WORKING WITH YOUR UTILITY TO ELECTRIFY YOUR SCHOOL BUS FLEET

This guide was developed by VEIC with support from World Resources Institute's Electric School Bus Initiative. This guide was published September, 2022.

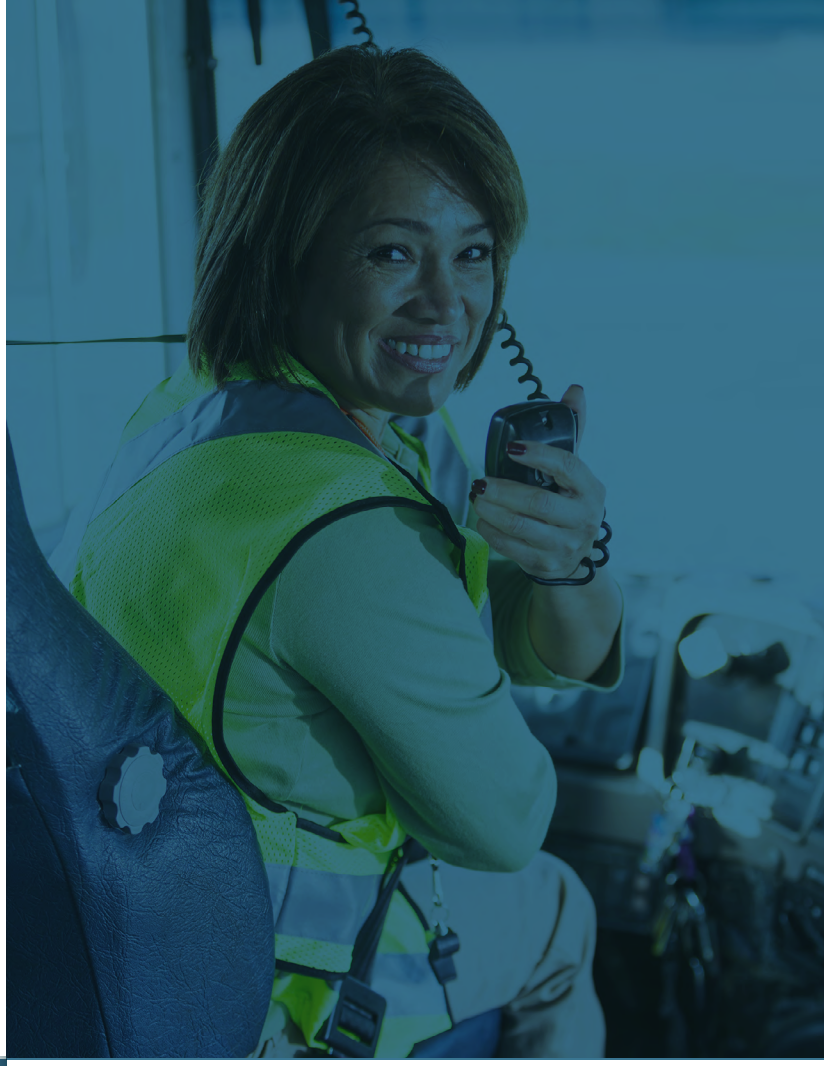
About VEIC

VEIC is a sustainable energy organization on a mission to generate the energy solutions the world needs. For over 35 years, VEIC has been working with governments, utilities, foundations, and businesses across North America to develop and deploy clean-energy services that provide immediate and lasting change. VEIC has expertise in energy efficiency, building decarbonization, transportation electrification, and demand management for a clean and flexible grid. We design innovative solutions that meet clients' goals, while reducing greenhouse gas emissions. VEIC is nationally recognized for programs and pilots that optimize energy use, reduce energy burdens for low-income customers, and advance emerging technologies and innovative program models.

About World Resource Institute's Electric School Bus Initiative

Established in partnership with the Bezos Earth Fund, WRI's Electric School Bus Initiative aims to collaborate with partners and communities to build unstoppable momentum toward an equitable transition of the U.S. school bus fleet to electric by 2030, bringing health, climate, and economic benefits to children and families across the country and normalizing electric mobility for an entire generation.

NAVIGATION



BENEFITS OF PARTNERING WITH YOUR UTILITY

Benefits of Partnering With Your Utility

Your electric utility will provide the electricity your electric school buses (ESBs) need to operate. However, your utility can do so much more to support your ESB project. They can – and should - be an important partner as you transition your school bus fleet to ESBs.

Many utilities are interested in supporting ESBs because they are in the business of selling electricity, and ESBs (and electric vehicles more generally) are a promising source of revenue growth. For others, support for ESBs is used to meet greenhouse gas emission and climate goals, which are increasingly common at the state and local levels. And as utilities plan for a future with widespread electric vehicle use, they are realizing how imperative programs are that balance energy loads throughout the day in order to prevent costly infrastructure upgrades. For these reasons, among others, many utilities offer the below types of support for ESB projects.

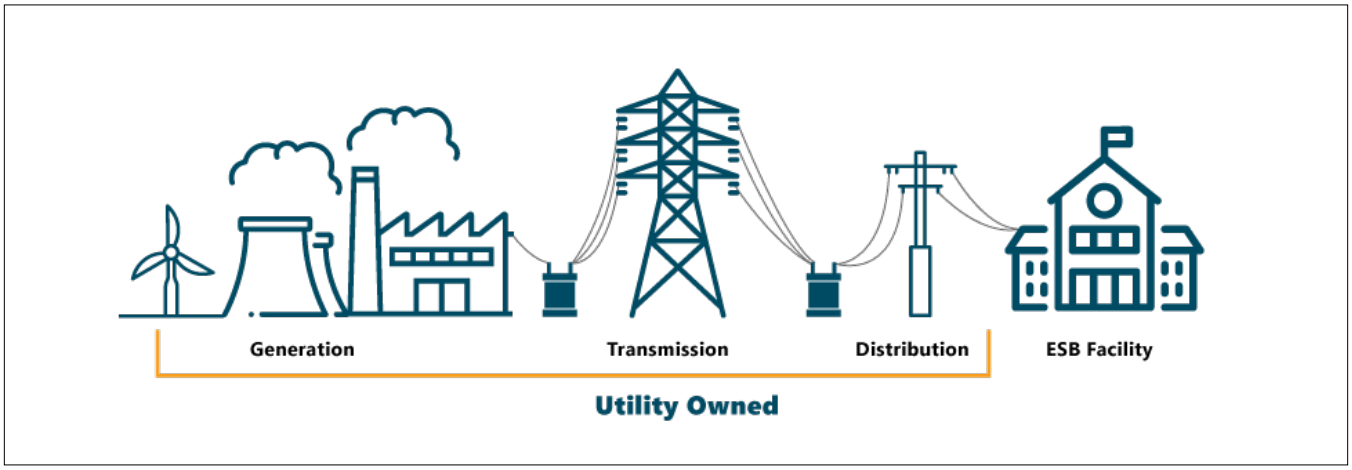
Project Support

An increasing number of electric utilities offer financial incentives to encourage the deployment of electric vehicles. These incentives can range from support for necessary electrical upgrade to direct cash payments that bring down the upfront cost of vehicles or charging infrastructure.

Early coordination with your utility is important to maximize the value of incentive programs. Program requirements can, in some cases, drive purchasing decisions or the design of electrical infrastructure. For example, some utility incentive programs offer support only for specific types of chargers. Finally, some programs may require significant administrative effort to document the expected electricity usage or environmental benefits. Schools should weigh all costs and benefits of participating in utility programs.

Facility Upgrades

A common way that utilities support electric vehicle (EV) deployments is through "**make-ready**" **programs** that offset the cost of **electrical infrastructure upgrades** necessary to install EV chargers. Depending on the project, the combined costs of electrical equipment, engineering, design, and construction can come close to the cost of the chargers themselves.



Early coordination with your utility is important to maximize the value of make-ready programs. Incentives can be tied to specific requirements relating to the type of chargers installed, their location, and intended use. The utility may need to be a key partner in the design and approval of upgrades, and some programs may require the use of approved contractors.

Advantageous Electricity Rates

Your utility can be an important partner in helping you navigate the rate structures that are available to you to **minimize your on-going electricity costs**. In some cases, **EV-specific rate structures** may be available for electric vehicle charging, but they may come with restrictions or requirements that you will want to understand as soon as possible as you develop your project.

In order to forecast your expected electricity costs under a particular rate structure, you will need to make some assumptions about when, how much, and how fast you'll be charging your buses. Typically, rate structures include significant fees, called demand charges, that are tied to the highest peak demand at any one time. Additionally, many rate structures include time-of-use variation, where the electricity costs vary within a particular day, month, or even seasonally. Your utility can be an important early partner in helping you **evaluate different rate structures and develop a charging strategy** that will minimize your electricity costs.

DEMAND CHARGES.

Most electricity customers incur demand charges, which are intended to cover the cost of maintaining the electric utility's infrastructure.

If your electricity bill is on a monthly cycle, the demand charge would be based on the highest amount of power drawn during the month.

VEIC has previously found that demand charges can comprise up to 2/3 of ESB deployment electricity costs.

UNDERSTANDING YOUR UTILITY

Understanding Your Utility

When working with your utility on an ESB project, it can be helpful to have a basic understanding of their mission, organization, and regulatory environment. Utilities are unique entities – typically, they are regulated monopolies that have both a profit motive and legal responsibilities to the general public. Understanding your own utility can help you maximize the support you receive for your ESB project, gain insight into the source of electricity generation, and more effectively navigate implementation challenges. To help get you started in this process, below are descriptions of the three main types of electric utilities:

Investor-Owned Utilities (IOUs):

IOUs are for-profit corporations that are owned by shareholders. They can be private or publicly owned (listed on a major stock exchange) but in all cases are governed by a public utility commission. Electricity provided by an IOU typically comes from a combination of sources, including some produced by the IOU and some purchased from public or private energy markets. About 75% of utility customers in the US are served by an IOU. Typically large and complex institutions, many IOUs may have significant incentive programs, so it is important to inquire about ESB incentive programs even if not listed outright on the website.

Municipal Utilities:

Municipal utilities, or public utilities, are owned by the community and operated as a division of government. Most municipal utilities are owned by cities and towns, but they can also be owned by counties, states, or an independent public utility district. Electricity is often cheaper and more reliable than that delivered by an IOU. Municipal utilities are often exempted from state oversight or have limited regulation, but nonetheless, many still offer incentive programs that could assist an ESB project.

Co-ops:

Electricity cooperatives are private, member-owned entities that are most common in rural areas. While they do not have an inherent profit incentive, because of the low-density areas they serve, the costs of providing electricity can be higher on a per-unit basis. Many coops are service-oriented and community-focused and may be able to work in close coordination to support an ESB project.

HOW TO GET STARTED

How To Get Started

Reach out to your utility early on to let them know you are interested in adding electric school buses (ESBs) to your fleet.

As you move through the procurement process, keep your utility informed as you decide how many ESBs you will acquire, how many charging stations you will need, and where they will go. Your utility can help determine if any infrastructure upgrades are needed and how you can prepare for more ESBs in the future.

Get organized internally:

- **Figure out who in your school district currently works with your utility,** and in what capacity. This might be a commercial accounts manager in the business office, and/or someone more involved in building facilities. Consider how past experiences have shaped the quality of the relationship with your utility.
- **Designate an internal primary point of contact,** if you don't already have one. This could be your facilities manager, transportation director, or business office staff.
- **Coordinate the key team members** whose input will be needed throughout the process. These may include key staff from facility, fleet, or administration departments. Other important players from time to time may include certain bus drivers, IT network admins, and an internal or external electrical contractor.
- **Decide where the buses will be charging**. For each potential charging location, review options for where chargers might be placed, current electrical infrastructure, lighting and foot traffic patterns, and current or planned vehicle storage and movement for the entire fleet (not just EVs). Exact charging locations may need to be changed as more information comes to light, but it is good to have reviewed the basics before having a site visit with someone from the utility.
- **Collect copies of necessary planning documents for easy reference:** building and electrical plans, example spec sheets for potential chargers, recent utility bills, and satellite and/or street view photos of the site.
- **Do some long-range planning**. Electrical infrastructure improvements may be costly, and installations can be intrusive to regular operations. It is best to avoid tearing out and replacing equipment after just a few years if it can be avoided by knowing in advance your anticipated fleet electrification schedule.

Navigating Your Utility:

Your utility may give you an account manager to work with. If not, ask for a point of contact you can work with and to whom you can come to with questions. Check to see if your utility has an EV or ESB liaison who can work with you throughout the process, as well.

Questions To Ask Your Utility:

Incentives

- [ ] Do you offer any incentives for electric vehicles or electric vehicle chargers?
- [ ] What is the process and timeline for accessing incentives?
- [ ] What specific documentation is needed and to whom does it go?

Service

- [ ] Can the chargers be added to our existing electricity service, or will they need to be added to a new service account with a new meter?
- [ ] Are there any usage thresholds we should be aware of?

Rates and Costs

- [ ] Can you help me understand our current electricity usage and rate structure? If our electricity usage or demand increases with the addition of electric school buses, how are our electricity bills likely to change?
- [ ] Do you have any EV-specific utility rates, or a rate structure that would be a good fit for our intended use?
- [ ] Are there restrictions or limitations for getting those rates, such as required public access or usage caps?

Infrastructure

- [ ] Can our current infrastructure handle the loads we are looking to add?
- [ ] What is the interconnection process and timeline for chargers?
- [ ] If infrastructure upgrades are needed, what is the expected cost and timeframe for installation? Are there ways to phase necessary upgrades to minimize costs?
- [ ] What role can you play in upgrading our facility (if upgrades are needed to support chargers)?
- [ ] Does Vehicle-to-Grid (V2G) or some other V2X technology make sense given my needs? Do you have experience with this type of technology?"

Coordination

- [ ] Do you know of any other nearby schools or other local utility customers who are or have already undergone school bus electrification? Are there any good contacts you can share with us so we can chat with them about the process?
- [ ] How can we best stay in touch throughout this process? Will we have a single point of contact? Would you recommend a regular meeting time?

TAKING YOUR PARTNERSHIP TO THE NEXT LEVEL

Taking Your Partnership To The Next Level

The growth of electric vehicle usage, including ESBs, will drive an increasing demand for electricity and place new strains on the complex system of electricity generation, transmission, and distribution, known as "the grid". If most new EVs, including ESBs, are charged around the same time every day, utilities may need to invest in new power generation to accommodate the increased demand for electricity.

For this reason, many utilities are interested in exploring programs in which ESB batteries send electricity back to the grid ('Vehicle-to-Grid', or 'V2G'), or directly to other building uses ('Vehicle-to-Building', or 'V2B'), when it is needed most. Deployed at scale, these programs should reduce the need for utilities to add new power generation and provide resiliency in the event of power disruptions. Ultimately, these programs should assist in lowering electricity prices for all customers.

However, projects involving energy discharge and ESBs are still quite new and may not be available to your district yet or a good fit at this point in time. School districts with the interest and expertise should consider exploring V2G and V2B opportunities, for their own benefit and the benefit of all utility customers. This section provides useful background on these two types of innovative energy discharge programs that may be possible with your ESBs.

What is Vehicle-to-Grid?

Vehicle-to-Grid, or V2G for short, is the capability to deliver power from ESB batteries to the grid. This creates a bidirectional flow of electricity between an ESB and the grid, allowing the ESB batteries to act as a "storage unit" that can be tapped for electricity when the grid is stretched due to high demand (during a heat wave, for example).

What are the benefits to V2G?

In exchange for being able to use your vehicle as an on-demand power resource, utilities may offer significant financial incentives including reduced charging rates, equipment rebates, and even direct payments. The controls for this exchange can either be placed directly in the hands of the utility or contracted to a third-party operator. There is typically an opt-out feature, which can prevent V2G modes from activating for particular events, but this opt-out may come with penalties.

What are the costs associated with V2G?

V2G will add complexity to your operations, so the operating needs of participating vehicles must be carefully considered in advance. A school bus which sits idle for many hours of the day may be an excellent candidate for V2G, if it has plenty of charge remaining for its next run. A bus with more constant utilization throughout the day would be more challenging for effective V2G implementation. A larger battery, which is a major cost driver in an electric bus, may be needed to accommodate V2G while still meeting operations' needs.

The costs for setting up a V2G system will depend on the features required, but are likely considerably higher than a standard one-way charger. Both the ESB and the charging infrastructure need to be capable of bidirectional charging to send energy back to the grid. Some commercially available charging stations even have optional features that could allow for utility signal inputs to influence, with varying levels of sophistication. More complicated systems, such as those that integrate with a microgrid or dynamic price signals, may be better suited for operation by a third-party entity.

What is Vehicle-to-Building?

Vehicle-to-building (V2B) is the ability to deliver power from vehicle batteries to supply building energy demands. The ESB batteries act as a "storage unit" that can be tapped by the building to augment its normal power supply.

What are the benefits of V2B?

The potential benefits of a vehicle to building system include providing emergency backup power during a power outage, reducing electricity costs, and enabling the direct usage of wind or solar resource. However, the expected value of a system is dependent on factors such as location and operational needs:

- At locations where power outages or preventive power shut offs are more frequent, as has recently been the case in California and other places, the value of an emergency power supply could be quite high.
- The extent to which electricity costs can be reduced depends on operational needs throughout the day. For example, a V2B system is more likely to supply electricity for after-school building uses than those during the school day, when buses are either in-service or charging to prepare for service.
- V2B systems that store energy produced from a renewable resource such as wind or solar can significantly reduce greenhouse gas emissions and electricity bills.

What are the costs associated with V2B?

The cost of implementing a vehicle-to-building system depends on the intended use, but would be a significant expense in any scenario. A system that's intended to provide a fully-islanded power source in the event of a power outage, or to store and supply renewable energy, would be higher-cost than a system that powers a single building circuit (e.g., just powering a gymnasium compared to the entire school). However, there are federal and state incentive programs for clean energy projects at schools that could help to bring down the upfront costs.