Public Electric Vehicle Charging Infrastructure

15 Points

Updated June 2017

While there are no prerequisites required to complete this action, Sustainable Jersey strongly recommends undertaking the following action in conjunction with this action:

- Completion of the "***Make Your Town EV Friendly***" action. This action includes guidance on parking regulations that will enable the municipality to clarify rules for parking and use of the EV charging station, whether or not the municipality of a third party owner owns the equipment.

This action recognizes towns that build publicly available charging stations for Plug-in Electric Vehicles (PEVs). These are distinct from workplace or home based charging stations since they are available for use by the general public. The goal of this action is to increase adoption of electric vehicles in NJ by reducing "range anxiety" barriers through increased access to public charging systems.

While there is significant flexibility in how the project is structured, there must be municipal involvement in initiation and implementation of the effort, and the chargers must be advertised and available for public use. Market experience has demonstrated that by increasing the availability of public chargers, PEV adoption will increase. Municipalities can therefore have a large impact on facilitating the adoption of more sustainable electrically fueled vehicles. Promotion of publicly available charging stations is an essential element of this action.

For silver certified communities this action can count toward Gold Stars in both Energy and Health. See the ***Gold Star Standard*** *section of this action for more information.*

Why is it important?

The benefits of fueling transportation with electricity, rather than petroleum, are especially pronounced in NJ since a) transportation represents a large fraction of energy use and greenhouse gas (GHG) emissions, and b) the Garden State's electricity supply is relatively clean compared to other states. Increasing the fraction of miles that are electrically fueled translates to direct improvements in air quality, reduced GHG emissions, and reduced dependence on fossil fuels. Facilitating a faster migration to electrically fueled vehicles (especially in parallel with increased renewable energy use) is one of the highest impact strategies for making NJ's energy infrastructure more sustainable.

The timing is particularly important since several popular, affordable and practical electric vehicles for commuting and personal use are available today. In addition, every major manufacturer is expected to have a "pluggable" model on the market within the next two years.

"Conventional wisdom" is that public chargers should be installed once PEV adoption reaches a critical threshold, thereby providing a needed service motivated by high levels of PEV ownership. But the goal of this action is to increase PEV adoption, *not* provide a service to consumers that have *already decided to purchase an electric vehicle.* Consumers typically adopt PEVs *after* they become comfortable that chargers are "commonly available." Municipalities have an opportunity to increase PEV adoption by increasing the availability of public chargers, thereby reducing consumer concerns about "range anxiety."

Range anxiety refers to the concern consumers have in "running out of charge" and finding themselves stranded. Although most PEVs will support the owner's typical daily drive, consumers worry about the "unplanned trips" that might cause their vehicles to run out of charge. It is this "exception travel" that motivates range anxiety concerns. Most PEV charging will actually be done at home or (to a lesser extent) at work. The role of public charging infrastructure is to support those motorists that have traveled outside their normal routine, to provide an emergency resource, and to reduce the associated range anxiety. There is significant evidence that as the density of publicly available charging stations increases PEV adoption increases *as a result.*

In addition to providing a real solution to range anxiety concerns, charging stations also play a role in increasing public awareness. Every EV Charging Station is like a billboard advertisement for a PEV vehicle.

The widespread adoption of electric vehicles is one of the most powerful actions that can be taken to ensure more sustainable energy use, and municipalities can play a unique leading role in facilitating and encouraging that transition.

Who should lead and be involved with this action?

There are several ways this action may be implemented. The strategy chosen will dictate who is involved and the degree of municipal leadership necessary.

Given the different strategies that could be taken for project implementation, the key first step is to identify the preferred approach. Sustainable Jersey recommends that the Green Team meet with interested governing body members to discuss the idea and determine if there is enthusiasm and interest to pursue this action. Once that threshold question is answered, there will need to be a follow-up discussion and decision regarding the best approach. That discussion should include municipal officials and appropriate staff.

The key challenge for this action will be covering the costs of charger equipment purchase and installation. Several options are available for a municipality to either own the equipment or let others pay for it through a "sponsorship" or third party ownership structure. Here are four typical scenarios:

- *Alternative #1:* Municipality owns and operates the EV Charging Station(s), and deploys it on municipal property. Deployment at a public parking lot is a typical scenario, or on municipal street-side parking. The municipality would typically fund the project through its capital budget, and may recover costs by charging a fee for the fueling service, or by providing other services (such as advertising). Alternatively, the municipality may view this purchase as part of a public service provided by the municipality. There are specific rules on how municipalities may procure goods and services, governed by Local Public Contracts Law N.J.S.A. 40A:11-1 et seq. There are assigned staff in the municipality that work specifically on procurement that will need to be involved, should this alternative be chosen.
- *Alternative #2:* A "sponsoring partner" funds the purchase and installation of a charger at a municipally designated location for public use. The partner is allowed to recover costs by charging a fee for the fueling service or the provision of other services. In some cases, the sponsoring partner may justify the costs as part of a public relations strategy, a customer retention strategy, or providing a public service. Green team members or municipal officials should be involved to recruit sponsoring partners.
- Alternative #3: Municipality provides land for a third party to own and operate an EV Charging Station. The equipment could be owned and operated by the equipment provider, or an independent third party. As with Alternative #1, there are specific rules that govern the municipality's leasing of land, and there will be assigned staff in the municipality that work on municipal land leasing projects. Those people will need to be involved, should this alternative be chosen.
- Alternative #4: Municipality works with private sector or not-for-profit entity in their town to build an EV charging station for public use. Since this alternative does not involve any of the municipality's assets, procurement rules would typically not apply. Green team or other volunteers that have relationships with potential partners should be involved. There also needs to be support from municipal officials and staff to formally encourage the construction of EV charging stations. That support could come in the form of publicity from the municipality, expediting of permits, providing "how to" support, or other potential "carrots," that could be offered.

These approaches are provided as examples, but any method can be used for Sustainable Jersey certification as long as a) the resulting charger is publicly available and advertised as such, and b) the municipality played an instrumental role in initiating the project. The people involved in the project will depend on the approach taken.

Public charger promotion will involve municipal staff involved with municipal signage, typically the department of public works.

Timeframe

Sustainable Jersey expects that these projects will typically take 8-12 months. Time will be required to (1) educate, discuss and make decisions; (2) follow the required procurement procedures (if applicable) and (3) install the signage.

Project costs and resource needs

As noted above, there are different approaches to the implementation of EV charging stations, and some approaches require municipal investment. Other approaches depend on third party or partner investment, and in those cases there could be little to no municipal expense. Regardless of who is actually investing in the charger, it is important to understand the two primary cost drivers for the project: the cost of the charging equipment itself, and the site-specific costs for installation and interconnection. Installation costs have the potential to increase total project cost considerably. As an example, digging a trench under a paved surface to get to the far corner of a parking lot can cost more than the charging equipment itself. Such site-specific costs can be mitigated through strategic choices regarding the placement of the charging infrastructure.

Types and costs for charging equipment: There are various types of charging stations. Level 2 Chargers are typically appropriate for publicly accessible systems. The DC Fast Charge, considerably more expensive, has been placed predominantly near interstate roadways.

For budgeting purposes, the approximate costs for charging equipment are as follows (please note, the EV charging equipment market is evolving quickly and these numbers will change). The best way to determine a cost estimate for a specific site is to contact the utility, EVSE manufacturers and/or EVSE installers for a site assessment.

- **Level 1 Charge:** 120 volt - a standard outlet just like the one you would use for a toaster. Assuming a fully depleted battery (unusual in most cases) it will typically take 3 to 16 hours to fully charge a Plug-in Hybrid Electric Vehicle (PHEV) and 20+ hours to fully charge a Battery Electric Vehicle (BEV) with a Level 1 Charge. Range of Cost: $300-$1,500.
- **Level 2 Charge Basic:** 240 volt - an outlet similar to those used for household electric dryers. Assuming a fully depleted battery (unusual in most cases), it will typically take 1.5 hours to 6 hours to fully charge a PHEV and 4 to 7 hours to charge a BEV with a Level 2 Charge. Range of Cost: $500-$2,600.
- **Level 2 Smart Chargers:** Smart Chargers are offered in Levels 1, 2, and 3 commercial duty qualities and are generally more expensive than basic chargers. Smart Chargers offer differing levels of communication with the user, site host, utility grid, and the Internet, depending on model and manufacturer. They also offer the option of collecting fees for the charging session and a high level of reporting capabilities. Smart Chargers generally connect with the Internet using cellular connections, Wi-Fi, or phone lines. Range of Cost: $4,500 - $17,000.
- **DC Fast Charge:** This level of charge is only available for some electric vehicle models and will recharge a car to about 80% in about 30 minutes. Range of Cost: $19,000-40,000.

Costs for Installation and Infrastructure: To accurately estimate infrastructure costs, an experienced electrician or electrical engineer should be contacted, a design established, and the costs estimated through a formal quote. However, for budgeting purposes, the following could be used as a starting point, which is in addition to the cost of the equipment itself (listed above):

Parking Garages:

- **Level 1 Charge:** Simple installation at existing wiring: $200-$400 per charge station.
- **Level 1 Charge:** Moderately complex installation: $4,000-$8,000 per charge station.
- **Level 2 Charger (basic):** Simple installation at existing wiring: $300-$500 per charge station.
- **Level 2 Charger (basic):** Moderately complex installation: $5,000-$10,000 per charge station.
- **Level 2 Smart Charger:** Simple installation at existing wiring; $400-$600 per charge station.
- **Level 2 Smart Charger:** Moderately complex installation: $6,000-$10,000 per charge station.

Surface Parking Lots:
- **Level 2 charge basic and smart:** $10,000-$15,000 per charge station.
- **DC Fast Charge:** $100,000-$200,000 per charge station.

Public Charger Promotion: $500 - $1000, mostly for signage.

Note that any non-electrical site improvements such as signage, striping or accessibility modifications would be in addition to the above. In cases where a municipality either finds a sponsoring partner, or where a third party finances the equipment, there may be minimal costs to the municipality for implementation of this action.

Note that regardless of how the equipment is purchased or who owns it, the owner is not allowed to directly sell the electricity to consumers that use the charger in NJ. The typical approach is to charge a “fueling fee” that is not directly tied to the sale of the electricity delivered, and/or to generate revenue through other services (like advertising).

What to do, and how to do it ("How to")

This section provides guidance and recommendations for implementing the action. A municipality does not need to follow this guidance exactly as long as it meets the requirements for earning points for this action. Please note that as part of the Resources section, there is reference material and a list of organizations that can aid green team volunteers with this action.

The first step is to decide on the implementation path with municipal officials, as described in the “Who Should Lead” section of this action. Project implementation depends heavily on the approach used, as described previously. In the simpler case where the municipality owns the equipment, equipment and installation quotes are solicited (potentially through an RFP), and the system installed. In cases where a partner is involved, that relationship must be established, and the partner is then responsible for project implementation. In all cases, the end result of the action is an EV charging facility at a publicly accessible location. Signage and other promotion must be part of the project.

To most effectively combat range anxiety, the EV charging station should be located at destinations that are easily visible and accessible to the public, and where drivers can spend time while their vehicle charges, particularly in the downtown, retail and leisure clusters. At the same time, strategic consideration should be given to how a given location might influence costs – where the charger is located (relative to the electrical interconnection point) can have a large impact on project costs.

Example locations include a) municipal parking lots and street-side parking (typically in a town center), b) commercial properties such as strip malls, supermarkets, malls, movie theaters, mixed use facilities, large employers, and c) places where the public gathers such as sports arenas, concert halls, theaters, public libraries, community centers, houses of worship, parks and recreational facilities, public and private schools including universities.

Public Charger Promotion:

The most important aspect of this action is to make the charger publicly available, including the “publication” of charger availability on at least one of the public domain “charger directories.” This makes the location of the charger known to most PEV drivers, either through their car or through a phone app, and may include other services such as being able to determine whether the unit is currently in use. The most important directory is the US Department of Energy's Alternative Fuel Data Center Station Locator at: www.afdc.energy.gov/locator/stations/places/new

Appropriate signage directing the public to the charger location increases awareness and enhances utilization and impact of the charging stations. Signage should identify the location of publicly accessible charging stations, both throughout town and next to charging stations.

Install appropriate signage directing drivers to any publicly available chargers in the municipality. Approval with a corresponding signage plan and budget will need to be secured from municipal officials. Green team volunteers, in additional to appropriate municipal officials and staff, should be involved in working up the signage plan. The municipal staff in charge of procurement will be involved with contracting for signage.

Note that for “way finding” road signs, any deviance from the Manual of Uniform Traffic Control Devices regulations requires approval under the “experimentations” waiver. Overall regulations applicable to EV charging designation signage include color and placement hierarchy.

What to submit to earn points for this action

To be eligible for Sustainable Jersey points, the charger must be physically installed, operational, “registered” on a public EV directory service, and available for public use. The municipality can get credit for this action regardless of the date when the public EV Charging Station was installed as long as the municipality can document that it is still operational and available for public use, and that signage for the public EV Charging Station is in place at the time of application.

In order to earn points for this action, the following documentation must be submitted as part of the online certification application in order to verify that the action requirements have been met.

1. Description of Implementation – In the text box provided on the submission page for this action provide a short narrative (300 words or less) of what has been accomplished and the impact it has or will have on the municipality.
2. Provide a letter, signed by a municipal authority that includes the following information:

- Type of EV charging equipment installed: Level 1, Level 2, or DC.
- Evidence that the charging station(s) is/are listed in a publicly accessible directory system. Indicate the directory or directories on which the charging station(s) is/are registered.
- Describe the signage and promotion utilized. Optional: submit signage plan and/or photographs of signage installed.

- A description of the approach taken to implementation (municipally owned, sponsoring partner, third-party ownership, etc.), specifically including a) if there are any charges to the consumer for system use, and what those charges are, and b) overall, how revenue is generated for the owner, if applicable.
- Optional: Photo of the public EV charging station(s)

Resubmission Requirements

To resubmit for points under this action, the municipality will need to document that the public EV Charging Station is operational and available and that public signage remains in place as documented at the time of application submission.

Approved Action Expiration Date

Points for this action expire 5 years from the year the certification application is submitted.

IMPORTANT NOTES:

There is a limit of six uploaded documents per action and individual files must not exceed 50 MB. Excerpts of relevant information from large documents are recommended.

All action documentation is available for public viewing after an action is approved. Action submissions should not include any information or documents that are not intended to be viewed by the public.

Gold Star Standard

Energy: Successful completion of this action is one of the requirements for earning a Gold Star in Energy.

Health: Successful completion of this action will meet the requirement of an Additional action for earning a Gold Star in Health.

For more information on earning a Gold Star in Energy or Health, see the Gold Star Standards section of the website.

Spotlight: What NJ municipalities are doing

In 2010, Montclair became the first municipality in the state to install a networked series of public charging stations in the heart of their commercial districts. Located in two municipal parking lots – one in the heart of the downtown business district, and one in Upper Montclair's busy shopping area – the four stations can recharge any battery-powered car, including pluggable hybrids, and are available for use by the public.

The downtown chargers can be easily reached from the Garden State Parkway, and the uptown chargers from Rtes. 80 and 46, and signage has been provided in the town to help drivers find the chargers. Drivers simply pull into either parking lot, plug their electric car into the ChargePoint device, return to find their car charged up and their "Smart Card" account automatically debited.

Summary of Project Costs (in 2010)

Chargers and Installation (Fullerton Parking Deck, 2 stations)	$10,450.00
Chargers and Installation (Upper Montclair Charging Plaza, 2 stations)	$9,825.00
Cost of Building Permits for Installation of Charging Stations	$185.00
Unit Set-up and Activation	$1,200.00
Signage (streets, parking lots, slip signs)	$1,161.00
Promotional activities (banner)	$96.00
Total Cost for Project	**$22,917.00**

This budget funded a total of four stations at two separate locations.

Resources

The following resources may be helpful in completing this action. There are extensive resources available for assisting municipalities with the installation of public charging infrastructure, and with the topic of electric vehicle adoption in general.

New Jersey Resources

- **Sustainable Jersey Alternative Fuel Vehicle Procurement Guide**
  https://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/Energy/Alternative_Fuel_Vehicle_Procurement_Guide_01.08.2020.pdf
- **Sustainable Jersey Purchasing Resource Center**
  The Sustainable Jersey Purchasing Resource Center is an online tool that assists municipalities and schools in accessing sustainable goods and services, such as alternative fuel vehicles and charging infrastructure. This resource offers a directory of cooperative purchasing options from state, county, and collaborative organizations, and a quote library showcasing eligible equipment and services customized to meet your needs.
- **NJTPA Alternative Fuel Readiness: A Guidebook for Municipalities**
  http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/Make_Your_Town_EV_Friendly/NJTPA_AFV_Readiness_Guidebook_Dec2017_FINAL.pdf
- **NJTPA Montclair Township AFT Readiness Plan**
  http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/Make_Your_Town_EV_Friendly/NJTPA_Montclair_AFV_Infrastructure_Readiness_Plan_FIN
- **NJTPA Town of Secaucus AFV Readiness Plan**
  http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/Make_Your_Town_EV_Friendly/NJTPA_Secaucus_AFV_Infrastructure_Readiness_Plan_FIN
- **NJTPA Woodbridge Township AFV Readiness Plan**
  http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/Make_Your_Town_EV_Friendly/NJTPA_Woodbridge_AFV_Infrastructure_Readiness_Plan_

Resources for NJ Municipal procurement

For Charging Stations:

- **EVSE-related members of the National Electrical Manufacturer's Association (NEMA)**
  https://www.nema.org/products/Pages/Electric-Vehicle-Supply-Equipment-System.aspx
- **For EVs:**
- ***NJ State Treasury Contract – covering Volt, Leaf, Prius PHEV and Focus EV***
  https://www.state.nj.us/treasury/purchase/pricelists.shtml

General Resources

Transportation and Climate Initiative

- ***Creating EV-Ready Towns and Cities: A Guide to Planning and Policy Tools***
  https://www.georgetownclimate.org/reports/creating-ev-ready-towns-and-cities-a-guide-to-planning-and-policy-tools-0.html
- ***Electric Vehicle Information for Local Governments***
  https://www.georgetownclimate.org/reports/electric-vehicle-information-for-local-governments.html
- ***Northeast Electric Vehicle Network***
  https://www.transportationandclimate.org/content/northeast-electric-vehicle-network
- ***Siting and Design Guidelines for Electric Vehicle Supply Equipment***

http://www.transportationandclimate.org/sites/default/files/EV_Siting_and_Design_Guidelines.pdf

US DOE Alternative Fuels Data Center

- ***A Guide to the Lessons Learned from the Clean Cities Community Electric Vehicles Readiness Project***
  https://afdc.energy.gov/files/u/publication/guide_ev_projects.pdf
- ***Costs Associated with Non-Residential Electric Vehicle Supply Equipment: Factors to Consider in the Implementation of Electric Vehicle Charging Stations***
  https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf
- ***Plug-in Electric Vehicle Readiness Scorecard***
  https://afdc.energy.gov/pev-readiness.html
- ***Public Electric Vehicle Handbook for Public Charging Station Hosts***
  https://afdc.energy.gov/files/pdfs/51227.pdf

Other states resources

California. Ready, Set, Charge California – a guide to EV-Ready communities http://www.ct.gov/deep/lib/deep/air/electric_vehicle/ReadySetCharge_-_CA.pdf

NYSERDA Best Practices Guide for Site Owners of Electric Vehicle Charging Stations on Commercial Properties
https://www.nyserda.ny.gov/Researchers-and-Policymakers/Electric-Vehicles/Resources/Best-Practice-Guides-for-Charging-Stations

Drive Electric Vermont. Electric Vehicle Charging Station Guidebook: Planning for Installation and Operation
https://www.driveelectricvt.com/Media/Default/docs/electric-vehicle-charging-station-guidebook.pdf

Colorado: *Drive Electric Northern Colorado*
http://driveelectricnoco.org/

New Jersey: *NJ Clean Cities Coalition*
https://cleancities.energy.gov/coalitions/new-jersey

North Carolina: *Plug-in North Carolina*
http://www.pluginnc.com/

Oregon: *Drive Oregon (now known as Forth Mobility)*
https://forthmobility.org/

Transportation and Climate Initiative of the Northeast and Mid-Atlantic States
https://www.transportationandclimate.org/content/northeast-electric-vehicle-network

US Department of Energy: *Clean Cities Coalitions*
https://cleancities.energy.gov/