Don't Miss the Bus: Including School Bus Electrification in State Implement Plans under the Clean Air Act

To: Edison Electric Institute (EEI)
From: Kristi M. Smith, Smith Environmental Law
Date: September 13, 2022

Shared with the Permission of EEI

After a relatively slow start, several recent events should lead to many more students in the United States riding electric school buses – and breathing cleaner air – in the coming years. The Infrastructure Investment and Jobs Act passed in 2021 included a large incentive for school bus electrification, providing $5 billion over five years for the replacement of existing diesel school buses with lower emitting options, with at least half of that funding specifically designated for zero emission buses such as electric buses.[1] EPA is expected to issue its first awards under the program later this year, and the Agency is prioritizing zero emission electric school buses for funding in each state.[2] Likewise, the recently passed Inflation Reduction Act includes included school buses as eligible vehicles in the $1 billion program to electrify medium and heavy duty commercial vehicles.[3] In addition, many states receiving settlement funds from the emissions fraud case against Volkswagen have decided to designate significant portions of those funds to school bus electrification projects.[4] Other states have proposed to fund specific programs to bring more electric school buses to their communities.[5] And some electric companies, including EEI members, are partnering with school districts to bring more electric school buses to students and school districts in their service areas.[6]

Many of these programs focus on the health benefits to school children that come from riding cleaner vehicles to school and the positive climate impacts of school bus electrification. Traditional diesel buses produce a wide variety of pollutants that can negatively impact the developing brains and bodies of the children riding those buses, and transitioning the U.S. school bus fleet to electric could also reduce greenhouse gas emissions by millions of tons each year.[7] However, there is another benefit of school bus electrification that is often overlooked – overall improvement in the ambient air quality of the areas served by these buses. Replacing existing diesel school buses with electric models can result in improved air quality, and some of those pollution reductions may be used to fulfill state air planning requirements under the Clean Air Act (CAA or Act), especially in areas designated as having poor air quality. As school bus electrification efforts increase across the country, school districts, communities, and air planning officials should be aware of the air quality improvements these buses can bring and coordinate with one another to ensure these potential benefits can be maximized. As explained below, state and local air agencies should be able to help quantify the specific

emissions reductions resulting from a well-designed school bus electrification program and may be able to use those reductions to improve local air quality and meet certain CAA requirements.

This paper examines the available opportunities to include electric school bus programs in State Implementation Plans (SIPs) required under the Act.[8] It explains the role of SIPs in attaining and maintaining air quality standards and how the emission benefits of electric school bus programs could be utilized to fulfill SIP requirements. It identifies the types of SIPs that could include the emission reductions attributable to electric school buses, summarizes prior SIP actions that relied upon school bus emission reduction programs, and discusses relevant EPA guidance, while recognizing some unique qualities of school bus electrification that may require additional EPA guidance and input. Finally, it highlights upcoming opportunities to include emission reductions from such programs in SIPs that communities and air agencies can consider when designing their school bus electrification programs.

Overview of Clean Air Act SIP Requirements for Ambient Air Quality

Ambient air quality in the United States is measured under the Clean Air Act through national ambient air quality standards (NAAQS). The Act requires the Environmental Protection Agency (EPA) to set NAAQS for certain pollutants and then designate air quality in every area of the country as meeting or not meetings those standards.[9] States are then responsible for attaining, maintaining, and enforcing the NAAQS within their borders through state implementation plans, or SIPs, which are collections of state-specific laws and regulations addressing air pollution.[10] While some basic SIP requirements are the same for all states, the specific requirements that a state must fulfill in its SIP depend primarily on whether its air quality has been designated as NAAQS attainment (*i.e.*, meeting) or nonattainment (*i.e.*, not meeting).[11]

The CAA sets specific deadlines for nonattainment areas to attain the NAAQS and requires states with these nonattainment areas to submit SIPs detailing how they will improve air quality in those areas.[12] SIPs in these nonattainment areas are generally required to include a variety of rules and programs to control emissions of NAAQS pollutants (and their precursors) and to provide air quality modeling showing that those controls will lead to NAAQS attainment in the area by the required deadline. EPA then determines whether each SIP meets the requirements of the Act and, after collecting resulting air quality data, whether each nonattainment area attained the NAAQS by those deadlines.[13]

Ongoing SIP obligations depend on that resulting air quality. Areas that attain the NAAQS can submit a SIP with the requirements necessary to maintain that good air quality and be redesignated to attainment; areas that do not attain the NAAQS must submit a new SIP with additional pollution controls to attain the standard.[14] Accordingly, under the CAA, there are a number of different types of SIPs that states may develop to attain, maintain, and enforce the NAAQS – general SIPs to address pollution throughout a state, attainment planning SIPs to improve air quality in nonattainment areas not meeting the NAAQS, and maintenance plan SIPs to ensure that improved air quality will continue in former nonattainment areas.[15] As explained

below, replacement of older school buses with zero-emission electric school buses will result in emission reductions that could potentially be used to address many CAA SIP requirements.

History of Relying on Reductions in School Bus Emissions to Improve Ambient Air Quality

Many school buses are powered with diesel engines that produce emissions that can raise ozone and particulate matter (PM) NAAQS pollution levels, as well as other toxic and climate-damaging emissions. For more than 15 years, EPA has awarded rebates to school districts to help replace older diesel school buses or retro-fit those buses with newer engines, recognizing that the use of newer, lower-emitting buses and engines will reduce pollution inside and outside buses.[16] While it does not appear EPA has taken action on a SIP including emission reductions from an electric school bus program, there is an established history of EPA approving SIPs that include emission reductions from the retrofit or replacement of older diesel school buses with lower-emitting diesel options. Given the complexity of the SIP program, these school bus programs have been identified in several different types of SIPs to meet a variety of CAA requirements. For example:

- In 2010, EPA approved inclusion of the Texas Clean School Bus Program as a general emission reduction measure in the state's **general SIP**. The Texas Clean School Bus Program was an economic incentive program that combined federal, state, and local funds to retrofit more than 7,000 and replace more than 700 older diesel school buses in the state, focusing on buses that would transport students in and near ozone nonattainment areas. [17]

- In 2010, EPA approved inclusion of the School Bus Fleets Rule as a specific NOx control requirement in the **ozone attainment planning SIP** for San Joaquin Valley, California. The rule required replacement or retrofit of all school buses operating in the area that were manufactured before 1978.[18]

- In 2018, EPA approved the **PM2.5 attainment planning SIP** for Oakridge, Oregon, that included a school bus diesel retrofit program in a suite of measures to fulfill the CAA's reasonably available control measure requirement.[19]

- In 2007, EPA approved an **ozone maintenance plan SIP** in West Virginia that included a school bus diesel retrofit program to fulfill the contingency measure requirements of the CAA.[20]

- In 2021, EPA approved a revision to the existing **ozone maintenance plan SIP** for Atlanta, Georgia that removed some existing control measures by relying on equivalent emissions reductions resulting from a program to replace 85 older school buses with 2018 models.[21]

As replacement of existing diesel school buses with electric models would also lead to decreases in ozone and PM pollution, especially in areas with older buses or relatively high

levels of bus traffic, there is a similar opportunity to include electric bus programs in SIPs and rely on their emission reductions to fulfill CAA obligations.

Considerations for Including Electric School Bus Programs in SIPs

EPA does not appear to have specifically addressed how the replacement of diesel school buses with electric models should be accounted for in SIPs, but the approved SIPs including diesel school bus retrofit and replacement programs described above provide a useful template for inclusion of school bus electrification programs in SIPs. In addition to these specific SIP actions, EPA has also issued guidance to assist states in quantifying emission reductions from diesel retrofit and replacement programs and including them in SIPs.[22] This guidance explains how state air quality planners can use the EPA's MOVES model to quantify the emissions reductions that would occur from such programs.[23] For a state to include the resulting emission reductions in a SIP, they must be creditable, which EPA has defined as being:

1) Quantifiable – measured in a reliable manner that can be replicated,
2) surplus – not already relied upon to meet CAA emission reduction requirements in that SIP,
3) federally enforceable – EPA, the state, or citizens must be able to bring action against specific parties if the emission reductions do not occur), and
4) permanent – emissions must be controlled throughout the period covered by the relevant SIP.[24]

Each element of the creditability demonstration and modeling analysis require specific information, and such information can be built into the design and implementation of a successful diesel school bus replacement project if its designers are aware of the need for it.

EPA has also issued guidance to help states determine the most cost-effective emission reductions from energy efficiency and renewable energy programs and how to incorporate such programs in SIPs.[25] While school bus electrification is not directly addressed in this guidance, it may also be helpful in designing programs that meet SIP inclusion requirements. For example, its planning flowcharts and suggested emission reduction analyses could be helpful in designing the specific elements of a school bus electrification project to maximize air quality impacts, such as comparing various bus model, battery, and charging implementation scenarios or assessing different funding opportunities. State and local air agencies should have the technical information and expertise needed to model and quantify potential emission reductions from an electric school bus program, and they are best equipped to understand the analysis and documentation needed to include such a program in a SIP. Involvement of state and local air agencies in school bus electrification programs should help maximize the ambient air benefits of such programs and utilize them to fulfill CAA SIP requirements, as necessary.

While school districts, legislatures, power companies, and other proponents of school bus electrification programs may design their specific programs with an eye toward their particular health and/or climate goals, designing and implementing programs that result in creditable

emission reductions is essential for relying on those reductions in state and local air planning.[26] For example, designing a electrification program with specific information on the quantity, type, and schedule for bus replacement will be important to quantifying the emissions, while including appropriate implementation mechanisms will likely be necessary to demonstrate its enforceability. Inclusion of an electric school bus program in a SIP also means that the program must be carried out – if a SIP relies on the projected emission reductions from the program, but the program proponents do not adequately fund or implement it, the state would likely have to revise its SIP to control emissions from other sources, a time-consuming process that states want to avoid.[27] Involving air planning experts in school bus electrification efforts can maximize the health, climate, *and* air quality benefits of these programs.

In addition to including state and local air planning experts in school bus electrification projects, it may also be necessary to seek assistance from EPA experts. While the EPA guidance and SIP actions described above should provide a good starting point for developing an electric school bus program that can be incorporated in a SIP, unique aspects of school bus electrification likely means that adjustments to this guidance and the underlying analyses will be needed when including their emissions reductions in SIPs. For example, EPA's diesel retrofit and replacement guidance specifies that states may only take credit for emission reductions occurring between the time of the replacement/retrofit project and the remaining useful life of the existing bus, since the MOVES model already assumes that school buses will be replaced by new, lower-emitting diesel buses at the end of their useful life as a part of normal fleet turnover.[28] However, electric school buses will result in lower emissions than both the existing buses they replace *and* the new diesel buses that would normally be used after fleet turnover. Likewise, school bus electrification projects in different areas could include a variety of different funding sources (grants, direct funding, partnerships, etc.) and responsible parties (state grant agencies, school districts, power companies, etc.), and EPA could help assess the impact of differing program designs on their enforceability under the Act.[29]

Discussing these and other factors unique to electric school bus programs with EPA should help ensure their inclusion in SIPs can be approved as easily as possible, and state and local air planning experts will be in the best position to reach out to the appropriate experts in the EPA Regional and Headquarters offices. Given the variety of SIPs that could include emissions reductions from electric school bus programs and the specific analyses and demonstrations required for SIP inclusion, including state and local air agencies in the development and/or implementation of such programs is an essential piece of ensuring that the air pollution benefits resulting from them are identified and utilized as efficiently as possible.

Upcoming SIP Obligations that May Benefit from Electric School Bus Projects

While the interest in and funding for electric school bus programs appears to be increasing throughout the country, different areas will have different CAA obligations that could impact whether and how the emission reductions from electrification are included in SIPs. As noted above, the national ozone and PM air quality standards are most impacted by emissions from diesel school buses. EPA is under a statutory obligation to determine whether areas across the

country currently classified as nonattainment for the ozone and PM NAAQS are meeting those standards, and the Agency is likely to make those decisions soon.[30] As explained previously, if EPA determines that any areas are still not attaining the relevant ozone and PM NAAQS, the Act requires those nonattainment areas to develop new attainment planning SIPs, often with additional and more stringent emission control requirements.[31] If electric school bus programs are implemented in such areas, the resulting emission reductions might be included in the state's plan to attain the NAAQS. On the other hand, if EPA determines that certain areas have attained the ozone or PM NAAQS, the state may be able to request redesignation to attainment and include a school bus electrification program in its maintenance plan SIP to show that improved air quality will continue based, in part, on the on-going emission reductions resulting from that program,[32] or include expansion of the program as a contingency measure if air quality deteriorated.[33]

Even states without current or upcoming CAA requirements to include additional emission reductions in their SIPs may benefit from inclusion of school bus electrification programs in their air plans. For example, states with existing nonattainment areas could consider the option of including the programs in their general SIP now and taking credit for those reductions in a future SIP. EPA has recognized that this approach can allow for development and inclusion of an emission reduction program in a SIP when there is adequate interest and funding, even if the reductions will not be relied upon until some future period.[34] And given EPA's continual obligation to review and update NAAQS levels, all states may be able to benefit from electric school bus programs that reduce ozone and PM pollution and thus potentially avoid nonattainment designations – and their resulting SIP control requirements – in the future.[35]

Conclusion

Regardless of whether electric school bus programs are included in SIPs, their resulting emission reductions are real and will benefit the health of the children riding in those buses and the communities in which they operate, while also addressing climate change. Mindful deployment of these programs can also help address the disparate racial and economic impacts of higher-emitting diesel buses and air pollution generally.[36] Highlighting the real and immediate impacts on ambient air quality of electric school bus programs may also increase interest in and funding for such programs, especially if the programs have the additional benefit of fulfilling Clean Air Act requirements. As electric school bus programs increase throughout the country, school districts, communities, and air planning officials should work together to maximize the air quality benefits of these programs while also addressing Clean Air Act requirements as needed.

Endnotes

[1] Public Law 117-58 (Nov. 15, 2021) at Title XI, *Clean School Buses and Ferries* (https://www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf).
[2] EPA Clean School Bus Funding (https://www.epa.gov/cleanschoolbus/school-bus-rebates-clean-school-bus-program); 2022 Clean School Bus (CSB) Rebates Program Guide (EPA-420-22-025; May 2022) (https://www.epa.gov/system/files/documents/2022-05/420b22025.pdf).
[3] Public Law 117-169 (Aug. 16, 2022) at Title VI (https://www.congress.gov/117/bills/hr5376/BILLS-117hr5376enr.pdf).
[4] See, for example, Connecticut ($12.7 Million for electric School Buses; https://portal.ct.gov/DEEP/News-Releases/News-Releases---2021/DEEP-Announces-Award-of-over-12M-in-VW-Settlement-For-43-Electric-School-Buses-in-EJ-Communities), Illinois (Up to $9 Million for electric school buses; https://www2.illinois.gov/epa/topics/air-quality/driving-a-cleaner-illinois/Pages/default.aspx).
[5] See, for example, New York (requiring a fully electric school bus fleet by 2035, financed with a pending $500 Million bond measure; https://www.timesunion.com/news/article/New-York-schools-have-five-years-to-begin-17072485.php); Colorado (proposed budget of $150 million for electric school buses; https://www.denverpost.com/2021/11/05/gov-polis-budget-proposal-includes-millions-for-electric-school-buses-air-quality-monitoring-green-buildings/), California ($130 million for zero-emitting school buses in rural areas; https://californiahvip.org/news/hvip-fy21-22-policy-changes-11-22-2021/).
[6] See, for example, Dominion Energy (https://www.dominionenergy.com/our-stories/electric-school-buses); PGE (https://portlandgeneral.com/energy-choices/electric-vehicles-charging/pge-electric-school-bus-fund).
[7] https://www.epa.gov/cleanschoolbus and https://electricschoolbuses4kids.org/our-work/.
[8] While this paper focuses on the incorporation of emissions reductions from electric school bus programs into SIPs, similar approaches could be used for electrification of public transit buses.
[9] CAA §§ 109 and 107, respectively.
[10] This paper uses the general terms "state" and "air agency" to refer to the state, local, and/or tribal authorities responsible for carrying out CAA-related duties in a particular area.
[11] Compare CAA § 110 (including general SIP requirements applicable to all areas) with CAA §§ 171-192 (providing specific SIP requirements for NAAQS nonattainment areas).
[12] CAA §§ 171-192.
[13] See https://www.epa.gov/criteria-air-pollutants/how-epa-works-states-sips.
[14] CAA §§ 107(d)(3) (redesignation), 175A (maintenance plans), and 179 (consequences of failure to attain).
[15] While CAA § 110(a)(2)(D)(i)(I) requires states to submit "good neighbor" SIPs with any controls necessary to ensure that emissions from sources within it do not impact NAAQS attainment in other states, these "good neighbor" plans are not included in this paper as historically their requirements have not been met using controls to reduce emissions from mobile sources. See, generally, EPA's Cross-State Air Pollution Rules from 2011 (76 Fed. Reg. 48208), 2016 (81 Fed. Reg. 74504), and 2021 (86 Fed. Reg. 23054), all of which only addressed emission controls for select stationary sources.
[16] See, generally, https://www.epa.gov/dera.
[17] 75 Fed. Reg. 18061 (4/9/10).
[18] 75 Fed. Reg. 10420 (3/8/10); see also 75 Fed. Reg. 17863 (4/8/10; approving inclusion of the Brandywine School Districts Clean School Bus USA grant in the ozone attainment planning SIP for Delaware).
[19] 83 Fed. Reg. 5537 (2/8/18); see proposed rule at 82 Fed. Reg. 52683, 52693 (11/14/17) for bus program details.
[20] 72 Fed. Reg. 27060 (5/14/07); see proposed rule at 71 Fed. Reg. 57905, 57913 (10/2/06) for bus program details.
[21] 86 Fed. Reg. 13191 (3/8/21).
[22] *Diesel Retrofit and Replacement Projects: Quantifying and Using Their Emission Benefits in SIPs and Conformity* (EPA-420-B-18-017, March 2018; https://downloads.regulations.gov/EPA-R09-OAR-2019-0318-0061/content.pdf) (hereinafter, "2018 Guidance"). In addition to the CAA's SIP requirements, this guidance also addresses transportation plans and related transportation conformity determinations required under the CAA for certain areas. These transportation plans do not undergo the formal EPA approval process required for SIP finalization, so

it is difficult to assess exactly how many such plans may have included emission reductions from school bus retrofit or replacement measures. While use of electric school bus emission reductions in transportation plans is not discussed in this paper, the 2018 guidance addresses use of diesel retrofit and replacement programs in such plans, and states may also be able to rely upon emission reductions from electric school bus programs in their transportation planning process.

[23] 2018 Guidance at 14-19.

[24] 2018 Guidance at 27-29.

[25] *Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State and Tribal Implementation Plans* (EPA-456/D-12-001a, July 2012; https://www.epa.gov/sites/default/files/2017-06/documents/eeremanual_0_0.pdf).

[26] For example, EPA only approved inclusion of the Texas Clean School Bus Program in the SIP after the state provided a detailed analysis showing that the emission reductions from the program were creditable (i.e., quantifiable, permanent, enforceable, and surplus). 75 Fed. Reg. at 18063.

[27] After EPA approved an ozone attainment planning SIP for Colorado Springs that included emission reductions from a Clean [Transit] Bus Acquisition Program (48 Fed. Reg. 55284, 12/12/83), the state could not acquire the necessary funding to finalize the program and had to submit a SIP revision substituting other emissions reductions for the bus program (64 Fed. Reg. 17102, 4/8/19).

[28] 2018 guidance at 20, 28.

[29] For example, EPA advises that given potential federal and state restrictions on requirements to replace vehicles, air agencies should consult with EPA "before commencing any state or local legal mechanisms (e.g. regulations, programs, contracts, etc.) that require" such programs in SIPs. 2018 guidance at 12.

[30] See Proposed Determinations of Attainment for 2008 ozone NAAQS Moderate nonattainment areas (87 Fed. Reg. 21825, 4/13/22), Proposed Determinations of Attainment for 2015 ozone NAAQS Marginal nonattainment areas (87 Fed. Reg. 21842, 4/13/22), and Fine Particulate NAAQS Implementation Milestones (https://www.epa.gov/pm-pollution/fine-particulate-naaqs-implementation-milestones; noting the December 2021 attainment date for 2012 PM2.5 NAAQS Moderate nonattainment areas).

[31] See, generally, CAA §§ 181-182 (SIP requirements for ozone nonattainment areas) and 188-89 (SIP requirements for PM nonattainment areas).

[32] CAA §§ 107(d)(3) and 175A; see also 78 Fed. Reg. 44494, 44508 (7/24/13) (explaining that EPA's proposed approval of a redesignation request and accompanying maintenance plan for Sacramento, California, is based on part on continued emission reductions from "cleaner fuels, tighter emission standards, and fleet turnover in the mobile source sector").

[33] See footnote 19 and accompanying text, *supra*, discussing 2007 West Virginia maintenance plan SIP approval.

[34] 2018 Guidance at 31; see also footnote 16 and accompanying text, *supra*, discussing 2010 Texas general SIP approval.

[35] See, for example, the EPA Advance Program (https://www.epa.gov/advance/benefits), which helps states take actions to address ozone and PM pollution in attainment areas, noting that the "[c]ost of remaining in attainment is less than cost of meeting nonattainment/maintenance area requirements."

[36] Research shows that low-income students are more likely to ride the bus to school (https://www.bts.gov/topics/passenger-travel/back-school-2019), and that racially and economically disadvantaged communities are more likely to live in areas with poor ambient air quality (https://www.lung.org/blog/environmental-justice-air-pollution).