



City of Phoenix Aviation Department

Vehicle Electrification Infrastructure Policy

PURPOSE

This policy provides direction on the electric vehicle (EV) charging infrastructure for the City of Phoenix Aviation Department (AVN) and aligns with the Department's [Roadmap to Net Zero Carbon](#) and City of Phoenix's [Climate Action Plan](#). The *Roadmap to Net Zero Carbon* sets a goal of Net Zero by 2040 and identifies transitioning the Aviation Department fleet to EVs as a medium-term strategy. The City's *Climate Action Plan* is focused on a 50 percent carbon emissions reduction by 2030. The *Climate Action Plan* also includes initiatives related to EV charging infrastructure and fleet electrification. The guidance in this policy supports the transition to EVs by outlining how to install critical charging infrastructure. The *2023 AVN EV Charging Stations Planning Study* identified locations for chargers and power considerations, which inform this policy and the EV Charging Roadmap.

It is AVN's policy that EV charging be made available at its airports to:

1. Reduce fossil fuel emissions;
2. Enhance the level of service and convenience for public parking customers as well as airport employees, tenant employees, and others working on airport property; and
3. Generate revenue from various parties, including public parking customers, airlines (via rates and charges), commercial vehicle operators, and others; AVN employees will be provided charging at no cost as an amenity.

It is the balance of these considerations that informs the business model and provision of EV charging at the facilities as described within this policy.

AVN prioritizes sustainability, safety, fiscal responsibility, and equitable access to EV charging infrastructure and EVs. These themes underlie all measures identified within this policy. Because the EV industry is rapidly developing, this policy is intentionally scalable and flexible to accommodate changing technologies, uses, and conditions over time. The flexibility component of this policy is intended to mitigate risks to changes in societal/political approach to charging infrastructure.

Ground Support Equipment (GSE) and GSE Operators are not included in this policy. AVN understands that GSE operators are a critical user group and strategies to support their transition to electrification are a priority. Due to complexities relating to common use and privately owned eGSE chargers, AVN will be developing guidelines for and working with airline partners separately from this policy.

This policy covers the three City of Phoenix airports: Phoenix Sky Harbor Airport (PHX), Phoenix Deer Valley Airport (DVT), and Phoenix Goodyear Airport (GYR). Policy guidance will vary based on specific operations and users unique to each facility.



DEFINITIONS

- **Centralized location:** Multiple chargers that are collocated, but not necessarily closest to a building.
- **Daily Parking:** Parking facilities with expected parking durations more than four hours and less than 24 hours.
- **DC Fast Charger (DCFC):** A charger which operates on 480 Volt 3-phase, 100 Amp circuit with an output of about 50-350 kW (35-200 miles/20 minutes) with integrated charging cables.
- **Downgraded Level 2 Charger:** A Level 2 charger which has the power output reduced to 1-2 kW. The Airport will provide all necessary charging infrastructure; users would not need to bring their own charging cable.
- **EV Capable:** An electrical panel has capacity and underground conduits are installed, but electrical circuits are not installed, and exact layout of chargers has not been determined.
- **EV Ready:** An electrical panel has capacity and underground conduits and electrical circuits are installed. Layout of chargers has been determined but the charger itself is not installed.
- **Ground Support Equipment (GSE):** Equipment which services aircraft.
- **Idle Time Fee:** Fees charged to a user after their vehicle is fully charged but their vehicle is still connected to the charger.
- **Level 1 Outlet:** A standard outlet which provides access to 120 Volt, 10-20 Amp circuit with an output of 1-2 kW (2-5 miles/hour).¹ Users provide their own mobile charging cable to plug into the outlet.
- **Level 2 Charger:** A charger which operates on 208-240 Volt, 15-80 Amp circuit with an output of about 6-15 kW (12-60 miles/hour), with integrated charging cables.
- **Load Managed Charger:** A networked charger capable of manipulating the amount of electricity based on the overall load of the system, typically in near real time for an entire cluster of EV chargers. Among other benefits, load managed chargers allow for the ability to avoid electricity demand charges. Also known as load shifting, load control, load curtailment, and load restricting.
- **Long-term Parking:** Parking facilities with expected parking durations more than 24 hours.
- **Networked Charger:** A charger that can send and receive communications for data exchange. Also known as a “smart charger.”
- **Short-term Parking:** Parking facilities with expected parking durations less than four hours.
- **Visitor Parking:** Parking locations for those conducting business at the following buildings: Facilities, AVN Headquarters, Operations, Design Construction Services, and Bus Maintenance Facility. Passenger pick-up, the Cell Phone lots, and the visitor parking at the Rent-a-Car (RAC) Center are not considered visitor parking.

¹ Note that these miles per hour of charge provided are indicative of the charging speed. Actual rates depend on several factors including the vehicle and environmental conditions.



USER GROUPS

- **AVN Employees:** Employees working for AVN that park their vehicles at the airport for the workday.
- **AVN Fleet:** Light-, medium-, and heavy-duty fleet vehicles operated by/for AVN.
- **Ground Transportation Operators:** Mostly light-duty vehicle operators such as taxi and ride-share companies, and some medium-duty vehicles operators such as hotel and parking shuttles that operate at the airport.
- **Public Parking:** Public visitors utilizing the airport, meeting travelers, or conducting other business at the airport.
- **Tenant Employees:** Employees working for entities other than AVN that park their vehicles at the airport for the duration of their work shift, typically less than 10 hours but which can be multiple days for some workgroups such as airline flight crews.

OVERARCHING APPROACH FOR EV CHARGING INFRASTRUCTURE

The guidance below provides an approach to planning and implementation, as well as the business models (inclusive of operations and maintenance) for EV charging infrastructure at AVN facilities to ensure the safe and effective transition to electric vehicles. These measures apply to EV charging infrastructure projects across AVN owned and operated facilities, operations, and user groups, including projects associated with changes to existing infrastructure and construction of new infrastructure.

Planning and Implementation

1. Foster close coordination and cooperation with Arizona Public Service (APS), including annual meetings on 5-year CIP projects impacting electrical demand.
2. Foster close coordination and collaboration with stakeholders operating fleets or equipment that are not managed by AVN regarding plans/goals to electrify fleets, electrical demand for charging infrastructure, and timeline to meet goals. These stakeholders include, but are not limited to airlines, ground transportation operators, and tenants whose vehicles primarily operate on airport property.
3. Plan for flexibility in implementation (i.e., changes in available technology; EV capable infrastructure rather than EV Ready; contracts that include provisions enabling the easy removal of infrastructure).
4. Integrate safety considerations in planning and implementation (i.e., coordinate with the Fire Department during planning of all EV Charging projects; incorporate EV related information in first responder training program).
5. Ensure that all EV charging projects meet local, state, and federal codes, including the Americans with Disabilities Act (ADA). All signs must meet current accessibility and signage requirements.



6. Coordinate EV charging projects across AVN facilities with solar installation projects, when feasible.
7. Coordinate with the Fire Department when installing EV chargers in parking garages and ensure compliance with current version of the National Fire Code. EV installations shall be located on the ground floor, where feasible.
8. Isolate electrical outlets used for Level 1 charging to dedicated electrical meters or submeters so that overall usage data can be collected.
9. Consider extreme heat conditions common to the Phoenix metropolitan area when designing EV charger installations. Design considerations could include shading of parking spots or chargers and selection of more reflective colors for parts that must be handled by users.
10. Plan EV charging projects to serve current demand with capability to expand to accommodate additional demand over the next 10 years based on pre-identified threshold trigger outlined below:
 - a. Measure the use and performance of EV Chargers (i.e., charger up time) to determine need for additional chargers. When the monthly charger utilization rate exceeds 75% for a given parking location AVN should consider increasing the number of chargers available.

Business Model

1. Except for chargers which exclusively serve AVN Fleet the business model should include fee structures for use of EV charging at Level 2 chargers and DCFCs. Additionally, the chargers should have the capability to impose idle time fees if a vehicle stays connected to a charger after it is completely charged.
2. For Level 2 chargers and DCFCs, AVN will fund and implement infrastructure necessary to power the charger locations. Third-party vendor(s) will provide, install, operate, and maintain the chargers, networking, load balancing, and associated software.
3. When considering whether to install Level 1 outlet access or Level 2 chargers, conduct a cost/benefit analysis to compare the additional cost of installing, operating, and maintaining Level 2 chargers versus electrical outlets, and evaluate the ability to outsource installation, operation, and maintenance of Level 2 chargers.
4. Ensure that all Level 2 chargers and DCFCs are networked.
5. Leverage federal, state, and local grant opportunities to further scale EV charging across all airports.

GUIDANCE FOR EV CHARGING BY USER GROUP

Specific EV-related considerations must be integrated in project planning, depending on the type of project. Measures common to all projects include:

- Chargers should be co-located in as few locations as possible to take advantage of electrical feeds and infrastructure, and provide ease of wayfinding.



- If installed in a garage, charging infrastructure must be near an entrance or exit, and be in centralized locations with appropriate signage for ease of wayfinding.
- If Level 1 outlets are installed:
 - Electricity will be provided at no additional cost to users, but parking rates may be modified in the future to account for power access.
 - Outlets will be operated and maintained by AVN staff.
 - Outlets will be on a separate sub metered circuit and monitored for utilization.
 - If new video cameras are installed for safety monitoring and analytics, they shall be positioned to detect if a vehicle is plugged into and utilizing a Level 1 outlet.
- If Level 2 chargers or DCFCs are installed:
 - Chargers will be networked and load managed.
 - EXCEPT FOR AVN FLEET USE, chargers will have a fee associated with their use.
 - EXCEPT FOR AVN FLEET USE, chargers will be operated and maintained by a third-party vendor.

The following sections outline the specific required measures that must be integrated for each project type and user group.

1. AVN Fleet

AVN Fleet (charging durations and locations vary)

- Level 1 and/or 2 chargers will be located in common worksites/strategic locations to provide power access to fleet vehicles across the AVN property.
- DC Fast Chargers will be installed at locations which are accessible to AVN fleet vehicles (e.g., fueling facility).
- Staff must reference AVN procedures to use chargers.
- Chargers located in AVN fleet parking lots will be operated and maintained by AVN. Divisions should maintain a charging plan and schedule based on their vehicle utilization to distribute the available capacity to a cross section of AVN users.
- Access control will be required.

2. AVN Employees

AVN Employee Parking (parking/charging duration during the workday, typically less than 10 hours)

- To account for changes in EV infrastructure in AVN employee areas, AVN will employ measures to adjust sizing based on demand (i.e., by collecting data via survey distribution).
- It is required to install Level 1 outlet access *at a minimum*, Level 2 chargers are an alternate option (based on cost/benefit analysis).



3. Tenant Employees

Other Employee Parking (parking/charging duration during the work shift, typically less than 10 hours, but which can be multiple days for flight crews)

- It is required to install Level 1 outlet access *at a minimum*, Level 2 chargers are an alternate option (based on cost/benefit analysis).

4. Ground Transportation Operators

Ground Transportation Operators (charging duration up to 30 minutes)

- It is required to install DCFCs for parking shuttles, as well as taxi and ride-share companies.
- No charging infrastructure will be installed to serve hotel shuttles.

5. Public Parking

Short Term Public Parking (parking duration four (4) hours or less)

- It is required to install Level 2 chargers.

Daily Public Parking (parking duration more than 4 hours and less than 24 hours)

- It is required to install Level 1 outlet access *at a minimum* and is optional to install downgraded Level 2 charger (conduct a cost/benefit analysis).

Long Term Public Parking (parking duration more than 24 hours)

- It is required to install Level 1 outlet access *at a minimum* and is optional to install downgraded Level 2 charger (conduct a cost/benefit analysis).

Visitor Parking (parking duration between one (1) and ten (10) hours)

- It is required to install Level 1 outlet access *at a minimum*, but it is optional to install Level 2 chargers (based on cost/ benefit analysis).

This policy will be reviewed annually and updated, as needed.