



Strategic Pathways for Indigenous Resilient and Innovative Transportation

A Guide to Public Electric Vehicle Charging Infrastructure for Tribes

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Case Studies

- Electric Nation Partnership Installs EV Charging Network Across Midwestern Tribes (**Section 3.2**)
- Gun Lake Tribe Installs EVSE To Support a Growing Electric Tribal Fleet for Environmental Programs (**Section 3.4**)
- Tule River Indian Tribe Partners With Native Energy Services Company and the Tule River Economic Development Corporation To Build EV Charging in the California Central Valley (**Section 3.4**)
- Mille Lacs Band of Ojibwe and the Mille Lacs Energy Cooperative Upgrade Electric Services for EV Charging (**Section 3.6**)
- Tule River Indian Tribe Uses Solar Plus Storage To Manage Electricity Rates (**Section 3.7**)
- Mille Lacs Band of Ojibwe Stack Funding Sources To Build an EV Charging Station (**Section 4.2**)
- Jamestown S’Klallam Tribe Prepares Buildings for Future EV Charging Demand (**Section 4.3**)
- A Group of California Tribes Design a Place-Based Pre-Apprenticeship Program for Low-Voltage Electricians (**Section 5.1**)

Acronyms and Abbreviations

- **AC:** alternating current
- **AFDC:** Alternative Fuels Data Center
- **DCFC:** direct-current fast charger
- **EV:** electric vehicle
- **EVSE:** electric vehicle supply equipment
- **kW:** kilowatt
- **kWh:** kilowatt-hour
- **NEVI:** National Electric Vehicle Infrastructure
- **OCPP:** Open Charge Point Protocol
- **RFP:** request for proposals
- **TERO:** Tribal Employment Rights Ordinances
- **V:** volt

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Commitment to Indigenous Data Sovereignty

The National Laboratory of the Rockies and the Alliance for Tribal Clean Energy recognize that data is a vital resource for Tribal Nations. As such, this project is committed to upholding the principles of Indigenous data sovereignty, which assert that Tribes have the inherent right to govern the collection, ownership, application, and sharing of data about their communities, lands, and resources. This project will integrate these principles to ensure that Tribal control over data is respected and that engagement processes align with the cultural values and priorities of participating Tribes.

Guiding Principles

- 1. Tribal ownership and control:** All data collected during this project will be treated as the shared intellectual property of the respective Tribes. Tribal consent will be required before data are collected, analyzed, or shared.
- 2. Free, prior, and informed consent:** Tribes will be informed how their data will be used, stored, and shared before they choose to participate. Participation will be voluntary, and Tribes may withdraw at any time without consequence.
- 3. Cultural sensitivity:** Data collection methods and questions will be designed to align with the cultural values, traditions, and preferences of participating Tribes.
- 4. Data minimization:** Only data that are essential to achieving the objectives of the Tribal transportation electrification guidebook and fact sheets will be collected. This minimizes the risk of misuse or exploitation.
- 5. Transparency and accountability:** The National Laboratory of the Rockies and Alliance for Tribal Clean Energy will provide clear communication about how data are managed and will seek Tribal input at every stage of the project.

This project will prioritize Indigenous ways of knowing and Tribal governance frameworks throughout all phases. Engagement methods will be tailored to the specific needs and preferences of each individual participating Tribe. This includes:

- Ensuring questions, materials, and outputs are accessible and reflect the varied priorities and realities of Tribal communities.
- Acknowledging and respecting traditional knowledge systems, including cultural, spiritual, and ecological, as equally valid and essential as Western scientific approaches.
- Providing Tribes with opportunities to guide the direction of the project, including recommendations for future initiatives.

1.0 Introduction

Electric vehicle (EV) adoption is increasing globally. In the United States, approximately 10% of new car registrations were electric in 2023 (International Energy Agency 2024). The number of EV charging stations across the United States is also growing rapidly, including in Indian Country. EV adoption and EV charging infrastructure deployment could align with larger Tribal goals, including long-term economic development goals, environmental goals, and Tribal sovereignty goals.

This project, *Strategic Pathways for Indigenous Resilient and Innovative Transportation*, serves as a guidebook for Tribes interested in pursuing public EV charging infrastructure. The guidebook is designed to serve Tribal planners, Tribal departments of transportation, environmental offices, Tribal enterprises, Tribal utility authorities, Tribal leadership, and any other interested parties.

This project is a partnership between the Alliance for Tribal Clean Energy and the National Laboratory of the Rockies. It was funded by the Alliance for Tribal Clean Energy from 2024 to 2026. The guidebook was developed using input from Tribal staff and leadership, gathered via interviews and a questionnaire.

This guidebook does not discuss private residential charging infrastructure, fleet electrification, or medium- and heavy-duty EVs. Resources about those topics are provided in **Appendix E**. This guidebook focuses on the contiguous United States and does not cover the different circumstances in Alaska or Hawaii.

2.0 Electric Vehicle and Electric Vehicle Charging Basics

In this section, the reader will learn:

- What is an EV?
- What are the different types of EV charging equipment?
- What are the benefits and challenges of EVs?
- What are different types of electric utilities?

2.1 EV Technology

This section introduces the reader to EV technologies, including the different types of EVs and regenerative braking, to help establish foundational knowledge.

Key Takeaways

- EVs draw electricity from electrical power sources and store the energy in the vehicle's battery.
- The term "EV" refers to battery-electric vehicles, plug-in hybrid electric vehicles, and hybrid electric vehicles.

EV Types

The term "electric vehicles" refers to plug-in hybrid EVs, all-electric vehicles, and hybrid EVs. EVs draw electricity from electrical power sources and store that energy in on-board batteries. **Table 1** compares the three types of EVs:

- All-electric vehicles, also known as  **battery-electric vehicles**, are solely powered by electricity. They operate by drawing energy from a battery that is charged by plugging the vehicle into charging equipment and through regenerative braking (AFDC n.d.-c).
-  **Plug-in hybrid EVs** are powered by an internal combustion engine and an electric motor that uses battery-stored energy. Plug-in hybrid EVs can operate in all-electric mode and use the internal combustion engine when the battery is mostly depleted or under other conditions that require additional power. Plug-in hybrid EVs can be plugged in to charge the vehicle battery (AFDC n.d.-c).
-  **Hybrid EVs** are powered by an internal combustion engine and an electric motor that uses battery-stored energy. The battery is charged by regenerative braking (AFDC n.d.-c) instead of plugging in the vehicle, so hybrid EVs do not need charging infrastructure.

This guidebook focuses on charging infrastructure for plug-in hybrid EVs and all-electric vehicles.

Table 1. Comparison of Different EV Types

Vehicle Type	All-Electric Vehicle	Plug-In Hybrid EV	Hybrid EV
Includes an internal combustion engine	No	Yes	Yes
Direct-current fast charging (DCFC) capability	No	No (typically)	No
Regenerative braking	No	Yes	Yes
All-electric range	100 to 400 or more miles	15 to 50 or more miles	0
Tailpipe emissions	No	Yes (when not operated in all-electric mode)	Yes

EV Battery

Batteries store energy for EVs. Types of batteries include:

- **Lithium ion:** Most all-electric vehicles and plug-in hybrid EVs use lithium-ion batteries. This type of battery can store more electrical energy in a smaller, lighter package than other battery technologies; performs well at high temperatures; can withstand low temperatures; holds energy well when not in use; and can maintain most of its original energy storage capacity through many charging cycles (Carreon 2023). Lithium-ion batteries do require critical minerals, discussed in **Section 6.2**.
- **Nickel metal hydride:** Hybrid EVs often use nickel-metal-hydride batteries. Compared to lithium-ion batteries, this type of battery has lower energy density (i.e., reduced driving ranges), loses more stored energy when not in use, and is more expensive.
- **Lead acid:** EVs currently on the market do not use lead-acid batteries due to short life cycle and poor cold-weather performance (AFDC n.d.-a).

Regenerative Braking

Regenerative braking allows EVs to capture the kinetic energy normally lost as heat during braking. The electric motor in the vehicle acts as a generator and stores the captured energy in the vehicle battery (U.S. Department of Energy 2023). Regenerative braking can extend the driving range of the battery.

Additional Resources

- **How Do All-Electric Cars Work?:** Learn more about the components of all-electric vehicles.
- **EV Batteries 101: The Basics:** Read about EV batteries, battery materials, and how they work.
- **At a Glance: Electric Vehicles:** Read a fact sheet about EV and EV charging basics.

2.2 EV Charging Infrastructure

This section introduces the reader to the three different levels of EV charging and important technical details.

Key Takeaways

- EVs are charged using EV charging equipment.
- Charging equipment is categorized by the power level used to charge the battery:
 - **Level 1:** Approximately 2–5 miles of range per hour of charging.
 - **Level 2:** Approximately 10–30 miles of range per hour of charging.
 - **DCFC:** Approximately 100–200 miles of range per 30 minutes of charging.

EVs are charged by plugging them in in **EV charging infrastructure**. A **station location** is the physical place with one or more EV charging ports, such as a convenience store parking lot. An **EV charging port** (also called a charger) provides power to charge an EV by plugging a **connector** (also called a plug) into the vehicle. An EV charging port can have multiple connectors, but only one vehicle can charge at a time. **Figure 1** illustrates EV charging infrastructure terminology.

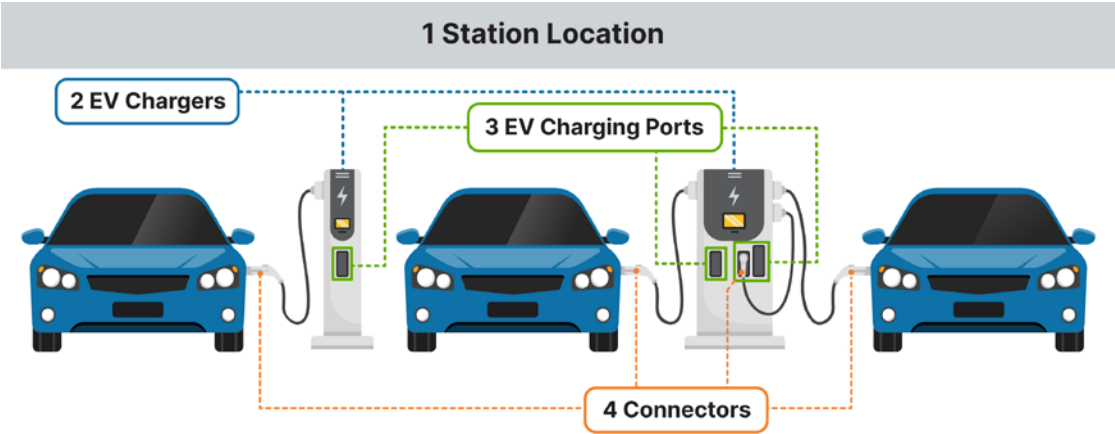


Figure 1. Illustration of charging infrastructure terminology (AFDC n.d.-b)

There are three primary types of connectors:

- **J3400 (North American Charging System):** Works for all charging levels. Many EV manufacturers are adopting this connector type for new models.
- **Combined Charging System (also known as SAE J1772):** Allows drivers to use the same charge port with Level 1, Level 2, and DCFC equipment. Most EV models on the market can use this connector.
- **CHAdEMO:** DCFC connector most common for Japanese automakers, but mostly being phased out from new vehicle models. The CHAdEMO connector is still available at some stations to serve older models.

Charging Equipment Levels

EV charging equipment is categorized by the power level used to charge the vehicle. **Table 2** compares the three categories of equipment and the connectors used for each category.

Table 2. Comparison of the Three Categories of EV Charging Equipment (AFDC 2025b)

	Alternating Current (AC) Level 1	AC Level 2	DCFC
Overview	Provides charging through a common 120-volt (V) AC outlet	Provides faster charging through 240-V (residential) or 208-V (commercial) AC electrical service	DCFC equipment enables rapid charging; sometimes referred to as Level 3 charging
Typical use cases	Home	Home, workplace, and public	Public
Voltage	120 V	208–240 V	400–1,000 V
Typical power output	1.3–2.4 kilowatts (kW)	2.9–19.2 kW	Up to 500 kW
Power requirements	Compatible with single- or three-phase power	Compatible with single- or three-phase power	Usually requires three-phase power. Some low-power DCFC units are compatible with single-phase power
Estimated EV charge time (to 80%) from empty	40–50 hours	4–10 hours	20 minutes to 1 hour

	Alternating Current (AC) Level 1	AC Level 2	DCFC
Charging speed	Approximately 2–5 miles of range per hour of charging	Approximately 10–30 miles of range per hour of charging	Approximately 100–200 or more miles of range per 30 minutes of charging
Connector type	 J1772 connector	 J1772 connector  J3400 (North American Charging System) connector	 Combined Charging System connector  CHAdeMO connector  J3400 (North American Charging System) connector
Grid infrastructure and costs	Lowest-cost option	Lower power might reduce the need for infrastructure upgrades	Higher power can increase infrastructure needs and energy costs through utility demand charges

Network Capabilities

A **networked** charging station is connected to the internet via cellular or wired broadband service and enables payment and customer support. Networked chargers can provide member-only access, which requires a membership to use and pay for the service, or open access, which allows nonmembers to pay for the service (AFDC n.d.-e).

Networked systems can also be monitored by the site host, allowing them to track usage and adjust power levels in real time. This capability also potentially enables the site host to better manage electricity use and costs and perform diagnostics. Technical issues can be identified remotely, and the site host might be able to troubleshoot without the cost of a site visit (AFDC n.d.-e).

Open Charge Point Protocol

Open Charge Point Protocol (OCPP) provides a universal, standard communication interface to enhance flexibility. Charging infrastructure with hardware that uses OCPP physically separates the hardware from the network so the station owner can change networks if necessary (AFDC n.d.-e). OCPP is an open-source standard and can be downloaded for free. It is developed and maintained by the Open Charge Alliance (Open Charge Alliance 2024).

Additional Resources

- **Electric Vehicle Charging Stations:** Provides an overview of EV charging equipment.
- **Electric Vehicle Charger Selection Guide:** Learn how to choose EV charging equipment.

2.3 Benefits and Challenges of EVs

This section introduces the benefits and challenges related to EVs, helping build a holistic understanding of EVs and EV charging for decision makers.

Key Takeaways

- All-electric vehicles generate zero tailpipe emissions.
- Life cycle emissions of EVs depend on how the electricity used to charge the battery is generated but are generally lower than internal combustion engine vehicles.
- EVs require less maintenance than internal combustion engine vehicles.
- EVs can be a potential option for backup power in an emergency.
- EV and EV charging efforts can be an avenue for workforce development efforts by creating jobs in maintenance, operations, and construction.

Air Quality

Air pollution from transportation contributes to poor air quality, impacting public health. In the United States, the transportation sector is responsible for approximately 45% of nitrogen oxide pollution, which can cause smog, acid rain, and respiratory diseases (U.S. Environmental Protection Agency 2025a). Vehicles also generate volatile organic compounds, which contribute to ozone and smog, and some are proven

carcinogens (U.S. Environmental Protection Agency 2025d). In addition, the transportation sector produces particulate matter, which can cause respiratory and cardiovascular issues.

All-electric vehicles do not produce [tailpipe emissions](#). Plug-in hybrid EVs and hybrid EVs produce tailpipe emissions when powered by the [internal combustion engine](#). [Life cycle air pollution](#) from EVs—the amount of air pollution generated from electricity production and vehicle manufacturing—is generally lower than internal combustion engine vehicles and depends on how the electricity used to power the vehicle is generated. Using electricity as a power source for transportation can improve air quality and public health.

Operational Cost Savings

EVs can reduce operating costs for the vehicle owner because the vehicles are very efficient and because regenerative braking can increase the vehicle’s range at no cost. Further, charging an EV at home is, on average, less expensive than fueling with gasoline (Paris 2025).

EVs have fewer moving parts and fewer fluid needs than gasoline or diesel vehicles and therefore require less maintenance and upkeep (see **Figure 2** to compare maintenance cost per 100 miles for different vehicle types). While EVs can cost more to purchase, lower maintenance costs and increased efficiency can make them less expensive over time.

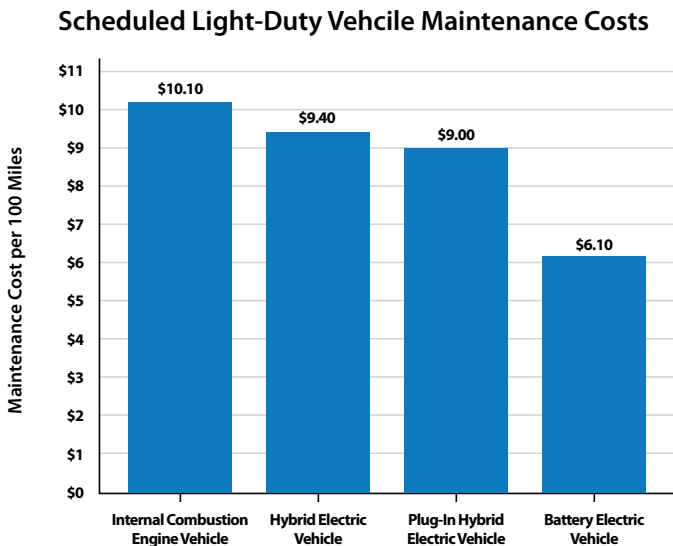


Figure 2. Maintenance costs per 100 miles by powertrain (adapted from Burnham et al. 2021)

Vehicle Cost Calculator

Use the [Alternative Fuels Data Center’s \(AFDC’s\) Vehicle Cost Calculator](#) to calculate the total cost of ownership for different vehicles.

Reliability

Incorporating EVs could increase the overall reliability of a Tribe’s transportation operations by providing another transportation energy option. For example, fuel supply disruptions and fuel pricing surges for gasoline and diesel could limit a Tribe’s ability to properly fuel vehicles and maintain operations if the Tribe only uses internal combustion engine vehicles. While power outages can pose a challenge for EV charging, using EVs alongside internal combustion engine vehicles provides an additional energy source that can help minimize operational disruptions.

Some EV batteries can be used to store and dispense power during emergencies and outages. This technology can potentially be used to charge phones, run refrigerators, and power lights for community centers during power outages and emergencies.

Economic Development

Integrating EVs and charging infrastructure can increase revenue and potentially generate job opportunities. Publicly accessible charging stations can increase tourism to the area by making destination sites more attractive to EV drivers. Locations to consider for charging installation include hiking trails, casinos, campgrounds, hotels, and museums. EV drivers also are likely to combine charging stops with some other economic activity. Dwell times for charging can be anywhere from 20 minutes to 12 hours, potentially increasing traffic to nearby businesses (U.S. Department of Transportation 2025-a). Stores, restaurants, hotels, and attractions could all see increased economic activity from EV drivers, including increased revenue from retail sales, direct sales from fueling, and increased consumer and employee interest from environmentally conscious branding and consumer preference (Satterfield and Nigro 2020).

Workforce development impacts may include more job opportunities for Tribal members. By 2032, it is estimated that more than 160,000 jobs could be created within the EV industry. More than 50% of the demand for these jobs will be in the installation, maintenance, and repair categories—jobs that require employees to be close to the site location (Bui et al. 2024). This creates opportunities for Tribal members to receive training and fill these positions while remaining on or near Tribal lands. Many programs also exist to support training and placement of jobs in EV maintenance, manufacturing, and electrical installation (Saha et al. 2024), including:

- **Electric Vehicle Infrastructure Training Program:** Provides comprehensive training and industry-approved certification for installation of EV charging equipment in the United States and Canada.

- **SAE International Electric Vehicle Supply Equipment Technician Certification:** Provides training and certification for existing experts requiring validation and less experienced individuals interested in transitioning into the sector.
- **National Institute for Automotive Service Excellence:** Offers industry-accepted safety certifications for people ranging from those encountering EVs in the workplace to service professionals and technicians building, operating, and maintaining high-voltage vehicles.
- **Weber State University's automotive technology training program:** Trains people on high-voltage vehicles and prepares them for the Automotive Service Excellence xEV certifications.
- **Green Pathways Workforce Initiative:** Trains Native communities for careers in renewable energy, including solar installation, energy efficiency, and EV charging infrastructure. Also offers apprenticeship opportunities with partner union programs and technical colleges.

Rural EV Charging Concerns

Despite continued recent increases in EV infrastructure installation, gaps remain in public EV charger availability in rural areas, low-income communities, and areas with high concentrations of multifamily housing (Yu et al. 2025). In rural areas, DCFC stations are often located farther apart, creating challenges for rural EV drivers who tend to drive

longer distances (U.S. Department of Transportation 2025-d). Drivers might not have time to wait for an EV to charge at a Level 1 or Level 2 charger. In addition, rural areas might not have the necessary maintenance staff to quickly fix technical issues, potentially leaving chargers unusable for extended periods of time.

Range Anxiety

Concerns about not being able to charge an EV due to a lack of public charging or unreliable stations, particularly for long-distance travel, can contribute to **range anxiety**. EV drivers in rural communities often have the potential to charge at home in dedicated off-street parking locations where home charging can be installed. However, the availability of a reliable power supply could be a challenge that needs to be addressed.

Advancements in EV technology have also improved vehicle range over time. As seen in **Figure 3**, the average range of an EV available in the United States has increased to 283 miles per charge in 2024, up from 218 in model year 2016 vehicles (U.S. Department of Energy 2024b). In addition, the number of electric pickup trucks and all-wheel-drive vehicles has increased, providing more options for Tribal communities in rural, rugged, and extreme terrain. However, these vehicles typically cost more than compact and two-wheel-drive EVs.

Median and Maximum Range of Electric Vehicles Offered for Sale in the United States, Model Years 2014-2024

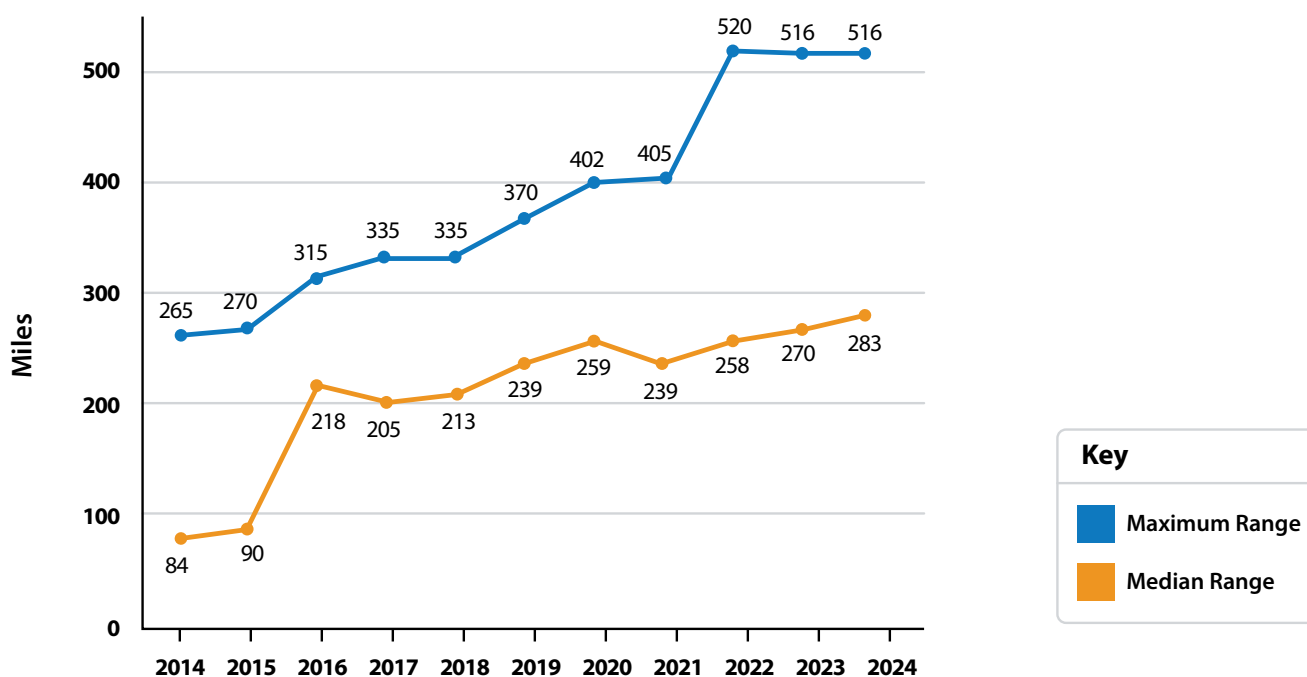


Figure 3. Median and maximum range of EVs (adapted from U.S. Department of Energy 2024b)

Range in Extreme Temperatures

Weather can also impact the range of EVs and should be considered for locations with extremely high or low temperatures. The actual range of an EV driving in extreme temperatures will be less than the rated range on vehicle sales stickers and fuel economy websites. The optimal operating temperature for an EV is about 70°F. During extreme cold, the EV range could decrease 50% or more. During extreme heat, the range could decrease 20% to 30%.

Tips to help reduce range loss when operating EVs in extreme temperatures include:

- **Keep cars in a garage when possible:** Keep EVs out of the sun to reduce range loss from high temperatures, and use a garage during low temperatures (ideally a heated garage) to minimize the energy needed to heat or cool the battery to the correct temperature.
- **Precondition the battery:** EV batteries perform best in temperatures between 60°F and 80°F. Preconditioning involves getting the battery to that temperature before driving. This also improves the range of the vehicle, compared to driving with a cold battery. Preconditioning while the vehicle is plugged into a power source ensures the vehicle is using power from the charger, rather than the battery, to reach optimal temperature.
- **Heat the passenger, not the car:** Maintaining a lower temperature inside the vehicle will maximize efficiency of the vehicle and reduce range impacts. For example,

the driver could lower the temperature and wear gloves and a jacket in the car to stay warm. Further, using a seat heater in an EV requires less energy than heating the cab of a vehicle to a higher temperature. If steering wheel heating is available, that will also help optimize energy use in the winter.

Additional Resources

Fuel economy estimates: Compare vehicle fuel economies, including EVs.

2.4 Electric Utility

The electric utility is going to be a major partner in any EV charging infrastructure project. This section introduces the reader to different types of utilities and EV-related programs the utility might have.

Key Takeaways

- Each of the four primary types of utilities have different structures and regulatory oversight, which can impact the programs and incentives the utility offers.
- Meet with the utility early to learn about their programs and incentives.

Understanding the Electric Utility

Electric utilities are grouped into four primary categories: investor-owned utilities, publicly owned utilities (sometimes called municipal utility, or muni), cooperative electric companies, and Tribal utility authorities. **Table 3** summarizes each utility type.

Table 3. Summary of Electric Utility Types

 Investor-owned utility	 Publicly owned utility/muni	 Cooperative electric company	 Tribal utility authority
• For profit. • Serves the majority of electric customers. • Owned by shareholders. • Regulated by state commissions (for distribution system and retail sales) and the Federal Energy Regulatory Commission (for transmission system and interstate generation and power sales). • Must obtain permission from the state commission via a filing to invest in a program to support EV infrastructure installation.	• Not for profit. • Typically operate in smaller, local areas. • Owned by federal, state, municipal entities, or political subdivisions. • Regulated by local government (city council or elected or appointed board) or state commissions. • May implement EV or EV charging programs without needing state commission approval.	• Not for profit. • Usually located in rural areas. • Typically overseen by municipal governments, cooperative boards, or federal regulators. • Owned by cooperative members. • Members vote for representatives to board of directors.	• Formed to regulate energy activities or to assume responsibility for and control of delivering power to customers on Tribal lands. • Owned and regulated by Tribal governments.

Utilities can implement a variety of program types and initiatives to support EVs, including:

- **EV infrastructure planning:** Involves assessing current grid capacity, forecasting future EV adoption, and identifying optimal locations for charging stations. This process ensures reliable electricity delivery, grid stability, and alignment with both regulatory requirements and customer needs (Smart Electric Power Alliance 2020). Additionally, a utility may directly invest in EV charging stations within its service territory or offer financial and/or technical support for customers to install EV charging stations.
- **EV charging rates:** Involves offering specific rate plans to lower the cost of EV charging. The utility may offer EV-charging-friendly utility rates for separately metered EV chargers for public sites.
- **EV charger purchase rebate:** Involves offering rebates for the purchase of EV charging equipment or EV charger installation.

Use the U.S. Department of Energy's [U-Finder](#) to identify a contact at the local utility and learn about incentives the utility offers.

3.0 Preparing for EV Charging Infrastructure

In this section, the reader will learn:

- Who should be involved in EV charging infrastructure project planning and deployment? What partners should be included?
- How should the Tribal community be involved in planning?
- What are the different project ownership models?
- What are the steps to determine how many chargers and needed, and what type?
- What are the steps to identify a site for an EV charging project?
- What are the steps to connect the EV charging project to the grid?
- What are methods to deal with grid capacity issues?
- How much will the project cost?

3.1 Getting Started

This section provides information about the first steps in an EV charging infrastructure project, including building a team and engaging with Tribal leadership.

Key Takeaways

- Form an internal team to drive EV charging project development.
- Leadership buy-in is critical early in project planning and can help ensure the EV charging project fits with larger Tribal goals and plans.

When starting an EV charging infrastructure project, start by identifying the team members needed to be successful. Successfully planning for and adopting EV charging infrastructure requires strong partnerships and frequent collaboration.

Forming an Internal Team

Start by identifying an EV champion—the person who will keep the project moving forward. This person is likely to be responsible for identifying the other team members, facilitating collaboration, and coordinating education or training needs during the process.

Other team member roles could include (U.S. Department of Energy n.d.):

- **Facility infrastructure manager:** Plans and oversees installation of EV charging equipment and necessary electrical upgrades and manages maintenance.
- **Facility energy manager:** Integrates EV charging equipment into overall facility energy plans, manages load impacts, and assesses optimal electricity rates.
- **Procurement officer:** Acquires equipment and ensures contracts meet policy and performance requirements.
- **Maintenance supervisor:** Ensures technicians are trained to work on EV charging equipment.

Other potential team members that might be internal or external to the Tribe could include:

- Council members.
- Economic development department staff.
- Environmental department staff.
- Property management staff.
- Site engineers, electricians, and maintenance staff.
- Local utilities and energy providers.
- Cybersecurity specialists.

Leadership buy-in during this process is also critical. Include a Tribal leader on the planning team and provide regular updates to ensure that transportation electrification

strategies align with the Tribe's long-term goals. Understanding the Tribe's environmental, educational, energy, and transportation goals are all key to ensure the EV charging infrastructure project plan aligns with the overarching strategic goals of the Tribe.

3.2 Project Partnerships

This section introduces the many partners that will be involved in an EV charging project, both internal to the Tribe and external partners and discusses how to keep Tribal sovereignty considerations at the forefront of the partnerships.

Key Takeaways

- EV charging projects will require partners, and the partners will depend on the ownership model and type of charging equipment installed.
- Tribes can use Tribal Employment Rights Ordinances as a mechanism to increase Tribal hiring and economic development.

Clean Cities and Communities Coalitions

Clean Cities and Communities is a U.S. Department of Energy partnership that fosters collaboration and innovation to advance transportation energy choices nationwide. More than 75 coalitions work in urban, suburban, and rural areas to deliver objective technical expertise based on a unique understanding of local markets. Coalitions can help Tribes by providing technical assistance, answering questions, and being partners. Coalitions can also provide information about funding opportunities.

Find the coalition nearest to the Tribe on the [Clean Cities and Communities Coalition Locations](#) webpage. If there is not a coalition in the Tribe's area, the closest coalition can help.

Types of Partners

Planning and implementing an EV charging station might require many partners, including:

- **Electrical contractor:** The entity installing the EV charging equipment. Sometimes, the electrical contractor is the same entity as the network and equipment provider.
- **Electric utility:** The electric utility that serves the charging site will be an important partner. See **Section 2.4** and **Section 3.6** for more information about working with the utility.
- **Equipment provider:** The company that sells and installs the EV charging equipment. The equipment provider and the network provider are sometimes the same.
- **Network provider:** Depending on the ownership model, private networking companies might own and operate charging equipment or maintain and operate the equipment. See **Section 2.2** for more information about networking. If the charging station is networked, the charging network company can be a beneficial partner to engage with early, as they have expertise and relationships that can help planning and implementation.
- **State department of transportation:** The state department of transportation might be able to offer funding resources or technical assistance.
- **Tribal enterprise:** Siting the charging station at a location owned by a Tribal enterprise will require collaboration with the Tribal enterprise. Tribal enterprises might also be involved with workforce development and staffing.

Case Study

Electric Nation Partnership Installs EV Charging Network Across Midwestern Tribes

[Native Sun Community Power Development](#) and Standing Rock Renewable Energy Power Authority brought together a coalition of partners to form the [Electric Nation](#) program. The goal of the program is to support electric transportation infrastructure and energy sovereignty on Tribal lands by deploying EV charging stations across Tribal communities in the Midwest, connecting the Tribes to one another, and filling gaps in EV charging infrastructure. Additionally, EVs have been integrated to support Tribal operations and services.

Partners include the American Lung Association, Minnesota Center for Energy and Environment, Minnesota Pollution Control Agency, Minnesota Power, North Dakota Clean Cities Coalition, Ottertail Power, Xcel Energy, and ZEF Energy.

Electric Nation works closely with each Tribe to determine their priority location for a charging station in their Nation. The program has installed EV chargers at Tribal government headquarters, casinos, health centers, fisheries, stores, and schools. Electric Nation also works closely with each Tribe to use local electrician labor, when preferred, to install the charging equipment.

Electric Nation has installed or supported more than 50 EV charging stations across more than 12 Midwestern Tribes (Native Sun Community Power Development 2026).

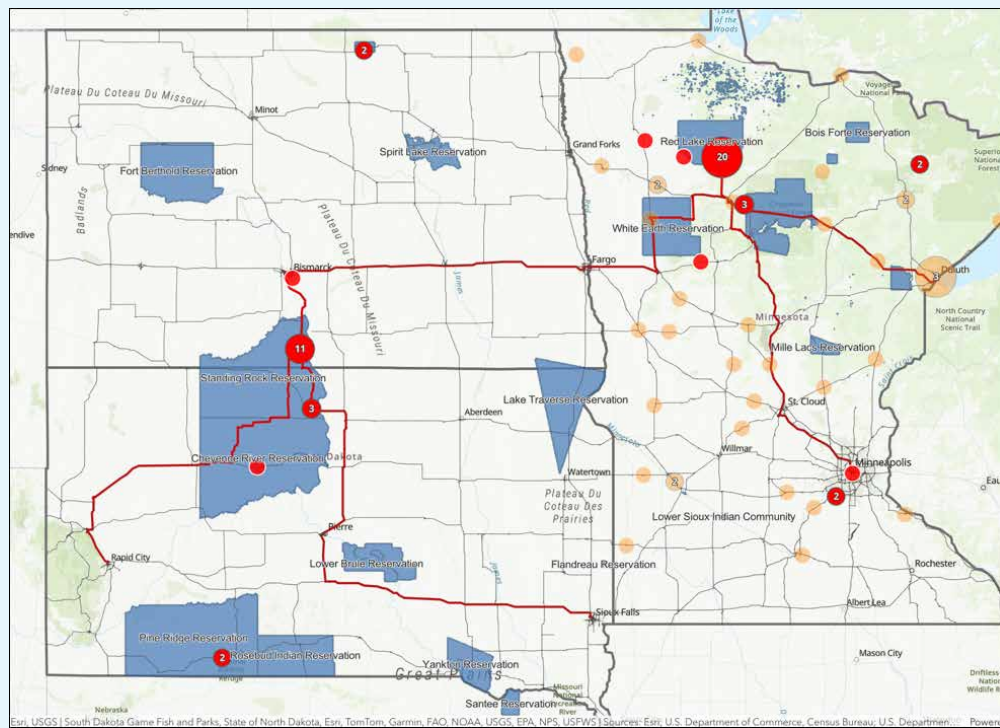


Figure 4. Map of Electric Nation EV charging stations. Red circles indicate EV charging stations deployed at Tribal Nations by Electric Nation, and orange circles indicate where charging stations were deployed by match partners in Minnesota. Map from Electric Nation, Native Sun Community Power Development

Tribal Sovereignty and Partnerships

The ability to protect [Tribal sovereignty](#) will depend on the ownership model selected:

- **Third-party owned and operated:** If a third party owns and operates the charging station, it is unlikely that the Tribe can impact charging fees or the data collected by the networked station. However, the Tribe may be able to use land lease negotiations as a mechanism to obtain control over pricing or data.
- **Tribally owned and operated:** The Tribe will have control over pricing if the Tribe owns and operates the EV charging equipment. Contracts with the network provider may be able to stipulate terms for data collection.

Culturally Appropriate Partnerships

Partnerships can be created and managed to protect Tribal sovereignty and advance Tribal interests.

Requests for proposals (RFPs) issued by the Tribe for EV charging equipment and services can be used to set the stage for partnerships that are respectful and mutually beneficial. An RFP can include:

- Indian Preference policy clearly stated with implementation details.
- Evaluation criteria that value demonstrated experience working with Tribes.
- Clear relationship expectations.

- Community engagement requirements.
- Workforce development requirements that can provide job training opportunities, including hands-on training.
- Data access and sharing protocols.

Tribes may use [Tribal Employment Rights Ordinances](#) (TERO) to require companies that serve them on Tribal lands to exercise Tribal member preference. Indian Preference is a political classification tied to sovereignty. This ensures that job postings and training opportunities are first offered to the Tribe (Schaff 2020). Tribes can use permitting and leasing authorities to negotiate commitments for local hiring, apprenticeships, or community benefit agreements on projects on Tribal lands.

Additional Resources

- **EVSE Products, Charging Network, and Service Providers:** Lists electric vehicle supply equipment (EVSE) product manufacturers, charging network administrators, and service providers.
- **Native American Businesses in SAM.gov:** Provides information about all Native American-owned businesses that are active in SAM.gov, the website used for businesses to register to do business with the federal government or find and apply for federal contracts and grants.
- **State Information:** Provides state-specific information about alternative fuels and vehicles, including laws and incentives, potential partners, projects, and fuel prices.

3.3 Tribal Community Engagement

After forming an internal team, engaging with the wider Tribal community is an important step in EV charging infrastructure planning. This section outlines best practices and guiding information to create an engagement strategy.

Key Takeaways

Community engagement can help ensure EVSE projects meet the needs of the Tribe and its members.

Community engagement is the process of working with people so they can participate in decisions that affect them. It creates space for Tribal members to share their needs, concerns, and ideas, and to take part in decision-making. Community education is an important component of engagement, ensuring that Tribal members have clear and accurate information to provide meaningful input that guides EV charging projects. Intentional engagement can help ensure an EVSE project aligns with the needs of the Tribe and Tribal members it is designed to serve.

Community Engagement Strategy

A community engagement strategy explains a plan for thoughtful engagement with the community and how that engagement will be integrated into project planning. Each Tribe has its own governance processes and cultural protocols. Tribal leadership can decide how and when community engagement should occur.

When beginning to develop a community engagement strategy, consider the following guiding questions:

- What stages in the project (e.g., design, planning, implementation) will you be engaging with the Tribal community?
- Who will be responsible for engagement efforts?
- What are the goals of this engagement?
- What does successful engagement look like for the project?
- What does successful engagement look like for Tribal members? (Answer this question after consulting with Tribal members.)
- What does successful engagement look like for other community members? (Answer this question after consulting with community members.)

- How will you incorporate feedback from Tribal members and other community members in your project plans?
- How will you be transparent about the process and what can and cannot be influenced?
- What key participants need to be reached (e.g., elders, youth, economic development organizations)? How do you ensure these perspectives are captured?
- How do you plan to engage with the Tribal community (e.g., in person, online, hybrid)?
- What are the barriers to participation (e.g., time, child care, transportation)? How can you address these barriers?
- How will the Tribe's current resources and capacity influence the engagement strategy?
- What does your community engagement process look like throughout the project's life cycle?
- What concerns or questions do community members have about EVs or EV charging?

It might be helpful to document community input and summarize key themes from engagement activities. These summaries can help Tribal leadership understand community priorities and guide project decisions.

Best Practices for Engaging the Community on EVSE Projects

- **Begin early:** Engage with the community as early as possible in project planning to help ensure community priorities and concerns are incorporated in decision-making (Romero-Lankao et al. 2023).
- **Engage frequently:** Communications between the project team and the community should be frequent and consistent throughout the project life cycle. When designing a community engagement strategy, map out when and how you will engage with the community (Colorado Department of Local Affairs n.d.; Romero-Lankao et al. 2023).
- **Be accessible:** There are various approaches (e.g., questionnaires, interviews, town halls) and modes (e.g., virtual, hybrid, in person) for community engagement. Identify what approach(es) and mode(s) of engagement will provide the best opportunity to gather community input.
- **Be responsive:** Develop a system for incorporating feedback into your project planning and follow up with participants frequently to demonstrate that the project team is taking community perspectives into account (Colorado Department of Local Affairs n.d.; Romero-Lankao et al. 2023).

- **Share results with the community:** After engagement activities, project leaders may choose to share a summary of what they heard from the community and how the feedback might influence project decisions.
- **Understand common concerns:** Common concerns or misunderstandings may make people hesitant to adopt EV or EV charging technology. Community engagement can address some of these concerns. Learn about these concerns and how to address them, keeping in mind that Tribal communities may choose not to adopt EV technology even after having their concerns addressed. See **Appendix B** for more information.
- **Educate:** Provide clear information about the project, its potential benefits and risks, and the community's role in project planning (Colorado Department of Local Affairs n.d.; Romero-Lankao et al. 2023). When it comes to EVSE projects, community education might extend beyond the context of the project and focus on EVs broadly to familiarize the community with EVs and increase adoption. Community education can begin well before EVSE project planning. Incorporating information on EV and EVSE into K–12 education can increase EV adoption and support workforce development pathways within a Tribe (see **Section 5.1**).

Needs Assessment

Start by conducting a needs assessment to identify the priorities, gaps, and opportunities so resources can be focused where they are needed most. Needs assessments can take many forms such as a focus group, questionnaire, or town hall meeting. Utilizing multiple methods of input solicitation over a sufficiently long period of time will help minimize the potential for community concerns to go undocumented. They can be tailored to collect certain information depending on the purpose of the assessment. When collecting information, it can be helpful to explain how the information will be used and how participant privacy will be protected.

A Tribe conducting a needs assessment to determine where to site EVSE might ask the Tribal community the following questions:

- Do you own an EV?
- Approximately how far is the nearest EV charger to your home or place of work?
- Which of the following locations would be most convenient for you to charge your EV?
 - Shopping center
 - Government building
 - Convenience store
 - Casino
 - Other:_____.

Additional Resources

- **Community Engagement Tips for EV Infrastructure Deployment:** Find tips for community engagement for EVSE planning and deployment.
- **Promising Practices for Meaningful Public Involvement in Transportation Decision-Making:** Provides information about integrating public involvement in all levels of transportation decision-making.
- **Answers to Common Questions About Electric Vehicles:** Learn how to answer common EV questions that may arise during community engagement.

3.4. Project Ownership

The purpose of this section is to help the reader understand how to determine the ownership and operations model of the EV charging project.

Key Takeaways

- The goals of the EV charging project should guide project development, including ownership and operations decisions.
- The Tribe needs to consider the amount of control it wants over aspects of the project, including ownership, fee setting, and operations and maintenance.

Guiding Questions

The reasons for installing EV charging infrastructure influence the approach to the project.

Consider the following questions to determine the project type:

1. How does EV charging align with the Tribe's broader goals?
2. What are the goals for installing an EV station?

Examples:

 - Economic development.
 - Expand access to EV charging.
 - Charge Tribal fleet vehicles.
 - Serve Tribal staff personal or work vehicles.
 - Air quality improvements.

Case Study

Gun Lake Tribe Installs EVSE To Support a Growing Electric Tribal Fleet for Environmental Programs

The Match-E-Be-Nash-She-Wish Band of Pottawatomí (Gun Lake Tribe) is dedicated to practicing the Seven Grandfather Teachings (Love, Truth, Respect, Bravery, Honesty, Wisdom, and Humility) every day. Part of this practice is protecting Grandmother Earth for the next seven generations by reducing environmental impacts through the electrification of Tribal vehicles. Gun Lake Tribe has integrated many EVs into its fleet, including those used by the environmental department, the public works department, and the Gun Lake Casino Resort.

The Tribe realized that the growing number of EVs needed to be supported with charging equipment, as they were charging the first EVs purchased by plugging the vehicles into a standard 120-V outlet, which is very slow and inconvenient. For more efficient charging, Gun Lake Tribe strategically placed Level 2 chargers at the environmental office, public works building, public safety building, and casino resort.

The Tribe also placed a Level 2 charger at their food recovery center as part of a waste reduction effort to divert food waste from the casino resort to a biodigester. This aerobic food waste digester produces compost for soil enhancement (Gun Lake Tribe n.d.). The Tribe uses a Ford F-150 Lightning EV to transport more than 1,600 pounds of food waste (Power Knot n.d.). This project reduces the Tribe's methane pollution by keeping food waste out of landfills and reduces tailpipe pollutants by using EVs for transportation.



Figure 5. A Ford F-150 Lightning transports food waste to a biodigester.
Photo from Gun Lake Tribe

3. Who is this EV station meant to serve? Examples:

- Tribal members.
- Reservation residents.
- Tourists.
- Tribal staff.
- Multifamily housing residents.

Ownership Models

Ownership models for EV charging projects include:

- **Tribally owned and operated:** The Tribe purchases, installs, and maintains the charging infrastructure, allowing for full control. The Tribe is also responsible for all costs, including maintenance and payment transaction fees. In addition, the Tribe is responsible for all additional wiring needed beyond the utility-provided equipment and wiring from the power lines to the facility.
- **Third-party owned and operated:** A third-party developer owns and operates the EVSE and wiring on premises. The Tribe may make revenue by leasing the location to the third party.
- **Full utility ownership:** The electric utility owns and operates everything, including wiring, meters, and EVSE. The utility also would set and collect fees for charging (U.S. Department of Transportation 2025-b). The Tribe may make revenue by leasing the location to the utility.
- ** Make ready and Tribally owned and operated:** The utility installs, owns, and maintains the wiring needed up to the EVSE interface. The Tribe installs, owns, and maintains the EVSE.
- **Make ready and third-party owned and operated:** The utility installs, owns, and maintains the wiring needed up to the EVSE interface. The third party installs, owns, and maintains the EVSE. The Tribe may make revenue by leasing the location to the third party.

Consider the following questions to select an ownership model:

1. What is the Tribe's budget for project implementation?
2. What is the Tribe's budget for long-term project management?
3. What is the Tribe's staff capacity for implementation? For operations? For maintenance?

Example: If the Tribe's staff capacity is limited, a third-party ownership and operation model might be considered.

Example: If the Tribe doesn't have appropriate staff to conduct maintenance, the Tribe could own the station and use a third-party maintenance contract.

4. How much control does the Tribe want over pricing structures?

Example: If the Tribe does not want Tribal members and/or staff to have to pay to use the EVSE, a Tribally owned and operated system is likely to be the appropriate choice.

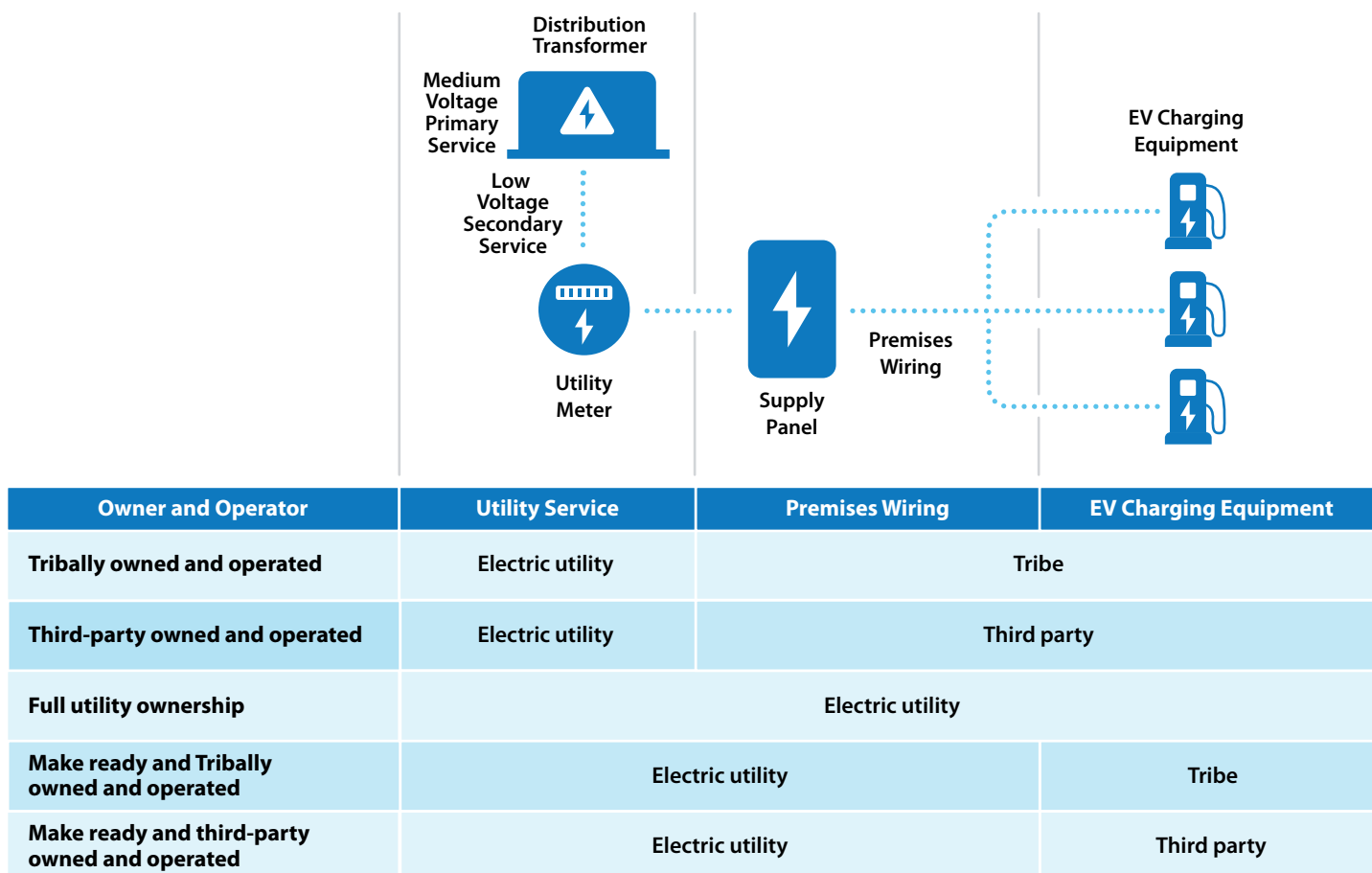


Figure 6. Comparison of ownership models for EV charging equipment and relevant electricity infrastructure (adapted from U.S. Department of Transportation 2025-b)

Tule River Indian Tribe Partners With Native Energy Services Company and the Tule River Economic Development Corporation To Build EV Charging in the California Central Valley

The Tule River Indian Tribe in California partnered with Native Energy Services Company (NESCO) and the Tule River Economic Development Corporation (TREDC) to develop a successful EV charging project. NESCO is an energy development company focused on Tribal projects. NESCO emphasizes the development of veteran and Native workforces. TREDC is a Section 17 federal corporation chartered by the Tule River Indian Tribe that works to diversify the Tribe's economic and employment opportunities (Tule River Economic Development Corporation n.d.). TREDC owns and operates the Eagle Feather Trading Post.

NESCO founder Liz Perez emphasizes that there are "many ownership and operations options for Tribes; the choice depends on Tribal priorities and capacity." For the Eagle Feather Trading Post EV charging infrastructure project, NESCO owns and operates the charging stations. The Tule River Tribe benefits from the EV charging project through a site host agreement, and TREDC is paid for the space. This arrangement accommodates each party's capacity.

Additional Resources

Public EV Charging Business Models for Retail Site Hosts:

Provides a financial analysis of common EV charging business models for retail site hosts.

3.5 Site Identification

This section will help the reader understand the many considerations in selecting an EV charging site.

Key Takeaways

- Appropriately siting EV charging infrastructure requires assessing current infrastructure (charging and electric) and charging needs.
- Beyond electric capacity, additional considerations for siting a charging station include environmental factors, available amenities, and safety concerns.

EV Charging Needs Baseline Assessment

Tribes may determine if EV charging infrastructure aligns with their community priorities, transportation needs, and energy goals. Conduct a baseline assessment to learn about the status of EVs and EV charging infrastructure needs for the Tribe. This baseline assessment can help determine the number and type of EV chargers needed to support current and future EV drivers.

Guiding questions for the baseline assessment:

- How many EVs are currently within the community and Tribal fleet?
- Does the Tribe have EV adoption goals?
- What are future EV adoption projections for the area?
- What opportunities are there for increased demand for EV charging from tourists and travelers?

EV Infrastructure Needs Baseline Assessment Worksheet

This worksheet, available in **Appendix D**, can be used to understand how many EV chargers are needed to meet demand.

Determine How Many Charging Ports To Install

The number of charging ports to install might be determined by funding available. If funding is not a constraint, the following outlines a method to estimate the number of charging ports needed:

1. Determine how many EV drivers come to the site.
2. Assume 80% of EV drivers need to charge.
3. Do the math:
 - a. Level 2 ports needed = (daily EVs needing to charge) / (average two sessions per day).
 - b. DCFC ports needed = (daily EVs needing to charge) / (average 10 sessions per day)

Example: A Tribe wants to know how many Level 2 charging ports to install at their casino to serve customers.

1. The Tribe conducts a traffic count at the casino for a week and finds the average daily number of EVs in the casino parking lot is 50.
2. Assume that 80% of the EVs will need to charge = 40 EVs need to charge daily.
3. Daily number of EVs that need to charge / average two sessions per day = $40/2 = 20$ ports.

The information gathered in a baseline assessment can be assessed with the information gathered in a community engagement needs assessment, forming a holistic understanding of EV use and charging needs for the Tribe.

Site Identification Steps

Create a short list of potential sites for deploying EV charging on Tribal lands by following these steps

1. **Understand the top priorities for public EV charging deployment.** Refer to **Section 3.4** to determine the project type and priorities.
2. **Understand where public EV chargers currently exist.**
Resources to help include:
 - **Alternative Fueling Station Locator:** Map of private and publicly accessible charging stations.
 - **Tribal EV Charging Infrastructure:** Map created using AFDC Station Locator data and publicly available maps of Tribal reservation boundaries that shows more than 800 EV charging stations on reservations (Necefer 2025).
3. **Learn where public EV chargers are planned**
 - Review state plans, including the state's National Electric Vehicle Infrastructure (NEVI) Formula Program plan, to see where the state department of transportation is planning to install new stations.
 - Review **Alternative Fuel Corridors** to understand what interstates and highways in the state are designated electric corridors. The **EV Alternative Fuel Corridors Map** illustrates EV-ready and pending routes.
 - Review regional plans, including multistate plans. In the Midwest, review the **Electric Nation** plans.
 - Review local plans, including county and city plans.
 - Reach out to local, regional, and state planners and decision makers to learn about the most up-to-date plans.
4. **Identify EV charging gaps.** A "gap" in EV charging station coverage can be defined based on topography, average EV battery range, charging station type (Level 2 or DCFC), number of charging ports, and driver destinations and origins. A distance-based rule of thumb is more than 50 miles between stations (Breck et al. 2019).
5. **Make and evaluate a list of potential sites with available public parking:**
 - Identify if the sites fill an EV charging gap.
 - Identify the land ownership status of each site and understand the associated challenges and benefits.
 - Identify the permitting requirements for each site.
 - Understand cultural and environmental considerations, and consult the cultural preservation officer to avoid impacts to sacred sites.

- Identify the utility that serves the facility (see **Section 3.6** for more information on utility engagement and utility incentives).

6. Determine the site's existing electric capacity and available grid infrastructure suitable for the level of installation. This will likely require engagement with the electric utility (see **Section 3.6**).



Figure 7. EV charger at the Coeur d'Alene Casino. Photo from Laura Laumatia, Coeur d'Alene Tribe

Additional Site Location Considerations

Evaluate the shortlist of potential charging station locations using the following criteria:

- **Americans with Disabilities Act:** Building codes often require that a certain percentage of publicly available EV charging parking stalls are accessible. Accessible EV charging stations must comply with technical requirements for floor and ground surfaces, clear floor or ground space, reach ranges, operable parts, accessible routes, and other provisions when needed (U.S. Access Board 2023).
- **Amenities:** Charging sites should be at locations with amenities for users, including food, restrooms, and shopping. Consider the length of time users will be at the station

and determine if there are enough amenities to serve the user. The amount of time drivers spend at a location might influence the type of charger installed. Locations where visitors stay longer might be well suited for Level 2 chargers, while locations with short visits might require DCFC. For example, the Coeur d'Alene Resort installed Level 2 chargers to serve casino and resort customers, encouraging customers to use amenities, including the spa and golf course (Coeur d'Alene Resort 2025).

- **Future expansion potential:** Consider existing or planned Tribal infrastructure and how the EV charging station might fit with those plans. Determine if there might be opportunities for expanding the EV charging services.
- **Reliability:** Identify natural disaster risks in the area and the likelihood of electrical grid outages. Consider integrating technologies such as a solar-plus-storage microgrid to extend charging station services during grid outages. Determine if the potential sites are in a 100-year flood zone and therefore would need to include extra protections such as waterproof connectors.
- **Existing infrastructure:** Construction costs comprise a significant portion of EV charging infrastructure installation costs. Existing elements like walkways, landscaping, and other structural elements might be barriers to charging and could need to be removed, moved, or retrofitted (Lubinsky et al. 2012).
- **Internet accessibility:** See **Section 3.8**.
- **Safety:** Considerations include:
 - **Emergency services:** Consider the potential location in relation to emergency services, including fire and police.
 - **Lighting:** Stations should be well lit, and additional lighting can be added to sites that are not sufficiently lit. Use solar lighting where grid access is limited. Respect night sky ordinances or cultural views of nightscapes when possible.
 - **Station placement:** Ensure the station is located in an area with high pedestrian or vehicle traffic. Avoid placing the station in a location without high visibility, like behind a building or in a densely wooded area (Joint Office of Energy and Transportation 2024).
 - See **Section 4.3** and **Section 5.2** for more information about safety at EV charging stations.
- **Serviceability:** Charging stations require regular maintenance (see **Section 5.3**). Consider the accessibility of the site for operations and maintenance staff. Tribes, especially those in rural areas, might struggle to get staff for maintenance in a timely manner. **Section 5.1** discusses local workforce development, which might help reduce this concern.

- **Easy to find:** Consider the visibility of potential sites for users; ensure that the site is accessible and easy to find.

Additional Resources

- **Argonne Geospatial Energy Mapper:** Identify areas suitable for EV charging equipment by mapping data, including 100-year flood zones, distance from substations, population density, and more.
- **Design Recommendations for Accessible Electric Vehicle Charging Stations:** Find information on designing and constructing EV charging stations that are accessible to and useable by people with disabilities.
- **ADA Requirements for Workplace Charging Installation:** Find best practices for complying with the ADA.
- **Physical Safety and Security at Electric Vehicle Charging Sites:** Learn about safety considerations for EV charging locations and equipment.
- **Public EV Charging Station Site Selection Checklist:** Find information about selecting a site for an EV charging station.

3.6 EV Charging Infrastructure Energization Process and Utility Engagement

The utility is a crucial partner for EV charging infrastructure projects. This section starts with an overview of the energization process and then provides information about how and when to engage with the electric utility during that process.

Key Takeaways

- Prepare for early meetings with utilities by gathering details about the proposed project and questions for the utility.
- Determine early if additional electrical capacity is needed to support EV charging infrastructure, as adding capacity can add time and cost to a project.

EV Charging Station Energization Process

Energization is the process of connecting equipment to a power source. When planning to install EV charging stations, be aware of how the process to energize the station could impact the timeline. If the project will be owned and operated by a third party, the third party will handle the energization process. Major steps to site and energize EV charging infrastructure include:

1. Site evaluation (see **Section 3.5** for more details):

- Identify locations that are most suitable for EV charging stations based on accessibility, usage patterns, and operational needs.
- Determine the type of charger (e.g., Level 2, DCFC) required for each site.
- Prioritize sites near existing electrical infrastructure with sufficient electrical capacity to reduce expenses associated with trenching, panel upgrades, and other installation work. This can help reduce costs.

2. Local utility engagement (see **Section 3.6** for more details):

- Contact the local utility to discuss potential locations for the EV charging infrastructure project.
- Early engagement allows the utility to help you plan vital technical details and evaluate your site before you submit a formal service request.
- Schedule a site visit with utility representatives to identify potential challenges and opportunities. For instance, the utility might recommend an alternative connection point to reduce costs.

3. Site assessment:

- Conduct a site assessment to evaluate existing electrical capacity and availability of electrical connections.
- Assess if a site has enough power for the planned chargers to avoid utility service upgrades.
- Using existing power on-site instead of requesting utility upgrades saves significant time and costs.

Consult with the utility, EV champion, facility manager, energy manager, and licensed electrician and collect the following technical and logistical site data:

- Distance from parking spaces to service panel.
- Service panel, including spare breaker positions, main breaker rating (amperes), and peak load (amperes).
- Distance from parking space to utility transformer.
- Transformer, including rating and peak load (both in kilovolt-amperes).
- Site constraints, including obstructions, hardscape, or limited access.

Conduct a site assessment to answer the following questions:

- Does the site have single-phase or three-phase electrical service? (Most DCFCs require three-phase service.)
- What is the peak electrical demand on the existing electrical service?

- What will the peak electrical demand be for the added EV charging infrastructure?
- Does the existing site capacity have enough power for EV chargers, or will a utility service upgrade be required?
- Do existing transformers and service panels have sufficient capacity for dedicated charging circuits (in addition to existing and other planned loads)?

4. Service request:

- After finalizing the site and EV project scope, submit a service request with the utility using their specified form. The form will likely require:
 - Project location.
 - Number of chargers.
 - Connection type (single phase versus three phase).
 - Estimated total electric demand (total load in kilowatts and total amperage).
- The utility might require additional information for the interconnection application or to make an informed plan to serve the load.

5. Application review, engineering, and design:

- Utility will review the request and might ask for clarification or revisions. They might also recommend a site visit, if not already conducted.
- Utility will assess available power and determine whether upgrades are needed. The depth and duration of the analysis could depend on the size of the project.
- If electric capacity is not readily available, the utility might explore flexible connection alternatives to bring power to the site.
- Modification to the project or site design could require resubmitting the request.

6. Contract:

- When the utility engineering and site design is complete, the utility will provide a service agreement that includes the scope of work, cost estimates, connection points, load commitments, and a construction schedule.
- Work with the utility to execute the contract and make any required payments.
- The utility will typically approve the interconnection request, which gives permission to operate your EV chargers.

Authority having jurisdiction: An organization, office, or individual responsible for enforcing the requirements of a code or standard (Coache 2020).

7. Permitting and easements:

- Once the utility approves the interconnection request, coordinate with the local authority having jurisdiction to secure necessary building or electrical permits.
- Use the [EV Charging Permit Process Flowchart](#) to navigate the permitting process.

8. Construction:

- The utility is responsible for completing any grid upgrades and laying any wiring to connect the charger to the grid, while the customer is responsible for hiring electricians to connect charging equipment to the electric meter. Check to see if your utility has a list of certified electricians for the installation.
- Maintain close coordination with the utility throughout the construction phase. They will need to approve the final project and energize the site.

9. Energization:

- Once the construction is complete, arrange for inspection of the electrical panel and any other work that required a permit from the authority having jurisdiction.
- The utility will perform a final inspection to verify all technical and safety requirements are met and will energize the site.
- The energization application might cost money to submit. For cost estimates, connect with the local utility or check their website.

Interconnecting With the Utility

The interconnection application is an agreement required by the utility to ensure the EV charging station installation meets safety standards, grid compatibility requirements, and local electrical codes. It serves as permission to connect charging equipment to the utility's electric grid and formalizes the terms, conditions, and responsibilities for the interconnection process. This agreement ensures all parties fulfill their obligations for a safe, reliable, and regulatory-compliant grid connection.

Working With the Utility

Contact the utility early and often in the EV planning process. Use the [U-Finder](#) to identify a contact at the local utility. This search tool helps states, communities, and fleets identify active local utility partners supporting the installation of EV chargers.

To prepare for discussions with your utility about EV projects, be ready to share the following details about the EV infrastructure plan:

- Number of charging ports.
- Power level (Level 1, Level 2, or DCFC).
- Parking lot location of charging stations.
- EV charging station arrival and commissioning timeline.
- Futureproofing needs for potential expansion.

If the Tribe is electrifying fleet vehicles and planning to charge at a central location, share the following details with the utility:

- Number of EVs being acquired.
- Vehicle types (make/model).
- Anticipated vehicle arrival timeline.
- Planned charging location on the site.
- Planned charging schedule, if known.

When discussing the EV charging infrastructure project with a utility, consider asking the following questions:

- **Programs and incentives:**
 - Are there make-ready programs or incentives for EV charging station installation?
 - Which ownership models are relevant for this EV charging infrastructure project?
 - Does the utility offer technical assistance, planning support, or site assessment support?
- **Rates:**
 - What are the utility's consumption and demand rates?
 - Does the utility have time-of-use rates? If so, what are the rates?
 - Are there special utility rates available for EVs?
- **Capacity and upgrades:**
 - What are the utility service equipment upgrade requirements and options?
 - Can flexible interconnection or on-site batteries reduce the need for upgrades?
 - Are there futureproofing considerations if the Tribe wants to expand the EV charging project in the future?
- **Process and timeline:**
 - What is the process and time frame for equipment upgrades, if needed?
 - What is the process and timeline for energization?
 - Can a site visit be conducted prior to formal new service or energization requests?
 - What is the cost to submit an energization request?

Utility Electrical Capacity

 **Grid hosting capacity** is the maximum amount of electricity the grid can handle at a time, or the total power that can be delivered to customers without issues. Grid capacity planning is one of the most critical aspects of electrical infrastructure when considering installing loads such as EV charging infrastructure. Installing EV chargers, particularly multiple Level 2 chargers or DCFCs that draw considerable power from the grid, requires careful planning and evaluation of electricity demands. Adequate grid hosting capacity is required to meet current and future electricity demands and therefore needs to be understood for EV charging infrastructure projects. Conduct a site assessment to understand limitations and potential infrastructure upgrades needed for a project (see **Section 3.5**).

Power Requirements and Capacity Needs

Level 2 and DCFC have different power and grid capacity requirements. Level 2 charging infrastructure is powered by 240-V AC or 208-V AC electrical systems. This is why Level 2 is typically the charging level used at workplaces and residences. Level 2 chargers require 2.9–19.2 kW. Costs vary depending on the manufacturer, power, permitting cost, and electrical infrastructure upgrade cost, if any (Murthy 2018; Ruedig 2025).

DCFCs are powered at 480-V AC and require significantly more capacity due to higher power output. The output of DCFC can range from 20 to 500 kW per unit. These systems are typically a good fit for high-traffic areas but can put a severe strain on the local electricity distribution system.

EV charging loads are not consistent. This intermittent nature creates additional challenges as EVs connect with DCFC for rapid charging followed by slow charging or even idle times. This requires early assessment of the existing electrical infrastructure and strategic planning for any upgrades, if required.

Utility Support for Potential Demand

Grid challenges and constraints are one of the most significant barriers to EV charging deployment. Determining if the utility can support projected EV charging demand requires analyzing both current and future electricity demand growth projections. Utilities need to evaluate existing electrical loads.  **Peak load** conditions, the time of day with the highest electricity demand on the grid, need to be studied, as they can vary.

If the site evaluation determines the grid hosting capacity is limited, installing EV charging infrastructure might require the following grid upgrades (which will impact project costs):

- **Upgraded service panel:** For smaller applications and upgrades, only upgrading service panels might be sufficient. Costs can range from \$1,800 to more than \$6,000 (UniColorado 2026; RSMeans Data n.d.).

- **New or upgraded transformers:** Larger installations might require upgrading or adding new transformers. Transformer cost varies significantly based on transformer type, power rating, and market conditions. For example, a single-phase transformer, which may be needed to support a Level 2 charger, varies from \$6,200 to \$44,000. For a 480-V secondary transformer, which may be needed to support DCFC equipment, costs vary from \$38,000 to \$110,000 (RSMeans Data n.d.). Some installations might even require an additional direct line from the grid to the EV charging site, adding to the project costs.
- **Electrical line:** The distance between existing electrical service points and where the chargers will be deployed can also impact the cost related to construction and trenching.

Load Forecasting and Planning

Ensure the existing or planned infrastructure can handle the demands of the project along with existing loads not related to EV charging. Utility bills provide the primary source of historical electricity consumption. A best practice is to collect 1 to 2 years of utility bills to understand seasonal variations and load patterns. The utility bills can provide information on total monthly energy consumption (measured in kilowatt-hours), peak demand charges (measured in kilowatts), time-of-use pricing, and seasonal variation patterns for comparisons. Online utility portals can also provide access to historical usage data along with basic analysis leveraging these details. The local utility might be able to provide more detailed information, including data at 15-minute, 30-minute, or hourly intervals. Smart meters can also offer interval data.

Load forecasting can be conducted using historical electricity usage data and anticipated usage based on the current EV market and projected growth. For a detailed analysis, the following resources can be used for forecasting:

- **Vehicle registration data** available on the AFDC provide state-level vehicle registration data that can be used to estimate vehicle adoption.
- **Electric Vehicle Infrastructure Toolbox** provides resources for estimating charging infrastructure needs.
- Utilities or local energy providers might offer detailed assistance for load forecasting, as they may have access to sophisticated planning tools, engineering expertise, and historical data.

For EV charging equipment, a detailed analysis should be conducted that accounts for:

- **Different charging behaviors pertinent to the hosting site:** Charging patterns and demands can vary from home, which typically occur in the evening hours, to public charging typically occurring during business hours (Li and Jenn 2024).

- **Growth projections:** Accurate planning is required to accommodate immediate and near-future growth projections.
- **Seasonal and hourly variations:** A site with significant power coming from solar panels might rely less on the grid during the sunlight hours and more on the grid during evening and night hours or cloudy days.
- **Seasonal travel patterns:** A site with seasonal visitation will have seasonal charging demand changes that should be considered in the analysis.

Solutions for Low Grid Capacity and Other Grid Issues

If grid hosting capacity is low, or if demand charges are high, there are several approaches that the Tribe can take when installing multiple Level 2 or DCFC units.

Managed Charging

 **Managed charging** controls when and how EVs are charged. This can be helpful for a site with several EV chargers and can be considered for charging Tribal-owned vehicles or employee vehicles. Strategically scheduling charging sessions can help balance energy needs across vehicles, buildings, and grids without compromising charging needs. Managed charging could reduce costs or expand charging capacity.

Mille Lacs Band of Ojibwe and the Mille Lacs Energy Cooperative Upgrade Electric Services for EV Charging

The Mille Lacs Band of Ojibwe Department of Natural Resources (DNR) needed an EV charging station to support the department's EV. DNR staff conducted site assessments and analyzed the electrical infrastructure of Tribal government facilities, including the DNR building, and Mille Lacs Corporate Ventures facilities to understand if each building could support Level 1, Level 2, or DCFC charging. This analysis determined the DNR building's electrical capacity was near maximum electrical capacity and would need electrical infrastructure upgrades to support Level 2 or DCFC equipment. The analysis also estimated the cost of completing these upgrades.

The Tribe worked closely with their Mille Lacs Energy Cooperative (MLEC) account representative, who helped Tribal staff brainstorm projects and connected the Tribe to the right MLEC engineers and decision makers. For this project, Tribal staff contacted MLEC early in the EV charging planning process. Together, they used the initial site assessment of the DNR building to determine

the building needed three-phase power to support EVSE. MLEC provided the initial cost estimate and then coordinated with the Tribe to construct three-phase electrical wiring connecting the half mile between the nearest service site and the DNR building. MLEC also coordinated with the Tribe's electrical contractor to install the charging equipment.

"When we have long-range plans or ideas, we give the cooperative a heads up and have them involved in the beginning so we can find a path to make projects a reality."

– Charlie Lippert, air quality specialist, Mille Lacs Band of Ojibwe



Figure 8. The power junction box brings three-phase power to the Mille Lacs Band of Ojibwe Department of Natural Resources campus, enabling EV charging infrastructure. Photo from Charlie Lippert, Mille Lacs Band of Ojibwe

Time-of-use charging is a management system that can offer cost savings and support grid operations by reducing demand during peak hours. Tribes can plan to use chargers for fleet or employee vehicles during off-peak hours when electricity pricing is typically lower. With managed charging, EV drivers' needs can be considered while adapting to the local grid conditions.

Charging Systems With Local Energy Storage or Generation or Buffered Charging Systems

The Tribe may choose to integrate energy storage and generation in an EV charging infrastructure project, including the following options:

- **Battery energy storage systems:** Some DCFC units come with preinstalled battery banks and act as battery-buffered EV charging solutions. Such options often do not require significant electrical grid infrastructure upgrades, potentially accelerating deployment. A battery energy storage system can also be used to reduce electricity costs by deploying the battery for charging during high time-of-use rates or to smooth out peak demand and avoid demand charges.

- **Flywheel energy storage systems:** Flywheel energy storage systems store energy mechanically with the help of an external motor. Energy is stored as kinetic energy in the rotating flywheel, and the stored energy can be released as electric energy on demand (Koohi-Fayegh and Rosen 2020). These systems can be used where hosting space is not a constraint. A flywheel energy storage system is typically larger than a battery energy storage system EV charging system. Flywheel energy storage systems may be used in locations with limited grid capacity for DCFC (Askew 2024).
- **Hydrogen-fuel-cell-powered EV charging systems:** Offer dual advantage with the capability of filling hydrogen directly to hydrogen fuel cell EVs, as well as use stored hydrogen to generate electricity and charge EVs.
- **Solar plus storage:** Solar energy generation coupled with local energy storage offers additional benefits in terms of grid independence and reduced operational costs. The energy storage can be charged by the solar panels during sunlight hours and discharged to power the EV charging infrastructure during peak hours. The grid can power the EV charging infrastructure during non-peak hours or non-sunny periods. A solar-plus-storage EV charging system might also present a revenue stream, as the site could sell electricity back to the grid at peak times or during blackouts (though this type of system is often more costly than a grid-tied solution). Similarly, hybrid systems can also power critical local facilities during grid electricity blackouts. However, local weather conditions and seasonal variations must be considered while planning system sizing because cold weather can impact battery performance as well solar generation, while extreme heat can impact system efficiency.

Common Obstacles to Tribal-Utility Relationships and Potential Solutions

Developing EV charging infrastructure requires a relationship with the electric utility that serves the site. Challenges that could inhibit a strong Tribe-utility relationship include:

- **Lack of trust:** Tribal Nations' relationships with their electric utility can sometimes be fraught due to historical and ongoing conflict, thereby making it potentially difficult to immediately establish a trusting working relationship. Trust building is a long process that requires effort from both parties. Tribes can start the process by attending board meetings (if served by a cooperative), engaging with their utility account managers, or engaging with utility liaisons. Utilities interested in building stronger relationships with the Tribes they serve can improve accessibility to the utility by hiring Tribal liaisons, forming an office of Tribal relations, and making communication mechanisms clear and simple (Beshilas et al. 2023).

- **Lack of electrical capacity or reliability:** Tribal communities often face limited electrical service and regular outages for many reasons, including regulatory barriers, the often remote locations of Tribes, and centuries of dispossession and underinvestment. These problems undermine a positive Tribal-utility relationship. Utilities interested in positive relationships can improve infrastructure by investing in the systems that serve Tribes. Tribes can also overcome capacity or reliability issues with microgrid technologies.
- **Limited utility capacity:** The utility might be understaffed or underfunded, reducing its capacity to work with the Tribe on projects. In this case, a strong relationship with the Tribe's account managers, the cooperative board, or other utility representatives might incentivize the utility to prioritize the Tribe. In addition, when working with a utility with limited capacity, be clear and concise with requests for data and information.
- **Limited Tribal-utility dialogue:** The Tribe and utility might not interact on a regular basis, limiting the access the Tribe has to utility staff, data, and tools, as well as possibly inhibiting trust building. This problem can be ameliorated by establishing clear lines of communication, including regular meetings to facilitate early problem identification and resolution (Beshilas et al. 2023).

- The power level of charging units (Level 2 or DCFC) will heavily influence the project cost.
- Utility electricity rates will impact project costs, and Tribes should be aware of the different types of charges (especially demand charges) and how they relate to different charging equipment.

Additional Resources

- **Battery Energy Storage for Electric Vehicle Charging Stations:** Provides information on how energy storage systems can support EV fast charging infrastructure.
- **Emerging Best Practices for Electric Vehicle Charger Interconnection:** Provides guidance for jurisdictions that want to enable the rapid deployment of EV charging equipment.
- **PVWatts®:** Estimates the size and performance of potential solar photovoltaic projects.
- **REopt®:** Evaluates the economic viability of solar, battery energy storage systems, or other on-site energy solutions.

3.7 Cost Estimates

This section provides a high-level overview of the costs associated with EV charging infrastructure. Costs vary based on many factors, and obtaining an estimate early in planning is crucial.

Key Takeaways

- EV infrastructure costs vary based on charging needs, power availability, infrastructure upgrade costs, and site conditions

EV Charging Infrastructure Cost

Charging infrastructure costs vary significantly based on charging needs, power availability, infrastructure upgrade costs, and site conditions. Labor costs will also vary significantly based on location.

Infrastructure and Installation Costs

Consider the following costs for the infrastructure equipment and installation (costs vary and depend on location):

- **Charger hardware:** Prices vary based on voltage, equipment manufacturer, and other factors (Borlaug et al. 2020).
 - **Level 2 charger:** Approximately \$3,500 per charger.
 - **DCFC:** Approximately \$38,000 per charger.
- **Charger installation:** Varies based on location and number of chargers installed at each site. The following estimates do not account for labor and permitting costs (Borlaug et al. 2020):
 - **Level 2:** Approximately \$2,500 per connector.
 - **DCFC 50 kW:** \$20,000 per connector.
 - **DCFC 150 kW:** \$60,000 per connector.
- **Electrical upgrades** (e.g., panels, transformers).
- **Site work** (e.g., trenching, paving, and signage).
- **Utility coordination:** Will likely include application fees, service upgrades, or capacity improvements (see **Section 3.6**).

Estimate infrastructure costs using a combination of the following methods:

- **Electric Vehicle Infrastructure – Locally Optimized Charging Assessment Tool and Estimator:** Estimate project-specific EV charging costs. Plan and estimate installation costs by:
 - Mapping charger locations from transformer to charging equipment.
 - Calculating wiring distances and evaluating equipment capacity

- Estimating costs based on site layout, incorporating local labor and material rates.

- **Vendor quotes:** Reach out to charging station vendors or electrical contractors for site-specific quotes based on preliminary layout sketches or site photos. This can help validate or supplement tool-based estimates.
- **Utility programs:** Determine if the utility offers calculators, feasibility assessments, or rebates that can reduce installation costs. In some cases, utilities might cover make-ready infrastructure (e.g., transformer upgrades or conduit).

Operational Costs

Operational costs include:

- **Electricity:** The cost of energy is likely the highest operational cost.
- **Networking and software:** Networked chargers offer smart charging management but require additional setup and annual fees that usually range from \$200 to \$400 per year per port (Desai 2024). See **Section 2.2** for more information about networking.

Utility Rate Structures and Demand Charges

Most facilities pay for the electricity used by EV charging equipment through monthly utility bills. Therefore, it is important to understand how EV charging affects the utility bill. Commercial utility rates typically include multiple components, reflecting the costs of supplying electricity to customers, and many utilities offer different rate options tailored for commercial users (Federal Energy Management Program 2022). **Table 4** details common utility rate components (Federal Energy Management Program n.d.)

Table 4. Common Utility Rate Components

⚡ Fixed charge (i.e., customer charge or base charge)	Designed to cover administrative costs, customer service expenses, and local distribution system maintenance. It remains constant regardless of the amount of electricity consumed and is typically billed as a flat fee per billing period.
⚡ Energy charge (\$/kWh)	Designed to recover variable costs such as fuel purchases, energy purchases, operations and maintenance, regulatory fees, taxes, and environmental initiatives. It represents the cost of all electricity consumed during a billing period. This charge applies a set price for each unit of energy used and is typically listed in dollars per kilowatt-hour (kWh).
⚡ Demand charge (\$/kW)	Designed to recover the costs associated with capacity and infrastructure, such as building and maintaining transmission lines, generating stations, and the necessary technology to ensure reliable electricity service. A demand charge is a monthly fee based on the single highest point of power consumption during the billing period. It is calculated by multiplying the peak demand by the demand rate, expressed in dollars per kilowatt. Standard in commercial and industrial rates but less common in residential rates. If the demand charge is \$20/kW and your highest kilowatt usage during the month is 100 kW, then $20 \times 100 = \\$2,000$ is added to the monthly bill.

Maintenance Costs

Section 5.3 provides details about EV charging station maintenance. Potential costs include:

- **Maintenance:** Approximately \$400 per charger annually for Level 2 chargers and approximately \$1,000 to \$2,000 per charger annually for DCFC (AFDC n.d.-d).
- **Charging station replacement costs:** Charging station units are typically operational for 7 to 10 years.

Insurance

Insurance needs for the EV charging station depend on the ownership structure. Consider the following types of insurance to ensure that the site and Tribe are protected no matter the ownership structure (Eickhoff and Heron 2024):

- **Business interruption insurance:** Coverage that replaces revenue lost due to downtime.
- **Cyber liability insurance:** Coverage for costs associated with a data breach.
- **Environmental insurance:** Coverage for environmental remediation costs.
- **Liability insurance:** Coverage to protect from lawsuits and compensation payoffs related to accidents or property damage.
- **Property insurance:** Coverage against property damage.

Demand Charge Example

Demand charges can have a large impact on the operational costs of a charging station, especially for DCFC. This example illustrates the energy bill a site might see due to demand costs.

If a Tribe in Washington in the Puget Sound Energy service territory wants to install three 200-kW dual-port DCFC units, what will the total monthly energy bill be?

1. Determine:

- **Average number of charging sessions per DCFC port:** 2.1 (California Energy Commission 2024).
- **Average daily energy use per DCFC port:** 39.69 kWh (California Energy Commission 2024).
- **Monthly energy use:** 1,191 kWh per DCFC port.
- **Total monthly site energy use for six DCFC ports:** 7,144 kWh.

2. Determine the power demand when all three DCFC ports are in use:

200 kW per station × 3 stations = 600-kW power demand.

3. Determine the electricity rate:

- **Puget Sound Energy:** New electric utility services that only host EV charging stations can use rate tariff [Schedule 558 General Service for Electric Vehicle Fleet Charging](#).
- **Rate Group 3 (RG-3D):** Rate class for customers with demand use greater than 350 kW per month. Note that the demand for three 200-kW DCFCs is 600 kW, so this will be the rate class chosen for this site.
 - There are three pricing options to choose from on this rate class: demand only, energy and demand only, and subscription.
 - Of the three pricing options, “energy and demand only” produces the lowest monthly electricity bill and thus will be chosen for this site.

4. Do the math:

Table 5. Monthly Rates Beginning Dec. 31, 2025. Adapted from [Schedule 558 General Service for Electric Vehicle Fleet Charging](#)

Rate Group	Basic Charge per Month	Peak Energy Charge per kWh	Off-Peak Energy Charge per kWh	Peak Demand Charge per kW	Off-Peak Demand Charge per kW
RG-1D	\$67.58	\$0.415186	\$0.035735	\$10.02	\$3.02
RG-2D	\$693.92	\$0.369963	\$0.031842	\$7.55	\$2.27
RG-3D	\$4,413.33	\$0.324740	\$0.027950	\$5.08	\$1.53

Assuming the worst-case scenario where all energy consumption occurs during the higher-priced peak hours (4–9 p.m.) and using the RG-3D rate with the energy and demand only pricing option seen in **Table 5**, the monthly energy bill can be calculated as:

Total Monthly Electricity Costs= (Basic Energy Charge per Month)+(Peak Energy Charge ×Total Monthly Energy Use kWh)+(Peak Demand Charge ×Monthly Peak Demand kW)

Total Monthly Electricity Costs= (\$4,413.33)+(\$0.324740×7,144 kWh)+(\$5.08×600 kW)

Total Monthly Electricity Costs=\$9,781.27

The monthly electricity bill for operating three 200-kW dual-port DCFCs during peak hours equals approximately \$9,781. Note that this is an estimate, and actual electricity costs will vary depending on charging station usage.

Tule River Indian Tribe Uses Solar Plus Storage To Manage Electricity Rates

The Tule River Indian Tribe opened an EV charging station at the Tribe's Eagle Feather Trading Post in Porterville, California. The Tribe partnered with Native Energy Services Company and the Tule River Economic Development Corporation to install DCFC for passenger vehicles, one Level 2 charger for employee use, and one charger for medium- and heavy-duty vehicles.

The Eagle Feather Trading Post electricity rates include time-of-use rates, meaning the electricity is more expensive during certain hours of the day. EV charging tends to occur during the highest electricity rate period. To manage this cost burden, the team decided to install a 66-kW rooftop solar project and a 184-kWh battery energy storage system. The solar-plus-storage system helps smooth out the demand to reduce time-of-use-related costs. In addition, the battery helps improve reliability, which is important in an area that experiences regular electricity outages.

- EV charging projects can help strengthen Tribal broadband systems by expanding network connections, improving backup systems, and supporting connections to Native-owned and Native-controlled networks.

3.8 Broadband Requirements for EV Charging Infrastructure

Networked EV charging equipment needs reliable broadband (high-speed internet) to work properly. Broadband is needed for safety, keeping chargers online, processing payments, setting prices, remote monitoring, reporting problems, and managing charging systems across multiple locations. This section explains broadband needs for EV charging and discusses Tribal data sovereignty.

Key Takeaways

- Broadband is essential for EV charging reliability, safety, and performance.
- Tribes should verify connectivity through their own testing (Federal Communications Commission broadband maps often overstate service in Tribal communities).
- Broadband and EV infrastructure can be planned together.
- Digital sovereignty means that Tribes own, control, govern, and exercise jurisdiction over all EV charging data generated on Tribal lands.

Relationship Between Broadband Access and Charging Infrastructure

Broadband, also called high-speed internet, allows people and systems to access the internet and internet-related services at higher speeds (Federal Communications Commission 2024). According to federal and academic studies, internet access on Tribal lands is significantly lower than the national average. While 4% of households nationwide lack internet access, nearly 18% of households on Tribal reservations do not have internet access at home (Howard and Morris 2019; Government Accountability Office 2022).

Reliable broadband is critical to the success of EV charging infrastructure. Networked EV chargers depend on steady, secure internet connectivity to process payments, communicate prices, and send alerts. In rural and remote areas of Indian Country, broadband quality often determines whether chargers stay online or go offline. Because charging stations may be far apart, reliability is especially important.

For Tribal Nations, broadband also supports Tribal sovereignty. When broadband is reliable and governed by Tribal policies, charging stations can meet performance standards, participate in energy programs, and ensure that Tribal data remain under Tribal control.

Key Terms

- Backhaul:** A high-capacity network link that carries data from a local site, such as an EV charging station, to the broader internet or utility network. Backhaul allows billing, monitoring, software updates, and communication with the electric grid.
- Failover:** A backup internet connection that automatically takes over if the main connection fails.
- Latency:** The time it takes for data to travel from one place to another. High latency can cause delays or failures in payments, charger communication, and system controls.

🔗 **Microwave:** A wireless technology that sends data over long distances using radio frequencies. Microwave links are often used to connect remote locations to larger networks.

🔗 **Middle mile:** The part of a broadband network that connects local service areas to major internet networks. Middle-mile infrastructure is especially important for linking rural and Tribal EV charging sites to regional systems.

🔗 **Redundancy:** Using more than one connection or system so operations can continue if one fails.

🔗 **Throughput:** The amount of data a network can carry at one time. Sufficient throughput is needed to support multiple chargers, reporting systems, and network management tools.

Tribal EV Charging Infrastructure Deployment and Broadband Lessons From the Electric Nation Project

The Electric Nation Project installed Level 2 and DCFC stations on several Native American reservations in the Midwest. This project highlighted that broadband quality had a greater impact on charger uptime than any other factor, especially in rural areas.

During the first year of service, multiple Electric Nation charging sites experienced intermittent outages linked to inconsistent local broadband connectivity. These disruptions most commonly impacted payment processing, remote diagnostics, and charger uptime, particularly in rural locations with limited backhaul redundancy. Without stable internet connectivity, project operators could not monitor chargers in real time or reset systems remotely. Instead, staff had to travel to sites in person, increasing costs and delays.

These experiences demonstrated the importance of Tribes testing real-world performance and treating broadband as an essential part of EV infrastructure planning.

Figure 9. Electric Nation charging station. Photo from Electric Nation, Native Sun Community Power Development



Required Broadband and Digital Capabilities

Most networked EV chargers and all DCFCs require reliable, secure broadband connections. Required capabilities typically include:

- A stable internet connection (e.g., fiber, fixed wireless, microwave, or Tribal middle-mile and last-mile networks).
- Strong cybersecurity protections (see **Section 4.3** for more information about cybersecurity and EV charging equipment).
- Backup internet connections in case the main service fails.
- Real-time monitoring of EV charger health and performance.
- Remote system control, including software updates and resets.
- Automated reporting and billing systems.
- Secure data storage and controlled data access.

Assessing Common Broadband-Related Considerations

Broadband planning should begin early in EV charging project planning. Important considerations include:

- Availability of fiber, fixed wireless, or microwave connections.
- Quality and reliability of last-mile service.
- Differences between advertised coverage and actual performance.
- Coordination across transportation, information technology (IT), broadband, and Tribal utility authorities.
- Electric grid reliability that could impact communication equipment.
- Permitting timelines for telecommunications infrastructure.
- Space for network equipment.
- Backup and redundancy options.
- Existing or planned Tribal broadband routes.

Resources to assess broadband considerations for EV charging infrastructure planning include:

- [Federal Communications Commission National Broadband Map](#).
- Tribal-led broadband mapping.
- Drive testing conducted by Tribes.
- Repeated, real-world performance testing at potential charging sites.

Provider coverage maps should be used with caution. These maps often show best-case speeds and might not reflect real conditions, especially in areas with rugged terrain, limited infrastructure, or frequent outages. Federal Communications Commission maps may list an area as “served” even when service is unreliable, slow, or unaffordable.

Viable Alternatives for Inconsistent Broadband

If fiber or stable wireless backhaul is unavailable, Tribes may consider the following options, noting that any alternative should support required reliability and data security measures:

- **Private LTE/5G systems using Tribal spectrum (i.e., 2.5 GHz):** A Tribe-owned wireless network that operates on Tribal-controlled airwaves. This option gives Tribes more control over reliability, security, and data but requires upfront planning and technical support. An example application would be a Tribe that runs its own cellular network for government buildings, clinics, and first responders instead of relying on outside carriers.
- **Dual-carrier cellular with automatic failover:** This setup uses two different cellphone networks at the same time. If one network fails, the other takes over automatically.
- **Low-Earth-orbit satellite connections:** This type of internet connects directly to satellites in space, making it useful in very remote areas. It can be deployed quickly, but speeds and reliability can change with weather.
- **Tribal mesh networks:** A mesh network shares the internet across many connected sites within a community. Each site helps extend the network to the next.

Communicating Broadband Requirements to Utilities and Partners

Tribes should clearly communicate and plan for digital infrastructure needs early in the project planning process. This includes setting expectations for the following:

- Required bandwidth and latency.
- Acceptable redundancy and failover options.
- Cybersecurity expectations.
- Requirements for data access and ownership.
- Involvement of Tribal broadband/IT departments from the start.
- Integrating broadband requirements into interconnection planning, charger procurement, and installation timelines.

Digital Sovereignty

All data generated on Tribal lands or by Tribally owned facilities—including energy use, payment information, charging behavior, and diagnostics—are inherently Tribal data. Broadband infrastructure is therefore integral to digital sovereignty, ensuring that:

- Tribes maintain ownership of data.
- Data systems comply with Tribal policies.
- Vendors cannot reuse or monetize Tribal data.
- Data storage aligns with Tribal rules and cultural values.

To protect the Tribe’s data sovereignty in an EV charging infrastructure project, contracts with vendors (including network providers, EV charging equipment vendors, and utilities) should include:

- Tribal ownership of all EV charging data.
- Guaranteed access to data through secure systems.
- Clear rules on where data are stored.
- Prohibitions or limits on vendor use of data (including resale or secondary use of data).
- Cybersecurity standards (see **Section 4.3** for more information about cybersecurity).
- Uptime requirements for both EV charging equipment and connectivity.
- Termination terms that ensure the Tribe retains all data.

Tribal data sovereignty models that inform EV charging infrastructure policy and assert Tribal authority over digital infrastructure may include:

- Tribal broadband authorities and telecom utilities.
- Indigenous data governance frameworks.
- Tribal control clauses in telecommunications rights-of-way.
- Tribal middle-mile and last-mile infrastructure projects.

Tribal Broadband Sovereignty as a Model for EV Data Governance

Several Tribes have developed strong digital sovereignty models that directly apply to EV charging infrastructure. These models can guide EV charging data governance and ensure that EV projects strengthen, rather than bypass, Tribal broadband systems. Examples include:

- The Navajo Tribal Utility Authority operates broadband, electric, and telecommunication services under unified Tribal governance (Navajo Tribal Utility Authority n.d.; U.S. National Telecommunications and Information Administration n.d.).
- The Confederated Tribes of the Colville Reservation manage a Tribal broadband network that prioritizes secure, managed service delivery, with Tribal control over network policies, access, and data governance (Colville Tribes n.d.).
- The Southern Ute Indian Tribe has invested in secure, modernized broadband infrastructure that supports Tribal government operations and enterprise systems, creating a foundation capable of supporting advanced energy and utility applications (Southern Ute Indian Tribe n.d.).

Federal Broadband Programs Supporting Tribal EV and Transportation Projects

Several federal programs can support broadband infrastructure and can be paired with EV charging infrastructure funding opportunities. Examples include:

- National Telecommunications and Information Administration (NTIA) [Tribal Broadband Connectivity Program](#).
- NTIA [Broadband Equity Access and Deployment \(BEAD\) Program](#).
- NTIA [Middle Mile Grant Program](#)
- U.S. Department of Agriculture [ReConnect Loan and Grant Program](#).

Potential challenges when combining broadband and EV charging infrastructure funding opportunities include:

- Misaligned grant timelines.
- Conflicting definitions of “served.”
- Burdensome reporting requirements.
- Limited federal guidance on combining broadband and EV grants.

These challenges can be mitigated through coordinated planning to approach funding opportunities holistically.

4.0

EV Charging Equipment Procurement

In this section the reader will learn:

- What are different funding and financing strategies to pay for an EV charging project?
- How are charging fees set?
- What are different ways to fund or finance an EV charging project?

4.1 Funding and Financing Strategies

This section introduces different strategies to fund or finance an EV charging infrastructure project and discusses how to approach these decisions.

Key Takeaways

- Costs associated with EV charging projects extend beyond the equipment, and costs vary significantly, making it critical to estimate project costs early.
- Tribes can consider different fee structures based on the goals of the project.

Guiding Questions

Determine how to pay for the EV charging project by first understanding the estimated costs:

1. Is the Tribe going to own the charging equipment?
 - What type of charging equipment will be installed (Level 2 or DCFC)?
 - How many chargers will be installed (see **Section 3.5**)?
 - What is the cost estimate for the EV charging equipment and installation (see **Section 3.7** for information on costs)?
 - What is the cost estimate to upgrade electrical infrastructure (see **Section 3.7**)?
 - What other associated site costs apply (see **Section 3.5** for site considerations, including lighting, safety, and signage)?
2. Is the Tribe going to operate and maintain the charger?
 - What are the estimated network costs (see **Section 2.2** for more information about networking)?
 - What are the modeled electricity costs for the planned charging equipment (see **Section 3.7**)?
3. Is the Tribe going to institute a fee for charging?

Revenue Opportunities

EV charging stations can bring in revenue in multiple ways, including:

- **Advertising:** Charging stations can sell space to advertisers.
- **Fees for charging:** Customer is charged per kilowatt-hour.
- **Indirect value:** There may be indirect revenue associated with installing EV charging stations such as the increased sale of products and services near the chargers and increased tourism business (Nigro and Frades 2014).
- **Subscription to charging service:** A subscription service can help ensure consistent revenue.

Fee Pricing Models

Site hosts should balance competitive pricing to attract users and recovering electricity costs or generating revenue. EV drivers often use apps to locate chargers based on cost, so pricing comparison with nearby charging stations is key. Ultimately, pricing strategy should account for station turnover, customer satisfaction, and operational cost recovery.

There are various methods to charge fees for EV charging. The goals for the project can drive the pricing decision. **Table 6** outlines different pricing models and the associated project goals. See **Section 5.2** for more details about charging fees.

Table 6. Charging Fee Pricing Models Based on Goal Considerations

Pricing Model	Project Goals
Free for all	• Drive tourism • Increase access • Amenity for Tribal staff • Amenity for Tribal members • Ease of access
Hybrid: Free for Tribal staff/members, fee for visitors	• Amenity for Tribal staff • Amenity for Tribal members • Economic development (indirect revenue)
Hybrid: Free Level 2 charging, fee for DCFC	• Amenity for Tribal staff • Amenity for Tribal citizens • Economic development (indirect revenue) • Cover a portion of the costs of installation, operations
Fee for all	• Economic development (likely indirect revenue) • Support other programs

If the Tribe decides to implement a fee for charging, tools to help determine revenue projections include:

- **EV Charging Financial Analysis Tool:** Evaluates business arrangements for EV charging equipment.
- **Workplace Charging Calculator:** Calculates fees for workplace charging. Use for any fee-collecting charging application. The tool inputs include the different charging station costs and expected utilization. It then outputs a breakeven charging fee in dollars per kilowatt-hour or dollars per charging session.
- **Electric Vehicle Infrastructure – Financial Analysis Scenario Tool:** Provides financial analysis for EV charging infrastructure.

Inter-Tribal Cost Sharing

Different departments and organizations within the Tribe may be able to play different roles in assuming the costs of charging station development. Think about ways to cost share with the following considerations:

- Can the Tribe’s [Section 17 corporation\(s\)](#) play a role?
- Can the Tribe’s business enterprises play a role?
- What department or organization owns the charging station location?
- Is there a Tribal utility authority? Can it cover the costs of any electric infrastructure upgrades needed?

- Does the Tribe employ licensed electricians? Which department manages the staff? Can the department pay for electricians to get certified through the [Electric Vehicle Infrastructure Training Program](#)?
- Can different departments work together to combine grants?

4.2 Finding Funding or Financing

This section provides the reader with introductory information about different funding and financing types and includes resources to find funding.

Key Takeaways

There are many funding and financing opportunities to support EV charging projects, but Tribes need to consider Tribal sovereignty and data sovereignty when deciding the funding avenue to pursue.

Grants

Grants that Tribes can consider for EV charging equipment include:

- **Competitive grants:** Requires organizations to compete for the funding, also called discretionary funding.
- **Formula grants:** Distributes funds to every recipient in a group to accomplish the same purpose. The funding for each recipient is calculated based on parameters determined by Congress (U.S. Department of Transportation 2025-c). An example is [Formula Grants for Rural Areas \(Section 5311\)](#) from the U.S. Department of Transportation that provides capital, planning, and operating assistance to states and federally recognized Tribes to support rural public transportation.
- **Pass-through grants:** The federal government issues funding to an intermediary, which is then passed to Tribes or other local entities to fund projects.
- **Continuation grants:** Grants meant to continue supporting grant-funded projects.
- **Block grants:** Fixed amounts of funding allocated to states or Tribes from the federal government that cover a general area of assistance. The U.S. Department of Housing and Urban Development [Indian Community Development Block Grant](#) provides funding to federally recognized Tribes for projects related to housing, community facilities, or economic development.
- **Private grants:** Issued by nonprofits or companies.

Many grants will require [matching](#) or “cost sharing,” meaning that part of the project’s cost is not covered by grant funding. The matching amount is generally stated as a percentage of the project cost and differs for every grant opportunity. Some grant programs offer reduced match requirements or match flexibility, especially for Tribes (U.S. Department of Transportation 2025-c). There are multiple ways to meet the match requirement:

- **Cash:** Also called “hard matching.” This could include matching funds from:
 - Tribal entities including business enterprises.
 - Other federal funds “braided” if permitted by the grant. Using other federal funding as the matching funds is often not allowable, but some flexibility may exist.
 - Nonprofit or philanthropic partners.
- **Third-party in-kind match:** Also called “soft matching.” Includes the value of noncash contributions provided by a third party, such as services (both volunteer and employee), supplies, equipment, and real property.

Grant opportunities change regularly. The following resources can serve as a starting point to find grant opportunities from the federal government, state governments, local governments, and private foundations:

- **Federal and State Laws and Incentives database:** Provides information about grants and other incentives available in each state.
- **Indigenous Power and Light Fund:** A collaborative fund that provides rapid-response grants and loans.
- **National Association of State Energy Officials State and Territory Energy Offices directory:** Provides contact information for state energy offices, which might have funding opportunities to encourage EV charging stations.
- **Office of Indian Energy Funding and Technical Assistance Opportunities:** Database of funding opportunities for Tribes, including prizes, grants, loans, and technical assistance.

Grant opportunities typically require data collection and reporting. Grant recipients are generally required to submit quarterly progress and financial reports, annual reports, and final reports. There are many award management systems that connect the grant application, management processes, reporting requirements, and closeout processes. Grants.gov maintains a [list of grant management systems](#).

Grants related to EV charging equipment typically require the following information for a certain number of years following the grant:

- Operational status.
- Uptime.
- Station use, including number of charging sessions and energy provided.

Mille Lacs Band of Ojibwe Stack Funding Sources To Build an EV Charging Station

The Mille Lacs Band of Ojibwe used multiple funding sources to install DCFC at their Department of Natural Resources. Stacking three funding sources allowed the Tribe to purchase the EVSE and pay for the necessary infrastructure upgrades. The three funding sources were:

- 1. Volkswagen settlement funds:** The second round of Volkswagen settlement funding required that projects contribute to reduced nitrogen oxide pollution. Mille Lacs Band of Ojibwe determined that EVSE meets this requirement.
- 2. Minnesota Clean Energy Resource Teams Seed Grant:** Seed grants encourage community-driven projects, and Mille Lacs Band of Ojibwe received an award in 2022.
- 3. Federally funded Tribal self-governance funds:** Mille Lacs Band of Ojibwe received a lump sum from the Bureau of Indian Affairs to use for environmental initiatives. The Tribe used the funding for projects like departmental recycling programs and to purchase EV charging equipment.



Figure 10. Level 2 EV charging station at the Mille Lacs Band of Ojibwe Department of Natural Resources office. Photo from Charlie Lippert, Mille Lacs Band of Ojibwe

NEVI Formula Program

The [NEVI Formula Program](#) provides funding to states to deploy EV charging stations to create an interconnected network. [NEVI Formula Program](#) funds may be used for installing new chargers, upgrading existing chargers, on-site distributed energy resources that relate to vehicle charging (like battery energy storage systems), and on-site electric service equipment (Federal Highway Administration 2025). States are expected to receive their last allocation of NEVI funding in 2026.

States are required to submit a state EV infrastructure deployment plan to the Federal Highway Administration and Joint Office of Energy and Transportation to access NEVI funding. These plans are publicly posted and outline how states plan to distribute NEVI funding. Locate a state's plan on their NEVI webpage, which is usually hosted by the state department of transportation or state energy office.

National [Alternative Fuel Corridors](#) are areas along major national highways where alternative fuel infrastructure will be built first. The Federal Highway Administration designates these corridors based on input from state and local officials. Alternative fuel infrastructure includes hydrogen, propane, and natural gas fueling stations, as well as EV charging stations. EVSE projects in Alternative Fuel Corridors are a priority for NEVI funding.

Federal and State Incentives

Federal and state tax incentives change regularly. The following resources can serve as a starting point to find federal and state tax incentives that might support EV charging infrastructure installation:

- [Federal and State Laws and Incentives database](#): Provides information about incentives available in each state.
- [EV Laws and Incentives Database](#): Database of federal and state laws and incentives regarding EVs, EV charging stations, fuel efficiency, and other transportation-related topics.
- [Database of State Incentives for Renewables and Efficiency](#): Provides information about policies and incentives by state.
- [Funding Guidance](#): List of funding opportunities that can be filtered based on applicant type, project type, project phase, and funding type.

Utility Incentives

Utility companies offer various rebates and incentives for EV charging station installation. Discuss potential opportunities with the Tribe's utility. If the Tribe is served by more than one utility, the site chosen for the charging equipment might depend on which utility offers incentives. Use the [U-Finder](#) tool to help find utility partners.

Utility Incentives

The AFDC maintains a [database of utility incentives](#) organized by type. Incentives include:

- EV charging deployment pilot programs.
- EV DCFC installation rebates.
- EV DCFC charging station purchase rebates.
- EV Level 2 charging station installation rebate.
- EV Level 2 charging station purchase rebates.
- Make-ready or pre-wiring rebates for EV chargers.

Loans

Loans might be available through traditional financing mechanisms. Tribes can also consider community development financial institutions or green banks as avenues for financing EV charging infrastructure projects.

[!\[\]\(66cfc90684fb13a564448e87c1beaba2_img.jpg\)](#) **Community development financial institutions** are lenders that provide funding to communities that are not typically served by mainstream financial institutions. Community development banks provide capital through lending and investing. Community development loan funds provide financing services to businesses, organizations, and individuals (Opportunity Finance Network n.d.):

- [Community Development Financial Institution Locator](#).
- [List of certified Native community development financial institutions](#), of which at least 50% of activities are directed toward serving Tribes.

[!\[\]\(56585c7ab8768f2ad5d7a55fd30584b3_img.jpg\)](#) **Green banks** are institutions that use financing to support the deployment of clean energy projects (CGC n.d.). A green bank may support a project by providing credit enhancement, co-investing in a project, or aggregating and warehousing dispersed projects.

- [State green bank map](#)

Loan Guarantees

A [!\[\]\(bfcc647664f7707d10750b1dd4ee0f19_img.jpg\)](#) **loan guarantee** is a loan backed by a government agency. The government agency guarantees to repay the loan if the borrower defaults. States may offer loan guarantees for

EV charging equipment. The federal government provides loan guarantees that may support EV charging equipment projects. Examples include:

- **Indian Loan Guarantee and Insurance Program:** Provides loan guarantees of up to 90% for Tribes.
- **U.S. Department of Agriculture Rural Development Loan Guarantees:** Offers loan guarantees to rural borrowers for business development.

Sponsorship

Tribes might also be able to get public charging stations installed using a sponsorship mechanism. Sponsors, including corporations, organizations, and individuals, may donate funds to install and maintain fee-free EV charging equipment in public places. This might be an appropriate funding opportunity for Tribes that want to encourage tourism.

[Adopt a Charger](#) is a nonprofit organization that coordinates the installation of fee-free chargers at locations like beaches, trailheads, museums, and parks. The nonprofit operates and maintains the station for 5 years. Ownership of the station is transferred to the site host upon installation. Many stations are fee-free. If the stations charge a fee to users, the fee is designed to cover costs. The Kashia Band of Pomo Indians worked with Adopt a Charger to install a charger at Fort Ross Historic State Park (Adams n.d.).



Figure 11. Adopt a Charger EV charging station at Fort Ross Historic State Park. Photo from Kitty Adams, Adopt a Charger

Tribal Sovereignty and Funding

Though many funding opportunities require data and information from the Tribe, there are methods to protect Tribal sovereignty. When applying for funding or financing, consider the following to ensure the Tribe is protected:

- **Control of data:** What data will the grant require for reporting? Will that data be made publicly available?

- **Equipment ownership:** What entity will own the equipment? See **Section 3.4** for more details on ownership structures and Tribal sovereignty considerations.
- **Land use authority:** Who manages the site? What policies and regulations apply?
- **Self-determination:** Does the funding opportunity empower the Tribe to make decisions and control how the funding is administered?
- **638 Contract:** The Indian Self-Determination and Education Assistance Act of 1975, also called 638 Contracts, allows federally recognized Tribes to manage programs and services with less oversight (Trumbly Lamsam 2025). The Tribe can request that any federal program, service, or activity be transferred to Tribal control (Strommer and Osborne 2014). Tribes may be able to use this to increase Tribal control over EV charging infrastructure projects.
- **Sovereign immunity protections:** Carefully review whether the funding agreement requires a waiver of sovereign immunity, submission to state or federal court jurisdiction, or arbitration under non-Tribal law. Ensure the Tribe can preserve Tribal court jurisdiction and avoid broad or unnecessary waivers.
- **Long-term compliance obligations:** Assess any long-term reporting, data sharing, maintenance, or performance requirements attached to the funding that may limit Tribal autonomy or create ongoing administrative burdens.
- **Match and cost-share requirements:** Determine whether the funding includes cash or in-kind match requirements, and whether such requirements could undermine financial sovereignty or force the Tribe into unwanted partnerships with utilities, states, or vendors.
- **Regulatory authority:** Confirm that the funding source respects Tribal regulatory jurisdiction, including Tribal environmental review, permitting, tax authority, procurement standards, and TERO requirements, rather than defaulting to state or local codes.
- **Ownership and operational restrictions:** Identify any requirements related to public access, vendor selection, network standards, or long-term operational control that could limit Tribal authority over pricing, data, or business models.
- **Consultation and consent:** Ensure that federal or state agencies engage in meaningful consultation or, where appropriate, free, prior, and informed consent processes, supported by memoranda of understanding or memoranda of agreement that affirm Tribal jurisdiction and decision-making authority.
- **Cultural resource protections:** Verify that funding does not override Tribal cultural resource laws, and ensure Tribal cultural monitors, Tribal protocols, and protections for traditional cultural properties are fully integrated into project requirements.
- **Trust responsibility alignment:** Evaluate whether the funding opportunity aligns with and reinforces the federal trust responsibility, supports self-governance, and avoids pathways that enable state interference in Tribal decision-making.

Additional Resources

- **Directory of Grant Writers:** Maintains a list of grant writers who are available to hire for grant writing.
- **Federal-Aid Matching Strategies:** Outlines innovative strategies to meet grant matching requirements.
- **Grants Learning Center:** Provides in-depth information about grants, policies, reporting, and systems.
- **How To Amp Up Transportation Transformation: A Guidebook for Funding and Financing Electrification:** Details funding and financing strategies and opportunities for EV charging stations.

4.3 Procurement and Installation

The purpose of this section is to outline the procurement and installation processes for EV charging projects and inform readers of the many details that need to be considered.

Key Takeaways

- The formal procurement process will be different for every Tribe and depends heavily on the selected ownership model.
- Networked versus non-networked charging also impacts procurement needs.
- Zoning ordinances, permitting requirements, and regulatory requirements will impact the project timeline and cost.
- Cybersecurity must be integrated from planning through operation. Using secure protocols and life cycle standards ensures charging systems are built with encryption, authentication, and integrity protection from the ground up.

Charging Equipment Procurement

Procurement processes will vary depending on the procurement requirements of the Tribe or organization purchasing the charging equipment. The following steps provide general guidance on how to approach the procurement process:

1. Determine the project type, including ownership model (see Section 3.4).

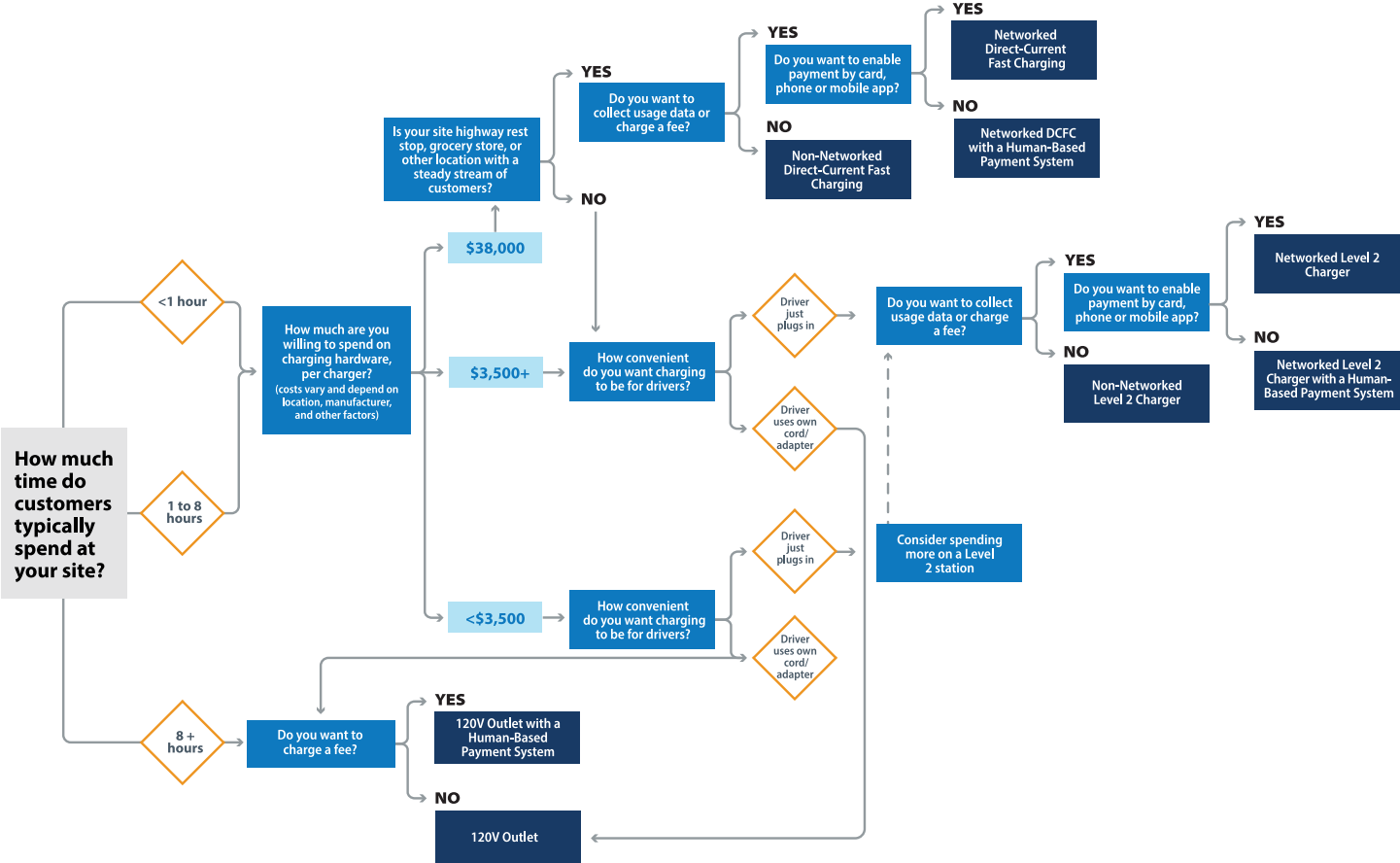


Figure 12. EV charger type decision tree (adapted from U.S. Department of Transportation 2025-b)

2. Determine communication network connection requirements (see Section 2.2 for more information about networked and non-networked charging). Table 7 highlights the benefits and considerations of both networked and non-networked charging.

Table 7. Benefits and Considerations of Networked and Non-Networked EV Charging Equipment

Networked Charging Equipment: Connected to internet or cellular service	
Benefits	Considerations
Can collect payment by credit card or smartphone	Monthly fee
Supports remote customer service	Requires broadband or cellular access
Transmits utilization data, can allow site host to participate in demand response programs	Data collection considerations for data sovereignty, need to negotiate data collection rights with network provider

Non-Networked Charging Equipment: Not connected to internet or cellular service

Benefits	Considerations
No monthly fee	Cannot collect fees
Does not require reliable broadband or cellular access	May increase response time for maintenance needs
Lower equipment cost	Cannot provide immediate customer service

3. Select equipment:

- Ensure equipment is UL-listed for EV charging equipment applications.
- Consider **ENERGY STAR® certified equipment**. Certified Level 1 and Level 2 chargers use 40% less energy when in standby mode (AFDC n.d.-e).
- Determine the connector type (see **Section 2.2**).
- Determine number of chargers to install (see **Section 3.5**).

4. Assess installation needs:

- Any upgrades to on-site electrical wiring.
- Consider futureproofing the electrical capacity of the site to allow for more charging equipment in the future.

Futureproofing—designing infrastructure for potential expansions—accounts for future needs at a project site. Futureproofing could include sizing transformers and electrical panels to have extra power capacity, as well as oversizing conduits or including spare conduits. These measures can help avoid expensive retrofits later. Futureproofing might need to be considered if:

- The Tribe anticipates increased EV adoption by Tribal members due to Tribal incentive programs.
- The site location has other planned projects that might draw EV drivers.
- Funding for charging equipment is currently limited, but funding for infrastructure is available and future funding for more equipment is possible.

5. Determine maintenance needs (see Section 5.3) and whether an outside party will provide maintenance services.

6. Conduct a formal procurement process (if relevant):

- Consider including TERO requirements.
- Consider including Buy America requirements (grant funding may include Buy America requirements).

RFP Checklist

The RFP checklist, available in **Appendix D**, can be used to gather and organize the information needed to create an RFP for EV charging infrastructure.

Consider the following in the procurement process:

- **Equipment lead times:** Understand the time between ordering equipment (both for EV charging and electric system upgrades) and delivery.
- **Equipment manufacturer stability:** Consider what would happen if the equipment manufacturer shuts down and whether the equipment can operate with other networks. See **Section 2.2** for more information about OCPP.
- **Fleet electrification timing:** If the planned charging equipment is meant to support forthcoming electric fleet vehicles, the EV charging equipment should be installed before the vehicles are procured.

Jamestown S’Klallam Tribe Prepares Buildings for Future EV Charging Demand

The Jamestown S’Klallam Tribe proactively plans for future EV adoption by making sure all Tribally owned buildings are EV ready. When there are new construction projects, the Tribe ensures the building will be able to meet future EV charging demand by including appropriate conduits and electrical capacity upgrades in building designs. When there is construction work at existing buildings, they leverage the ongoing work to extend conduits to parking areas to serve current and future charging needs. As an important lesson learned, the Tribe now also recommends extending ethernet cables for future connectivity to accommodate potential additional EV charging stations that require internet access.



The Tribe's environmental planning manager emphasized the importance of developing strong relationships with key stakeholders—including facilities and IT staff, electricians, construction crews, project managers, and utility representatives—when preparing buildings for EVSE installations. Early engagement with these groups enables a thorough assessment of existing electrical load and capacity, helps identify optimal locations for charging stations, and supports comprehensive planning to meet future EV demand.

Figure 13. Charging stations at the Jamestown S'Klallam Tribe Healing Clinic. Photo from Robert Knapp, Jamestown S'Klallam Tribe

Permitting and Code Compliance

There are likely regulatory requirements, permits, and ordinances relevant for installing EV charging equipment. All will vary based on location, depending on whether or not the site is located on Tribal land. Tribes have discretion in regulating projects within their reservations. Consider the following categories:

- Building codes.
- Zoning ordinances.
- Parking ordinances: Consider codes that require a minimum number of parking spaces that are ready for EV charging equipment or EV charging.
- Local permits.
- Federal regulations, including the National Environmental Policy Act and the National Historic Preservation Act.
- Americans with Disabilities Act requirements.

The installer/electrician should know the relevant codes to follow for EV charging infrastructure, including:

- [National Electric Code Article 625: Electric Vehicle Charging System](#).
- [SAE International Standards](#).
- The National Electrical Code covers the electrical conductors and equipment that connect an EV to premises wiring for charging, power export, or bidirectional current flow. Includes requirements that equipment is UL listed (National Fire Protection Association 2023).
- NFPA 88A: Standard for Parking Structures is the standard for the construction and protection of open and enclosed parking structures.
- Additional National Fire Protection Association standards for fire hydrant placement.

Installation

The charger installation process follows these steps:

- 1. Pre-installation site preparation:** Coordinate with facilities staff and contact local call-before-you-dig services to identify and mark all underground utilities (e.g., electric lines, gas pipes, water and sewage lines, underground storage tanks).
- 2. Excavation and electrical infrastructure:** Install underground conduit, which houses the electrical wiring between the charging equipment and the power source. Install a separate disconnect switch if the charger draws more than 60 amps, as required by National Electrical Code 625.23.
- 3. Wiring installation:** After conduit inspection, pull the wires through the conduit. Overcurrent protection should be sized to support 125% of the charger's rated load, as required by National Electrical Code 625.21.
- 4. Testing and final inspections:**
 - Confirm electrical inspections.
 - Get final approvals from the authority having jurisdiction (this will vary depending on where the station is located).
 - Test connectivity and charging speeds.
 - Ensure applicable network connectivity.
- 5. Install signage and safety instructions.**



Figure 14. Parking lot signage for EV charging. Photo from Laura Beshilas, NLR

Physical Safety

Tribes can follow these measures to have safe EV charging stations:

- **Emergency shut-off (E-stop):** Install an external disconnect for each charger so the charger can be disconnected from power in case of emergency. This is recommended but not required by the 2023 version of the National Electric Code.
- **Protect equipment:** Charging equipment must be protected from vehicles with physical barriers.
- **Protect cords:** Use cord management to prevent tripping hazards or damage.
- **Fire prevention:** Install charging equipment appropriately and meet National Fire Protection Association standards and the National Electric Code.

Cybersecurity

Networked EV charging stations are connected to the grid and central management systems. They exchange data about pricing, location, and usage and are often updated remotely. Compromised devices can allow unauthorized access to private data, disrupt charging services, or destabilize the local electric grid. Security measures should be built into the planning, procurement, installation, and operation of charging infrastructure.

Cybersecurity best practices include:

- **Supply chain security:** Vet vendors and integrate security requirements into procurement contracts. Ensure that third-party components and software meet the same security standards.
- **Network segmentation:** Segregate the charging network management system from the public internet and Tribal IT systems.
- **Zero trust:** Apply “zero trust” principles by authenticating every device and user before granting access.
- **Vulnerability management:** Maintain an inventory of assets and dependencies, apply security patches promptly, and regularly scan systems for vulnerabilities.
- **Incident response and recovery:** Develop plans for incident response. Ensure there are offline backups of critical systems and implement processes for restoring operations after a breach.
- **Training and awareness:** Train personnel, including site managers and maintenance contractors, on cybersecurity best practices and phishing awareness.
- **Physical security:** Ensure chargers are tamper-resistant and tamper-evident. Provide secure access to panels and detect physical intrusion attempts.

Consider the following questions when choosing an equipment or network provider:

- **Is the charging equipment compliant with [UL 2900](#)?** UL 2900 is a standard for evaluating and testing network-connected products for vulnerabilities and malware. Independent testing by a third party to UL 2900 can give operators confidence that EV charging software does not contain exploitable flaws and updates are securely managed.
- **What [OCPP](#) security profile does the charging network use?** OCPP has three different security profile options with different levels of encryption and authentication. Operators should select the most secure profile their hardware support allows.
- **How does the EV charging equipment comply with the [NIS 2](#) cybersecurity framework?** The European Union Network and Information Security Directive identified charging station operators as providers of critical infrastructure. This directive requires organizations to:
 - Implement risk management measures.
 - Secure supply chains.
 - Maintain resilient networks and protect personal data.
 - Report incidents to authorities.
 - Demonstrate compliance through documentation and audits.
 - Maintain an incident response plan.
 - Conduct regular security assessments.
 - Verify that vendors and subcontractors follow secure development practices.
- **Does the EV charging infrastructure use the [Open Charge Point Interface](#)?** The Open Charge Point Interface allows drivers to use different charge point operators and service providers (referred to as “[roaming](#)”). It defines authorization mechanisms to establish trust between parties, including radio-frequency identification cards or mobile app identifiers, to authenticate drivers and control access to the chargers.
- **How does the EV charging equipment comply with [IEC 62443](#)?** IEC 62443 is a suite of standards for securing automation and control systems for infrastructure such as water, power, and transportation.
- **Does the equipment use [ISO 15118](#)/plug-and-charge protocols?** ISO 15118 governs communications between the EV and charging station. Digital certificates authenticate both the vehicle and the charger. This enables seamless plug-and-charge without sacrificing security.

Additional Resources

- **Building Codes, Parking Ordinances, and Zoning Ordinances for Electric Vehicle Charging Infrastructure:** Provides more information about codes and ordinances relevant to EV charging.
- **Certification for EV infrastructure:** Lists the different parts of EV charging equipment and applicable standards and certifications.
- **Electric Vehicle Charging Station Permitting Guidebook:** A guidebook for EV charging permitting. Though specific to California, it has resources and information useful for anyone interested in EVSE.
- **Environmental Statutes and Executive Orders Relevant to EV Infrastructure:** Describes laws and regulations that might be relevant for EV charging infrastructure installation.
- **EVSE Products, Charging Network, and Service Providers:** Lists EVSE product manufacturers, charging network administrators, and service providers.
- **PlugStar Qualified Electrician Finder:** Helps consumers find qualified electricians to install residential charging equipment.

5.0 Managing EV Charging Stations

In this section the reader will learn:

- What are the workforce needs to support EV charging infrastructure?
- How can the Tribe develop an EV charging support workforce?

- What data should the Tribe collect about the EV charging station itself? About the charging services provided?
- How are fees collected for charging?
- How should emergency services be incorporated into operations planning?
- What maintenance will be required for EV charging stations?

5.1 EV and EV Charging Infrastructure Workforce

EVs and EV charging infrastructure can create workforce opportunities for Tribes. This section details the skills needed for EVSE projects (both installation and operations and maintenance) and different opportunities to develop the workforce.

Key Takeaways

- Licensed electricians certified in EV charging infrastructure installation are required.
- Tribal workforce requirements vary depending on the project type and partners involved.
- The need for an EV and EVSE workforce is growing, and Tribes can take advantage of this growing sector by pursuing different workforce development opportunities.

Skills Needed for Long-Term Support of EV Charging Infrastructure

Table 8 summarizes the range of skills needed to support EV charging infrastructure projects.

Table 8. Summary of the Skills Needed for EVSE Operations and Maintenance (Bui et al. 2024)

Category	Requirements/Skills	Example Responsibilities
Electricians	Licensed electrician, specialized training like the Electric Vehicle Infrastructure Training Program	Support operations and maintenance of EVSE
Project management and coordination	Project management, collaboration with project partners, procurement of technology, knowledge of permitting, knowledge of larger Tribal goals	Manage and coordinate the project and align the project with larger Tribal goals
Engineering and technical	Site engineering, grid capacity analysis, knowledge of Tribal standards and compliance	Ensure the project is sited appropriately and there is infrastructure (e.g., electricity, parking spaces, Wi-Fi) to support EVSE

The number and range of skilled workers needed to support a project will depend on several factors such as the project type and project partners and vendors (see **Section 3.2** for more information about project partners). For example, if a third-party developer owns and operates the EVSE, the Tribe might not need a licensed electrician with EVSE certifications on staff. Or if the Tribe partners with the utility on an EVSE project, the utility might support the more technical aspects like site engineering. It is helpful to align the Tribe's EVSE project(s) and goals with workforce development opportunities.

Workforce Training Opportunities

To meet the demands of the growing EV sector, community, technical, and Tribal colleges are expanding programs and certifications to include EV and EVSE. To date, most training programs focus on EVs, such as battery technology and EV repairs and maintenance. Some programs focus on EVSE, such as field technical training, but they are less common. Programs range in delivery (hybrid, online, in-person, or combination) and length (2 weeks to 2 years). Many available programs are flexible in their design, like courses offered at your own pace, to increase accessibility to more groups of people interested in a career in the EV sector (Shrestha et al. 2025).

In addition to institutions like colleges, there are organizations that provide certification, apprenticeship, and pre-apprenticeship programs for electricians, as well as publicly available resources that support the development of the EV and EVSE workforce. These include:

- **Joint Office of Energy and Transportation:** Offers a range of resources (e.g., training programs, guides, and tools) to support workforce development in the transportation electrification sector. Their resources can be used to train first responders on EV safety, connect people to apprenticeship opportunities, and train electricians on EVSE.
- **Electric Vehicle Infrastructure Training Program:** Gives electricians the skills to install and maintain EV charging stations. This national certification is recognized at the federal and state level.
- **Career and technical education programs:** Prepare people for specific careers, trades, or fields with an emphasis on hands-on skills that can be translated directly to the workforce. These programs are offered through a variety of institutions such as K–12 schools, community colleges, and trade schools. Electrical training is common through these programs.
- **Apprenticeship programs:** Allow participants to earn an income while learning the trade. Participants typically work with and learn from skilled electricians or EVSE

professionals and take formal coursework. Locate programs through trade schools, your local union, or the [federal database of apprenticeships](#). Apprenticeship programs can be either accredited or nonaccredited. An accredited program has been approved by an official body and is guaranteed to meet industry standards in training. A nonaccredited program does not have this credential but might have more flexibility in curriculum design or be more tailored to a specific role or community need.

- **Tribal colleges and universities:** Academic institutions chartered by Tribal governments. There are 35 accredited Tribal colleges and universities in the United States that range in size, educational focus, and location. They are all rooted in Tribal identity and share the mission of Tribal self-determination and service to their respective nations (American Indian Higher Education Consortium n.d.). Many offer electrician and electrical technology training programs (e.g., [Navajo Technical University](#) and [San Juan College](#)).

Considerations for Developing a Tribal Workforce Development Program

An alternative to accessing workforce training through existing channels is to develop a workforce development program for the Tribe. Developing a program allows the Tribe to tailor the curriculum to fit the specific community needs and Tribal goals.

Considerations and opportunities when developing a workforce development program include:

- Determine the type of program you would like to develop (e.g., apprenticeship, pre-apprenticeship, professional development) based on your Tribe's goals and needs. For instance, it might make sense to design a pre-apprenticeship program if you would like flexibility in curriculum design.
- Partner with Tribally owned companies or companies with expertise in Tribal workforce development.
- Partner with Tribal colleges and local career and technical education programs to support curriculum design or implementation.
- Lean on the expertise of existing Tribal workforce development programs to determine the type of program you would like and inform curriculum and program implementation.
- Avoid partnering with organizations that see workforce development as checking a box for a larger project rather than a meaningful effort. Tribal workforce development programs should be place based and designed to meet the specific needs of the Tribe.

- Ensure the program is governed under Tribal law, Tribal education codes, or other Tribal regulatory frameworks to reinforce Tribal sovereignty.
- Consider whether the Tribe will use or expand the TERO to support hiring preferences, training requirements, and contractor obligations.
- Determine whether the program will offer or prepare participants for industry-recognized credentials (e.g., Electric Vehicle Infrastructure Training Program, North American Board of Certified Energy Practitioners, Occupational Safety and Health Administration certifications, electrical licensing) and whether the Tribe wants to establish Tribal credentialing pathways for work on Tribal land.
- Evaluate whether memoranda of understanding or agreements with state licensing bodies are needed to ensure reciprocity or recognition of training completed through Tribal programs.
- Plan for long-term program sustainability, including ongoing funding, staffing, instructor capacity, and the potential creation of a permanent Tribal workforce development department.
- Identify career pathways and employment pipelines for graduates, including Tribal utilities, Tribal enterprises, environmental departments, cultural resource programs, or contractor partners required to hire Tribal members through TERO agreements.
- Consider wraparound supports such as transportation, child care, equipment, tools, mentorship, and case management to improve completion and retention.
- Protect data sovereignty by ensuring the Tribe owns and governs all participant data, training records, assessments, and employment outcomes, and by avoiding third-party platforms that extract data without Tribal oversight.
- Align workforce development with the Tribe's broader strategic plans, economic development goals, energy plans, and long-term governance capacity-building.
- Incorporate Tribal health, safety, and labor standards, including required safety trainings (e.g., OSHA 10/30, NFPA 70E, CPR/first aid) and Tribal-specific safety protocols.

Potential Avenues for Workforce Development Funding

Many economic development and energy programs offered through the U.S. Department of Energy, U.S. Department of Transportation, U.S. Department of Labor, Bureau of Indian Affairs, and others include funding for workforce development. For example, federal programs like the

Tribal Broadband Connectivity Program allow funding to be used for workforce training. Coupling workforce development with energy, economic, or other Tribal projects can increase capacity of the Tribe, sustain projects in the long term, develop long-term career pathways for Tribal members, and increase Tribal sovereignty.

In addition to funding at the federal level, state-level programs can support workforce development depending on where you are located. There are also opportunities to secure funding for workforce development through grants at nonprofits.

Tribes may also consider integrating workforce development components directly into infrastructure, energy, cultural resource, or climate resilience projects to create embedded funding pathways and long-term employment opportunities.

When pursuing funding, review requirements to ensure they respect Tribal sovereignty, avoid unnecessary reporting burdens, and allow the Tribe to maintain governance over program design and implementation.

Additional Resources

- **Tribal Workforce Development: A Decision-Framing Toolkit:** Helps frame and inform strategic decision-making around workforce development.
- **A Summary of Native Workforce Development Models:** Highlights successful workforce development models.

A Group of California Tribes Design a Place-Based Pre-Apprenticeship Program for Low-Voltage Electricians

In August 2025, 25 students graduated from a new pre-apprenticeship program developed by the Blue Lake Rancheria, Karuk, Yurok, and Hoopa Valley Tribes. Twenty-four of the students were Tribal members. The program consisted of 5 weeks of online learning and a 3-day in-person training. Participants received a \$5,000 stipend for completing the course and access to OSHA's 10-hour safety certification.

Tribes in the region recognized the need to fill urgent local workforce gaps and create good-paying jobs in the area (Oxendine 2025). The Tribes collaborated with a consultant with expertise in Tribal sovereignty and Tribal workforce development. The team conducted interviews to shape the program curriculum with both Native and non-Native apprenticeship programs, including the Meskwaki Nation apprenticeship program (Blue Lake Rancheria n.d.). Tribal speakers with energy expertise, both in the region and

across the United States, supported the program as guest lecturers, as did representatives from the Tribal Employment Rights Office, the local union for electricians, and other organizations in the region.

The Tribes decided to create a pre-apprenticeship program that could support multiple career paths, including carpentry, registered apprenticeships, working in Tribal government, or going to college. A pre-apprenticeship program also gave the Tribes more freedom with curriculum design. In addition to standard coursework, the program provided training on nontechnical skills such as understanding Tribal sovereignty, how to work successfully with Tribes, and navigating human resource policies and benefits. They also supported participants with resume design and mock interview practice. Programs like this pre-apprenticeship can help support growing EV charging equipment operations and maintenance needs in Indian Country.

“From my experience, this program really helps you understand what the work is like and gives you the chance to practice the skills you’ll actually use on the job. It’s not just sitting in a classroom—you get hands-on training, safety knowledge, and exposure to real projects.”

– Program participant



Figure 15. Pre-apprenticeship program participants. Photo from Blue Lake Rancheria

5.2 EV Charging Equipment Operations

This section provides information about the operations responsibilities of an EV charging station owner-operator, including fee setting, data collection, and emergency management.

Key Takeaways

- Data and information collection is important for appropriate fee setting, contract management, grant reporting, and maintenance.
- EV fires require different response techniques. Tribes should coordinate with emergency services to be appropriately prepared.

Day-to-day operations of EV charging infrastructure include compliance with electrical, safety, and accessibility codes, as well as local zoning and permitting rules. General operations actions also include regular ongoing maintenance (see **Section 5.3**), as well as monitoring and payment system management.

The organization responsible for day-to-day operations depends on the ownership system. See **Section 3.4** for more information about ownership models. If a third party owns and operates the charging station, the Tribe can ensure that the third party is accounting for the following responsibilities.

Fee Collection

Site hosts may charge a fee to use the charging infrastructure. Networked systems can facilitate the transaction. There are different payment methods for EV charging, including smartphone app-based, kiosk-based, or on-charger point of sale. Non-networked systems can also receive payment via in-person payments (AFDC n.d.-d).

Pricing Structures

The fees levied for EV charging depend on the Tribe’s goals for the EV charging station. Fees charged at a station designed to bring in revenue to the Tribe via tourism will be different than fees charged at a station designed to serve Tribal members and staff. Fees can also differ based on the charging level.

Common pricing structures for user charging fees could be based on:

- **Kilowatt-hours:** Based on the amount of electricity used.
- **Length of time:** Common in states where non-utilities are prohibited from selling electricity.
- **Session:** Common in states where non-utilities are prohibited from selling electricity. This is relevant for stations that are located on non-Tribal land.
- **Subscription:** Recurring payment plan that allows drivers to access a network of charging stations. Designed to provide predictable costs for drivers.
- **Tiered pricing:** Based on Level 2 or DCFC.

Input costs for calculating a user charge fee can be determined based on:

- **Volumetric electric rate:** The cost per kilowatt-hour of electricity that the site pays the utility, based on the consumption.
- **Demand charge:** Billed by the utility for the highest level of electricity used by the charging station during a billing period.
- **Annual costs:** Including maintenance costs, insurance, and network costs.
- **Capital costs:** Including the equipment itself and any electrical upgrades or site work. Consider the amortization period of the EVSE and the electrical infrastructure work.
- **Additional costs:** Including credit card transaction fees.

Tribes might choose to make EV charging a free amenity available to Tribal members and/or staff but charge others for the service. This can be managed with smart charging software that differentiates between users with radio-frequency identification or a smartphone application.

Data Monitoring

The owner and operator of an EV charging station should review and analyze the following data:

- **Real-time monitoring of uptime:** Monitor maintenance response time (especially if contracting a third-party maintenance provider) and the number and types of maintenance needs.
- **Maintenance and repair needs:** Keep records of maintenance and related costs to better understand the costs of operating an EV charging station.
- **Customer support and communications:** Review the customer support required, adjust signage, and consider offering community education to better support station users.
- **Utilization:** Understand the number of charging sessions, their duration, and the time of day. This information can be used to plan for expansion.

- **Utility fees:** Review utility fees and how the different charges (see **Section 3.7**) impact the station's utility bills.

Much of this information is more easily reviewable with a networked system. If the station is not networked, the operator can review utility bills and track maintenance and repair needs.

Emergency Services

EV fires often require different firefighting techniques and safety protocols due to the high-voltage battery system. Fires could occur if the battery is damaged during a crash or due to excessive heat or water intrusion, manufacturing defects, or extreme environmental conditions. High-voltage battery fires are often addressed either by using a significant amount of water or letting the fire burn out (U.S. Department of Energy 2024-a).

Consider coordinating training for Tribal emergency service providers, as well as nearby local emergency service providers, including police departments, fire departments, emergency medical services, and emergency managers. In-person trainings are available and can be coordinated with the local Clean Cities and Communities coalition. Work with the provider to ensure the trainings are appropriate and culturally informed. Online training resources are also available, including general [EV fire response courses from the National Fire Protection Association](#) and [EV model-specific fire response resources from General Motors](#).

In addition, take the following steps to improve emergency services:

- Ensure charging station staff know the location of the nearest fire and emergency resources and how to contact the services.
- Ensure charging station location information is accurately registered with emergency dispatch services.
- Equip emergency responders with safety information, including:
 - [Electric and Hybrid Vehicle Quick Reference—Fire Service Edition](#): Outlines initial actions responding to EV and hybrid EV emergencies.
 - [Emergency Response Guides](#): Provides manufacturer-submitted emergency response guides for EVs.
 - [Submerged Hybrid/Electric Vehicles bulletin](#): Provides quick information for emergency responders about how to respond to a submerged EV or hybrid vehicle.
 - Include EV charging stations in Tribal emergency planning.

Other Operations Responsibilities

The EV charging station operator should also consider the following responsibilities:

- Reassess user fee structure based on data collected and assessed, including maintenance costs and utility fees.
- Required reporting for grant funding.
- Expansion planning.
- EV charging equipment replacement.

Additional Resources

- **Electricity Laws and Incentives:** Provides a list of state laws and incentives related to electricity, which could impact how fees are determined, depending on the land status of where the charging station is located.
- **Electric Vehicle Charging Stations Economics Calculator:** Calculates the costs and revenue of operating a charging station.
- **Electric Vehicle Safety Training Resources for First and Second Responders:** Includes resources about general safety, fire safety, and training resources for both first and second responders.
- **Best Practices for Payment Systems:** Summarizes EV charging payment challenges and proposed solutions.
- **Federal Workplace Charging Program Guide:** Provides information for federal workplace charging programs and has useful information about how to calculate charging fees.

5.3 EV Charging Equipment Maintenance

This section details the maintenance that a Tribe that owns and operates the EV charging station needs to conduct, as well as considerations if the Tribe contracts maintenance out to a third party.

Key Takeaways

- Maintenance costs depend on charging level and whether the station is networked or non-networked.
- Maintenance includes regular cleaning, general inspections, charging cable storage, and repairs.

 **Uptime** is the total time a charging station is functional and available for a user to complete a charge. EV charging equipment funding opportunities often require a minimum uptime. Proper maintenance and monitoring are important to maintain uptime.

EV charging equipment maintenance and the cost of maintenance is based many factors, including charging level and whether the station is networked on non-networked (California Energy Commission 2018). EVSE owners can assume that maintenance will cost approximately \$400 per charger annually for Level 1 and Level 2 chargers. The annual maintenance cost for DCFC could be \$1,000 to \$2,000 per charger. These estimates are likely low for Tribes located in rural or remote areas, as hiring outside labor will be more expensive.

Maintenance concerns for all levels of charging equipment include:

- Regular cleaning.
- General inspections.
- Charging cable replacement.
- Vandalism.

Maintenance Management

EV charging infrastructure maintenance requires coordination and pre-planning to ensure that the charging station's downtime is minimized.

Warranties

The EV charging equipment manufacturer will provide a warranty, included in the equipment cost. Typically, the warranty is for 1–3 years and covers equipment repair services and parts replacement, including charging cables and connectors. The warranty provided by the equipment manufacturer likely will not include general maintenance or uptime response. Warranties generally exclude coverage for damage due to improper use or “acts of nature” like natural disasters (AFDC n.d.-d).

Extended Warranties

Many providers offer options to extend the warranty an additional 2–7 years. The price of the extended warranty depends on the term length and power level of the charging station.

Operations and Maintenance Contracts

The EV charging station host can enter an operations and maintenance contract with a provider where these services are provided for an annual payment. Operations and maintenance services can be provided by the installer, network provider, or a dedicated company. The [Electric Vehicle Infrastructure Training Program Find a Contractor](#) tool is a map and database to identify certified EVSE installers that may also be able to provide these services.

An operations and maintenance contract should include:

- Overall uptime requirement.
- Response time.
- Time for a given repair.
- Emergency maintenance protocols.
- Preventative services.

Barriers to Maintenance

Barriers to timely maintenance could include:

- **Weather patterns:** Both extreme heat and cold temperatures can impact charging equipment. Overheated cables can be a safety hazard, and freezing temperatures can make equipment brittle. In addition, moisture seeping into equipment can cause physical damage and be dangerous for maintenance staff. EV charging stations can be designed to reduce the impacts of hot and cold temperatures. In addition, keeping relevant spare parts on hand (such as cables) can help minimize downtime.
- **Obsolete parts:** EV charging equipment parts can age out and become obsolete if the charging equipment company no longer offers replacement parts. If the charger cannot operate without the specific obsolete part, the charger will need to be replaced. Replacing a charger with another of the same power level is a simple task for a licensed electrician.
- **Out-of-service companies:** When an EV charging company closes (e.g., the manufacturer or network provider), operations and maintenance efforts become more challenging. The following solutions can help prevent or manage the challenges:
 - Ensure that the equipment uses OCPP, which enables changing network providers if one fails.
 - Check if there is a transition plan (e.g., if the failed provider will be purchased by another provider).
 - The charging station hardware might need to be replaced if it does not operate on OCPP and/or if the company is not taken over by another.

- **Remote location:** There may be limited operation and maintenance services available in remote and rural areas. Service contracts for EV charging stations in remote areas should take the additional costs and challenges into consideration. In addition, Tribal preference for operations and maintenance contracts might help by utilizing local organizations.

6.0 Additional Considerations for Tribes

In this section the reader will learn:

- How can EV and EV charging projects align with a Tribe's sovereignty?
- What are critical minerals, and can they be reused or recycled after an EV's life?

6.1 Tribal Sovereignty

Key Takeaways

- EVs and EV charging stations can be used by a Tribe as part of an effort to exercise Tribal sovereignty.
- If Tribal sovereignty is a goal of the Tribe in EV and EVSE development, the Tribe should also consider data sovereignty, land use sovereignty, economic sovereignty, and procurement sovereignty.

 **Tribal sovereignty** is the inherent, original, and continuing authority of Tribal Nations to exist as distinct political governments with the power to determine their own systems of law, define citizenship, regulate their territories and resources, administer justice, manage governmental and economic affairs, engage in intergovernmental relations, and protect the health, welfare, culture, and future of their people. This is an authority that predates the United States and does not derive from federal or state governments.

As the Tribe pursues EV charging projects, planners should consider how the projects align with the Tribe's self-governance principles, priorities, and long-term community values.

Tribal sovereignty considerations, as they relate to EV charging equipment, include:

- **Data sovereignty:** Tribes have the inherent right to govern the collection, ownership, application, and sharing of data about their communities, lands, and resources. Data sovereignty considerations include:
 - Ownership and control of charger usage data.
 - Data sharing required by grants or other funding opportunities.
 - Charging network data collection and privacy concerns.
 - Control of third-party network communications, roaming agreements, and backend software access.
 - Protections for personally identifiable information and location-based mobility data generated by EV drivers on Tribal lands.
- **Land use sovereignty:** Projects on Tribal lands should be governed by Tribal permitting and review processes. In  **checkerboarded** areas, ensure jurisdictional boundaries are clarified (for both utility and broadband infrastructure). Land use sovereignty considerations include:
 - Recognition of Tribal authority over environmental review processes (e.g., Tribal National Environmental Policy Act equivalents).
 - Application of Tribal building, electrical, and fire codes rather than state or local codes.
 - Tribal authority over easements, rights-of-way, and land assignments used for EV infrastructure.
- **Long-term economic sovereignty:** Consider the role of Tribal entities in ownership and operations (see **Section 3.4**) for more control over pricing, access, and data. Economic sovereignty considerations include:
 - Tribal tax authority, including sales tax, utility fees, and excise taxes on charging services.
 - Revenue retention within Tribal enterprises or Tribal utilities.
 - Integration with Tribal energy planning, microgrids, storage, and renewable energy development.
- **Procurement sovereignty:** The Tribe can assert decision-making authority over siting, operations, data collection, and vendor relationships. Tribes can use Tribal preference policies in procurement and exercise TERO rights. Additional procurement considerations include:
 - Use of sovereign immunity provisions, indemnification terms, and dispute resolution mechanisms grounded in Tribal law.
 - Vendor compliance with Tribal labor, safety, and contracting codes.
 - Authority to require service, maintenance, and training commitments from vendors on Tribal land.

- **Regulatory and utility sovereignty** considerations include:
 - Tribal authority over interconnection approvals when chargers connect to Tribal utilities, microgrids, or distributed energy systems.
 - Tribal control of rate design and pricing structures for EV charging when operated by Tribal utilities or enterprises.
 - Tribal authority to negotiate jurisdiction, terms, and operational boundaries with external utilities operating on or near Tribal lands.
- **Broadband and communications sovereignty** considerations include:
 - Tribal governance over fiber, wireless backhaul, broadband networks, or other communications infrastructure necessary for charger connectivity.
 - Use and protection of Tribal priority spectrum (e.g., 2.5-GHz Educational Broadband Service) for EV charger communications.
 - Requirement for vendors to adhere to Tribal cybersecurity protocols.
- **Legal and jurisdictional sovereignty** considerations include:
 - Ensuring all liability, insurance, and disputes related to EV infrastructure are handled through Tribal courts or Tribal law.
 - Clear articulation of criminal and civil jurisdiction for incidents occurring at EV charging sites.
 - Contractual requirements that all entities operating on Tribal land comply with Tribal laws and regulatory authority.
- **Cultural resource sovereignty** considerations include:
 - Enforcement of Tribal cultural resource protection laws during EV siting and construction.
 - Requirement for Tribal cultural monitors during any ground disturbance.
 - Protection of traditional cultural properties and culturally sensitive landscapes in charger siting decisions.
- **Intergovernmental relations and consent** considerations include:
 - Formal agreements (memoranda of understanding, memoranda of agreement, and interconnection agreements) that recognize Tribal jurisdiction and consent authority.
 - Ensuring state and federal agencies meet Tribal consultation or consent standards, including more rigorous Tribal-defined requirements.
 - Coordination with counties, cities, and departments of transportation without ceding jurisdiction over Tribal lands.

- **Labor, workforce, and contractor sovereignty** considerations include:
 - Enforcement of TERO requirements for hiring and contracting.
 - Prioritization of Tribal workforce development and certification in EV infrastructure installation, operations, and maintenance.
 - Requirements for contractors to follow Tribal labor, safety, and procurement standards beyond state or federal norms.
- **Public safety and emergency management sovereignty** considerations include:
 - Tribal authority over emergency response protocols, including charger safety, emergency shut-off procedures, and incident reporting.
 - Integration of EV charging infrastructure into Tribal police, fire, and emergency management planning.
 - Authority to regulate signage, access control, and on-site safety standards.
- **Transportation sovereignty** considerations include:
 - EV deployment aligned with Tribal transportation plans.
 - Tribal jurisdiction over roadway modifications, traffic patterns, and signage related to charging stations.
 - Internal transportation governance.

6.2 Critical Materials Mining and Recycling

The purpose of this section is to discuss the impacts of mining attributed to EV batteries and how technological advances, recycling, and reuse can help mitigate some of the externalities.

Key Takeaways

- EVs and battery energy storage systems require critical minerals.
- Mining for critical minerals has a history of negative impacts on Indigenous communities around the world.
- Battery and critical mineral recycling and reuse efforts are advancing.

Critical Minerals

Critical minerals are naturally occurring and are found and mined from the Earth's surface. These materials play a key role

in emerging energy technologies. For example, lithium, nickel, cobalt, manganese, and graphite are all critical minerals used to make lithium-ion batteries. Demand for these materials has grown significantly in recent years due to increases in emerging energy technologies like EVs, solar panels, and wind turbines (International Energy Agency 2025a). Demand for these materials is expected to triple by 2030 and quadruple by 2040 (Willige 2025).

These materials are concentrated in specific regions of the planet. For example, 90% of gallium, a critical mineral used in solar panels, is mined in China (Willige 2025), and the Democratic Republic of the Congo supplies most of the world's cobalt (International Council on Mining and Metals n.d.). Though there are higher concentrations of critical minerals in certain regions, mining for these materials happens all over the globe, including regions in the United States.

Environmental and Social Impact of Critical Mineral Mining

Mining can have negative environmental and social impacts. Critical mineral mining can impact the environment in the following ways:

- **Biodiversity:** Habitat destruction due to land use change can lead to biodiversity loss (International Energy Agency 2025b).
- **Water:** Processing critical minerals requires large amounts of water, leading to water depletion. In addition, chemicals used in critical mineral mining can leach into and pollute water (International Energy Agency 2025b).
- **Air pollution:** Mining is energy-intensive and emits pollution. Fine particulate matter from mine dust can also cause air pollution (International Energy Agency 2025b).

Critical mineral mining can have social impacts in the following ways:

- **Cultural disruption:** 54% of critical minerals are located near Indigenous people's land (Mahmood, McCauley, and Cárdenas 2024), and mining can lead to the damage or loss of cultural sites.
- **Labor and human rights violations:** There is a history of human rights abuses in critical mineral mining. These include cases of child labor, dangerous working conditions, and threats to public health from polluted water and air (Kippenberg 2024).

Governments, nongovernmental organizations, advocacy groups, and other organizations across the world are working to mitigate the negative impacts of critical mineral mining. Their efforts include:

- Regulatory frameworks and policies that address environmental and social impacts, such as policies that incentivize recycling (Mahmood, McCauley, and Cárdenas 2024) or guidelines that include best practices or requirements for engaging with local communities and Indigenous peoples like free, prior, and informed consent (International Energy Agency 2025b).
- Organizations like the United Nations and Organization for Economic Co-operation and Development encourage intergovernmental collaboration and produce standards and resources that support environmentally friendly development.
- Research dedicated to accessible alternatives to critical minerals and innovative technologies that decrease water and air pollution during the mining process.

Violations of free, prior, and informed consent and Indigenous peoples' right to self-determination are not limited to mining, but they have become a pressing concern due to the growing demand for critical minerals to support alternative energy options.

EV Battery Repurposing

EV batteries degrade. When a battery has only approximately 75% of its original capacity, the battery is considered at the end of its useful life for EV applications (Electric Vehicle Council n.d.-b). If the battery is not damaged, it can be repurposed for a "second life." A retired EV battery could have enough capacity to serve as energy storage for a decade or longer (AFDC n.d.-a).

EV Battery Recycling

When batteries are recycled, critical minerals and other materials can be recovered and used in the production of new batteries.

The U.S. Environmental Protection Agency determined that most lithium-ion batteries on the market today should be considered hazardous wastes when they are disposed because of their likelihood to catch fire or explode. However, batteries in common consumer electronics and EVs are generally safe if bought from a trusted manufacturer and used appropriately. In general, batteries only become a concern at the end of their life if they are damaged, mismanaged, or recycled incorrectly (U.S. Environmental Protection Agency 2025c). When lithium-ion batteries are recycled properly, they can help meet the growing demand for critical minerals, support other energy technologies, and prevent safety hazards caused by improper recycling.

Lithium-Ion Battery Recycling Process

The following is a simplified battery recycling process (U.S. Environmental Protection Agency 2025c):

- 1. Collect and check:** Batteries are typically picked up or dropped off at a retailer, e-waste site, or other business that specializes in battery recycling. The materials are first checked to see what can be reused or repaired before sending the remainder to be recycled.
- 2. Disassemble:** Batteries are broken down into different parts in a process referred to as shredding. This creates waste streams, including:
 - Black mass, a material made up of shredded cathodes and anodes that can be further processed and made into new battery cathodes and anodes.
 - Copper and aluminum foils.
 - Plastics.
 - Other materials.
- 3. Recover minerals:** Smelting or leaching is used to recover metals out of the black mass. The minerals are cleaned up and readied for new purposes.
- 4. Byproducts:** Noncritical mineral materials like plastics or aluminum are sent into their own recycling streams.

Work with a certified recycler to ensure safe handling, disposal, and recovery of valuable materials to support the circular economy. There are two accreditation standards for recycling:

- [Responsible Recycling \("R2"\) Standard for Electronics Recyclers.](#)
- [e-Stewards Standard for Responsible Recycling and Reuse of Electronic Equipment.](#)

Additional Resources

- [Building Batteries Better: Doing the Best With Less:](#) Discusses strategies to reduce the type and amount of critical minerals needed for EV batteries through technological improvements, recycling, and reuse.
- [Choosing a Responsible Recycler:](#) Provides guiding questions to help choose the right recycling provider.

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Appendix A. Glossary

638 Contract: The Indian Self-Determination and Education Assistance Act of 1975, also called 638 Contracts, allows federally recognized Tribes to manage programs and services with less oversight.

Alternative Fuel Corridor: Areas along major national highways where alternative fuel infrastructure will be built first.

Authority having jurisdiction: An organization, office, or individual responsible for enforcing the requirements of a code or standard.

Backhaul: A high-capacity network link that carries data from a local site, such as an EV charging station, to the broader internet or utility network. Backhaul allows billing, monitoring, software updates, and communication with the electric grid.

Battery-electric vehicle: Also known as an all-electric vehicle, operates solely by electricity. Battery-electric vehicles operate only in all-electric mode and have a battery that is charged by plugging the vehicle into charging equipment.

Broadband: Also called high-speed internet; allows people and systems to access the internet and internet-related services at higher speeds.

CHAdeMO connector: Common DCFC connector for Japanese-made vehicles.

Checkerboarding: A situation in which land ownership is intermingled between two or more statuses, resulting in a checkerboard pattern.

Combined Charging System connector: Also known as the SAE 1772 combo connector, drivers can use the same charge point with AC Level 1, AC Level 2, and DCFC equipment.

Community development financial institution: Lenders that provide funding to communities not typically served by mainstream financial institutions.

Connector: Also called a plug; what is plugged into the EV to charge it. There are four types of connectors.

Cooperative electric company: A utility cooperative delivers a public utility, like electricity, to its members. Profits are reinvested or distributed to members.

Demand charge: Monthly electric utility fee based on the single highest point of power consumption during the billing period. Calculated by multiplying the peak demand by demand rate in dollars per kilowatt.

Direct-current fast charging: Also referred to as Level 3 charging, DCFC equipment enables rapid charging.

Electric vehicle charging infrastructure: Network of hardware and software designed to charge EV batteries.

Electric vehicle charging port: Provides power to one vehicle at a time using a connector.

Electric vehicle supply equipment: Charging equipment for EVs.

Energization: The process of connecting equipment to a power source.

Energy charge: Electric utility charge that applies a set price per each unit of energy used. Typically listed in dollars per kilowatt-hour.

Failover: A backup internet connection that automatically takes over if the main connection fails.

Fiber: A wired internet technology that uses fiber-optic cables to send data using light. Fiber is very fast and reliable and is often used for major network connections that support EV charging systems.

Fixed charge: Also called customer charge or base charge. Electric utility charge that is constant and billed as a flat fee per billing period. Covers administrative costs, customer service expenses, and maintenance costs.

Fixed wireless: A type of broadband that uses radio frequencies to send internet service between fixed locations, such as towers and buildings. Fixed wireless is often used in rural or Tribal areas where fiber is unavailable or too expensive.

Futureproofing: Designing infrastructure for potential expansions.

Green bank: Institutions that use financing to support the development of alternative energy projects.

Grid hosting capacity: The maximum amount of electricity the grid can handle at a time, or the total power that can be delivered to customers without issues.

Hybrid electric vehicle: Powered by internal combustion engine and an electric motor that uses battery-stored energy.

Internal combustion engine: The ignition and combustion of fuel (such as gasoline or diesel) happens within the vehicle's engine.

Investor-owned utility: Corporation owned by investors and engaged in distributing electricity to retail customers.

J3400 (North American Charging System) connector:

Works for all charging levels.

Latency: The time it takes for data to travel from one place to another. High latency can cause delays or failures in payments, charger communication, and system controls.

Lead-acid battery: Rechargeable battery not used in EVs currently on the market.

Level 1 charging: Provides EV charging through a common 120-V AC outlet.

Level 2 charging: Provides faster charging through 240-V (residential) or 208-V (commercial) AC electrical service

Life cycle air pollutants: The air pollutants that result during a product's entire lifespan, from cradle to grave. For EVs, it includes the air pollutants that result from producing electricity to power the car.

Lithium-ion battery: Battery type used for most all-electric vehicles and plug-in hybrid EVs.

Loan guarantee: Loan backed by a government agency

Make ready: Prepare a site for EV charging infrastructure by upgrading electrical infrastructure.

Matching: Also called cost sharing; part of a project's cost is not covered by grant funding, and the grant recipient is required to provide a certain percentage of a project's cost.

Managed charging: Controls when and how EVs are charged.

Microwave: A wireless technology that sends data over long distances using radio frequencies. Microwave links are often used to connect remote locations to larger networks.

Middle mile: The part of a broadband network that connects local service areas to major internet networks. Middle-mile infrastructure is especially important for linking rural and Tribal EV charging sites to regional systems.

National Electric Vehicle Infrastructure Formula Program: Federal program that provides funding to states to deploy EV charging stations to create an interconnected network.

Network: A networked charging station is connected to the internet via cellular or wired broadband service, enabling payment and customer support.

Nickel-metal-hydrate battery: Rechargeable battery often used in hybrid vehicles.

Open Charge Point Protocol: Universal, standard communication interface for charging infrastructure.

Peak load: The highest demand for electricity during a specific period.

Plug-in hybrid electric vehicle: Powered by an internal combustion engine and an electric motor that uses battery-stored energy. Can operate in all-electric mode. Once the battery is depleted, or if the vehicle needs additional power, an internal combustion engine powers the vehicle. Batteries can be plugged in to charge.

Publicly owned utility: Utility owned and operated by local communities.

Range anxiety: The concern that an EV will not be able to reach its destination or the next charging station due to battery power.

Redundancy: Using more than one connection or system so operations can continue if one fails.

Regenerative braking: Allows EVs to capture the kinetic energy usually lost as heat during braking. Stores captured energy in the vehicle battery.

Roaming: Drivers can use different charge point operators and service providers.

Section 17 corporation: A federally chartered business formed under Section 17 of the Indian Reorganization Act. Allows a Tribe to create business entities with assets and liabilities separate from the Tribal government.

Station location: Physical location of one or more EV charging units.

Tailpipe emissions: Air pollutants resulting from the burning of fossil fuels in an internal combustion engine.

Throughput: The amount of data a network can carry at one time. Sufficient throughput is needed to support multiple chargers, reporting systems, and network management tools.

Tribal Employment Rights Ordinances: Requires that employers who are engaged in operating a business on reservations give preference to qualified Indians in all aspects of employment, contracting, and other activities.

Tribal sovereignty: Refers to the inherent right of Tribes to govern themselves and their borders, lands, and people.

Tribal utility authority: A Tribe owns and operates electric systems on Tribal lands.

Uptime: Total time a charging station is functional and available for a user to complete a charge.

Appendix B. Navigating Common EV and EV Charging Concerns

People who have limited knowledge or experience with EVs might feel unsure about the technology, which can make them less likely to use it. They might also be more likely to believe misinformation that adds to those worries. **Tables B-1 and B-2** identify specific EV and EVSE concerns, respectively, and outline information to help address these concerns during engagement.

Table B-1. Common EV-Related Concerns and Potential Ways To Address These Concerns

Common EV Concerns	Potential Solution
EV range anxiety: People worry EVs do not have enough range to handle their travel demands (U.S. Environmental Protection Agency 2025b). This is especially a concern in rural areas where there are fewer charging stations.	More than 73% of all on-road passenger trips were 10 miles or less and more than 98% were less than 75 miles. The majority of EVs can travel farther than 200 miles on a fully charged battery, and many EVs get up to 300 or 400 or more miles of range (U.S. Environmental Protection Agency 2025b). Find out more about estimated range for different EVs on the Find a Car Tool.
Cold-weather performance: In regions where temperatures are very cold, people might worry about temperatures impacting EV performance.	Cold temperatures can impact the range of EVs, but there are steps drivers can take to reduce the impact, including: • Precondition the battery and interior of the vehicle when connected to the charger (rather than using the battery). • Lower the interior temperature and use a heated steering wheel and heated seats for warmth. Even with the reductions in range caused by cold temperatures, EVs can still cover 96% of U.S. daily travel distances (Pierce 2024).
Hot-weather performance: In regions with hot temperatures, people might be concerned about EV performance.	Extreme heat (~104°F) can reduce EV battery lifespan. Newer EVs have thermal management systems that help keep the battery cool and protect battery life, impacting EV range (Electric Vehicle Council n.d.-a). There are steps EV owners can take to protect the battery and maintain their EV's efficiency: • Keep an eye on the battery's temperature and level of charge. • Park in the shade, when possible, to keep the vehicle cool. • Use eco mode (Hardesty 2025). • Precondition (cool down) the car's interior before driving. • Charge during off-peak hours, which tend to be during more temperate times of the day. Extreme heat can impact charging speed and stress the battery (Hardesty 2025).
Critical mineral mining: People might be hesitant to adopt EVs because the batteries are developed using critical minerals.	Mining for critical minerals can have environmental and social impacts, especially on Indigenous communities. EV battery recycling research is advancing, enabling the reuse of some critical minerals. Additional information can be found in Section 6.2.
Battery recycling: A common concern is that EV batteries cannot be recycled and will end up in landfills.	EV batteries can be recycled with a certified recycler. Additional information can be found in Section 6.2.
EV fires: A common safety concern is that the battery will catch fire, and the fire will be difficult to control.	Trainings are available for emergency responders on how to appropriately respond to EV fires. Additional information can be found in Section 4.3.

Table B-2. Common EV Charging Infrastructure Concerns and Ways To Address Those Concerns

Common EVSE Concerns	Potential Solution
EV charger reliability: EV drivers might worry about the reliability of charging stations.	When planning an EVSE project, include a strong operations and management plan (Sections 5.2 and 5.3). Having electricians with EVSE experience on staff can improve reliability and reduce downtime. See Section 5.1 for more information about workforce development. If operations and maintenance is outsourced, make sure project partners are reliable and able to quickly repair charging stations. More information about selecting project partners can be found in Section 3.2.
Ownership model and project control: Project planners might be worried about losing or having limited control over an EVSE project, depending on the project's ownership model.	Understand the various models for EVSE project ownership and choose a model that aligns with the Tribe's goals. More information about ownership models can be found in Section 3.4.

Appendix C. List of All Resources

2030 National Charging Network: Learn about state-level projects for EV adoption.

Adopt a Charger: A nonprofit organization that coordinates the installation of fee-free chargers at locations like beaches, trailheads, museums, and parks.

Alternative Fuel Corridors: Understand what interstates and highways in the state are designated electric corridors.

Answers to Common Questions About Electric Vehicles: Learn how to answer common EV questions that may arise during community engagement.

Argonne Geospatial Energy Mapper: Identify areas suitable for EV charging equipment by mapping data, including 100-year flood zones, distance from substations, population density, and more.

At a Glance: Electric Vehicles: Read a fact sheet about EV and EV charging basics.

Battery Energy Storage for Electric Vehicle Charging Stations: Provides information on how energy storage systems can support EV fast charging infrastructure.

Best Practices for Payment Systems: Summarizes EV charging payment challenges and proposed solutions.

Building Batteries Better: Doing the Best With Less: Discusses strategies to reduce the type and amount of critical minerals needed for EV batteries through technological improvements, recycling, and reuse.

Building Codes, Parking Ordinances, and Zoning Ordinances for Electric Vehicle Charging Infrastructure: Provides more information about codes and ordinances relevant to EV charging.

Certification for EV infrastructure: Lists the different parts of EV charging equipment and applicable standards and certifications.

Certified Native CDFIs: List of Native community development financial institutions certified by the U.S. Department of Treasury.

CDFI Locator: List provided by the Opportunity Finance Network to find community development financial institutions.

Charging Forward: A Toolkit for Planning and Funding Rural Electric Mobility Infrastructure: A guide from the U.S. Department of Transportation for rural EV charging planning and deployment.

Choosing a Responsible Recycler: Provides guiding questions to help choose the right recycling provider.

Clean Cities and Communities Coalition Locations: Find the closest Clean Cities and Communities coalition. If there is not a coalition in the Tribe's area, the closest coalition can help.

Community Engagement Tips for EV Infrastructure Deployment: Find tips for community engagement for EVSE planning and deployment.

Database of State Incentives for Renewables and Efficiency: Provides information about policies and incentives by state.

Design Recommendations for Accessible Electric Vehicle Charging Stations: Find information on designing and constructing EV charging stations that are accessible to and useable by people with disabilities.

Directory of Grant Writers: Maintains a list of grant writers who are available to hire for grant writing.

Electric and Hybrid Vehicle Quick Reference—Fire Service Edition: Outlines initial actions responding to EV and hybrid EV emergencies.

Electric Nation: Tribal-led program of Native Sun Community Power Development to plan and install EV chargers with Midwestern Tribes.

Electric Vehicle Charging Stations: Provides an overview of EV charging equipment.

Electric Vehicle Charging Station Economics Calculator: Calculates the costs and revenue of operating a charging station.

Electric Vehicle Charging Station Permitting Guidebook: A guidebook for EV charging permitting. Though specific to California, it has resources and information useful for anyone interested in EVSE.

Electric Vehicle Charger Selection Guide: Learn how to choose EV charging equipment.

Electric Vehicle Infrastructure Toolbox: Provides resources for estimating charging infrastructure needs.

Electric Vehicle Infrastructure – Financial Analysis Scenario Tool: Provides financial analysis for EV charging infrastructure.

Electric Vehicle Infrastructure – Locally Optimized Charging Assessment Tool and Estimator: Estimate project-specific EV charging costs.

Electric Vehicle Infrastructure Training Program: Provides comprehensive training and industry-approved certification for installation of EV charging equipment in the United States and Canada.

Electric Vehicle Safety Training Resources for First and Second Responders: Includes resources about general safety, fire safety, and training resources for both first and second responders.

Electricity Laws and Incentives: Provides a list of state laws and incentives related to electricity, which could impact how fees are determined, depending on the land status of where the charging station is located.

Emergency Response Guides: Provides manufacturer-submitted emergency response guides for EVs.

Emerging Best Practices for Electric Vehicle Charger Interconnection: Provides guidance for jurisdictions that want to enable the rapid deployment of EV charging equipment.

ENERGY STAR Electric Vehicle Chargers: Find ENERGY STAR-certified EV charging equipment and learn about EV charging equipment.

Environmental Statutes and Executive Orders Relevant to EV Infrastructure: Describes laws and regulations that might be relevant for EV charging infrastructure installation.

e-Stewards Standard for Responsible Recycling and Reuse of Electronic Equipment: A standard for ethical and responsible electronics reuse and recycling.

EV Alternative Fuel Corridors Map: illustrates EV-ready and pending routes under the Alternative Fuels Corridors program.

EV Batteries 101: The Basics: Read about EV batteries, battery materials, and how they work.

EV Charging Financial Analysis Tool: Evaluates business arrangements for EV charging equipment.

EV Laws and Incentives Database: Database of federal and state laws and incentives regarding EVs, EV charging stations, fuel efficiency, and other transportation-related topics.

EVSE Products, Charging Network, and Service Providers: Lists EVSE product manufacturers, charging network administrators, and service providers.

Federal-Aid Matching Strategies: Outlines innovative strategies to meet grant matching requirements.

Federal Workplace Charging Program Guide: Provides information for federal workplace charging programs and has useful information about how to calculate charging fees.

Federal and State Laws and Incentives database: Provides information about grants and other incentives available in each state federal database of [apprenticeships](#).

Find a Contractor: Find a contractor in your area that uses electricians certified through the Electric Vehicle Infrastructure Training Program.

Fuel economy estimates: Compare vehicle fuel economies, including EVs.

Funding Guidance: List of funding opportunities that can be filtered based on applicant type, project type, project phase, and funding type.

Grants Learning Center: Provides in-depth information about grants, policies, reporting, and systems.

Green Pathways Workforce Initiative: Trains Native communities for careers in renewable energy, including solar installation, energy efficiency, and EV charging infrastructure. Also offers apprenticeship opportunities with partner union programs and technical colleges.

Guidance in Complying with Americans with Disabilities Act Requirements: Find best practices for complying with the Americans with Disabilities Act.

How Do All-Electric Cars Work?: Learn more about the components of all-electric vehicles.

How To Amp Up Transportation Transformation: A Guidebook for Funding and Financing Electrification: Details funding and financing strategies and opportunities for EV charging stations.

Indian Loan Guarantee and Insurance Program: Provides loan guarantees of up to 90% for Tribes.

Joint Office of Energy and Transportation Workforce Development Resources: Offers a range of resources (e.g., training programs, guides, and tools) to support workforce development in the transportation electrification sector. Their resources can be used to train first responders on EV safety, connect people to apprenticeship opportunities, and train electricians on EVSE.

National Association of State Energy Officials State and Territory Energy Offices directory: Provides contact information for state energy offices, which might have funding opportunities to encourage EV charging stations.

National Electric Code Article 625 Electric Vehicle Charging System: Specifications and requirements for EV charging systems.

National Institute for Automotive Service Excellence: Offers industry-accepted safety certifications for people ranging from those encountering EVs in the workplace to service professionals and technicians building, operating, and maintaining high-voltage vehicles.

Native American Businesses in SAM.gov: Provides information about all Native American-owned businesses that are active in SAM.gov, the website used for businesses to register to do business with the federal government or find and apply for federal contracts and grants.

Office of Indian Energy Funding and Technical Assistance Opportunities: Database of funding opportunities for Tribes, including prizes, grants, loans, and technical assistance.

Physical Safety and Security at Electric Vehicle Charging Sites: Learn about safety considerations for EV charging locations and equipment.

PlugStar Qualified Electrician Finder: Helps consumers find qualified electricians to install residential charging equipment.

Promising Practices for Meaningful Public Involvement in Transportation Decision-Making: Provides information about integrating public involvement in all levels of transportation decision-making.

Public Electric Vehicle Charging Infrastructure Playbook: A guidebook with interactive resources to help communities plan and build EV charging infrastructure.

Public EV Charging Business Models for Retail Site Hosts: Provides a financial analysis of common EV charging business models for retail site hosts.

Public EV Charging Station Site Selection Checklist: Find information about selecting a site for an EV charging station.

PVWatts: Estimates the size and performance of potential solar photovoltaic projects.

REopt: Evaluates the economic viability of solar, battery energy storage system, or other on-site energy solutions

Responsible Recycling (“R2”) Standard for Electronics Recyclers: A standard for electronic recycling.

SAE International Electric Vehicle Supply Equipment Technician Certification: Provides training and certification for existing experts requiring validation and less experienced individuals interested in transitioning into the sector.

SAE Standards: Technical standards for safety and quality in mobility industries.

State green bank map: Map of green banks across the country, including states exploring state bank establishment.

State Information: Provides state-specific information about alternative fuels and vehicles, including laws and incentives, potential partners, projects, and fuel prices.

Submerged Hybrid/Electric Vehicles bulletin: Provides quick information for emergency responders about how to respond to a submerged EV or hybrid vehicle.

A Summary of Native Workforce Development Models: Highlights successful workforce development models.

Tribal Workforce Development: A Decision-Framing Toolkit: Helps frame and inform strategic decision-making around workforce development.

U.S. Department of Agriculture Rural Development Loan Guarantees: Offers loan guarantees to rural borrowers for business development.

Vehicle Cost Calculator: Calculate the total cost of ownership for different vehicles.

Vehicle registration data: Provides state-level vehicle registration data that can be used to estimate vehicle adoption.

Weber State University’s Automotive technology training program: Trains people on high-voltage vehicles and prepares them for the Automotive Service Excellence xEV certifications.

Workplace Charging Calculator: Calculates fees for workplace charging. The tool inputs include the different charging station costs and expected utilization. It then outputs a breakeven charging fee in dollars per kilowatt-hour or dollars per charging session.

Appendix D. Additional Resources

EV Infrastructure Needs Baseline Assessment Worksheet

Adapted from the Joint Office of Energy and Transportation's [EV Infrastructure Needs Baseline Assessment](#).

Establishing a baseline assessment can help you assess and estimate how many EV chargers you will need to meet demand. A baseline assessment should include an evaluation of scenarios that combine public and private EV charging, levels of charging (Level 2 and DCFC), and number of ports.

Conduct a baseline assessment to help you determine the number and type of EV chargers needed to support EV drivers in your area based on high and low percentages of home charging adoption. This analysis can be based on projected EV adoption at a designated point in the future or your jurisdiction's EV adoption goals.

Note: This assessment does not include charging needs for road trippers and visitors. Tools from the National Laboratory of the Rockies such as [EVI On-Demand](#) and [EVI-RoadTrip](#) can complement the projections that result from this activity to provide a more detailed assessment of requirements.

Step 1: Identify the EV projections and/or goals for your infrastructure needs analysis based on a high percentage of home charging (consider using estimates that reflect potential EV charging demand at multiple points in the future—e.g., 2030 and 2035).

Option 1: Use local projections for EV adoption.

Option 2: Use local EV adoption goals from your jurisdiction's existing plans or policies.

Option 3: Use [state-level projections](#) from the National Laboratory of the Rockies' [2030 National Charging Network report](#).

- Click on this link: data.nlr.gov/submissions/214.
- Download the state_cbsa-2030ncn-results.zip folder and unzip the files.
- Once the files are unzipped, you will see a file for each state. Select the state of your target municipality or municipalities.
- Each state file contains 12 projection scenarios.
 - Select three to five files (unique projection scenarios) that you want to explore as possible projections to use as inputs in the EVI-Pro Lite tool to estimate EV infrastructure needs.

- Open the corresponding Excel files.
- Useful projection scenario files may include baseline, low_home_charging_access, high_home_charging_access, fast_sales_growth, and/or low_sales_growth.
- Locate your target “region_name” within these Excel files. If your exact region is not included, locate a nearby and/or similar region to use as a proxy for this exercise.
- Switch to the 2030 tab and locate the projected number of plug-in EVs (including both battery-electric and plug-in hybrid vehicles) for that year.
- Based on your exploration of various projected plug-in EV ownership rates under unique scenarios, choose one EV adoption scenario to use for your EV infrastructure needs baseline assessment.

Step 2: Run calculations in the National Laboratory of the Rockies' [EVI-Pro Lite](#) online tool to determine the number of chargers needed if there is a lower percentage of home charging. EVI-Pro Lite estimates how much EV charging infrastructure is needed to support typical daily travel in a given state or metropolitan area. Note: There may not be a metropolitan area that accurately reflects the Tribe's land. Consider using a similar metropolitan area and change assumptions including vehicle mix, home charging access, and ride-hail support.

- Input the first in your series of EV projections or goals.
- Take screenshots of the charts the tool generates.
- Reduce the percentage of at-home charging. Note: Consider setting the percentage of at-home charging equal to the percentage of homeowners (thereby assuming no at-home charging for renters).
- Hit “Recalculate.”
- Screenshot the generated charts.

You now have two EV infrastructure projections to meet your first interim vehicle goal or projection! The first shows the number of chargers if there is a higher percentage of home charging, and the second shows the number of chargers needed if there is a lower percentage of home charging.

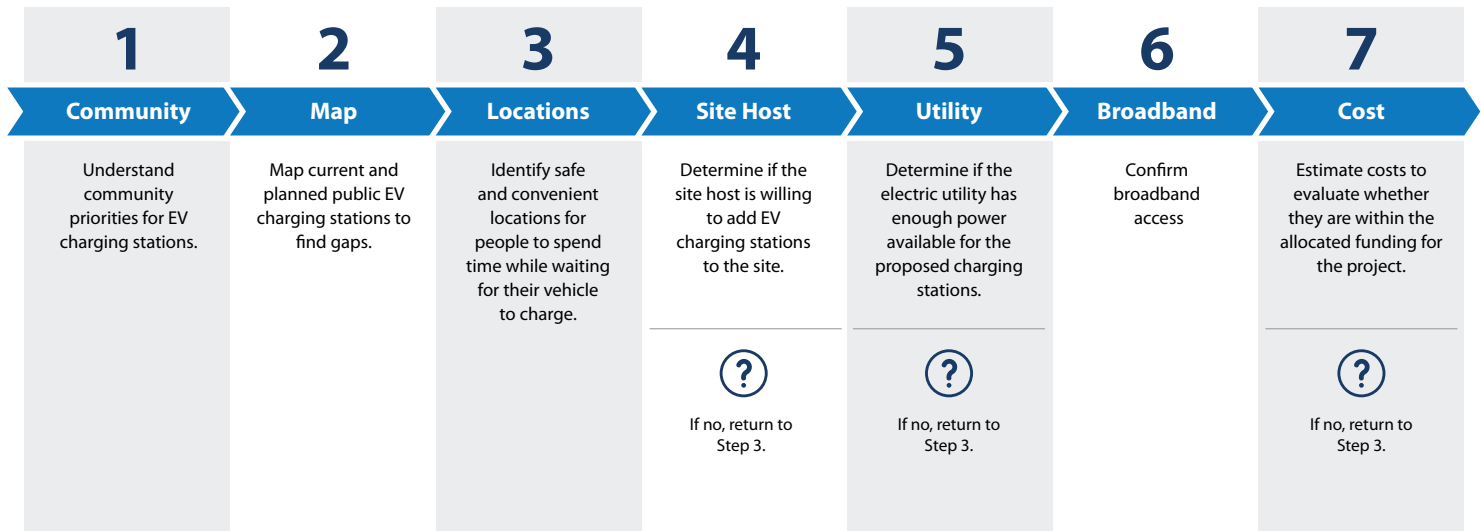
Step 3: Repeat Step 2 for each projection in your series. You should have two sets of infrastructure needs for each EV adoption projection/goal.

You can record your data here:

Scenario Description	Single-Family Charging Ports	Shared Private Charging Ports	Public Level 2 Charging Ports	Public DCFC Ports
Year: # of Vehicles: % of At-Home Charging: Other Scenario Characteristics:				
Year: # of Vehicles: % of At-Home Charging: Other Scenario Characteristics:				
Year: # of Vehicles: % of At-Home Charging: Other Scenario Characteristics:				
Year: # of Vehicles: % of At-Home Charging: Other Scenario Characteristics::				

Site Selection Process for EV Charging Stations

Adapted from the Joint Office of Energy and Transportation's [Public EV Charging Station Site Selection Checklist](#).



Below is a high-level step-by-step process for selecting an EV charging station site.

1. Conduct **community engagement** to determine priorities for public EV charging deployment. Refer to Section 3.4 to determine the project type based on priorities.
2. **Map** where public EV charging stations exist and where they are planned. Determine where there are gaps.
3. Identify potential charging station **locations**:
 - Identify the land ownership status of each site and understand the associated challenges and benefits.
 - Identify the permitting requirements for each site.
 - Understand cultural and environmental considerations, and consult the cultural preservation officer to avoid impacts to sacred sites.
 - Ensure the site is available and safe for public access.
 - Confirm the site is a conducive place for customers to spend 2 or more hours for Level 2 charging and around 30 minutes for DCFC.
 - See **Section 3.5** for additional site location considerations.
4. Engage with the **site host** to determine if they are willing to add EV charging stations to their site.
<If the site host is not willing, return to Step 3.>
5. Engage with the **electric utility** to understand grid hosting capacity at the potential site location. See Section 3.6 for additional information about utilities and utility engagement.
<If there is not sufficient electrical capacity at the location, return to Step 1 or discuss options for increasing capacity with the utility.>
6. Confirm **broadband** availability, especially if the EV charging equipment is networked. See Section 3.8 for additional information about broadband.
7. Estimate **costs**, including project costs (e.g., equipment, construction, labor), electrical upgrade costs, operations costs e.g., networking fees, electricity costs, insurance), and maintenance costs. See Section 3.7 for more information about cost estimates.
<If costs are prohibitive, return to Step 3.>

EV Charging Infrastructure Request for Proposal Checklist

Adapted from the Joint Office of Energy and Transportation's [Checklist to Develop an EV Charging Infrastructure RFP](#).

This checklist can be used to gather and organize the preliminary information needed to build an RFP for EV charging infrastructure.

Objective: Develop an RFP timeline and process.

Set clear milestones for the RFP distribution, vendor selection, and infrastructure installation. Consider what internal Tribal procurement requirements need to be considered when building an RFP timeline.

Determine the timeline for the following RFP milestones:

- RFP released for comment period.
Note: Some Tribes may prefer to issue a separate request for information or request for expression of interest to gather information before issuing a formal RFP.
- Deadline for RFP comments.
- RFP released.
- Deadline for submitting questions.
- Release answers to all questions submitted.
- Deadline for submission of proposals.
- Evaluation period.
- Selection of vendor.
- Contract negotiation.
- Final contract with vendor.
- Installation of infrastructure.
- EVSE energized.

Step 1. Establish a project description.

Prepare background information about the project, along with the scope, specifications, and duration of the envisioned effort.

- What is the origin of the project, including history and predecessors?
- What are your goals and expected outcomes for the RFP?

Step 2. Identify ownership structure.

Identify your EV charging ownership, operation, and maintenance model. See **Section 3.4** for additional information.

- Will the Tribe, a Tribal enterprise, or a partner vendor own the chargers?

- Will the Tribe, a Tribal enterprise, or a partner vendor operate the chargers?
- Will the Tribe, a Tribal enterprise, or a partner vendor maintain the chargers?

Step 3. Establish desired contract length.

Determine how long you want your contract to run. Third-party EV charging providers might propose contract terms of 5 years or more. It is important to recognize that the contract term you select will have an impact on the prices and service levels included in vendor bids.

- If stations are not owned by the Tribe, what should the length of the contract for usage of public land be (in years)?
- Does the Tribe have limitations on long-term contracting? If so, what mechanisms can you use to help extend contract length and improve financial viability?

Step 4. Identify site(s).

If you determine that the RFP will identify specific locations, identify and describe the sites, prioritization criteria, and any contextual information that could improve the quality of bids. Vendors are more likely to choose sites with lower installation costs, if that information is publicly available, and higher expected utilization. Information to provide could include physical address, site type, number of spaces available, access to nearby amenities, and walkability.

- Which types of sites or areas will be prioritized for the RFP?
- Which individual locations have been identified for the RFP? List available site details.

Step 5. Assess site access to electricity.

Determine where your site's electricity will be drawn from and technical details of that site. Distance from an electricity source can significantly affect installation cost.

- Do you have an existing site map, construction drawings, and/or photos that you can provide in the RFP?
- Consult with an electrician and/or utility to identify the transformer capacity and the voltage of the electricity source accessible from the site.
- Work with an electrician and/or utility to determine if there are concerns about the site's access to electricity.

Step 6. Identify use case for charging infrastructure.

Identify how the infrastructure will be used, by whom, and the pattern of usage. These details will impact site design, fee structures, payment processing needs, and installation costs.

- Will the chargers for this procurement be publicly accessible, for Tribal use, for fleet use, or shared?
- If chargers are shared by Tribal fleets and the public, how will you ensure that fleet vehicles are charged when needed?
- Will there be specific hours when chargers are accessible to the public?
- How will decisions about pricing and fees for charging services be made?

Step 7. Scope out financial details.

Clearly state any expectations from the Tribe of a low-/no-cost proposal, as well as how the budget will be evaluated.

- What funding sources are available?
- What requirements are associated with that funding?
- What portion of the funding for charger equipment and installation will be provided by your entity from local or federal funds?
- What are your preferences related to revenue sharing?
- Will any fees be charged for using Tribal land, or will providers be exempt from fees as an incentive?

Step 8. Design guidelines/charger specs.

Describe the specifications and design guidelines you have for your site(s). Possible requirements for infrastructure specifications could include charging level, number of ports, cord length, signage (including site and wayfinding signage), and more. You can use a weighted evaluation rubric to communicate desires versus requirements.

- What design guidelines and/or EV charging equipment specifications should be followed in proposals?
- Are each of those guidelines preferences or requirements?
- If you are proposing design requirements or specifications that would necessitate product redesign by charging manufacturers, is the impact of those requirements reflected in the expected value of the RFP?

Step 9. Identify compliance requirements.

Identify compliance requirements for the equipment and installation, which will need to meet all applicable requirements. These may include the Americans with Disabilities Act; Buy America; Davis–Bacon Act; Electric Vehicle Infrastructure Training Program technician training; codes and standards such as SAE J1772, National Electric Code Article

625, UL Solutions Standard 2594, International Electrochemical Commission 61851, state and local codes (depending on where the project is built), or their equivalents; and any other requirements specific to your Tribe or funding source.

- Who on your team, or which partners, can you talk to about any compliance requirements?
- What compliance requirements should be included in your RFP?

Step 10. Establish data access and sharing protocols.

Provide clear information about data sharing expectations between the Tribe and the vendor. Consider ownership and control of charger use data as well as protections for personally identifiable information and location-based mobility data generated by EV drivers on Tribal lands.

Some federal funding programs require states and direct funding recipients to collect and report data on the reliability, cost, and use of federally funded charging equipment. These reporting requirements can be complicated and confusing, particularly if data sharing expectations are not well defined upfront in contracts.

- What data security protections should be in place?
- What data should be shared by the selected vendor once the project begins operation?
- What departments within your entity should be involved in data collection, management, and reporting?

Step 11. Consider maintenance and repair.

You might want to ask bidders to provide quotes for maintenance costs over a period of years. It can be helpful to ask bidders to describe their approach to technician staffing and parts supply to ensure they have the required staff and parts accessible in your region. See **Section 5.3** for additional information about maintenance.

- Will the Tribe or the vendors handle maintenance and repairs?
- Will the Tribe or the vendors resolve technical and maintenance issues?
- What are your expected timelines for repairs?

Step 12. Identify payment/fee collection structure.

Identify your payment/fee collection structure. Some payment options can confuse EV drivers, limit charging station access, or act as barriers for people who lack access to a smartphone or a credit card.

- Do you want users to be charged a fee? If so, how?
- How can you ensure that chosen payment methods do not create barriers to use?

- Do you want to include requirements for credit/debit card payment options rather than, or in addition to, subscription to a charging service?
- Are there any fees from the EV charging equipment vendor related to payment collection?

Step 13. Identify revenue opportunities.

Identify what opportunities there will be for vendors to generate revenue in exchange for installing/operating charging infrastructure.

- What sources of revenue will be allowed (e.g., advertising, sponsorship, cost of charging)?
- Can you incentivize proposals with revenue-boosting mechanisms like ads?
- Will you include requirements for pricing transparency in project or bid evaluation criteria?
- If you are asking vendors to share revenue with the Tribe, how will you and the vendor determine reasonable division of revenue as operating costs and on-site utilization change over time?

Step 14. Consider TERO, training, and workforce development.

Deployment of EV charging infrastructure is an opportunity to exercise TERO to support hiring preferences, training requirements, and contractor obligations. Consider how an RFP can advance Tribal workforce development.

- Does your Tribe or funding source have any requirements related to technician training for those installing the equipment?
- Do you want to include requirements for workforce development or use of registered apprenticeships in proposal evaluation criteria?
- Do you want to include requirements that a vendor train Tribal staff or local Tribal members to maintain chargers?

Step 15. Determine end-of-contract details.

Determine what you want vendors to do at the end of the contract. Actions can include contract renewal, transfer of ownership, station decommissioning, or system removal.

- What should happen with the equipment at the end of the contract?
- To whom do you want to assign responsibility for station decommissioning, if you choose that route?
- Are end-of-contract activities considered eligible costs under the terms of your RFP?

Step 16. Develop proposal evaluation criteria.

Decide how you will evaluate proposals. A proposal evaluation rubric should include standard factors like vendor qualifications and experience, quality and durability of the technology, and an operations and maintenance plan. The rubric can also prioritize proposals that provide additional benefits to the Tribe such as workforce development.

- What proposal evaluation criteria are most important to you?
- How will you weigh these criteria against each other?
- How can your RFP incentivize project benefits?

Appendix E. Fleet Electrification and Medium- and Heavy-Duty EV Resources

Fleet Electrification Resources

- **Electric Vehicles for Fleets:** Provides information about the benefits and drawbacks of fleet electrification. Includes information about charging, safety, training, vehicle selection, working with the utility, and infrastructure planning.
- **Federal Fleet Alternative Fuel Resources:** The Federal Energy Management Program landing page with resources about alternative fuel types and alternative fuel fleet transitions.
- **Federal Fleet ZEV Ready Center:** The Federal Energy Management Program guide for transitioning a fleet to EVs. Includes a step-by-step process.
- **Fleet Electrification Solution Center:** A step-by-step guide for fleet electrification for Class 3–8 vehicles.
- **Preparing To Plug In Your Fleet – 10 Things To Consider:** A guide to working with the electric utility to electrify a fleet organized around 10 key considerations.
- **Rightsizing Your Vehicle Fleet:** Provides guidance for fleet managers to optimize vehicle use, conserve fuel, reduce emissions, and save money.

Medium- and Heavy-Duty EV Resources

- **Charging Forward with Electric Trucks:** Provides information about electric trucks and charging infrastructure from the North American Council for Freight Efficiency.
- **Electric School Bus Education:** A series of webinars and handouts about electric school buses, including information on working with the utility, cost factors, infrastructure planning, and driver and technician training.
- **Electric School Bus Initiative:** A website with tools and resources for school districts and fleet operators interested in transitioning school buses.
- **Electric School Bus Planning Guide:** A step-by-step guide to electrify electric school buses.
- **Electric Vehicle Charging Guidebook for Medium- and Heavy-Duty Commercial Fleets:** A guide for fleet managers to select, install, and maintain charging for medium- and heavy-duty fleet vehicles.