



Electrification
Coalition

HOW TO AMP UP TRANSPORTATION TRANSFORMATION

*A Guidebook for Funding and
Financing Electrification*

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EXECUTIVE SUMMARY

Electrifying our transportation system is vital to enhancing U.S. economic and national security. It also plays an important role in reducing air pollution, improving public health, and combating climate change. However, while consumers can save thousands of dollars over the life of an electric vehicle (EV), higher first-costs are a barrier to wider adoption. Using information in this guide, policy makers and others can identify funding and financing options to help overcome this barrier and start reaping the benefits of transportation electrification more quickly.

Money to support funding and financing can come from a variety of places. This includes federal, state, local, and utility sources, as well as legal settlements (most notably the Volkswagen settlement funds), state or regional carbon market revenues, future operational savings, and the monetization of vehicle-to-grid capabilities. There are also ways to lower the upfront costs of EVs and EV infrastructure through pooling demand and promoting competition.

Funding options to reduce the upfront costs of EVs and EV charging infrastructure generally fall into one of four categories:

- *Formula grants for states* from the U.S. Department of Transportation, U.S. Department of Energy, and U.S. Environmental Protection Agency;
- *Grants, rebates, and discounts* targeting new vehicles, used vehicles, fleets, and charging infrastructure, including a range of programs from those same federal agencies and numerous programs from states and utilities (sometimes using Volkswagen settlement funds);
- *Sales and use tax exemptions* in some states; and
- *Tax credits* both at the federal level and from some states.

There are also programs, such as state low-carbon fuel standards, that provide revenues that can offset some of the purchase premium.

Financing programs are fewer, but there is still a significant universe of sources for EVs and EV charging infrastructure. This financing can take various forms, including:

- *Loans* with low or no interest offered by states, utilities, and their partners, which can sometimes be repaid over time on property tax or utility bills;
- *Loan guarantees* from federal and state programs;
- *Bonds* issued by local government entities; and
- *Leasing* options from utilities and private companies.

It may be possible to pay for these financing options through the operational savings achieved throughout the lifetime of the vehicles and infrastructure.

Both funding and financing programs can be designed to meet the needs of low-income consumers or target disadvantaged or rural communities to help promote greater equity in access to electrified transportation.

There is not one best pathway to reducing upfront cost barriers. Several different approaches could apply – and users of this guide can often layer funding and financing from multiple sources and programs. Indeed, a combination of programs is likely to provide the most sustainable support.

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INTRODUCTION

America’s reliance on oil, primarily to fuel its transportation fleet, is a challenge to both the country’s economic security and its national security. In addition, transportation is now [the largest source](#) of greenhouse gas (GHG) emissions in the United States, as the electricity sector has reduced its GHG emissions in recent years. Transportation is also a large source of local air pollution, including for low-income and communities of color that face disproportionate exposure. Fortunately, there are a host of electric vehicle options across all sectors that tackle these challenges and offer high performance, but consumers need financial support to overcome higher up-front purchase costs.

Many models of electric vehicles and infrastructure have lower total lifetime costs of ownership than conventional options, with consumers typically saving \$6,000 to \$10,000 over the life of the [vehicle](#) (see Fig. 1). Even in vehicle classes where that is not yet true (e.g., the medium- and heavy-duty sector), great improvements are expected in the next few years (see Fig. 2). Decisions are rarely made, however, based on total costs of ownership. For many individual consumers as well as some fleets and other entities, purchasing decisions are made based on upfront costs (e.g., capital

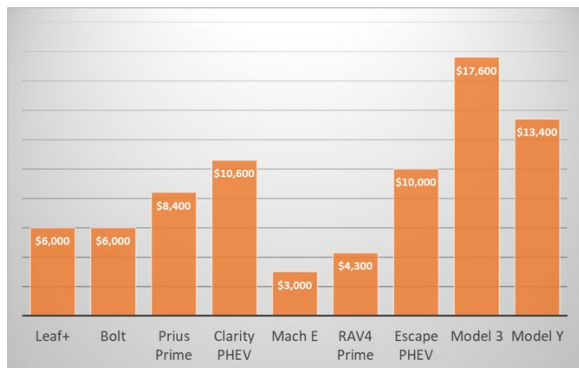


Fig. 1 – Lifetime Savings from EVs vs. Best-Selling ICE Vehicles in Class. Source: [Consumers Report](#) (2020)

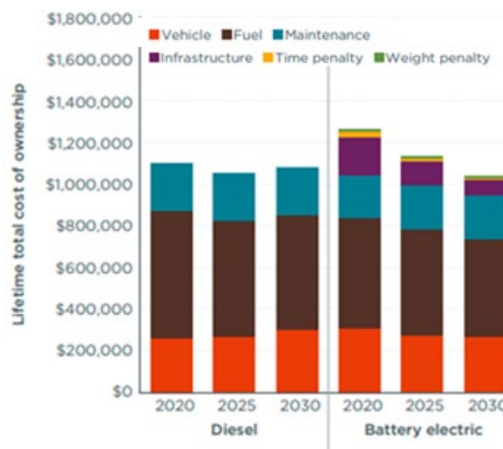


Fig. 2 – Total Cost of Ownership for Diesel, Electric Long-Haul Tractor-Trailers Source: Adapted from [ICCT](#) (2019)

budgets), not the total cost of ownership (e.g., operational budgets). During a time of tight budgets – exacerbated by the COVID pandemic and the associated economic contraction – the upfront cost challenges are an even greater barrier to wider, faster adoption of EVs and EV infrastructure.

This guide is intended to assist state policy makers and others by identifying both funding and financing options to overcome upfront cost barriers to EVs and charging infrastructure. As a simplified categorization in this guide, “funding” generally refers to dollars that do not have to be repaid, whereas “financing” refers to dollars that do. While this guide focuses on options for battery electric vehicles and their supporting infrastructure, many of the options described could also apply to hydrogen fuel cell vehicles and other electrified transport technologies. Included in the guide are examples of programs that support rural communities, low-income consumers, and those that live in disadvantaged communities, to help provide the benefits of electrified transportation broadly. These can take the form of targeted vehicle and infrastructure support for certain geographical areas or income levels, electric car-sharing in underserved communities, support for freight electrification, infrastructure support for

multi-unit dwellings, or inclusion of used vehicles, transit, and school buses in programs.

Clearly, funding can help overcome the upfront cost challenges. [Analyses](#) have shown that monetary incentives are one of the most effective means of promoting market growth of EVs. In particular, EV incentives appear to be most effective when they are applied at the time of purchase, such as through point-of-sale grants, discounts, and sales tax exemptions. These point-of-sale approaches reduce how much purchasers have to spend upfront. Rebates that come very soon after purchase, while requiring purchasers to have more funds on hand for the initial purchase, also appear impactful. Incentives Not surprisingly, funding programs are very popular with purchasers. They reduce upfront costs and do not have to be paid back. Financing approaches such as loans, in contrast, may reduce upfront costs but require the purchaser to pay the full amount – or more, with interest – over time.

Financing approaches, though, have some advantages as well. For example, because grant dollars are more finite, obtaining them can sometimes be quite competitive, with no guarantee of success, whereas financing approaches may provide more certainty of obtaining the needed funds. Some grant programs may also cover only a portion of the costs and require significant matching funds, whereas financing might be able to cover all or most of the upfront costs, thereby enhancing access to electrified transportation for those with more constrained budgets. In addition, given that the total cost of ownership for EVs is already or will soon be lower than for conventional vehicles, there are opportunities to obtain financing that is paid for out of the stream of future operational savings. Furthermore, from a broader perspective, scaling up EVs and EV charging infrastructure to significant levels largely through grants would likely mean a need for extremely high, potentially unsustainable levels of grant funding,

that come well after the purchase, such as some post-purchase rebates and income tax credits, appear to be somewhat less effective – again, purchasers make decisions based on upfront costs and heavily discount the value of rewards that come later. Though these post-purchase approaches may be less effective than on-the-hood approaches, they still can be [important](#) in many purchasing decisions. One [study](#) attributed more than 30% of EV sales to the federal tax credit, and up to 49% of sales for particular models. Of course, tax credits, used at both the federal and state level, are only effective if the purchasing entities have tax liability (which not all do) or they can find other ways to monetize the benefits.

whereas financing dollars can be recirculated when paid back.

Both funding and financing can play key roles in overcoming upfront cost barriers for EVs and EV charging infrastructure. This guide lays out some of the key options of each type.

SOURCES OF FUNDING & FINANCING

When expense is a concern and budgets are tight, monetary support can smooth the path to widespread deployment of EVs and EV charging infrastructure. Fortunately, there are numerous funding and financing options that can help states and others overcome the upfront cost hurdles.

It is important for states, transit agencies, and others looking to buy EVs and EV charging infrastructure to recognize that there is not one best pathway to reducing the upfront costs. Depending on the circumstances, several different approaches could apply – and procurers can often layer funding and financing from multiple sources and programs.

General Sources of Dollars

Before delving into specific funding and financing options and programs, below is a high-level review of where the dollars for those programs come from.

Federal Budgets: Federal budgets provide a key source of money. Sometimes these dollars flow directly to the purchaser of EVs and charging infrastructure, and sometimes these dollars flow first through intermediary programs. Sources of federal dollars include numerous U.S. Department of Transportation (USDOT) programs, including many under the 2015 Fixing America's Surface Transportation (FAST) Act.¹ Examples of relevant USDOT programs include Surface Transportation Block Grants, the National Highway Performance Program, Federal Transit Administration (FTA) formula grants (e.g., for Urbanized and Rural areas), the Congestion Mitigation and Air Quality Improvement program (CMAQ) administered by the Federal Highway Administration (FHWA), and other programs that direct dollars to transit agencies, airports, and other entities.

In addition to USDOT, there are also relevant programs at the U.S. Department of Energy (DOE), including annual State Energy Program funds, programs under the Office of Energy Efficiency and Renewable Energy, and opportunities from the Loan Programs Office. DOE also runs the Clean Cities Coalition Network, which does not provide its own funds but connects members to various funding opportunities both within DOE (e.g., from the Vehicle Technologies Office) and outside DOE.

At the U.S. Environmental Protection Agency (EPA), there is both formula and

¹ USDOT programs are generally authorized under Congressional transportation bills. The last bill, the FAST Act, reauthorized these programs. The FAST Act was scheduled to expire at the end of September 2020, but as

How Big Are These Sources?

The following examples give a sense of the scale of resources available from various sources (FY 2020 levels except where noted):

- Surface Transportation Block Grants: ~\$12 billion
- Congestion Mitigation and Air Quality Improvement program: ~\$2.5 billion
- Low or No Emission Vehicle Grants: ~\$55 million
- Diesel Emission Reduction Act School Bus Rebate Program: ~\$10 million
- Pennsylvania's Alternative Fuels Infrastructure Grant Program: ~\$5 million
- Utilities: ~\$1.2 billion approved (Jan.-Aug 2020)
- Volkswagen settlement: ~\$3 billion for mitigation trust fund, ~\$2 billion in ZEV infrastructure (*total*)
- Proceeds from the Regional Greenhouse Gas Initiative (RGGI): ~\$248 million (*2018*)

competitive funding under the Diesel Emission Reduction Act (DERA) to support replacement of diesel vehicles, engines, and equipment, including (but not limited to) school buses, heavy-duty highway vehicles, marine engines, and construction and cargo equipment.

There are also federal tax credits that can reduce costs for EVs and EV charging infrastructure, as well as federal loan guarantees.

State and Local Budgets: State and local budgets are another important source of dollars for efforts to advance EV and EV

Congress has thus far been unable to agree on a new surface transportation bill, Congress extended the FAST Act for one year. At some point, Congress will enact a new reauthorization of surface transportation programs.

charger deployment. There are numerous state and local programs, incentives, and other efforts designed to support EVs and EV charging infrastructure; sometimes these take the form of agency grant or rebate programs, green bank financing programs, or tax credits. These programs can sometimes be funded by federal dollars (as noted above) or from other sources (as noted below), but the funding can also come directly from state and local budgets. Such funding can come from general revenues, but sometimes it can also come from more targeted sources. For example, state and some local governments can increase gas taxes, sales taxes, vehicle registration fees, or other taxes and fees to fund transportation projects.

Utilities and Ratepayers: Utilities have strong interest in the electrification of transport, as it represents an important potential source of increased load at a time of otherwise flat or declining demand. Accordingly, there are utility programs and incentives in the majority of states designed to drive such electrification, funded by ratepayers. Charges on utility bills can also be used by states to support transportation electrification programs.

Legal Settlements: Transportation electrification efforts in many states have been advanced by money made available under various legal agreements and settlements with corporations. The most notable of these is the [Volkswagen settlement funding](#), which came in the wake of the automaker using devices to cheat emissions tests on its diesel vehicles. In addition to paying billions of dollars in fines, Volkswagen also agreed, as part of efforts to mitigate the excess pollution it caused, to spend billions of dollars on national zero-emissions vehicle (ZEV) infrastructure and ZEV awareness-raising (to be divided between California and the rest of the United States), as well as for projects to reduce diesel emissions (to be divided among the states, DC, tribes, and Puerto Rico). Importantly, Volkswagen settlement

funding is not considered a “federal” source and so can be used as a source of matching funds to meet the requirements of various federal grant programs.

Carbon Markets, Other Revenues, and Savings: Dollars to support transportation electrification can come from carbon market revenues as well. For example, carbon markets in the Northeast and Mid-Atlantic states (the [Regional Greenhouse Gas Initiative](#), or RGGI) and in [California](#) have provided revenues that support state programs seeking to advance the electrification of transport, including [clean mobility programs for disadvantaged communities](#) that can promote opportunities for zero-emission car-sharing and ride-sharing. The [Transportation Climate Initiative \(TCI\)](#) that is under development in the Northeast and Mid-Atlantic states will likely provide additional revenues to support such efforts. Policy makers will need to take care to ensure that equity considerations are included in developing and implementing such efforts.

Similarly, the Low-Carbon Fuel Standard (LCFS) in [California](#) and Clean Fuels Program in [Oregon](#) provide revenues that support EVs and EV infrastructure.

In addition, vehicle-to-grid (V2G) technologies are starting to provide an additional revenue stream for EVs that can help offset costs (see box).

Beyond revenues, long-term savings from the switch to electric transport (e.g., reduced fuel and maintenance expenses) can be used to make the conversion more affordable.

There are also ways that do not involve funding or financing that states and other procurers can use to lower the upfront costs of EVs and EV infrastructure, such as through pooling demand and promoting competition (see box).

FUNDING PROGRAMS

As prices decline and manufacturing scales up over time, the upfront cost barriers to EVs and EV charging equipment will be reduced and eliminated. In the meantime, though, programs that provide funding to reduce the costs of EVs and EV charging equipment can drive greater sales and deployment. Below are descriptions of some of the major funding programs and approaches, first for EVs and then for EV charging infrastructure (though there is significant overlap).

Funding Programs for Electric Vehicles

Funding for EVs generally falls into a few basic categories, including formula grants for states, grants/rebates/discounts, sales tax exemptions, and tax credits. As noted earlier, there are also programs, such as those tied to low-carbon fuel standards, that do not necessarily reduce the costs of vehicles but that provide revenues that can offset some of the purchase premium.

Vehicle-to-Grid (V2G)

There are nascent efforts piloting the use of EV batteries as grid assets through V2G technologies. These efforts are particularly focused on school buses, which have highly predictable downtimes that coincide with periods of high energy demand, including middays, evenings, and summers. Making buses available for V2G can lead to monetary support for vehicle or infrastructure purchases.

In the White Plains school district in New York, for example, [Con Ed](#) is supporting the purchase of electric school buses in exchange for the ability to use the bus batteries to support the grid during summers. [Dominion Energy](#) is providing funding to support a similar V2G effort with school buses in Virginia. In Massachusetts, the battery in the city of Beverly's first EV school bus will be used and compensated as a grid resource by [National Grid](#).

a) Formula Grants for States:

Formula grant programs involve federal dollars that flow regularly to states, as opposed to many of the programs described later below, which states or others apply to directly or in a competitive way. States can choose to use some of the funds from these formula programs to support transportation electrification. Examples of formula funding that states can use to support deployment of EVs include the following, categorized by agency:

US DOT:

[Surface Transportation Block Grants](#) – The [Surface Transportation Block Grant Program](#) (STBG), which evolved from the long-standing Surface Transportation Program, provides flexible funding for state and local surface transportation needs, [including](#) construction of highways, bridges, tunnels, ferry boat terminal facilities, transit capital projects, vehicle-to-infrastructure

Competition & Pooled Demand

Competition and pooling demand can lead to better prices when purchasing EVs.

The Electrification Coalition co-hosts a [purchasing collaborative for the Climate Mayors program](#) that leverages the buying power of participating cities to reduce the costs of EVs and charging infrastructure. Member fleets have already purchased more than 2,200 EVs in 2020.

The [New York State Vehicle Marketplace](#), for example, allows state agencies and local governments to buy or lease Class 1 through 8 vehicles, including EV versions, through the Office of General Services from a range of vehicle dealers already under contract, who compete to service each bid. In the Boston area, the Metropolitan Area Planning Council's [Green Mobility Group Purchasing Program](#) has aggregated demand from various cities and towns for EV charger group buys.

communication equipment, and truck parking facilities, as well as many other types of eligible capital and operational projects. Among the many possible uses of this flexible funding, STBG funds can be used for the purchase of transit vehicles; for example, the Indianapolis Public Transportation Corporation (IndyGo) is planning on using more than \$10 million in STBG awards in 2020 and 2021 for [fleet replacement with electric buses](#).

In FY2020, the STBG had about \$12 billion to disburse. Each state's apportionment of funds is based on a formula set in law, with some set aside for transportation alternatives, planning and research, and non-highway bridges, and with much of the rest directed to areas of each state with particular population levels. Up to half of STBG funds can be transferred to other federal aid programs, including the National Highway Performance Program, National Highway Freight Program, and Congestion Mitigation and Air Quality Improvement Program. The [federal share](#) of projects is generally limited to 80-90%, though it can be 100% for certain types of projects.

Urbanized Area Formula Grants – The FTA's [Urbanized Area Formula Funding](#) program provides funding to urbanized areas for transit capital and operating assistance. In FY 2020, the [program](#) had more than \$5 billion to apportion, based on legislative formulas tied either to population (for smaller urbanized areas) or to transit miles and population (for larger urban areas). For urbanized areas with more than 200,000 people, funds flow directly to designated local recipients; for areas with under 200,000 people, the funds flow to the governor for distribution. Activities eligible for funding include, among many other things, capital investments in bus and bus-related activities such as replacement and rebuilding of buses. The federal share is not to exceed 80% of project costs for capital expenditures, but it can be 90% for vehicle-related equipment to comply with the Americans with Disabilities Act and the

Clean Air Act, which can [include](#) electric buses and associated charging facilities. Matching funds can come from other federal (non-USDOT) funding, which can allow local communities to use only federal funding for projects.

Formula Grants for Rural Areas – The FTA's [Formula Grants for Rural Areas](#) program provides capital, planning, and operational funding to states and tribes to support public transportation in rural areas with populations below 50,000. In FY2020, the program had more than \$750 million to disburse. The federal share is 80% for capital projects and 50% for operating assistance. As with the Urbanized grants, matching funds can come from other federal (non-USDOT) funding.

US DOE:

State Energy Program – The [State Energy Program](#) (SEP), created by Congress in the 1970s, provides funding and technical assistance to states, territories, and the District of Columbia to enhance energy security, advance state-led energy initiatives, promote energy efficiency and renewable energy, and reduce energy waste. SEP provides annual funding to state and territory energy offices, as well as technical assistance. Examples of EV-related state energy office work highlighted by SEP include work by Arizona to [purchase EVs for the state fleet](#).

US EPA:

Diesel Emission Reduction Act (DERA) State Grants – By law, 30% of [Diesel Emission Reduction Act \(DERA\)](#) appropriations are allocated to states and territories for diesel emissions reduction projects (with two-thirds based on a formula and one-third as an incentive for states and territories providing matching funds). [Eligible projects](#) include diesel engine, vehicle, and equipment replacement with a zero tailpipe emissions power source (e.g., grid, battery, fuel cell); funding can cover up

to 60% of the labor and equipment cost of an engine replacement and up to 45% of the cost of a new electric vehicle.

b) Grants, Rebates, and Discounts

Grants, rebates, and discount programs can help reduce the upfront costs of EVs more or less at the time of purchase (or perhaps with a slight delay). There are numerous programs available from the federal government, state governments, and utilities that can reduce the price of new (and sometimes used) EVs.

Federal: At the federal level, grant, rebate, and discount programs include the following, categorized by agency:

US DOT:

Congestion Mitigation and Air Quality Improvement program (CMAQ) – [CMAQ](#) – which was established in 1992 and continued under subsequent transportation bills including the FAST Act – is run by the FHWA. In 2020, its estimated funding was around \$2.5 billion. CMAQ can be used flexibly by state governments, local governments, and transit agencies for projects or programs that reduce transportation-related emissions of air pollutants in areas not fully meeting air quality standards under the Clean Air Act (or that formerly were nonattainment areas) and that are included in the metropolitan planning organization's current transportation plan and transportation improvement program or in the current state transportation improvement program. States can transfer up to half of CMAQ funds to other programs such as the National Highway Performance Program or the Surface Transportation Block Grant Program. CMAQ generally provides 80-90% of a project's funding, but it could be up to 100% for certain types of projects. In continuing CMAQ, the FAST Act also continued eligibility for EVs and EV infrastructure under CMAQ. In 2019, for

example, CMAQ [grants](#) included the following:

- Adding 10 zero-emission buses and associated chargers and charging infrastructure to be used in new public transit service between downtown Sacramento, CA, and Sacramento International Airport.
- Adding electric non-transit vehicles in the Denver regional area in Colorado.
- Purchasing 20 all-electric transit buses and 5 chargers in Chicago, IL.
- Purchasing electric police motorcycles in Orange County and Davidson County in North Carolina.
- Replacing diesel tugs and belt loaders with electric versions at Chattanooga Metropolitan Airport in Tennessee.

Better Utilizing Investments to Leverage Development (BUILD) Grants – [BUILD grants](#) replaced the Transportation Investment Generating Economic Recovery (TIGER) grant program in 2018, though the programs are similar in providing competitive grants that [invest in transportation infrastructure](#) – including road, rail, transit, freight, and port projects – that have significant local or regional impact. BUILD grants can be used in part for vehicle acquisition. State and local project sponsors can get funding for multi-modal, multi-jurisdictional projects that may be harder to fund through other USDOT programs. BUILD can also provide funding directly to a broader set of entities; any public entity can receive funding, including municipalities, counties, states, port authorities, tribal governments, municipal planning organizations, or others. For projects designated as urban, total federal funding (from all federal sources) cannot exceed 80% of project costs, and the minimum BUILD award is \$5 million (which means the minimum total project cost must be \$6.25 million). For projects in rural areas, BUILD grants can cover up to 100% of project costs, and the minimum BUILD award is \$1 million. The maximum award

for all projects is \$25 million, and not more than \$100 million can be awarded to any single state. BUILD grants are reimbursement grants, which means recipients pay project costs as incurred and then submit requests for reimbursement. Examples of EV-related BUILD grants in recent years include the following:

- In [FY2020](#), Teton County was awarded \$20 million to implement a series of multimodal improvements along the Idaho 33 / Wyoming 22 corridor (Driggs, ID, to Jackson Hole, WY), which included, among many other things, purchase of two EV local buses.
- In [FY2019](#), Antelope Valley Transit Authority in California was awarded more than \$8 million to purchase about 20 EV transit buses and corresponding chargers to service new transit locations in the Valley, including routes servicing lower-income populations. The Memphis Area Transit Authority in Tennessee was also [awarded](#) \$12 million to develop an 8-mile bus rapid transit (BRT) system by constructing approximately 28 new transit stations and purchasing approximately 9 EV buses and associated charging equipment.
- In [FY2018](#), Brazos Transit District in Brazos County, TX, was awarded more than \$14 million to replace more than 30 diesel buses with more fuel-efficient diesel buses and with EV buses.

Low or No Emission Vehicle Grants – The [FTA's Low or No Emission Vehicle Program](#) provides \$55 million per year in competitive grants to state and local authorities for the purchase or lease of zero-emission and low-emission transit buses, as well as for buying, building, or leasing required supporting facilities for the buses. Eligible recipients include those directly receiving Urbanized Area Formula program grants, states, and tribes. Rural projects have to be submitted as part of a consolidated state proposal. The federal share of the cost of leasing or purchasing a transit bus is

capped at 85%, while the share of leasing or buying the related equipment and facilities is capped at 90%. Examples of [Low-No funding in FY 2020](#) include the following:

- Purchasing EV buses to replace old diesel buses at Alabama A&M University.
- Purchasing new EV buses and associated charging infrastructure to replace old diesel buses for Capital Transit in Juneau, AK.
- Purchasing a new EV bus to replace an old diesel bus for Gainesville Regional Transit System in Florida, as well as modifying existing charging equipment to support the EV bus fleet.
- Purchasing new EV buses and associated charging infrastructure to replace old diesel buses for Georgia's Chatham Area Transit.
- Purchasing new EV buses and associated charging infrastructure for Mountain Rides in Blaine County, ID.
- Purchasing new EV buses to replace old buses for Lawrence Transit in Kansas.
- Purchasing new EV buses and dedicated charging stations to replace old diesel buses for the Transit Authority of Omaha, NE, as well as supporting maintenance and first responder training for the new technology.

Bus & Bus Facilities Grants – Low-No is actually a sub-program of a broader FTA [Bus and Bus Facilities grant program](#) that makes federal resources available to state or local governmental entities or other recipients that operate fixed route bus service or that allocate funding to fixed route bus operators. The funding is to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. The federal share is not to exceed 80%. While Low-No is the program focused on low- and zero-emission vehicles, EV-related grants can also come from the broader program. [Examples in FY2020](#) include the following:

- Purchasing EV buses and related charging equipment and infrastructure for Butte Regional Transit in Butte County, CA.
- Purchasing new EV buses for the Central Florida Regional Transportation Authority (LYNX), Hillsborough Area Regional Transit Authority, and Pinellas Suncoast Transit Authority in Florida, as well as, for the latter two, charging infrastructure.
- Purchasing new EV buses and related charging infrastructure for the Guam Regional Transit Authority.
- Purchasing EV buses and charging stations for the Bloomington Public Transportation Corporation in Indiana.

Capital Investment Grants (New Starts, Small Starts, Core Capacity) – The FTA [Capital Investment Grants](#) program is a discretionary and competitive grant program – appropriated about \$2.3 billion every year – that funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit. It has three programs within it. New Starts is for new fixed guideway systems (e.g., light rail, commuter rail), extensions to existing systems, and fixed guideway BRT systems that have total project costs of \$300 million or greater or that are seeking New Starts funding of \$100 million or greater. Small Starts is for the same types of projects, as well as corridor-based BRT systems, but with total project cost below \$300 million and total Small Starts funding sought below \$100 million. Core Capacity is for substantial investment in corridors for existing fixed guideway systems that are at or over capacity (or will be within five years) to increase capacity by at least 10 percent. These are multi-year, multi-step processes. Before receiving a construction grant agreement under New Starts and Core Capacity, the project development and engineering phases must be completed; for Small Starts, only the project development

stage must be completed. The federal share of the project's costs can be between 50% and 80%. These programs can be used to support EV-related projects. For example, in May 2018, the Indianapolis Public Transportation Corporation (IndyGo) executed a Small Starts grant agreement with the FTA for almost \$75 million to support its [Red Line BRT project](#), including funds for construction and BRT vehicles, which will be fully-electric 60-foot buses. IndyGo has also been accepted into Project Development under Small Starts for its Purple Line and Blue Line BRT projects.

Airport Zero Emissions Vehicle and Infrastructure Pilot – The Federal Aviation Administration's [Airport Zero Emissions Vehicle and Infrastructure Pilot Program](#), created in 2012, lets airport sponsors use Airport Improvement Program (AIP) funds to improve airport air quality by purchasing ZEVs and building or modifying infrastructure needed to use ZEVs at airports. Airports in nonattainment areas under the Clean Air Act are given first priority, followed by airports in areas that used to be nonattainment (maintenance areas) and then airports in attainment areas. Projects with the greatest air quality benefits and best cost-effectiveness are prioritized. Examples of [projects in recent years](#) include the following:

- In FY 2019, San Diego International Airport and John Wayne Airport (Orange County) in California each were awarded funds to purchase EV buses and chargers. San Diego was granted more than \$1.3 million (75% of AIP funds), with local matching funds of about \$450,000, to purchase 2 EV buses and 2 charging units. John Wayne Airport was awarded more than \$2.1 million (81% of AIP funds), with more than \$500,000 of local matching funds, to purchase 3 EV buses and 3 chargers.
- In FY 2017, San Jose International Airport (CA), Sacramento International

Airport (CA), Indianapolis International Airport (IN), and Raleigh-Durham International Airport (NC) were each awarded 50% of AIP funds to purchase EV buses and chargers, with awards ranging from \$1 million for Indianapolis to purchase 3 buses and chargers to more than \$4.8 million for San Jose to purchase 10 buses and chargers.

US DOE:

Vehicle Technologies Office funding – DOE's Vehicle Technologies Office (VTO) supports research, development, and deployment of efficient and sustainable transportation technologies, including [advanced batteries and electric drive systems](#). VTO has awarded nearly \$460 million since 1998 for hundreds of projects across the country advancing alternative fuel vehicle technologies, and new funding opportunities are announced regularly. These [projects](#) have included understanding transportation electrification in public and private fleets, integrating alternative fuel vehicles and fueling infrastructure in urban and rural communities, and developing fueling and charging stations along busy transportation corridors. VTO projects are more focused on research and demonstrations than on typical wide-scale deployment, but they could still be relevant to efforts to expand deployment of EVs and EV infrastructure. Examples of recent VTO-funded projects include the following:

- In 2020: the Department of Solid Waste Services for Anchorage, AK, was [awarded](#) almost \$690,000 to pilot heavy-duty EV deployment for municipal solid waste collection; Tulane University in Louisiana was [awarded](#) more than \$730,000 to demonstrate electric shuttles for the New Orleans region; a project to introduce EVs and charging infrastructure to St. Louis, MO, social service agency fleets to meet the transportation needs of seniors was [awarded](#) \$500,000; and the University of Texas at Austin was [awarded](#) \$1 million

to pilot medium-duty electrified fleets in urban and regional applications.

- In 2019: Kansas City Regional Clean Cities was [awarded](#) \$780,000 for a project on electrifying terminal trucks in unincentivized markets; Clean Fuels Ohio was [awarded](#) almost \$780,000 for heavy-duty EV demonstrations for freight and mobility solutions; a demonstration program in Hood River, OR, to show that EV car sharing can serve rural communities was [awarded](#) more than \$540,000; Lone Star Clean Fuels Alliance in Central Texas was [awarded](#) more than \$800,000 for an electric first- and last-mile on-demand shuttle service project for rural communities; and Virginia Clean Cities was [awarded](#) \$670,000 for a mid-Atlantic electric school bus experience project.
- In 2017, Pecan Street in Austin, TX, was [awarded](#) \$1 million (with \$1 million in required local matching funds) to test the use of a private fleet of low-speed all-electric shuttles for first- and last-mile transit connections in three Austin neighborhoods.

US EPA:

DERA National Award Grants – Under DERA, 70% of appropriations are for national competitive grants and rebates to fund projects using diesel emission reduction technologies. [National DERA grants](#) in 2020, for example, include the following:

- San Joaquin Valley Unified Air Pollution Control District in California received more than \$3.6 million to replace 17 short-haul yard trucks with new all-electric trucks.
- San Diego County Air Pollution Control District in California received more than \$2 million to replace a diesel tugboat with an electric one.

- The Regents of the University of Colorado received more than \$790,000 to replace 2 diesel transit buses with battery electric buses.
- Ocala, FL, received \$777,000 to replace 6 diesel refuse haulers with new all-electric refuse trucks.
- Berkeley-Charleston-Dorchester Council of Governments in South Carolina received more than \$800,000 to replace 2 diesel transit buses with battery electric buses.
- The Northwest Seaport Alliance in Washington received more than \$780,000 to replace 6 terminal tractors with fully battery-electric ones.

DERA School Bus Rebate Program – DERA allows the EPA to offer [rebates](#) in addition to grants to replace or retrofit older, dirtier diesel vehicles, which EPA has used to support a school bus rebate program. The rebate application period typically opens in the fall, and projects are completed in under a year. The 2020 rebates will offer more than \$10 million to scrap and replace old diesel school buses with newer, cleaner ones, with rebates varying based on the fuel type of the replacement bus. The rebate reimbursement for battery or hydrogen electric buses is \$65,000 per bus, with a maximum rebate amount per application of \$300,000. Applicants are selected in a lottery, with at least one chosen from each state or territory represented in the applicant pool. Among the [2019 awards](#), the California Air Resources Board (CARB) received more than \$550,000 – to be combined with more than \$500,000 in funds from CARB and more than \$1.1 million in fleet cost-share funds – to replace 5 diesel school buses with EV buses.

State: There are also numerous grant, rebate, and discount programs at the state level. In addition to programs for new light-duty vehicles, states also have programs for fleets and heavy-duty electric vehicles,

programs for electric school buses, programs with added incentives for low-income purchasers, and programs for used EVs. Examples include the following:

Incentives for new vehicles:

Under Delaware’s [Clean Vehicle Rebate Program](#), individuals or businesses that buy or lease an EV can apply for a cash rebate of \$2,500 for a battery electric vehicle and \$1,000 for a plug-in hybrid vehicle. The purchase price of the vehicle cannot exceed \$60,000. Those buying or leasing a vehicle can either apply for the rebate within 90 days of getting the vehicle or, more conveniently, can purchase or lease it from a participating dealership, which will roll the rebate into the purchase or lease (essentially making the rebate into a “cash-on-the-hood” incentive).

The [Massachusetts Offers Rebates for Electric Vehicles \(MOR-EV\)](#) program provides rebates of up to \$2,500 for the purchase or lease of battery EVs and fuel cell EVs with a purchase price below \$50,000, as well as up to \$1,500 for plug-in hybrids with all-electric ranges of 25 miles or more (and again, with a purchase price below \$50,000). The program is available for Massachusetts residents, as well as commercial and nonprofit fleets.

In 2020, New Jersey enacted a [law](#) that draws \$30 million annually for 10 years from the societal benefits charge on utility bills to support a Board of Public Utilities fund that will provide light-duty plug-in EV incentives equal to \$25 per mile of electric-only range, up to \$5,000. The Board can also deposit into the fund additional amounts from the societal benefits charge to provide incentives for the purchase and installation of in-home EV service equipment (not to exceed \$500 per person).

Under the [Texas Emissions Reduction Plan](#), the Texas Commission on Environmental Quality offers 11 different grant programs, each with its own requirements and

application periods, for a range of vehicle types, including a \$2,500 rebate for the purchase or 3-year lease of electric, plug-in hybrid, and hydrogen fuel cell [light-duty vehicles](#) (and smaller amounts for shorter leases). There are also programs for electrifying [fleets](#) and [heavy-duty vehicles](#), as well as [electric charging stations](#).

Incentives for fleets and heavy-duty EVs:

The [ALT Fuels Colorado](#) program – under the Clean Air Fleets public-private initiative of the Regional Air Quality Council – offers funds to public, private, and non-profit fleets across Colorado to incentivize the replacement of older diesel heavy-duty trucks, medium-duty trucks, school and shuttle buses, railroad freight switchers, airport ground support equipment, heavy forklifts, and port cargo handling equipment with fully electric vehicles (or vehicles fueled exclusively with renewable natural gas). The program provides funding equivalent to 110% of the cost difference between the clean vehicle and a comparable new diesel vehicle. Additional funding is available for EV charging stations used to power these new vehicles. The program was initially operated with CMAQ funding and is now funded by Volkswagen settlement dollars.

The Indiana Department of Environmental Management is using a mixture of DERA funds and Volkswagen settlement funds to provide [DieselWise Indiana grants](#) ranging from \$50,000 to \$750,000 in the form of cooperative agreements for projects focused on addressing diesel emissions from non-road vehicles and equipment, including in construction, agriculture, cargo handling, rail transport, and marine transport. Projects can include replacing diesel vehicle and equipment with alternative fuel versions, with the program covering up to 45% of the total cost for zero-tailpipe-emissions replacements. Applicants proposing all-electric vehicles or equipment projects have to identify the availability of charging infrastructure for the project.

Maryland's [Clean Fuels Incentive Program](#) for FY 2021, funded primarily by RGGI revenues, is focused in part on alternative fuel vehicles for fleets (the other focus area is publicly available alternative fuel infrastructure). Competitive grants for reimbursement will cover up to 100% of the incremental cost difference to buy or lease new battery electric, plug-in hybrid, or hydrogen fuel cell vehicles (Classes 1-8), with maximum awards ranging from \$2,500 for Class 1-2 EVs with under 200 miles of all-electric range to \$50,000 for Class 3-8 EVs with more than 100 miles of range. Eligible fleet purchasers include school districts, municipal authorities, local governments, nonprofits, and private-sector entities.

In New York, the [Municipal ZEV Rebate and Infrastructure Grant](#) program provided rebates to cities, towns, villages, and counties to purchase or lease new zero-emission vehicles for fleet use. Plug-in hybrids, all-electric, and fuel cell vehicles with electric range of 10-50 miles were eligible for a rebate of \$2,500 and vehicles with higher ranges for a rebate of \$5,000. (The rebate application period appears to have closed.) In addition, the [New York Truck Voucher Incentive Program \(NYTVIP\)](#) – which is funded by both CMAQ and Volkswagen settlement funds – provides vouchers (discounts) to fleets across the state that purchase or lease battery electric, fuel cell electric, plug-in hybrid, conventional hybrid, and other cleaner medium- and heavy-duty vehicles and that scrap a similar older diesel vehicle. Voucher amounts are either 95% (for battery and fuel cell vehicles) or 90% (for others) of the incremental difference in cost between the cleaner vehicle and a comparable diesel vehicle, up to a per-vehicle cap that varies by vehicle technology and weight class – from \$25,000 for a Class 4 conventional hybrid to \$185,000 for a Class 8 battery or fuel cell vehicle. There are also vouchers for 100% of the difference for battery electric or fuel cell transit buses (up to \$385,000 for Class 8) and for 80% of the

difference for battery electric school and shuttle buses (up to \$150,000 for Class 8). (California similarly has a [Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project \(HVIP\)](#).)

Incentives for low-income purchasers and for used EVs:

Under California's [Clean Vehicle Rebate Project](#), low- and moderate-income purchasers of new plug-in hybrid, battery-electric, or fuel cell electric vehicles are eligible for an extra \$2,500 rebate on top of the standard rebate. California also has a [Clean Vehicle Assistance Program](#) that provides grants (and affordable loans) to help income-qualified people purchase or lease a new or used hybrid or EV. The grant – a maximum of \$2,500 for hybrids and \$5,000 for plug-ins – is given to the dealer to lower the cost of the new or used vehicle. (The program provides grants for EV chargers as well.) In addition, California's [Clean Cars 4 All](#) program – which cannot be stacked with funding from the Clean Vehicle Assistance Program – provides lower-income consumers living in participating air districts with up to \$9,500 to retire their older polluting vehicles and purchase a new or used plug-in hybrid, battery electric, or fuel cell electric vehicle (or up to \$7,500 in incentives to access public, private, and shared mobility options).

Efficiency Maine, the quasi-state agency that administers programs to improve energy efficiency and reduce greenhouse gases in Maine, is using Volkswagen settlement funds to offer instant [rebates](#) for battery EVs and plug-in hybrids at participating dealerships, as well as mail-in rebates for eligible vehicles purchased directly from a manufacturer. For battery EVs, the rebates are \$2,000 for individuals, businesses, and organizations, \$3,000 for low-income residents, and \$7,500 for Maine governmental entities or tribal governments. For plug-in hybrids, the rebates are \$1,000, \$1,500, and \$2,000.

Oregon's [Clean Vehicle Rebate Program](#), which provides rebates for new battery and plug-in hybrid EVs, provides an extra \$2,500 rebate for low- and moderate-income households for either new or used EVs.

Pennsylvania's [Alternative Fuel Vehicle Rebate](#) program provides \$1,000 rebates on the purchase or lease of fuel cell vehicles, \$750 rebates on battery electric vehicles, and \$500 rebates on plug-in hybrids and electric motorcycles. The vehicles can be new or one-time pre-owned with a purchase price of \$50,000 or less, and if pre-owned, with under 75,000 miles on it and purchased from a dealership. Low-income purchasers can receive an additional \$1,000 rebate.

Vermont is supporting the [MileageSmart](#) program, administered by Capstone Community Action, to assist lower-income Vermont households by providing up to 25% of the cost of a used electric, plug-in hybrid, or hybrid vehicle, up to \$5,000.

Volkswagen settlement funds: As some of the above examples make clear, money for some state-level EV efforts comes from the Volkswagen settlement funds. The Volkswagen funds are sometimes directed into existing state programs and sometimes deployed directly to support EVs. While states can use up to 15% of funds for charging equipment, the remainder of the funding is to be used to replace or repower medium- and heavy-duty vehicles. For example:

Maryland used part of its Volkswagen settlement funds, as well as funds from separate settlements between Maryland and Fiat Chrysler and Bosch, for an [electric school bus pilot program](#). In 2019, that program approved spending almost \$2 million for 6 electric school buses (and chargers) in 4 county school systems.

Michigan, in its first grant program supported by Volkswagen settlement funds, likewise directed up to \$3 million to replace

old diesel school buses with [new all-electric school buses and charging stations](#).

Funding for non-government-owned school buses would cover up to 50% of the cost of an electric bus and charging station, versus up to 70% for government-owned and privately-owned buses under contract with a public school district.

Rhode Island's [plan](#) for its Volkswagen settlement funds included spending about 75% of its initial allocation of funds (\$10 million) to fund the replacement of about 20 old diesel-powered transit buses with new all-electric ones, as well as to install associated charging infrastructure.

Tennessee, in its second grant program supported by Volkswagen settlement funds, [directed](#) about \$4 million to the Chattanooga and Memphis area transit authorities to replace diesel transit buses with all-electric ones, as well as to install associated charging infrastructure.

Utilities are another common source of grants and rebates for EVs. These include investor-owned utilities, rural electric co-operatives, and municipal utilities. For example:

In Florida, Jacksonville Electric Authority offers [rebates](#) for plug-in hybrid and all-electric passenger vehicles, with rebates varying based on battery size: \$500 rebates for battery sizes below 15 kWh and \$1,000 for 15 kWh and higher.

In Nevada, NV Energy's [Electric School Bus Incentives program](#) offers funding up to 75 percent of the total costs to help public school districts replace diesel school buses with all-electric versions and to install related charging infrastructure. The \$3 million program is funded by NV Energy customers and is part of the EV Infrastructure Demonstration program established by the Nevada legislature in 2017.

New Hampshire Electric Co-op offers [rebates](#) for members that purchase or lease a new or used battery EV (\$1,000), plug-in hybrid (\$600), or electric motorcycle (\$300).

In Pennsylvania, Duquesne Light Company has partnered with dealerships to offer instant [rebates](#) toward the purchase of plug-in EVs -- \$2,000 for new EVs priced at \$40,000 or less (\$1,000 rebate if the price is higher), \$1,000 for new plug-in hybrids under \$40,000 (\$500 if higher), and \$1,000 for pre-owned or leased EVs and plug-in hybrids.

c) Sales Tax Exemptions

Like many grants and rebates, programs that exempt EVs from sales taxes have the benefit of reducing the cost of EVs directly at the time of purchase. They are also easy for vehicle dealerships to administer. Examples of states with EV sales tax exemptions include the following:

New Jersey has a [sales and use tax exemption](#) for the purchase, lease, or rental of zero-emission vehicles (but not partial zero-emission vehicles such as hybrids), saving those getting an EV from paying the [usual 6.625% rate](#).

Washington has a [sales and use tax exemption](#) for the purchase or lease of new or used passenger cars, light-duty trucks, or medium-duty passenger vehicles that are powered by a clean alternative fuel or can travel at least 30 miles on battery power. The vehicle must have a sales price or fair market value of \$45,000 or less if new and \$30,000 or less if used. Washington also has [sales](#) and [use tax](#) exemptions for the sale of zero-emission buses.

d) Tax Credits

Unlike grants, rebates, or sales tax exemptions, tax credits reduce the costs of EV acquisition more after the fact, whenever the purchaser files a tax return (assuming the purchaser has tax liability).

At the **federal** level, there are two relevant tax credits, one for typical EVs and one for two-wheeled EVs. Both are in [section 30D](#) of the Internal Revenue Code.

Typical EVs: Under the New Qualified Plug-In Electric Drive Motor Vehicle tax credit, battery electric and plug-in hybrid vehicles – with at least 4 wheels, weight less than 14,000 pounds, and battery capacity not less than 4 kWh – are eligible for a tax credit. The credit starts from a base of \$2,500, with \$417 added if the battery has at least 5 kWh of capacity, plus \$417 for each kWh of capacity above 5 kWh, up to a total maximum credit of \$7,500. The credit begins to phase out once a manufacturer reaches 200,000 plug-in electric vehicles sold in the United States, declining over the course of a year to 50% for the first 2 calendar quarters, 25% for the next 2 calendar quarters, and then 0 after that. (Tesla and GM have already hit the 200,000 vehicle mark.) Sellers of qualified EVs can also claim the credit if they sell to tax-exempt entities or governmental units, as long as they clearly disclose to the purchasers the amount of credits allowable.

For example, Alameda County, California, conducted an aggregated EV purchase for ten county and municipal public fleets. In addition to receiving almost \$2 million in CMAQ funding, the aggregated solicitation encouraged vendors to [claim the federal tax credit](#) and pass the value on to the agencies as a discount – and the dealer with the lowest bid did so.

Two-wheeled EVs: Under the Qualified Two-Wheeled Plug-In Electric Drive Motor Vehicle tax credit, electric vehicles that draw energy from a battery with at least 2.5 kWh of capacity, are made primarily for use on public streets, and can achieve speeds of 45 mph or greater are eligible for a tax credit of 10% of the cost of the vehicle, up to \$2,500. Unlike the regular EV tax credit, two-wheeled vehicles have to be acquired before January 1, 2021 to be eligible.

At the **state** level, several states offer EV tax credits. For example:

Colorado offers a [tax credit](#) for the purchase, lease, or conversion of new electric and plug-in hybrid vehicles. For purchased EVs, the credit in 2020 ranges from \$4,000 for a light-duty passenger vehicle up to \$16,000 for a heavy-duty truck (though the credit for a truck is limited to the cost difference compared to a gasoline or diesel truck); the credit declines over time through the end of 2025. For leased vehicles, the credit in 2020 is half the value of the credit for purchases and likewise declines through the end of 2025, though transportation network companies can qualify for a slightly higher credit for leases of light-duty EVs and plug-in hybrids.

Louisiana offers a [tax credit](#) for qualified clean-burning motor vehicle fuel property, which includes the purchase of new alternative fuel vehicles (including EVs) and the cost of property for delivering alternative fuel (including electricity) to motor vehicles. The credit is 50% of the cost of the fueling property. In the case of a vehicle, that applies only to the exact cost of the portion of the vehicle that stores the electricity and delivers it to the engine; if the taxpayer does not want to or cannot determine that exact cost, the taxpayer can claim a credit that is the lesser of 10% of the vehicle's cost or \$3,000.

Montana offers a [tax credit](#) of either \$500 or \$1,000 (depending on vehicle weight) for the equipment and labor to convert a motor vehicle to operate on an alternative fuel, including electricity (and hydrogen).

e) Revenues

Other programs can provide after-purchase revenues that ultimately reduce the full cost of EVs for purchasers. For example, under the Low Carbon Fuel Standard in California, the electricity sold to fuel electric vehicles, trucks, transit systems, forklifts, cargo-handling equipment, transportation

refrigeration units, and shore power to ocean-going vessels at berth is [eligible](#) to generate fuel pathway-based credits. Since EV owners do not always have separate metering at their residences for EVs, the California Air Resources Board calculates the credits for non-metered residential EV charging based on the carbon-intensity of California's grid. Utilities earn credits for all residential charging using the grid average intensity, and the load serving entity, auto manufacturer, or another entity can also generate incremental credits for supplying metered, low carbon-intensity electricity or smart charging to residences. All electricity credit generators must use credit proceeds to promote transportation electrification and provide benefits to their EV customers. In addition, CARB is starting to require all utilities participating in the program to contribute a portion of their residential LCFS credits to support a new statewide [Clean Fuel Reward program](#) that provides point-of-purchase cash rebates to help accelerate EV sales, with [higher rebates](#) for vehicles with higher battery capacities.

Oregon has a similar [Clean Fuels Program](#) that enables clean fuel providers, including businesses that own EV charging stations and utilities that provide electricity for EVs, to generate credits, which can be sold to generate revenue for projects such as electric school buses and charging stations.

As discussed in the box on page 8, vehicle-to-grid technologies are also beginning to open up additional sources of ongoing revenue for EV owners.

Funding Programs for EV Charging Infrastructure

As with EVs, there are numerous programs that provide funding for EV charging infrastructure. These fall into very similar categories – formula funds, grants/rebates, tax credits, and revenue opportunities – and often involve the same programs. As several of the examples already given above make clear, many programs support

both EVs and charging infrastructure at the same time.

a) Federal Formula Funds

US DOT:

Surface Transportation Block Grants – As noted earlier, STBG funding is very flexible and can be used for many purposes. Among those, STBG support for truck parking facilities and fringe and corridor parking facilities can [include](#) the addition of EV charging stations.

National Highway Performance Program – The [National Highway Performance Program](#) (NHPP), which had about \$24 billion in FY2020, provides support for the condition and performance of the National Highway System (NHS), [including](#) construction of new facilities on the NHS. NHPP funding can be used for [EV charging stations](#) associated with fringe and corridor parking facilities. Each state's apportionment of funds is based on a formula set in law. Up to half of NHPP funds can be transferred to other federal aid programs, including STBG, National Highway Freight Program, and Congestion Mitigation and Air Quality Improvement Program. The [federal share](#) of projects is generally limited to 80-90%, though it can be 100% for certain types of projects.

Urbanized Area and Rural Area Formula Grants – As noted earlier, the FTA's [Urbanized Area Formula Funding](#) program can [include](#) funding for both electric buses and associated charging facilities, and the [Formula Grants for Rural Areas](#) program could likewise provide capital support to states and tribes to support EV infrastructure for public transportation in rural areas.

US DOE:

State Energy Program – As noted earlier, the [State Energy Program](#) (SEP) provides funding and technical assistance to state

and territory energy offices. Examples of state energy office work related to EV charging highlighted by SEP include Nevada's use of SEP funds to offset the costs of [installing charging stations](#) along Route 95 between Las Vegas and Reno.

US EPA:

Diesel Emission Reduction Act (DERA) State Grants – As noted earlier, DERA state grants can [support](#) replacements of diesel engines, vehicles, and equipment with a zero tailpipe emissions power source (e.g., grid, battery, fuel cell); funding can cover up to 60% of the labor and equipment cost of an engine replacement and up to 45% of the cost of a new electric vehicle. Eligible replacement costs also include the purchase and installation of electrical infrastructure or equipment to enable the use of power.

b) Grants, Rebates, and Discounts

There are numerous grant, rebate, and discount programs available from the federal government, state governments, and utilities that can reduce the price of EV charging infrastructure.

Federal: At the federal level, grant, rebate, and discount programs include the following, categorized by agency:

US DOT:

CMAQ Grants – CMAQ funding (described earlier) can also be used for EV chargers and other related infrastructure. For instance, in addition to some of the examples given earlier, CMAQ [grants](#) in 2019 included the following:

- Installing 14 electric charging units and related equipment to support the introduction of EV buses to the Unitrans bus fleet in the Sacramento area in California.
- Purchasing four electric charging stations for LaPorte, IN.

- Installing 30 dual-port Level 2 EV charging stations and 7 fast-charging stations for use by the MassDOT fleet in Massachusetts.

BUILD Grants – As noted earlier, BUILD grants can support a range of capital transportation projects. This can include EV charging infrastructure. For instance, in addition to the examples given earlier, an [FY 2018 grant](#) awarded Miami-Dade County in Florida more than \$9 million to expand and improve two existing park-and-ride facilities along the South Dade Transitway Corridor (a BRT line), including adding EV parking with charging stations.

Low or No Vehicle Emission Grants – As noted earlier, grants under the FTA's Low-No program support not only buses, but also the supporting infrastructure for those buses, including charging. The federal share of the cost of leasing or purchasing the related equipment and facilities is capped at 90%. In addition to the examples provided earlier, other examples of [Low-No funding in FY 2020](#) include the following:

- Purchasing EV buses and associated charging infrastructure in Tucson, AZ.
- Purchasing EV buses and related charging infrastructure in Rochester, MN.
- Purchasing charging infrastructure to meet the needs of Park City, Utah's EV bus service expansion.
- Purchasing EV batteries, charging stations, and infrastructure upgrades in Racine, WI.

Bus & Bus Facilities Grants – As noted earlier, Low-No is a sub-program of a broader FTA Bus and Bus Facilities grant program to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. The federal share is not to exceed 80%. While Low-No is the program focused on low- and

zero-emission vehicles, EV-related grants can also come from the broader program, including for charging infrastructure.

[Examples in FY2020](#) include the following:

- Planning, constructing, and installing charging infrastructure, including on-route charging at transit centers, for a future all-electric Solano County Transit bus fleet in California.
- Purchasing new EV buses and charging equipment for Suffolk County Transit in New York.
- Purchasing new EV buses and charging infrastructure for Chapel Hill Transit in North Carolina.

Capital Investment Grants (New Starts, Small Starts, Core Capacity) – As noted earlier, the FTA Capital Investment Grants program – which includes New Starts, Small Starts, and Core Capacity sub-programs – is a discretionary and competitive grant program that funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit. The federal share of the project's costs can be between 50% and 80%. These programs can be used to support projects related to EV charging infrastructure. For example, in April 2019, the FTA awarded the Spokane Transit Authority in Washington more than \$53 million, subject to execution of an approved Small Starts grant agreement, for a 6-mile, corridor-based [City Line BRT route](#) that will include EV buses and electric charging infrastructure.

Voluntary Airport Low Emissions Program – The FAA's Airport Zero Emissions Vehicle and Infrastructure Pilot Program, described earlier, has been used to support the purchase of both EVs and charging equipment at airports; based on the examples given earlier, they are often bought in tandem. An additional and similar FAA program is the [Voluntary Airport Low Emissions Program \(VALE\)](#), created in

2004, which improves airport air quality and provides air quality credits for future airport development by helping airport sponsors meet their state-related air quality responsibilities under the Clean Air Act. Through VALE, airport sponsors can use Airport Improvement Program (AIP) funds and Passenger Facility Charges (PFCs) to finance low-emission vehicles, refueling and recharging stations, gate electrification, and other airport air quality improvements. VALE [allows](#) large and medium hub airports to use AIP funding to cover 75% of the incremental costs of new vehicles and infrastructure, while smaller airports can use it to cover 95%. PFC funding can cover 100% of the incremental costs for new vehicles and infrastructure; PFC funds can also be used as AIP matching funds. While vehicles are eligible, recent [examples of VALE grants](#) appear to focus solely on charging infrastructure. In FY 2019, for example:

- Phoenix Sky Harbor International Airport in Phoenix, AZ, was awarded more than \$540,000 (more than \$180,000 required in local matching funds) for 12 dual port charging stations for ground support equipment.
- Logan International Airport in Boston, MA, was awarded more than \$3 million (with more than \$1 million required in local matching funds) for 43 dual port charging stations for ground support equipment.
- McCarran International Airport in Las Vegas, NV, was awarded more than \$4 million (more than \$1.4 million required in local matching funds) for 59 dual port charging stations for ground support equipment.
- San Antonio International Airport in San Antonio, TX, was awarded more than \$2.3 million (more than \$770,000 required in local matching funds) for 32 dual port charging stations for ground support equipment.

US DOE:

VTO – Vehicle Technologies Office funding, described earlier, has been used not only to advance EVs, but also EV infrastructure. For example, in 2019, Utah Clean Cities was [awarded](#) \$670,000 to support EV infrastructure deployment along rural corridors in the Intermountain West.

US EPA:

DERA National Grants & Vehicle Rebates – The DERA national grants and vehicle rebates mentioned earlier can be used for supporting infrastructure as well. For example:

- Among recent [DERA national grants](#), Clean Cities – Georgia received more than \$420,000 in 2019 to install electrified parking spaces for reefer trailers at 4 distribution centers.
- Among the [2019 awards](#) for rebates, the American Samoa Power Authority received more than \$118,000 to replace 4 diesel trucks and install 3 EV charging stations.

State: At the state level, there are also numerous grant, rebate, and discount programs for EV charging infrastructure. Examples include the following:

The California Energy Commission's [Clean Transportation Program](#) approved a \$384 million investment plan for 2020-2023 that focuses on funding zero-emission vehicle infrastructure, as well as related workforce development and manufacturing, with the funds distributed to projects through a mix of competitive funding solicitations and direct funding agreements. The Program will seek to provide half of the funds to projects that benefit low-income and disadvantaged communities.

[Charge Ahead Colorado](#), which is run by the Regional Air Quality Council (for the Denver metro area) and by the Colorado Energy Office (for the rest of the state), offers

funding for 80% of the cost of EV charging stations, up to \$6,000 for Level 2 fleet-only stations, \$9,000 for Level 2 dual port stations, \$35,000 for Level 3 stations, and \$50,000 for Level 3 ultra-fast stations. (The RAQC will also fund 80% of the incremental cost difference between a leased EV and its gasoline equivalent, up to \$8,260.) This funding is available to state agencies, local governments, non-profits, and others (with some differences in funding priorities between RAQC and the Colorado Energy Office).

Pennsylvania's [Alternative Fuels Infrastructure Grant \(AFIG\) Program](#), funded by the utilities gross receipts tax, provides about \$5 million in grants annually for school districts, municipal authorities, political subdivisions, nonprofit entities, corporations, limited liability companies, or partnerships for alternative fuel vehicles and infrastructure. Applicants can submit separate applications for the different project categories (e.g., one for vehicle purchasing, another for refueling infrastructure). Vehicle or charging projects that have received [Driving PA Forward](#) incentives (from Volkswagen settlement funds) are not eligible for AFIG funding. Among other categories under the AFIG program, applicants can get [funding](#) to cover up to 50% of the cost to purchase and install fleet EV charging infrastructure, public recharging infrastructure (DC fast chargers), or workplace or home-based recharging infrastructure, up to a maximum of \$600,000.

Utah's [Workplace Electric Vehicle Charging Funding Assistance Program](#) provides businesses, nonprofits, and government entities (e.g., local governments, higher education institutions) with reimbursement grants to cover up to 50% of the purchase and installation costs of Level 2 or DC fast chargers, up to \$75,000 for businesses and nonprofits (governmental entity maximums to be determined by the Utah Division of Air Quality).

Volkswagen settlement funds: As with the vehicles themselves, funding for some state-level EV charger efforts comes from the Volkswagen settlement funds. As noted earlier, states are allowed to spend up to 15% of their allotment on charging infrastructure, and [more than two-thirds of states](#) have elected to do so. For example:

Florida in 2020 directed \$8.6 million of Volkswagen settlement funds to install [74 additional DC fast chargers](#) across the state.

Idaho is using some of its Volkswagen settlement funding to provide [cost-share funds](#) for DC fast chargers at strategic locations along Idaho's highways.

Efficiency Maine, primarily using Volkswagen settlement money, is supporting a [three-phase effort](#) to expand EV charging infrastructure in the state, including rebates for Level 2 EV charging stations for large employers, apartment managers, retail centers, and other similar locations.

Minnesota is using some of its Volkswagen settlement funds to provide more than \$2.5 million in [grants to install DC fast chargers](#) in designated corridors along highways and interstates in the state, with the maximum grant amount being 80% of project costs up to \$70,000.

Ohio in 2020 directed more than \$3 million of its Volkswagen settlement funds toward grants to help fund the installation of [publicly available Level 2 charging stations](#) in 26 Ohio priority counties, as well as in certain state parks. A separate funding opportunity will be made available in 2021 for DC fast charging stations.

Other settlement funds: Volkswagen is not the only source of relevant settlement funds. For example:

In Huron, California, the [Green Raiteros program](#) has 2 EVs and 22 chargers around

town, used to drive residents to places that are too far for them to get to otherwise. Funding for the cars came from philanthropy (from the Schmidt Family Foundation), while [funding](#) for the chargers came both from the Volkswagen settlement and from a settlement between NRG Energy and the California Public Utilities Commission over energy market manipulations in 2001.

In North Carolina, Duke Energy gave \$300,000 in grants in 2019 to help the GoRaleigh and GoTriangle transit agencies install [charging stations for electric buses](#) coming into their fleets. Duke had previously helped Asheville and Greensboro in a similar manner, in addition to funding numerous public EV charging stations. The funding from Duke was part of a 2015 [settlement](#) with the U.S. EPA and environmental groups to end Clean Air Act litigation.

Utilities: While utilities have some incentives for EVs, there are far, far more examples of state regulators authorizing utilities to offer incentives for EV charging infrastructure. Examples of utility EV charger incentives include the following from investor-owned, municipal, and rural electric co-operative utilities:

In Arizona, [Tucson Electric Power](#) offers rebates to commercial businesses, multi-family complexes, and nonprofit customers that purchase and install EV charging ports at their locations, with customers located in lower-income areas receiving higher rebates. Level 2 chargers at workplaces can get a rebate of \$4,500 per port (\$6,000 if located in a lower income area) or up to 75% of the project cost. Level 2 chargers at multi-family or nonprofit locations can get \$6,000 per port (\$9,000 if located in a lower income area) or up to 85% of the project cost. DC fast chargers can get a rebate of \$24,000 per port (\$40,000 if located in a lower income area) or up to 75% of the project cost. Residential customers can get a [rebate](#) covering up to 75% of the cost of installing a Level 2 or higher EV charger, up

to \$500 for a networked charger and \$250 for a non-networked charger.

In California, [Pacific Gas & Electric](#), [San Diego Gas & Electric](#), and [Southern California Edison](#) implemented pilot programs to install EV infrastructure to support up to 12,500 charging stations at multi-unit dwellings, workplaces, and public interest destinations, with more than 1,600 of these in [disadvantaged communities](#). The programs sometimes involved rebates for chargers and, for some lower-income communities, no cost for charger installation, equipment, maintenance, and operation.

In Hawaii, [Hawaii Energy](#) offers rebates for EV chargers at commercial facilities and multi-unit dwellings. For first-time installations, the rebates are \$4,500 per networked Level 2 charger (with at least 2 ports) and \$35,000 per networked DC fast charging station. For station retrofits, the rebates are \$3,000 and \$28,000. For affordable housing developments, there is a \$5,000 bonus incentive per networked Level 2 charger for existing developments and a \$1,500 bonus incentive per networked Level 2 charger for new developments.

In Iowa, [Alliant Energy](#) offers rebates up to \$500 for networked Level 2 EV charging stations and \$250 for non-networked Level 2 stations.

In Minnesota, [Dakota Electric](#), [Connexus Energy](#), and [Lake Region Electric Cooperative](#) all offer \$500 rebates for EV chargers.

In North Carolina, [Roanoke Electric Cooperative](#) has a pilot program in which members who sign up for a new reduced EV charging rate are provided with a home EV charger at no cost. The charger is installed, maintained, and owned by the Cooperative, which can curtail the level of charging during on-peak hours.

In Texas, [Austin Energy](#) offers a rebate of 50% of the purchase and installation cost of a Level 2 charging station, up to a maximum of \$1,200 for networked charging stations and \$900 for non-networked stations.

Utilities can also get approval from state regulators to deploy EV charging stations directly. For example, in September 2020, a group of Midwest utilities – Oklahoma Gas & Electric, Ameren Missouri, Ameren Illinois, Evergy, Consumers Energy, and DTE – signed an [agreement](#) to coordinate the buildout of a regional EV charging network along highways in their service areas by the end of 2022, subject to approval from regulators in each state. Some of the utilities are already installing [EV chargers along highways](#) with regulator approval; Ameren Missouri, for instance, got approval in 2019 to spend more than \$4 million for 11 EV charging stations along highway corridors.

c) Tax Credits

There are federal and, in some places, state tax credits available for EV charging infrastructure.

At the federal level, there is the [Alternative Fuel Vehicle Refueling Property Credit](#). For EV chargers for business/investment use, the credit is the smaller of 30% of the cost of all property placed in service at a given location or \$30,000. For EV chargers for personal use placed in service at the taxpayer's home, the credit is the smaller of 30% of the cost or \$1,000. As with the tax credit for EVs, sellers of EV chargers to tax-exempt organizations and governmental units can claim the credit if they clearly disclose to the purchasers the amount of the credit allowed – creating the potential for such purchasers to get the value of the credit passed through to them.

Several states and the District of Columbia have EV charger tax credits as well. For example:

New York offers a [tax credit](#) for investments in EV recharging property, equal to the lesser of \$5,000 or 50% of the cost of property less any cost paid from the proceeds of grants. The credit is targeted at commercial and workplace charging stations.

Oklahoma offers a [tax credit](#) for investments in qualified clean-burning motor fuel property, including new metered-for-fee, public access recharging systems for EVs. The per-location credit is 45% of the cost of clean-burning motor fuel property.

Washington offers a tax credit against [business and occupation tax](#) and [public utility tax](#) for up to 50% of the cost to purchase and install EV charging infrastructure, up to a maximum of \$2 million.

Washington, DC, offers a [tax credit](#) equal to 50% of the costs of purchasing and installing a charging station, up to \$1,000 per station at a private residence and up to \$10,000 per station on non-residential property designed for use by the public.

d) Revenues

As with EVs, LCFS programs can provide after-purchase revenues – in the form of saleable credits – that ultimately reduce the full cost of EV charging infrastructure for purchasers. For example, under the LCFS in California, amendments made in 2018 added a new crediting mechanism to support deployment of [ZEV infrastructure](#) based on the capacity of the hydrogen station or EV fast charging site to deliver fuel once it is fully utilized. The infrastructure credits will decrease as a charger reaches full utilization, until it eventually generates credits only for its dispensed fuel. As of May 2020, 48 hydrogen stations and 484 DC fast chargers at 55 sites were approved for ZEV infrastructure crediting.

As noted earlier, Oregon's [Clean Fuels Program](#) also generates credits that can be sold to support projects such as charging stations.

Connecticut Green Bank launched in December 2020 an innovative EV charger carbon offset credit [project](#) whereby Green Bank partners may enroll EV chargers to create carbon credits from their EV charger datasets, opening private carbon capital as a new source of investment for EV charging. EV chargers earn funds based upon the amount of electricity dispensed to vehicles, factoring in the carbon intensity of the electricity used.

FINANCING APPROACHES & PROGRAMS

While funding programs appear relatively bountiful, there is a smaller but still significant universe of sources of financing for EVs and EV charging infrastructure as well.

Financing for Electric Vehicles

Financing for EVs can come in different varieties, including loans, loan guarantees, bonds, and leasing. It may also be possible to pay for EVs over time on utility bills or through the savings achieved throughout the vehicles' lifetime.

a) Loans

Several states offer **zero- or low-interest loans** to enable purchases of EVs. For example:

As noted earlier, California's [Clean Vehicle Assistance Program](#), in addition to providing grants, also provides affordable loans to help income-qualified people purchase or lease a new or used hybrid or EV. The program's preferred lender offers loans for grant recipients at an 8% interest rate or lower.

Nebraska's [Dollar and Energy Saving Loans](#), offered by the Department of Environment and Energy and lending institutions in the state, offer simple interest rates of 5% or less for prequalified projects, including alternative fuel vehicles and fueling facilities.

New Mexico has an [Alternative Fuel Acquisition Revolving Loan Fund](#) established in [law](#) through which the Energy, Minerals and Natural Resources Department can provide zero-interest loans for up to 7 years to state agencies, political subdivisions, and educational institutions to cover the incremental cost difference of buying EVs, up to \$5,000 for light-duty, \$10,000 for medium-duty, and \$20,000 for heavy-duty. The fund balance is capped at \$5 million, but it appears that it has not yet received its initial capitalization funding.

Some utilities have partnered with financial institutions to provide EV financing for their customers. For example, in Vermont, Burlington Electric Department has [partnered](#) with three credit unions to offer low- (and potentially no-) interest **loans** for customers to purchase EVs, with the EV rebate that Burlington Electric Department offers factored in up front to reduce the overall financing costs and needs.

Some utilities also offer loans in the form of **on-bill financing**. On-bill financing allows purchasers of EVs to pay off the cost over time on their electricity bills. In western Illinois, for example, Illinois Electric Cooperative has a program for its members to [finance](#) EVs and plug-in hybrids and to pay the loan amount (and electricity usage) on monthly power bills.

b) Municipal Bonds

Rather than receiving loans from the state or utilities, it is also possible for public procurers of EVs to get loans – of a sort – by issuing debt instruments (i.e., municipal bonds). This is a way that transit agencies, school districts, and others can secure

funds from outside investors to cover the upfront costs of electrification, with the governmental entity paying back the principal and interest over time. Bond issuances often have to be approved by state or local legislative bodies or directly by voters.

For example, in November 2016, voters in Greensboro, NC, approved a transportation bond, funds from which – combined with federal and private grant money – were used by the Greensboro Transit Authority for a \$3.84 million [project](#) to purchase 4 new 40-foot all-electric battery-powered buses.

c) Leasing

Purchasers of EVs can also reduce their upfront outlays of capital by leasing the vehicles, including through innovative arrangements. For example, Beverly, Massachusetts, partnered with Highland Electric Transportation (a private company) to get its first electric school bus (and charging infrastructure) in 2020, with the company buying and owning the bus and charging infrastructure (with some support from Volkswagen settlement funds) and the school district [paying a monthly fee](#) for use and maintenance.

Some transit operators have bought electric buses but decided to lease the batteries to bring the upfront costs down to levels comparable to conventional transit buses. For example, in 2017, Park City, UT, deployed 6 Proterra electric buses (using Low-No funds) but entered into a [battery service agreement with Proterra](#) to lease the batteries, applying some of the operational and maintenance savings toward the lease payments. Proterra owns and guarantees the performance of the batteries over the 12-year lifetime of the buses and replaces the batteries at mid-life. MetroLINK in Quad Cities, Illinois, also participates in the Proterra battery leasing program.

d) Savings

The operational savings from transport electrification are significant and can help offset some of the upfront costs. Energy service companies (ESCOs) have been active in achieving energy efficiency gains in buildings for a long time, utilizing contracts that guarantee savings from new technologies and that have payments below that level of savings. The model has not been used much in the transportation sector, such as with fleets that could save on total cost of ownership by electrifying, but Colorado [statute](#) enables such transportation ESCOs by including vehicle fleet operational and fuel cost savings within the definitions of energy cost savings and energy performance contracts.

Financing for EV Charging Infrastructure

The financing options available for EV charging infrastructure are, unsurprisingly, very similar to those available for EVs, including loans and bonds.

a) Loans & Leasing

As with EVs, several states offer a variety of low-interest **loans**, including through revolving loan funds (i.e., capital from repaid loans is re-loaned for new projects). For example:

The Connecticut Green Bank, in partnership with Energize CT and various local lenders and contractors, offers [Smart-E loans](#) for home energy improvement projects, including EV charging stations. This no-money-down financing has rates as low as 4.49% for a 5-year term, with higher rates for longer terms.

The Vermont Economic Development Authority offers a [program](#), funded through the State Infrastructure Bank, that provides loans to sole proprietorships, partnerships, corporations (for-profit and non-profit), and municipalities to purchase and/or install EV charging stations that are available for use by the general public. The loans, up to \$100,000, have a 1% interest rate with a

term dependent on the useful life of the asset.

The Washington Department of Commerce's [Energy Revolving Loan Fund Program](#), through nonprofit partners, provides loans for homeowners and commercial building owners who want to install clean energy upgrades, including EV chargers. The Revolving Loan Fund is one of several programs under the state Clean Energy Fund, which is supported by capital budgets approved by the legislature.

Utilities also offer **on-bill financing and leasing** for EV charging infrastructure. For example:

Holy Cross Energy in Colorado provides [Level 2 chargers and maintenance agreements](#), under which Holy Cross provides the charger for free, owns the charger, pays local contractors to install it, agrees to maintain it for three years, and recovers the costs of the installation and the maintenance contract through a fixed charge on the utility bill over three years – after which ownership of the charger transfers to the customer. Customers agree to enroll in Holy Cross's distribution flexibility tariff and occasional load-shaping.

City of Tallahassee Utilities in Florida provides [energy efficiency loans](#) for residential customers, including for Level 2 EV charging equipment. The loans have 5% interest, are for up to 5 years, and are paid on monthly utility bills.

Idaho Falls Power offers an on-bill [charging station lease program](#), under which Idaho Falls Power installs and maintains the charging station and the commercial customer pays \$20 per month.

OPALCO in Washington has a [Switch it Up! Program](#) that provides on-bill financing for qualifying projects, including EV chargers, at 2% interest. Seattle City Light in Washington also provides [on-bill leasing](#) for EV chargers, offering Level 2 charging

stations with no upfront costs, coverage of permitting costs and upkeep, and a \$29.99 fee added to monthly bills for 3 years.

Some purchasers of EV charging infrastructure also have the option to put the costs not on their utility bills but on their property tax bills through **Commercial Property-Assessed Clean Energy** (C-PACE) programs, with the costs running with the property (even if sold). For example:

The Connecticut Green Bank in 2020 launched a new [Charge Up CT Buildings](#) initiative that offers up to three free EV charging stations to commercial property owners that use at least \$150,000 in C-PACE financing to make energy improvements to their buildings.

In Oregon's Multnomah County, PropertyFit offers [C-PACE financing](#) for a range of improvements to commercial, industrial, and multifamily buildings, including creating or improving the property's capacity to charge EVs.

The Rhode Island Infrastructure Bank offers [C-PACE financing](#) for energy efficiency and renewable energy projects, including EV charging stations, in commercial, industrial, and multifamily properties. The C-PACE financing involves long-term financing up to 25 years and no out-of-pocket costs.

Utah's program likewise includes EV chargers among the improvements eligible for [C-PACE financing](#).

b) Municipal Bonds

As with EVs, **municipal bonds** can be an option for EV charging infrastructure as well. For example:

- Mason City, IA, issued \$7 million in bonds in 2020 for capital improvements, including \$20,000 for an [EV charging station at city hall](#).

- Utah [law](#) gives interlocal entities (i.e., political subdivisions of the state created by public agencies) authority to issue bonds or notes to finance energy efficiency upgrades, renewable energy systems, or EV charging infrastructure.

c) Loan guarantees

At the federal level, the Department of Energy's Loan Programs Office (LPO) provides Title XVII loan guarantees to accelerate the deployment of innovative clean energy technologies, as long as projects use new or significantly improved technologies and provide a reasonable prospect of repayment. The LPO issues technology-specific solicitations, and in 2016, the LPO [clarified](#) that under its [Renewable Energy and Efficient Energy Projects](#) solicitation, distributed energy facilities may include, in appropriate cases, EV charging facilities. However, while EV charging infrastructure may be eligible, it is not clear that LPO loan guarantees have ever actually been [used](#) to support them.

Some states offer loan guarantees for EV charging equipment as well. For instance, the California Pollution Control Financing Authority's California Capital Access Program, funded by the California Energy Commission, has an [Electric Vehicle Charging Station Financing Program](#) that offers loan guarantees covering loans for the design, development, purchase, and installation of EV charging stations at small business locations in the state – with a maximum enrolled loan amount of \$500,000 per qualified borrower. After borrowers successfully repay the loan, the program provides them a partial rebate.

CONCLUSION

Costs for EVs and EV infrastructure are declining rapidly, and this trend is expected to continue. In the meantime, this guide describes some of the many options for purchasers of EVs and EV infrastructure to obtain monetary support to help overcome

the current upfront cost hurdles. This guide describes options to receive both funds that do not need to be repaid and financing that does. States, transit agencies, and others looking to buy EVs and EV charging infrastructure should try to find the programs and approaches that work best for their circumstances, recognizing that funding and financing from multiple sources and programs can often be stacked together.

Addressing the needs of low income, rural and disadvantages communities calls for specific program design approaches. The specific programs and options available will continue to change over time, based on developments in both policies and markets, but all forms of monetary support are welcome and needed in the drive to scale up and accelerate the electrification of transportation.

APPENDIX A: SUMMARY TABLE OF FUNDING & FINANCING PROGRAMS IN THIS GUIDE

Examples of Funding Programs

Federal Programs		
<i>U.S. Department of Transportation</i>		
Program	EVs	Chargers
Surface Transportation Block Grant (STBG) Program (formula)	•	•
National Highway Performance Program (NHPP) (formula)		•
Urbanized Area Formula Funding (formula)	•	•
Formula Grants for Rural Areas (formula)	•	•
Congestion Mitigation and Air Quality Improvement program (CMAQ)	•	•
Better Utilizing Investments to Leverage Development (BUILD) Grants	•	•
Low or No Emission Vehicle Program	•	•
Bus and Bus Facilities grant program	•	•
Capital Investment Grants (New Starts, Small Starts, Core Capacity)	•	•
Airport Zero Emissions Vehicle and Infrastructure Pilot Program	•	•
Voluntary Airport Low Emissions Program (VALE)	•	•
<i>U.S. Department of Energy</i>		
State Energy Program (formula)	•	•
Vehicle Technologies Office (VTO)	•	•
<i>U.S. Environmental Protection Agency</i>		
Diesel Emission Reduction Act (DERA) State Grants (formula)	•	•
DERA National Award Grants	•	•
DERA Rebate Program	•	•
State Programs		
<i>Incentives</i>		
Clean Cars 4 All (CA)	•	
Clean Fuel Reward program (CA)	•	
Clean Transportation Program (CA)	•	•
Clean Vehicle Assistance Program (CA)	•	•
Clean Vehicle Rebate Project (CA)	•	
Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) (CA)	•	

State Programs		
<i>Incentives</i>		
Program	EVs	Chargers
ALT Fuels Colorado (CO)	•	•
Charge Ahead Colorado (CO)	•	•
Clean Vehicle Rebate Program (DE)	•	
DieselWise Indiana grants (IN)	•	
Efficiency Maine Electric Vehicle Rebates (ME)	•	
Massachusetts Offers Rebates for Electric Vehicles (MOR-EV) (MA)	•	
Clean Fuels Incentive Program (MD)	•	•
Electric Vehicle Act of 2020 (NJ)	•	•
Municipal ZEV Rebate and Infrastructure Grants (NY)	•	•
New York Truck Voucher Incentive Program (NYTVIP) (NY)	•	
Clean Vehicle Rebate Program (OR)	•	
Alternative Fuels Infrastructure Grant (AFIG) Program (including Vehicle Rebate) (PA)	•	•
Texas Emissions Reduction Plan (TX)	•	•
Workplace Electric Vehicle Charging Funding Assistance Program (UT)		•
MileageSmart (VT)	•	
<i>Use of Volkswagen Settlement Funds</i>		
Florida’s Beneficiary Mitigation Plan (FL)	•	•
State of Idaho Volkswagen Beneficiary Mitigation Plan (ID)	•	•
Efficiency Maine EV Charging Initiatives (ME)		•
Maryland Volkswagen Mitigation Plan (MD)	•	•
Michigan Volkswagen Settlement Beneficiary Mitigation Plan (MI)	•	•
Minnesota EV fast charging corridor grants (MN)		•
Ohio Volkswagen Mitigation Grants (OH)	•	•
Driving PA Forward (PA)	•	•
Rhode Island Beneficiary Mitigation Plan Volkswagen Environmental Mitigation Trust Agreement (RI)	•	•
State of Tennessee’s Beneficiary Mitigation Plan (TN)	•	•

Utility Programs		
Program	EVs	Chargers
Tucson Electric Power rebates (AZ)		•
Pacific Gas & Electric pilot (CA)		•
San Diego Gas & Electric pilot (CA)		•
Southern California Edison pilot (CA)		•
Jacksonville Electric Authority rebates (FL)	•	
Hawaii Energy rebates (HI)		•
Alliant Energy rebates (IA)		•
Dakota Electric rebates (MN)		•
Connexus Energy rebates (MN)		•
Lake Region Electric Cooperative rebates (MN)		•
Roanoke Electric Cooperative no-cost charger with EV charging rate (NC)		•
NV Energy’s Electric School Bus Incentives program (NV)	•	•
New Hampshire Electric Co-op offers rebates (NH)	•	
Duquesne Light Company rebates (PA)	•	
Austin Energy rebate (TX)		•

Examples of Funding Programs | Sales Tax Exemptions

Program	EVs	Chargers
Sales and use tax exemption (NJ)	•	
Sales and use tax exemption (and sales and use tax exemptions for zero-emission buses) (WA)	•	

Examples of Funding Programs | Tax Credits

Federal Credits		
Program	EVs	Chargers
New Qualified Plug-In Electric Drive Motor Vehicle Credit	•	
Qualified Two-Wheeled Plug-In Electric Drive Motor Vehicle Credit	•	
Alternative Fuel Vehicle Refueling Property Credit		•

State (and District of Columbia) Credits		
Program	EVs	Chargers
Innovative Motor Vehicle and Truck Credits for Electric and Plug-in Hybrid Electric Vehicles (CO)	•	
Alternative Fuel Tax Credit (LA)	•	•
Credit For Alternative Fuel Motor Vehicle Conversion (MT)	•	
Alternative fuels and electric vehicle recharging property credit (NY)		•
Investments in Qualified Clean-Burning Motor Vehicle Fuel Property credit (OK)		•
Clean alternative fuel commercial vehicles and alternative fuel vehicle infrastructure credit against business and occupation tax and public utility tax (WA)	•	•
Alternative Fuel Vehicle Infrastructure and Conversion Credits (DC)	•	•

Examples of Funding Programs | Revenues

Program	EVs	Chargers
Low-Carbon Fuel Standard (CA)	•	•
Clean Fuels Program (OR)	•	•

Examples of Financing Programs

Loans		
State Programs (Including C-PACE)		
Program	EVs	Chargers
Clean Vehicle Assistance Program (CA)	•	
Charge Up CT Buildings (C-PACE) (CT)		•
Smart-E loans (CT)		•
Dollar and Energy Saving Loans (NE)	•	•
Alternative Fuel Acquisition Revolving Loan Fund (NM)	•	
C-PACE financing in Multnomah County (OR)		•
C-PACE financing (RI)		•
C-PACE financing (UT)		•
Electric Vehicle Charging Station Loan Program (VT)		•
Energy Revolving Loan Fund Program (WA)		•

Utility Programs		
Program	EVs	Chargers
Holy Cross Energy free chargers and on-bill financing for installation and maintenance (CO)		•
City of Tallahassee Utilities on-bill energy efficiency loans (FL)		•
Illinois Electric Cooperative on-bill financing (IL)	•	
Burlington Electric Department partner loans (VT)	•	
OPALCO Switch it Up! on-bill financing (WA)		•
Municipal Bonds		
Mason City bonds (IA)		•
Greensboro transportation bond (NC)	•	
Interlocal entity bond/note authority (UT)		•
Leasing		
Idaho Falls Power on-bill charging station lease program (ID)		•
Quad Cities, IL, and Park City, UT, battery service agreement with Proterra (IL, UT)	•	
Beverly, MA, agreement with Highland Electric Transportation (MA)	•	•
Seattle City Light on-bill leasing (WA)		•
Transportation Energy Service Companies (ESCOs)		
Utility Cost-Savings Measures statute (CO)	•	
Loan Guarantees		
Renewable Energy and Efficient Energy Projects Title XVII loan guarantees (U.S. Department of Energy, Loan Programs Office)		•
Electric Vehicle Charging Station Financing Program (CA)		•

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