EV RESOURCE GROUP
Design . Build . Maintain

EV CHARGING INFRASTRUCTURE 101

TYPES OF CHARGING STATIONS

- Level 1 Charger (Trickle Charger)
Level 1 Chargers are recommended for Residential use and plug into a standard 110-volt outlet. The estimated Electric Range per hour of Charging is 2-5 miles.

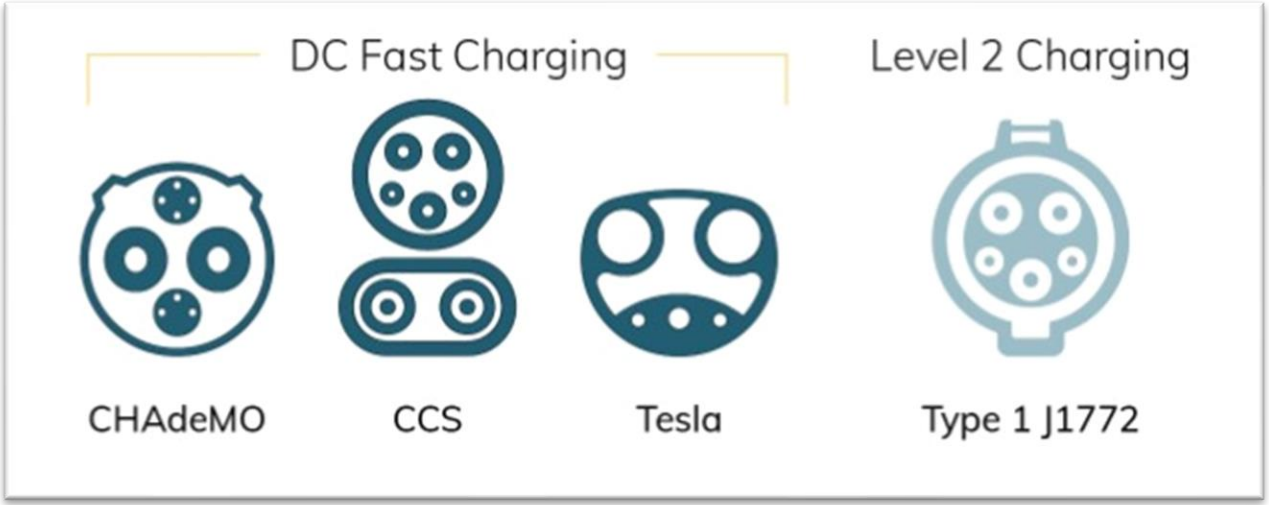
- Level 2 Charger
Level 2 Chargers operate at 208-240 V and offer anywhere from 3kW to 19kW of AC power. Level 2 Chargers are also recommended for Residential use and are ideal for overnight charging. Level 2 Chargers can also be found at commercial office buildings and other places of destination.

- Level 3 Charger (DC Fast Charger)
DC Fast Chargers operate at 208V or 480V 3-Phase and supply anywhere from 20kW to 400kW.

- For most applications when dealing with Fleet Charging, large Level 2 chargers will be utilized or Level 3 DC Fast Chargers.



Connector Types



Level 2 Charging:

Tesla Connector - Standard Connector on all Tesla vehicles.

J1772 Connector – Standard on all Non-Tesla Vehicles.

Level 3 Charging (DC Fast Chargers):

CCS Connector – Standard on most Non-Tesla vehicles.

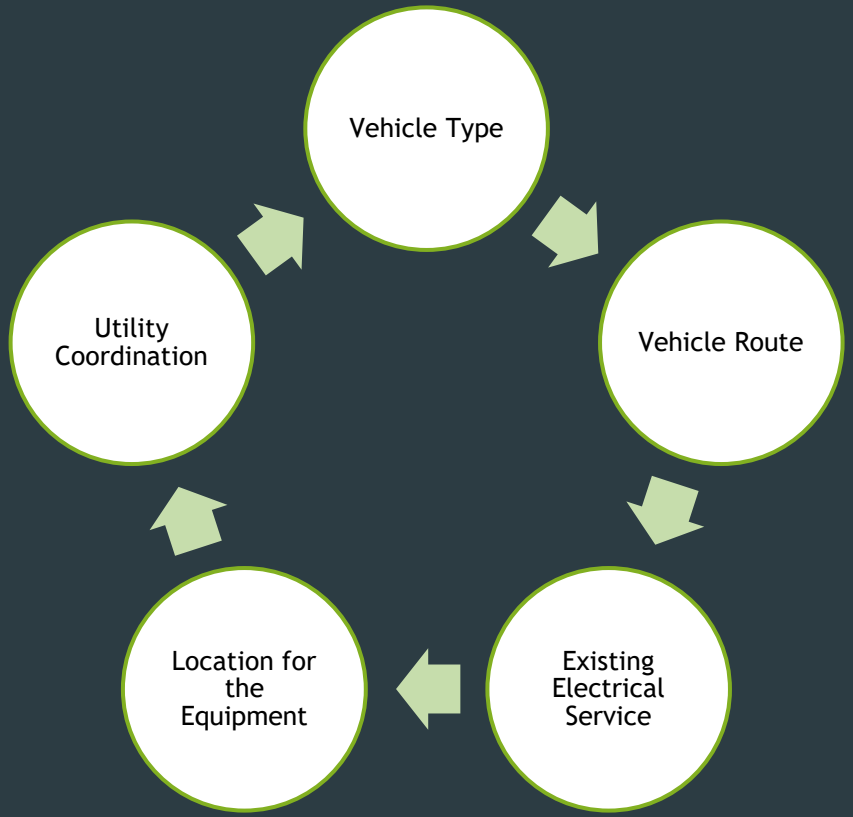
Tesla Connector – Standard on all Tesla Vehicles.

CHAdeMO – This connector is used on a very small number of Non-Tesla vehicles.

CONSULTATION / SITE ASSESSMENT

Step 1: Schedule a Consultation with a qualified EV Infrastructure Company to determine the Sites Needs for Charging. The overall process can take months, if not years, so the earlier the process is started the better. A qualified contractor will ask a series of questions to gather the appropriate information and complete a detailed site analysis to determine your current charging needs and will also tailor the project to include future charging needs.

- **What type of vehicle will be charged?**
- **How many vehicles will require charging?**
- **What type of routes will the vehicle be traveling and the total distance?**
- **The above questions will determine the type of equipment that will need to be used and the type of electrical service that will be required to operate the chargers.**
- **Determine the capabilities of the existing electrical service. Will a new service be required to operate the chargers based on the above?**
- **Determine a location for the installation of the chargers. The location chosen should be in close proximity of the electrical service.**
- **If a new service or upgrade to the service is required, coordinate with the utility company for a site visit with an engineer.**



UTILITY COORDINATION / ELECTRIFICATION



Step 2: Coordinate with your Utility Provider through your contractor. This is one of the most important steps in the process. Most locations will require a new service or at the minimum an upgrade to the existing service. This process can take 6+ Months from Initiation to Completion.

Initiation:

- ➔ Prepare & Submit a Service Application

Planning:

- ➔ Site Visit with the Utility Provider Engineer.
- ➔ Utility Provider to complete Initial Design.
- ➔ Utility Provider to provide a Cost Estimate & Timeline Estimate.

Design:

- ➔ Customer approves the Utility Provider to start work.
- ➔ Utility Provider completes design.
- ➔ Utility Provider applies for Utility Permits.

Scheduling:

- ➔ Contractor to coordinate with the Utility Provider to schedule construction for the utility infrastructure.

Construction:

- ➔ Utility Provider performs a site inspection for site readiness.
- ➔ Utility Provider

Completion:

- ➔ Installation Complete



DESIGN

Step 3: Design. This will be a collaborative effort between the end user, contractor and engineer to ensure that the design that will be used for execution of the project meets the clients' expectations, abides by local and federal guidelines, will be sustainable and maintainable as well as to ensure that any future charging needs have been taken into consideration.

- Equipment Selection
- Scope Development
- Future Proofing
- Utility Coordination
- Value Engineering
- Aesthetics
- User Friendly
- Protection
- Safety and Security Review
- ADA Guidelines
- Final Site Layout
- Permittable Construction Drawings





Permitting

Step 4: Permitting. Once the design is complete, a permittable set of construction documents can be assembled to submit for Zoning and Building Permits.

Zoning Permit:

- Zoning Application Submission (Submitted by the Contractor or Owner)
- Zoning Application must be accompanied by a current site survey. (The site survey is to be provided by the property owner)
- Approval

Building Permit:

- Once Zoning has approved the Zoning Application, Building and Electrical Permits must be applied for with the local jurisdiction.
- Construction Application with the proper subcode sheets must be submitted.
- The application must be accompanied by constructions drawings detailing the scope of work to be completed.
- Approval

ONCE THE ZONING AND BUILDING PERMITS ARE APPROVED WORK CAN COMMENCE.

CONSTRUCTION

Step 5: Construction

- ➔ **Schedule**
- ➔ **Mobilization**
- ➔ **Utility Mark-Out**
- ➔ **Ground Penetrating Radar (GPR)**
- ➔ **Saw-Cutting / Directional Drilling**
- ➔ **Excavation**
- ➔ **Underground Electric**
- ➔ **Underground Inspections**
- ➔ **Concrete (Footings / Pads / Bollards)**
- ➔ **Backfill / Grading**
- ➔ **Electric**
- ➔ **Equipment Installation**
- ➔ **Site Repairs**
- ➔ **Asphalt Striping**
- ➔ **Signage**
- ➔ **Landscaping**







EQUIPMENT TESTING / COMMISSIONING

Step 6: Testing / Commissioning. Now that construction is complete, and the Charger is installed, it is time to get the charger online and ensure that it is functioning properly.

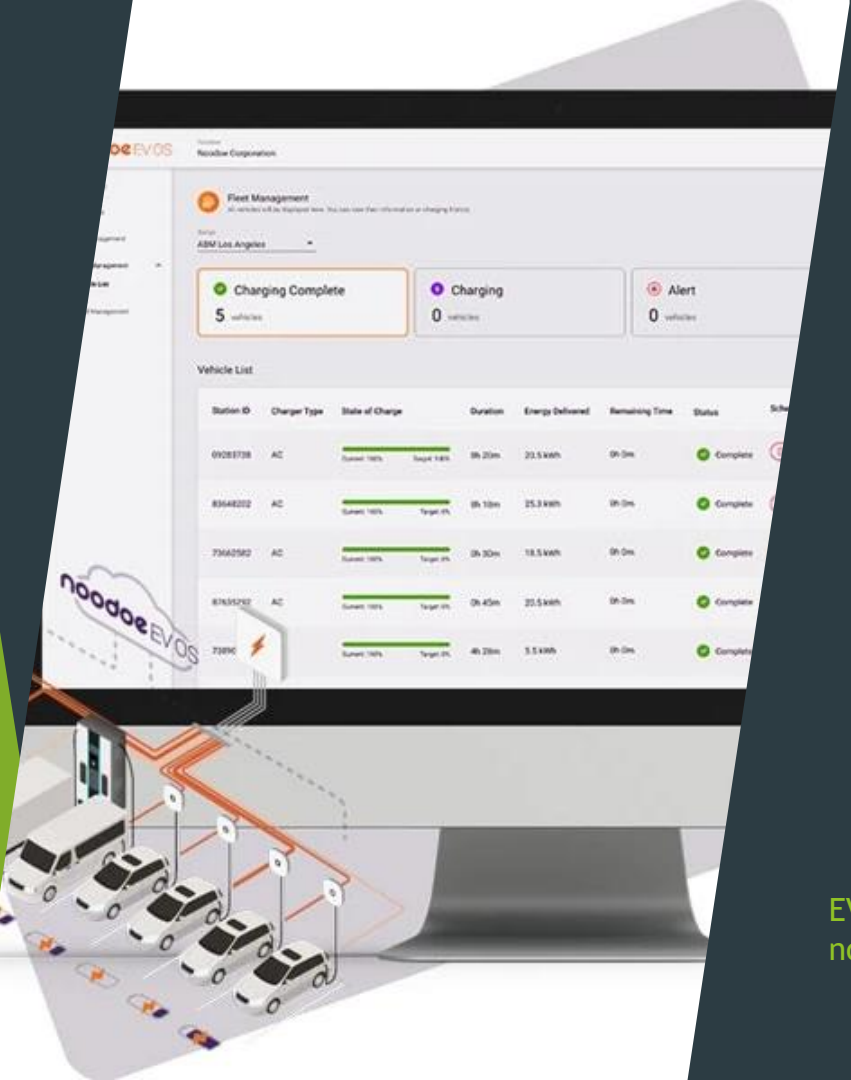
- Power Cycling: Safely Cut and Restore Power to the Charging Unit.
- Connect to the charger with a Laptop utilizing an Ethernet Cable.
- Connect the charger to the 4G Network or Wi-Fi.
- Ensure the Charger is online.
- Have an EV or simulator onsite to test the charger to ensure operation.
- Check all vital connections to ensure that the charger is operating properly.
- Troubleshoot if necessary.



PREVENTATIVE MAINTENANCE

Step 7: Preventative Maintenance. Protect your investment to ensure that your fleet remains operational. Evaluate the warranty and maintenance options available when purchasing your EV Charger. Preventative Maintenance is a necessity.

- Annual Inspections
- General Maintenance
- Emergency Repairs
- Equipment Upgrades
- Hardware Replacement
- Electrical Diagnosis
- Vandalism Repairs
- Warranty Repairs
- Service Plans



Management Software

Management Software will allow the end user the ability to track, monitor and manage the charging process to ensure that the fleet is operating efficiently.

- Save Time
- Save Money
- Less Stress
- Access Control
- Schedule Charging
- Load Management
- Track Charging Activity
- Distribute Energy Load
- Process Payments (If Applicable)
- Thorough Reporting

EV Charging Management Software is not just useful, but critical.

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