

Promoting Workplace Charging in New York State

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Promoting Workplace Charging in New York State

Final Report

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Executive Summary

Installing electric vehicle (EV) charging stations at workplaces can benefit employers and their employees alike. Charging at work may make it more feasible for an employee to use an EV, especially if installing a charging station at their residence is challenging. For employers, EV charging stations, also referred to as electric vehicle supply equipment (EVSE), can attract and retain desirable employees. This project engaged workplaces throughout New York State to educate and encourage them to install workplace charging for their employees, which will support increased adoption of EVs. The engagement effort was phased to first use a widespread approach that introduced the concept of workplace charging, then targeted specific businesses that expressed interest in workplace charging to provide installation planning support and educate their employees on EV technology and options.

Project team members met with 87 workplaces to conduct initial discussions on workplace charging. The team provided on-site staff with high-level EV information, typical EV range, charging times, upfront costs, energy efficiency, emissions savings, fuel cost savings, and available incentives for EVs and charging infrastructure.

Twenty-five workplace locations were interested in further participating in this project to conduct employee outreach and receive an infrastructure assessment. The infrastructure assessment helped guide the installation planning by identifying potential power sources; ideal locations for charging stations; requirements to trenching, conduit, and wire routing; and potential funding sources. The EV educational event provided employees with information regarding available EV models, vehicle costs, range, recharge time, and other factors of EV ownership. When permissible, the employee events included on-site ride-and-drive components conducted by local EV dealers to provide a hands-on EV experience.

The team faced challenges, including engaging the right person at the workplace to discuss this topic; after the initial meeting, many businesses had little interest or difficulty signing the commitment letter to proceed; and, even after the letter was received, there was difficulty scheduling the site assessment or employee event. However, any work completed with the businesses was well received as this was a new topic to many. There were very few charging station installations resulting from this project thus far, but this type of engagement is necessary to introduce a new technology and initiate discussion about workplace charging.

1 Introduction

Installing electric vehicle (EV) charging stations at workplaces can be beneficial to both employers and their employees. For EV owners, charging at work may make it more feasible to use a battery electric vehicle (BEV), which relies exclusively on electric power and is more limited than conventional vehicles with the distance it can travel per fill-up. For a plug-in hybrid electric vehicle (PHEV), additional opportunities to charge increases their electric miles, which are less costly than using its gasoline-powered engine. For employers, EV charging stations can attract and retain desirable employees. Charging stations, also referred to as electric vehicle supply equipment (EVSE), also visibly demonstrate an organization's commitment to sustainable energy consumption and complement other environmentally friendly initiatives. However, supporting EV use and installing charging stations is a new concept to most businesses; therefore, it is necessary to provide education, outreach, and support. This project engaged workplaces throughout New York State to educate and encourage them to install workplace charging for their employees, which will support increased adoption of EVs.

The project team included several New York-based organizations to effectively provide workplace charging information and outreach throughout the State. A key partner was Energetics Incorporated (Energetics) for project management support, project evaluation, and charging station installation planning consultations. Also supporting the project were the six U.S. Department of Energy (DOE) Clean Cities Coalitions:

- Greater Long Island Clean Cities Coalition
- Empire Clean Cities
- Capital District Clean Communities Clean
- Clean Communities of Central New York
- Genesee Region Clean Communities
- Clean Communities of Western New York

The engagement effort was phased to first use a widespread approach that introduced the concept of workplace charging, then targeted specific businesses that expressed interest in workplace charging to provide installation planning support and educate their employees on EV technology and options.

The initial informational meetings with 87 different workplaces targeted human resources personnel, management, operations, facilities, and/or administrators. The team provided on-site staff with high-level EV information, typical EV range, charging times, upfront costs, energy efficiency, emissions savings, fuel cost savings, and available incentives for EVs and charging infrastructure. This presentation, included as Appendix A – Workplace Charging Introductory Presentation described the potential benefits to employers, employees, and site owners. Team members were available for a question and answer session and provided resource materials to the business.

Any business requesting more information about charging infrastructure at its specific location and providing EV ownership information to employees signed a commitment letter stating interest in the project. The site visit included a discussion using the Appendix B – Workplace Charging Infrastructure Consultation Presentation, and a walk-through of the facility and parking areas. Energetics’ consulting services helped guide the installation of charging infrastructure by identifying potential power sources; ideal locations for charging stations; requirements to trenching, conduit, and wire routing; and potential funding sources. Energetics also discussed strategies for integrating EV technology into workplace policy and culture. Following each site visit, Energetics provided each business with a summary of their visit, including a site design and layout summary that documented the suggested installation approach. The report for each business also included the Appendix C – Charging Infrastructure Assessment Background Information.

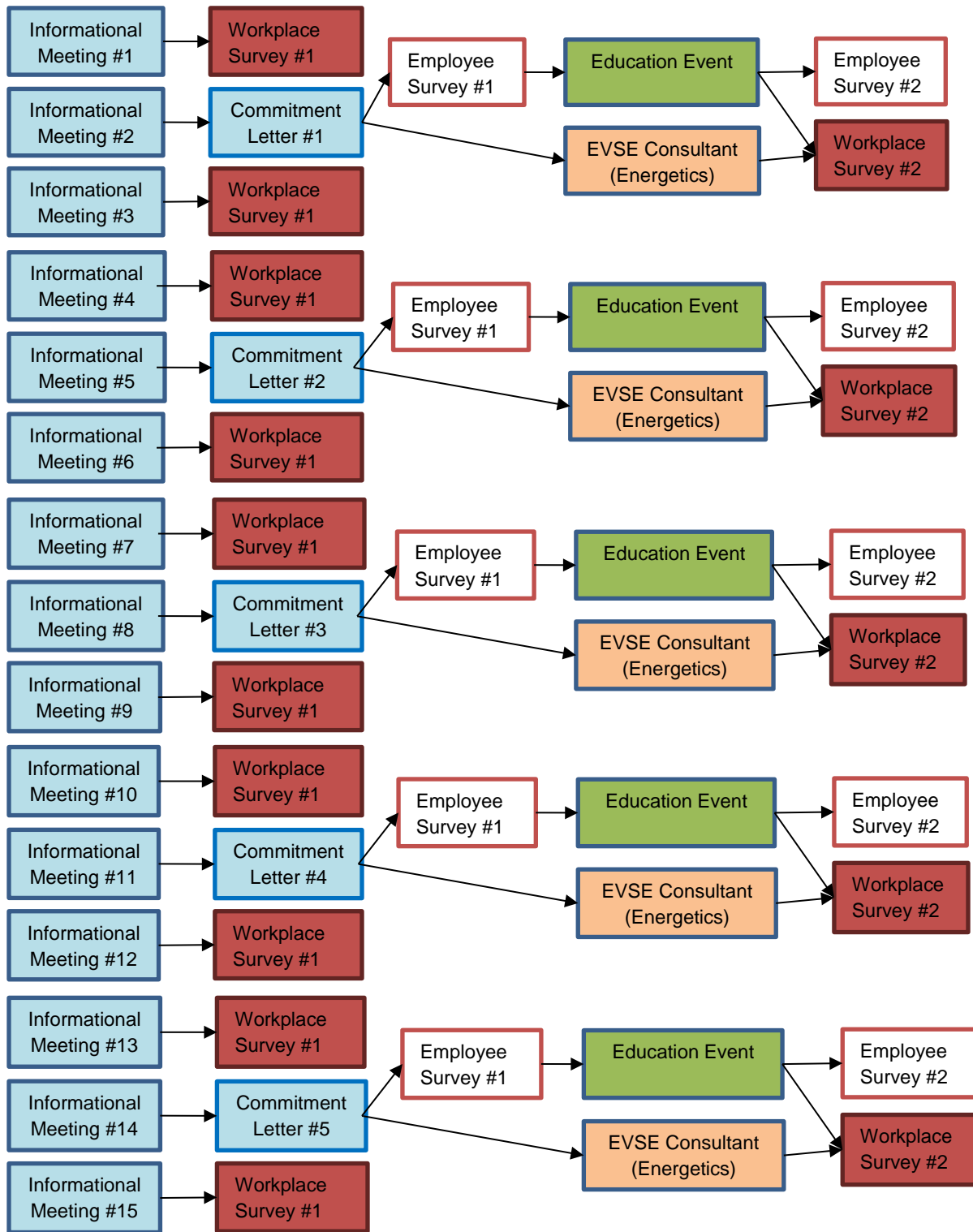
The Clean Cities Coalitions offered to facilitate an EV educational event at each of the businesses that signed a commitment letter. The event provided employees with information regarding available EV models, vehicle costs, range, recharge time, and other factors of EV ownership. A survey was conducted with participating business employees before the educational event to understand employee transportation factors and gauge knowledge/interest in EV technology to tailor the event appropriately (Employee Survey #1). When permissible, the employee events included on-site, ride-and-drive components conducted by local EV dealers to provide a hands-on EV experience.

Additional surveys were developed and conducted at businesses that participated in the project to evaluate the impact of the project elements. The surveys, included in Appendix D – Employee and Workplace Surveys, were designed to gain feedback and information on:

- Whether the business chose to pursue installation of charging stations, and why or why not (Workplace Survey #1 and #2)
- The effectiveness of the employee outreach event (Employee Survey #2 and Workplace Survey #2)
- Which parts of the project were most valuable and what could have been improved (Workplace Survey #1 and #2)

Each region in the State represented by a Clean Cities Coalition – Greater Long Island, Empire (New York City [NYC] and Lower Hudson Valley), Capital District, Central New York, Genesee, and Western New York—had a goal to complete 15 initial informational meetings with businesses and get commitments from five to do the infrastructure assessments and employee educational events. The project activity flowchart for each coalition is shown in Figure 1.

Figure 1. Project activity flowchart per Clean Cities Coalition Region



2 Workplaces Participating in only the Initial Informational Meeting

Project team members met with 87 workplaces to conduct initial discussions on workplace charging. The 62 workplaces listed in Table 1 and Table 2 opted not to further engage with project team members through this project to have a charging infrastructure site assessment performed or educate employees.

Table 1. Workplaces that participated in only the initial informational meeting

| | Business/Workplace | Location (City) | Employees | Prior EV Activity |
|------------------------------------|--|------------------------------------|----------------------------------|--|
| Long Island | SunPower by EmPower Solar | Island Park | 29 | 3 EVSE, 6-8 EV drivers |
| | Greenman Pedersen, Inc | Babylon | ~70 | 2-4 EV drivers |
| | Long Island Power Authority | Uniondale | ~100 | 2-3 EVSE, 6-7 EV drivers |
| | St. Joseph's College | Patchogue | 781 employees 3,528 students | Reserved "energy efficient vehicle" parking spaces |
| | Suffolk County Community College | Riverhead, Selden, Brentwood | 27,000 students 1,973 faculty | 12 EVSE |
| | Scully, Scott, Murphy & Presser, P.C. | Garden City | 30 Lawyers 40 Staff | None |
| | The Rochlin Organization | Melville | 30 | None |
| Empire (NYC & Lower Hudson Valley) | RXR Realty | Uniondale | Multiple employers | EVSE at 6 locations |
| | Colliers International | New York | | None |
| | Bronx Community College | Bronx | 2,000 | Level 1 EVSE |
| | Wartburg | Mount Vernon | N/A | None |
| | Regeneron Pharmaceuticals, Inc | Tarrytown | ~2,500 | 16+ EV drivers, with 2 EVSE and 4 more planned |
| | Sunrise Solar | Briarcliff Manor | ~25 | None |
| | Sun Blue Energy | Sleepy Hollow | 10 | None |
| | Diamond Properties | Mount Kisco | ~25 | 2 underutilized EVSE |
| | Queens Theatre | Queens | | None |
| Capital District | Capital District Regional Planning Commission (CDRPC) + Capital District Transportation Committee (CDTC) | Colonie | 22 | 2 PHEV drivers |
| | Picotte Companies | Albany | ~100 | None |
| | Dearing Group | Niskayuna | 1 | None |

Table 2. Workplaces that participated in only the initial informational meeting (continued)

| | Business/Workplace | Location (City) | Employees | Prior EV Activity |
|--------------------|--------------------------------|------------------------|------------------|------------------------------|
| Central New York | Ceravalo Medical Center | North Syracuse | 40 | 1 PHEV driver |
| | Tracey Truck Center | East Syracuse | 110 | 1 PHEV driver |
| | Bond, Shoeneck, & King, PLC | Syracuse | 145 | 2 EV drivers |
| | Allied Spring | East Syracuse | 44 | None |
| | Oswego YMCA | Oswego | ~40 | None |
| | Nastri Real Estate | Eastwood | 6 | 1 PHEV driver |
| | Inner Harbor | Syracuse | 15 | None |
| | Edgewater Development | North Syracuse | 150 | Several PHEV drivers |
| | Anhueser Busch | Baldwinsville | 400, 2 shifts | 2 EVSE, several PHEV drivers |
| | North West YMCA | Baldwinsville | 270 | None |
| | Teracai | North Syracuse | 30 | 3 PHEV drivers |
| | American Red Cross | Syracuse | 25 | None |
| | National Grid | North Syracuse | ~300 | EVSE, several EV drivers |
| | Haylor, Freyer & Coon | Syracuse | 400+ | None |
| Indium Corporation | Clinton | 200+ | None | |
| Genesee | Harbec Plastics | Ontario | 150 | EVSE, several EV drivers |
| | SUNY Geneseo | Geneseo | 1,100 | None |
| | College at Brockport-SUNY | Brockport | 1,300 | BEVs in fleet |
| | Monroe County | Rochester | 3,500 | EVSE at fleet center |
| | Eastman Business Park | Rochester | 6,000 | None |
| | Rochester-Genesee RTA | Rochester | 900 | None |
| | University of Rochester | Rochester | 13,000 | EVSE in public parking areas |
| | Brockport Central School | Brockport | 750 | None |
| | Greece Central School District | Greece | 2,150 | None |
| | Rochester Regional Health | Rochester | 16,000 | None |
| | Victor Central School District | Victor | 1,550 | None |
| | Wegmans Food Markets | Gates | 12,000 | None |
| | City of Rochester | Rochester | 3,000 | EVSE in public garages |
| | Monroe Community College | Brighton | 1,215 | None |
| Western New York | Moog Inc. | Elma | 2,600+ | None |
| | Upstate Niagara Co-Op | Buffalo | 120 | None |
| | Tops Markets | Williamsville | 150 | 2 EVSE |
| | Delaware North Companies | Buffalo | 1,000+ | None |
| | Ford | Buffalo | 800 – 1,200 | None |
| | Fresenius Kabi | Grand Island | 700 – 900 | None |
| | General Motors | Tonawanda | 1,500 – 1,800 | EVSE at Powertrain Plant |
| | M&T Bank | Buffalo | 3,500 | None |
| | National Grid | Buffalo | 800 | EVSE |
| | Village of Williamsville | Williamsville | 19 | None |
| | City of Niagara Falls | Niagara Falls | 100+ | None |

2.1 Long Island Workplaces with only Initial Informational Meetings

SunPower by EmPower Solar has EV charging powered by Solar, which is provided free to staff and under a long-term lease. While considering additional EV charging, the company is more focused on offering the free assessments as a tool for current clients to expand solar installs.

Greenman Pedersen, Inc (GPI) is an international engineering firm. It is interested in EVSE for its Long Island site and perhaps additional offices, if successful. To commemorate its 50th year in business, GPI decided to share its good fortune with its communities by performing 50 acts of kindness throughout the year. Offering public charging at the business was being considered as one of these.

Long Island Power Authority (LIPA) is a utility interested in providing rebates to commercial customers where five or more employees commit to, or currently drive, an EV, that replace a portion of its light-duty vehicle fleet with EVs, and provide EV educational information on its website. LIPA is in further discussions to determine how workplace assessments can be of service to LIPA and its customers.

St. Joseph's College seemed to be enthusiastic about workplace charging, but the initial contact could not find the ultimate decision maker in this process. The college is considering other facility changes and would try to incorporate EVSE at the design phase at a future date. The contact felt the campus parking lot configurations would make deciding where to install the EVSE challenging.

Suffolk County Community College already had some EVSE and wanted to know how we could do a better job in getting other entities to install EVSE, therefore encouraging greater EV adoption. While the college might consider expanding EVSE in the future, it didn't need additional stations at this time.

Scully, Scott, Murphy & Presser, P.C. is dependent on Treeline Properties as the building owner to make the decision about installing EVSE. There are currently no charging stations at this business park location. The representative was rather doubtful the EV industry would expand with the heavy level of subsidy required.

The Rochlin Organization, a tenant at Valley East Properties, will manage properties for dozens of buildings owned by individuals or groups like most other building management companies. There are currently no EVSE at any of its locations. Several of these companies owned and managed other properties, so the focus was less about sustainability and more about raising rates per square foot and/or maintain their relevance in the market compared to the competition. In this case the company only manages, not owns, property and getting approval for this upgrade was difficult. The space it currently occupies is leased, so the decision to install EVSE would need to come from the building owner.

2.2 Empire Workplaces with Only Initial Informational Meetings

RXR Realty installed EVSE at five of 60 locations; however, those EVSE have low usage rates. RXR noticed several tenants have employees driving longer-range EVs that may not require charging at work. Despite this, they expressed interest in increasing EVSE installations and promoting charging.

Colliers, a commercial real estate firm in Westchester, has buildings under construction at multiple locations and sites, both owned and leased. At least one location will house about 225 parking spots with no current plans to install EVSE, so the information was timely. While they didn't know the percentage of employees who drive EVs or have existing green-energy initiative, they felt the charging stations would convey a positive environmental image, which would be beneficial.

Bronx Community College has about 2,000 employees across two locations and currently makes L1 charging available for educational purposes. They are interested in accommodating more EVSE facilities on campus and could conceivably accommodate the necessary increases in space and the electricity demand on their current electrical infrastructure.

Wartburg signed a commitment letter, but subsequently declined to proceed. They have more than 400 employees with 150 parking spots spread out across two main sites and eight additional buildings, so there is potentially ample space for EVSE installations. They demonstrated a strong desire to tackle green vehicle projects as part of a green energy plan focused chiefly on energy security, clean air, and clean living. They did have some concerns on how this would affect a planned overhaul of their current meter system (and its consolidation of many meters into one) and requested an evaluation of potential impact.

Regeneron Pharmaceuticals, Inc., in Tarrytown, NY, has approximately 2,700 employees and more than 16 are EV drivers. Regeneron currently offers two EVSE with four additional planned for install using Greenlots network across both of its campuses. This is part of a larger more comprehensive focus on building green initiatives, which includes reaching out to new employees, solar canopies, LEED building, etc. They also own both of the campuses, which facilitates EVSE installation and reduces obstacles to growth in that area. They anticipate (indeed encourage) increased EV drivers and do not anticipate difficulties with infrastructure updates or electrical upgrades.

Sunrise Solar has approximately 25 employees, two or more drive EVs. As a solar company they are intensely focused on green initiatives—for both commercial purposes and to promote a positive environmentally friendly image. Parking may be a concern as additional, non EVSE spaces are already ‘tight’, and reconfiguration of existing spaces would be needed. They are interested in offering EV charging and are open to presentations to their staff and sales teams.

Sun Blue Energy has eight full time and two part-time employees, with two buildings: one facility in Sleepy Hollow with parking restrictions and limited flexibility, and a more optimal warehouse in Yonkers. As a solar company, they are extremely receptive to EVSE parking and green vehicle initiatives; however, they are limited by space at the site. Happily, the company owner is a licensed electrical contractor and stated that he could do most of the installation work himself, if afforded the space.

Diamond Properties has about 20-25 employees and several dozen off-site maintenance staff, stretched across their home office and 70 properties they own or lease. Their home office is situated in a larger strip mall that has two EVSE chargers. The property manager for the home office noted in interviews these appear underused, but expressed interested in expanding EVSE across their other properties, especially the properties they own. They are enthusiastic adaptors of green tech, installing nearly 23,000 solar panels across 25 acres of roof space. Their existing electrical engineer staff and expertise would help to minimize installation difficulties. Capital District Workplaces with only Initial Informational Meetings

Capital District Regional Planning Commission (CDRPC) and Capital District Transportation Committee (CDTC) are both committed to sustainability through smart land-use planning and integrated transportation planning and policies. Both organizations work on EV education and outreach, and providing EV charging is consistent with organization goals and ongoing projects. CDRPC and CDTC rent office space from Picotte Companies and requested an evaluation of installing charging stations at its properties.

Picotte Companies owns 15 commercial office buildings and requested information on EV charging to assess the cost-benefit of providing EV charging as an amenity to stay competitive with other local real estate management companies in the Capital Region.

Dearing Group recently relocated to the Capital Region. George Dearing purchased an EV and is interested in promoting EV charging through his marketing and branding work with other companies.

2.3 Central New York Workplaces with Only Initial Informational Meetings

Ceravalo Medical Center is an upscale building/location and having EVSE may differentiate this practice from others. The owner is considering a BEV for himself, and one of the tenants has a PHEV, so there is existing interest in charging. He asked for tax credit and any grant opportunity that may assist in getting a single unit installed. Unfortunately, the owner would not take the time for follow-up; his belief was that EVSE should be provided for free.

Tracey Road Equipment/Tracey Truck Center is a longtime supporter of the Central New York Clean Cities Coalition; there was some interest, but the contact would like to see some financial incentives and asked we work with the engineering company (planning a major upgrade of its facility) to integrate EVSE into the next facility upgrade. The contact expressed an interest in having the Vice President of Human Resources get involved as a part of the company's overall sustainability program. There is interest in offering EVSE to employees as an incentive, and potentially could install multiple units.

Bond, Shoeneck, & King, LLC (BS&K), the largest Central New York legal firm, has an interest, but this potential application will require a lot of time as the firm leases six floors of its location, has no on-site parking, and leases spots in a parking garage. There are 40 spots leased for the general partners. While BS&K has an active sustainability plan, a better choice may be waiting until a planned move in the future to a suburban location.

Allied Spring, a distributor of spring products, agreed to the initial meeting, but expressed no further interest. The company has an outdated building, so installation would be costly, and this is not an ideal location. The point of contact also owns a similar business in Rochester. There is no current demand for charging as no employees drive EVs.

Oswego YMCA may be a good prospect when there is a funding program in place because it is a nonprofit that cannot take advantage of tax credits. Additionally, the building is older and in need of upgrades. The director indicated this could be revisited when the building goes through its next upgrade. All YMCA's have sustainability goals that will include EVSE. The director also made an introduction to a newer facility located in Baldwinsville, NY.

Nastri Real Estate had legitimate interest from its owner, but due to current electrical service, it would be very expensive to add EVSE to this location. The business would be able to take advantage of tax credits, though. The owner may reconsider once employees start driving EVs, so this should be revisited.

Inner Harbor Communications is a radio station/communications group located in an old building that will eventually be upgraded. The general manager invited Clean Communities of Central New York back for an interview on Workplace Charging and general Clean Cities information. There is a level of interest if funding is made available for the EVSE, and that area of Syracuse is experiencing a lot of development, so it is recommended to revisit this location when the building is upgraded.

Edgewater Development owns multiple commercial properties in the State and operates a co-gen facility in Auburn. The company owns a building in Liverpool and utilizes part of it for its own operation (150 employees), then leases out the remainder of the building. This company is in the energy development business and has an informal sustainability plan. There is interest in installing chargers and utilizing State tax credits, plus any other incentives. There are in-house electricians who would be able to do the installation.

Anheuser Busch Brewery was very interested initially and agreed to sign the letter of commitment after the initial meeting. The original contact was transferred, and the letter had to be sent to headquarters in St. Louis. Anheuser Busch does have one dual-port Level 2 EVSE that went in on a previously funded program, and the company would like to see a similar deal with some State incentives, along with the tax credit. Anheuser Busch has a very active energy management program.

Northwest YMCA is a busy new facility, has a sustainability person and is interested, but the EVSE installation would have to be donated or paid for by others. As a nonprofit, this location cannot take advantage of State tax credits and is looking for other incentives. The general manager did offer to host an educational event; a date is still pending.

Teracai is a software/network support company. There are employees with EVs, but the company was difficult to follow-up with. Although the initial contact did express some interest, a date for an event was not established prior to the end of the contract. If there is some incentive funding available, this could be a good candidate.

American Red Cross has an older building in downtown Syracuse where the EVSE installation would likely be expensive. It is a nonprofit that could likely not do this with outside assistance. A National Grid representative attended the meeting, but there is no current Grid incentive program available. The representative discussed an upcoming project with Johnson Controls to upgrade the HVAC at the building with a performance contract, and EVSE could potentially be incorporated.

National Grid has a lot of local interest in EV charging. The utility has participated in other EVSE programs and has installed level 2 EVSE at this fleet location. A follow-up phone meeting was held with the operations person in charge of the U.S. operation, based in Massachusetts. There is interest in locating EVSE here, but their corporate structure makes local decision-making a challenge. National Grid will very likely add EVSE at some point for all its facilities and can take the State tax credit.

Haylor, Freyer & Coon is located in the Salina Meadows Office Park in Syracuse, adjacent to Thruway Exit 36. The initial contact was the office manager, who was not previously knowledgeable on the technology, but afterwards was very enthusiastic. She proposed a follow-up meeting with both the Director of Operations, who may be a better point of contact, and a representative from the real estate company that owns the property.

Indium Corporation has a main office in Clinton, with two warehouses/facilities in Utica, and it owns all of these properties. Staff seemed interested in charging stations and had minimal concerns about installing them. The biggest concerns related to regulating the parking spaces and that giving preferential parking or providing electricity to EV drivers would create controversy. Most parking is away from the building, which might increase installation costs.

2.4 Genesee Workplaces with Only Initial Informational Meetings

Harbec Plastics provides chargers for all employees who have EVs. The owner has a long history of supporting green policies, which was not known to the project team prior to this meeting. Follow-up to the initial meeting was not needed based on existing policy in place. The owner established a policy for employees that provides an additional EV station for any employee who purchases and drives an EV to work.

SUNY Geneseo has no known demand from employees, but could foresee a need in the future. Funding would be an issue, as would selection of initial placement of chargers. The school has the type of employees who would be likely candidates for purchasing EVs, so that may drive demand in the future. There is also a new sustainability staff person, and this may result in a more proactive approach to EVs and EVSE.

College at Brockport-SUNY stated that EVSE is consistent with sustainability programs, but no demand was identified at this time. College employees fit the demographic profile of EV adopters, so demand should occur in the future. The college does have an EV truck fleet for its maintenance division and these Level 1 chargers could be used by employees during the work day while the fleet trucks charge at night. This would be a creative way to get a program started at this worksite.

Monroe County has a distinguished track record with green initiatives, although there is no employee demand at this time. Site selection would be an issue based on the large number of work locations for county employees. A subsequent follow-up meeting resulted in discussion about having charging at one or two of the downtown parking locations. However, without funding, this may not happen anytime soon.

Eastman Business Park is a large business park with 70 employers and 6,000 employees. To date, there is no known demand. If this did happen, the management of the park could address the need on an individual basis with the employer. Given the large number of multiple employers and employees at this site, this is a challenge. Subsequent to the initial visit under this contract, this location has been referred to the Rochester EV Accelerator project for possible Ride and Drives and perhaps employer engagement.

Rochester-Genesee Regional Transportation Authority (RGRTA) has no employee demand at present and no chargers at work locations. The Authority may consider charging in the future, and this may be impacted in a positive way due to the planned acquisition of five new EV transit buses in the next one

to two years. This will require the installation of EVSE infrastructure. One advantage of this site is that they have most of their employees at one work location.

University of Rochester/Strong Hospital has some employee demand for EVSE. Employee demographics would lean towards EV adoption, so this may be a good option in the future. Site selection for initial EV stations is an issue due to the large number of employees and sites around the expansive campus. Funding is also an issue. They also have several parking locations that might be good for public EVSE.

Brockport Central School District has no stations now, but would add one if there was funding. There is some demand currently, and the District is likely to get EV school buses in future. Management is interested in learning more in the future and were a key contributor with comments for the VW Settlement in our region with suggestions for using EVs.

Greece Central School District is a large district with 17 locations. If funded, the District would need to decide where to install the first employee EVSE. The adoption of EVSE for staff and the public is consistent with policies the district put in place for sustainability and energy management. There is interest from the top leadership in district.

Rochester Regional Health System is large, and the sheer size of system presents challenges. A strong demographic of professional staff such as doctors, nurses, and health care managers indicates possible employee adoption of EVs based on income and educational levels. Funding for the stations would help, but the main challenge is the 37 different work locations in their system and need help deciding where to begin. The organization is likely to adopt EVSE in the future.

Victor Central School District expressed strong interest, and the board president drives a Chevy Volt. Aside from that, there is not yet consistent employee demand. All employees are located on a variety of sites within one campus. Funding would be a catalyst. The interest may be influenced by the installation of an EV station in the village hall parking lot. There is also a very active sustainability group in the community and they may help shape policy.

Wegmans Food Markets is a very large employer with more than 75 work locations. Aside from a Tesla driven by the CEO, there is no significant employee demand, but this may change. One option is to start the charging program at corporate headquarters. Station funding would help encourage EVSE

installations because deployment could be large given the number of sites where employees work. They did ask for more technical information on charging systems after the initial meeting

City of Rochester signed a commitment letter, but there was not adequate time to do an employee event prior to year-end at a selected location. The city operates charging stations at several public garages. They do have an EV station at City Hall lot for employees who have a parking pass for that site.

Monroe Community College saw EVSE as being consistent with its policies. During the initial meeting in July, there was reluctance to signing a commitment letter. Since then, the college purchased and installed EVSE, and the team was informed that this is due in part to the July meeting. The contact sent a memo requesting involvement at the “next steps” level, but this occurred too late in the year to have an employee event.

2.5 Western New York Workplaces with Only Initial Informational Meetings

Moog Inc. is a busy, high profile employer in Western New York. While it may take time to get the information in front of upper management, this is certainly a great opportunity given the number of employees and vehicles. Management was informed that SRC in Syracuse (a competitor) is offering workplace charging for employees, which might motivate Moog to do so, as well.

Upstate Niagara Co-op is a very busy dairy cooperative that farmers join and that works with multiple trucking companies. There is interest in EVSE, as this is consistent with its image, and the Co-op is a long-standing, well known company in Western New York. The contact is gauging interest from employees. Since this is locally operated, the site could move quickly if there was an interest.

Tops Markets (Tops) is a member of the Clean Communities of Western New York that expressed an interest in any project that could result in positive environmental publicity. As Tops continues to expand its use of natural gas for deliveries, the addition of a workplace charging initiative would be good for management. Tops is considering moving toward electrification at some point in the next three years, so the project team should push this now. The availability of State tax credits is also important.

Delaware North Companies is one of the largest employers in the area and works extensively throughout the Northeast. While it will require follow-up meetings with the parking garage/lot owners and/or operators, this is a major employer, and it is believed that its employees would see this as a very

positive program. It was discussed that charging could be free to use initially, and then gradually phase in an extra charge for EV charging.

Ford is a long-time employer in Western New York. There was interest expressed at this location and it was mentioned that its plant in Canada may also be interested. As a manufacturer of EVs, the company should be aggressively pursuing this opportunity.

Fresenius Kabi is owned by a large conglomerate in Germany, but most operational decisions are made locally. The company is now aware that there are several programs through the State on both EVs and EVSE. This is a growing company that is one of the larger employers in Western New York.

General Motors has had a facility in Western New York for more than 75 years and is a major employer. There may be challenges of giving preferred parking or free charging to union employees.

M&T Bank has a long history as a “premium” employer in Western New York. The contact was willing to talk about potential applications. He needs to get a couple of other managers and the property manager involved and agrees it would be a great idea as a part of the firm’s sustainability program.

National Grid has been investigating putting an employee incentive program together based on EV range, similar to the State incentive program. The business development people are supposed to be doing outreach on EVs and EVSE, but this might not happen often. However, there is interest in anything that would put the utility in a better light, and it has asked Clean Cities to provide support for the proposed rate increase.

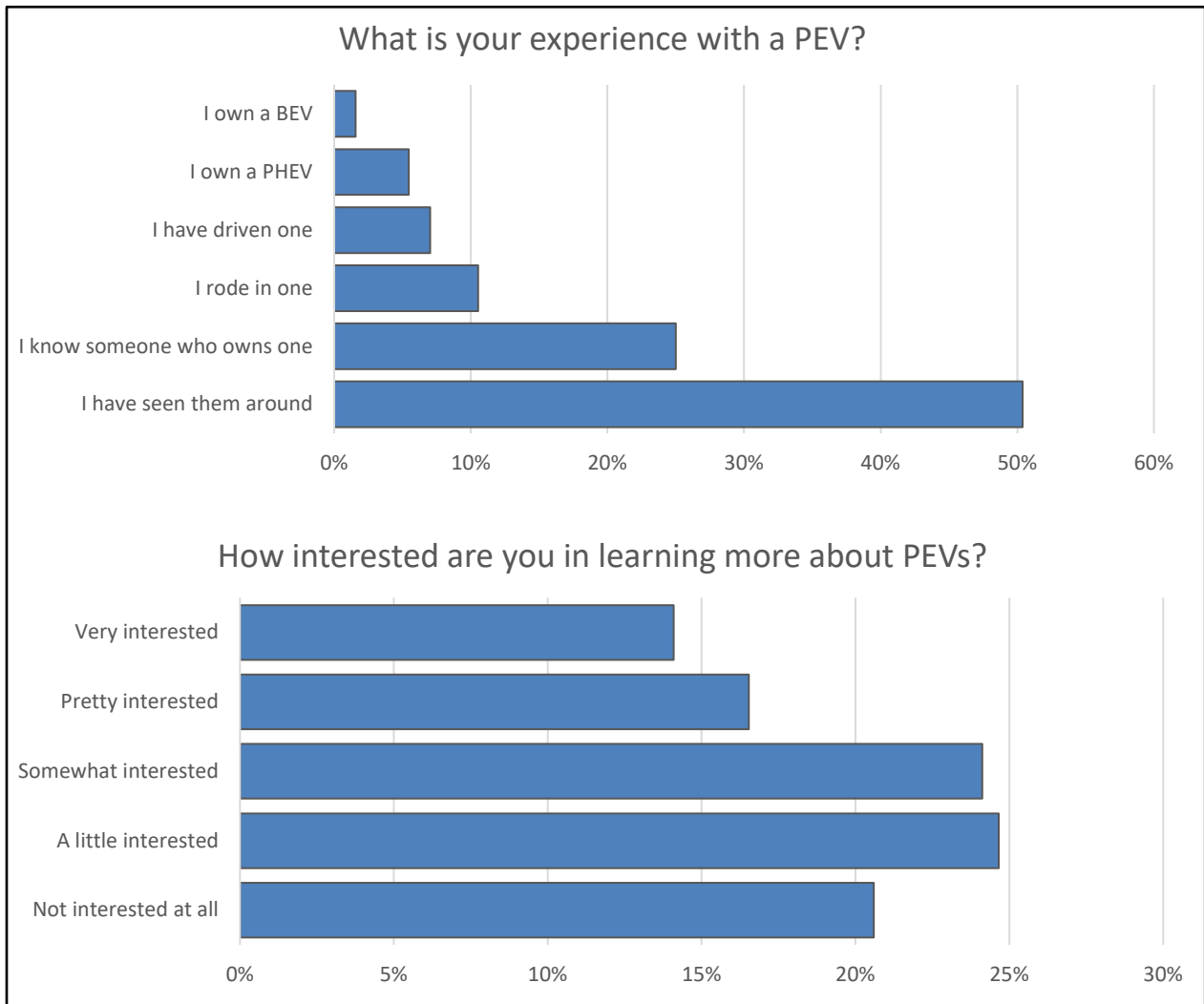
The Village of Williamsville is highly interested in moving forward with an EV charging station at its location. Plans are to offer free charging initially to employees and students. The proposed location is central to the Village and is adjoined to a town park that is heavily utilized.

City of Niagara Falls is interested in moving forward with an EV charging station at its location. Plans are to offer free charging initially to employees and surrounding businesses. The largest hurdle to moving forward is receiving acceptance from the planning board and getting a commitment to add an EVSE charger to their parking lot.

3 Workplaces Participating in EV Engagement Beyond the Initial Informational Meeting

Twenty-five workplace locations were interested in participating further in this project to conduct employee outreach and get an infrastructure assessment. These businesses and organizations administered a survey to understand the transportation requirements of their employees, as well as gauge their knowledge and interest in EV technology. More than 93% of respondents reported driving to work alone (as opposed to walking, carpooling, etc.), with at least 70% commuting less than 20 miles a day. Some additional information on their experience and interest in EV technology is outlined in Figure 2.

Figure 2. Employee survey results prior to educational event (percent of respondents)



A complete list of the workplaces that participated in project activities beyond the initial informative meeting is shown in Table 3. A site visit was conducted at these organizations to evaluate the potential for EV charging infrastructure. The developed report provided a high-level plan with approximate cost estimates and energy considerations they could use to pursue an installation.

Table 3. List of workplaces that participated in EV engagement

| | Business/Workplace | Location (City) | Employees | Prior EV Activity |
|--------------------------------------|-------------------------------------|----------------------|-------------------------------|----------------------|
| Long Island | Mattone Group, LLC | College Point | 35 | None |
| | Molloy College | Rockville Centre | 800 employees, 5,000 students | Several EV drivers |
| | Teamson | Bay Shore | 17 | None |
| | Treeline Companies | Garden City | ~20 | None |
| | Jaspan Schlesinger, LLP | Garden City | 60 Lawyers, 60 Staff | A few BEV drivers |
| | Trans Group, LLC | Babylon and Copiague | 400 | None |
| | Valley East Properties | Westbury | ~10 | Several EV drivers |
| Empire (NYC and Lower Hudson Valley) | Tea Town Preserve | Ossining | 34 | 1 EV driver |
| | Oakwood Friends School | Poughkeepsie | 55 | 1 EV driver |
| | Bard College | Annandale-on-Hudson | 975 | 1 EVSE |
| | Pace University School of Law | White Plains | 800 | None |
| | Stone Barns Center for Food and Ag. | Pocantico Hills | 45 | None |
| | Candela Lighting Systems | Hawthorne | 45 | None |
| | Pace University | Pleasantville | 1,000 | None |
| | Dennis Noskin Architects | Tarrytown | 22 | 1 EV driver |
| | Fordham University | Bronx | 1,500 | None |
| Capital District | Honest Weight Food Coop | Albany | 201 | Facility is EV-ready |
| | AAA Hudson Valley | Albany | 37 | None |
| CNY | Bristol Labs | East Syracuse | 470 | None |
| | C&S Engineers | North Syracuse | 85 | Several PHEV drivers |
| | Frost Valley YMCA | Frost Valley | 20 | 2 EVSE |
| G | Exelon Corporation | Williamson | 450 | None |
| Western New York | University at Buffalo | Buffalo | 6,000+ | 4-5 EVSE |
| | Energy Mark LLC | Williamsville | 10 | None |
| | Wendel | Williamsville | 160 | None |
| | National Fuel | Williamsville | 400 | None |

3.1 Long Island Workplaces Participating in EV Engagement

Mattone Group, LLC felt that EVSE was not only the right thing to do environmentally, but from a business point of view will only make its locations more attractive to tenants and shoppers. No employees currently drive EVs, but at least one is in the market for the near future. The office is located above a Staples store with its own parking area and entrance. The entire building is owned by Mattone Group. The charging station could be offered to Staples' (or future tenants') clients if desired, but would be situated primarily for employee use. The potential charger location (Figure 3) selected for Mattone Group could be wall-mounted on the building to reduce installation costs; however, this would require a barrier to prevent anyone from walking over the cords when plugged into an EV.

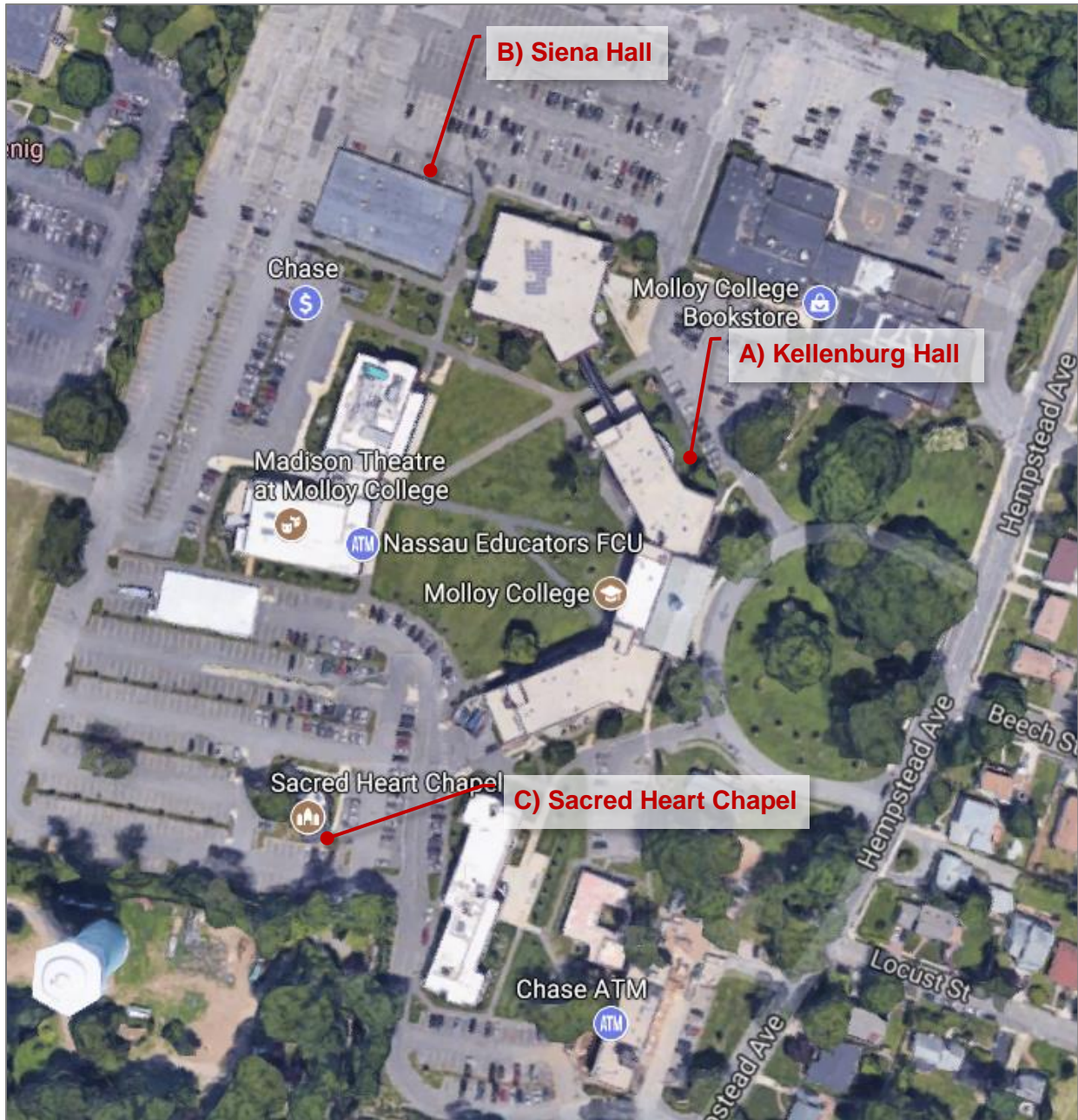
Figure 3. Proposed Mattone Group charging station installation location



Molloy College is in Rockville Center, which has a municipal utility with rates at one-third of rest of Long Island, so this would make charging very affordable. Unfortunately, the energy sources are not very renewable currently. The college completed one solar project, some lighting upgrades, built LEED buildings, and is active with the U.S. Green Building Council. It was determined that due to the small size of the campus (<30 acres), charging stations at any building could potentially serve individuals attending

any part of the campus within comfortable walking distance. Three potential locations (Figure 4) were identified as good candidates for charging station installations. One of these could be wall-mounted, which keeps costs low. The other locations would require trenching only through dirt, which should be easier. These stations would be used primarily by employees, but could also be available to the student body as necessary.

Figure 4. Molloy College potential charging station installation locations



Teamson is a 20-year-old family business making children’s toys and furniture. The business owns the 15,000-square foot building, acquired two years ago, and installed solar panels at that time. The owner’s mother has a PHEV, and the owner wants to purchase an EV. The company wants to reduce its carbon footprint—sustainability issues are very important. The site assessment revealed two potential locations for charging station installations shown in Figure 5, including a front publicly-visible location and a rear, employee-only space. The location near the rear of the building could be very cost effective because the electrical panel is close, and the station could be wall-mounted, but the parking surface would need to be configured.

Figure 5. Teamson Design Corporation potential charging station installation locations



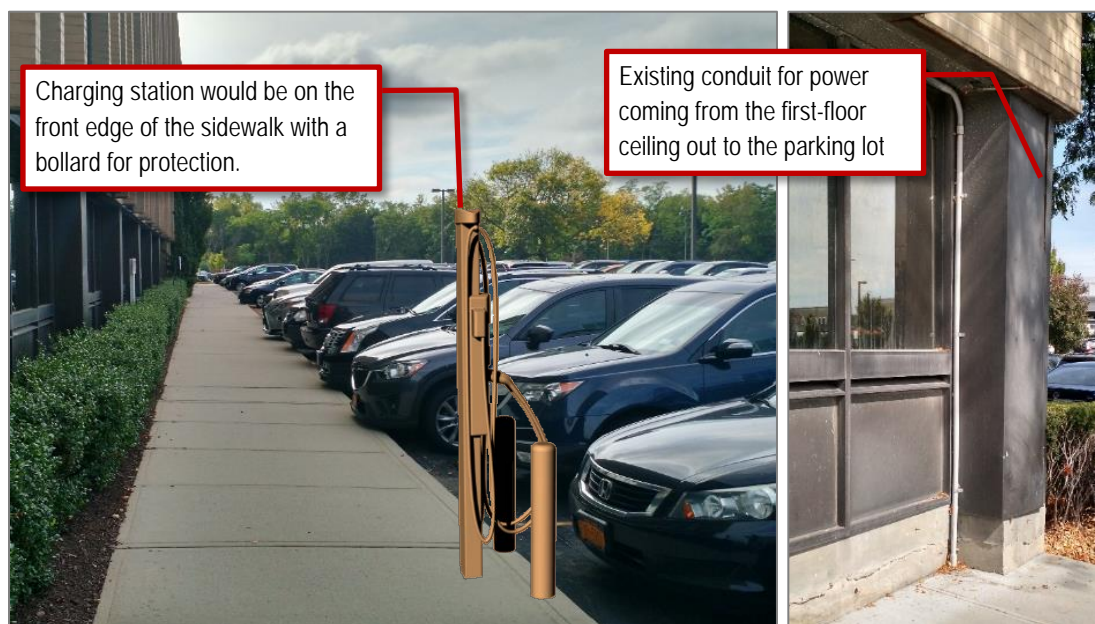
The Treeline Companies owns and manages 14 business parks in Long Island. The focus for incorporating EVSE was less about sustainability and more about raising rates per square foot and/or maintaining its relevance in the market as compared to the competition. The buildings at Ring Road in Garden City are supplied by ample electrical power with large transformers and electrical panels in the basement. Individual tenants have their own electrical panels, and the management has panels on every floor of these multi-story office buildings. Charging stations for specific tenants can be placed in the sidewalk adjacent to the building where there are reserved parking spaces for employees. The best charging station location option for non-reserved parking provided by the property manager is along the side of Building 100 as shown in Figure 6. Power for the stations can come from the basement and run down the middle of the parking rows. This location has the shortest electrical run through the parking lot to reach non-reserved parking spaces. The other charging station locations examined required extensive conduit runs through pavement, which would have been much more expensive.

Figure 6. Potential EV charging location at Treeline Properties on Ring Road in Garden City beside building 100 and between parking rows



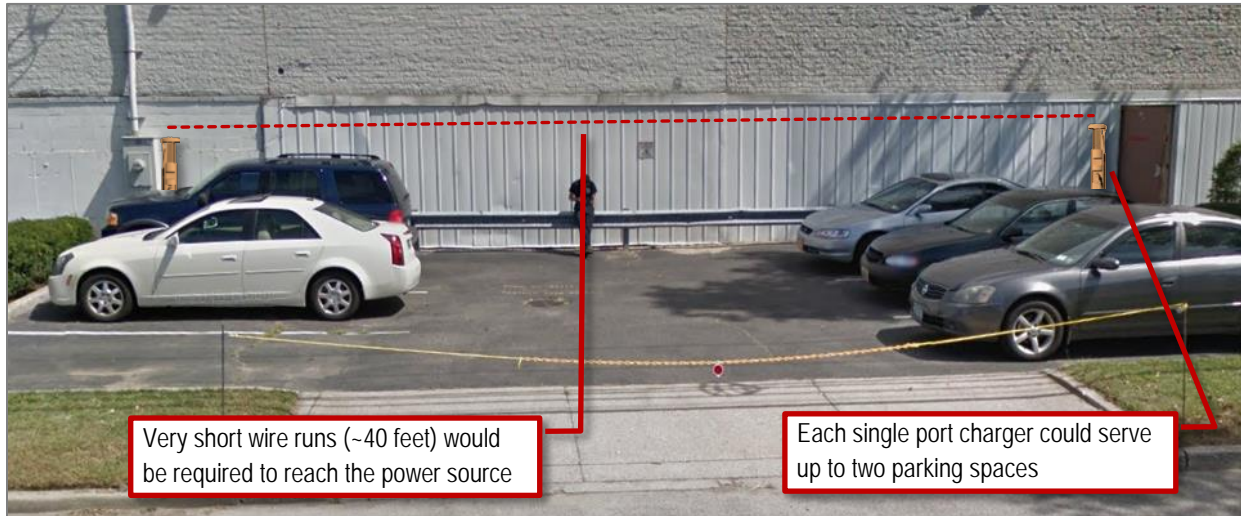
Jaspan Schlesinger LLP leases office space from Treeline Properties in Building 300 at Ring Road in Garden City. The company would need to collaborate with the building owner to install EVSE. There is interest in providing charging for its employees that own EVs now or are considering them for their next purchase. These EVSE can be placed in the sidewalk adjacent to the building where they have reserved parking spaces (Figure 7). The sidewalks are wide enough to install the station with protective bollards and still leave sufficient width on the sidewalk to be ADA compliant. As a tenant-owned charging station, power may be drawn from Jaspan’s electrical panel, navigated through the first-floor ceiling and then down the side of the building as shown in Figure 7.

Figure 7. Potential EV charging location at Jaspan Schlesinger reserved spaces



The Trans Group LLC is one of the largest associations serving the school bus industry. It is interested in both fleet and employee EVSE, but wants to pilot a few EVs in the fleet first. There is a large hierarchy and getting decision-making for workplace charging rather than fleet charging was difficult. Two facilities, located at 63 Lamar St, West Babylon and 222 Hudson St, Copiague (approximately 10 minutes apart), serve as transportation hubs and maintenance garages for the fleet of buses. The site assessment visit covered both facilities and identified the best location for a charging station at each. The faculty parking lot at Lamar Street accommodates staff vehicles parked during work hours. Stations placed on the wall at the end of the parking space rows could reach one or more EVs with the existing parking configuration as shown in Figure 23. Electricity would be routed from the nearby electrical panel (approximately 40 feet) and run along the side of the building in conduit. Overall costs should be lower because no trenching is required.

Figure 8. Potential EV charging location for Trans Group at Lamar Street facility



Valley East Properties was less concerned about installing EVSE to be green, but saw value in improving the sites for current and future tenants. A site visit was conducted at its location where a Barnes and Nobles office was located. This property also has about 10 additional tenants whose employees could also gain access to the charging stations if needed. Two locations on the lower level of the employee parking structure are potential candidates for charging station installations. The employee parking lot has surface parking with a second level located below ground level. The lower level provides a better option for charging station installation due to protection from the elements and closer proximity to electrical power. The location shown in Figure 9 has close access to electrical power (behind the stations), but would require pedestal stations and cutting the walkway for wire runs, which increase costs.

Figure 9. First potential EV charging location in Barnes and Nobles employee parking garage



An alternative charging station location for Barnes and Nobles employees is along the adjacent wall of the underground parking garage, as shown in Figure 10. This location would require longer wire runs, but could use wall-mount stations, which are easier to install.

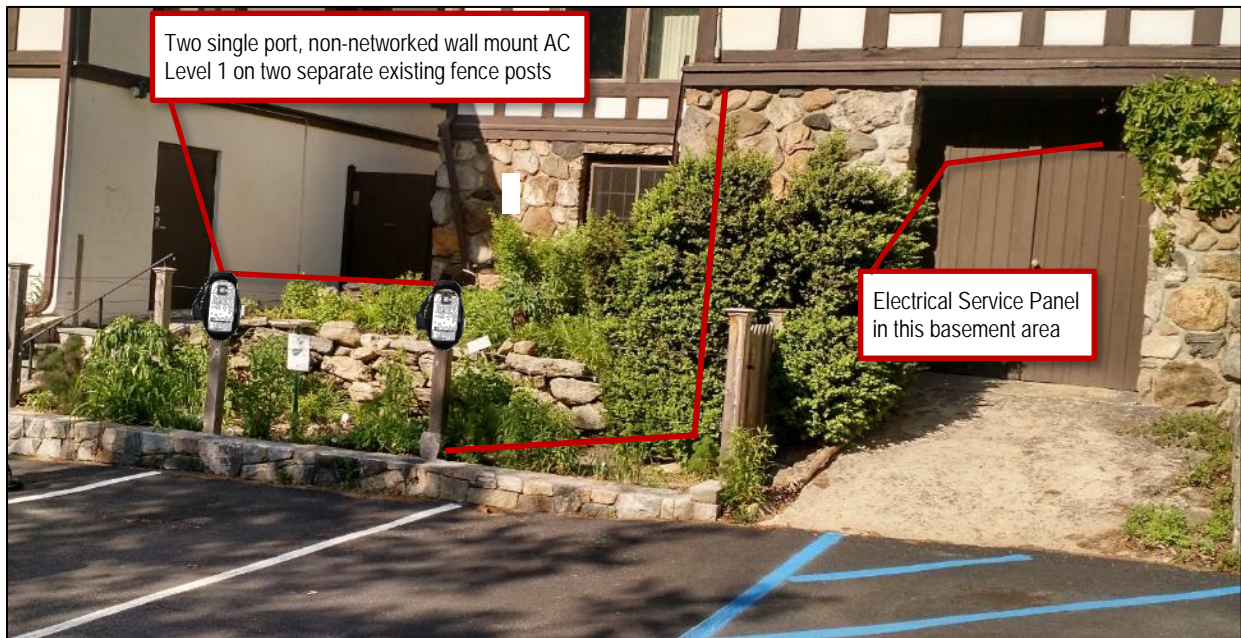
Figure 10. Second potential EV charging location in Barnes and Nobles employee parking garage



3.2 Empire Workplaces Participating in EV Engagement

Tea Town Preserve is a 1,000-acre nature preserve and education center committed to environmental stewardship, and there are many EV drivers in the community. For the educational event, 20 volunteers brought EVs to an engaged audience of about 70 participants. EV usage is expected to include a mix of employee charging, facility vehicles, and public charging to encourage visitors to travel to this location. Two areas were identified as potential locations to add charging infrastructure: the main parking area and an employee parking area by the barn. The main parking area is a visible charger site that would convey the “green” and “sustainable” image of the organization. Electrical power is available in the basement of the adjacent building, and wires would not need to be routed through pavement to reach existing parking spaces (Figure 11). The barn is a more secluded parking area used only by employees, and the EVSE could be wall-mounted to reduce costs. However, existing electrical infrastructure to this location could not support a Level 2 station and upgrades would be costly due to long wire runs.

Figure 11. Potential EV charging location for Tea Town in the main parking area



Oakwood Friends School is looking to add one to two EVs for school use and promote to faculty and staff. Two locations were identified at the Oakwood Friends School to install EV charging stations: in front of the science building, which might be ideal to charge several employee EVs throughout the day; and at a much more visible parking space in front of the main administration building, where the school-owned EVs might also charge to reinforce the schools “green” image (Figure 12).

Figure 12. Potential EV charging location for Oakwood Friends School at the administrative building



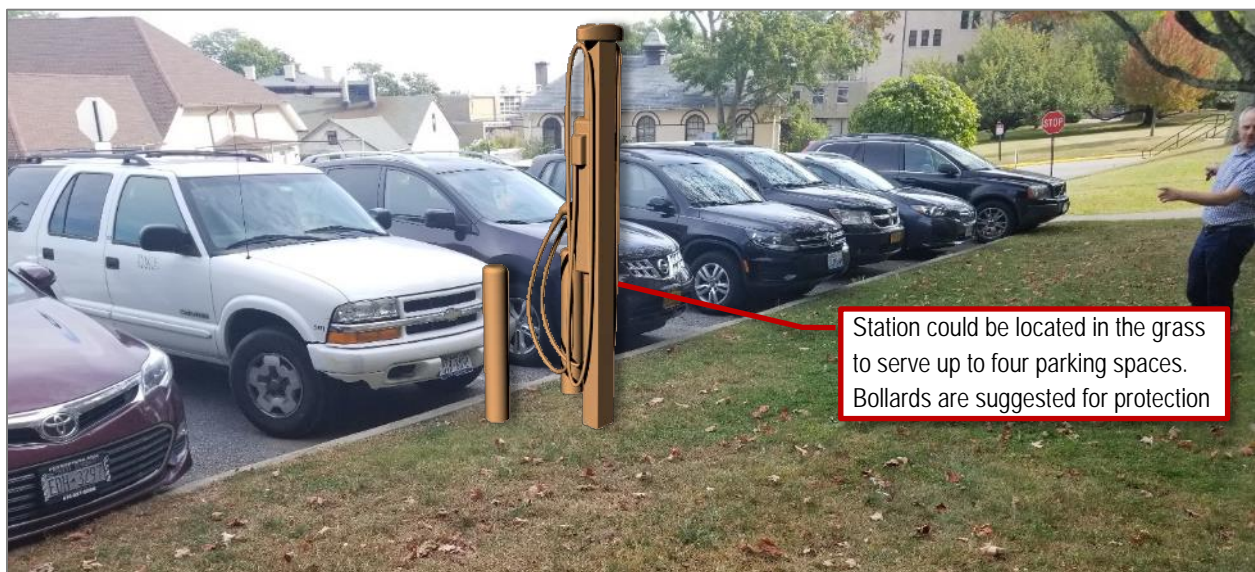
Bard College has no known EV drivers and a medium level of PEV knowledge. Bard College currently has one networked dual-port Level 2 charging station installed for public use. Four potential sites for additional chargers were identified for more charging infrastructure. Each of these locations was chosen to function for workplace charging. However, each also offers the potential for mixed use charging by students, visitors, and the public. Installations could be completed by an electrician employed by the college and installed the previous charging station at Bard.

Figure 13. Bard College potential charging station installation locations



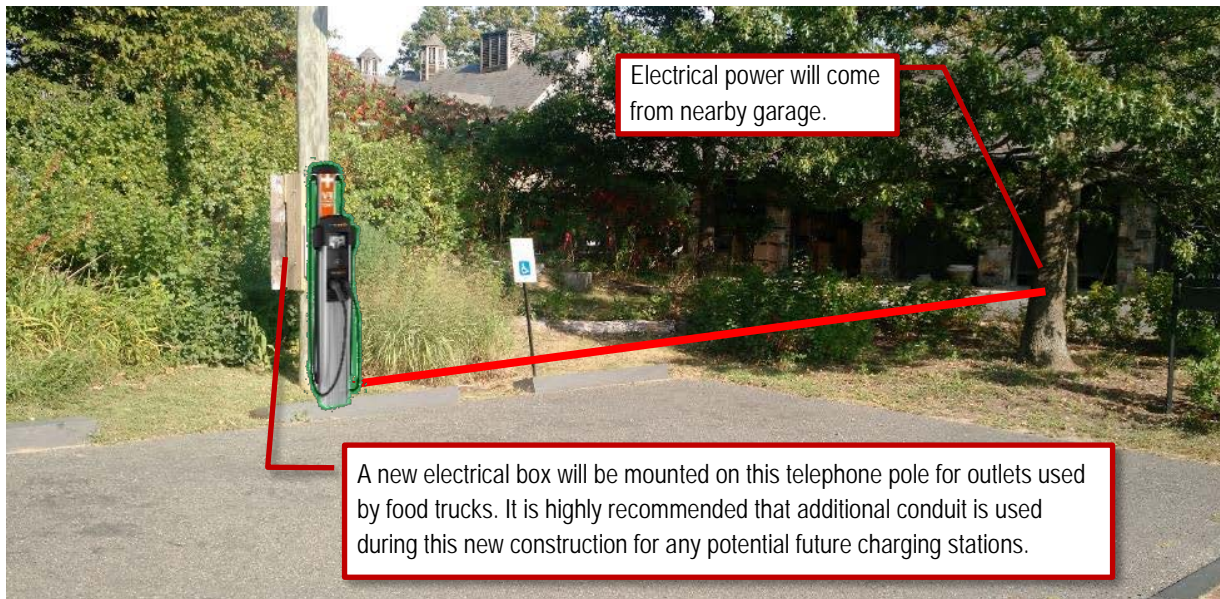
Pace University School of Law has Solar PV and LED campus lighting, but little EVSE activity. Two potential locations were identified at the Pace School of Law campus for charging station installations, including a parking area in front of the main building and the lower level of the parking garage. This campus is relatively small, which would allow either of the locations to serve the entire campus. A station installed in the parking area near Aloysia Hall (shown in Figure 14) would be very prominent and highly visible entering the campus. The parking garage is a secondary location for installing charging stations because the station would be well protected, has convenient electrical power access, and would likely not interfere with other parking arrangements.

Figure 14. Potential EV charging location for Pace University School of Law near Aloysia Hall



Stone Barns Center for Food and Agriculture is a popular tourist destination that is interested in charging stations to bolster its green image, which would help attract new visitors. There is high interest in EV, but lack of general parking is a challenge. The buildings are old, but electrical power is upgraded to handle the current needs (restaurant, greenhouse, etc.), and there were no expressed concerns about sufficient electrical capacity for charging stations. A charging station that can be used by both visitors and staff would be placed in the main parking lot nearest to the building to minimize the electrical run (Figure 15). Stone Barns is planning on pulling power to this location and installing an electrical panel with outlets so food trucks can park and operate here without running their diesel generators. This presents an ideal opportunity to also install power for a charging station. It is a prime parking location that will showcase the charging station to all visitors and EV drivers. Employees could use the station before events since they typically arrive two to four hours early to prepare food and set up, or on days (Monday or Tuesday) or times (before 10 a.m.) when the property is not open to the public.

Figure 15. Potential EV charging station installation location at Stone Barns



Candela Lighting Systems is a good fit for EVSE. Two potential locations were identified as good candidates for charging station installations. In addition to Candela Systems, three additional tenants are currently in the building with a total of about 30 employees among all the organizations. The front parking location (shown in Figure 16) could conveniently serve any tenant's employees. Electrical conduit is already routed within 25 feet of this location, which helps reduce installation costs.

Figure 16. Potential EV charging station installation location at Candela Lighting Systems



Pace University has limited parking and no known EV drivers. Since the university is away from other attractions, public use of the stations will likely be minimal and should not impact availability for on-site staff. Four potential locations were identified as good candidates for charging station installations. The options are shown on Figure 17. The front faculty parking area lot P location is convenient for staff EVs and power could be routed from the nearby building. The Paton House parking area is currently being remodeled, which provides an excellent opportunity to incorporate EV charging infrastructure into the overall site plan. Parking near the Choate House is a centrally located and has nearby electrical power only requiring 40 feet of trenching and wiring through ground (although tree roots might add some complications). Miller Hall parking spaces are very close to the building (and electrical supply), so less than 20 feet of trenching through dirt would be required for the installation.

Figure 17. Pace University potential charging station installation locations



Dennis Noskin Architects is a green architecture company, and the owner has a Tesla. It currently has a 220V outlet used for EV charging that could provide power for a charging station installation without any electrical upgrades. A single-port charging station could be shared between two EV parking spaces. As shown in Figure 18, a station positioned here would be very prominent and highly visible.

Figure 18. Potential EV charging station installation location at Dennis Noskin Architects



Fordham University has two locations within the parking garage that are potential candidates for charging station installations. Charging stations installed near the faculty parking garage entrance location (Figure 19) would accommodate staff vehicles during work hours. Electricity would be routed through the lower level and up to the stations (approximately 100 feet). The existing guardrail would protect the stations, but may need some covering on the sharp edges to avoid cord wear. The second location option (within 60 feet of the first option) would position the charging stations on garage support columns.

Figure 19. Potential EV charging station installation location at Fordham University Parking Garage



3.3 Capital District Workplaces Participating in EV Engagement

Honest Weight Food Co-op had requests from employees and customers to install a charging station. Along with its mission of sustainability, the Co-op had a desire to install charging stations to convey positive environmental image. The Co-op proceeded to install a charging station during the project on its own, and the project team provided support and advice on how best to operate the station once it was installed. An outreach event for staff and Co-op members was conducted as shown in Figure 20. There were more than 30 test-drives during the event. A handful of EV owners joined for a bit to speak with interested drivers about their vehicles. EV owners demonstrated how the EV charging station works for interested drivers.

Figure 20. Pictures from the outreach event at Honest Weight Food Coop



AAA Hudson Valley is interested in providing services that enhance its members' travel experiences, such as its recent expansion to bicycle repair service. This location continues to assess whether installing EV charging at its office versus off-site, at a destination, would benefit its members more. AAA is pursuing the installation of an EV charging station to support EVs driven by employees or to charge customers' EVs if disabled and in need of a charge. AAA owns the building and property at this facility, which enables complete control over the installation and management of a charging station. The Northeast side of the building (shown in Figure 21) is occasionally used for short-term parking and currently does not have any marked spaces. No trenching would be required for a wall-mounted station installation on the side of the building, and all wire would be routed along the building's interior. The lowest cost concept could repurpose an exterior outlet along this section of wall to power a single Level 1 station. While this may be sufficient for employees, it would not provide relatively quick charges beneficial for client vehicles when disabled. For a higher-powered station, another wire run would be required from the electrical panel, which is on the opposite side of the building (approximately 100 feet).

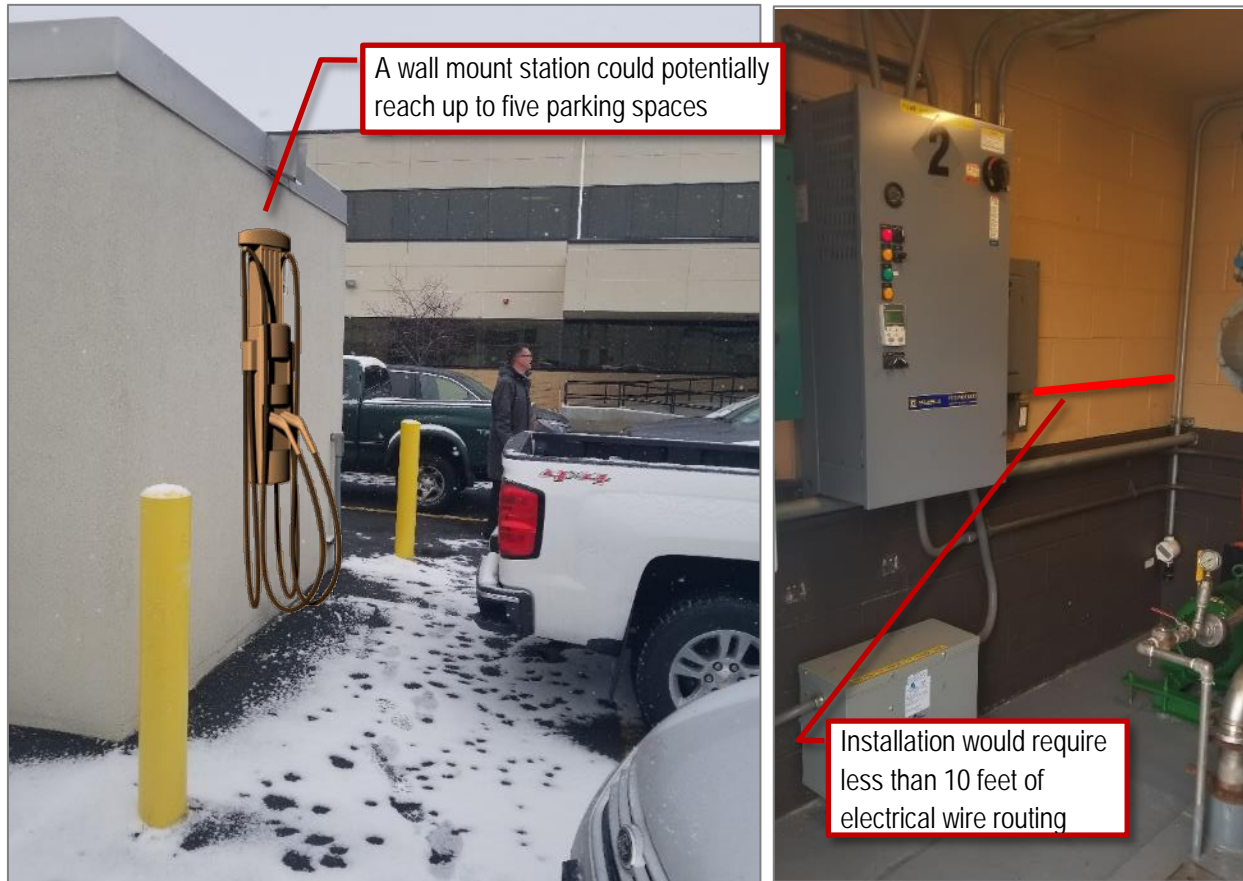
Figure 21. Potential EV charging station installation location at AAA Hudson Valley



3.4 Central New York Workplaces Participating in EV Engagement

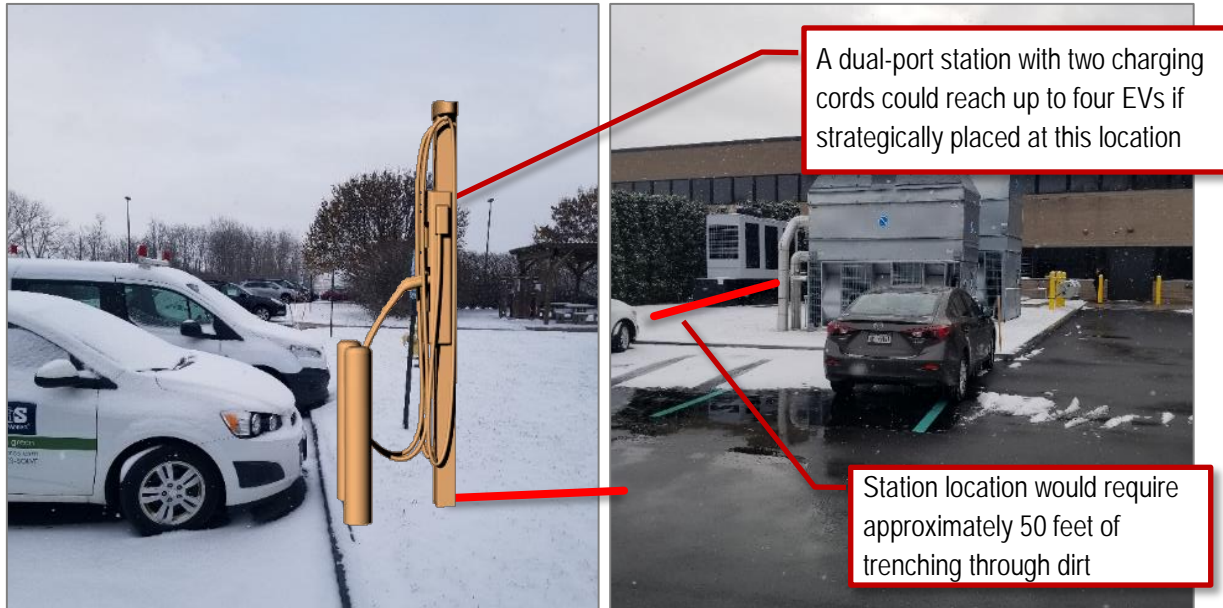
Bristol-Myers Squibb has a facility in Syracuse with almost 500 employees. The facility director believes upper management will want to install EVSE and take advantage of State tax credits. There is a dedicated sustainability person on staff, and lots of employee vehicle interest was expressed during the education/outreach event, which was held in the cafeteria due to inclement weather. Identified during the site assessment, the best option for installing EV charging infrastructure would be on the backside of the electrical building located in the parking lot in front of building 32. This location would require short electrical wire runs and offers convenient station wall mounting, as shown in Figure 22. Some minor surface painting and signage will ensure employees are aware that spaces are reserved for EVs only. Installation would likely be handled by the company’s electrical contractors due to stringent on-site electrical infrastructure codes.

Figure 22. Potential EV charging station installation location at Bristol-Myers Squibb



C&S Engineers is an energy and mechanical design business. Its primary business is designing and working at airports, and there have been previous collaborations with Clean Communities of Central New York to design EVSE installations for other airports. There is a dedicated sustainability program, and there may be interest in installing charging regardless of incentives. The company is very interested in EV technology and hosted a ride-and-drive in December. The best potential location for installing a charging station (shown in Figure 23) is close to an electrical power source, offers parking convenience for EV drivers, and is currently designated as a “green vehicle” parking area. This potential station location for a dual-port unit could reach four parking spaces for EVs. More charging stations could be easily added along this parking row if needed in the future.

Figure 23. Potential EV charging station installation location at C&S Engineers



Frost Valley YMCA currently has two Level 2 Clipper Creek EV charging stations and would consider more as the market and use of EVs expands. The remoteness of this location made it difficult to plan for the use of BEVs (190 miles from Syracuse, 50 miles from closest auto dealership); however, the team decided to proceed as the YMCA's interest level was high. For the outreach event, Clean Communities of Central New York gave a presentation on available vehicles, State incentives, and types of EVSE. A ride-and-drive then took place both on the grounds of the YMCA and on local roads in Claryville. All participants liked the EVs (shown in Figure 24), with the Prius Prime being a good example of an affordable, useful vehicle for this remote part of the State where driving distances are longer. The event raised the level of EV awareness for the employees of Frost Valley YMCA.

Figure 24. EVs on display and for a ride and drive at Frost Valley YMCA



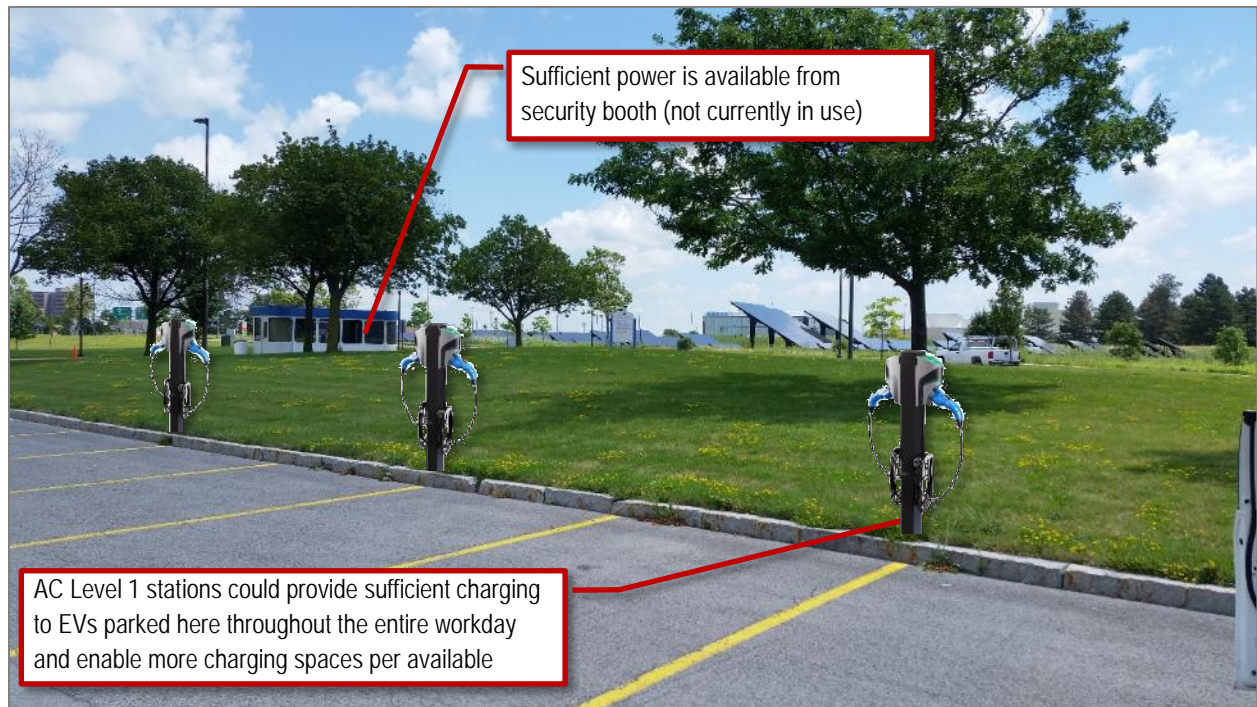
3.5 Genesee Workplaces Participating in EV Engagement

Exelon Corporation was very interested in pursuing charging stations after the initial meeting and signed a commitment letter. There is employee demand internally, and this made them receptive to engaging with this project. Exelon had a local firm, EV Charge Solutions, conduct a site visit and provide a quote for installing charging stations. Some additional advice and recommendations for charging infrastructure was provided by the project team over the phone. Unfortunately, there was not time to fit in an employee event in 2017. However, the company is connected to another NYSERDA contractor that might conduct a ride-and-drive event at its location, and additional support from the Clean Cities Coalition will be provided when Exelon is ready to move forward.

3.6 Western New York Workplaces Participating in EV Engagement

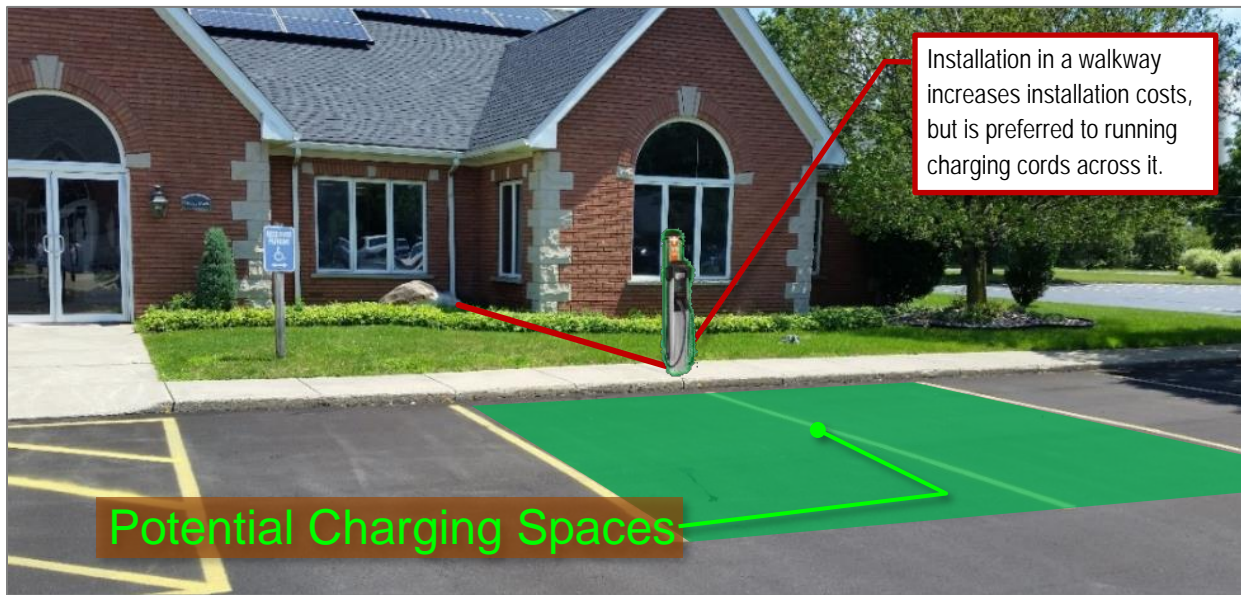
University at Buffalo is highly interested in moving forward with additional EVSE on its campuses. Plans are to offer free charging initially to employees and students. There are two EV charging stations installed on the north campus. The long-term plan is to develop a large-scale, centralized charging solution that could cater to a large number of future student, staff, and university owned and operated EVs. However, near-term plans are to add several stations to better meet the current charging demand during the school year. The most prominent location option for near-term charger installation at the university is near the main entrance loop. A charging station near this location would be very visible and convenient for EV drivers to access many of the academic buildings. However, installation at these parking spaces would be quite difficult due extensive concrete and pavement between the source of power (buildings) and the charging station. Several of these parking spaces are also handicap or restricted. A more economically feasible installation would be at the Center for Tomorrow lot located just south of the main campus center. This location is well-suited for several low power AC Level 1 charging stations for EVs to remain plugged in throughout the day since employees and students would unlikely want to return to this lot midday to move their EVs. As shown in Figure 25, power from a decommissioned guard booth could be run to these charging spaces. Many chargers could be installed in this lot based on demand.

Figure 25. Potential EV charging station installation location at UB's Center for Tomorrow lot



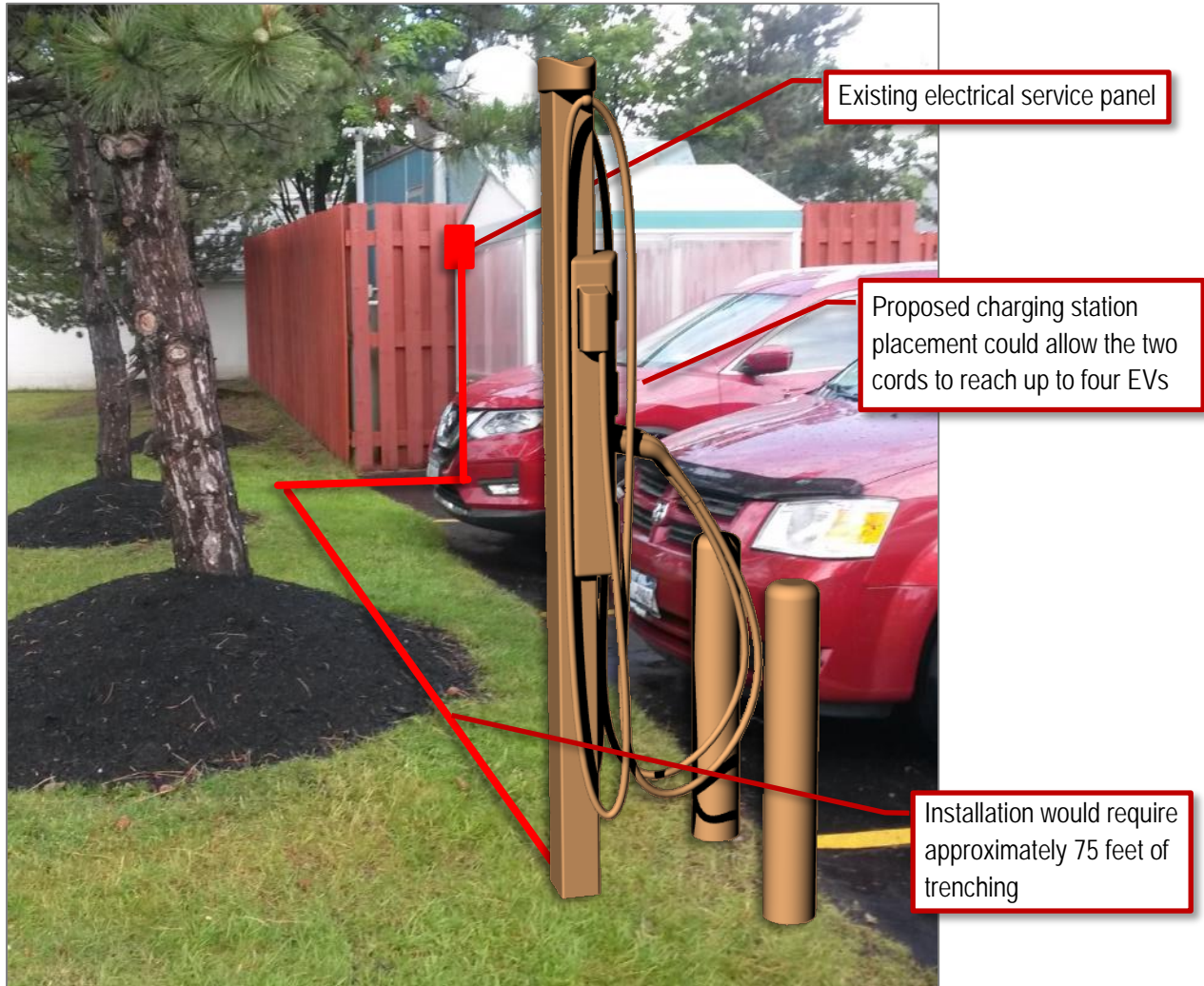
Energy Mark's ownership is highly interested in moving forward with an EVSE charging station at their location. Plans are to offer free charging initially to employees and surrounding businesses. Cost of an EVSE installation is a concern and additional incentives will promote the installation of a charging station. An employee outreach event was held in December. A brief presentation on the difference between PHEVs and BEVs was given to the employees to raise their awareness of the different available options. This was followed by an explanation of where public EV charging stations are in the Western New York area and how to find them. Employee reception of the handouts was very good. Employees were also offered to ride in and drive a Kia Optima Plug-In Hybrid, and this was a very positive experience for all participants. Overall, participants were in favor of owning a plug-in hybrid as a future vehicle, but continued to express concern over range anxiety. The primary location chosen for the installation of a charging station was right next to the entrance on Main Street in a very visible location. However, this would require approximately 160 feet of trenching that must navigate some tree roots and likely result in higher installation costs. An alternative location for an EV charging station, directly in front of the office building entrance (shown in Figure 26), was proposed. This location would be convenient to employees and have a much shorter electrical power run, but still require trenching and replacement of a sidewalk square.

Figure 26. Potential EV charging station installation location at Energy Mark



Wendel is a forward-thinking company and occupies a LEED certified office. There is a desire to continue a positive company image by having an EVSE charging station available to its employees. Clean Communities of Western New York held an employee outreach event, and reception of the presentation was very good. The employees all had a very positive experience test-driving the Kia Optima. Employees commented that DC fast charging sites would benefit EV adoption. An EV charging station installed at Wendel offices (property owned by Ciminelli Real Estate Corporation) would serve employees and bolster its green image. The best potential charging station location is close to an electrical power source. The parking spaces are not priority locations, which might not benefit EV drivers as much, but would likely cause less controversy with few employees currently driving EVs. A station positioned at this location (shown in Figure 27) would be very cost effective to install.

Figure 27. Potential EV charging station installation location at Wendel



National Fuel met with Clean Communities of Western New York to complete the initial informational meeting on workplace charging, then supported an outreach event for its employees. This contact came through an outreach engineer who does business development for key natural gas accounts. The event consisted of a brief presentation, handouts, questions and answers, and a ride-and-drive. The employees had a positive reaction to test-driving the Chevy Volt provided by Fucillo Automotive. Participants commented on the ride quality and acceleration of the vehicle and were in favor of possibly owning a plug-in hybrid in the future. Managers from National Fuel indicated there will be no further interest to hold employee educational events on EVs as this is seen as a conflict of interest for a natural gas distribution company.

4 Lessons Learned

Additional surveys were conducted to gather information from the organization's management on the effectiveness of initial efforts and why they chose not to proceed (Workplace Survey #1), get feedback from employees on how the informative sessions were handled (Employee Survey #2), and get feedback from managers on how useful the site layout and installation factors information was to them (Workplace Survey #2). Only one response for Workplace Survey #1 was received with no major takeaways.

Overall, the response from the educational events for the employees was positive, and many welcomed the opportunity to learn more about EVs and the chance to drive these new vehicles. Specifically, the source of non-biased information and not being pressured into a purchase while exploring the EVs was beneficial. More than 80% of participants are considering an EV for their next vehicle purchase, 36% indicated within the next three years. Additionally, 11% of respondents currently drive an EV, and only 8% are not considering an EV for future purchases. The ability to charge at work was also reported as a significant enabler for EV technology, with more than 80% of individuals mentioning this as an important factor when considering EV purchases.

Results from the Workplace Survey #2 showed a positive acceptance of the informational meeting as well as the site visit and plan layout. Overall, participants welcomed the information provided on EVs and EV charging technologies and the ability to ask questions pertaining specifically to their site. Most reported minimal expertise with EV technology and appreciated what was provided.

The project team experienced several challenges while conducting this project. These include making the right contact at the workplaces, getting commitments to further engage with employee outreach and the infrastructure assessments, installation complications that increased costs, and lack of incentives to persuade the workplaces to invest in charging stations.

- Getting the appropriate contact to return calls proved difficult. There was very good guidance for contacts with major employers in Central New York through the project advisors and several local Chambers of Commerce. The difficulty was reaching the listed contact person or someone to authorize a meeting or a site survey—project team members were generally viewed as salespeople. Additionally, in the Capital District, many large employers already have charging stations or are a State agency and not authorized to agree to a meeting. Other employers that were interested in providing charging stations for their employees and/or customers wanted information about the stations themselves, but once a meeting was suggested, the email conversation ended or they did not follow up. It appears many of these conversations start because the owner is interested in buying a Tesla or the company has a strong commitment to sustainability. When such interest exists, there is availability for the information session. Otherwise, finding contacts without requirements to install EVSE has been hard as most companies see this as a luxury item. It was much easier to engage employers if there was internal demand by employees who owned EVs. In one case, the team was contacted by the employer about the project, due to employee requests.
- While the team felt the commitment letter did not obligate the business to agree to the installation, several agreements got caught up in corporate hierarchy, which was a major issue. While about half of the organizations that participated in the initial informational meetings moved to accepting a free assessment, only three of the organizations installed EVSE at the end of this contract. Those included Honest Weight Food Coop, Bard College, and Monroe Community College. A handful of other organizations are pursuing internal and external funding and are expected to install a charging station within the next year. The interest in charging stations at most of these organizations is currently high because of this project, and if additional external funding became available, several would likely move forward with an installation. The assessments were informative; however, most owners only wanted a quote for the installation, but this did not provide an actual quote or a preferred electrician (although the team tried to provide names/contacts when asked).
- Potential installation costs at many of the older locations ended up higher than expected due to the lack of proper electrical supply. Getting businesses to invest may require an incentive from government beyond the tax credit, which complicates things since the operations/facilities people have no idea if their employer makes a profit. This is also an issue where the businesses don't own the building. In the case of some business parks, finding the best spot to trench and locate EVSE was very difficult. Either their electric panels needed to be upgraded and/or the location was far from where they wanted to install the equipment. Even when they knew where they wanted to install EVSE, those sites might have other hurdles to overcome like relocating handicap space. The unknown cost (or assumed headache) seemed like a large hurdle for them to overcome.
- Most businesses were very pleased to receive the information provided through this project, but they were also looking for direct funding to purchase and install the EVSE, beyond just the State tax credit. Many heard of NYS Department of Conservation's municipal incentives and other programs available to some groups, so they were expecting funds would be available to them. Many employers said they wanted to wait until incentives or funding became available before proceeding with the site analysis or further discussions. In some cases, the team combined this project's outreach services with another NYSERDA grant to install a station.

Having some funding for stations at all these workplaces would have likely encouraged several to pursue the installation, especially for public and non-profit employers that can't use the State tax credit.

- Overall, the industry of EV and EVSE is at a nascent stage in and around the State. With the lack of EVs on the road (types and models, dealership issues related to the cost of maintenance, advertising of EVs and training), and lack of HOV lanes and DC fast chargers, many of the business are not ready to install EVSE unless it is easier or paid for by the State. In the case of some business owners that buy Teslas, they find they can charge at home and are not yet ready to install at their business (especially in a lease scenario).
- Using surveys as a feedback loop is difficult to have completed by both the workplace and the employees. We may need to rethink methods of gathering feedback at future events. Perhaps surveys can be gathered at the time of education event. Absent a strong relationship with dealers, it was challenging to have EVs readily available for workplace ride-and-drive events.

Suggestions on how to make this program easier to implement in the future include the following:

- State and Local Advertising/Outreach: Although the DOE Clean Cities Coordinators have access to a lot of materials, it would be great if there was a State advertising campaign (like there is for business incentives, parks programs, etc.) for EVSE.
- Dealer Outreach Programs: It would be beneficial to have a NYSERDA or State program that would provide dedicated outreach/training, in conjunction with auto manufacturers, to make their salespeople more comfortable with promoting and selling EVs. There could even be a program that would provide matching marketing funds for dealerships.
- Include preferred (and discounted) Electrical Contractors: The electrical contractors and their unions should be engaged in doing outreach to their existing customers. If a few electrical contractors that could install EVSE were included in the program to give specific quotes and do so at cost (the premiums covered by a grant), many owners might have been able to make easier, more informed, and quicker decisions.
- Better understand economic impacts of hosting EVSE: Quantifying the estimated benefits and/or costs for each potential site host would help persuade more employers. Qualitative benefits were appealing, but not as convincing as estimated cost/benefit data.
- Education events before EVSE: Once there are more EVs on the road, those owners could and should demand EVSE at work where necessary. The events could be conducted at or near EVSE that is publicly accessible. It is also helpful if there are tie-ins to other community events like Earth Day.
- HOV Lane development: Workers need to see the benefit of EVs by going faster in HOV lanes that only exist in a few areas around the State.

In general, it was apparent that workplace charging was a topic that was not on the radar of many organizations. The education provided was a good first step in helping raise awareness.

Appendix A – Workplace Charging Introductory Presentation

ELECTRIC VEHICLE CHARGING AT THE WORKPLACE

ELECTRIC VEHICLE BASICS

Plug-in electric vehicles (PEV) include:

- **Battery electric vehicle (BEV)**
 - Vehicle that has only an electric engine
- **Plug-in hybrid electric vehicle (PHEV)**
 - Hybrid electric vehicle (primarily uses an efficient gasoline engine but has a supplemental electric motor) with a larger battery pack that can be plugged into the grid to charge
 - Extended range electric vehicles (EREV) primarily use the electric motor and battery, but do have an onboard gasoline generator to charge the batteries as a back-up.

Common battery electric vehicles:

| | |
|---------------------|-------------------|
| BMW i3 | Mitsubishi i MiEV |
| Cadillac ELR | Nissan Leaf |
| Chevy Bolt | smart ED |
| Chevy Spark EV | Tesla Model S |
| Fiat 500e | Tesla Model X |
| Ford Focus Electric | Volkswagen e-Golf |
| Kia Soul EV | |
| Mercedes-Benz B250e | |

Common plug-in hybrid electric vehicle:

| | |
|--------------------------|-----------------------------|
| Audi A3 Sportback e-tron | Honda Accord PHEV |
| BMW i3 w/ Range Extender | Hyundai Sonata PHEV |
| BMW i8 | Mercedes-Benz S-Class PHEV |
| BMW X5 xDrive40e | Porsche Cayenne S E-Hybrid |
| BMW 330e | Porsche Panamera S E-Hybrid |
| Chevy Volt | Toyota Prius PHEV |
| Ford C-Max Energi | Volvo XC-90 |
| Ford Fusion SE Energi | |

ELECTRIC VEHICLE CHARGING BASICS

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE), more commonly known as **EV CHARGING STATIONS**, includes: conductors, PEV connectors, attachment plugs, and any apparatus installed specifically for the purpose of delivering energy from the premises wiring (grid) to the PEV. There are three levels of EV charging stations installed:

AC Level 1 Charging

- Cord-and-plug connected
- Single-phase 120 V, up to 16 A (1.9 kW)
- 8-16 hours required for full charge



Level 1 Charging at NYPA workplace in White Plains

AC Level 2 Charging

- Wired to individual branch circuit
- Single-phase 208 V or 240 V, up to 80 A (19.2 kW)
- 4-6 hours required for a full charge



Level 2 Charging at Price Chopper Headquarters in Schenectady

DC Fast Charging

- 200 – 500 V DC, up to 80 A (40 kW)
- Less than 1 hour required for full charge



DC Fast Charger at Diane's Auto Shop in Ithaca

EV CHARGING LOCATION

Not all chargers are suitable for every location. Factors like how long cars are parked at that location, and how long each charger takes to supply a sufficient charge should be considered.

DC Fast Charging

Public Stations (15 minute dwell – rest areas)

AC Level 2

Residential

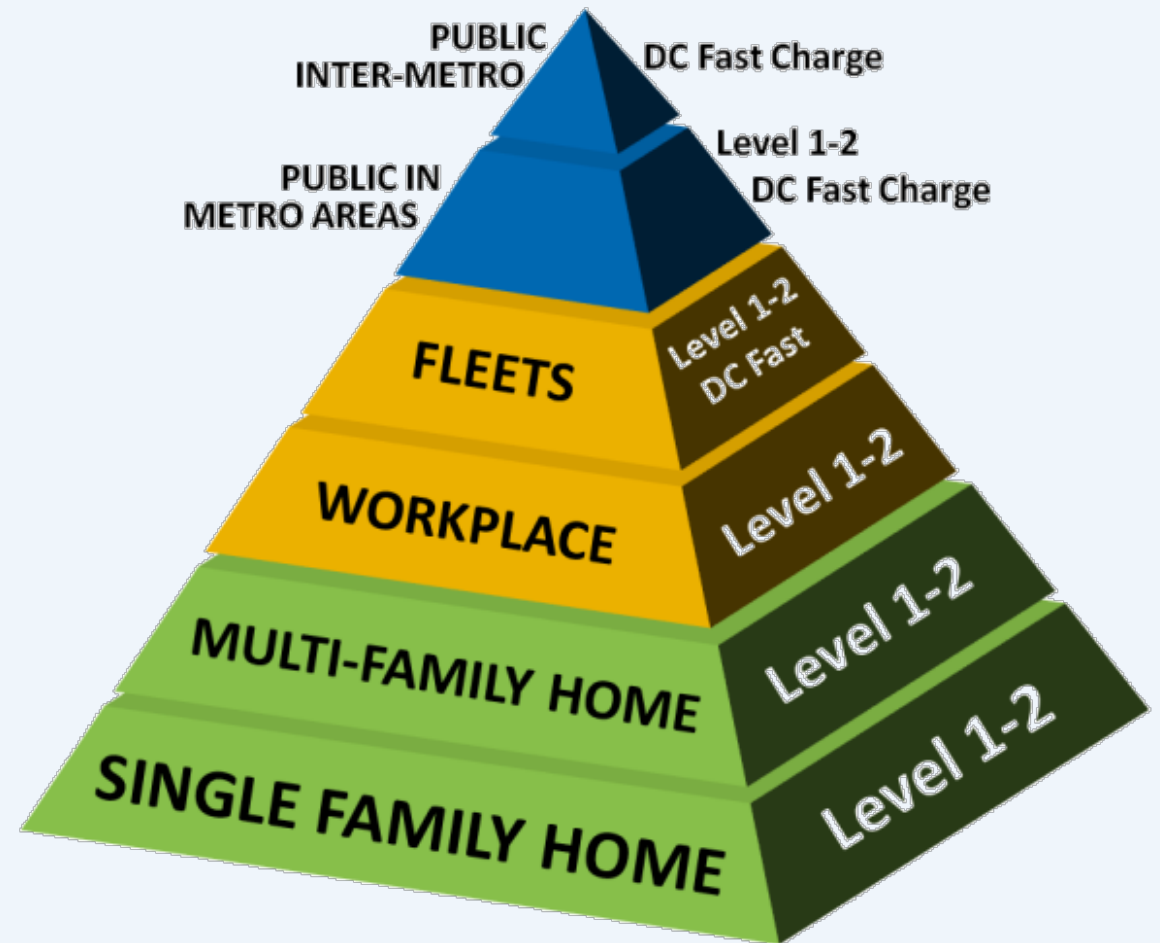
Workplace (BEVs)

Public Stations (1-2 hour dwell)

AC Level 1

Residential overnight charging

Workplace (PHEVs, EREVs)



WORKPLACE CHARGING BENEFITS

Employer Incentives

New York State Tax Credit

New York State provides an income tax for 50% of the cost, up to \$5,000

January 1, 2013 to December 31, 2017

Employer Benefits

Employee Recruitment/Retention:

- Attract and retain desirable employees.
- Typically tech-savvy and highly educated

Increase Company's "Green" Image:

- Visibly demonstrate an organization's commitment to sustainability
- Can provide points for LEED certification



Level 2 Chargers at MetLife in Oriskany

WORKPLACE CHARGING CHALLENGE

The U.S. Department of Energy's *Workplace Charging Challenge* is available to workplaces for:

- access informational resources,
- network with other participants,
- receive assistance with planning and siting, and
- be recognized for environmental stewardship.

For more information on the DOE's Workplace Charging Challenge, [click here](#).

For more information from the DOE on level 1 charging at the workplace, [click here](#).



WORKPLACE CHARGING CONSIDERATIONS

Before installation, employers must consider the potential challenges:

- Investment
- Selecting the required hardware
- Installing the units
- Establishing usage policies



Level 2 Chargers at GE in Schenectady

CHOOSING EV CHARGER LEVEL

Level 1 Charging Stations

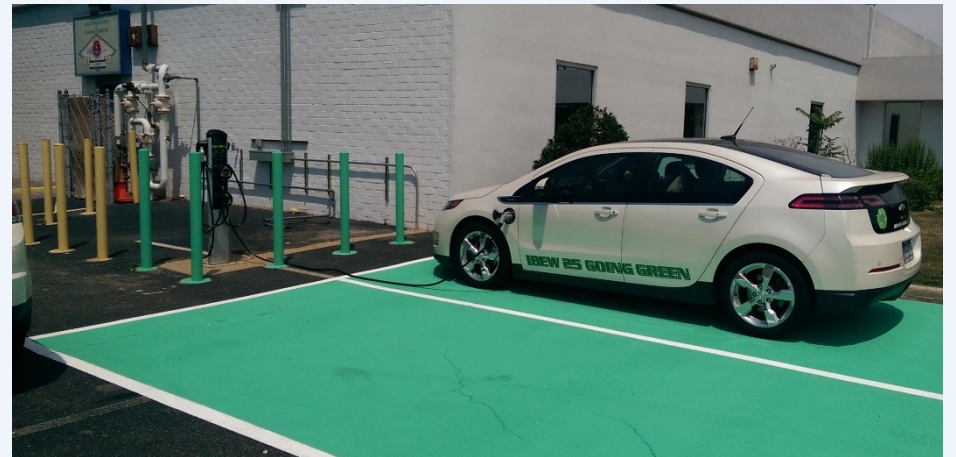
- 120 Volt, typically 15–20 Amps
- Adds 4–8 miles of electric range per hour of charging
- Hardware cost: \$100–\$1,000
- Installation cost: \$500–\$3,000

Considerations:

- Who are the potential users?
- How long would users be parked?

Level 2 Charging Stations

- 240 Volt, typically 30–40 Amps
- Adds 10–20 miles of electric range per hour of charging
- Hardware cost: \$500–\$5,000
- Installation cost: \$2,000–\$10,000



Level 2 Charger at the IBEW in Hauppauge

NUMBER AND LOCATION OF EV STATIONS

Quantity of Stations

- Enough to serve current EV drivers
- Anticipate future demand and visitors
- Extra conduit can be installed to serve future demand

Locations of Stations

- Installations near electric panels can *decrease* the cost
- Installations that require wiring through sidewalks or pavement *increase* the cost
- Placement near the entrance of a building can boost company's green image
- Snow removal and maintenance of parking lot can should be considered to maintain safe access to charging station year round

Considerations

- Too many stations will increase installation costs
- Stations left unused for long periods of time may show wear or need maintenance by the time it is used
- Too few stations will create access and scheduling issues
- Installing extra conduit to anticipate future demand can save costs later
- Location of stations can increase or lower installation costs
- Placement can improve company image
- Parking lot management and maintenance

ACCESSIBILITY CONSIDERATIONS

Accessibility can be affected by a number of factors:

- Enough room for maneuvering charging equipment
- Consider tripping hazards and liabilities
- Adhere to the Americans with Disabilities Act (ADA)
 - No current restrictions for EV charging stations, site design should incorporate ADA accessibility requirements



Level 2 Charger at IBM in Ossining

SIGNAGE REQUIREMENTS

Effective signage is important to enforce charging policy and help EV drivers navigate to their location

Three types of signs used:

1. Blue General Service Sign
2. Regulatory Signs
3. Trailblazer Signs

Another effective strategy is to mark the parking space by painting it green

Considerations:

- Signage can help direct EV drivers to charging locations
- Regulatory signs help inform and enforce charging policy
- Signage helps increase green image
- Can serve as a source of information on program funding, tourism and economic development, and sponsorship



INSTALLATION DETAILS

1. Select a contractor

- EV charging stations should be installed by a licensed electrician
- Selecting an electrician with **Electric Vehicle Infrastructure Training Program (EVITP) Technical Training** may prove beneficial
- EVITP training addresses EV charging station requirements, regulations, products, installation, and maintenance

2. Notify local utility

- Advance notice to utility is helpful, especially if multiple ports are planned
- EV charging increases grid demand, and sometimes require distribution changes
- Notification can minimize any potential disruption or issues

3. Provide Maintenance

- Networked stations provide notification of any system faults
- Non-networked stations will require manual inspection
- Any issues should be promptly addressed
- Charging station and cord should be checked frequently, and be cleaned regularly

AFTER INSTALLATIONS

Appropriate policy and enforcement procedures should be established to successfully serve EV drivers

- **Access Priority**
 - Most organizations adopt a “first come, first served” policy
 - Other policies include: reservation system, spaces reserved/rented by specific employees, or priority for EVs without a backup gas engine, which may require charging to get home.
- **Vehicle Switching**
 - Level 2 charging can provide most vehicles a sufficient charge in less than 8 hours
 - 4 hour limits or shifts throughout the day
 - Reserved spaces for EVs when not charging can help ease of vehicle switching
- **Charging Etiquette**
 - Establish protocols of when appropriate to disconnect EV that is currently charging
 - Devise and enforce consequences for when etiquette is not followed
- **Payment Options**
 - Free charging can be a good option
 - Set cost slightly higher than cost of home charging
 - Hourly charging rates can encourage EV drivers to move vehicle when sufficient charge is reached

CASE STUDY 1: RXR PROPERTIES

Location: Uniondale & Melville (Long Island)

Number of Chargers: One dual-port chargers at four different locations

Reason for installing: Response to requests from employees who work in office buildings operated by RXR.

Location of Installations: The stations are **located at convenient parking spaces** near building entrances to provide additional incentivize for EV drivers and good visibility of this amenity.

Who uses the station: The building tenants represent a wide variety of fields, resulting in exposure of EV technology to a diversified set of individuals. There are typically **10–12 events** per station per week.

Cost to use: The cost to use the stations is currently **\$2.45 per charge event**. Charge events are limited to three hours, and drivers are asked to move their vehicles after charging for this length of time. This seems to work well, and the business offices have had **no issues with unauthorized parking** or extended charging events.

Lessons Learned:

- **EVSE Enhance the attractiveness of a business location;** The marketing of the EV charging stations has increased the property management firm's green image and given the firm a distinct feature that sets it apart from other business office locations in the area.
- **Demand remains with fee for charging;** The stations are used frequently (typically 10–12 events per station per week) even with the fee to charge.



CASE STUDY 2: NEW YORK POWER AUTHORITY

Location: White Plains

Number of Chargers: Three level 1, Four level 2 stations

Reason for installing: Installations were part of NYPA's **sustainability plan**. Was not a response to employee requests, but employees were interested in alternative vehicles

Location of Installations: All stations were installed in **covered and non-rooftop spaces**, addressing the concern for precipitation. Stations are also located about **25 feet closer to the entrance** than other spots to incentivize EV drivers.

Who uses the station: The level 1 stations were installed for employee use and the level 2 are for NYPA's EV fleet. Each charger is used consistently because each is assigned to a vehicle, whether employee or NYPA owned.

Cost to use: Users are charged \$15/month for charging in a designated space

Lessons Learned:

- **Level 1 chargers can be very effective in a workplace environment** and are a low cost option to test EV station success
- NYPA's intention is only to **break even on electricity costs** and are priced as such



Level 2 Charger for fleet vehicles

CASE STUDY 3: TIME WARNER CABLE

Location: Schenectady

Number of Chargers: One dual port, level 2 station

Reason for installing: Leviton, a charging station supplier, **approached a TWC Green Team** with **available funding** from the New York State Energy Research and Development Authority (NYSERDA).

Location of Installations: Station installed by the **building and close to existing electrical infrastructure**, minimizing trenching, conduit runs, and wire lengths

Who uses the station: Station is **used daily** by employees who drive EVs. The station has generate interest from employees and has inspired at least one to purchase an EV.

Cost to use: Currently it is **free to charge** vehicles at TWC, but TWC may consider charging if station use increases to cover the cost of electricity.

Lessons Learned:

- Installation can be greatly simplified **if placed near an electrical power source and close to a building**
- Installation **can incentivize employees to purchase an EV**



RESOURCES

For Further Information:

The screenshot shows the NYSEERDA website with a navigation bar for Business & Industry, Communities & Governments, Residents & Homeowners, Partners & Investors, and Cleantech & Innovation. The main content area is titled 'Charging Station Hosts' and includes a sidebar with links to Electric Vehicles, Basics, Information for..., Electric Vehicle Buyers & Dealers, Planners & Municipalities, Charging Station Hosts, Fleet Operators, Charging Station Installers and Inspectors, Support and Discounts, Electric Vehicle Programs, Data and Reports, Case Studies, Tools, and News and Events. The main text discusses the benefits of charging stations and provides information on how to find a good location for installation.

[NYSEERDA EV Webpage](#)
[Workplace Charging Brochure](#)

The screenshot shows the DOE Alternative Fuels Data Center website. The navigation bar includes 'U.S. DEPARTMENT OF ENERGY Energy Efficiency & Renewable Energy' and 'Alternative Fuels Data Center'. The main content area is titled 'Electric Vehicle Charging Stations' and includes a sidebar with links to Electricity Basics, Benefits & Considerations, and Stations. The main text discusses the benefits of electric vehicle charging stations and provides information on how to find a good location for installation. A 'ChargeNY' logo is visible in the top left corner of the page.

[DOE Alternative Fuels Data Center](#)
[DOE PEV Handbook for Workplaces](#)

The cover of the 'Plug-In Electric Vehicle Handbook for Workplace Charging Hosts' features a blue background with a white sign that reads 'LOW EMITTING VEHICLES ONLY' with a green arrow pointing right. The sign is set against a backdrop of a blue sky with white clouds. The text 'U.S. DEPARTMENT OF ENERGY Energy Efficiency & Renewable Energy' is visible in the top right corner. The 'Clean Cities' logo and 'U.S. Department of Energy' text are in the bottom right corner.

Appendix B – Workplace Charging Infrastructure Consultation Presentation

ELECTRIC VEHICLE CHARGING AT THE WORKPLACE



ACRONYMS



EV

Electric Vehicle (charges its batteries by plugging in)

BEV

Battery Electric Vehicle (only electric motor and battery)

PHEV

Plugin Hybrid Electric Vehicle (electric motor and gas engine)

kWh

Kilowatt-hours (electrical energy stored by batteries)



EVSE

Electric Vehicle Supply Equipment or EV Charging Station

AC

Alternating Current (electrical grid)

DC

Direct Current (batteries)

kW

Kilowatt (electrical power of motors or chargers)

ELECTRIC VEHICLE SUPPLY EQUIPMENT



The Society of Automotive Engineers (SAE) established a standard for EVSE connectors (**SAE J1772**).

Most EVs use J1772 connectors for **AC Level 1** and **AC Level 2** EVSE (except Tesla).

For **DC fast charging**, some EVs used a **CHAdemo** connector prior to the release of the SAE J1772 **Combo** Coupler, so both are still used (plus one for Tesla).



DC Fast Charging

Public Stations (short dwell – rest areas)

AC Level 2

Residential

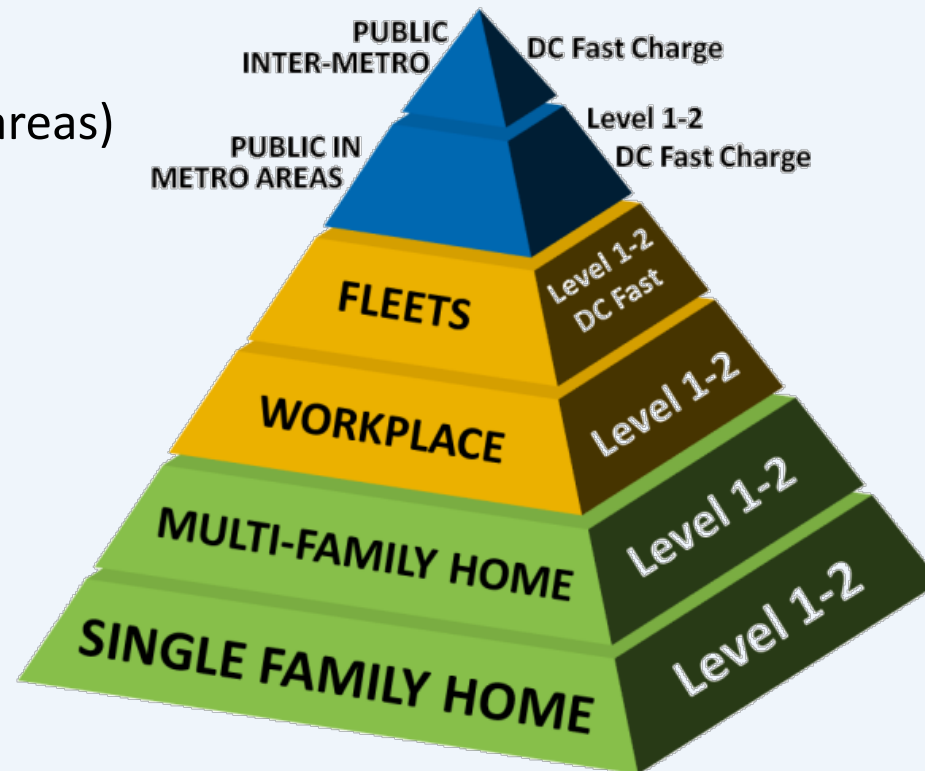
Workplace (BEVs)

Public Stations (1-2 hour dwell)

AC Level 1

Residential overnight charging

Workplace (PHEVs, EREVs)



Considerations:

- Who are the potential users?
- How long would users be parked?

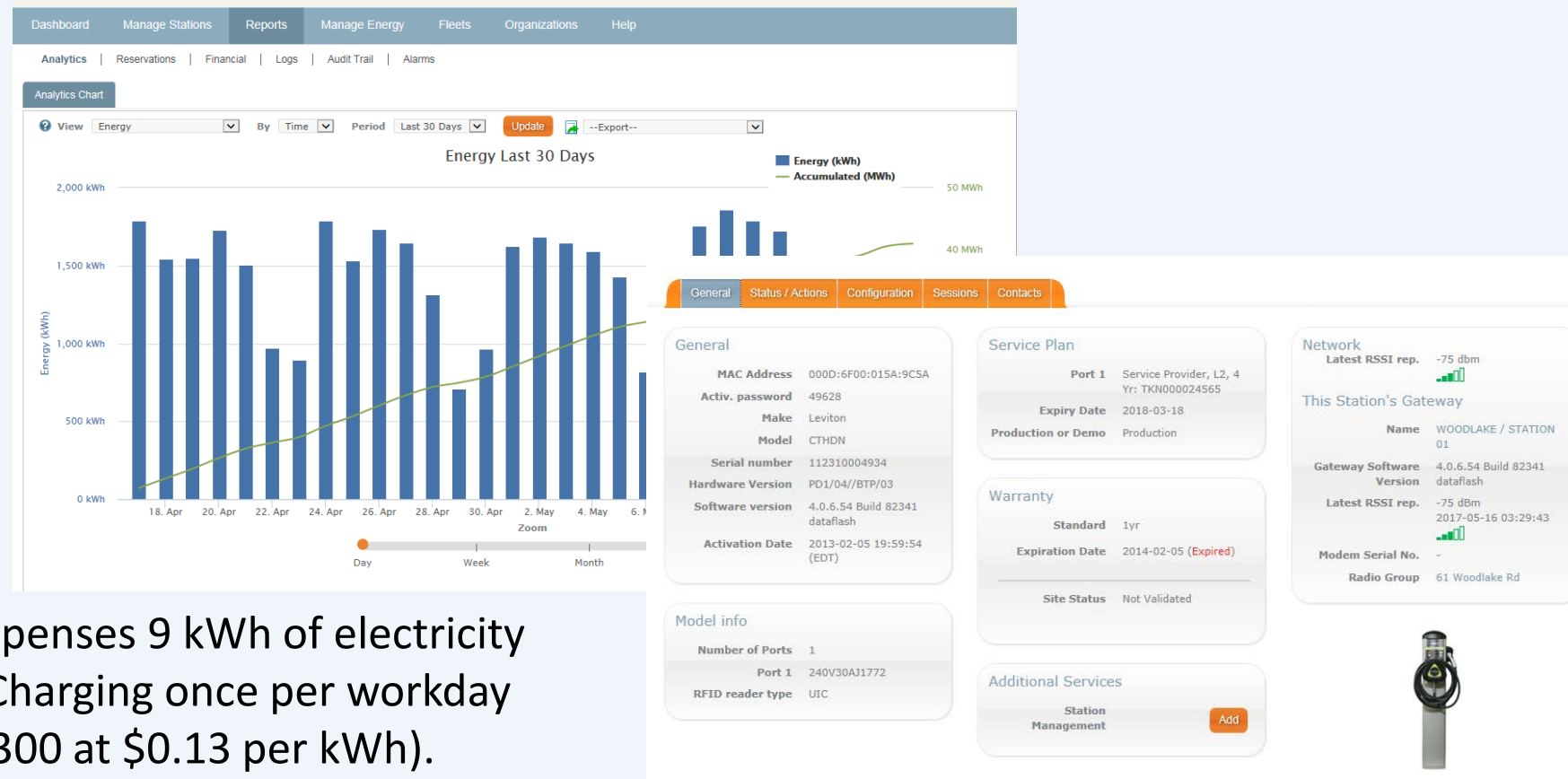
NETWORKED STATIONS

Networked Charging Stations offer advanced features. There is no fee for EV drivers to sign up and most stations have a toll-free number to set up an account if the EV driver does not have a network card. Networked stations have a subscription fee around \$20 to \$30 per month per charging outlet that the owner pays (\$500-\$700 per year for a dual-port station).

Networked Features

- Payments
- Real-time status
- Tracking of use
- Listed on network maps
- Notification of issues

The average charge event dispenses 9 kWh of electricity for an EV to travel 30 miles. Charging once per workday totals 2,250 kWh per year (\$300 at \$0.13 per kWh).



GFCI OUTLET FOR CHARGING

Installation of a ground fault circuit interrupter (GFCI) outlet on a dedicated 120 volt / 15 amp circuit for EV drivers to charge

- All EVs come with a portable “occasional use” AC Level 1 charging cord
- Adds 2-4 miles of electric range per hour of charging (~10 hours for the average charge event of 9 kWh or 30 miles)
- Hardware cost: \$100
- Not recommended for regular EV charging use, because the outlet receptacle will wear out
- An option to start offering EV charging where there might not be high demand



AC LEVEL 1 STATION

Low power charging stations

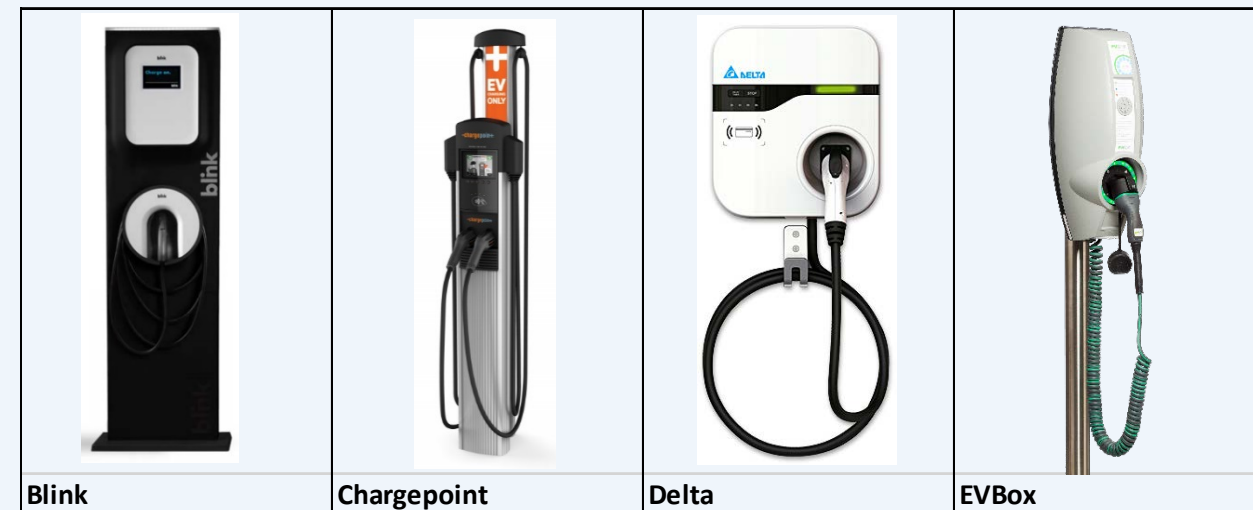
- 120 Volt, typically 15–20 Amps
- Adds 4–8 miles of electric range per hour of charging (~6 hours for the average charge event of 9 kWh or 30 miles)
- Hardware cost: \$100–\$1,000 per port
- Some can be networked, but it is rarely done
- Limited features



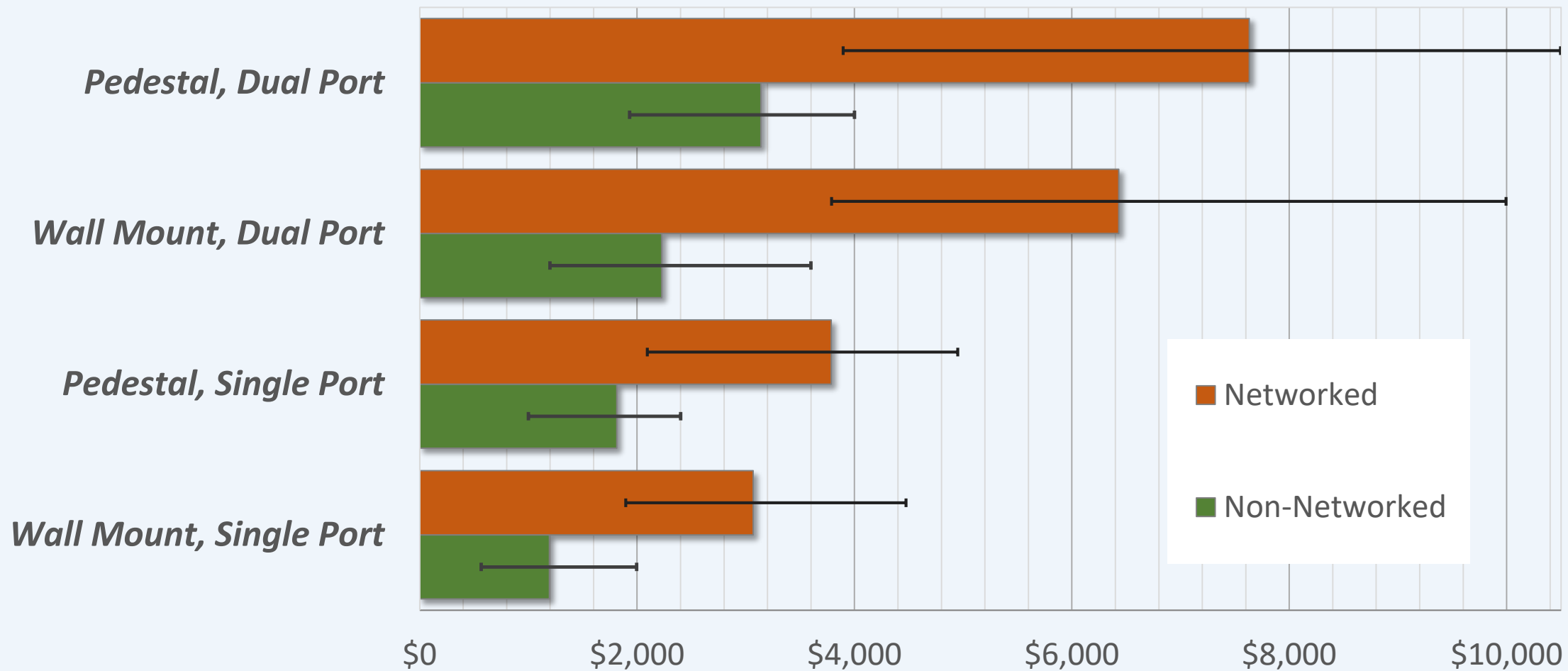
AC LEVEL 2 STATION

Higher power charging stations

- 240 Volt, typically 30–40 Amps
- Adds 10–20 miles of electric range per hour of charging (~2 hours for the average charge event of 9 kWh or 30 miles)
- Networking available
- Many different features

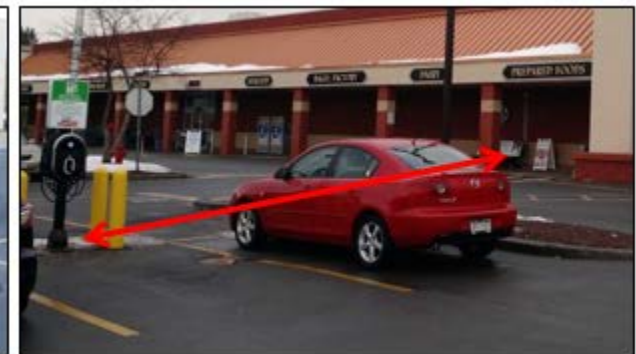


AC LEVEL 2 STATION COSTS



INSTALLATION CONSIDERATIONS

- **Too many stations** will increase installation costs, but **too few stations** will create access and scheduling issues
- Installations **near electric panels** can *decrease* the cost
- Installations that require wiring **through sidewalks or pavement** *increase* the cost
- **Electrical upgrades**, if needed, would significantly *increase* costs
- Placement **near the entrance** of a building can boost company's green image
- **Snow removal** and maintenance of parking lot can should be considered to maintain safe access to charging station year round



PROTECTING THE STATIONS

- Most charging station repairs are due to **damage from vehicles**.
- Some form of charging station protection should be used to prevent cars, snow plows, or sweepers from **hitting the station or snagging the charging cords**.
- A single **tire stop** is about \$350 delivered to the installation site and a set of two **bollards** to protect the station can be constructed at the site for about \$1,500.



SIGNAGE

- Signage can help direct EV drivers to charging locations
- Regulatory signs help inform and enforce charging policy
- Signage helps increase green image
- Can serve as a source of information on program funding, tourism and economic development, and sponsorship



POLICIES AND PROCEDURES

- **Access Priority**

- Most organizations adopt a “first come, first served” policy
- Other policies include: reservation system, spaces reserved/rented by specific employees, or priority for EVs without a backup gas engine, which may require charging to get home.

- **Vehicle Switching**

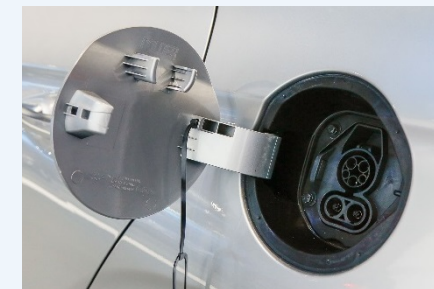
- Level 2 charging can provide most vehicles a sufficient charge in less than 8 hours
- 4 hour limits or shifts throughout the day
- Reserved spaces for EVs when not charging can help ease of vehicle switching

- **Charging Etiquette**

- Establish protocols of when it is appropriate to disconnect an EV
- Devise and enforce consequences for when etiquette is not followed

- **Payment Options**

- Free charging can be a good option or set cost only slightly higher than cost of home charging
- Hourly charging rates can encourage EV drivers to move vehicle when sufficient charge is reached



WORKPLACE CHARGING BENEFITS



Employer Incentives

New York State Tax Credit

New York State provides an income tax for 50% of the cost, up to \$5,000 through December 31, 2017

Various other Grant Programs

Employer Benefits

Employee Recruitment/Retention:

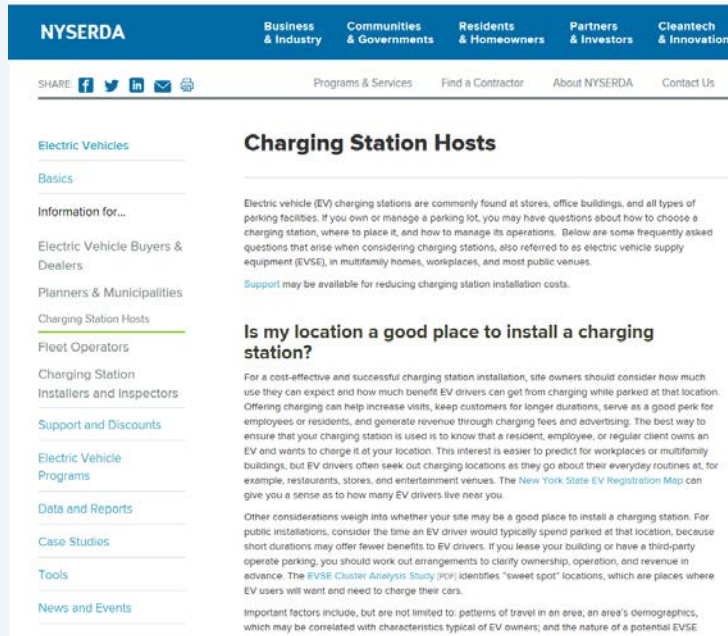
- Attract and retain desirable employees.
- Typically tech-savvy and highly educated

Increase Company's "Green" Image:

- Visibly demonstrate an organization's commitment to sustainability
- Can provide points for LEED certification

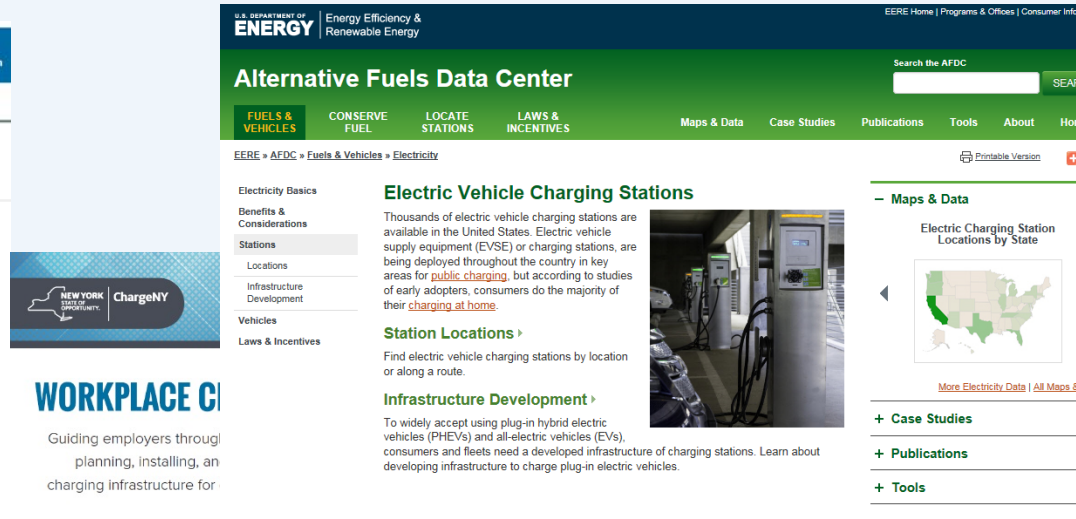


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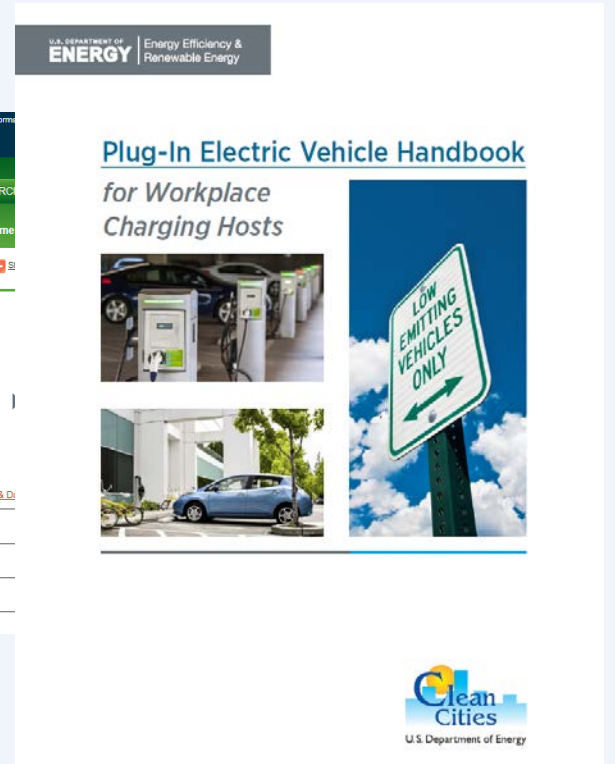
[NYSEERDA EV Webpage](#)
[Workplace Charging Brochure](#)



The screenshot shows the DOE Alternative Fuels Data Center website. The navigation bar includes FUELS & VEHICLES, CONSERVE FUEL, LOCATE STATIONS, LAWS & INCENTIVES, Maps & Data, Case Studies, Publications, Tools, About, and Home. The main content area is titled "Electric Vehicle Charging Stations" and includes a sidebar with links to Electricity Basics, Benefits & Considerations, Stations, Locations, Infrastructure Development, Vehicles, and Laws & Incentives. The main text discusses the availability and benefits of electric vehicle charging stations, including a section on "Station Locations" and "Infrastructure Development".



[DOE Alternative Fuels Data Center](#)
[DOE PEV Handbook for Workplaces](#)



The screenshot shows the DOE Plug-In Electric Vehicle Handbook for Workplace Charging Hosts. The navigation bar includes U.S. DEPARTMENT OF ENERGY, Energy Efficiency & Renewable Energy. The main content area is titled "Plug-In Electric Vehicle Handbook for Workplace Charging Hosts" and includes a sidebar with links to Maps & Data, Case Studies, Publications, and Tools. The main text discusses the benefits and considerations of installing charging stations at workplaces, including a section on "Station Locations" and "Infrastructure Development".



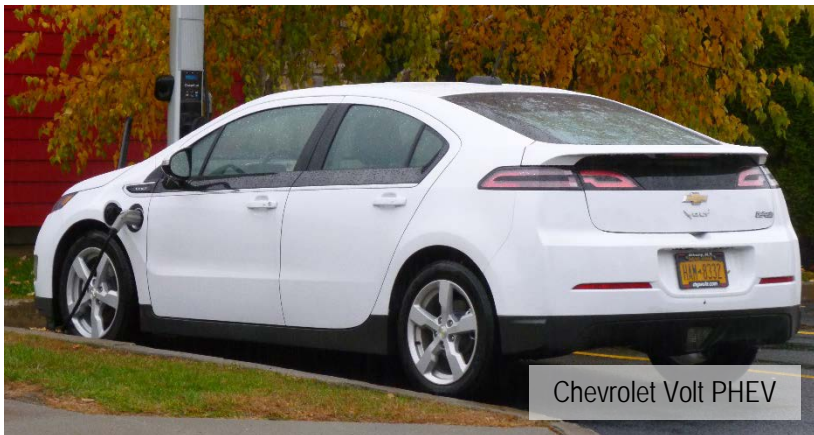
Appendix C – Charging Infrastructure Assessment Background Information

Electric Vehicles

Electric vehicles (PEV) reduce or eliminate the petroleum fuel typically used as a fuel in most vehicles by using a motor powered by electricity stored in a battery pack to propel the vehicle. The electricity stored in the battery pack is primarily obtained by connecting the vehicle to a charging station on the electrical grid (a small portion of electricity may be obtained from regenerative braking while the vehicle is being slowed down or excess power from the engine if it has one). EVs include plug-in hybrid electric vehicle (PHEV) and battery electric vehicle (BEV) models. The PHEV operates similarly to a hybrid electric vehicle (HEV) that uses a motor powered by electricity stored in a battery pack to propel the vehicle or add to the power provided by the engine, but the PHEV has a larger battery pack and can connect to a charging station to get electricity from the grid. The Toyota Plug-in Prius is an example of an HEV with these enhanced features to become a PHEV, while the Chevrolet Volt is an example of a BEV with an added engine to provide back-up power once the batteries are depleted. The Volt has a much larger battery pack and thus can go farther on electric power (the 2015 and earlier models had 38 miles of electric range and the new 2017 model will have 53) than the Plug-in Prius (the 2014 and earlier models only had 10 miles of electric range, although the new 2017 Prius Prime has 22). BEVs typically have a larger battery pack for more electric miles, but have no back-up option when the battery is depleted. The Nissan Leaf is the best-selling BEV and offers a typical electric range for most lower-cost BEVs available today (the 2015 and earlier models had 84 miles of electric range and the new 2016 model has an option for 107). Another popular BEV is the Tesla Model S which has a much greater



Toyota Prius Plug-in PHEV



Chevrolet Volt PHEV



Nissan Leaf BEV

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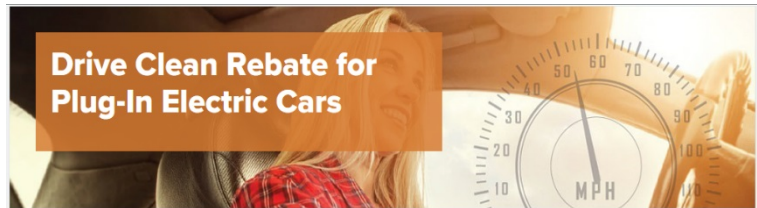
electric range between 230 and 253 miles depending on the configuration, but it is also much more expensive (\$70,000 to over \$100,000 as compared to \$30,000 to \$40,000 for the Nissan Leaf). One new BEV model recently made available is the Chevrolet Bolt with an electric range around 238 miles per charge at a starting costs less than \$40,000.



Compared to gasoline-powered cars, PEVs are more energy efficient and cost 50-70% less to operate per mile.

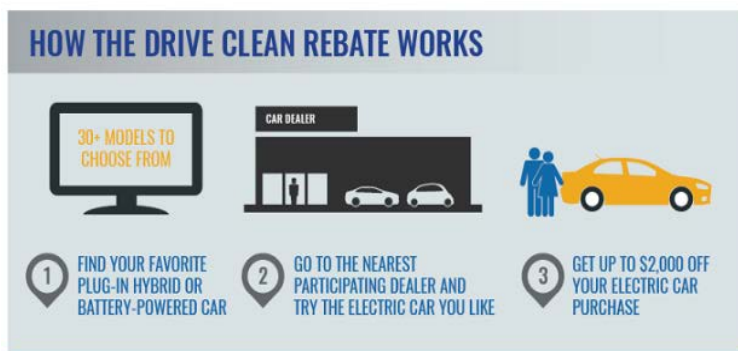
The average efficiency of a PEV is 0.32 kilowatt hours (kWh) per mile, so to travel 100 miles the PEV will use 32 kWh which costs \$4.16 at a typical New York State (NYS) electricity cost of \$0.13 per kWh. Conventional gasoline engine cars average around 25 miles per gallon, so 4 gallons of gasoline is needed to travel 100 miles which costs \$10.00 with gasoline at \$2.50 per gallon. Electric motors require less maintenance than gasoline engines and have no oil to change, so PEVs typically have lower maintenance costs.

A significant number of PHEV and BEV models are available in NYS due to its participation in the multi-state zero emission vehicle (ZEV) initiative led by California. The mandate requires all major car manufacturers to sell increasing percentages of ZEVs. In addition, NYS has prioritized PEV market development support through its ChargeNY initiative. ChargeNY aims to reach 3,000 PEV charging stations to support an expected 30,000-40,000 PEVs in NYS by 2018. Since the program's inception in 2013, ChargeNY has supported the installation of nearly 500 charging stations (bringing the statewide total to more than 1,100), revised regulations to clarify charging station ownership rules, and supported research and demonstration projects on new PEV technologies and policies. Ongoing and additional ChargeNY efforts will continue to promote and incentivize PEV or EVSE ownership.



In addition to the expanded offerings by manufacturers that are making EVs more attractive to customers, the Federal tax credit up to \$7,500 is still being offered and New York State has recently initiated a Drive Clean Rebate that could add a reduction of up to \$2,000 on EV purchases. These vehicle incentives are likely to significantly increase EV ownership in New York State.

REBATE UP TO **\$2,000** | **30+** CAR MODELS | **1,600+** CHARGING STATIONS ACROSS NYS



Electric Vehicle Charging Stations

EV charging stations are classified by their approximate charge rates and the form of power delivered (alternating current [AC] or direct current [DC]). Charging times for each specific vehicle vary depending on power electronics, state of existing charge, battery capacity, and level of charging station used. These stations are technically referred to as electric vehicle supply equipment (EVSE). AC Level 1 EVSE (at 120 volts of alternating current [VAC] up to 2 kilowatts [kW]) and AC Level 2 EVSE (at 240 or 208 VAC up to 19.2 kW) provides power in the same capacity as it is supplied and the EV uses an onboard inverter to switch it to DC power that charges the batteries. DC EVSE uses an off-board inverter so it can supply DC power to the vehicle directly at higher amps for a faster charge. DC fast charging stations are designed for quick EV charging during longer distance travel and are unnecessary for workplace charging since they are much more expensive.

Connectors, or plugs, for AC Level 1 and AC Level 2 charging stations have been standardized to allow owners of EV models to utilize the same charging infrastructure. This standard Society of Automotive Engineers (SAE) J1772 connector shown in Figure 1 provides significant safety and shock-proof design elements. Tesla EVs use a different proprietary connector, but they have a SAE J1772 adapter.



Figure 1. SAE J1772 Connector

The charging requirements at each location determine the type of charging station that should be installed. As illustrated by the charging pyramid in Figure 2, most EVs will charge at home (single- or multi-family) for the majority of the time.

However, EV drivers also seek public charging infrastructure to use at work, around town, and on longer trips. Many of these chargers come with an option to purchase a subscription to a charging network that can collect payments from users and limits use of the station to charging network members. There is often no fee for EV drivers to become a member, and there is usually an option to activate the station using a toll-free number for anyone that does not have a network card. In addition to listing the station on its network maps for EV drivers, the network (for a subscription fee around \$20 to \$30 per month per charging outlet) will track station usage and enable the owner to bill for use.

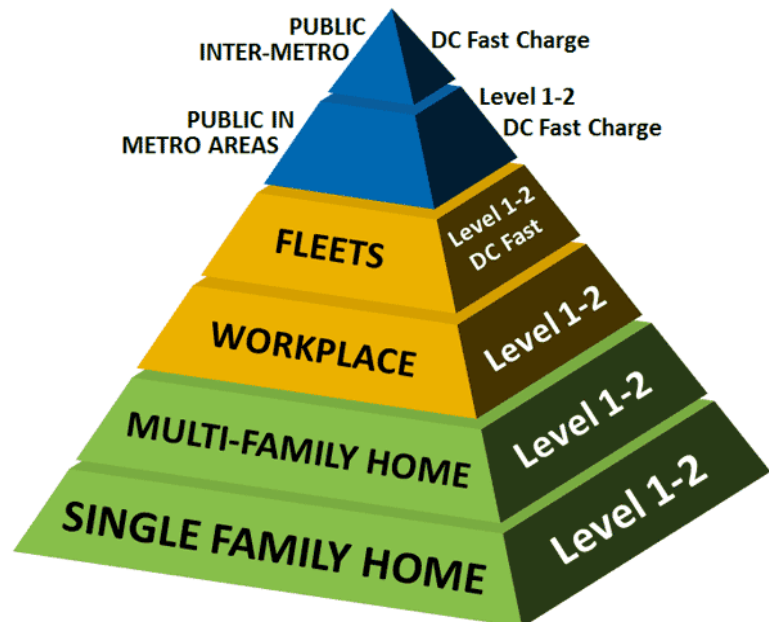


Figure 2: EV charging pyramid

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Level 2 charging stations are a popular choice for commercial public installations because they typically offer better durability and more features, such as a cord management system that keeps the cord off the ground when not in use (Figure 3) and network connections for tracking use, establishing payments, or making reservations. Listed on Table 1 are networked Level 2 stations that offer valuable features, but the stations are more expensive because of this capability and require an annual subscription fee. There are non-networked Level 2 charging station models available as shown in Table 2, but they cannot collect payments from the users or monitor station activity. Most manufacturers offer charging stations that can be wall mounted or installed as a stand-alone pedestal. They often have models with either a single or double charging port per station. Level 2 charging stations provide 10 to 20 miles of range per hour of charging, a sufficient boost for EV drivers parked for a few hours.

At workplaces where employees park for an extended period of time during the day, Level 2 charging may not be required. This is especially true for drivers of plug-in hybrid electric vehicles that have smaller battery packs or battery electric vehicle drivers that regularly charge at another location and don't require a full charge each time they park at these locations.

Figure 3: EV charging station with cord management

Table 1. Networked Level 2 EV charging stations

| | | | |
|---|---|--|---|
|  |  |  |  |
| <p>Blink Level II Charger 30 Amp 25 foot Cable 1 Port Pedestal Mount</p> | <p>Chargepoint CT4000 16-30 Amp 18-23 foot Cable 1-2 Ports Wall/Pedestal Mount</p> | <p>Delta AC Charger 30 Amp 18 foot Cable 1 Port Wall/Pedestal Mount</p> | <p>EVBox Business Line 30 Amp 20-26 foot Cable 1-2 Ports Wall/Pedestal Mount</p> |

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Table 2. Non-networked Level 2 EV charging stations

| | | | |
|---|--|---|---|
|  |  |  |  |
| <p>Aerovironment EVSE-RS 30 Amp 15-25 foot Cable 1-2 Ports Wall/Pedestal Mount</p> | <p>Bosch Power Xpress 12-32 Amp 18 foot Cable 1-2 Ports Wall/Pedestal Mount</p> | <p>Clipper Creek Chargers 20-48 Amp 25 foot Cable 1 Port Wall/Pedestal Mount</p> | <p>JuiceBox EVSE 40-75 Amp 24 foot Cable 1 Port Wall Mount</p> |
|  |  |  |  |
| <p>SemaConnect ChargePro 30 Amp 18 foot Cable 1 Port Wall/Pedestal Mount</p> | <p>Tellus Power EVSE 30 Amp 18 foot Cable 1-2 Ports Wall/Pedestal Mount</p> | <p>Tesla Charger 48-72 Amp 8.5-24 foot Cable 1 Port Wall Mount</p> | <p>WattZilla EV Chargers 40-80 Amp 25 foot Cable 1-4 Ports Wall/Pedestal Mount</p> |





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To reduce the costs for the stations and their installation, Level 1 stations might be a better option for workplace charging. With the same electrical service and panel, two Level 1 stations (Figure 4) can be installed instead of one Level 2 station. The power draw by Level 1 stations is much less, so there is less electrical expense to the host. However, because of their simplicity, most Level 1 stations do not have the option for a subscription on a charging network and cannot easily bill EV drivers for usage or track station activity. Examples of currently available AC Level 1 charging products are shown in Table 3.



Figure 4: AC Level 1 charging station

Table 3. Non-networked Level 1 EV charging stations and cords

| | | | |
|--|---|---|--|
|  |  |  |  |
| <p>Aerovironment TurboDock 16 Amp 20 foot Cable 1-4 Ports Wall/Pedestal Mount</p> | <p>Aerovironment TurboCord 16 Amp 20 foot Cable 1 Port Cord only</p> | <p>Clipper Creek Chargers 12-20 Amp 25 foot Cable 1 Port Wall/Pedestal Mount</p> | <p>Juice Bar Power Bar 16 Amp 14 foot Cable 1 Port Pedestal Mount</p> |

For organizations interested in providing EV charging, but not wanting or able to pay a lot for the initial installation, there are opportunities to lower costs by taking advantage of some low cost installation strategies. Wall mounted installations, non-networked stations, or even AC Level 1 stations are significantly less expensive than the typical pedestal mounted networked AC Level 2 stations found in many public settings. Instead of an average installation cost of \$18,000, these strategies can reduce installation costs below \$10,000 and in some cases even less than \$5,000. This makes installing a charging

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station an option for more organizations. One option even less expensive than installing a simple station on a wall, would be to install ground fault circuit interrupter (GFCI) outlets on dedicated 15 amp circuits which can be offered to EV drivers for charging (example shown in Figure 5). All EVs come with a portable AC Level 1 charger that they can pull out and connect between the outlet and their vehicle, so any EV driver is prepared for these



Figure 5. Outlets, such as these on light poles (left) can be offered for EV charging using an EV driver's portable connector (right) if they are on an individual circuit

outdoor outlets. However, a GFCI outlet for regular EV charging use is not recommended, because those outlets are not designed for continuous max power draw by an EV and the outlet receptacle will wear out and potentially need to be replaced. For occasional use and an opportunity for a business to start offering EV charging where there might not be high demand, this can be an initial solution to test.

Installation and hardware costs for each of these options vary depending on power levels and included options. To minimize installation costs and optimize the overall charging station use, care must be taken to select the best option for each location. Figure 6 demonstrates the progression of charging infrastructure cost and provides examples of included capabilities.

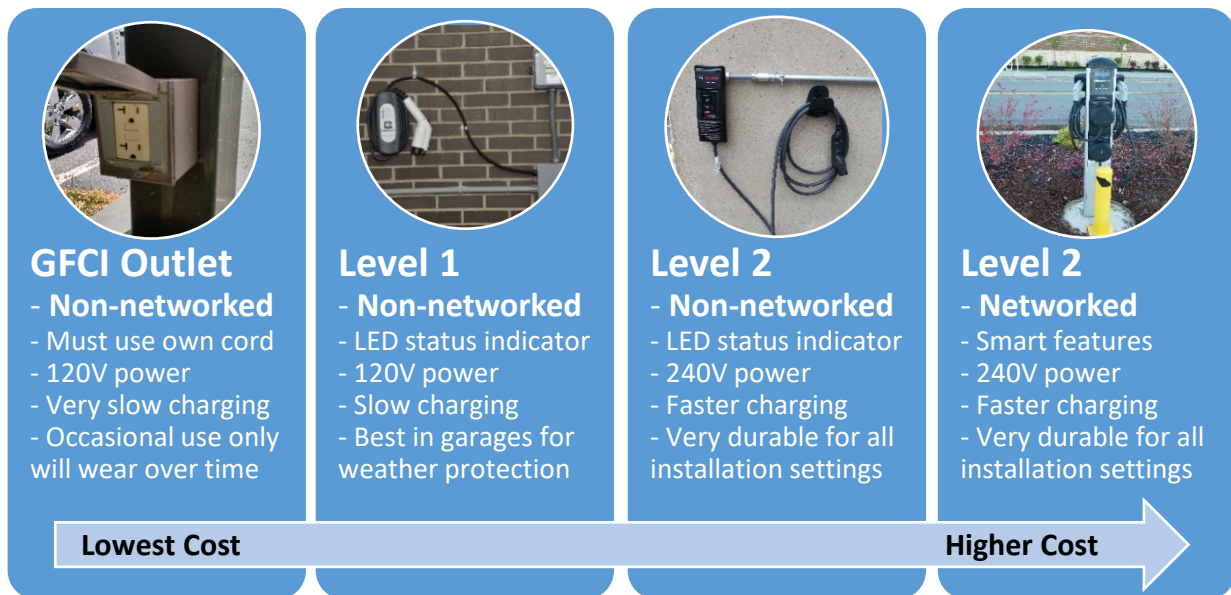


Figure 6. EV Charging Station Alternative Current (AC) Types

Electric Vehicle Charging Station Protection and Signage

Most charging station repairs are due to damage from vehicles. Some form of charging station protection should be used to prevent cars, snow plows, or sweepers from hitting the station or snagging the charging cords. Mounting the station above the bumper level on a wall or behind a curb is helpful, but a tire stop or bollard would provide added protection (see Figure 7). A single tire stop is about \$350 delivered to the installation site and a set of two bollards to protect the station can be constructed at the site for about \$1,500 (or \$1,000 if only one bollard is needed).



Figure 7: Bollards, tire stops, and sign posts used for charging station protection

It is also useful to install a post for signage while the station is being put in. If the location of the station on the property is not obvious to EV drivers, additional directional signage throughout the property can be useful, but will add additional cost. Typical signage and striping costs are around \$500 per site. Parking garages with charging stations may want to place a sign outside the entrance and also have wayfinding signs or instructions just inside the gate. This will ensure EV drivers are aware of the charging station and are able to find it (see examples in Figure 8).

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Figure 8. Signage at the entrance and inside a parking garage can be useful to EV drivers

The value in having signage at the charging station is to enforce charging policies (regulatory), advertise (trailblazing), and create EV awareness in non-EV drivers that might use the station in the future. Regulatory Signs are required for enforcing what vehicles park in EV charging station parking spots, as well as the time duration that EVs are permitted to park and/or charge at public charging stations. Green/white regulatory parking signs are considered *permissive* signs and are intended to provide motorists with the allowable time and days to park. Red/black/white regulatory parking signs are *prohibitive* and are intended to advise motorists of an action that shall not be taken. Signs in private parking facilities for public use are not required to meet the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) standards, but owners and operators are encouraged to do so. Trailblazing (Special) Signs are used at the EVSE or host facility to provide additional information for drivers and visitors (sustainability benefits, funding source, tourism or economic development info, sponsorship, etc.). These may include other logos, shapes, and colors as part of the signage theme at the site. Painting an EV charging station symbol or using a solid color on the parking surface can also help to clearly identify EV charging station spaces more visibly.



Figure 9. Regulatory signs (left), trailblazing signs (middle), and painted spaces (right) clearly mark EV charging station locations

Installation Considerations

A number of factors influence charging station installation costs, which can often exceed the cost of the hardware itself. These factors should be considered when determining site viability and the ideal location to install the charging station on the property. The largest factor is usually the currently available electrical service. All new charging station installations should have a load analysis performed on the facility's electrical demand to determine if there is capacity to add EV charging stations. Each Level 2 charging port will need a dedicated 240-volt (40 amp) circuit. If a site has to upgrade electrical service, this adds significant cost to the installation. The condition of the electrical panel can be observed. Older or outdated panels (see Figure 10) may need to be replaced and updated before a charger can be safely added to the system.



Figure 10: Older electrical panels may require upgrades to bring up to modern codes

It is also good to note whether the electrical panel has available breaker slots or some marked as spares that could be used for the charging stations. A single port Level 2 charging station will require two breaker slots for its 240V circuit and a dual port charging station will need four (see Figure 11). Each Level 1 charging station will only require a single breaker slot for a 120V circuit.

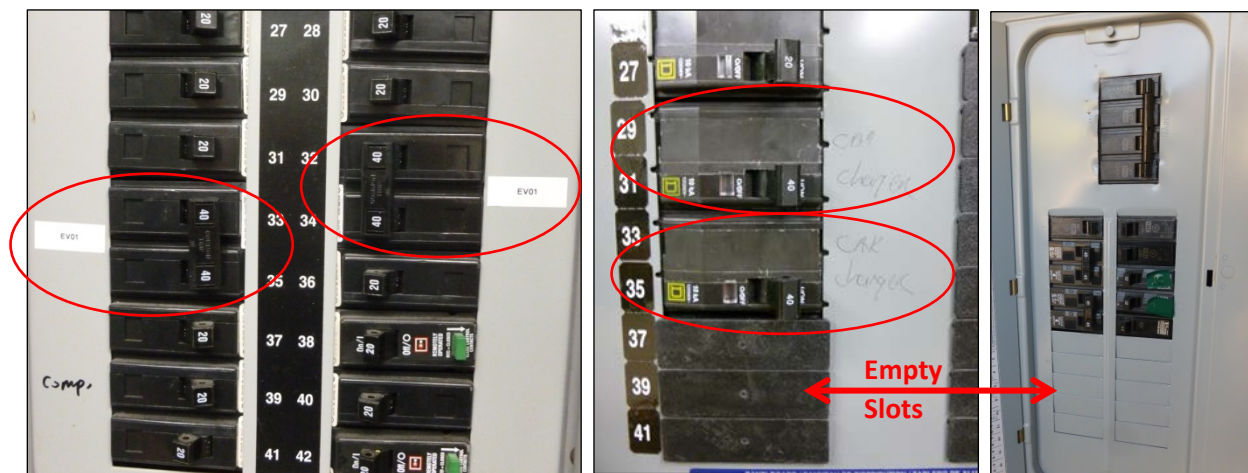


Figure 11: Level 2 charging station 240V-40A circuits breakers and examples of empty breaker slots

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Available space in the electrical panel can indicate, but does not necessarily guarantee, whether there is sufficient capacity with the current electrical service to add the charging station(s) without requiring an upgrade from the utility. The electrical contractor will determine the available electrical capacity with a load calculation or reviewing the as-built electrical drawings and schedules. It is possible to simply add a small subpanel (see Figure 12) for the charging station circuit(s) if there is sufficient capacity with the existing service but no space in the main panel. In general, expect more complications and higher costs (ranging from \$500 to \$2,500, or possibly even higher) when installing charging stations at a facility that has an older and/or fully packed electrical panel, and if there is the option to select between two different locations or facilities, the one with a newer electrical panel is likely a better option.



Figure 12: Added subpanel for charging station circuits

Identifying all electrical panels at the facility will help with planning the installation. These panels come in many shapes and sizes and can be tied directly to the grid or used as sub-panels to further distribute power from larger panels. The electrician may determine that one panel is better to work with than another, or one may offer a shorter electrical run to a good charging station location, reducing costs.

A longer distance between the electrical panel and the EV charging station means increased installation costs because it increases the amount of necessary trenching (and repair), conduit, and wire. Example installations are shown in Figure 13 and Figure 14.



Figure 13: Charging station installations sited in convenient, but not prime parking spaces that minimize conduit runs to reduce costs

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Figure 14: Charging stations at parking spaces away from a building require longer trenching through pavement and could disrupt traffic flow during construction

Although it is desirable to minimize the distance between the electrical panel and EV charging station as much as possible, where a charging station is located on a property can impact how it is used. For example, placing charging station parking spaces in the back of a building might discourage their use, but other customers may be upset if a charging station is installed in prime parking spaces that often remain vacant because there are few EV drivers. Charging stations in prime parking spaces are also more likely to be occupied by non-EVs, as shown in Figure 15.



Figure 15: Charging stations installed in prime parking spaces may be used by non-EV Drivers who have traditionally used these spaces

All externally run and most internally run electrical wire will have conduit for protection. It will be routed along ceilings and walls inside, pass through the building foundation or walls, and be buried underground until it reaches the station. Inside the facility, the length of the run, obstacles (e.g., concrete walls, metal I-beams, lights, or fire suppression systems), and accessibility should be noted. For outdoor routing, the length of the run, immovable objects (e.g., landscaping, tree roots, ponds, or buildings), manmade surfaces (e.g., concrete or pavement), utility lines (e.g., electrical, water, or gas), and any other obstacles that may complicate trenching should also be noted as best as possible. Trenching through grass, dirt, or gravel is easy to dig and repair. Most contractors will tunnel under a short concrete sidewalk, but some will cut into and repair it. Wire runs across parking lot pavement are typically longer and could be accomplished by tunneling under or cutting and repairing. Samples of trenching work are shown in Figure 16 for dirt, Figure 17 for concrete walkways, and Figure 18 for pavement.

Promoting Workplace Charging in New York State



Figure 16: Examples of trenching through dirt (easiest outdoor installations)



Figure 17: Concrete walkway examples of cut/repair (left and center) and tunneling under (right)

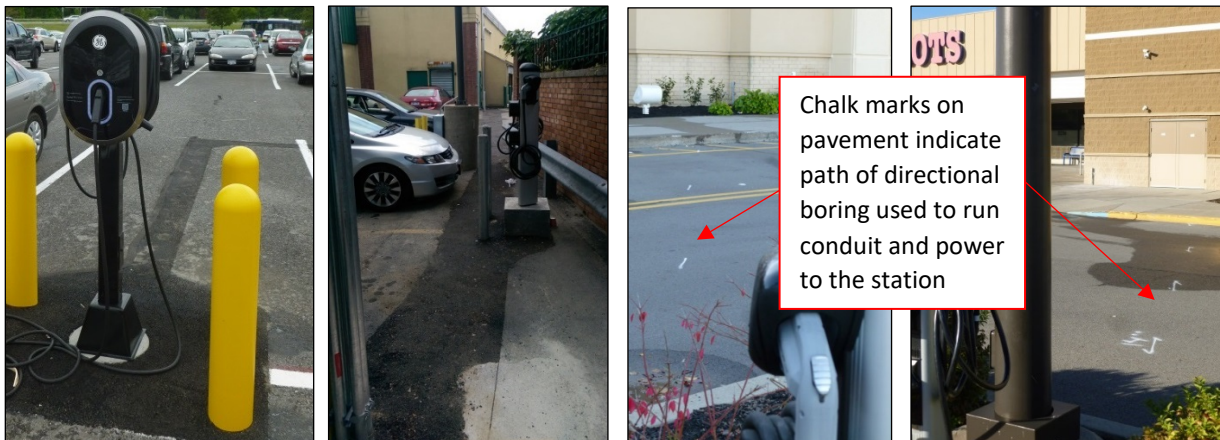


Figure 18: Parking lot pavement examples of cut/repair (left) and tunneling under (right)

Promoting Workplace Charging in New York State

Cellular signal strength is an important factor for networked EV charging station installations. Key features on a networked station (e.g., fault notifications, in-use status, user authentication, payments, or reservations) will not be available if the station cannot communicate with the central network via cellular signals. When considering where to place the station on the property, use a cell phone to test the available strength and determine if an alternative location might have a better signal. Charging station installations in remote locations or in underground garages may have more difficulty acquiring a good cellular connection. If the charging station cannot be moved into a place with a better cellular signal, some charging manufacturers offer equipment with alternative cellular providers that may have better strength at that location. Extended antennae or cell signal boosters can also be used, but these will add to the cost of the station installation. Wireless internet communication solutions are being offered with some vehicle charging stations to allow energy usage monitoring and control without relying on a cellular service plan. Most charging stations offering this are for residential applications, but some of this hardware could be used for workplace charging as well.

Other installation considerations have less impact on costs, but are important to ensure that the charging station is well integrated into the parking lot. When selecting a site, be sure to think about the path of the charging cord when in use, so it is not a tripping hazard. Also consider parking lot management practices: will the charging station get in the way of pavement cleaning or snow plowing (see Figure 19), is it a space where snow is piled in the winter, or is equipment stored nearby that might block access to it?



Figure 19: Snow management practices may impede EV charging

Operating Expenses

The higher end (more expensive) commercial Level 2 charging stations have shown to be very durable in various environments and have very few manufacturer issues. The most common issue is wear of the connector pins due to frequent use. Over time the pins may eventually not make a good connection and the connector will need to be replaced. Some less expensive Level 2 charging stations have occasionally failed because they used less durable materials that do not hold up to harsh environmental conditions (they are better suited for installation in a garage or covered parking location). Most manufacturers have an initial 1-3 year warranty on their product and several offer extended warranties for additional cost.

Most charging station repairs are due to damage when vehicles that hit them, which is why some level of protection is highly recommended. Another issue is the charging cords being caught by a plow in winter because they were not coiled up after use and ended up getting buried by snow (Figure 20). Charging stations with cord retraction systems help alleviate this issue. All charging stations require occasional cleaning and should have the cords inspected once a month and everything wiped down quarterly or monthly depending on use. Snow should be cleared from around the charging station so it can vent properly and be easily accessed.



Figure 20. Charging cords not coiled up in the winter can be covered with snow and caught by a plow

Workplace charging stations rarely serve as an EV driver's primary source of electricity as this is done at home. Thus, while electric vehicle battery capacities can be 20-80 kWh, or even higher, the average energy dispensed per charge event at public stations in New York is only 8 kWh (approximately 25 miles of electric range which is typical for a commute to work). At \$0.13 per kWh, this is a cost of only \$1.04 per charge event. Workplace charging stations could potentially experience 1 charge event per port per workday which would result in approximately \$5 per week in electricity. This would be at the higher end of the spectrum for cost per month experienced by stations in NYSERDA's EVSE deployment program as shown in Figure 21.

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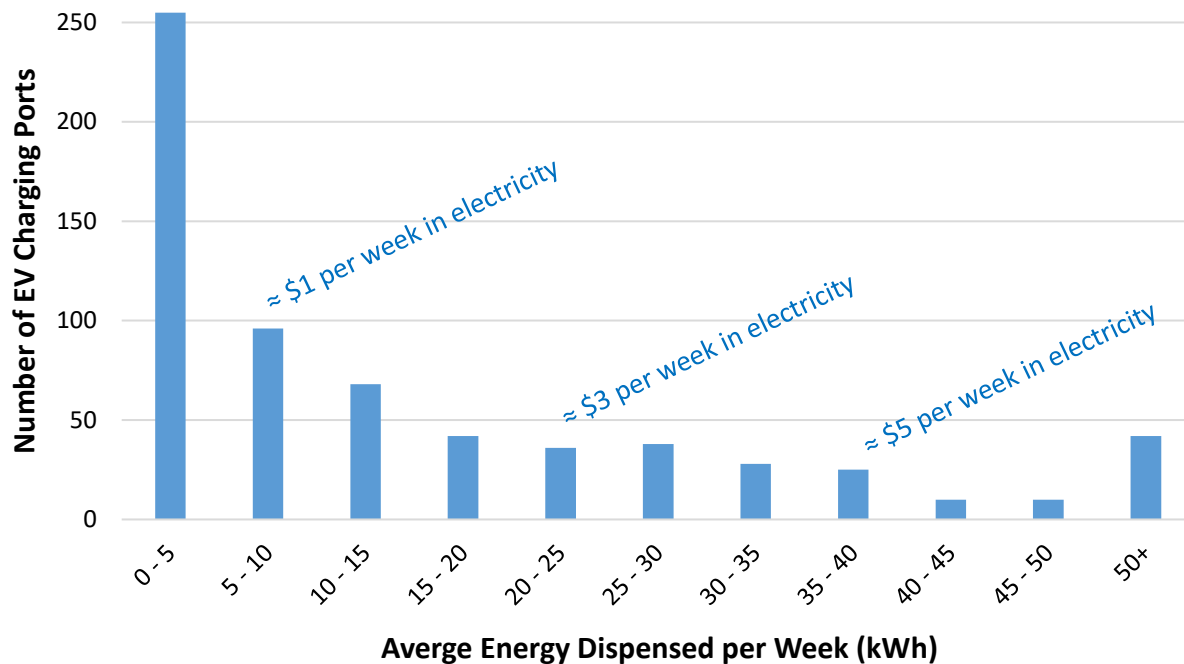


Figure 21. Electricity costs per charging port in 2015 for the stations in the NYSERDA Deployment Program

While minimal, a site owner may want to recoup the costs to supply electricity and maintain the station. Most stations must be networked and have an active subscription, at an additional operating cost, for a site owner to impose a fee for use. If the site owner intends to share the networking costs with the EV drivers, the cost per charge event to recover all of the site owner's expenses might be higher than many EV drivers would pay for unless it was an emergency. Since network subscriptions costs would be challenging to get back through station use fees, networked stations should not be used solely to generate revenue. The primary purpose of maintaining an active network subscription should be for tracking usage, real-time notification of issues, and other available benefits.

Charging station fees can be per hour, per session, or per unit of electricity. If charging per hour, the cost of energy may vary widely by charging session because different EVs receive electricity at different rates. Charging per session is usually more appropriate for workplace charging or charging stations that have very short, regular sessions. Charging by unit of energy (usually kilowatt-hour [kWh]) accurately accounts for the true cost of electricity for the charging station owner, but does not give an incentive for a car that is fully charged to leave the space. Some site owners have tried combinations of these approaches, such as charging a flat rate for the first two hours, then an increasing rate for longer sessions. Some locations might prefer to offer free charging, either as an additional draw or to lower operating expenses by not needing to join a charging station network.

Incentive and Grants

The opportunities to secure funding for EV charging stations are dwindling as the technology matures. However, there are still several active incentives and grants that can be used by ambitious hosts that show a strong interest in supporting an installation and are willing to make some investment themselves. Several current incentives and grants in New York State for EV charging stations are listed below with an explanation on who is eligible to participate and what each program offers. Currently there are no incentives at the Federal level for EV charging stations.

New York State Alternative Fuel Vehicle Recharging Tax Credit

New York State provides an [income tax credit](#) for 50% of the cost, up to \$5,000, for the purchase and installation of electric vehicle charging stations until end of 2017. The credit targets **commercial and workplace charging stations**.

NYPA Public Sector Charging Station Program [Contact: John Markowitz, john.markowitz@nypa.gov, 914-390-8209]

Level 2 EV charging stations manufactured by EV-Box are offered to **NYPA energy customers, as well as any state or local government entity**, through a pre-negotiated contract with EV Connect to install and manage approximately 300 stations. EV Connect will provide management of the charging ecosystem, which includes the charging stations, host locations, electric utility interaction and the driver experience.

CALSTART Charge to Work NYC [Contact: Alycia Gilde, agilde@calstart.org, 718-303-0787]

This initiative is designed to promote EV adoption amongst employees that work for the City's most progressive and forward-thinking companies. Charge to Work NYC offers support for workplaces to install charging stations along with incentives for employees to purchase EVs. **Companies in and around New York City** are eligible to participate.

EV Connect EV Charging Station Financing Project [Contact: David Hughes, david@evconnect.com, 888-780-0062]

Low-cost financing and leasing opportunities for EV-Box charging stations with a **focus on public and non-profit entities**. EV Connect provides their innovative management and software solutions, making charging station management easy and interactive for every site host.

Zero Emission Vehicle Infrastructure Rebate Program for Municipalities [Contact: Nancy Welsh, 518-402-8448]

The second round of the [Municipal ZEV Infrastructure Rebate Program](#) is now open and accepting Applications until all funds are exhausted up to May 31, 2018. Through this program administered by the New York State Department of Conservation, rebates are awarded for EV charging stations up to \$8,000 per port, and for DC Fast Charge infrastructure up to \$32,000 per pedestal. The applicant is responsible for a 20% local match (of the rebate amount) and any additional costs above the stated limits.

Additional incentives and grants may be available in the future, but they are less likely as a technology emerges so it is best to leverage those that are currently active. These programs provide discounts and reduce out-of-pocket expenses, but several come with requirements and paperwork because the sponsor wants to gain some information and insight on the installation in exchange for the provided funding. In many cases that increases the time to deploy the technology and someone will need to handle the paperwork. While often not eligible through grant programs (but still eligible for the tax credit), low cost charging station installation options are available when lower charging rates and non-networked stations are feasible.

Appendix D – Employee and Workplace Surveys

Employee Survey 1 –

Administer before PEV Education Event

Employee knowledge and acceptance of PEVs, to be conducted prior to the event to help shape the discussion

Plug-in electric vehicles (PEV), including plug-in hybrid electric vehicles (PHEV) which have electric propulsion and can plug in, but also have a gas engine once the battery is depleted and battery electric vehicles (BEV) which rely entirely on batteries and an electric motor, are a growing piece of the transportation landscape.

Please complete the following survey to help us understand your interest and knowledge of electric vehicles.

1. Please select your workplace from the list below:
(pull-down list)
2. What mode of transportation do you typically use for your daily commute to work?
 - a. Walking
 - b. Biking
 - c. Public Transportation
 - d. Carpooling
 - e. Driving
3. How long is your daily commute (one-way)?
 - a. Less than 10 miles
 - b. 10 – 20 miles
 - c. 20 – 30 miles
 - d. 30 – 40 miles
 - e. 40 – 50 miles
 - f. More than 50 miles
4. How knowledgeable are you on PEVs?
 - a. No knowledge
 - b. Very little knowledge
 - c. Somewhat knowledgeable
 - d. Pretty knowledgeable
 - e. Very knowledgeable
5. What is your experience with a PEV?
 - a. None
 - b. I have seen them around
 - c. I know someone who owns one
 - d. I rode in one
 - e. I have driven one
 - f. I own a PHEV
 - g. I own a BEV
6. Are you aware of any local public PEV charging stations?
 - a. No, I haven't noticed any.

- b. No, there aren't any around here.
 - c. Yes, I know of some local charging stations.
7. How interested are you in learning more about PEVs?
- a. Not interested at all
 - b. A little interested
 - c. Somewhat interested
 - d. Pretty interested
 - e. Very interested
8. An event is being planned to provide PEV information for employees at your workplace, which type of event would you be most interested in?
- a. A webinar that you can view from your desk
 - b. A booth and expert available over a period of a few hours where you can stop by and get information or ask questions
 - c. A presentation to the group
 - d. A display of PEVs and information from an expert (no test drives)
 - e. A ride-n-drive to test out a PEV
9. When would be the best time to hold a PEV event?
- a. Before work
 - b. Lunchtime
 - c. After work
 - d. During work hours
 - e. On a weekend

Employee Survey 2 – For Participants of the PEV Education Event

Administer to employees during or after each event, which will provide employers with an estimate of potential PEV drivers and employee interest and knowledge of PEVs.

Due to their more limited range as compared to gasoline vehicles and the longer period to refuel (charge), having more opportunity to charge wherever the vehicle is parked for an extended period of time (such as the workplace) is valuable.

Please complete the following survey to help us understand your interest in electric vehicle charging stations at your workplace.

1. Please select your workplace from the list below:
(pull-down list)
2. How valuable was the PEV Educational Event?
 - a. Not valuable
 - b. A little valuable
 - c. Somewhat valuable
 - d. Pretty valuable
 - e. Very valuable
3. What was the best part of the event? _____
4. How could the event be improved? _____
5. What do you like best about PEVs?
 - a. Fun to drive (quick to accelerate)
 - b. Quiet
 - c. Lower operating costs
 - d. Less fuel use and emissions
 - e. Other _____
6. What is your biggest concern about PEVs?
 - a. Cost
 - b. Electric range
 - c. Limited public charging opportunities
 - d. Ability to install a charger at home
 - e. Other _____
7. Would you consider a PEV for your next vehicle purchase?
 - a. I already own a battery electric vehicle
 - b. I already own a plug-in hybrid electric vehicle
 - c. Yes, a battery electric vehicle and I'm looking at getting one within the next 3 years
 - d. Yes, a battery electric vehicle but it won't be within the next 3 years
 - e. Yes, a plug-in hybrid electric vehicle and I'm looking at getting one within the next 3 years
 - f. Yes, a plug-in hybrid electric vehicle but it won't be within the next 3 years
 - g. No
8. Would having an opportunity to charge at work influence your ability to consider or use a PEV?
 - a. I would only use a PEV if there was charging at work

- b. Having charging at work would make me more strongly consider using a PEV
 - c. Charging at work would be nice, but wouldn't influence my decision to use a PEV
 - d. There is no reason to have charging at work
9. What type of charging do you feel is most appropriate for your workplace?
- a. Outlets where PEV drivers can use their own cords to charge and remain plugged in all day
 - b. Lower power chargers that provide 3-5 electric miles per hour of charge and you could stay plugged in all day
 - c. Higher power chargers that provide 6-10 electric miles per hour of charge, but you would have to move your PEV after it is done charging so someone else can use the charger (typically after 3-4 hours)
10. Would you be willing to pay a fee for charging at work?
- a. Yes, the fee should cover electricity and a portion of the expense for the station
 - b. Yes, but the fee should only be for the price for electricity used
 - c. No, this should be provided as a perk for employees
11. At your workplace, would you rather;
- a. Have a lower power charging option that is free
 - b. Have a higher power charging option that costs a fee

Workplace Survey 1 –

For businesses not interested in EVSE

Survey for businesses that participated in the project to gain feedback on: why the business chose not to pursue the installation of charging stations and how the process deployed in this project could have been improved.

Thank you for meeting with us to learn more about electric vehicle charging stations at your organization. Electric vehicles charging stations can be a valuable asset to businesses and organizations, but are not always suitable for specific sites.

Please take the survey below to help us understand how we can improve our outreach and electric vehicle deployment efforts.

1. What is the name of your business/organization? _____
2. How valuable was the initial informational meeting on PEVs in the workplace?
 - a. Not valuable
 - b. A little valuable
 - c. Somewhat valuable
 - d. Pretty valuable
 - e. Very valuable
3. What did you learn most from the informational meeting? _____
4. How could the meeting be improved? _____
5. What was the major reason for not pursuing EV charging for your employees?
 - a. Cost
 - b. Logistics to install/operate charging stations on the property
 - c. Don't expect it to get any use
 - d. Not interested in the technology
 - e. Other: _____

Workplace Survey 2 –

For Businesses signing the commitment and participating in phase 2 activities (site plan, employee event)

Survey for businesses that participated in the project to gain feedback on: why the business chose to pursue the installation of charging stations, how the process deployed in this project could have been improved, and the effectiveness of the employee outreach event

Thank you for meeting with us to learn more about electric vehicle charging stations at your organization. Electric vehicles charging stations can be a valuable asset to businesses and organizations. EV Charging stations can retain current employees and attract new ones, bolster your organizations “green-image”, and encourage others to patronize your business.

Please take the survey below to help us understand how we can improve our outreach and electric vehicle deployment efforts.

1. What is the name of your business/organization? _____
2. How valuable was the **initial informational meeting** on PEVs in the workplace?
 - a. Not valuable
 - b. A little valuable
 - c. Somewhat valuable
 - d. Pretty valuable
 - e. Very valuable
3. What did you learn most from the **informational meeting**? _____
4. How could the **informational meeting** be improved? _____
5. What was the major reason for pursuing EV charging for your employees?
 - a. Employee interest
 - b. Sustainability goals/green image
 - c. Attract or retain employees
 - d. Right thing to do
 - e. Other: _____
6. How valuable was the **site assessment and installation plan/advice** to prepare for charging station at the workplace?
 - a. Not valuable
 - b. A little valuable
 - c. Somewhat valuable
 - d. Pretty valuable
 - e. Very valuable
7. What was the most important information obtained from the **site assessment and installation plan/advice**? _____
8. How could the **site assessment and installation plan/advice** be improved? _____
9. How valuable was the **employee educational event**? _____

- a. Not valuable
 - b. A little valuable
 - c. Somewhat valuable
 - d. Pretty valuable
 - e. Very valuable
10. What was the most useful outcome of the **employee educational event**? _____
11. How could the **employee educational event** be improved? _____

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