in Electric Vehicle Ownership in New York State

Figure 7. Registered EVs in New York State from 2013 to 2016

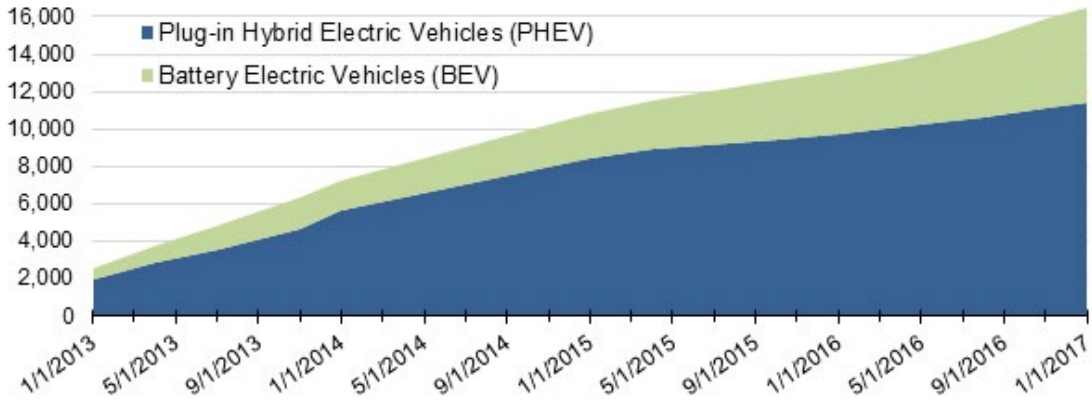


Figure 8. Current Mix of PHEVs in NYS

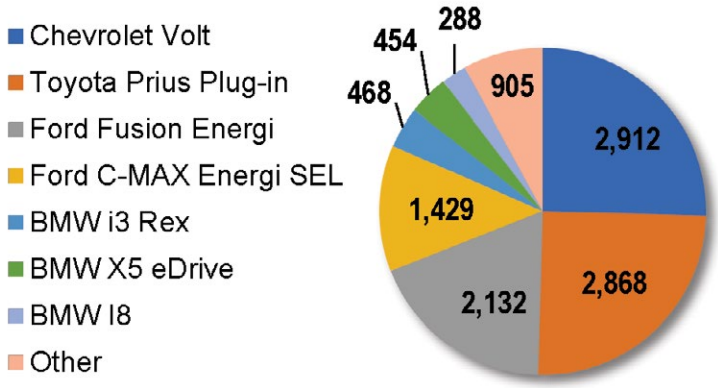
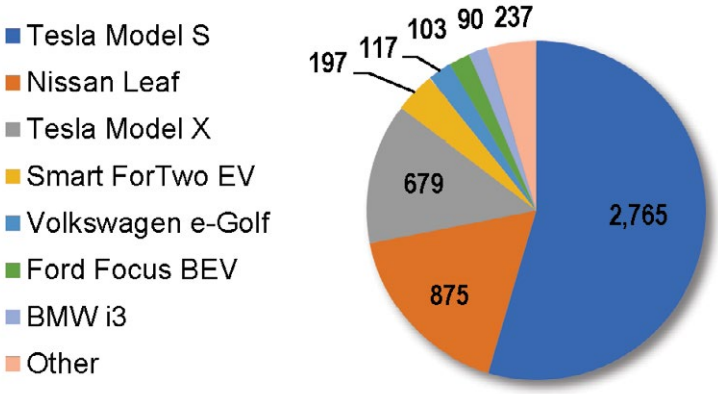
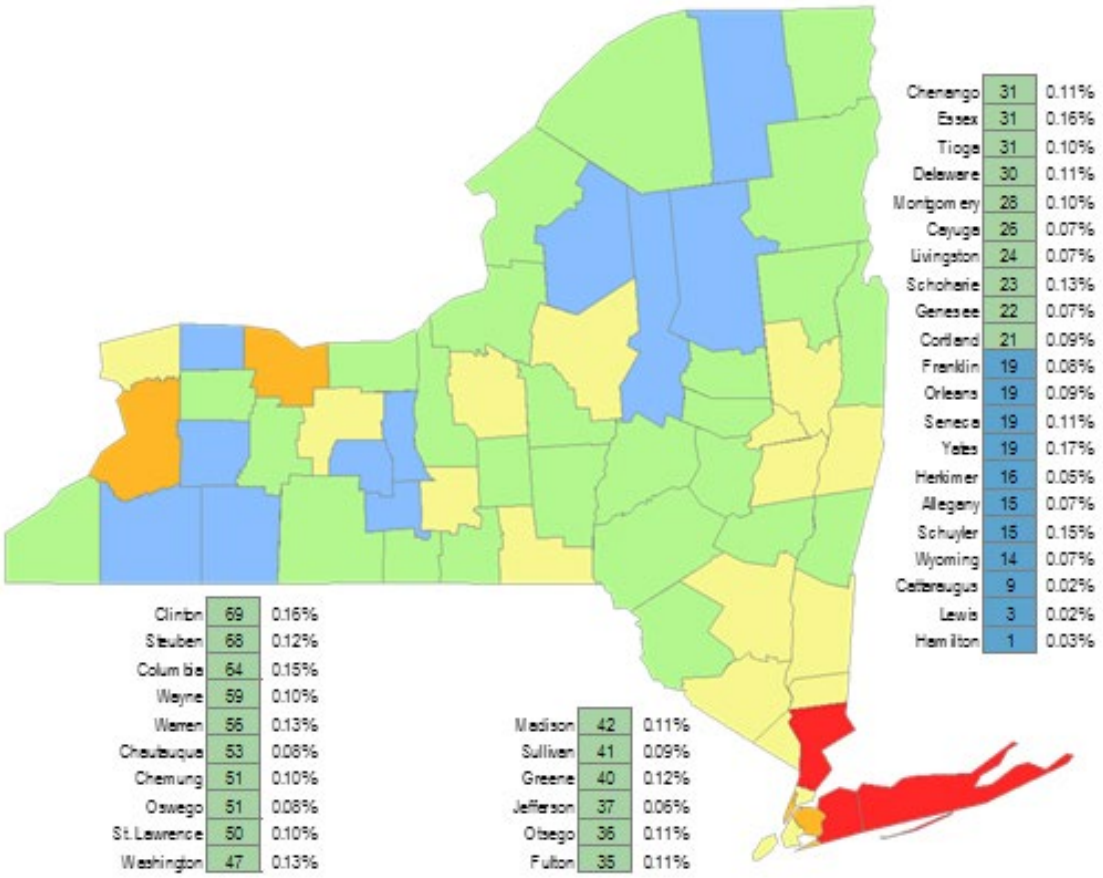


Figure 9. Current Mix of BEVs in NYS



BEVs and PHEVs by County
(NYS Department of Motor Vehicle data as of 12/31/2015)



	Number of EVs	Percent of Total Vehicles
Suffolk	3,356	0.33%
Nassau	2,156	0.24%
Westchester	1,619	0.30%
Queens	1,025	0.14%
New York	1,009	0.44%
Monroe	955	0.21%
Erie	728	0.14%
Kings	514	0.12%
Rockland	361	0.19%
Albany	351	0.18%
Onondaga	345	0.13%
Orange	300	0.13%
Dutchess	299	0.15%
Saratoga	278	0.19%
Richmond	277	0.11%
Ulster	240	0.19%
Bronx	201	0.08%
Tompkins	186	0.37%
Schenectady	159	0.16%
Niagara	140	0.12%
Rensselaer	139	0.15%
Oneida	125	0.09%
Broome	124	0.10%
Putnam	109	0.14%
Ontario	101	0.14%
Clinton	69	0.16%
Steuben	68	0.12%
Columbia	64	0.15%
Wayne	59	0.10%
Warren	56	0.13%
Chautauqua	53	0.08%
Chemung	51	0.10%
Oswego	51	0.08%
St. Lawrence	50	0.10%
Washington	47	0.13%
Madison	42	0.11%
Sullivan	41	0.09%
Greene	40	0.12%
Jefferson	37	0.06%
Otsego	36	0.11%
Fulton	35	0.11%
Chenango	31	0.11%
Essex	31	0.16%
Tioga	31	0.10%
Delaware	30	0.11%
Montgomery	28	0.10%
Cayuga	26	0.07%
Livingston	24	0.07%
Schoharie	23	0.13%
Genesee	22	0.07%
Cortland	21	0.09%
Franklin	19	0.08%
Orleans	19	0.09%
Seneca	19	0.11%
Yates	19	0.17%
Herkimer	16	0.05%
Allegany	15	0.07%
Schuyler	15	0.15%
Wyoming	14	0.07%
Cattaraugus	9	0.02%
Lewis	3	0.02%
Hamilton	1	0.03%

NYNJPA Bus Terminal
303 W 42nd Street, New York

3,356
Electrical Vehicles in Sulfolk County

EV Charging Station Utilization

EVs using the EV charging station outlets in the NYSERDA Deployment Program created significant energy and environmental benefits in 2016.

Comsumption of
486 MWh
of energy

Displacement of
65,000 gallons
of petroleum

Savings of
870,000 lbs.
of CO_2 emissions

Public Access EV Stations Statistics

42,070 charge events totaling 302 MWh

4.1% of the time an EV Outlet was occupied

53% of the occupied time was spent charging

0.29 charge events per day per EV outlet

3.4 plug-in hours and 7 kWh per charge event

Limited Access EV Stations Statistics

Limited access stations are installed specifically for, but may not be restricted to, a select group (e.g., employees, apartment building tenants, or hotel guests).

20,901 charge events totaling 184 MWh

7.5% of the time an EV outlet was occupied

36% of the occupied time was spent charging

0.25 charge events per day per EV outlet

7.1 plug-in hours and 9 kWh per charge event

Village of Freeport Municipal Parking
Freeport Plaza East

Yonkers Parking Authority
86 Main Street; Yonkers

Highlights of the Infrastructure Installations in the NYSERDA Deployment Program

EV charging stations in **New York City (NYC) parking garages, multifamily dwellings, transit stations, and hotels averaged fewer charge events per day, but dispensed the highest amounts of energy per charge event.** EV charging stations that **charged a fee for use** (most are NYC parking garages) followed this same trend: fewer charge events per day, but high energy dispensed per charge event.

The **average plug-in time per charge event differed for various location types** as shown in Figure 10. The shortest, by far, were the **retail locations (**1.2 hours), followed by leisure destinations (3.3 hours). The longest plug-in times per charge event occurred at **multifamily dwellings** (14.3 hours), **NYC parking garages** (8.5 hours), and **transit stations** (7.6 hours).

Figure 10. Comparison of Public NYS EV Charging Station Usage by Venue

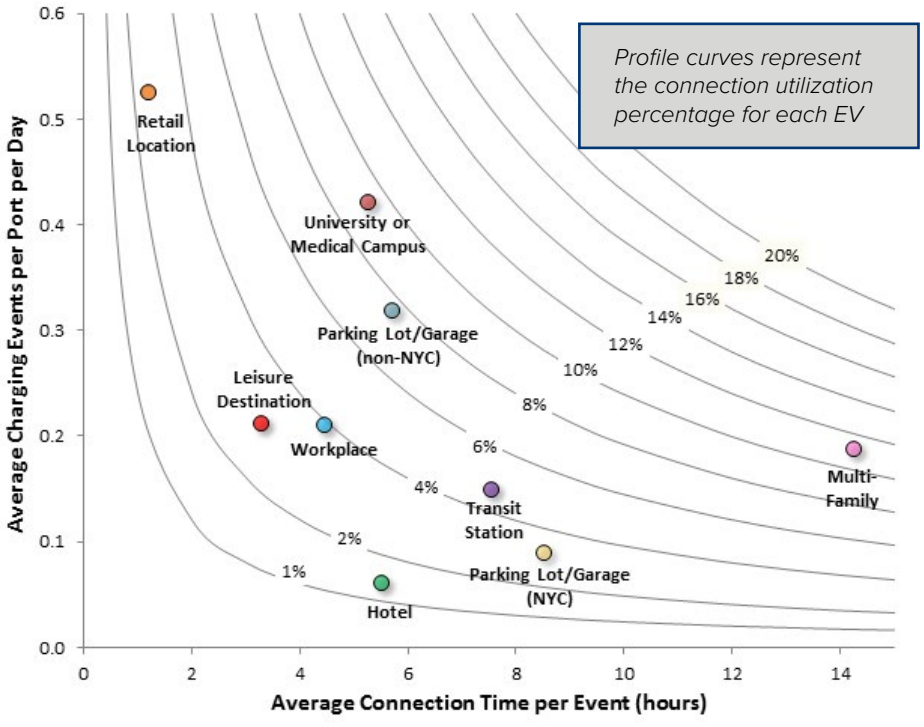


Figure 11. Comparison of Public New York State EV Charging Station Usage by Region

Profile curves represent the connection utilization percentage for each EV port

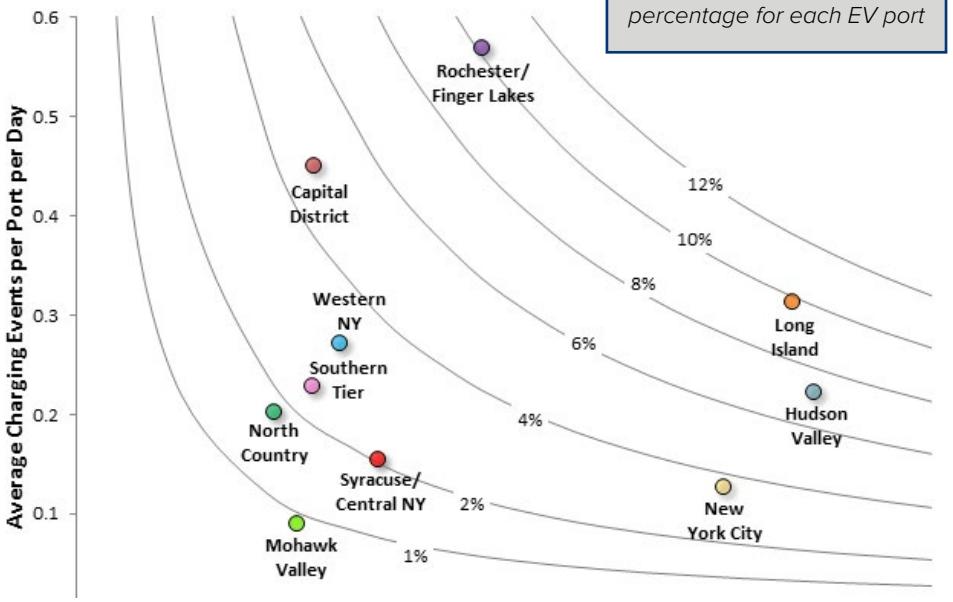
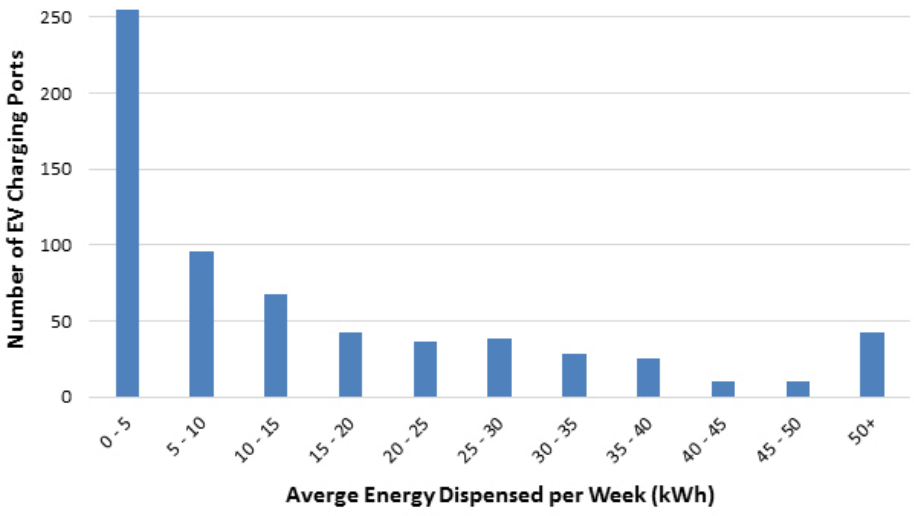


Figure 12. Average EV Charging Station Port Energy Dispensed per Station in 2016



Delaware County Electric Coop
39 Elm Street: Delhi

Brooklyn Navy Yard Building 128
63 Flushing Ave, Brooklyn

Northwell Health
600 Community Drive: Manhasset

Hofstra University - Constitution Hall
320 Hofstra University; Hempstead

Media Coverage

1. Tyler, Lauren. “New York Power Authority Adds High-Speed EV Charging Stations to Thruway.” *NGT News*. January 29, 2016.
2. Reynolds, Jessica. “Oneonta, Cobleskill colleges praised for green-energy measures,” *The Daily Star.* August 31, 2016.
3. Woyton, Michael. State Power Authority Announces Milestone in Electric Vehicle Charging Stations Patch. September 15, 2016.
4. Cairns, Robert. “The Catskills bet big on electric vehicles,” *Watershed Post*. October 18, 2016.
5. Snow, Violet. “Woodstockers check out new electric vehicles at community center,” *Hudson Valley One*. December 15, 2016.

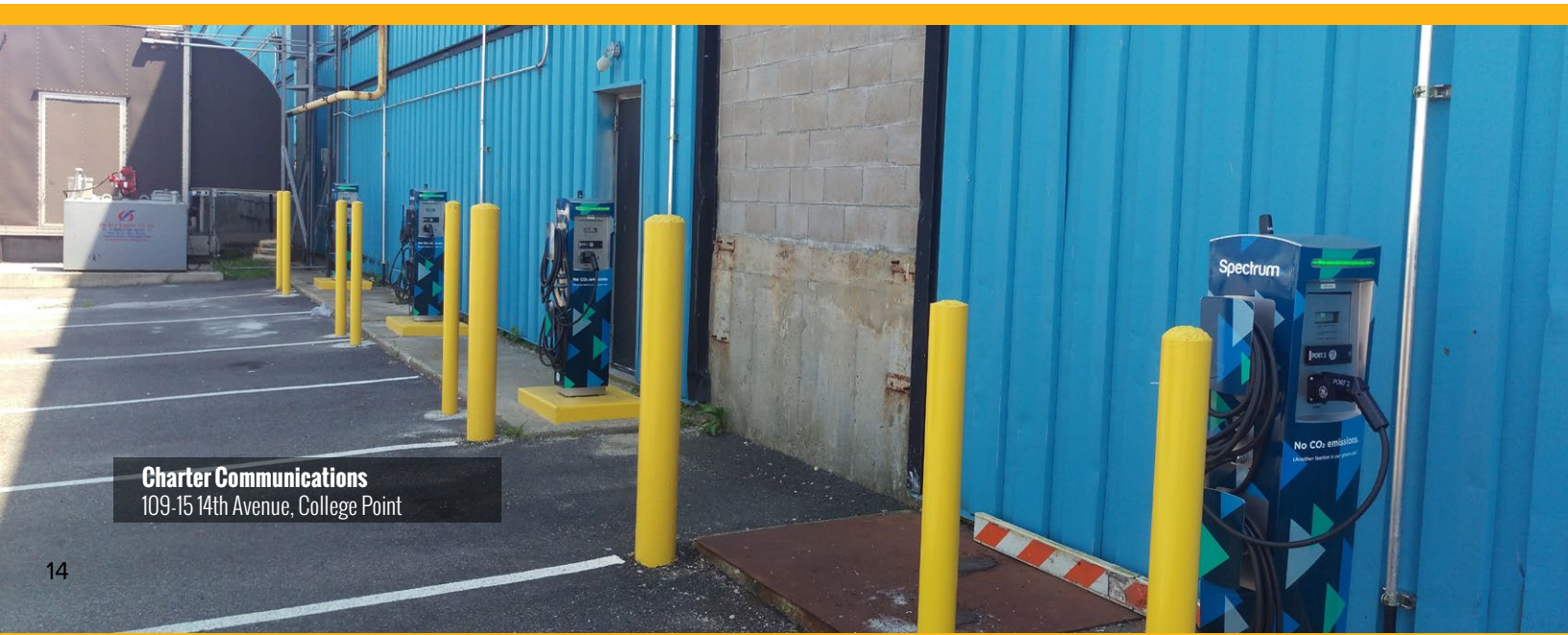
Village of Sleepy Hollow
28 Beekman Ave: Sleepy Hollow

Detailed EV Charging Station Usage Statistics*

Access	Ports	Total Days of Port Availability	Charge Events (CE)	Charge Events per day	Plug-in Time			Charging Time			% of Plug-in time charging	Total Energy (kWh)	Energy per CE
					Hours	Hours per CE	%	Hours	Hours per CE	%			
Public	432	145,737	42,070	0.29	144,262	3.4	4.1%	76,821	1.8	2.2%	53%	301,747	7.2
Limited	244	82,629	20,901	0.25	148,418	7.1	7.5%	52,708	2.5	2.7%	36%	184,077	8.8

Region	Ports	Total Days of Port Availability	Charge Events (CE)	Charge Events per day	Plug-in Time			Charging Time			% of Plug-in time charging	Total Energy (kWh)	Energy per CE
					Hours	Hours per CE	%	Hours	Hours per CE	%			
New York City	165	51,376	6,513	0.13	44,354	6.8	3.6%	20,740	3.2	1.7%	47%	102,082	15.7
Capital District	122	42,525	19,180	0.45	47,828	2.5	4.7%	28,473	1.5	2.8%	60%	100,063	5.2
Hudson Valley	120	40,877	9,116	0.22	70,652	7.8	7.2%	22,976	2.5	2.3%	33%	87,391	9.6
Long Island	79	27,307	8,560	0.31	64,510	7.5	9.8%	20,919	2.4	3.2%	32%	73,572	8.6
Western NY	61	21,642	5,898	0.27	16,301	2.8	3.1%	10,686	1.8	2.1%	66%	35,775	6.1
Rochester/ Finger Lakes	42	14,864	8,465	0.57	36,041	4.3	10.1%	17,536	2.1	4.9%	49%	58,088	6.9
North Country	32	11,240	2,274	0.20	4,723	2.1	1.8%	3,435	1.5	1.3%	73%	11,557	5.1
Syracuse/ Central NY	29	9,215	1,436	0.16	4,543	3.2	2.1%	2,271	1.6	1.0%	50%	8,034	5.6
Southern Tier	14	4,960	1,137	0.23	2,821	2.5	2.4%	1,840	1.6	1.5%	65%	7,085	6.2
Mohawk Valley	12	4,360	392	0.09	906	2.3	0.9%	654	1.7	0.6%	72%	2,176	5.6

*Includes data from all stations reporting usage, which may be less than all stations installed by the end of 2016.



Charter Communications
109-15 14th Avenue, College Point

Detailed EV Charging Station Usage Statistics* (continued)

Land Use Type	Ports	Total Days of Port Availability	Charge Events (CE)	Charge Events per day	Plug-in Time			Charging Time			% of Plug-in time charging	Total Energy (kWh)	Energy per CE
					Hours	Hours per CE	%	Hours	Hours per CE	%			
Suburban	354	122,160	37,580	0.31	155,652	4.1	5.3%	65,449	1.7	2.2%	42%	228,331	6.1
Urban	270	87,610	22,777	0.26	127,254	5.6	6.1%	58,691	2.6	2.8%	46%	238,364	10.5
Rural	52	18,596	2,614	0.14	9,773	3.7	2.2%	5,389	2.1	1.2%	55%	19,128	7.3

Location Type/Venue	Ports	Total Days of Port Availability	Charge Events (CE)	Charge Events per day	Plug-in Time			Charging Time			% of Plug-in time charging	Total Energy (kWh)	Energy per CE
					Hours	Hours per CE	%	Hours	Hours per CE	%			
Parking Lot/ Garage (NYC)	126	40,746	3,674	0.09	31,297	8.5	3.2%	14,754	4.0	1.5%	47%	81,846	22.3
University or Medical Campus	128	43,614	18,395	0.42	96,902	5.3	9.3%	42,873	2.3	4.1%	44%	147,098	8.0
Parking Lot/ Garage (non-NYC)	107	36,331	11,586	0.32	66,237	5.7	7.6%	23,192	2.0	2.7%	35%	78,314	6.8
Retail Location	92	30,846	16,228	0.53	19,498	1.2	2.6%	16,003	1.0	2.2%	82%	56,635	3.5
Workplace	91	30,627	6,452	0.21	28,778	4.5	3.9%	14,831	2.3	2.0%	52%	48,877	7.6
Transit Station	44	15,976	2,384	0.15	18,008	7.6	4.7%	5,034	2.1	1.3%	28%	20,543	8.6
Hotel	40	13,104	808	0.06	4,460	5.5	1.4%	2,296	2.8	0.7%	51%	10,289	12.7
Leisure Destination	26	9,250	1,967	0.21	6,451	3.3	2.9%	3,928	2.0	1.8%	61%	14,437	7.3
Multi-Family	22	7,872	1,477	0.19	21,049	14.3	11.1%	6,618	4.5	3.5%	31%	27,786	18.8

Payment Required	Ports	Total Days of Port Availability	Charge Events (CE)	Charge Events per day	Plug-in Time			Charging Time			% of Plug-in time	Total Energy (kWh)	Energy per CE
					Hours	Hours per CE	%	Hours	Hours per CE	%			
No	565	192,861	58,841	0.31	265,576	4.5	5.7%	117,388	2.0	2.5%	44%	427,620	7.3
Yes	111	35,505	4,130	0.12	27,104	6.6	3.2%	12,141	2.9	1.4%	45%	58,204	14.1

*Includes data from all stations reporting usage, which may be less than all stations installed by the end of 2016.

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