

Electric Vehicle

Advisory Committee



Report of Recommendations 2016





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- ▶ EV ownership in New York City remains relatively low and, as a result, demand for additional charging solutions is limited.

- ▶ Options for charging EVs in the City appear sufficient for the time being, but new solutions may be needed in the future as electric vehicle use continues to grow.

- ▶ Increasing the availability of charging can be done in several ways, not all of which require the City's direct involvement.

- ▶ Recent Mayoral and City Council initiatives and laws will help increase the presence of electric vehicles and charging opportunities. New York City DOT and the Committee fully support these initiatives and laws and welcome the growth of sustainable modes of transport in the city and the region.



CHARGE YOUR ELECTRIC CAR HERE.

One of the few DC fast chargers in operation in New York City.

The Electric Vehicle Advisory Committee (the Committee) was convened pursuant to Local Law 122 of 2013. The Committee's goal is to make recommendations on ways to promote the use of Electric Vehicles (EVs) among the general public. EVs are becoming progressively more common in New York City, but increased EV use raises many complex questions. The Committee is working to find potential solutions to these questions and other issues related to increased EV usage.

New York City Council Local Law 122 of 2013 requires the following Committee members:

- the Commissioners of the City's Department of Transportation (DOT), the Department of Environmental Protection (DEP) and the Department of Buildings (DOB) or their designees;
- the Director of the Mayor's Office of Sustainability or his or her designee;
- the Speaker of the City Council or his or her designee;
- each of the five borough presidents or their designees; and
- at least one representative from the EV industry and transportation and environmental advocates (currently Consolidated Edison [ConEd], New York Power Authority [NYPA], National Resources Defense Council [NRDC], Green Parking Council and the Electric Drive Transportation Association).

The Committee is required to meet at least twice a year through 2019. During the first meeting in 2015, the committee discussed the recommendations of the report. The second meeting, held on December 8, 2015, focused on issues to be discussed in the 2016 report, as well as an update on workplace charging and the successful funding of a grant that focus efforts on workplace charging.

This report addresses the current state of EV usage in New York City and recommends potential actions that the City and other members of the Committee can take to encourage the use of EVs.

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I. Current State of the EV Industry

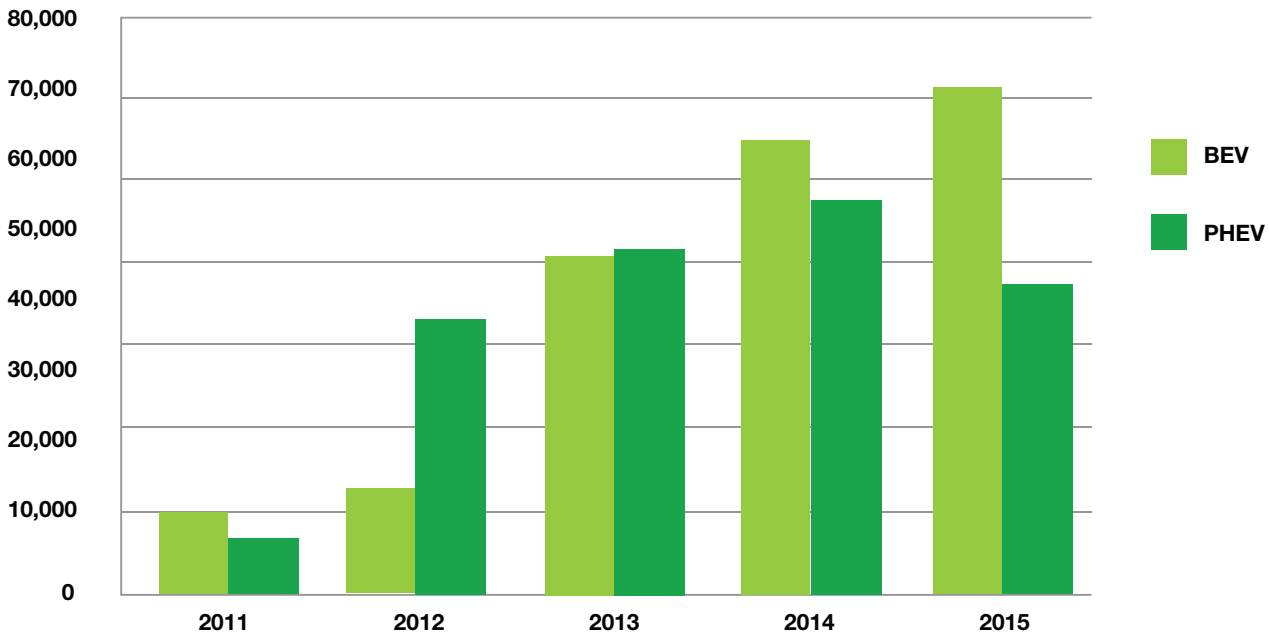
National EV Sales

Since the current generation of EVs, as defined by the Nissan Leaf and Chevy Volt, entered the market in 2011, the number of EV models has steadily increased and currently there are about 20 models of plug-in Electric Vehicles (PEVs) available. As the name suggests, a plug-in EV requires that the vehicle be connected to an electrical source to charge its battery. Two types of plug-in EVs are now on the market: plug-in hybrid EVs (PHEVs), powered by battery and gasoline, and pure battery powered EVs (BEVs).

EV sales have grown dramatically since 2011.

However, penetrating the American automotive market with a new technology has been a long, slow process: EV sales represent less than 1% of total national vehicle sales in 2015. According to the Electric Drive Transportation Association (EDTA), 114,000 plug-in vehicles were sold in 2015, while a cumulative total of 400,500 plug-in EVs now operate in the United States. (This represents a slight decline from the 118,000 sold in 2014.) Battery-only EVs represent approximately 63% of the plug-in EVs sold in 2015. This trend has continued from the end of last year.

National Sales 2011-2015 (EDTA Data)



⁴ www.plugincars.com/cars

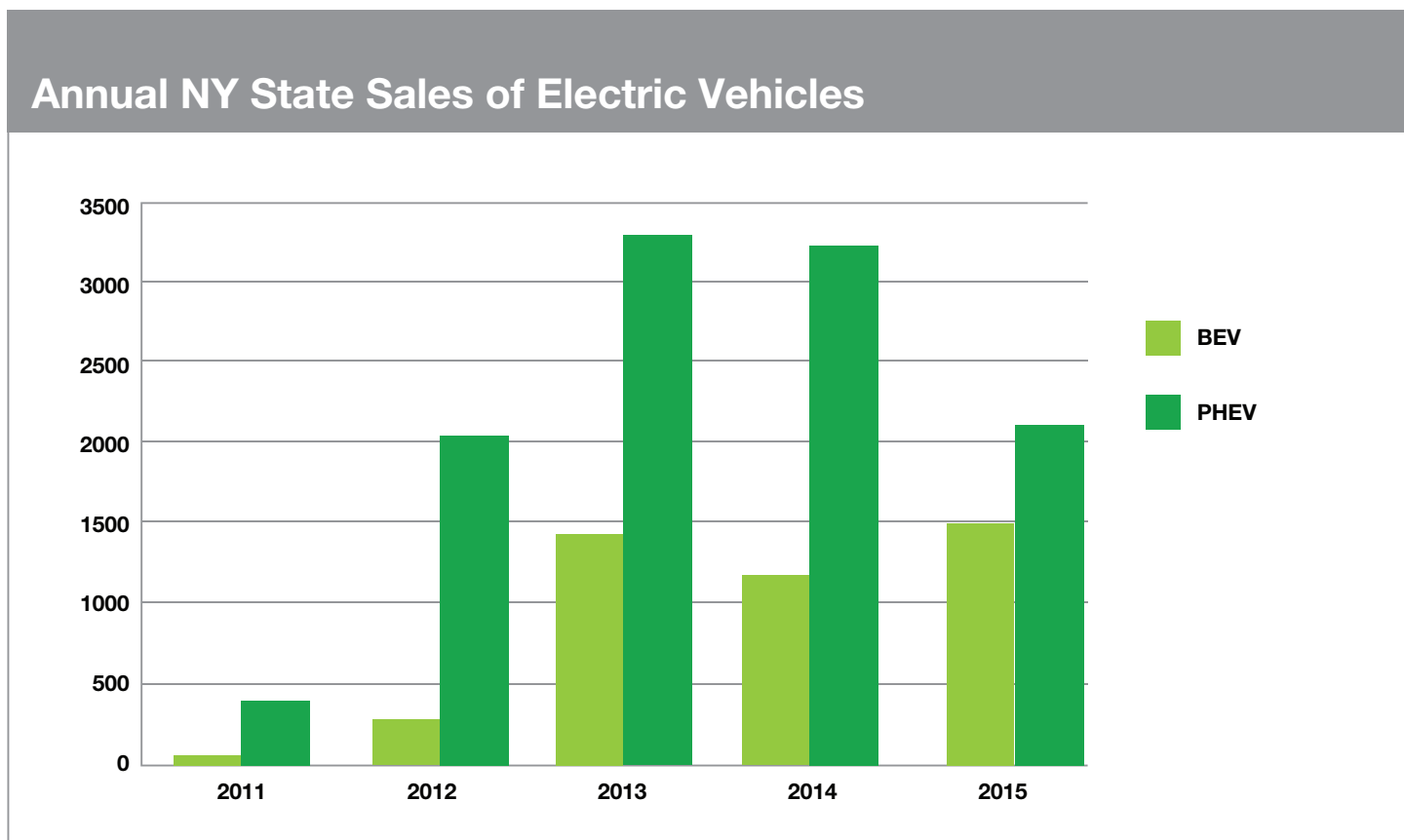
In addition the following industry trends have been observed:

- With more makes and models coming online, the variety of plug-in vehicles is increasing dramatically. By 2017, 30 plug-in models will be on the market. After Federal incentives, 14 models will be priced at \$30,000 or less and six models will be priced at \$25,000 or less¹.
- Available range and battery size are increasing with Tesla and General Motors both offering 200-mile range by 2017.
- As range increases, the demand for DC fast charging will also increase as well that the rate of charge of those stations. Currently fast charge is defined at 25 to 50 kWh. But as battery packs grow above 50 kWh, the need to quickly charge them requires faster fast charges. These new faster chargers will present challenges to the electric grid and increase the already high demand charges associated with these loads.

¹<http://www.plugincars.com/cars>

Regional EV Sales

In 2015, 1,117 plug-in EVs were registered in New York City and Westchester County, of which 615 were pure battery EVs. Cumulatively, since 2011, there were over 4,100 EVs registered in New York City and Westchester.

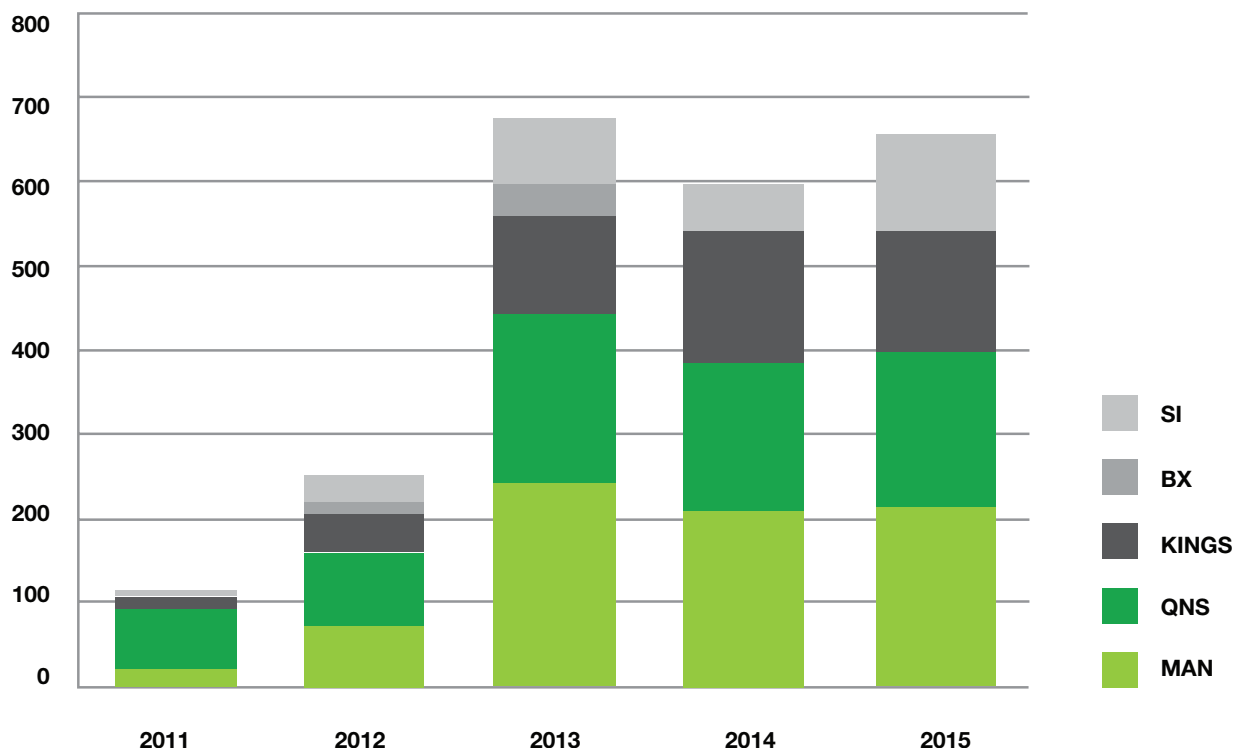


²[California Low Emissions Vehicle Standards section 1962.1\(d\)\(5\)\(E\)](#)

Local EV Sales

In 2015, 931 plug-in EVs were registered. About 2230 Plug-in EV's have been registered in New York City between 2011 and 2015.

Annual NYC Plug-in EV Registrations by Borough 2011-2015 (Polk Data)



Multi-State ZEV Memorandum of Understanding (MOU)

In October 2013, New York State (NYS) joined seven other states (California, Connecticut, Maryland, Massachusetts, Oregon, Rhode Island, and Vermont) in signing a Memorandum of Understanding (MOU) which, among other things, is aimed at reducing transportation-related air pollution, including greenhouse gas emissions. Specifically, the signatory states agreed to jointly develop infrastructure, policies, codes and standards to put 3.3 million Zero-Emission Vehicles (ZEVs) on the road by 2025. ZEVs include hybrid plug-in, battery electric and hydrogen-powered fuel cell EVs. These eight states together comprise about a quarter of the nation's new car sales. Since the signing of the MOU, state regulators, the auto industry, infrastructure developers, and other stakeholders have shared information and best practices to help move this groundbreaking effort forward.

To meet the goal of this multi-state effort, NYS will need approximately 820,000 ZEVs on the road by 2025. As of late 2015, there were about 11,000 ZEVs in New York. To develop plans to increase the use of ZEVs within the government as well as to encourage the public to use them, NYS created the Governor's ZEV Task Force. NYCDOT staff participates in these task force monthly meetings. Critical topics being considered include coordination of State agency procurement, development of signage, education outreach events and exploration of issues related to multi-unit dwelling charging, co-op and condo guidance.

II. Major Events in 2015



Mayoral Announcement on the Municipal Fleet

In December 2015, Mayor Bill de Blasio announced the launch of NYC Clean Fleet: a comprehensive plan to create the largest municipal electric vehicle fleet of any U.S. city, cut municipal vehicle greenhouse gas emissions in half by 2025 – and 80 percent by 2035, and serve as a model for the private sector and other 21st century cities in fighting climate change.

Overall, the transportation sector accounts for nearly one-quarter of citywide greenhouse gas emissions. City-owned and operated vehicles account for approximately four percent of citywide transportation emissions, or 13 percent of the City government’s emissions, creating the polluting equivalent of an 80 MW coal power plant.

The full NYC Clean Fleet plan is available here: <http://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/NYC%20Clean%20Fleet.pdf>

As part of this agenda, NYC Clean Fleet will replace approximately 2,000 fossil fuel sedans with plug-in electric vehicles (EVs), which, combined with the over 300 government EVs currently on the road, would mean EVs will make up half of the City’s non-emergency sedans and create one of the largest municipal electrical vehicle fleets in the United States and, potentially, the world. This transition would reduce gasoline consumption by approximately 2.5 million gallons a year and reduce the City fleet’s greenhouse gas emissions by nine percent by 2025.

Utility Planning for EV Charging

The Supplemental Distribution System Implementation Plan (DSIP), outlines Con Edison’s plan to efficiently integrate distributed energy resources (DER), including a plan to encourage technological innovation and promote a robust marketplace for DER. The DSIP also presents the opportunity for the utilities to collaborate in the development of initiatives that will have the effect of reducing carbon emissions, including decarbonizing the transportation system.

One such opportunity that should be addressed in

the Supplemental DSIP is planning for, and enabling increased deployment of, electric vehicle supply equipment (EVSE). The market growth of plug-in electric vehicles will be enhanced by the State’s PEV deployment goals resulting in increasing demand and adoption of PEVs and the corresponding need for EVSE will likewise increase.

Con Ed describes the new process as follows:

Coordinated statewide approaches by the utilities will directly contribute to market development and decreases in carbon emissions. In addition to new demand on the system resulting from PEV charging service, issues related to vehicle grid integration will have direct impact on utility operations and planning. Therefore, it is appropriate for the utilities to include consideration of EVSE deployment as part of the DSIP process.

While PEV and corresponding EVSE market conditions may vary across the state, early planning should identify and address collaborative initiatives that can set the stage for accelerated market growth. The collaborative planning may also be supplemented by individual utility initiatives, consistent with the collaborative planning for the deployment and integration of EVSE in their service territory.

The required engagement plan should also include a description of plans to coordinate and engage with stakeholders including the industry and municipalities in investigating and developing their EVSE deployment approaches or proposals.

Currently, Con Edison offers residential customers a reduced rate for charging EVs during off-peak hours. Con Edison has not yet released any public materials on how they will pursue the promotion of EV in accordance with Reforming the Energy Vision (REV) and the Supplemental DSIP guidance. However, according to a 2016 rate filing, Con Edison plans to hire one new full-time staff for their Electric Vehicle Program to “work with various stakeholders to reduce the barriers” to wider EV adoption. Initiatives include working on tariffs, developing a workplace charging program, and supporting research and development to reduce the cost of EV ownership generally and DC fast charging in particular.³

Workplace Charging Program

The Electric Vehicle Committee 2014 report recommended that the Committee focus on workplace charging. The resulting public-private partnership that was developed successfully applied for and won \$2.25 million in state funds to develop and implement a citywide workplace charging program focused outside the Central Business district. The new program, named *Charge to Work NYC*, features the following program partners:

- CALSTART
- NYCDOT
- Chargepoint
- GM
- Northeast States for Coordinated Air Use Management
- Empire Clean Cities

Charge to Work NYC will develop a program that can be implemented by large NYC-based employers.

The team will:

- develop materials,
- recruit companies to participate,
- provide employees with a webinar about the program,
- provide ride and drives for the employees to test drive vehicles, and
- provide rebates of up to \$500 for the first few employees from each company who purchase the plug-in vehicle. This rebate is in addition to the \$7500 Federal tax credit and recently announced \$2000 State tax credit.

In addition, the team will assist the company with development of charging infrastructure if needed and provide select discounts toward charging. The program is anticipated to begin recruitment by fall of 2016. While the program is under the direct management of CALSTART, the Committee will be participating in both program development and corporate outreach.



This solar car charger is self-contained, can charge vehicles during power failures or increase charging capability quickly without construction.

³ See www.coned.com/2016-rate-filing/pdf/testimony-exhibits-electric/08-eiop-exhibits-eiop-01-eiop-14.pdf

III. Approaches to EV Charging

International Markets and Incentives

Cities around the world such as Oslo, Amsterdam, Paris, London and Berlin have developed different approaches to EV charging. Norway is the world leader in EV adoption. As of December, 2015 over 22% of new vehicle sales were electric⁴. Norway also continues to have the most generous incentives in the world. The *New York Times*⁵ calculated the value of the incentives to be close to \$18,000 per vehicle and combined with potential annual savings of over \$13,000 in reduced fees, free fuel and tolls. These incentives included: tax credits, access to priority bus lanes, waiver of the city congestion zone fee, and free parking and charging in the city. Sixteen models of plug-in vehicles are for sale in Norway. Norway's success has resulted in congestion of the bus lanes causing a scaling back of that incentive.

The Netherlands is second in the world in terms of percentage of EV market share: 9.6% of vehicles sold in the Netherlands in 2015 were electric. The City of Amsterdam has committed to placing 4000 on-street charging locations by 2018. Incentives include business tax incentives, an expedited permit to park in the congested city, and free public charging.

In Paris, the Autolib electric car share system has been a catalyst for the creation of a citywide network of EV parking and charging stations. Over 4000 charging locations provide charging to the program's 2500 vehicles; and are available to privately owned vehicles as well. French EV sales are at 1.4% of market.

London has added on-street charging over the past couple of years with limited success. As of late 2015, London has invited the Bolloré group, who operate the very successful electric car-share program in Paris to create a similar program for London. The Bolloré group now owns and has upgraded over 1000 charge points located within the City of London⁶. They are rolling out the Blue City electric car share program with the first 40 plug-in vehicles in summer 2016 slowly increasing to 3000 vehicles by 2019. Also it was announced that effective in 2018 all new purchases of London's iconic black taxi's would be plug-in hybrids. A new plant in England will supply the vehicles.⁷

In Germany, support for electric vehicle infrastructure is also growing. In Berlin, an effort to develop an on-street charging network took shape in 2015, when the city awarded a contract to a consortium to develop a citywide network. Phase one involves the installation of 400 on and off-street charging locations including light poles and will be completed by October 2016. Phase two will expand this network to several thousand, with locations based on demand — with an aim to complete the network by 2020.

China is the world's leader in straight sales of EVs with 188,000 vehicles sold last year (as compared to 114,000 in the US), with the market share of EVs also exceeding that of the U.S. (0.8% compared to 0.66%). China will add to subsidies aimed at speeding up the building of electric car recharging stations, targeting enough infrastructure to handle five million plug-in vehicles by 2020⁸. Aid for charging facilities will be



On-street electric charger as part of the Car2Go Program in Berlin.

⁴All international sales figures from EV-sales.blogspot.com; ⁵ Jolly, David. Norway is a model for Encouraging Electric Car Sales. *New York Times*. October 16, 2015. ; ⁶ www.sourcelondon.net/#howitworks ; ⁷ www.autoexpress.co.uk/car-news/93222/meet-the-new-london-taxi-hybrid-tx5-black-cab-revealed; ⁸ Bloomberg News (10/8/15)

expanded and local governments will be asked to disclose their favorable policies and incentive offers. Newly-built residential buildings should all have charging facilities or set aside space for them. China has noted that it will unify charging standards, expand public charging facilities from urban areas to suburbs and encourage fuel stations to install chargers. For their part, government agencies will also add charging facilities on their own parking lots.

National Models

Citywide on-street charging networks remain very limited in the United States. A few small programs are being developed, most notably in Indianapolis, Indiana. BlueIndy began service in 2015 with 50 vehicles and has a goal to expand from 12 to 200 charging locations and 100 vehicles in 2016. A key requirement of Blue-Indy's car share program is that it will have two on-street charge points for each car in the program.

The majority of public charging infrastructure in the United States is located off-street on private property such as shopping mall parking facilities, large box stores, coffee stops, and rest areas. Many of these charging locations, predominantly on the west coast, were funded through the United States Department of Energy's EV Project, which funded mostly Level 2 and some Level 3 chargers in 16 cities in nine states (Arizona, California, Georgia, Illinois, Oregon, Pennsylvania, Tennessee, Texas, and Washington) and the District of Columbia. Another federally funded public charging initiative is the West Coast Electric Highway Project, which facilitated the installation of 43 Level 3 chargers along Interstate 5 and other major roadways in the Pacific Northwest.

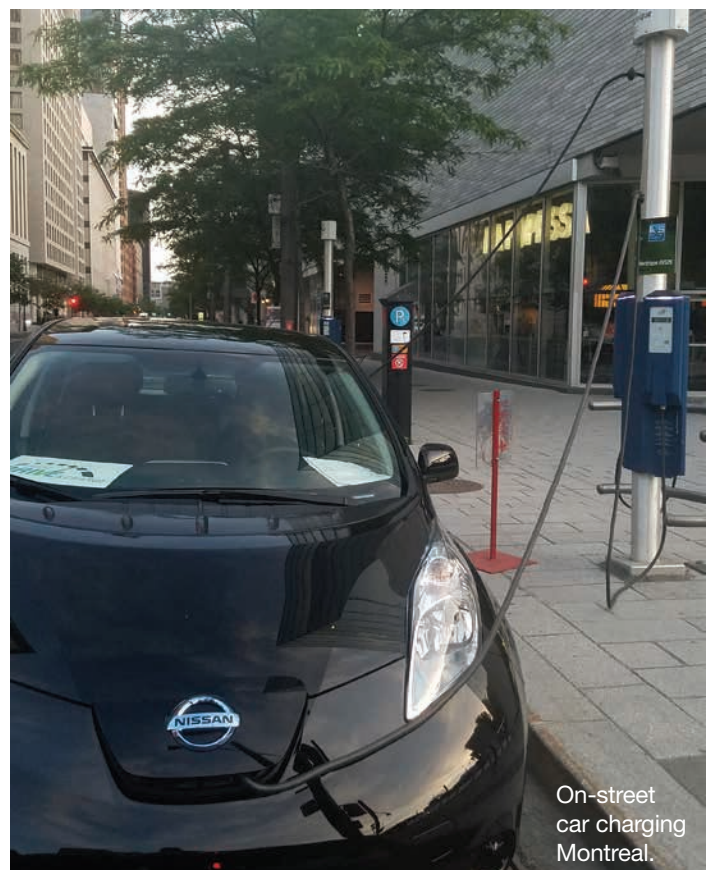
Utility investment in charging stations for EV's has been growing as well. For example, Kansas City Power and Light is in the process of installing 1000 charging stations. In addition, because the State of California Public Utilities Commission (CPUC) recently rescinded a rule prohibiting utility ownership of charging networks, California's three largest utilities submitted proposals to operate charging stations in the state.

In January 2016, the CPUC approved Southern California Edison's (SCE) \$22 million dollar pilot program to build and operate 1500 EV chargers in the service area. The \$22 million pilot will locate Level 2 stations where cars are parked for extended periods of time, including workplaces, schools, and apartment and condo complexes. SCE will locate, design, and build the infrastructure, as well as offer incentives. Customers will own, operate, and maintain the stations. As an incentive

to participate in the program, SCE will offer rebates of between 25 and 100% of the base cost of the charging stations and their installation, depending on location and market segment. The program also calls for at least 10 percent of the charging stations to be installed in disadvantaged communities.

At the conclusion of the pilot, SCE will seek authority from the CPUC to expand the program to bring the total number of charging stations to about 30,000 for a total estimated cost of \$355 million. The program also provides funding for education and outreach to develop awareness about the benefits of EV's.

EV charging is also being privately funded on a national scale—most notably by EVgo, formerly a subsidiary of NRG Energy, Inc., but recently the recipient of a majority investment from Vison Ridge Partners. EVgo created the nation's first privately funded comprehensive network of home charging stations and fast charging stations and offers different charging plans (monthly fees/usage rates) so that its users can charge their EVs both at home and away from home. In 2015, BMW, in coordination with EVgo, created ChargeNow DC Fast which is rolling out 500 DC fast chargers across the USA (including within New York State). Under this program, these chargers will be universally available although they will be free for BMW drivers for an introductory period.



On-street car charging Montreal.

IV. EV Charging Activity in New York City

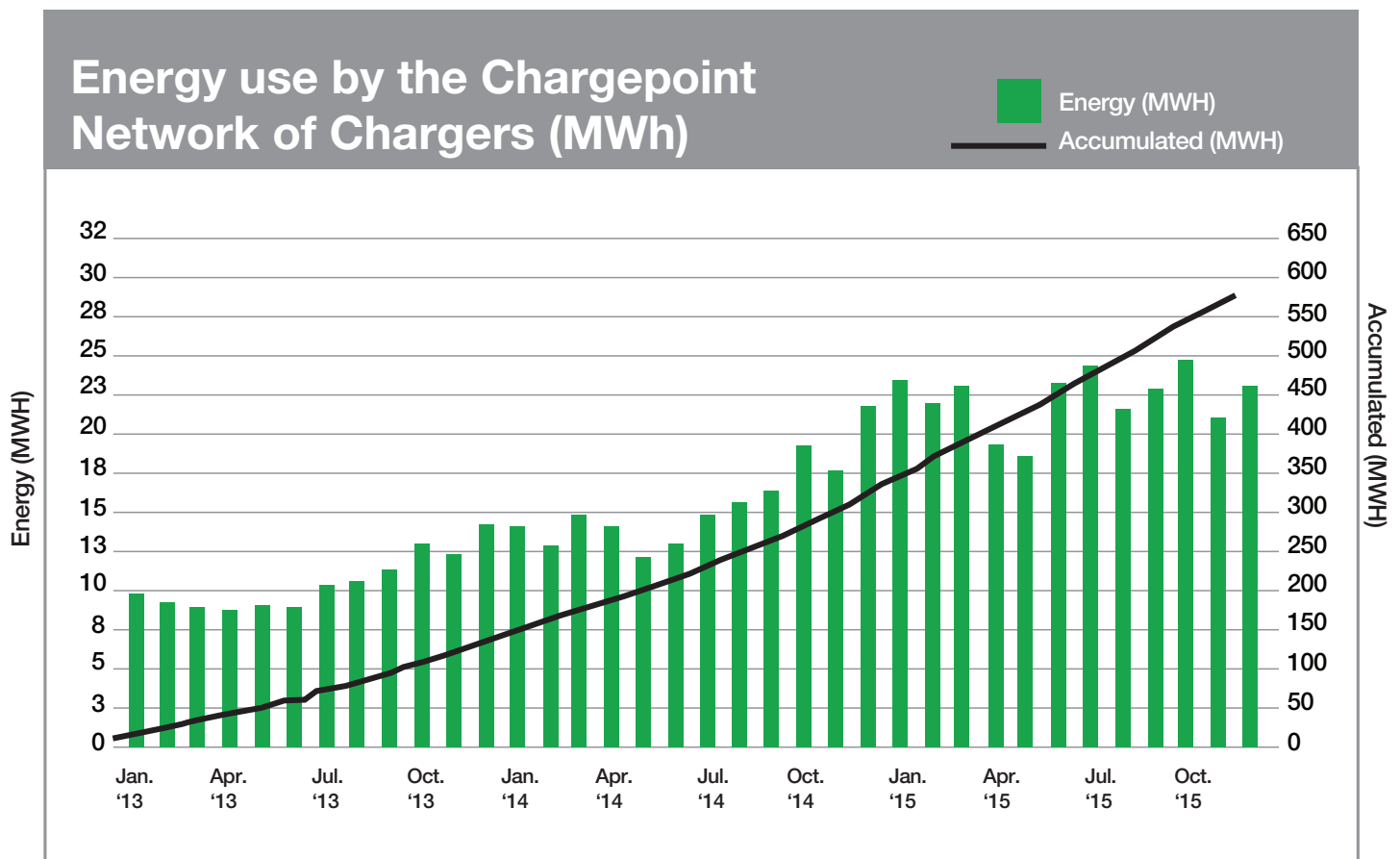
Charging for plug-in EVs in New York City is currently available at residences and private parking facilities. There are nearly 300 publicly available charging sites in New York City, with the vast majority located in private parking facilities in Manhattan⁹. In addition, the City has installed over 275 chargers at City facilities for charging its own fleet of EVs.

Chargepoint operates the majority of these charging locations. Since 2011, over 260 charge ports have been installed in private garages and other off-street locations by Chargepoint. By 2013 there were over 1000 individual charging sessions every month on the Chargepoint network. That number grew to over 3000 charges per month in 2015. Energy consumption too has also grown from 10 MWh per month in 2013 to 23 MWh per month in 2015. In addition to the Chargepoint Facilities, Blink operates approximately 20 charging locations. Fast charging, which can provide an 80% charge in approximately 20 minutes, is also now available in New York City.

EVgo has fast chargers in Flushing, Queens and Windsor Terrace, Brooklyn and Tesla has installed their proprietary Superchargers at Kennedy Airport. Tesla also announced placement of 100 Destination DC fast chargers in private parking facilities in Manhattan by the end of 2016¹⁰. For station locations please check the company websites or use the Alternative Fuel Station locator operated by the US Department of Energy.

<http://www.afdc.energy.gov/>

New York City recently acquired a solar car charger that offers the ability to charge vehicles without a grid connection. The charger is also moveable and gives the City flexibility of growing the electric fleet without construction. The plans are to incorporate up to 30 Solar Car chargers into municipal operations at those locations where grid connections and electrical upgrades are cost-prohibitive.

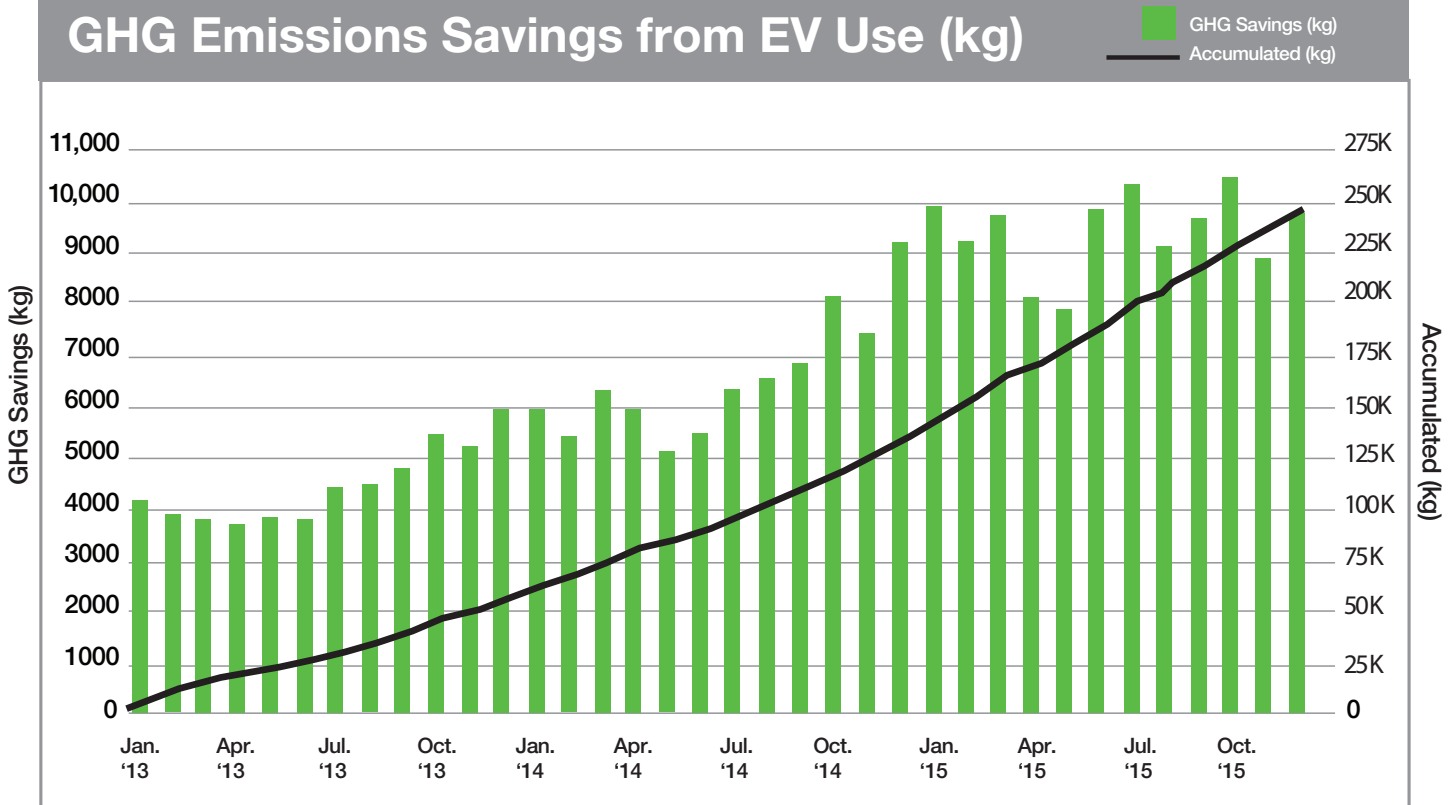


⁹ National Renewable Energy Laboratory (NREL) AFDC

Data provided by Chargepoint, January 2016.

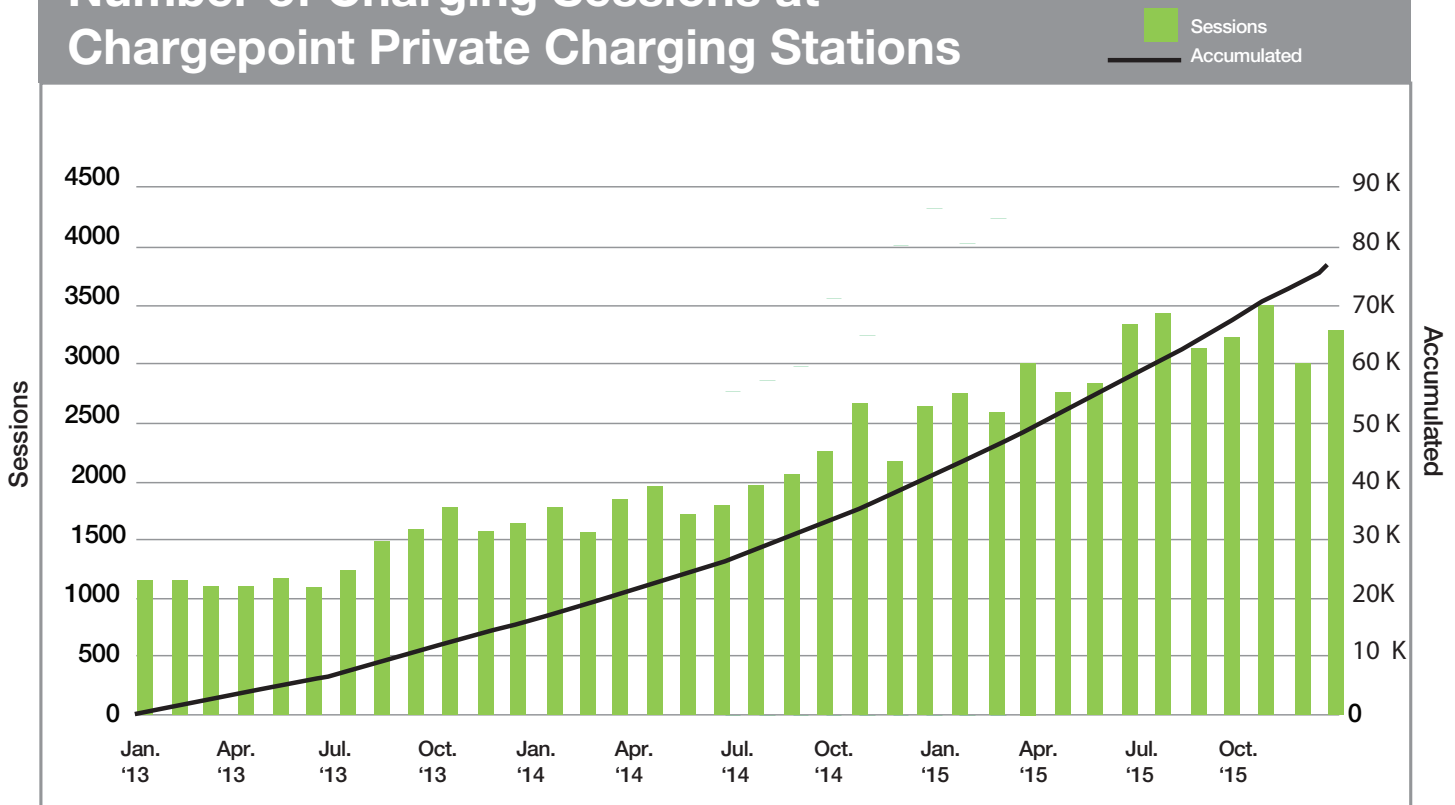
¹⁰ <http://gas2.org/2016/03/19/more-tesla-charging-stations-than-gas-stations-in-nyc-soon/>

GHG Emissions Savings from EV Use (kg)



Data provided by Chargepoint, January 2016.

Number of Charging Sessions at Chargepoint Private Charging Stations



Data provided by Chargepoint, January 2016.

Charging Station Map



The website Plugshare www.plugshare.com offers a map of EVSE locations in the USA. This sample captures the heavy concentration of public charging located in Manhattan below 110th Street.



Municipal Parking

In 2013, DOT and NYPA entered into an agreement allowing NYC DOT to purchase 27 NYPA-funded EV charging stations that were installed at various DOT-owned parking garages and municipal lots in all five boroughs. NYPA completed these installations at the following locations shown in the chart below:

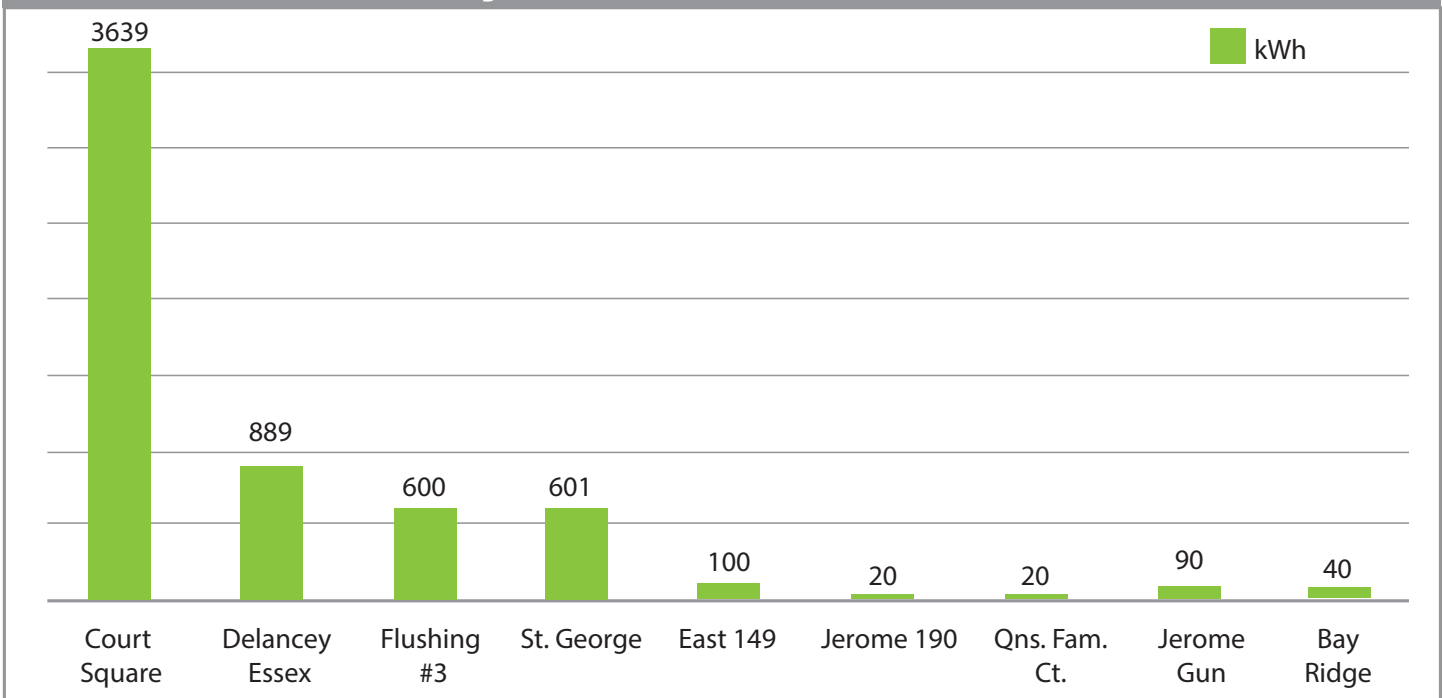
EV Chargers Installed in Municipal Parking Facilities 2015

Locations	Address	# of EV Chargers
Bay Ridge Municipal Parking	8501 Fifth Avenue, Brooklyn, NY 11209	3
Court Square Municipal Parking	45-40 Court Square, Long Island City, NY 11101	3
East 149 th St. Municipal Parking	315 East 149th Street, Bronx, NY 104511	3
Jerome-Gun Hill Road Municipal Parking	3510 Jerome Ave Bronx, NY 10467	3
St. George Courthouse Garage	54 Central Avenue, Staten Island, NY 10301	3
Flushing #3 Municipal Parking Field	133 41st Avenue, Flushing NY 11354	3
Delancey and Essex Municipal Parking	107 Essex Street, NY, NY 10002	3
Queens Family Court Garage	150-07 Archer Avenue, Jamaica NY 11433	3
Jerome-190 th Street Municipal Garage	150-07 Archer Avenue, Jamaica NY 11433	3

Station utilization rates 2015

The chargers went into service during the summer of 2015. Of the nine locations, Court Square in Long Island City Queens is used most often. Those chargers are used daily, potentially owing to the proximity to various public transit options enabling that DOT parking facility to serve as a park and ride. Chargers are used several times a week at the Delancey and Essex Municipal Parking, St. George Courthouse and Flushing #3 locations. The other five EV charger locations have been used much less frequently. See chart below.

Utilization of Municipal Garages based on kWh consumed July-December 2015



New Parking and Charging Coming to Queens

DOT is in the process of constructing a new parking field located at Queens Borough Hall. This new field will offer four EV charging locations when it opens with the ability to expand to 62 EV charging locations as demand grows.

V. Committee Recommendations: 2016 Work Plan

1. Coordination with the New York State EV Working Group.

As part of the multi-state MOU to support the increased use of ZEVs with the intent of improving air quality, Governor Cuomo established a working group to explore statewide initiatives to accelerate the sale of EVs in New York State. The Committee will coordinate closely with the State's working group to ensure a consistent effort to promote the use of EVs in New York City and New York State. Along with continued public outreach and coordination, the committee identified the need to develop guidance for coops and condo buildings regarding the installation of EV charging.

2. Develop Information for Public Dissemination.

The Committee will develop information and guidance for public dissemination to New York City community boards, 311, and NYC.gov on general information about plug-in vehicles, ways to locate EV charging, and guidance for the installation of home charging.

3. Implement Charge to Work NYC.

The grant was awarded to CALSTART, but the contract is not yet final and work has not yet commenced. The committee's goal for 2016 is to implement the grant and institute programs to encourage workplace charging.

4. Improve Data Collection.

The committee will work with Con Edison, New York State, Connecticut and New Jersey to capture the growth of EV's beyond Con Edison's service territory. Inclusion of regional data will better reflect the percentage of electric commuter vehicles New York City might expect to see.

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