Equitable Strategy Map: A Toolkit for Greenhouse Gas Reduction through Electric Vehicles and Related Infrastructure for Low-Income and Disadvantaged Communities

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**Business as usual is no longer enough.** Communities of color, Native communities, and those who are economically disadvantaged are disproportionately impacted by the risks and realities of climate change. These are the Frontline Communities—Black, Indigenous, and People of Color, low- and middle-income (up to 200% of the Federal Poverty Level), and other disproportionately impacted communities who are experiencing climate change “first and worst” (Juarez J. M., 2023). Homes and farms are damaged. Workers and businesses face the impact of on-going economic shifts. Lives and livelihoods are at stake. We need to reinvigorate the community development field through deep commitment to resilience and climate change mitigation and begin to structure investments to ***ensure that resilience and greenhouse gas reduction are engineered into******every deal, every building, every business, every project, everywhere, for everyone.***

The Inflation Reduction Act (IRA) includes historic funding and opportunities to fuel greenhouse gas reduction for low-income and disadvantaged communities. ***In particular, the Environmental Protection Agency’s (EPA) $27 billion Greenhouse Gas Reduction Fund (GGRF) represents a critical tool for realizing the vision of a more equitable, climate resilient future.*** Since late 2022, the University of New Hampshire’s Center for Impact Finance (CIF) and the Natural Resources Defense Council (NRDC) have led a “sprint design process” to develop “equitable strategy guides” to inform equitable greenhouse gas reduction through traditional lending lines of business in key market sectors.

Through this "sprint design lab" process, supported by CIF and NRDC staff and consultants, **expert teams have shared knowledge and developed recommendations for delivering equitable resilience and greenhouse gas reduction through coordination, cooperation, and collaboration by all members of the project development ecosystem**: Community Development Financial Institutions (CDFIs), community development banks and credit unions, Minority Depository Institutions (MDIs), Green Banks, and other mission lenders; community development corporations; environmental advocates; contractors; community groups; and others committed to a just, resilient future.

The resulting guides address how to (1) integrate and normalize greenhouse gas reduction into development services, financing, and asset management and (2) coordinate and collaborate on the most impactful ways to deploy Greenhouse Gas Reduction Fund (GGRF) dollars to scale clean energy financing in low income and disadvantaged communities and maximize "co-benefits" such as economic development, quality jobs, resilience, affordable housing, and sustainable food systems. Recommendations are grounded in deep, hands-on expertise, developed through working groups of relevant market participants and stakeholders who together estimated the investment opportunity in each market sector, identified barriers and potential solutions to scaling each lending line of business, brainstormed about collaborations necessary for project development, and discussed funding priorities.

Each design lab engaged a cohort of experienced lenders, developers, and thought leaders reflective of the project development and finance process for that market sector to develop an Equitable Greenhouse Gas Reduction Strategy Guide. Many thanks to all who participated.

## Scope

In this guide, we hope to make the case that investing in “greening” the transportation sector through increased electric vehicles (EVs), deployment of EV infrastructure in low-income and disadvantaged communities (LI/DACs), and other low/no carbon transportation modalities in LI/DACs should be a key strategy for the EPA’s GGRF. Currently, this guide focuses primarily on the consumer market: passenger cars, e-bikes, and related infrastructure. We hope to expand the guide to include the commercial market: light-duty trucks; medium-duty trucks; heavy-duty trucks; and commercial fleets such as school buses. For a deep dive into financing decarbonization in small businesses, consult the [Equitable Strategy Map: A toolkit for Equitable Greenhouse Gas Reduction Through Small Business Finance in Key Market Sectors](https://carsey.unh.edu/sites/default/files/media/2023/06/6-7-23_final_small_business_finance_equitable_strategy_map_draft_for_comment.docx).

Investments in EVs, related infrastructure, and the greening of transportation generally will not only help mitigate the harmful effects of greenhouse gas pollution but will simultaneously increase wellbeing and resiliency in the communities most affected by these emissions, by delivering substantial “co-benefits” such as better health outcomes, economic development and wealth-building opportunities, and more. Below, we describe the potential opportunities related to this sector and make concrete recommendations to ensure efficiency, effectiveness, accountability, and—above all else—equity in implementation.

We have attempted to keep our focus tight on these specific assets and the market sector that designs, develops, and finances them. For overall recommendations around the implementation of the Greenhouse Gas Reduction Fund and other market sectors, please consult the Center for Impact Finance’s webpage “[An Equity-Centered, Collaborative Approach to Greenhouse Gas Reduction for Low-Income and Disadvantaged Communities](https://carsey.unh.edu/center-for-impact-finance/current-projects/equity-centered-collaborative-approach-greenhouse-gas-reduction-low-income-disadvantaged-communities)”.

## Overview of Opportunity

The transportation industry is the largest contributor to greenhouse gas (GHG) emissions and many neighborhoods—particularly low-income ones—are not shaped to fit the needs of people living within them, often facilitating car travel over other modalities such as walking, biking, or transit. Increased investment into electric vehicles and related infrastructure as well as public transit and other mobility options holds the key to significant advances in GHG reduction, as well as environmental justice in LI/DAC communities.

There is a real opportunity for market transformation in this sector, by leveraging the $3 billion set aside for transportation equity and environmental justice initiative in the Inflation Reduction Act, including supporting access to transportation for low-income and historically marginalized communities (Jennings, 2022). For example: $1.89 billion within the [Neighborhood Access and Equity Grants Program](https://www.congress.gov/bill/117th-congress/house-bill/5376/text) will be directed toward addressing these issues around the country, and an additional $1.1 billion is reserved specifically for such programs targeting low-income communities. “Local governments, public authorities, metropolitan planning organizations, and several other groups will all be eligible to apply for funding through this program (Jennings, 2022).” Investments at the federal level, as well as nationwide demand increases for alternative sources of transportation has created a unique window of opportunity for private, public, and statewide entities to make strategic investments into electric vehicles and related infrastructure and greatly impact the health, resilience, and economic development of LI/DACs.

### Transportation-Related Activities Overall

According to the EPA, transportation activities are the ***largest source of global warming emissions in the United States, contributing around 28% of total emissions*** (EPA, 2023). As of 2021, passenger cars, medium and heavy-duty trucks, and light-duty trucks — including sport utility vehicles, pickup trucks, and minivans—accounted for over 80% of transportation-related greenhouse gas emissions (US Environmental Protection Agency, 2021). After pandemic related declines, emissions were back up in 2021 (US Environmental Protection Agency, 2021):  
  
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A 2007 study led by the Urban Land Institute described the three-legged stool needed to reduce greenhouse gases from automobiles (Ewing, 2007):

* Vehicle fuel efficiency
* Carbon content of the fuel itself
* Amount of driving or vehicle miles traveled (VMT)

Others use the ***Avoid-Shift-Improve (ASI)*** framework to communicate the integrated, inter-modal and balanced approaches critical to unleashing the full benefits of sustainable, low carbon transport (Avoid-Shift-Improve Refocusing, 2023). The SLOCAT diagram below shows a non-exhaustive list of measures to (1) ***avoid*** and reduce the need for motorized travel, (2) ***shift*** to more sustainable measures, and (3) ***improve*** transport modes (Avoid-Shift-Improve Refocusing, 2023):

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### Consumer Loans for Passenger Vehicles

According to the International Energy Agency’s (IEA’s) Global EV Outlook, electric car sales in the United States reached a sales share of 8% in 2022, an increase of 55% over 2021 (International Energy Agency, 2023). Further, IEA predicts that the market share for electric cars could reach 50% by 2030, propelled by the Inflation Reduction Act (IRA) and the adoption of California’s Advanced Clean Cars II rule by a number of states (International Energy Agency, 2023). To date, seven states have adopted versions of the rule which requires manufacturers to increase sales of electric and other zero-emission models within the state over time, culminating with 100% of new sales in 2035—California, Washington, Oregon, Massachusetts, New York, Virginia, and Vermont—and at least five others are considering it (Ceres, 2023).

Why the relatively slow adoption rates to date? Interest in purchasing an EV is not the problem: a 2022 nationally representative survey conducted by Consumer Reports with input from the Union of Concerned Scientists, GreenLatinos, and EVNoire found high overall interest in purchasing EVs across all racial demographics with communities of color reporting higher levels of interest than white consumers—38 percent of Black, 43 percent of Latino, and 52 precent of Asian Americans say they would “definitely” or “seriously consider” purchasing or leasing an EV as their next vehicle. Barriers identified include costs, charging, and lack of firsthand experience with an EV. Availability of publicly accessible charging remains a greater concern than convenience orlong charging times*,* for those who reported charging as an issue limiting adoption. (Consumer Reports, et al., 2022)

However, perceptions of both upfront costs and costs over time may already be outdated and the economics are continuing to improve quickly. A report released in July 2023 by the Environmental Defense Fund and WSP studied the lifetime costs of owning new electric vehicles with comparable gasoline vehicles over a decade including the purchase costs of the cars and home chargers, annual registration, maintenance, insurance, and fuel costs (Environmental Defense Fund, 2023). They found that all of the studied electric vehicles are expected to be the same or less expensive to own and operate over their lifetime than the comparison gasoline vehicles—with a total lifetime savings of $18,440 (Environmental Defense Fund, 2023). Furthermore—while this analysis did include federal tax credits now available, it did not take into account state and local tax credits and purchase incentives available in some jurisdictions—in those places, the total costs of ownership would be even less for EVs (Environmental Defense Fund, 2023).

Further, there is recent encouraging news about the deployment of public electric vehicle charging infrastructure in the US. A July 2023 study by the Environmental Defense Fund and WSP found that existing and already announced public EV charger deployments will provide at least 70% of the public chargers needed in the US by 2030 (Environmental Defense Fund, 2023). Their conclusion: “[m]arket forces together with incentives from recent federal policy have attracted a wide array of players to invest in public charger deployments.” (Environmental Defense Fund, 2023). The increase in the pace of charger announcements increased dramatically following the passage of the Inflation Reduction Act (Environmental Defense Fund, 2023). That said, community development lenders can help accelerate investment in LI/DACs.

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Mission lenders and others in the community development ecosystem are well-positioned to leverage the opportunities in recent federal legislation as well as state, local, and utility incentives to ensure that low-income and disadvantaged communities aren’t left behind as the US transitions to electric passenger cars and supporting infrastructure. CDFIs and other mission lenders can leverage existing relationships with low-income/disadvantaged consumers, and EVs represent a new market opportunity, generating new customers in their footprints.

### Emerging Markets in low-carbon transportation

The pandemic accelerated the adoption of e-bikes: sales of new e-bikes were up over 145% in 2020 compared to 2019 (Bikes Make Life Better, 2023). Building owners and managers can support the use of e-bikes—and regular bikes for that matter—by providing convenient, easily accessible, and secure bike parking and charging facilities (Bikes Make Life Better, 2023).

Other strategies include car sharing, ride sharing, and micro mobility modalities such as bicycles, scooters, and skateboards.

### EV Charging Infrastructure

EV infrastructure refers to buildings, materials, structures, and equipment that are used to support the charging and maintenance of electric vehicles. As mentioned above, there is promising news around the deployment of EV charging infrastructure. That said, with most of the nation’s public chargers clustered in areas where wealthy, predominantly whiter early adopters live, and areas with little to no public charging often fall along racial and socioeconomic lines (Lindwall, 2023). Ensuring affordable, accessible, and safe publicly accessible charging is a matter of equity—and one that the community development ecosystem is well positioned to address.

*“[E]nsuring that public charging infrastructure is affordable, accessible, reliable, and*

*situated in safe locations is a matter of equity.”* (Consumer Reports, et al., 2022)*.*

More businesses are installing EV chargers to attract customers (Struett, 2023). As of 2018, the US Energy Information Administration estimated that only 2% of commercial buildings had EV charging stations; and, the smaller the building, the less likely it is to have a charging station (US Department of Energy Information Administration, 2018). That said, as EVs grow in popularity and gain market share, the demand for EV chargers at commercial buildings will increase (Better Buildings, US Department of Energy, 2023). By installing EV chargers at commercial buildings and community facilities in and for low-income and disadvantaged communities, a building owner or manager can further equitable deployment of EV infrastructure while simultaneously attracting customers and clients and serving employees.

A building owner has choices to make around EV charger type, ownership options, and business models that we won’t get into here, but they could use help from their lender to navigate (Better Buildings, US Department of Energy, 2023).

In addition, investments in electric vehicle infrastructure play a key role in bringing economic prosperity to disadvantaged and low-income communities through a boost to the tourism industry. As part of its Rural EV Toolkit, the US Department of Transportation explains that “publicly available charging infrastructure at public lands and in gateway communities helps to encourage visitors with electric vehicles to visit and to support the local economy.” (US Department of Transportation, 2023). Through increased accessibility to EV charging stations, drivers will provide increased revenue from frequent EV driver visits bringing money into small business, as well as increasing EV market competition between states (U.S. Department of Transportation, 2023).

### Avoid: Reducing Vehicle Miles Traveled

The mile with the smallest carbon footprint is the one not traveled at all. Greenhouse gas emissions from transportation related activities can be cut by reducing the number and length of trips for work, play, and other activities, as was demonstrated by the sharp reduction in emissions in 2020 during the pandemic. Analysis by the Rocky Mountain Institute (RMI) “...indicates that the United States must reduce VMT by 20 percent before the end of the decade to limit warming... even under ambitious EV adoption scenarios” (RMI, 2021).

Location matters for greenhouse gas mitigation and lenders, developers, and owners should place high importance on location considerations when planning investments. According to the Center for Transit-Oriented Development, “Transit-Oriented Development or TOD is typically defined as more compact development within easy walking distance of transit stations (typically a half mile) that contains a mix of uses such as housing, jobs, shops, restaurants and entertainment (Reconnecting America: Center for Transit-Oriented Development).” Smart growth policies contribute to both mitigating climate change by reducing greenhouse gases from development and adapting to climate change by making communities more resilient to the effects of climate change. Compact development allows people to live within walking or bicycling distance of their daily destinations, driving 20 to 40 percent less while gaining health and fiscal benefits (Ewing, 2007). Going beyond general smart growth practices, service providers and businesses can cut down on transportation costs and greenhouse gas emissions by co-locating with other providers and businesses that serve the same customers or clients.

## Key Players

Meaningful greenhouse gas reduction in this sector will require coordination and collaboration by lenders, state and local governments, and industry stakeholders. A successful strategy should consider and leverage the unique role each actor plays. Below, we highlight some of these players and how they fit into the transportation puzzle.

### Mission-driven Lenders

Mission-based lenders such as CDFIs and credit unions provide **both consumer lending** to low-income/disadvantaged/underserved individuals **and commercial lending** in LI/DACs in the form of 1) equipment loans for EVS, 2) early-stage financing (predevelopment; acquisition) critical to scoping out building decarbonization pathways, 3) subordinate debt (bridge; construction) key to financing deeper GHG-reducing improvements that include clean mobility features, and 4) financing for EV-related business development/expansion. Consumers and businesses with existing lender relationships represent a target market for EV and EV infrastructure loans.

Lenders can finance decarbonization investments—including EV charging infrastructure—through standalone financing or as part of a financing package for a larger project. Lenders may also promote the idea of energy/cost-saving investments and connect borrowers to other key players. Lenders who can reach commercial and mixed-use real estate, affordable multifamily housing, and community facilities in LI/DACs and underserved communities include:

* + Primarily community banks and nonprofit loan funds
  + Some CDCUs, Community Development Banks, and MDIs
  + Some Green Banks, such as SELF in Florida, CT Green Bank, Michigan Saves, and Colorado Clean Energy Fund, offer or have partnered with community lenders to help them provide attractive lending products for improvements to commercial buildings, CRE developers, and contractors.

### Green Banks

Green banks—not technically banks at all—are mission-driven institutions that leverage private and public resources, innovative partnerships, and local knowledge to serve the unique clean energy needs of their communities. They use public capital to mobilize more private investment into underserved green and resilient financing markets to fill market gaps with the ultimate goal of enabling private capital partners to enter clean energy markets at scale without assistance. Many green banks provide financing for clean mobility infrastructure. Green banks are great potential partners for community development lenders as well as traditional banks that provide related vehicle and real estate financing.

### State and Local Entities, including Energy Offices

State and local policymakers set policies and mandates to achieve climate targets, develop programs to help customers access them, and sometimes authorize funding to support these goals. State policies can be instrumental in driving change, such as adoption of California’s Advanced Clean Cars II rule by a number of states (International Energy Agency, 2023). As mentioned above, to date, seven states have adopted versions of the rule which requires manufacturers to increase sales of electric and other zero-emission models within the state over time, culminating with 100% of new sales in 2035—California, Washington, Oregon, Massachusetts, New York, Virginia, and Vermont—and at least five others are considering it (Ceres, 2023).

State Energy Offices often serve as a vehicle for distributing federal funds.The 56 [*State and Territory Energy Offices*](https://www.naseo.org/members-states) are important agents of change – advancing practical energy policies, informing regulatory processes, and supporting energy technology research, demonstration, and deployment. In partnership with the private sector, State Energy Offices accelerate energy-related economic development and support state climate goals through energy solutions that address their citizens' needs and enhance physical and cyber energy security (National Association of State Energy Officials, 2023).

State Energy Offices' work is generally under the direction of the governors or legislatures, and is funded by both state and federal appropriations, such as the [U.S. State Energy Program (SEP)](https://www.naseo.org/state-energy-program). Deeply involved in energy efficiency and renewable energy programs, State Energy Directors and their offices allocate or oversee more than $7 billion of efficiency funds derived from ratepayers and state appropriations each year (National Association of State Energy Officials, 2023).

### State Economic Development Authorities

State Economic Development Authorities or “EDAs” support existing businesses, encouraging entrepreneurship, recruiting new businesses, and coordinating the economic development activities of their local governments. For example, the [Massachusetts Clean Energy Center](https://www.masscec.com/) (MassCEC) is a state economic development agency dedicated to accelerating the growth of clean energy sector across the state and to spur job creation, deliver statewide environmental benefits and to secure long-term economic growth for the people of Massachusetts. Clean transportation is one of MassCEC’s areas of focus, which aims to accelerate the commercialization of clean transportation technologies, animate new markets, and cultivate the growth of the clean transportation workforce.

### Public Utility Commissions and Other Regulators

Public utility commissions and other power regulators are also key entities that set policies and regulations utilities must follow in relation to building decarbonization and potential grant programs. They set specific energy efficiency and decarbonization targets for utilities under their jurisdiction and approve of ratepayer funding to enable such programming. Regulators monitor utility performance every few years and put in place interim adjustments if programs are not performing as desired. Regulators also can approve the creation of specific lending programs for energy efficiency and decarbonization investments, allowing utilities to implement on-bill financing programs (which are generally provided by third-party capital providers), funding lenders to provide discounted loans, or funding green banks (such as the Connecticut Green Bank and the New York Green Bank).

### Local Utilities and Energy Efficiency Entities

Local utilities and energy efficiency entities play a key role in greenhouse gas reduction. Many of these entities oversee and manage energy efficiency and decarbonization programs to achieve the targets set for them by the regulators, usually using ratepayer funds (though these can be supplemented by carbon taxes and other sources of funds, such as penalty payments, wholesale electricity market revenues, and state budget funds). In some states, such as New York, Oregon, and Vermont, there is a state-wide entity that plays an important role in designing and administering such programs. Learn more about your local utility programs from the [Database of State Incentives for Renewables & Efficiency](https://www.dsireusa.org/)

### Industry Stakeholders

* ***Dealers:*** According to a new report from the Sierra Club, 66 percent of car dealerships nationwide did not have a single EV available for sale (Sierra Club, 2023). Of that 66 percent, 44 percent reported they would offer an EV for sale if they could get one but 45 percent of those dealers reported they *would not offer an EV for sale regardless* of automaker allocation and supply chain constraints (Sierra Club, 2023).
* ***Direct Sales:*** Twenty-three states have “Direct Sales” laws that allow manufacturers such as Tesla, Lucid Motors, and Rivian to sell directly to consumers in their states through storefronts that are owned directly by the respective companies instead of through independent car dealership (Sierra Club, 2023). Direct sales states sold 615,724 EVs in 2022, representing 65 percent of all EVs sold nationwide (Sierra Club, 2023).
* ***Non-Direct Sales:*** Non-direct sales do not allow for manufacturers to sell directly to consumers but instead require them to sell through independent dealerships. In 2022, these states sold 333,587 EVs, representing 35 percent of all EVs sold nationwide. These restrictive laws create barriers to entry for manufacturers like Tesla, Lucid Motors, and Rivian that have business models based on selling directly to consumers (Sierra Club, 2023).
* ***Service providers for Electric Vehicles:*** Currently, EV maintenance/repair is generally conducted by the EV dealer or manufacturer (Marketplace, 2023). As EVs and EV-technology become more mainstream, there will be a greater need for after-market service providers leading to business startup and expansion.

## Social Equity Concerns

If designed and implemented well, investments in the electrification of transportation and other clean mobility strategies can significantly address economic and racial inequities across a number of outcomes, from health to supporting wealth creation. However, if these goals and considerations are not centered around supporting LI/DACs, investments have the potential to exacerbate existing inequities. Below, we discuss some important issues to keep in mind, as well as key opportunities to further environmental justice.

### Cost of Transportation

Transportation is the fourth largest household cost after healthcare, housing, and food (U.S. Bureau of Transportation Statistics, 2021). The Center for Neighborhood Technology’s Housing and Transportation Index offers an expanded view of affordability, one that combines housing and transportation costs to show that location-efficient places can be more affordable as well as more livable. Further, location-efficient places have lower annual GHG emissions from household auto use—check out your location in the [H&T Greenhouse Gas Emissions tool](https://htaindex.cnt.org/compare-greenhouse-gas/).

### Access to Auto Financing

As the National Equity Atlas points out, reliable and affordable transportation is critical for meeting and accessing educational and employment opportunities—and in most American communities, reliable transportation still means a car (National Equity Atlas, 2020). Households headed by people of color are less likely than white households to have access to a vehicle, with Black headed households least likely to have access to a vehicle at 18% (National Equity Atlas, 2020). Further, for all racial and ethnic groups, female-headed households are less likely than male-headed households to have access to a vehicle (National Equity Atlas, 2020). Why do Americans of color have less access to vehicles than White Americans? The answer: income and wealth disparities and racially discriminatory pricing for auto loans and car insurance that make car ownership more costly (National Equity Atlas, 2020).

And these are the reality for vehicles of all types, not just EVs. About the transition to electric vehicles, a 2021 MIT Science Policy Review article concluded (Hardman, 2021):

* “Electric vehicle buyers are mostly male, high-income, highly educated, homeowners, who have multiple vehicles in their household and have access to charging at home.
* Electric vehicle model availability is increasing, however most new electric vehicles are luxury vehicles or SUVs which cost more than early models.
* Incentives for electric vehicles do not incorporate equity in their design, many are received post purchase, and some give more incentives to higher income buyers.
* Electric vehicle charging infrastructure is not equitably dispersed and more low-cost charging is needed in lower income residential areas.”

### Disproportionate Environmental Penalties

There's disproportionate and (literally) low-hanging pollution in these communities. Communities of color, Indigenous communities, and those that are economically disadvantaged are disproportionately impacted by longstanding environmental injustices as well as the risks and realities of climate change. This is especially the case along freight corridors and near major logistics hubs (Juarez & Mendiratta, 2021)

A 2022 report from the American Lung Association found that 41% of the population or 137 million people live in areas with unsafe ozone and particle pollution. Of this staggering statistic, people of color are 61% more likely to reside in an impacted community. Continued Exposure to these toxic pollutants can result in increased rates of asthma, strokes, heart attacks as well as premature death (American Lung Association, 2022).

With the transportation sector representing the highest percentage of GHG emission pollution, and heavy-duty vehicles accounting for 26% of GHG emissions, communities of color and low income residents become increasingly more vulnerable to the accompanying pollution and poor air quality. With 72 million Americans living in and around major truck routes, they become increasingly more vulnerable to adverse health effects (American Lung Association, 2022).

The 2022 Report by the American Lung Association outlines the following benefits of net-zero emissions from medium & heavy vehicles in transportation sector for communities along major trucking routes.

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## Deal Economies

### EV Economics

Currently, *new* EVs cost about $10,000 more than the industry average of all gas-powered and electric vehicles, but prices are “expected to shrink considerably in the coming years as manufacturers produce more affordable models and battery technology (which is the most expensive part of an EV) improves” (NRDC, 2022). Studies by the University of Michigan’s Transportation Research Institute and Consumer Reports show that drivers of EVs save about 60 percent on fuels costs per year, compared to gas-powered cars, but savings calculations depend on vehicle efficiency, how much you drive, regional electric costs, and where and when you charge (NRDC, 2022). That said, EV maintenance and repair is typically half as much as that of gas-powered cars. Overall, EVs can provide between $6,000 and $10,000 in savings over the life of the vehicle versus a similar gasoline model, and “the cost savings of 5- to 7-year-old used EVs was found to be two or three times larger on a percentage savings basis” (Consumer Reports, 2020).

Included in these calculations is the value of federal tax credits: many individuals and businesses qualify for a $7,500 tax credit for new, qualified plug-in EV or fuel cell electric vehicle (IRS, 2023); and individuals can get up to $4,000 in credit for a qualified used EV or FCV (IRS, 2023).

### EV Infrastructure Economics:

The economics of EV infrastructure is highly dependent on the end-user(s), whether they are homeowners, renters, commercial customers, or the general public. Residents of all kinds can get a slow charge through their regular household outlet, but “EV owners who install faster chargers at home (so-called Level 2 equipment) tend to be much more satisfied with their cars overall” (Energy Sage, 2023). Homeowners would consider the cost of infrastructure as part of the overall EV investment, while renters may need or want to negotiate EV purchase/installation with their landlords, and both residential and commercial building owners would have to recoup the cost of EV infrastructure through rents or sales.

It may be difficult to justify the added cost of EV infrastructure for residents, landlords, and business owners in LI/DACs, which subsidies funded with GGRF dollars can help address, in addition federal and state tax incentives, rebates, and other incentives offer by utility companies. The IRA established a 30% federal tax credit for EV chargers in rural and low-income communities, up to $30,000 for depreciable property and $1,000 for all other property (IRS, 2023).

## Barriers to Market Development

In this section, we describe the complicated set of economic, physical, regulatory, and social barriers to greening this sector, getting investable deals, and achieving impact. The challenges are particularly acute in LMI and disadvantaged communities. While a number of barriers exist to decarbonizing transportation, **there are proven financing and technical assistance strategies that can be deployed, particularly when considering the role Green House Gas Reduction Fund capital can play.**

* ***Affordability:*** Both upfront and lifecycle costs can be a significant barrier, real or perceived, as discussed above.
* ***Availability/Scarcity:*** Shortages of EVs, particularly affordable EVs and used EVs are a real obstacle for adoption by LMI/DACs.
* ***Public Perception re: Infrastructure:*** Actual and perceived shortages of accessible, affordable, safe public charging infrastructure
* ***Borrower Clean Energy Literacy****:* Potential EV buyers may not have the time and energy to research EVs and may be slow to adopt as a result, particularly if they haven’t had access or exposure to EVs from friends, family, neighbors, and others in their community. Further consumers, small business owners, and real estate developers alike often don’t have the expertise (or, again, time) to understand complex energy projects, though this wouldn’t be as important if borrowers had access to trusted, qualified channel partners and turn-key solutions.
* ***Timing****:* Adding charging infrastructure at commercial real estate and community facilities must account for the various investment cycles for equipment and building retrofits among community facilities and small CRE, that typically don’t replace equipment until needed. For more information on this issue, see the *Equitable Strategy Map: A Toolkit for Greenhouse Gas Reduction through the Greening of Commercial Real Estate and Community Facilities*, downloadable from the CIF webpage, [An Equity-Centered, Collaborative Approach to Greenhouse Gas Reduction for Low-Income and Disadvantaged Communities](https://carsey.unh.edu/center-for-impact-finance/current-projects/equity-centered-collaborative-approach-greenhouse-gas-reduction-low-income-disadvantaged-communities).
* ***Resources and Technology:*** Difficulties and/or costs of estimating and tracking emissions reductions.
* ***Lack of Economic Return:*** Building owners may not understand how to monetize investments in charging infrastructure and/or other supports for clean mobility—and those investments may not make economic sense, particularly in the short term.
* ***Length of Payback Period:*** Depending on the energy project, geographic area, local incentives and energy costs, projects may have too long of a payback period to attract interest from owners.
* ***Split Incentives****:* This is an issue for commercial building owners and tenants wherein owners aren’t incentivized to make improvements if they don’t pay the building utilities or reap the benefits from customer and employee satisfaction, and tenants aren’t incentivized to make improvements to assets they don’t own and/or won’t pay for themselves during their lease period.
* ***Supply-Side Constraints****:* There is a dearth of developers, installers, service providers, and other clean energy workforce needed to implement decarbonization strategies, in general, and especially in small/rural/underserved communities.
* ***Legal and Regulatory Barriers/Hurdles****:* Some states and localities have policy barriers to clean energy adoption, such as long queues for approval or flat-out moratoriums on certain energy project development. Apparently, the state of Mississippi passed a law to prevent the opening of electric car dealerships that do not operate under a franchise model; as a result both Tesla and Rivian were barred from operating a dealership in the state because neither one uses this model (Pollard, 2023).
* ***Lack of Centered Models:*** Lack of culturally appropriate service models and community outreach and engagement tactics.
* ***Lack of Alignment:*** Alignment between the goals, strategies, and service offerings of key players such as local governments, utilities, etc.: Well-meaning players may confuse building owners and managers and other consumers by providing a dizzying array of services—resulting in paralysis instead or progress.
* ***Workforce Training:*** There is a dearth of skilled technicians, operators, and maintenance workers in the EV industry and need for training. Two relevant examples:
  + ***California’s Sustainable Transportation Equity Project (STEP)*** is a Clean Mobility Equity Pilot Program that funds not only the groundwork to identify residents’ mobility needs in low-income and disadvantaged communities but funds infrastructure, zero-emission vehicles and other mobility options, land use, pricing innovations, workforce development, community engagement activities and staff-time for operating services (Creger, 2021).
  + ***On The Road Garage*** offers on-the-job apprenticeship training within five programs registered with the US Department of Labor. Each Garage location has onsite charging stations that are used to train apprentices on the repair of electric vehicles and calibration of advanced driver assistance programs.

## Recommendations for Deployment of GGRF Dollars

Below are a set of recommendations for greenhouse gas reduction in this sector, through equitable deployment of GGRF dollars and other federal, public, and private investments. These recommendations are grounded in deep, hands-on expertise and were developed in collaboration with experts and practitioners, including working groups of relevant market participants and stakeholders who together explored the investment opportunity in this market sector, identified and discussed barriers to scaling this particular lending line of business, and considered potential solutions and funding priorities. Contributors considered how best to deploy GGRF funds into this space, with a focus on the highest priority strategies needed to turn on the spigot of creditworthy, impactful decarbonization projects in LI/DACs.

In this guide, we focus on the levers within control of community development investors and developers, leaving aside the large-scale public investment, planning, and policy decisions around public transit systems and the like. That said, this is a surefire opportunity for additionality and these projects won't happen without GGRF's help.

### Reduce Driving

* Increasing access to low- and no-emission modes of transportation
* Support Transit Oriented and Smart Growth Development
* Support Compact Development

### Close the Demographic Gap in EV Ownership

The 2022 report by Consumer Reports, Union of Concerned Scientists, EVNoire, and GreenLatinos recommended a three-pronged set of policy recommendations to help close the demographic gaps in EV ownership (Consumer Reports, et al., 2022):

* Increasing access to EVs
* Increasing access to EV infrastructure
* Increasing community awareness

Below, we identify strategies for mission lenders and others in the community development sector to advance these strategies toward more equitable EV ownership and access.

#### Increasing Access to EVs

Strategies aimed at consumers include:

* **Purchase incentives:** Provide purchase incentives to drive down up-front costs, making sure that these incentives are accessible and equitable (Consumer Reports, et al., 2022).
* **Scrap-and-replace programs:** Target the most polluting vehicles in the low-income communities most affected by pollution with scrap-and-replace programs to eliminate the worst vehicles and replace them with zero-emission vehicles (Consumer Reports, et al., 2022).
* **Used vehicle incentive programs**: Create or expand separate incentive programs for used vehicles, since communities of color are most likely to purchase vehicles on the secondary market (Consumer Reports, et al., 2022).
* **Financing strategies to improve affordability such as loan guarantees and low- or no-interest loans for qualifying low-income households** (Consumer Reports, et al., 2022)**:**
  + Some lenders such as the [Clean Energy Credit Union](https://www.cleanenergycu.org/personal/clean-energy-vehicle-loans/) don't finance any gas-only cars—just new and used plug-in hybrids and fully electric vehicles.
  + [Genesee Co-op Federal Credit Union](https://www.genesee.coop/new-and-used-auto-loans) and [USC Credit Union](https://www.usccreditunion.org/vehicle-loans/) provide a rate buydown for “green” cars with a fuel economy rating of at least 35 MPG.

Strategies aimed at financial institutions:

* **Incentive programs aimed at financial institutions:** Affordable financing options could and should be unlocked through incentives aimed at financial institutions themselves (Consumer Reports, et al., 2022).

#### Increasing Access to EV infrastructure

Strategies include:

* **Incentivize and assist apartments and condominiums to provide access to EV charging**, since Black and Latino Americans are substantially more likely than white Americans to live in multifamily housing (Consumer Reports, et al., 2022).
* **Incentivize the provision of EV charging infrastructure in the workplace,** which could help compensate for the gap in access to at-home charging (Consumer Reports, et al., 2022).

### Finance strategically

Affordability is a key market barrier and source of inequity; therefore, grants, rebates, and accessible, affordable, equitable car loans can make all the difference.

* Understand and leverage available rebates.
* Provide capital (debt and equity) strategically to serve and incentivize specific markets.
* Seed capital and predevelopment.
* Support secondary markets to unlock capital flow.

### Campaign for Hearts and Minds

* Make the case for the decarbonization opportunity.
* Make the case for the resilience opportunity.

General recommendations applicable to this sector

* **Incentivize sustainable and impactful strategies based on meaningful coordination, cooperation, and collaboration with other organizations across the project delivery and financing ecosystem**. We envision an alliance of mission lenders – community development financial institutions (CDFIs), Minority Depository institutions (MDIs), credit unions, community development banks, green banks, and others – community development corporations, clean energy and decarbonization technical assistance providers, environmental advocates, and likeminded organizations working across the project delivery and financing ecosystem to center equity and resilience through climate-safe community development.
* **Insist on democratic, community accountability in the investment of these dollars**, with a transparent and fair process at all levels. As an institution intended to serve the needs of low-income and disadvantaged communities, any recipient of GHGRF dollars must reflect, understand, and be accountable to their communities. Under the CDFI Fund’s regulations, CDFIs are required to be accountable to their communities.
* **Direct grants to CDFIs and other lenders that have a demonstrated track record** and the capacity and a credible strategy to effectively deploy GGRF.

## Conclusion

Significant greenhouse gas reduction and improved health, economic, and resiliency outcomes are achievable through strategic investment with GGRF capital in the decarbonization of transportation in and for low-income and disadvantaged communities across the country.

Such outcomes will require coordination and collaboration by lenders, developers, installers, technical assistance providers, policy and advocacy groups, community groups, and other key players across the ecosystem. Successful investment strategies will address the complicated set of economic, physical, and regulatory barriers to developing an affordable, reliable, clean transportation market for this sector and achieving impact – challenges that are particularly acute in low-income and marginalized communities. By taking an ecosystem level approach to greening transportation, we can work to drive significant quality of life improvements for millions and begin to structure investments to ensure that resilience and greenhouse gas reduction are engineered into every investment, every building, every business, every project, everywhere, for everyone.

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## Links to relevant literature, websites, and case studies

### National Resources:

* [American Cities Climate Challenge (ACCC) EV Readiness resource library](https://drive.google.com/drive/folders/1pn4NnkYpxYUieCYjQWqJacsvoerBZ_ni?usp=sharing)
* [USDOT EV funding/financing resources](https://www.transportation.gov/rural/ev/toolkit/ev-infrastructure-funding-and-financing)
* [Greenlining mobility equity resource page](https://greenlining.org/our-work/environmental-equity/electric-vehicles/)
* [ICCT report on EV incentive design](https://theicct.org/sites/default/files/publications/ICCT_IZEV-incentives-comp_201606.pdf)
* [ICCT on funding the EV transition](https://theicct.org/sites/default/files/publications/Funding_transition_ZEV_20191014.pdf)

### Potentially relevant CA and OR Programs:

* [Greenlining lessons from CA clean transportation programs](https://greenlining.org/publications/reports/2021/clean-mobility-transportation-equity-report/)
* Clean vehicle grants
* [Clean cars for all](https://ww2.arb.ca.gov/sites/default/files/movingca/vehiclescrap.html)
* [CAL eVIP](https://calevip.org/)
* [Charge Ahead CO](https://energyoffice.colorado.gov/zero-emission-vehicles/grants-incentives/charge-ahead-colorado)

### TDM and equitable TOD:

* [Elevated Chicago resources](https://elevatedchicago.org/resources/), including [ETOD policy plan](https://elevatedchicago.org/wp-content/uploads/2022/05/ETOD-Full-Policy-Plan-with-Appendices-6-15-21.pdf) and [Connected Communities ordinance](https://www.chicago.gov/city/en/sites/equitable-transit-oriented-development/home/connected-communities-ordinance.html#:~:text=The%20Connected%20Communities%20Ordinance%20advances,to%20reflect%20Chicago's%20ETOD%20Policy)
* [Equitable TDM policy](https://nelsonnygaard.com/five-steps-toward-equitable-inclusive-tdm/) (includes some specific multifamily insights)
* [Guide to TDM implementation](https://nelsonnygaard.com/the-new-tdm-guide/)
* [ACCC Parking/TOD resource library](https://drive.google.com/drive/folders/1IkcW7P5FnFO2I0XyJp3ZQVJWpaLotSDV?usp=sharing)
* [ACCC TDM and transportation behavior change resource library](https://drive.google.com/drive/folders/14J5IKKP2F8QMLy4cTZl3XqKhZ5l0YY3J?usp=sharing)