



**EPA CLEAN
SCHOOL BUS**

WORKFORCE PLANNING RECOMMENDATIONS AND RESOURCES

EPA's Clean School Bus (CSB) program is enabling school districts across the country to purchase new, cleaner vehicles to transport kids to school every day. The successful deployment of clean school buses requires a workforce that is well-prepared to operate and maintain the buses. Worker preparedness, safety, empowerment, and job quality are thus top priorities in the transition to clean school buses. EPA strongly recommends that schools and school districts develop a workforce readiness plan, using resources such as those included in this document and on EPA's website, to support the transition to new buses. Funding from EPA's Clean School Bus program can be used for workforce development activities, which might include developing training materials, sending employees to training courses, and/or paying for services from a third-party workforce partner. Additional funds for workforce development may be available through state or local agencies, and school districts are encouraged to pursue partnerships with other districts and local education and training partners to fulfill their training needs.

This document outlines suggestions for how to prepare and empower your workforce for the transition to clean school buses. The specific needs of each school district will vary based on many factors, including the number of new buses, the number of workers operating and maintaining the buses and infrastructure, the current expertise of the workforce, and other similar considerations. The suggestions below provide general recommendations for workforce planning and districts are encouraged to adapt them to their own needs. Additional workforce development resources can be found on [EPA's Clean School Bus website](#).

Establish a Workforce Readiness Team

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Perform a skills gap analysis

**Identify the skills required to operate and maintain
the fleet and associated infrastructure**

**Identify training
resources and partners**



Please contact cleanschoolbusTA@NREL.gov if you have any questions and visit epa.gov/cleanschoolbus to learn more about technical assistance (TA). TA for CSB **planning and deployment** is available to school districts participating in the EPA Clean School Bus Program.

Step 1. Establish a Workforce Readiness Team.

A Workforce Readiness Team should be assembled to develop and implement a workforce readiness and job quality plan. It's important that this team brings together diverse expertise and includes both school district fleet management and front-line workers and/or their representatives. Collaborative labor-management partnerships, with an emphasis on empowering workers and maintaining strong labor standards, will be foundational to successful clean school bus deployment.

This group can be tasked with comprehensively planning for workforce readiness and job quality, monitoring implementation of the plan, and creating feedback mechanisms for workers to ask questions and provide suggestions. Once established, this team can carry out the subsequent steps recommended in this guide.

Step 2. Identify the skills required to operate and maintain the fleet and associated infrastructure.

A key responsibility of a Workforce Readiness Team should be to identify and understand the skills required to operate and maintain the proposed fleet and associated infrastructure. This will require an approach for bus drivers, maintenance workers, and other essential personnel, such as first responders, as appropriate for your community.

Operators: It is essential that all bus drivers operating the new vehicles feel confident and prepared to drive students safely. Operators will need to be comfortable with key differences between operating an electric and diesel bus, such as regenerative braking, new safety features, and charging the vehicle, among other skills. There are resources online that provide a basic overview of driving an electric bus, such as [YouTube videos](#) and [webinars](#). Additionally, school districts are encouraged to discuss operator training with their bus manufacturer or dealer to understand what training and ongoing support they provide.

Maintenance: Schools and school districts should prepare their workers to perform maintenance and diagnostic tasks for the fleet and infrastructure. The [Transit Workforce Center \(TWC\)](#) and the [American Public Transportation Association \(APTA\)](#) are currently developing industry standards for the training necessary to maintain zero emission buses. Once published, districts are strongly encouraged to adopt these industry standards.¹ In the meantime, fundamental electric school bus maintenance skills can be split into four main categories:

- 1. Safety.** Student, worker, and community safety is of utmost importance when preparing for the transition to new buses. School districts must thoroughly understand what skills are needed to safely operate and maintain the buses and charging infrastructure.
- 2. Electrical basics.** Basic electrical/electronic principles, including foundational skills related to batteries, circuits, electrical theory, multiplexing, electronics, and similar topics. APTA's [training syllabus for electrical/electronic skills](#) is one resource that identifies these fundamental skills.
- 3. Electric school bus basics.** Electric school bus basics, including the overall bus architecture, major components and functionality, safety requirements, and skills pertaining to the specific high-voltage aspects of electric buses, including related subsystems. There are numerous resources a district might consult to understand these skills, such as:

¹ The TWC worked with the APTA, transit labor unions, and zero-emission bus (ZEB) manufacturers to facilitate discussions among subject matter experts (SMEs) on the training needed for ZEB technicians. In spring 2023, the SME review process was completed, and the recommended training practices are now going through public comment before being finalized and issued as the industry standard.

- **Original equipment manufacturers (OEMs) and bus dealers.** OEMs are the companies that produce the buses and related equipment and are familiar with the technology training requirements. Many OEMs partner with bus dealers to sell their products and provide training opportunities. Many OEMs provide videos on their YouTube channels with introductory information about their vehicles.
- **[The Transit Cooperative Research Program's Guidebook for Deploying Zero-Emission Transit Buses.](#)** Industry researchers and experts designed this free book to provide transit agencies with information on current best practices for zero-emission bus deployments from industry researchers and experts.
- **[Electrified Transportation Pro+ Training and Certification program.](#)** This is a training and certification program focused on electrified transportation. While it is focused on EVs broadly (i.e., not specific to school buses) there is significant overlap with the fundamental skills.

4. Product-specific training. These more advanced skills include detailed training for specific vehicle systems. Training is often provided by an OEM or sub-component suppliers with scheduling coordinated through the OEM.

Other essential personnel: School districts should have a close working relationship with their local electrical utility and emergency first responders. Utilities can share their experience, training, and best practices around high-voltage safety. First responders from local fire departments or Emergency Medical Technicians (EMTs) should participate in training to understand the electric school buses and develop their own safety practices. Having a local towing company present for training can also help ensure a bus can be safely removed from the scene of an incident.

Electric Vehicle Supply Equipment (EVSE) operations and maintenance: School districts that plan to operate and maintain their charging infrastructure, also known as electric vehicle supply equipment (EVSE), must be prepared to do so properly and safely. The [Electric Vehicle Infrastructure Training Program](#) (EVITP) is the most comprehensive training for the installation of EVSE equipment today. To protect worker safety and ensure the highest standards of delivery, EPA requires that electricians installing, operating, or maintaining EVSE purchased through the Clean School Bus program be certified by EVITP or another training program approved by the agency.

School districts should also develop the ability to monitor and interpret data coming from electric school buses and charging infrastructure. This is important for overall fleet management and optimization. Districts can work with EVSE and/or electric school bus OEMs to develop this capability in-house, or work with aftermarket third-party vendors.

Step 3. Perform a skills gap analysis.

Once you understand the skills and proficiencies your workforce needs to acquire, consider performing a skills gap assessment to understand what training and support will be required. Start by estimating the number of workers who will support the transition to zero-emission buses. Consider how your maintenance workforce is structured; are technicians required to work on all maintenance tasks, or do some specialize in specific job areas? All operators and technicians may need some level of electrical training to ensure proficiency in electrical work electronics, while only some may require advanced training related specifically to electric school buses and EVSE.

Once you've identified which workers will support the buses and infrastructure, perform a baseline assessment of your workers' current skills. One way to do this is through a questionnaire that asks operators and technicians to rate their own ability to perform job tasks on a scale. Consider evaluating foundational electrical/electronic skills and electric bus-specific skills. The International Transportation Learning Center (ITLC) provides a template [skills gap survey](#) as a starting point. To refine the survey to meet the needs of your workforce, consider using the job tasks identified in [APTA's training syllabus for electrical/electronic skills](#).

It is important to communicate that the sole purpose of the survey is to assess skills so training can be provided to enhance those skills.

Leadership disseminating the survey should clearly communicate that the results will not negatively affect workers in any manner; low scores, whether individually or in a group, should only be viewed as an opportunity for additional training.

EPA strongly encourages school districts to have clear strategies to ensure current workers are not replaced or displaced as a result of new buses.

Engaging with workers and their labor representatives via the Workforce Readiness Team is critical for developing a thoughtful approach to training that meets the needs of the school district and its workforce.

Step 4. Identify training resources and partners.

Finally, the Workforce Readiness Team should identify resources and partners that can assist with the training and workforce development activities identified in the previous steps. There are many types of partners that can support a school or district's workforce development needs. Examples include but are not limited to bus manufacturers and dealers, other vendors or suppliers, trade and technical schools, universities, community colleges, labor unions, professional or industry associations, nonprofit training providers, employers with Registered Apprenticeship Programs, local or state government-led collaboratives, and other similar education and training providers. School districts are encouraged to explore which partners may be available in their local community or nearby communities to meet their training needs.

There are also online resources, ranging from introductory materials about zero-emission buses to more advanced distance learning courses to regular webinars and events from nonprofits and industry groups. Online resources should supplement in-person, hands-on training but generally should not be considered sufficient on their own. EPA maintains a list of online resources focused on workforce development on the Clean School Bus [website](#).

School districts should also establish how they will prioritize worker empowerment and job quality in any training they pursue. For example, workers should be compensated their normal wages for time spent in training and training opportunities should be scheduled flexibly to accommodate workers on different shifts. Districts should collaborate with workers and their representatives when developing training plans to meaningfully integrate employee perspectives. Workers should clearly understand if and how any of their job functions may change and the support they will have to perform those roles effectively.

Working with your OEM. Most school districts will rely on their OEM or bus dealer for at least some workforce training. When working with your OEM or dealer, it is important to be specific about the training your workforce will need and to understand clearly what you can expect from your OEM. The language in your bus procurement documents can be a powerful tool to shape the training services you receive. The ITLC and Jobs to Move America developed a [guide](#) to assist purchasers procuring electric buses and training services, which includes sample text that can be used in a Request for Proposals.

Thanks to the research you did in previous steps and the skills gap analysis, you can be specific about the quantity and quality of training your staff will need in your procurement documents and, ultimately, bus contracts. For example, you might consider including:

- **Maintenance after warranty.** Your district should have a plan for long-term maintenance of the buses. If you intend to maintain the buses, require OEM training be comprehensive to the point where your technicians are qualified to perform work in-house when the OEM/dealer's warranty expires. This will help ensure your technicians are equipped to perform repairs and limit your reliance on third-party service providers.
- **Train-the-Trainer.** You might consider working with your OEM to adopt a train-the-trainer model where you train a select number of individuals on complex tasks so those individuals can train other technicians and build the capacity of your school district over time.

- **Standard Operating Procedures.** Ask your OEM/dealer to produce standard operating procedures (SOPs) for critical safety-related tasks. SOPs contain step-by-step procedures that must be followed to perform given job tasks safely and properly. Example SOPs could include using of personal protective equipment (PPE), working with high-voltage equipment and insulated tools, and de-energizing batteries so technicians can safely perform maintenance.

Supplementing OEM training: In some instances, OEMs may not be equipped to provide all the training your workforce needs, such as education in foundational electrical/electronic skills. Other workforce partners, such as community colleges or local Career Technical Education centers, may be able to help fill these gaps. You can approach a potential partner with a specific list of learning objectives that need to be covered based on the results of a skills gap analysis, and your training partner may be able to adapt existing curriculum to meet your needs. Any training provider should demonstrate that it has experience in workplace education and can provide evidence of success in training incumbent workers.

Examples of organizations currently providing or developing electric vehicle or EVSE training programs include the [California Energy Commission](#), [Colorado Department of Transportation](#), [Michigan Department of Labor and Economic Opportunity](#), [National Alternative Fuels Training Consortium](#) at West Virginia University, and the [Transit Workforce Center](#).

Hands-on training and mentorship: Online and/or classroom training should be reinforced through hands-on learning and opportunities to practice. Additionally, it is valuable to provide workers with ongoing mentorship from experienced professionals as they are learning and honing new skills. This ITLC Mentoring [Guidebook](#) provides ideas for how to establish mentoring as a training method with guidance, suggestions, and examples to implement or expand upon existing mentoring programs.

In Summary

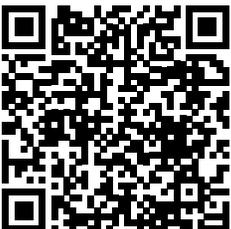
Workforce development is a key component of the transition to clean school buses. School districts should evaluate their workforce needs and collaborate with partners to prepare drivers, maintenance workers, and other essential personnel for the safe operation and maintenance of the vehicles and infrastructure.

It is essential that workers feel supported and empowered during this transition. Making sure employees are provided with high-quality training opportunities, forums to ask questions and learn from each other, and avenues for feedback will prepare the workforce and the school district for success.

Clean school buses provide immense benefits, from cleaner air for students and drivers to cost savings for school districts. Through thoughtful planning and prioritizing workforce development, school districts and workers will collaboratively usher in a new era of cleaner transportation solutions for America's students.

Acknowledgements: Many of the concepts in this document come from a framework developed by the Transit Workforce Center, "[Resources and Best Practices for a Zero Emission-Workforce Fleet Transition Plan](#)."

Disclaimer: EPA is not responsible for updating or verifying accuracy of the information on the non-EPA linked pages in this document.



Clean School Bus Program: Workforce Planning Process and Resources

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