



Portland General Electric

Electric School Bus Fund Report

Q4 2023



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1. Abstract

The Electric School Bus Fund (ESB Fund) is positively impacting Oregon school districts. This program provides a helping hand as school districts take their first step toward school bus fleet electrification and provides valuable insights to PGE and the broader industry. Some of the goals of PGE's ESB Fund are bus electrification, long-term savings for districts, improved air quality, and more environmentally sustainable school districts. These districts and the community continue to share positive feedback and appreciation, illustrating the importance and impact of the ESB Fund. The program has evolved since its inception and this report shares district experiences based on feedback and lessons learned along the way.

2. Key Takeaways

A summary of key takeaways is highlighted here with additional details later in the report.

- PGE's Electric School Bus Fund can help school districts meet climate goals as they transition their fleets by providing financial and technical assistance. These and additional benefits for child safety and health are promising, though not quantified at this stage.
- The early cycles of the fund illuminated challenges with the program's initial design and barriers faced by applicants and interested school districts. As a result of district feedback:
 - PGE shifted the application timeline and moved to an online platform.
 - Ongoing programmatic changes resulting in shortened project timelines and leading PGE to collect better data on implementation and bus performance.
 - PGE began conducting proactive outreach to every district across its service area, leading to an increase in applications from small and rural districts.
- The ESB Fund has and will continue to evolve as bus technology and district needs change.

3. Introduction

PGE's Electric School Bus Fund helps provide electric school buses to public school districts wholly or partially within PGE's service area. PGE's Electric School Bus Fund is made possible by the sale of Clean Fuels Credits via the Oregon Department of Environmental Quality's Clean Fuels Program.¹ This program enabled many of the first electric school buses in Oregon.² These electric buses provide a cleaner, quieter and safer ride for students while releasing zero tail-pipe emissions, which directly benefits student health as well as the environment.³ In the first three years of the program, PGE awarded funding to support 19 school bus purchases across nine districts, providing the incremental cost of a new electric school bus over a new diesel bus. In addition to funding the incremental cost of an electric school bus, recipients can also receive funding for charging infrastructure. As the ESB Fund evolves, PGE and its partners encounter and overcome challenges. PGE plans to capture the lessons learned and share them with other implementers of this work. This report takes a deeper look into the successes, obstacles, and key takeaways, and looks toward the future of the ESB fund.

The following sections provide an overview of PGE's ESB fund to date as well as learnings and recommendations captured from interviewing two participating school districts and two PGE staff in summer 2023 who worked on this program.

4. Background

The Electric School Bus Fund is made possible by the sale of Clean Fuels Credits via the Oregon Department of Environmental Quality's (DEQ) Clean Fuels Program (CFP). Therefore, the ESB Fund and its recipients must meet the CFP guiding principles:

1. Support the goal of electrifying Oregon's transportation sectors.
2. Provide majority of benefits to residential customers.
3. Provide benefits to traditionally underserved communities.
4. Programs are developed collaboratively and transparently.
5. Maximization of funds for implementation of programs.

For projects where PGE helps fund the cost of charging infrastructure and installation, PGE acts as an aggregator of the Clean Fuels Credits produced by those chargers. The ESB Fund first began awarding grants to school districts in 2020 and continues to do so on an annual basis. All applicants must complete a thorough application to demonstrate project eligibility and competitiveness with other applicants. The amount of charging infrastructure funding has varied since the creation of the ESB Fund and will continue to adapt and change to equitably benefit all recipients.

Preference is given to projects that:

- Have interest in exploring school bus fleet electrification.
- Have commitment to engaging community, school, and/or other stakeholders in the project.
- Have interest in using the electric bus in curriculum development around STEM, climate and/or sustainability.
- Have district commitment to diversity, equity and inclusion and will use the bus to support underserved communities.
- Have taken advantage of other funding mechanisms.

Applicants are encouraged to apply for other funding sources, including PGE's Fleet Partner program to maximize the funds available for school bus fleet electrification. Several school districts are repeat awardees, with larger fleets and more frequent bus replacement. As the program continues it must evolve so rural and tribal districts as well as those districts with smaller fleets are receiving support to electrify their fleets as well.

Expectations for Awardees

The ESB Fund provides awardees with funding to execute their projects from PGE. PGE has an identified staff member to support grant completion and work with districts to troubleshoot any challenges that arise. It is the awardee's responsibility to:

- Select and procure the electric school bus(es).
- Select, procure and install electric vehicle charging equipment for the bus.
 - This charging equipment must be [qualified](#) by PGE and capable of charging data collection and demand response.
- Provide maintenance and operations to the bus and its charging equipment throughout the life of the project.
- Provide quarterly updates, a final project report and annual reports for three years following the completion of the project.

Expectations of PGE

In addition to the grant project manager to support districts throughout the process PGE provides:

- Provision of funding to recipient, 75% at the beginning of the project period and the remaining 25% upon project completion and approval of the final project report.
 - This funding covers the incremental cost of the purchase of an electric school bus (cost beyond that of a traditional bus), associated charger and infrastructure costs (optional).
- Provide technical support through PGE's [Fleet Partner](#) program to guide recipients through infrastructure planning and implementation.
- Provide additional technical assistance throughout the process, as needed, including site assessments and guidance on bus and charger selection.

5. Program Impacts + Improvements

5.1 Community Benefits of Electric School Buses

As more electric school buses come into operation, PGE will continue to collect data to better understand the benefits and impact associated with an electrified fleet. Though the ESB Fund is still relatively new PGE has received anecdotal feedback suggesting support in pursuit of these benefits.

Long Term Savings

Electricity provides long-term savings compared to diesel. Furthermore, electric vehicles (EVs) require less maintenance than internal combustion engine (ICE) vehicles, lowering the total cost of bus ownership for school districts. Craig Beaver, Administrator for Transportation at Beaverton School District, states that one of the positive impacts he has seen from ESB Fund aiding their fleet electrification journey has been reduced operating and maintenance costs.

Safety & Sound

Electric school buses are quieter than their diesel counterparts, reduce noise pollution in neighborhoods and allow students and drivers to communicate more effectively and safely. When asked how the drivers have adjusted to driving the electric buses, Beaver said, "the people that drive them, love them...they just can't believe how powerful and quiet they are."

Climate Benefit

Electric school buses have zero tailpipe emissions, which helps with air quality and contributes to both PGE and school districts achieving their climate goals. "Electric school buses reduce greenhouse gas emissions by more than half compared to their diesel counterparts," said John Farmer, PGE spokesperson.⁴ This notable reduction improves the air quality for not only the students and communities surrounding the electric bus routes but all of Oregon. This is important to many students.

"In our district, we had a student group working to make our school district greener, and there were a lot of questions about how we would do that," said Jarvis Gomes, operations administrator at Tigard-Tualatin School District. "Then in the midst of that conversation, the ESB Fund became available. Given our desire to reduce our carbon footprint, we looked into it and our community thought this is a good way to do it."

"Communities have voiced support for this program. I've heard nothing but positive feedback," said Beaver. "Elementary students are excited to ride the electric buses and high school students appreciate the switch to electric buses for a better climate. Our electric school bus fleet primarily serves our historically underserved communities and students eligible for the Federal Free & Reduced Lunch Program."

Health Benefit

A significant factor in the selection process is the impact of the project on underserved communities, including environmental justice communities, which are disproportionately affected by environmental factors, including poor air quality. Electric buses reduce exposure to harmful pollutants found in diesel exhaust, which can lead to increased risk of cancer, asthma and heart disease.³

5.2 First Electrification Guidance

School bus fleet electrification is new to school districts and resource have only recently become available. The ESB Fund has put many of the state's first electric school buses on the road. Luke Whittemore, a PGE Grid Edge engineer, said one of ESB Fund's greatest successes is the guidance and instructions provided to districts on how to electrify their first school bus. "The ESB Fund helps school districts get over that initial hurdle of trying out electric school buses," said Whittemore. "That first project is when they need the most help and have the greatest opportunity to learn. Once they try it, they want more, and that's what gets them on this electrification journey."

5.3 Ongoing Technical and Project Support

PGE offers technical assistance throughout the electrification process for these school buses, something few other funding sources provide. This innovative portion of the ESB Fund allows for both PGE and the district to ensure "their project is a success and they're learning about EV chargers and electric school buses," said Whittemore.

Jarvis Gomes greatly appreciates this level of support. "PGE has been so easy to work with and the communication has been really good."

In the first two years of the ESB Fund, technical assistance for school districts was provided directly through PGE Grid Edge Engineers as part of the grant award process. When PGE's Fleet Partner program launched, it proved to be a more robust and preferable way to provide technical assistance. PGE now encourages awardees to participate in Fleet Partner, which provides infrastructure planning and potentially additional financial support.

"I am grateful for PGE's efforts to offer the ESB Fund and their support through the Fleet Partner Program," said Beaver. "There are a lot of challenges that come with getting charging infrastructure installed and for school districts who are new to this or may not have a lot of staff, the support is truly needed. When it comes to installing charging infrastructure, PGE has that process clearly defined within Fleet Partner. We would not be as successful today without these two programs."

5.4 Charging Data

The ESB Fund provides a unique opportunity for PGE to learn more about electric school bus charging patterns. The chargers used for these buses supply data about the interaction between vehicle charging and the grid. This provides insight that can help further the development surrounding managed charging and create a better understanding of how to pursue vehicle to grid technology and implementation. Data reporting was not fully available in earlier iterations of the ESB Fund but improvements to the reporting process for applicants now allow PGE and school districts to better understand the impacts of these deployments.

5.5 Creation of the Clean Fuels Program Grants Coordinator Position

As the grants funded by Clean Fuels Program credits have continued to grow, PGE needed additional resources to support the increasing number of awardees. PGE dedicated a Clean Fuels Program Grants Coordinator position to provide a centralized point of contact for both this grant and the Drive Change Fund awardees. This support improves awardee experience and shortens project timelines by providing guidance throughout the entire length of the projects funded by these grants. This specialized role also implements continuous process improvements to improve the ESB Fund.

6. Challenges

PGE staff are taking an iterative approach to improving the ESB Fund based on the challenges faced by internal and external stakeholders.

6.1 Application Phase

Application Process

In the first three years of the ESB Fund, applicants filled out their applications as PDFs and submitted via email. This approach proved to be complex for both districts and PGE, so the application was revised, and PGE now leverages online grant management software. By moving the application and reporting to an online system, it became easier to track documents, deadlines, and other important information about the grant. Repeat awardee districts voiced appreciation for the transition from PDF applications to a virtual platform.

Applicant Pool

The ESB Fund historically struggled to receive applications from small and rural districts. This was due to multiple reasons:

- They tend to have less staff capacity to spend on researching and writing grant applications.

- They tend to have fewer buses in their fleet, which leads to a lower replacement rate.
- PGE historically conducted limited outreach to school districts.

Beginning in 2023 PGE reached out to all 39 school district in its service area, sharing information about the grant as well as resources such as grant writing support. This led to a record number of applicants, including multiple small and rural districts.

Timeline

For grants awarded through 2023, the application's project timeline allows for an 18-month award period, which is meant to address current issues with vehicle and equipment supply chains. However, the notification of awards from PGE comes at the end of each calendar year, meaning that when schools order buses, they arrive around March, which is in the middle of the academic year. The arrival of a bus mid-year is difficult for school districts to manage. These mid-year arrivals often mean the routes the electric buses serve are not optimized and districts must scramble to put these buses to use upon receiving them. Districts shared that the current timeline for award application and award announcements did not align with their purchase cycles. With this feedback, PGE shifted the timeline for the 2024 cycle to better align with academic calendars and district budget planning processes. Applications now open in the fall so awarded districts can receive buses by the following school year. This new timeline aligns more with the school districts' fiscal year and budget planning.

6.2 Executing the Grant

The ESB Fund has evolved in many ways based on the learnings of another CFP grant program offered by PGE, the Drive Change Fund. The improvements below represent changes to the ESB Fund that now align it closer with Drive Change Fund requirements. Additionally, as both grant programs have grown in recent years and PGE hired a grants coordinator, it has been easier to establish consistent lines of communication and expectations with recipients, supporting their overall success.

Mitigating Long Lead Times

Long lead times for buses and charging infrastructure has been the primary reason for delays on ESB Fund projects. Though long lead times from manufacturers are outside of the control of both awardees and PGE, there are ways to mitigate these long lead times reduce the risk of project delays. Awardees must now order the vehicle in the first quarter of the award being made, which has shown to keep projects on track in the Drive Change Fund.

Juliae Riva, Clean Fuels Program Grants Coordinator shares her experience on mitigating delays, stating that "ordering the school buses as soon as possible makes things run much smoother, and we work with districts to have a charging plan to ensure chargers are operational by the time the school buses arrive."

Additionally, seeking approval from school boards ahead of time can help mitigate delays in the approval process once districts are awarded. "Everyone is supportive of our electric school bus deployment efforts. The school board just approved the purchase of up to \$14 million worth of electric school buses over the next five years," said Beaver. This type of pre-approval has simplified the procurement process and can help minimize frustration with delays.

Reporting

For the first three years of the ESB Fund, certain reporting requirements weren't necessary as PGE staff were providing direct assistance and regular communication. To standardize the experience for all awardees, starting with the 2023 award year, recipients are required to submit quarterly reports and a final report upon project completion via a grants management platform called Cybergrants. By creating a standard list of questions for all districts to answer, PGE staff made it easier to monitor projects, which in turn made it easier for all projects to receive equal attention. This also relieves the strain of monthly meetings from school districts, especially as they wait for buses to be delivered and fewer updates occur. This reporting ensures all districts can share what is happening in their electrification process.

Funding Breakdown

Starting with the 2023 round, ESB Fund awards 75% of funds upfront and the final 25% upon project completion. This encourages participation in quarterly reporting, regular communication and mirrors PGE's Drive Change Fund.

Qualified Chargers

At the beginning of the ESB Fund, there was not yet a published list of qualified chargers for PGE's grant programs, which caused delays in the ability to order chargers when school districts were ready. Since then, PGE has established a continually updated list of qualified Level 2 and DC Fast Chargers, that is accessible on PGE's website.⁵

7. Looking Forward

The ESB Fund will evolve to meet the growing needs of its applicants as PGE receives more ESB Fund applicants each year and electric vehicle technology moves forward. To support this evolution, PGE staff will consider incorporating changes to the ESB Fund based on input from awardees and other stakeholders. A few examples are below.

7.1 Peer Mentor Program

PGE believes it is important to provide opportunities for continuous learning for grant awardees. Connecting awardees at various project stages can help districts learn from one another's successes and mistakes, especially as more districts apply. Larger districts have voiced encouragement for this, offering to be mentors for interested applicants and first-time awardees. Semi-annual connections between awardees can provide a space for districts to share information, tips, tricks, and lessons learned.

7.2 Vehicle to Grid

Vehicle to grid, also known as V2G or V2X, is an emerging technology that aims to put large batteries (such as those found in electric school buses) to use when they are sitting idle. The idea is that in times of need, an electric vehicle could provide power back to a building (V2B) or the grid, instead of the other way around. This could be used as a resiliency source during outages to provide power to community resource centers, or more regularly to support the grid during peak use times. This technology is new

and is still far from being widely available and ready for use. Districts are interested in its future potential. “I could definitely see us in a situation where we need to use our buses as a power source,” said Gomes. PGE is testing V2G through a previous ESB Fund award at West-Linn Wilsonville School District’s bus depot. This demonstration will provide valuable information on how this technology might benefit school districts and the grid.

7.3 Retrofitting and Repowering Buses

As electric school bus technology develops and demand for these buses increases, retrofitting diesel buses to electric buses has become a potential cost-effective option that can also help address long lead times associated with new electric buses. The most frustrating part of the electrification process for many districts is how long it takes for them to receive their buses. Though this is out of PGE’s control, it is still a difficulty faced by districts and can be a deterring factor from the program for districts that may not be able afford to wait that long for a bus. Beaverton School District is currently partnering with Forth, a nonprofit focused on making transportation electrification more accessible and equitable, to pilot the repowering of one of their older buses. “We received a federal grant to replace the diesel motor with an electric motor and they came to us because of what we’re doing,” said Beaver. “I’m giving them a 2008 diesel plus, which would otherwise have to be scrapped and they’re converting it to an electric platform.” Additionally, lower costs for refurbished buses means more buses could be electrified for less than the cost of a new electric bus.

7.4 Changing Requirements Depending on District Size and Experience

To better aid smaller districts and first-time applicants, PGE has discussed potentially limiting the number of buses or successive rounds of awards districts can receive. This can help new districts receive buses. Additionally, changing the requirements for larger districts and repeat awardees by requiring things like managed charging could improve the program. “We are excited to support the rural areas of our service area and help smaller school districts who haven’t started their electrification journey,” said Riva.

8. Conclusion

PGE’s Electric School Bus Fund led to the first of many electric school buses in Oregon and has increased the momentum of electric school bus adoption in the region. As climate goals grow more ambitious and demand for electric school buses increase, it is critical this program evolves to suit the ever-changing needs of the communities served by both the districts and PGE. By sharing the early wins, lessons learned, and opportunities for the future in this report, PGE aims to help more districts and partners successfully electrify school buses in Oregon.

9. Sources

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