Electric Buses and Clean Energy Financing: How Transit Authorities Can Leverage State and Federal Funds to Buy More Zero-Emission Buses

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ABSTRACT

The transportation sector is now the leading emitter of greenhouse gases ("GHGs") in the United States, emitting more GHGs than the power sector. In order to reach greenhouse gas emission reduction goals to mitigate the effects of climate change, transit authorities must transition to zero-emission vehicle ("ZEV") bus fleets. The average life span of a diesel bus is twelve years; therefore, it is imperative that transit authorities act quickly and stop buying additional diesel buses. However, one significant barrier to shifting to ZEVs is the upfront cost. Although electric buses have or will soon reach cost parity with their diesel counterparts over time, they are more expensive to purchase. Currently, many states are using limited federal funding and the VW Settlement Fund, but those are finite resources that are already spread too thin. This Note argues that transit authorities should consider a Pay-As-You Save ("PAYS") financing structure to cover the initial increased cost. Through PAYS, electric companies bear the additional upfront cost in purchasing electric buses and charge the transit authorities a fixed tariff on their electric bill. Utilities supply the additional electricity to power the buses and PAYS will allow transit authorities to leverage the limited public funds, so they can buy more electric buses. This will allow them to transition to a zero-emission fleet faster.

This Note examines the VW Consent Decree, a selection of state VW Mitigation Beneficiary Plans, as well as the Low-No Emissions federal grant, none of which pose a legal barrier for leveraging VW funds through PAYS. Although there is additional coordination to set up PAYS and there is more administration than simply using federal grants or VW funding, PAYS financing will allow transit authorities to scale their bus electrification while we are running out of time to prevent meaningful effects of climate change.

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INTRODUCTION

As the effects of climate change are beginning to be felt around the world and a recent Intergovernmental Panel on Climate Change ("IPCC") Report warns of the effects of a mere 1.5°C rise in average temperature, mitigating greenhouse gas emissions is becoming more urgent.[1] Transportation is now the largest source of greenhouse gas emissions in the United States.[2] Although more than half of these emissions come from passenger cars and light duty vehicles,[3] electrifying public transit buses is a necessary step for cities and states to reach their GHG emission reduction goals.[4] As electric buses are approximately 40% more expensive than traditional diesel buses, transit authorities rely on the Volkswagen

1. IPCC, SPECIAL REPORT ON GLOBAL WARMING OF 1.5°C 175–312 (2018), https://perma.cc/7T5L-76DL.

2. Vicki Arroyo, Kathryn Zyla & Gabe Pacyniak, *New Strategies for Reducing Transportation Emissions and Preparing for Climate Impacts*, 44 FORDHAM URB. L.J. 919, 920 (2017); *Sources of Greenhouse Gas Emissions*, U.S. ENVTL. PROT. AGENCY, https://perma.cc/T9KJ-58XR (last updated Sept. 13, 2019).

3. *Sources of Greenhouse Gas Emissions*, *supra* note 2.

4. N.Y. DEP'T OF ENVTL. CONSERVATION, N.Y. STATE BENEFICIARY MITIGATION PLAN 6 (2018); DEP'T OF ENVTL. MGMT. R.I. OFF. OF AIR RESOURCES, BENEFICIARY MITIGATION PLAN VOLKSWAGEN ENVIRONMENTAL MITIGATION TRUST AGREEMENT 3 (2018).

("VW") Settlement Trust and federal grants such as the Low-No Emissions grant to pay this upfront cost differential.

In 2016 and 2017, the Environmental Protection Agency ("EPA") and VW signed three partial consent decrees after EPA discovered that VW had secretly installed defeat devices designed to thwart emissions regulations by changing vehicle performance in order to pass emissions tests.[5] The consent decrees established a $2.925 billion Environmental Mitigation Trust ("Mitigation Trust"), which provides funds to all fifty states, the District of Columbia, Puerto Rico, and federally recognized tribes to counter the excess emissions.[6] The primary goal of the plan is to "improve ambient air quality by using the Trust allocation to implement projects that reduce NOx, benefit disproportionately affected communities, and expedite deployment and widespread adoption of zero emission vehicles."[7]

The VW settlement fund is only one source of funding available to state and local transit authorities to support efforts to reduce transit fleet emissions. In 2012, Congress passed the Low-No Emissions Vehicle Deployment Program ("Low-No Program") to fund zero-emission and low-emission buses and charging infrastructure.[8] Unlike the VW Consent Decree ("Consent Decree"), which focuses on lowering NOx emissions in a variety of transportation sectors,[9] the Low-No Program funds only transit buses and supporting expenses.[10] In addition, although funds from the VW Trust can be used to replace old diesel buses with new diesel buses, the Low-No Emissions grant only provides funding to State and local authorities to purchase or lease zero or low emissions buses and supporting facilities.[11] The competitive grant is operated by the Federal Transit Authority ("FTA").

Clean Energy Financing, such as Pay As You Save ("PAYS"), allows transit authorities to leverage limited public funds to support the transition to an electric bus fleet.[12] This clean energy financing is an opportunity to leverage limited public funds to accelerate investment in clean energy solutions.

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5. Partial Consent Decree, In re: Volkswagen. "Clean Diesel" Mktg., Sales Practices, and Prods. Liab. Litig.3:15-md-02672-CRB (N.D. Cal. June 28, 2016), ECF No. 1605.

6. United States' Notice of Filing of Trust Agreements Attachment A, app. D-1B at 49, United States v. Volkswagen AG et al, No. 3:16-cv-00295 (N.D. Cal. Oct. 2, 2017) ECF No. 51-1.

7. Press Release, Office of N.J. Governor Phil Murphy, ICYMI: N.J. Moving Forward with Plans to Improve Air Quality Using Volkswagen Settlement Funds (Oct. 5, 2018), https://perma.cc/C6SE-YU6L.

8. *Low or No Emission Vehicle Program – 5339(c)*, FED. TRANSIT ADMIN., https://perma.cc/32G2-SEDK (last visited Sept. 27, 2019).

9. Eligible Mitigation Actions in the VW Consent Decree are eligible large trucks, eligible buses, freight switchers, ferries/tugs, ocean going vessels shorepower, local freight trucks, airport ground support equipment, forklifts and port cargo handling equipment, and light duty zero emission vehicle supply equipment. Passenger vehicles are not eligible.

10. *Low or No Emission Vehicle Program – 5339(c)*, *supra* note 8.

11. Partial Consent Decree, *supra* note 5 at app. D-2; *Low or No Emission Vehicle Program – 5339(c)*, *supra* note 8.

12. *Pay As You Save for Clean Transport*, CLEAN ENERGY WORKS, https://perma.cc/D7PC-3G6H (last visited Sept. 27, 2019).

After analyzing a number of State Volkswagen Beneficiary Mitigation Plans as well as the FTA's Low-No Emissions Vehicle Program, this Note finds that there is no legal barrier to using PAYS financing in conjunction with these funds; however, states and the FTA are neither encouraging nor incentivizing transit authorities to leverage these limited grants, which might be a missed opportunity to effectively scale electric bus fleets.

I. OPPORTUNITIES FOR CLEAN ENERGY FINANCING OF ELECTRIC BUSES

Electrifying buses will improve air quality, reducing the effects of climate change and improving human health. One of the primary barriers preventing transit authorities from switching to electric fleets is the upfront cost. Clean energy financing, such as PAYS, can leverage limited government funds, allowing transit authorities to use the VW Settlement Fund to buy more buses.

A. BENEFITS OF SWITCHING TO ELECTRIC BUSES

There are many public policy reasons for transit authorities to switch to electric buses. First, fewer carbon emissions mitigate the effects of climate change. Although the amount of GHG reduction is tied to the electricity grid that powers buses, regardless of the how the energy is generated, battery electric buses still have lower GHG emissions compared to diesel or natural gas buses throughout the US.[13] For instance, Virginia estimates that electric vehicles produce 70% fewer carbon emissions than their diesel powered counterparts and New York estimates an almost 80% CO_2 emission reduction.[14] The U.S. Department of Transportation estimates that over the standard twelve-year lifespan, a zero-emission bus is able to eliminate approximately 1690 tons of CO_2 compared to a diesel bus, which is the equivalent of taking approximately twenty-seven cars off the road.[15] Second, fewer particulate emissions means cleaner air, especially in urban areas where there is typically more congestion and higher levels of air pollution. Cleaner air benefits human health, and electric buses eliminate approximately ten tons of nitrogen oxides and 350 pounds of diesel particulate matter over their typical twelve-year lifespan.[16] EPA estimates that there is a $150,000 health benefit to the populace of New York City from the reduction of respiratory and other diseases, for every diesel bus that is replaced by an electric bus.[17] Third, electric

13. Jimmy O'Dea, *Electric vs. Diesel vs. Natural Gas: Which Bus is Best for the Climate?*, [BLOG] UNION OF CONCERNED SCIENTISTS (July 19, 2018, 1:05 PM), https://perma.cc/NY5M-6EF2.

14. Press Release, Va. Governor Ralph S. Northam, Governor Northam Announces Virginia Investment in Electric Transit (Oct. 31, 2018), https://perma.cc/9MEN-UH8K; N.Y. DEP'T OF ENVTL. CONSERVATION, *supra* note 4, at 25.

15. U.S. DEP'T OF TRANSP., BENEFITS OF ZERO EMISSION BUSES, https://perma.cc/M54Y-YU63 (last visited Sept. 27, 2019). Again, the exact amount is dependent on the energy source for the electricity grid.

16. *Id.*

17. JUDAH ABER, N.Y.C. TRANSIT & COLUMBIA UNIV., ELECTRIC BUS ANALYSIS FOR NEW YORK CITY TRANSIT 5 (2016), https://perma.cc/BGF3-TFAF.

buses run quieter than conventional buses, so they reduce noise pollution in the areas they service.[18] Fourth, jobs are created to support the technology needs and manufacturing of these new engines and buses.[19] Finally, electric buses have the lowest ownership and maintenance costs of any bus.[20] This results in significant annual savings for combined fuel cost (diesel vs. electricity) and bus maintenance. The United States National Renewable Energy Laboratory estimates that electric buses are five to seven times more fuel efficient than diesel buses over the same route.[21] Furthermore, there are fewer moving pieces in electric engines, which decreases maintenance costs.[22] A study by Carnegie-Mellon found that electric buses reduce maintenance and ownership costs by 17–23% compared to diesel buses.[23] Although it is difficult to calculate the exact savings, Clean Energy Works analysis shows that electric bus manufacturers have already reached cost parity in key markets.[24] New York estimates $39,000 savings annually, or $468,000 savings over a 12-year life of an electric transit bus.[25] However, Bloomberg estimates up-front parity between electric buses and diesel buses will probably not come until 2030, although increased demand could expedite that timeline.[26] Regardless of the precise numbers, as battery prices continue to drop, the savings spread over the lifetime of the bus will likely more than offset the initial higher price.

B. BARRIERS TO SWITCHING TO ELECTRIC BUSES

Because many transit authorities are operating in economically constrained environments, the upfront cost premium is a barrier to buying new electric buses to replace twelve-year-old diesel buses, much less retiring diesel buses early and replacing them with electric vehicles. It is approximately 40% or $300,000 more expensive to buy an electric bus than a traditional diesel bus.[27] The cost for an electric bus ranges from approximately $700,000 to $800,000, while the cost of a

18. N.Y. DEP'T OF ENVTL. CONSERVATION, *supra* note 4, at 15.

19. U.S. DEP'T OF TRANSP., *supra* note 15.

20. U.S. DEP'T OF TRANSP., *supra* note 15.

21. LESLIE EUDY & MATTHEW POST, DEP'T OF ENERGY, NAT'L RENEWABLE ENERGY LAB., FUEL CELL BUSES IN U.S. TRANSIT FLEETS: CURRENT STATUS 2017 vi (2017), https://perma.cc/GRW5-9SUB.

22. N.Y. DEP'T OF ENVTL. CONSERVATION, *supra* note 4, at 15.

23. WILTON E. SCOTT INST. FOR ENERGY INNOVATION, CARNEGIE MELLON UNIV., POLICY MAKER GUIDE: WHICH ALTERNATIVE FUEL TECHNOLOGY IS BEST FOR TRANSIT BUSES? 18–20 (2017) https://perma.cc/QN4K-6C42.

24. *Tariffed On-Bill Finance to Accelerate Clean Transit*, CLEAN ENERGY WORKS, https://perma.cc/4XFG-HEVV.

25. N.Y. DEP'T OF ENVTL. CONSERVATION, *supra* note 4, at 15.

26. *Electric Buses in Cities: Driving Towards Cleaner Air and Lower CO_2*, BLOOMBERG NEW ENERGY FINANCE 1 (Mar. 29, 2018), https://perma.cc/R2LS-42BW.

27. *Id*. at 30–39.

new diesel bus can vary from $450,000 to $550,000.[28] Like personal vehicles, plush interiors and additional features including GPS can increase the price.[29] However, because the batteries are becoming less expensive to produce, the price of electric buses continues to fall.[30]

Currently, transit authorities are primarily relying on grants for the upfront cost differential; however, grant funding is not a predictable long-term strategy for achieving GHG reduction goals.[31] The Low-No Emissions Federal Grant supports transit authorities switching their bus fleets to electric, but in FY 2019, it funded only one-third of projects and provided only 15% of the total amount requested.[32] The Low-No Emissions Grant will again provide $85 million in competitive grants during FY 2020 to support the nation's transit fleet shift to electric,[33] which is still unlikely to meet current demands. Many states are also using VW Settlement funds to electrify their transit bus fleets. This money can be used for a variety of projects that reduce NOx emissions in the transportation sector; it is not limited to transit buses.[34] Because of the limited funds, transit authorities should consider alternate finance mechanisms as opposed to relying solely on limited federal funding to pay for the increased upfront cost of electric buses. For governments that target transportation GHG emissions reduction goals in the next ten to fifteen years, the transition to electric buses must begin now because buses typically remain in circulation for twelve years.[35]

C. BENEFITS OF PAY-AS-YOU-SAVE FINANCING

Clean Energy Works is a nonprofit proposing a utility investment model called PAYS, to more efficiently use federal funds. Under this financing structure, electric companies bear the additional upfront cost in purchasing electric buses. The public transit authority repays the electric distribution utility ("utility") through a

28. MD. DEP'T OF THE ENV'T: MD. VOLKSWAGEN MITIGATION PLAN 17–19 (2019), https://perma.cc/F5U9-XRL9; N.C. DEP'T OF ENVTL. QUALITY DIV. OF AIR QUALITY: STATE OF N.C. VOLKSWAGEN MITIGATION PLAN 13 (2018), https://perma.cc/QG4H-EHPK.

29. ABER, *supra* note 17, at 14.

30. Kyle Field, *No Need to Wait: Electric Buses are Cost Competitive Today*, CLEAN TECHNICA (Apr. 29, 2018), https://perma.cc/FG3C-BHQ7.

31. In California, the Greenlining Institute, in partnership with tariffed on-bill financing experts at Clean Energy Works and multiple environmental justice, traditional environmental groups, and ratepayer advocates including the Union of Concerned Scientists, TURN, Green for All, Sierra Club, and others submitted a proposal to use $4M of PG&E's open solicitation for priority review projects to implement a pilot tariffed on-bill financing program for transit buses (Greenlining Institute, 2017). *See* Kelly Blynn, *Accelerating Bus Electrification: Enabling a sustainable transition to low carbon transportation systems* (Feb. 2018) (M.S. thesis, Massachusetts Institute of Technology), https://perma.cc/6LQE-RLYN.

32. FY 2019 Competitive Funding Opportunity: Low or No Emission Grant Program, 84 Fed. Reg. 55, 10564 (Mar. 21, 2019).

33. *Low or No Emission (Low-No) Program FY 2019 Notice of Funding*, FED. TRANSIT ADMIN., (Mar. 18, 2019), https://perma.cc/B67P-UZGS.

34. *VW Settlement Clearinghouse*, NASEO & NACAA, https://perma.cc/3A3Q-SGUY.

35. *PAYS for Clean Transport – Q&A*, CLEAN ENERGY WORKS, https://perma.cc/22AZ-YMT6.

fixed charge, or tariff, on its monthly bill, but the charge is less than the estimated savings from not buying diesel fuel.[36] Once the loan is paid off, including a low interest rate, the transit authority owns the bus. A PAYS transaction differs from traditional leasing because it does not impose additional liabilities on the transit authority's balance sheet. In addition, the utilities rely on disconnection for nonpayment as opposed to credit worthiness to ensure cost recovery.[37] The transit authority benefits because it spends the same amount up-front for the new bus, saves money over time, and promotes better air quality and health for the area. The utility sees expanded load growth as the transit authority uses more electricity to power the new buses.[38]

In Santiago, Chile, a PAYS investment for 100 buses reduced grant requirements by 97%. It leveraged more than $70 of investment for each dollar of grant funding. This generated $25 million in electricity sales revenue while eliminating 62,000 tons of CO_2 emissions.[39] Such a model allows limited government grants to have a greater impact, accelerating transit authorities' switch to an electric bus fleet and funding more grant applications. This will also potentially increase production for electric batteries and reduce their cost, which will lower the cost of not only electric buses, but all electric vehicles. This could make personal electric vehicles more accessible, thereby further reducing transportation sector GHG, NOx, SOx, and particulate emissions.

II. ELECTRIC TRANSIT BUSES IN THE VOLKSWAGEN SETTLEMENT

A review of the VW Consent Decree does not show any legal restriction preventing transit authorities from utilizing PAYS financing to leverage those funds. This Note examines a number of state beneficiary plans and finds that they neither prohibit nor incentivize (or even mention) using clean energy financing in conjunction with the VW Settlement Fund.

A. ELECTRIC BUSES IN THE CONSENT DECREE

The Consent Decree specifies that states can use part of this funding to electrify their public bus fleets.[40] Only transit buses engine model year 2009 and older can be replaced using these funds.[41] Then, those eligible buses must be scrapped.[42]

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36. *Id.*
37. *Id.*
38. *Pay As You Save for Clean Transport*, *supra* note 12.
39. *Pay As You Save for Clean Finance*, CLIMATE FIN. LAB, https://perma.cc/6HEH-LQUD.
40. U.S. ENVTL. PROT. AGENCY, THE VOLKSWAGEN (VW) SETTLEMENT: DERA OPTION, https://perma.cc/4J7Z-6LDY. The VW/EPA Consent Decree lays out how the fund can be used to finance buses in Appendix D-2 on Eligible Mitigation Actions and Mitigation Action Expenditures.
41. United States' Notice of Filing of Trust Agreements, *supra* note 6, at 54.
42. *See* U.S. ENVTL. PROT. AGENCY, THE DERA OPTION: ELIGIBLE MITIGATION ACTION #10 UNDER THE VOLKSWAGEN SETTLEMENT, APPENDIX D: FACTSHEET FOR STATES, DISTRICT OF COLUMBIA AND PUERTO RICO (2017), https://perma.cc/XT87-DEVV.

Governments may completely finance an electric engine, including installation of such an engine using VW funds. States may also fund up to 100% of the cost of a new all-electric bus, according to the Consent Decree. Additionally, they may fund 100% of the charging infrastructure associated with the new all-electric engine using the VW Fund, regardless of whether they are buying new buses or just replacing the engines. Because the stated goal is to reduce NOx emissions and not to reduce GHG emissions, up to 100% of new diesel engines or vehicles may also be funded by the VW Trust.[43] Newer diesel engines emit less NOx, but clean diesel does not exist. Diesel engines continue to spew GHGs as well as NOx and SOx.[44] The Consent Decree does not state a preference for electric over diesel; instead, it gives autonomy to the states and beneficiaries to decide.

Although the VW/EPA settlement agreement does not explicitly mention clean energy financing or leveraging government funds with a utility investment model, review of the Consent Decree's Appendix D did not identify any potential barriers to using clean energy financing to leverage settlement funding to attract additional investment.

B. THE DERA OPTION

The Consent Decree lists ten Eligible Mitigation Actions ("EMAs"). EMAs 1–9 involve equipment, for instance, replacing a diesel engine with an electric one in a freight truck, school bus, forklift, ferry, transit bus, etc.[45] Beneficiaries may also use VW funds as their non-federal voluntary match as required by the Diesel Emissions Reduction Act ("DERA") under the tenth EMA. Through DERA funding, the EPA provides grants and rebates to state agencies to reduce harmful emissions from diesel engines.[46] This allows beneficiaries to use VW Trust funds for projects not enumerated in EMAs 1–9.

Beneficiaries may split their Mitigation Trust funds between EMAs 1–9 and the DERA Option as they choose. The second EMA allows states to use up to 100% of the VW Fund to buy new electric buses. Under the DERA Option, transit authorities must contribute a higher percentage towards purchasing the electric bus, but they can be awarded additional EPA DERA funds. DERA funding is limited to 60% of an all-electric engine replacement.[47] DERA funding is limited to 25% if the government is replacing the vehicle with a cleaner diesel vehicle, and 45% if replacing with an all-electric vehicle.[48] DERA allows states to receive additional federal funding for electric buses outside of the VW Fund.

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43. Partial Consent Decree, *supra* note 5, at app. D-2.

44. Taras Grenscoe, *The Dirty Truth About Clean Diesel*, N.Y TIMES (Jan. 2, 2016), https://perma.cc/NV2P-UFST.

45. Partial Consent Decree, *supra* note 5, at app. D-2.

46. *Clean Diesel and DERA Funding*, EPA, https://perma.cc/UR4B-ATSH.

47. THE DERA OPTION: ELIGIBLE MITIGATION ACTION #10 UNDER THE VOLKSWAGEN SETTLEMENT, *supra* note 42, at 5.

48. *Id*.

Per DERA's statutory authority, if a state provides a voluntary match equal to the base allocation offered by the EPA, the EPA will provide a matching incentive equal to 50% of the base allocation. For example, if the EPA offers a base allocation of $200,000 to the state, the state could contribute $200,000 of its Trust Funds as a voluntary match, then the state would receive an additional $100,000 in EPA funding as a matching incentive.[49] States may use Mitigation Trust funds as their non-federal voluntary match under EPA's State Clean Diesel Grant Program, although Trust funds cannot cover the required non-federal mandatory cost share requirement.[50]

Hawaii is using a combination of DERA funds and VW mitigation matching funds to purchase two electric vehicles. The state is using $411,578 in DERA grant funding, combined with $274,385 in VW mitigation matching funds and $837,870 in cost-sharing funds from participating fleets.[51] Hawaii is relying on a variety of grants to fund the new buses, when leveraging those grants with PAYS financing might be a more efficient use of the limited federal funds.

DERA is a federally funded option that encourages the use of VW mitigation funds. If private financing can be used as the non-federal mandatory cost share requirement, then beneficiaries can purchase more buses with less government funding and less local money. The federal government encourages and often requires states and transit authorities to raise additional funds as opposed to relying on only a single government grant, except with the VW Trust funds. The Consent Decree allows for 100% funding to buy new electric buses. States should avoid this, albeit more straightforward plan, by leveraging clean energy financing to make their VW and DERA funds go further. Although the Consent Decree is silent regarding private financing structures to supplement the VW fund, it does not prohibit them.

C. CASE STUDIES OF ELECTRIC BUSES IN STATE VW BENEFICIARY MITIGATION PLANS

While the Consent Decree is the general guiding document regarding the Trust, each state has its own VW Beneficiary Mitigation Plan with its own specifications. All states list engine model year 2009 or older class 4-8 transit buses as an eligible project type for VW settlement funds.

1. Connecticut

The Connecticut VW Mitigation Plan names transit buses as an eligible mitigation project type. Government-owned buses can qualify for up to 65% of the cost to repower with a new diesel or alternate fueled engine, or with a new all-electric engine. This includes the costs to install such an engine, and the charging

49. *Id.*

50. Partial Consent Decree, *supra* note 5, at app. D-2.

51. *EPA Awards EPA Diesel Emissions Reduction Act Gant for Clean Air Projects in Hawaii*, EPA.GOV (Nov. 20, 2018), https://perma.cc/DX7J-VAKW.

infrastructure associated with the new all-electric engine. It will also fund up to 65% of the cost for a new diesel, alternate fueled, or all-electric vehicle, including charging infrastructure associated with the new all-electric vehicle. Connecticut does not differentiate percentage of funding available for replacing old diesel vehicles[52] with new diesel or alternative fuel buses compared to electric buses. This means that Connecticut is not specifically incentivizing transit authorities to prioritize electric buses over new diesel buses. PAYS financing could provide such an economic incentive.

The Department of Energy and Environmental Protection ("DEEP"), which wrote the Plan, supports Connecticut's ongoing commitment to wide-scale deployment of an electric fleet. It also "intends to exercise the DERA Option, utilizing Trust funds to match its State DERA allocation to allow for a greater variety of eligible projects."[53] This suggests that DEEP is eager to maximize its VW Settlement funds, but it only mentions other federal funding to do so. The Connecticut Plan does not mention alternative funding or financing sources, whether incentivizing or restricting them. [54] The Plan lists some of the benefits of reducing diesel vehicles including reduced pollution of NOx and GHGs, as well as improved ambient air and human health in nonattainment areas.[55] Buying more electric buses with fewer government dollars through PAYS financing might be an efficient way to accomplish this goal. PAYS may be an attractive option that DEEP should consider to leverage Trust funding, allowing Connecticut to scale its electric bus program.

2. Maryland

The Maryland Mitigation Plan lists transit buses as an eligible mitigation project type. Beneficiaries may draw 100% of funds to repower old buses with a new all-electric engine, including the costs to install such an engine or 100% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new all-electric engine or vehicle.

Maryland has specifically set aside 20.7% of its VW funds for transit bus and school bus replacements.[56] Of that, $5,525,000 is set aside for local transit authorities. A number of cities and counties have expressed interest in investing in electric vehicles. These funds would cover the incremental up-front cost of purchasing alternative fueled buses and would provide local match dollars for other federal grants. Maryland is taking advantage of different federal programs

52. Model year 2009 or older.

53. CONN. DEP'T OF ENERGY AND ENVTL. PROT., STATE OF CONNECTICUT MITIGATION PLAN 12 (2018), https://perma.cc/7HTB-ATTJ.

54. *Id*.

55. *Id*. at 12–14.

56. Maryland is to receive approximately $75.7 million.

to transition to an electric bus fleet, but it still focused on using federal grants to do so.

Maryland is also looking to replace forty old diesel buses with new diesel buses. Maryland argues that this is a more cost-effective solution in the short term and will result in immediate benefits to the City of Baltimore, where the new buses will be used. It will result in 1.4 tons/year NOx emission reductions annually. Furthermore, in addition to an 83% reduction in NOx emissions, the new diesel buses will also result in a 95% reduction in harmful $PM_{2.5}$ emissions.[57] However, merely updating these forty buses will cost over $2.1 million. Additionally, while updating to newer diesel buses will reduce these criteria pollutants, there are limited GHG reduction benefits by updating to new diesel engines.[58] Although Maryland does not address whether clean energy financing solutions are encouraged or restricted, the state is concerned with making a large impact, quickly.[59] Using the PAYS system would allow Maryland to leverage its VW settlement money to buy more electric buses, which could be more cost effective and may result in greater benefits than only updating to newer diesel models, which will likely be on the road for another twelve years.[60]

3. Massachusetts

Government-owned buses will be funded up to 100% for a new all-electric engine, including installation, as well as the purchase and installation of electric charging and fuel cell infrastructure under the Massachusetts VW Settlement Beneficiary Mitigation Plan. The Trust can also be used to purchase 100% of new all-electric vehicles, or 100% of a new diesel or alternate fuel engine or vehicle. Although Massachusetts does not explicitly incentivize transit authorities to switch to electric buses, only electric bus purchases are listed in the Plan.

Massachusetts intends to spend up to $11 million (14.7%) in the first year to support the Pioneer Valley and Martha's Vineyard Transit Authorities purchase of new electric buses. Massachusetts is prioritizing these transit authorities because they can order buses in FY 2019. Furthermore, the Massachusetts Department of Environmental Protection received many comments regarding the importance of funding electric buses serving low-income communities to promote environmental justice ("EJ") concerns, and both Pioneer Valley and Martha's Vineyard serve EJ communities. The Plan makes clear that it may choose to fund less than the maximum allowable percentage. This implies that transit authorities and local governments should look for other funding options,

57. MD. VOLKSWAGEN MITIGATION PLAN, *supra* note 28, at 17.
58. O'Dea, *supra* note 13.
59. *See* MD. VOLKSWAGEN MITIGATION PLAN, *supra* note 28.
60. *Pay As You Save for Clean Transport*, *supra* note 12.

but this is not an explicit suggestion. The Plan also does not mention clean energy financing or leveraging the Trust.[61]

4. New Jersey

New Jersey lists transit buses greater than 14,001 pounds gross vehicle weight rating as a project type eligible for VW funds in its Beneficiary Mitigation Plan. Transit buses replacing buses model year 2009 or older are eligible for up to 100% funding, including charging equipment.

The New Jersey Department of Environmental Protection is particularly interested in funding pilot programs that electrify transit buses that affect disproportionately impacted communities. It will consider the NOx reductions in a cost-effective manner as well as EJ criteria in determining where the fund should be allocated.

The New Jersey Plan does not discuss clean energy financing, but it does specify that if two proposals are identical, it will choose the proposal that requests less than the maximum funding. This implies that New Jersey wants to promote alternative funding, but the Plan is silent as to whether private financing, including clean energy financing, is encouraged or restricted.[62]

Since the New Jersey Plan has been published, the state has allocated $8 million[63] to purchase eight electric NJ Transit buses to operate in the city of Camden.[64] These eight buses are considered a pilot program. Although NJ TRANSIT might want this pilot program to slowly transition to an all-electric fleet, PAYS financing may allow NJ TRANSIT to leverage these allocated funds to buy many more buses to use in Camden and throughout the state.[65]

5. New York

Adopting an electrified mass transit system is one of the New York State Beneficiary Mitigation Plan's seven goals. It hopes to "enhance the market competitiveness of electric transportation technologies by achieving increased economies of scale, expanded market awareness, improved supporting infrastructure, and better financing options."[66]

The New York Plan prioritizes the replacement of diesel vehicles and equipment with all-electric replacements in EJ neighborhoods. However, the Plan

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61. COMMONWEALTH OF MASS. DEP'T OF ENVTL. PROT., FINAL MASSACHUSETTS VOLKSWAGEN SETTLEMENT BENEFICIARY MITIGATION PLAN (2018), https://perma.cc/V6GJ-GFD8.

62. N.J. DEP'T OF ENVTL. PROT., STATE OF NEW JERSEY BENEFICIARY MITIGATION PLAN FOR THE VOLKSWAGEN MITIGATION TRUST (2018), https://perma.cc/2HV8-D83Y.

63. NJ was allocated $72.2 million.

64. News Release, State of N.J. Dep't of Envtl. Prot., *DEP to Use First Round of Volkswagen Settlement Funds for Electric Vehicle Charging Stations, NJ Transit Electric Buses*, NJ.GOV (Feb. 28, 2019), https://perma.cc/W3EG-8ZCS.

65. *Pay As You Save for Clean Transport*, *supra* note 12.

66. N.Y. DEP'T OF ENVTL. CONSERVATION, *supra* note 4, at 6.

recognizes and anticipates that the number of vehicle replacements will be greater if some old buses are replaced with newer diesel buses. This is a solution to reduce emissions quickly and more cheaply. However, if New York incorporates financing like PAYS, it could leverage the same grant funding and buy all electric buses, which will have a greater benefit for EJ neighborhoods. New diesel buses still emit greenhouse gases, NOx, and SOx whereas electric buses only emit based on the electricity grid. In New York City/Westchester, the city can save almost 500,000 metric tons of CO_2 per year by switching to an all-electric fleet.[67] A Columbia University study estimates a $150,000 health benefit to the New York City populace per new electric bus due to cleaner air.[68]

New York is ensuring that the reduced costs of ownership and maintenance of the electric vehicles is considered when transit systems are budgeting for new buses. The Department of Environmental Conservation plans to develop funding incentives with project sponsors to reflect the cost differential between new electric and equivalent diesel vehicles and equipment. When fuel and maintenance cost savings are reported by owners of new electric vehicles receiving VW settlement funds, it informs other fleets of the economic advantages of all-electric transportation.

New York estimates that it will devote at least $52,400,000 (or 40.5% of the fund) to replace school, shuttle, and transit buses. It anticipates buying 500 new buses, more than 100 of which will be all-electric transit buses. The remaining will be new alternative fuel, electric, or diesel-powered school and paratransit buses. As experience is gained and the financial advantages of electric buses are demonstrated, the Department of Environmental Conservation may adjust the funding support provided in future solicitations.

The Plan lists the primary barriers to wide-scale adoption of medium and heavy duty electric vehicles as: 1) the large upfront cost of the new vehicles; 2) the lack of operational experience and the challenge of adopting new technology; 3) expensive infrastructure that is often not standardized across manufacturers; and 4) potentially higher costs of electricity as demand increases.[69] Although PAYS cannot knock down each of these barriers, it directly addresses the first. The purpose of PAYS is to negate the upfront cost barrier. The utility pays the upfront differential, so that is no longer a concern for transit authorities. PAYS can also be used for expensive charging infrastructure, which might help New York scale its electric bus fleet.

New York is actively seeking out alternate funding options for school buses and large trucks. The Plan states that the "funding amount will also consider the availability of other mechanisms to finance the initial incremental purchase cost while also considering anticipated savings due to reduced fuel and maintenance

67. Aber, *supra* note 17, at 5.
68. *Id*.
69. N.Y. DEP'T OF ENVTL. CONSERVATION, *supra* note 4, at 14.

costs." Although New York does not include this stipulation for the funding of electric transit buses, it shows that the state is probably open to financial structures.[70] Given the long-term benefits, New York might benefit from considering PAYS financing to defray the additional upfront cost of switching to electric buses.

6. North Carolina

For government-owned eligible buses, beneficiaries may draw funds from the trust for up to 100% of the cost to repower with a new all-electric engine, including the costs to install such an engine and the charging infrastructure associated with the new all-electric engine. Beneficiaries may also draw funds up to 100% of the cost of a new all-electric vehicle. North Carolina will also fund up to 100% to repower with diesel or an alternate fuel engine, or a new diesel or alternate fuel vehicle. North Carolina is allocating 20% of its Phase 1 funding, or $6,136,377, to its transit bus replacement program from 2018–2020. The VW Mitigation Plan does not specify how much of this funding will go towards updating the old diesel buses with new diesel buses as opposed to purchasing all-electric buses, but the state intends to purchase both. It does not incentivize transit authorities to buy electric, but it does include data showing that electric vehicles reduce NOx emissions more cost effectively than diesel buses.[71] Implementing PAYS financing will make electric buses even more cost-efficient with the added benefit of reducing GHG and particulate emissions.[72] North Carolina does not discuss private financing or clean energy financing options more specifically in its Plan.[73]

70. *Id*. at 19.
71. N.C. DEP'T OF ENVTL. QUALITY DIV. OF AIR QUALITY, *supra* note 29, at 13.

Transit Bus Type	Estimated Cost (per vehicle)	# of Buses	Estimated Lifetime NOx Emission Reductions (tons per vehicle)	Lifetime Effectiveness ($/ton NOx reduced)
Diesel	$500,000	1	0.351	$1,424,501
Natural Gas	$540,000	1	1.10	$490,909
Electric	$800,000	1	0.725	$1,103,448

72. *Pay As You Save for Clean Transport*, *supra* note 12.
73. *See* N.C. DEP'T OF ENVTL. QUALITY DIV. OF AIR QUALITY, *supra* note 28.

7. Rhode Island

Rhode Island is prioritizing electrifying public transit with its VW settlement funds. The Rhode Island Beneficiary Mitigation Plan outlines the benefits of investing in public transit: generating economic development, creating a marketing opportunity to reach a captive ridership, and drastically reducing NOx, smog, and GHGs to protect the health in EJ communities.[74] Rhode Island is proposing to use 75% of funds, or $10 million, to purchase twenty new all-electric buses for the state. It argues that investment in public transit "will speed further integration as additional transportation electrification technologies come to scale, bringing measurable economic and environmental benefits to the communities they serve."[75] Rhode Island is breaking this purchase into two phases. In the first phase, the Rhode Island Public Transit Authority ("RIPTA") will lease (with an option to buy) three all-electric zero-emission transit buses and associated charging equipment for three years. After an evaluation, in Phase 2, RIPTA may purchase up to twenty additional all-electric zero-emission transit buses and associated charging equipment and may also invest in utility upgrades necessary to support the operation of such buses. Rhode Island does not discuss alternative funding or clean energy financing.[76] Rhode Island could buy more electric buses and spend less Trust funding using PAYS financing. This would assist Rhode Island to scale the electrification of its bus fleet.

8. Virginia

The Virginia Mitigation Plan specifies electric buses as an eligible project type for which VW funds can be used to update or replace. Virginia does not list transit buses as a priority expense and funds them at the same level as non-government owned eligible large and medium local freight truck, school buses, and shuttle buses. There is no discussion about whether alternate funding or financing sources is permissible.[77]

However, since the Mitigation Plan was finalized, Virginia has announced that it will invest $14 million, or 15%, of its Volkswagen Environmental Mitigation Trust fund in electric buses.[78] In his announcement, Governor Northam did not mention any private financing or leveraging the grants suggesting that the grant will cover at least the additional cost of electric compared to diesel buses. Virginia should consider PAYS financing to buy more buses with the same $14 million dollars, potentially expediting the transition to an all-electric fleet.

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74. DEP'T OF ENVTL. MGMT. R.I. OFF. OF AIR RESOURCES, *supra* note 4, at 3.

75. *Id*.

76. *Id*. at 5.

77. VA. DEP'T OF ENVTL. QUALITY, DIV. OF AIR AND RENEWABLE ENERGY, COMMONWEALTH OF VIRGINIA BENEFICIARY MITIGATION PLAN FOR THE VOLKSWAGEN ENVIRONMENTAL MITIGATION STATE TRUST AGREEMENT 3–9 (2018), https://perma.cc/CY33-4YVA.

78. Press Release, Virginia Governor Ralph S. Northam, *supra* note 14.

D. CONCLUSIONS BASED ON THE OVERVIEW OF SELECTED STATE VW BENEFICIARY MITIGATION PLANS

Neither the VW Consent Decree nor any of the state mitigation plans studied specify that the funds cannot be used with clean energy financing. States are concerned that there will be a higher demand for VW funds than are available across transportation sectors. In addition, they want to make the biggest impact immediately. This is leading many states, including Connecticut, Maryland, New York, North Carolina, and Virginia, to propose buying new diesel buses because it is more cost effective upfront than investing in electric buses and charging infrastructure. However, new diesel buses do not substantially reduce GHG emissions and clean diesel does not exist. Instead, states should look to clean energy financing as an effective way to leverage the VW Trust to buy additional electric buses with the same public funding. States are not restricting leveraging the VW Fund, but they are not incentivizing it either. The benefit of PAYS financing is that transit authorities can greatly reduce the upfront cost differential between diesel and electric buses, and thus, use a smaller amount of the limited VW funding when electrifying the whole fleet. States should consider and perhaps prioritize funding projects that maximize the VW funds through PAYS, rather than using 100% grants. Utilizing financing is more scalable and will allow for a bigger impact from the limited Trust funding.

III. FEDERAL FUNDING FOR ELECTRIC BUSES THROUGH THE LOW-NO EMISSIONS GRANT

In recent years, there has been a much greater demand for federal Low-No Emissions grants than available funds. For instance, in FY 2017, the FTA received 128 proposals from 40 states, requesting $515 million in federal funds. Because only $55 million was available, only fifty-one projects were funded.[79] Originally, the grant was supposed to allocate $55 million per year until 2020, but due to its popularity, the grant has been expanded. In FY 2018, Congress passed as omnibus bill allocating an additional $30 million, and a total of $85 million was allocated to fifty-two projects in FY 2019.[80] Currently, there is $85 million available for FY 2020; it is anticipated that again, there will be intense competition for the limited funds.

The government will fund up to 85% of the project through the Low-No Program with local matching funds providing the remaining 15%. In Rhode Island, RIPTA is prioritizing transitioning its fleet to the lowest emitting and most energy efficient transit vehicles, but it is struggling to find local match

79. Fiscal Year 2017 Low or No Emission Grant Program Project Selections, 83 Fed. Reg. 53, 12071 (Mar. 29, 2018).

80. *Id.*; Transcript, *Low or No Emissions Grant Program Webinar*, FED. TRANSIT AUTH. (Apr. 11, 2019), https://perma.cc/YUG7-6F4M.

dollars for its federal funding.[81] According to its Capital Budget and Capital Improvement Plan, RIPTA is continuing to "seek a long-term funding solution to ensure that the fleet can sustainably be replaced and kept in a state of good repair." Yet, even though it says it is prioritizing the shift to electric buses, RIPTA is ordering twenty-nine diesel buses in FY 2019, which are likely to be on the road until 2032.[82] It plans to continue buying diesel buses even in FY 2022, and those buses will likely be on the road until 2035. RIPTA is slowly rolling out electric buses, in part because it wants to do its own pilot program, and in part due to financial limitations given the increased cost of electric buses. Although PAYS financing will not expedite the pilot program, it might allow RIPTA to buy more electric buses with less public money, hastening the transition to an all-electric fleet.

Although VW Settlement funds can be used as the local match provided that stipulations are met for both programs, it is unclear whether tariffed utility investments would be considered local match funds under the Low-No Emissions Grant.[83] The Notice of Funding Opportunity describes what qualifies:

> Eligible sources of local match include the following: cash from non-Government sources other than revenues from providing public transportation services; revenues derived from the sale of advertising and concessions; amounts received under a service agreement with a State or local social service agency or private social service organization; revenues generated from value capture financing mechanisms; funds from an undistributed cash surplus; replacement or depreciation cash fund or reserve; new capital; or in-kind contributions.[84]

This list does not explicitly state that leveraging private capital, for instance Pay As You Save financing, would be considered a local match. However, it does allow for "revenue generated from value capture financing mechanisms."[85] Value capture is the public recovering increased private property value due to public infrastructure improvement.[86] For instance, a new public transit hub increases the property value of surrounding private homes, so the government implements a tax to capture part of that increased value. Yet, it could be argued that PAYS is maximizing value. There is value in an electric bus. There is value in its operation

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81. R.I. PUB. TRANSIT AUTH., FY 2019 – FY 2024 CAPITAL BUDGET AND CAPITAL IMPROVEMENT PLAN 2, https://perma.cc/GU2H-P4TX (last visited Sept. 28, 2019).

82. A typical public transit bus has a twelve-year lifespan. The buses purchased in FY2019, have an expected delivery in 2020.

83. Transcript, *Low or No Emissions Grant Program Webinar*, *supra* note 80; *Low or No Emissions Grant Frequently Asked Questions*, FED. TRANSIT AUTH., https://perma.cc/5W8H-8WSM (last visited Sept. 28, 2019).

84. FY 2019 Competitive Funding Opportunity, *supra* note 32, at 10564.

85. *Id.*

86. SASHA PAGE, WILLIAM BISHOP, WAICHING WONG, GUIDE TO VALUE CAPTURE FINANCING FOR PUBLIC TRANSPORTATION PROJECTS 13 (National Academy of Sciences, 2016).

because each day, people pay their bus fare. There is value in its fuel cost savings as it is significantly cheaper to operate and maintain an electric bus than a traditional diesel bus.[87] Although it is more difficult to monetize, there is value in cleaner air and the health benefits that result from replacing a diesel bus with an electric bus.[88] Finally, there is value in reducing GHG emissions and potentially mitigating the effects of climate change.[89] The transit authority is leveraging that value through a private loan from the utility company. States and transit authorities should ask the FTA if this is permissible. Until the FTA explicitly supports it, transit authorities should consider using this language to support the use of PAYS as a local match.

Applicants are encouraged to include scaled funding options in case full funding of their project is not available. Given the limited funds and the mandatory 15% local match, the FTA wants to see transit authorities prepare to receive less funding than they requested in their grant applications. PAYS financing could fill this role. It would allow federal grant dollars to have a greater impact and more transit authorities to convert their fleets to electric using less of the limited federal funds. In future notices, the FTA should make it more explicit that PAYS financing does not conflict with federal grants including the Low-No Grant, and perhaps is even encouraged in order to scale growth.

The FTA should also make it clear that projects incorporating PAYS will get priority funding as they are the most cost-effective programs. The Notice for FY 2020 states that the applications will be reviewed based on a) Demonstration of Need, b) Demonstration of Benefits, c) Planning and Local/Regional Prioritization, d) Local Financial Commitment, e) Project Implementation Strategy, and f) Technical, Legal, and Financial Capacity.[90] Leveraging PAYS financing demonstrates a higher benefit for a lower cost to the government and transit authorities. It also establishes a strong financial capacity. Within the Demonstration of Benefits category, the FTA specifies these criteria: (1) Reduce Energy Consumption; (2) Reduce Harmful Emissions; and (3) Reduce Direct Carbon Emissions.[91] More electric buses for the same amount of federal funding results in all three of these benefits. Furthermore, if PAYS financing can be used as the local match, then there is an increased local financial commitment, giving project proposals which include PAYS another advantage in the grant selection process. As state and local authorities see this advantage, more will potentially incorporate PAYS into their requests, further expanding the federal funds' impact.

87. Press Release, Virginia Governor Ralph S. Northam, *supra* note 14.
88. *Id.*
89. *Id.*
90. FY 2019 Competitive Funding Opportunity, *supra* note 32, at 10566–67.
91. *Id.* at 10566.

In an April 11, 2019 webinar about applying for Low-No Emissions grants, the FTA gave an overview of the program and answered questions from potential applicants. In the ninety-minute meeting, the FTA did not mention leveraging grants to maximize public funds. However, it stated that VW Trust funds could be used as the local match but stayed within the paradigm that the local match is local government dollars.[92] The FTA should promote and explicitly state a preference for applications that incorporate clean energy financing. This would at least inform states of a potential alternate source of funds as they transition to electric buses. By overlooking this option, the FTA passively reinforces a system where federal grants continue to be overburdened by a greater demand than available funds.

Smaller cities often struggle to find local match funds. For instance, cities in North Carolina have used grants from the Low-No Program as well as federal highway money available through a "congestion mitigation" program for projects to improve air quality to purchase five electric buses.[93] In Ashville, the local match came from the city's Capital Improvement Plan. In its staff report, the Transportation Department Director via the City Manager describes how Ashville needs to increase its local match in order to win another "extremely competitive" federal Low-No Program grant.[94] If the city can leverage the federal grant and PAYS financing could contribute the local match, then more electric buses would be purchased or the public funds could be freed for other uses. In Greensboro, North Carolina, the $670,000 local match came directly from taxpayers. In a 2016 bond referendum, voters approved $4.5 million for local match for bus replacement with electric vehicles.[95] If PAYS financing was used as the local match, then those tax dollars could be used for other climate change mitigation and adaptation efforts.

CONCLUSION

Diesel buses purchased in 2019 will likely stay on the road until 2031. This will likely hinder states and municipalities as they try to reach their GHG emission reduction goals, unless they hasten the transition to an all-electric bus fleet. Between federal grants including the Low-No Emissions Program and the VW Settlement Trust, there are sources of public funding for local transit authorities to transition to electric bus fleets. Currently, new electric buses are purchased

92. *Low or No Emissions Grant Program Webinar*, *supra* note 80.

93. *Zero Emission Electric Buses*, CITY OF ASHEVILLE, N.C., https://perma.cc/DF6V-CAND (last visited Sept. 28, 2019).

94. Staff Report from Ken Putnam, Transportation Dept Director to Planning & Economic Development Committee via Gary Johnson, City Manager on ART Fleet Procurement Policy and Related CIP Budget Considerations, at 2 (Nov. 21, 2017), https://perma.cc/GGV7-69DG.

95. Taft Wireback, *Wanting to Have an All-Electric Fleet, GTA Aims to Buy 6 More Buses*, NEWS & REC. (Feb. 27, 2019), https://perma.cc/R3CS-6DCY; *Transportation Bonds*, GREENSBORO N.C., https://perma.cc/GDU9-GDE6 (last visited Sept. 28, 2019).

almost exclusively using this grant money, but this may not be the most efficient use of these funds. Although the VW Consent Decree permits governments to use the VW Trust to finance 100% of new electric buses and the Low-No Program only requires a 15% local match, limited public funds can have a greater impact if transit authorities incorporate private financing. The FTA and state programs allocating these grants should explicitly require grant applicants to include private financing, such as Pay As You Save in their proposals. Until they do, applicants should take the initiative and incorporate PAYS in their applications, showing increased benefits given the same grant allocation. Electric buses are more expensive upfront and although states and municipalities are benefiting from the VW Trust and government grants, these state and federal funds can be more efficiently spent if they are leveraged through PAYS. This would allow transit authorities to transition to a zero-emission fleet without relying solely on limited government grants.