blueprints
Energy Efficiency & Conservation Block Grant Program

Blueprint 4A How-To Guide: Electric Vehicles and Fleet Electrification

Introduction

The Energy Efficiency and Conservation Block Grant (EECBG) Program Blueprints provide ideas and guidance for projects in various clean energy areas. The Blueprints include several high-level key activities, which are suggested steps EECBG Program awardees can take to begin or make progress within their selected blueprint. The **Blueprint How-To Guides** provide detailed steps to help EECBG awardees plan and implement specific projects. Awardees can reference these more detailed guides for recommendations on where to start, next steps, and how to leverage existing resources.

Key Terms in this Document

- **Fleet electrification**: Transitioning fleets from vehicles with fossil fuel-burning engines to electric vehicles (EV).
- **Site assessment:** Evaluating a location for optimal EV charging station setup.
- **Charging plan:** A strategic approach for establishing and managing EV charging infrastructure.
- **Demand charging:** A fee for large power draws during peak periods, added on to the typical energy rate.
- **Electric Vehicle Supply Equipment (EVSE):** A device that supplies electrical power for charging EVs.

KEY ACTIVITY CHECKLIST: BLUEPRINT 4A

1. Develop Fleet Replacement Plan

- ☑ Gather information on fleet requirements
- ☑ Engage with stakeholders
- ☑ Plan for driver/ technician training

2. Site Planning and Preliminary Assessments

- ☑ Determine locations for charging
- ☑ Evaluate charging equipment options

3. Coordinate with and Develop Utility Data Sharing Agreement

- ☑ Determine data to share & develop agreement

4. Develop Charging Plan Including Cost Assessment of Electric Bill

- ☑ Gather the relevant usage data to develop your charging plan
- ☑ Estimate your future electricity costs

5. Procurement, Legal, and Technical Support to Purchase EVs and EVSE

- ☑ Examine EVs on the market that best fit with your earlier fleet assessment
- ☑ Procure electric vehicle supply equipment (EVSE)
- ☑ Determine your overall financials

6. Installation of Charging Infrastructure

- ☑ Determine inspection, permitting or other needs
- ☑ Select construction and electrical contractors to perform the work
- ☑ Start construction and installation of charging infrastructure

Key Activities

KEY ACTIVITY 1: DEVELOP FLEET REPLACEMENT PLAN WITH STAKEHOLDER ENGAGEMENT

➢ **Goal: Craft a detailed vehicle replacement plan.**

Step 1: Gather information on the vehicles in your fleet

How? Follow the checklist:

- ❑ **Collect data on vehicles in your fleet**. Collect fleet data including vehicle type, routes, and charging station availability; prioritize older vehicles for data collection and replacement.
- ❑ Identify **the best candidates for electrification**. Use resources, like the AFLEET Tool to provide a total cost of ownership and assess the best fit for EV deployment.

What to consider:

- **Data collection is time-consuming but crucial.** To make data collection more efficient, consider creating a central database.
- **Vehicle availability.** Some common types of municipal vehicles may have supply chain constraints that could affect the timeline of the project. Check in with Clean Cities and Communities Coalitions to get insights from other communities before deciding which fleet to electrify. For communities not served directly by a coalition, reach out to the nearest neighboring coalition — they will be happy to help!
- **Explore your utility's resources on fleet electrification**. For technical assistance regarding fleet replacement, consult with the nearest Clean Cities and Communities: Coalition Location.

Step 2: Engage with stakeholders

How? Follow the checklist:

- ❑ **Collect stakeholder feedback.** Speak with local leadership, fleet managers, staff mechanics, drivers, electrification advocates, etc. They can often provide valuable feedback and information on unique vehicle specifications and specific community interests.

What to consider:

- **Utilize stakeholder network.** As in *Step 1*, consider reaching out to your local Clean Cities Coalition to discuss local best practices.
- **Organize stakeholder feedback.** Maintain records of all the feedback you gathered and incorporate stakeholder needs and concerns, when possible, into your plan to keep the project grounded in what matters most to your community.

Step 3: Create a plan for driver and technician training

How? Follow the checklist:

- ❑ **Engage fleet staff.** Incorporate fleet drivers' feedback and experiences into a driver and technician training plan. Staff may need ongoing support and time to build comfort using the new technology. Training should cover strategies to conserve energy when driving, charging practices, and

KEY ACTIVITY 1 RESOURCES

Technical assistance, outreach, training, and partnerships:

Clean Cities and Communities (DOE)

Fleet assessment tools and resources:

AFLEET Tool - Argonne National Laboratory

Alternative Fuels Data Center: Fleet Electric Vehicle Implementation Checklist

Alternative Fuels Data Center: Electric Vehicles for Fleets (DOE)

calculation payloads for EVs. Use resources like Federal Energy Management Program's catalogue of fleet management training courses.

- ❑ **Assess technician's experience.** Determine if additional EV repair and maintenance training is needed. Train operations staff on charging logistics if on-site infrastructure is included. The National Alternative Fuels Training Consortium provides training courses for vehicle technicians.
- ❑ **Check maintenance facilities.** Collaborate with original equipment manufacturers for specific EV maintenance requirements and make sure technicians have the tools to help the fleet electrification project succeed

What to consider:

- **Train first responders**. Use OEM emergency response guides and resources for first responder vehicles. NAFTC also offers first responder training.
- **Schedule refresher trainings.** Reoccurring trainings can be useful for drivers of both EVs and non-EVs to reduce accident risk and extend the vehicle's life cycle. **Tip:** Use these meetings for feedback and updates on future driver, operator, and technician trainings.
- **Provide extra training for medium- and heavy-duty vehicles.** Additional training is required for these types of vehicles due to operational differences in EVs versus conventional diesel vehicles.

KEY ACTIVITY 2: SITING PLANNING AND PRELIMINARY ASSESSMENTS

➢ **Goal: Identify and evaluate locations for charging infrastructure installation**

Step 1: Identify and determine charging locations

How? Follow the checklist:

- ❑ **Identify Charging Needs.** Identify the charging needs at the fleet location, including how many and what type of charging stations are required, and which vehicles will have access to the charging infrastructure.
- ❑ **Determine locations for charging infrastructure.** Conduct an analysis to choose optimal charging station locations. Consider that EVs will likely need to park overnight and charge for an extended period, as well as factors like equipment requirements, proximity to electrical infrastructure, and convenience. Your local utility can help identify locations with adequate infrastructure and avoid those that may require a transformer upgrade, which can delay the installation substantially (e.g., 18+ months). Dive deeper with resources like the Fleet Electric Vehicle Implementation Checklist.
- ❑ **Evaluate existing infrastructure.** Determine if your site meets EV needs. Use resources like the Federal Energy Management Program's fleet electrification process.
- ❑ **Consider at-home charging.** A flexible approach for different charging options may work in your community. Create a policy to allow employees who have at-home charging capabilities to take EVs home. **Tip:** Check the Alternative Fuels Data Center's State Laws and Incentives page for potential home charging incentives for your employees.

KEY ACTIVITY 2 RESOURCES

Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite (DOE)

EV Planning Resources: Charging and Energy Needs (USDOT)

Alternative Fuels Data Center: Electric School Bus Education (DOE)

Reach out to mailto:evi-ensite@nrel.gov for free technical assistance

What to consider:

- **Efficient site planning.** Use existing site installation planning checklists and resources to avoid delays resulting from missing information.
- **Consider a networked charging system.** A networked system is connected to the internet and gathers data to facilitate better energy management.
- **Utilize free modeling tools.** National Renewable Energy Laboratory (NREL)'s suite of modeling tools, including Electric Vehicle Infrastructure – Energy Estimation and Site Optimization tool, can help with site design and optimization.
- **Consider the costs for siting.** Siting estimates can range from $10,000 to $100,000. This includes a detailed charging plan, including parking locations, siting for charging equipment, and cost assessment of electricity bill based on electricity rates, power needed, and planned charging times. Siting costs vary based on site location and charging needs. You may view federal and state incentives on the Alternative Fuel Data Center website.

PROJECTS TO LOOK FOR

- ☑ Local and municipal fleet electrification (e.g. light-duty, trucks, cargo vans) to decarbonize transportation sector
- ☑ Incorporate renewables for resilience benefits
- ☑ Installing chargers at city-owned property to accelerate fleet electrification

Step 2: Evaluate charging equipment options

How? Follow the checklist:

- ❑ **Determine the right type of charger.** Choose the charger type that meets your needs. Level 2 chargers are less expensive, charge a vehicle in four to ten hours and require one port per vehicle. DC Fast Chargers (DCFCs) can charge an EV in 20 minutes to an hour and serve three to four vehicles. Level 2 equipment requires one port per vehicle, whereas DCFC can serve three to four vehicles.

What to consider:

- **Future-proof charging infrastructure.** Consider the charging capacity of newer EVs and faster DCFCs. Continually refer to your fleet and site assessment plans to choose the best charging infrastructure. Creating a charging plan checklist and central database will help you keep data updated.
- N**etworked vs. non-networked chargers.** Although non-networked chargers are less expensive to install, networked chargers can store usage data and connect to online management tools. Networked chargers also increase the feasibility of data sharing and reduce the time it takes to create reports for your utility.
- **Consider renewable energy options in charging plan.** Installing battery storage or renewables will have high upfront costs but make economic and environmental sense in the long run. Use resources like NREL's Electric Vehicle Infrastructure - Enabling Distributed Generation Energy Storage model to understand the value of integrating EV charging and energy storage systems with on-site solar PV generation.

- **Identify an experienced electrical contractor.** The equipment provider may have contractor recommendations. The Electric Vehicle Infrastructure Training Program also maintains a list of contractors trained and certified in EV equipment installation.

Step 3: Begin outreach with your local utility

How? Follow the checklist:

- ❑ **Contact your utility.** Work with your local utility (as well as vehicle and equipment providers) to analyze your fleet's electricity and charging needs. Share your fleet electrification requirements, including estimated power needs, and new charging equipment locations.
- ❑ **Determine if grid or facility upgrades are needed.** Start this process early, as system upgrade projects have long lead times.

What to consider:

- **Research utility incentive programs and rebates**. Many utilities offer programs like Make Ready and Demand Charge rebates that can reduce the costs of installing and using charging infrastructure.

KEY ACTIVITY 3: DEVELOP UTILITY DATA SHARING AGREEMENT

➢ **Goal: Establish a utility data sharing plan that best fits your fleet's needs**

How? Follow the checklist:

- ❑ **Make a checklist of data you would like to share**. This can include charging utilization rates, power demand, charging times, and projected fleet changes. Sharing data can also benefit other fleet operators looking to electrify. Some utilities share at least partial data about their network capacity.
- ❑ **Work with your utility on the terms of an agreement**. This can help mitigate grid impacts, avoid excess demand charges, and plan for future infrastructure needs by enabling the utility to remotely control EV charging to respond to real-time grid needs.

What to consider:

- **Be aware of grant requirements.** Many federal and state grants for EV charging infrastructure require data sharing**.** The Joint Office is developing the Electric Vehicle Charging Analytics and Reporting Tool, which will be the centralized hub for collecting the data required for the National Electric Vehicle Infrastructure (NEVI) program. Once running, this may be a helpful tool to understand what data is required.

KEY ACTIVITY 4: DEVELOP CHARGING PLAN INCLUDING COST ASSESSMENT OF ELECTRIC BILL

➢ **Goal: Establish a charging plan that meets your fleet's needs and optimizes the charging schedule**

Step 1: Gather the relevant information to develop your charging plan

How? Follow the checklist:

- ❑ **Analyze the fleet's electricity and charging-time needs.** A charging plan will set a schedule for your fleet's charging to ensure all vehicles have enough power to complete their required tasks. Work with your utility and equipment vendor to develop a plan suitable for the vehicle type.

What to consider:

- **Understand fleet usage patterns, routes, and distances to determine charging times.** Consider "smart" charging from network chargers to stagger vehicle charging and take advantage of lower off-peak electricity rates.
- **Vehicle type.** Your charging plan will be primarily impacted by the make and model of your chargers (i.e., Level 2 or DCFCs). The U.S. DOT has a **list of helpful resources for fleet operators** trying to determine fleet and community charging needs.
- **Account for overlapping charging times.** Account for overlapping charging times by designating shifts. For example, buses will need to quick-charge at multiple times throughout the day; but can slow-charge overnight.

Step 2: Compile the plan with an estimate your electricity bill

How? Follow the checklist:

- ❑ **Compile the Plan.** Incorporate fleet electrification plan and site assessment information in your charging plan.
- ❑ **Manage charging costs.** Understand the impacts of increased electricity consumption, including charging during peak electricity demand periods.
- ❑ **Understand your electricity rates.** Work with your utility to understand how your electricity rate may differ by time of day and potential demand charges. Your utility may be able to help assess multiple charging schedule scenarios.

What to consider:

- **Check with your utility about charging rates for fleets.** Special reduced-rate structures may be available for EV fleets.
- **Take advantage of off-peak hours**. During times when demand for electricity is relatively low (e.g., overnight) less expensive charging may be possible. Ask you utility about available options.

KEY ACTIVITY 5: PROCUREMENT, LEGAL, AND TECHNICAL SUPPORT TO PURCHASE ELECTRIC VEHICLES AND EVSE

➢ **Goal: Purchase EVs and charging infrastructure for your fleet**

Step 1: Examine EVs on the market that best fit your needs

How? Follow the checklist:

- ❑ **Utilize tools to find available EVs**. Use tools such as the **Find and Compare Cars (DOE)** and AFDC's **Alternative Fuel and Advanced Vehicle Search**. Keep operations and maintenance costs consistent by sticking with fewer vehicle providers and choosing vehicles that align with your charging infrastructure and timing needs.
- ❑ **Coordinate with vehicle provider to get their input on project plans, costs, and logistics.** Understand availability and delivery schedules to integrate into your charging plan.

What to consider:

- **Commercial Clean Vehicle tax credit**. The Inflation Reduction Act made some tax credits newly accessible to state, local and tribal governments through a feature called elective pay. Governments that buy a qualified commercial clean vehicle may qualify for a clean vehicle tax credit

of up to $40,000 under Internal Revenue Code (IRC) §45W. Qualifying vehicles include passenger vehicles, buses, and ambulances. See more information from the IRS.

- **Work with the vehicle provider to verify the following information:**
  - Ensure vehicle selection aligns with procurement systems (e.g., General Services Administration for public fleets or preferred dealers for private fleets) and eligibility for specific incentives (e.g., state programs may only apply to an approved list of vehicles).
  - Confirm warranty coverage details, particularly for batteries, maintenance, and support services. These services include the scope of service agreements, local servicing availability, technician training provisions, and post-warranty maintenance plans.
  - Verify additional provisions such as driver training, delivery timelines, and assess other EV-related needs (like vehicle suitability for fleet requirements and charging infrastructure) as part of the fleet assessment and site planning process.

Step 2: Procure electric vehicle charging equipment

How? Follow the checklist:

- ❑ **Procure charging equipment**. **Procure charging equipment**. Use resources like the California Energy Commission's Electric Vehicle Charger Selection Guide tool for charger purchase and network selection considerations. You may also locate charging providers by contacting one of the main industry associations, such as Electric Drive Transportation Association, or Zero Emission Transportation Association. When purchasing your charging equipment, consider that equipment, installation, and networking costs vary. Estimates for Level 2 chargers range from $3,000 to $6,300, and $55,000 to $120,000 for DCFCs, including hardware and installation costs.
- ❑ **Select charging infrastructure manufacturer(s), vendor(s), and network provider**. As you confirm project logistics, engage manufacturers and vendors early. Use resources like the Alternative Fuels Data Center: Charging Infrastructure Procurement and Installation for procurement guidance.

What to consider:

- **Project needs from the perspective of both the EVs and the charging infrastructure**. Coordinate the timing of charging equipment purchase and installation with vehicle delivery (which can be especially slow/complicated for municipal organizations). Involve the utility, vehicle provider, and charging equipment vendor in planning to reduce the probability of delays.
- **Determine if a formal solicitation is required**. Use resources like the EV States Clearinghouse (for state agencies) for charging infrastructure requests for proposal (RFPs) information.
- **Consider certified equipment**. The U.S. Environmental Protection Agency's ENERGY STAR® certified chargers are tested for operational safety by a nationally recognized testing laboratory.

KEY ACTIVITY 5 RESOURCES

Find and Compare Cars (DOE) (for light-duty vehicles)

Alternative Fuels Data Center: Vehicle Search (DOE) (includes heavy-duty vehicle models)

Zero-Emission Technology Inventory

Truck and Bus Voucher Incentive Project (California HVIP)

Alternative Fuels Data Center: State Laws and Incentives (DOE)

EV Utility Finder (DOE)

Open Funding Opportunities (The White House)

Charging Infrastructure Procurement and Installation (DOE)

Step 3: Determine your overall financial commitment

How? Follow the checklist:

- ❑ **Include costs, capital, and incentives in project budget.** In addition to federal and state incentives, your fleet may be eligible for municipal or utility incentives.
- ❑ **Estimate future costs:** Compare future operations and maintenance costs with current costs. Work with your budget office, fleet manager(s), and energy manager to incorporate these adjustments into future budget requests and planning.

What to consider:

- **Identify potential incentives.** Coordinate with vehicle and equipment providers to determine if EVs or charging infrastructure are eligible for funding. Ensure your fleet can take advantage of as much grant and incentive funding as possible when budgeting.
- **Refueling Property tax credit.** If your community installs qualified vehicle charging property, it may be eligible for the §30C Alternative Fuel Vehicle Refueling Property Tax Credit, which provides up to $100,000 in cash back. Like §45W (described above), this tax credit is now available to governments through elective pay.

KEY ACTIVITY 6: INSTALLATION OF CHARGING INFRASTRUCTURE

➢ **Goal: Complete the installation of charging infrastructure for your fleet**

Step 1: Determine inspection requirements and additional site needs

How? Follow the checklist:

- ❑ **Comply with local/state codes**. Use a licensed electrical contractor who is aware of relevant codes and standards and who obtains a permit from the local building authorities before installing charging infrastructure. Additional time may be needed, as permitting may require a site installation plan, and approval from fire, environmental, or electrical inspection entities. For detailed guidance on charger installation, refer to the CA Electric Vehicle Charging Station Permitting Guidebook.
- ❑ **Consider signage and pavement markings.** Install charging infrastructure in a convenient location. Consider lighting, and minimize vandalism by using preventive strategies (e.g., motion detectors, anti-vandalism hardware.
- ❑ **Comply with Americans with Disabilities Act (ADA) requirements**. ADA compliance is required by some incentive programs and state regulation. Furthermore, following ADA guidance (even if not required for your project) helps ensure that EV infrastructure is accessible to as many community members as possible. For more information on accessibility considerations, see the Installing EV Charging in Compliance with the ADA Requirements webpage and Access Board's Design Recommendations.
- ❑ **Ensure manufacturer certification compliance.** When choosing charging infrastructure, ensure that the manufacturer has complied with certification requirements, including testing the product with a certified testing body**.** Charging infrastructure should comply with SAE International standards, such as SAE J1772.

KEY ACTIVITY 6 RESOURCES

Alternative Fuels Data Center:

Charging Infrastructure Procurement and Installation

Installing Electric Vehicle Charging in Compliance with the Americans with Disabilities Act Requirements

Signage for Electric Vehicle Charging Stations

What to consider:

- **Identify local codes and regulations and certified electrical contractors.** Refer to the Electric Vehicle Infrastructure Training Program list of trained contractors and consult with project partners (e.g., manufacturers, utilities, and Clean Cities coalitions).
- **Understand permitting requirements.** Consult permitting case studies and helpful resources like the Northeast States for Coordinated Air Use Management fact sheet that outlines strategies for state and local governments to improve permitting and zoning for chargers, or Sonoma County's expedited permitting process for all levels of EV charging.
- **For EECBG projects > $250,000, ensure compliance with Buy America requirements.** Visit the Made in America Office website for more information.

Step 2: Select construction and electrical contractors and start installation

How? Follow the checklist:

- ❑ **Assemble construction and electrical teams**. The Electric Vehicle Infrastructure Training Program maintains a list of contractors trained and certified in EV equipment installation. Your utility, equipment vendors and/or local Clean Cities coalition may also be able to recommend qualified contractors.
- ❑ **Discuss permitting requirements with your electrical contractor**. This will ensure that your project can move forward without delays once construction starts. Both your construction and electrical contractors can help to navigate permits.
- ❑ **Start installation of charging infrastructure.** Refer to your project checklists to ensure timelines are being met.
- ❑ **Schedule regular meetings with the project teams.** These regular check-ins are essential to discuss concerns or updates during the installation process.

What to consider:

- **Assign a Project Manager.** This individual will supervise the engineering and construction of the charging infrastructure, ensuring high-quality work for the fleet with minimal site disruption.
- **Incorporate the construction and electrical teams into your budget**. Consider issuing formal bids for construction and electrical contractors to best suit your budget.
- **Celebrate!** Be sure to host a ribbon-cutting press event when the project is complete to share this achievement far and wide.