U.S. Department of Transportation, Climate Change Center
Climate Strategies that Work

SHARED MICROMOBILITY & MICRO TRANSIT

Shared and electric micromobility offer convenient, flexible, and clean travel options while improving public health and addressing gaps in urban mobility.

Table of Contents

Overview

GHG Reduction Potential

Co-Benefits

Cost Considerations

Funding Opportunities

Complementary Strategies

Case Studies

Implementing Shared Micromobility &
Micro Transit: What to Read Next

Resources

References

OVERVIEW

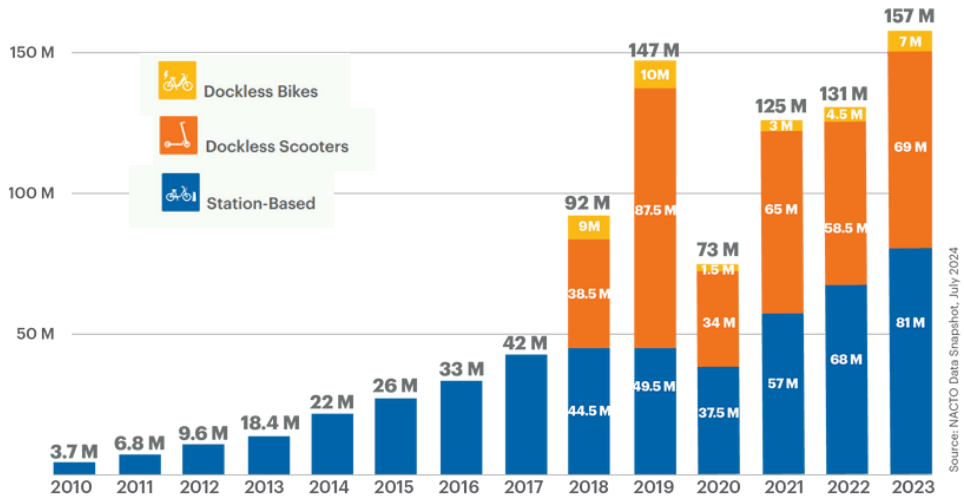
Best Suited for:
Long Term & Short Term
Urban, Suburban, Rural, & Tribal

Shared micromobility is defined as small, lightweight human-powered or electric vehicles operated at low speeds, such as docked and dockless e-scooters and bikeshare systems. According to the National Association of City Transportation Officials (NACTO) (2024), **people in the United States took more than 133 million trips on shared bikes and e-scooters in 2023**, an increase of 17% since 2022 and nearly 10-fold increase from 2013.

Most shared micromobility trips are 15 minutes long and average 1.5 miles. Shared micromobility has a role to play in transportation decarbonization by increasing access to low-carbon transportation modes.

Shared bikes and e-scooters are **particularly useful for first and last mile connections to public transit, for people without access to a personal bike or scooter or without the space required to store them, for one-way trips, and for visitors and tourists.** These systems have become an increasingly common and vital part of the transportation ecosystem.

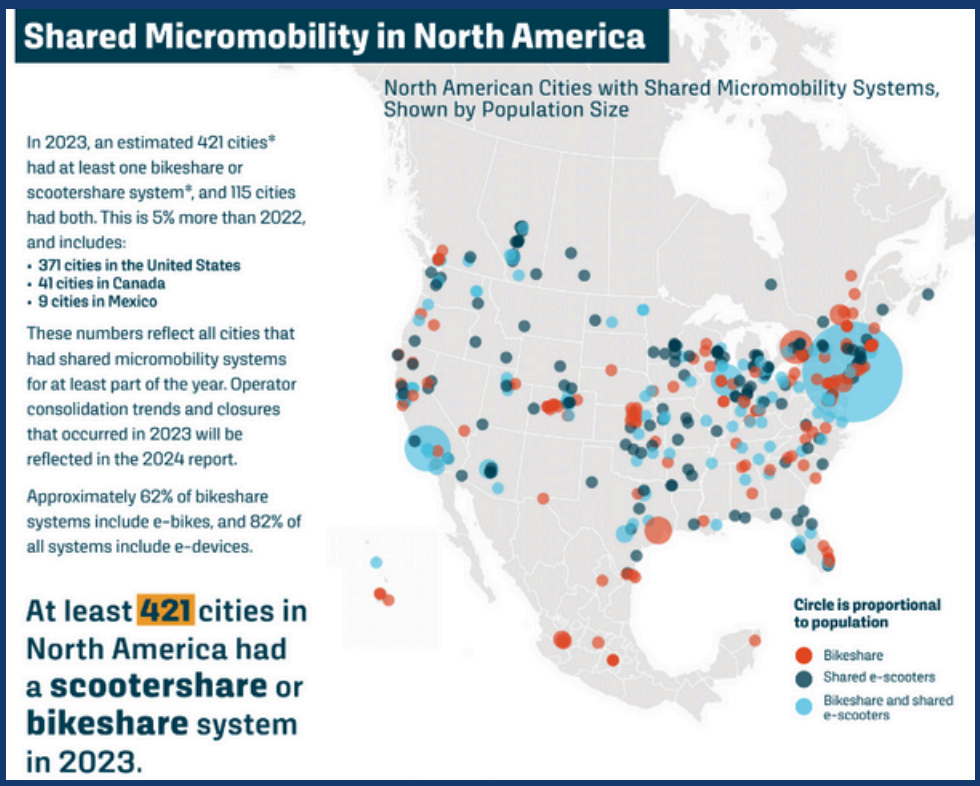
Micromobility systems can be station-based or "dockless," as well as have different ownership models. The longest running and most-heavily used systems in the U.S. and Canada operate as public-private partnerships or city-run nonprofits. Programs that offer adaptive bike share options can better serve the disabled community. Ideally, shared micromobility systems go hand in hand with safe and accessible bike networks, including bike lanes, trails, and protected bikeways. Bike share has become increasingly popular, leading to a greater need for multimodal streets that accommodate walking and biking at different speeds, in addition to room for personal and public transit vehicles.



Shared Micromobility Ridership in the U.S. 2010-2023 (Source: NACTO, 2024)

JUMP TO: Overview | GHG Reduction Potential | Co-Benefits | Cost Considerations
Funding Opportunities | Complementary Strategies | Case Studies | What to Read Next | Resources

Microtransit is defined as small-scale, on demand public transit services that that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling (APTA, n.d.). Microtransit may serve populations with unique needs, such as seniors and people with disabilities, rural communities with less capacity for robust public transportation network infrastructure, or highly dense urban areas with limited public transit options.



According to NACTO, the five longest-running and highest-ridership shared micromobility systems in the U.S. and Canada are:

- BIXI (Montréal)
- Bluebikes (greater Boston)
- Capital Bikeshare (greater Washington D.C.)
- Citi Bike (NYC, Jersey City, and Hoboken)
- Divvy (Chicago and Evanston)

Source: (NABSA, 2023)

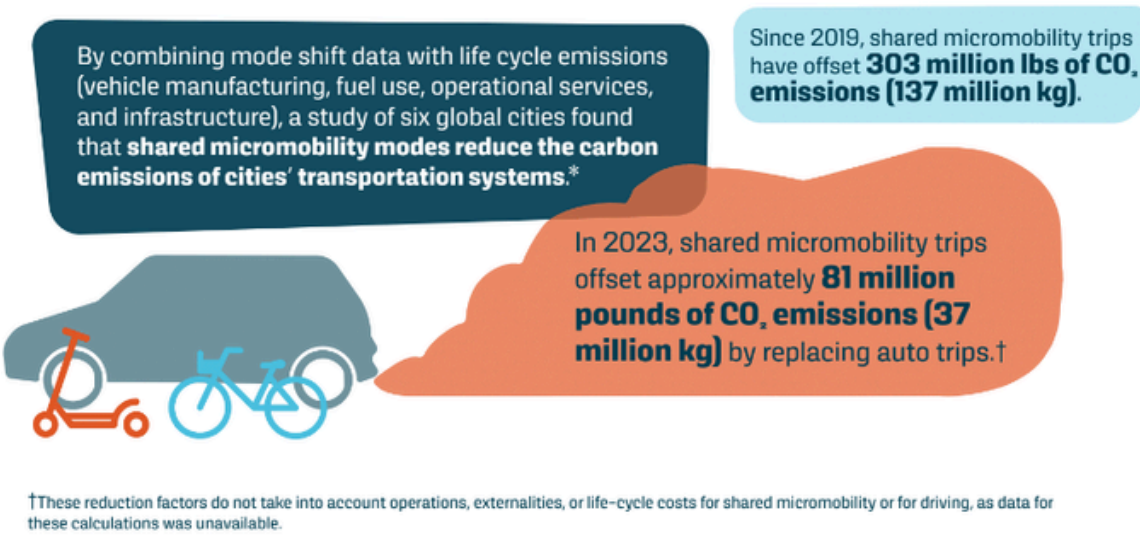
GREENHOUSE GAS REDUCTION POTENTIAL

This section provides an overview of greenhouse gas (GHG) emission reductions associated with the strategy. It highlights key findings and relevant metrics from GHG modeling resources, peer-reviewed studies, and real-world applications.

SHARED BIKES AND SCOOTERS REPLACE CAR TRIPS AND REDUCE EMISSIONS

The U.S. Department of Energy (DOE) National Renewable Energy Laboratory (NREL) found that at peak adoption, shared micromobility can save the equivalent of 2.3 billion gallons of gasoline per year nationwide (NREL, 2021).

In 2023, shared micromobility offset approximately 81 million pounds of CO_2 emissions (37 million kg) by replacing car trips. Thirty-seven percent of shared micromobility trips continue to replace car trips, and 70% of riders report that they used shared micromobility to connect to transit. In these ways, shared micromobility is a powerful climate action tool that helps to decarbonize transportation (NABSA, 2024).



Source: (NABSA, 2023)

Recent modeling by NREL found that by expanding access to shared electric bicycles and electric-assist bicycles (e-bikes) in Los Angeles to meet demand could reduce citywide vehicle miles traveled (VMT) by about 5%, GHG emissions by about 316,000 tons of CO_2e and electricity demand by about 187 GWh when compared to light duty EVs (NREL, 2021).

In a study of shared micromobility in six global cities, shared e-scooters and e-bikes provide net emissions benefits compared with other modes, particularly trips replacing ridehailing, personal car use, and carshare. For example, shared e-bikes provide a net CO_2e benefit per trip of 679 grams (Krauss et al., 2022).

Using Seattle as a model, researchers found that 18% of short car trips could be replaced by micromobility, reducing congestion on heavily driven urban roadways (Fan and Harper, 2022).

As part of a recent State of the Industry report, the North American Bikeshare and Scootershare Association (NABSA) conducted a user survey and found that 37% of shared micromobility trips replace a car trip (NABSA, 2024).

ON-DEMAND MICRO TRANSIT, INCLUDING ELECTRIC SHUTTLES, PROVIDE A CLEANER ALTERNATIVE FOR SHORT CAR TRIPS

In San Diego, the 'FRED' (Free Ride Everywhere Downtown) local shuttle program, launched in August 2016 in partnership with Circuit, reduces CO_2 emissions by 110.5 metric tons a year.

CO-BENEFITS

This section outlines the multiple co-benefits associated with the strategy, including safety benefits, local air quality improvements, and improved accessibility. Each co-benefit presents examples that demonstrate how the strategy enhances regional or community well-being while addressing emissions.

SAFETY

Investments in and the expansion of active transportation infrastructure for micromobility users are proven safety countermeasures promoted by Federal Highway Administration (FHWA) for reducing roadway fatalities and serious injuries.

See other FHWA Safety Countermeasures here.

Investment in active transportation can promote the perception and reality of safety. A higher volume of people walking, cycling, and scooting fosters a stronger sense of community (USDOT, n.d.).

Communities designed with pedestrians, bicyclists, and other micromobility users in mind can reduce the incidence of collisions, injuries, and fatalities on shared roadways. Safer streets and connecting trails can, in turn, encourage choices towards active transportation (USDOT, n.d.).

ECONOMIC GROWTH

Communities with well-connected active transportation networks and options for micromobility experience increased foot traffic, which translates to economic benefits for local businesses (Litman, 2024).

Investing in active transportation infrastructure creates jobs. International Energy Agency (IEA) data suggests that pedestrian and bike lanes generate 8 to 22 jobs for every million dollars spent. These jobs typically involve construction, painting, signage installation, and paving (IEA, 2020).

AIR QUALITY AND HEALTH

Reducing the number of emissions-emitting vehicles on the road (especially in densely populated areas) will decrease air pollutants that are harmful to human health (Sax, 2024).

Shared scooters, bikes, and other shared individual vehicles can bridge the last-mile gap, reducing traffic and congestion, which in turn reduces exhaust emissions that are harmful to health (EPA, 2014; Sax, 2024).

ACCESSIBILITY AND EQUITY

Shared e-scooters have a high potential to be a last-mile solution to transit. People of color, who have been historically underserved by the transportation system nationally and have lower access to emerging transportation modes, use shared e-scooters to connect with transit more frequently (Huang et al., 2024).

Shared micromobility operators and regulators have prioritized equitable access to micromobility facilities. 90% of North American systems offer discount programs, 72% offer alternative payment options, 67% incorporate geographic distribution policies, and 69% offer education and outreach programs (NABSA, 2024).

In a survey of NACTO member cities, income-based discounts were available in nine out of ten (91%) station-based systems and two out of three (67%) dockless systems. These programs have become increasingly common since 2016, when only 24% of shared micromobility systems offered income-based subsidies (NACTO, 2024).

Most shared micromobility services are app based, a disadvantage for individuals without smartphones, bank accounts, or credit or debit cards. To ensure that these devices remain accessible to all, micromobility operators can provide additional payment options (FHWA, 2022).

Shared micromobility operators can offer adaptive devices for individuals with physical disabilities who may be unable to ride traditional stand-up scooters or bicycles. Adaptive devices can take the shape of seated scooters, recumbent bicycles, hand-pedaled cycles, powered cycles that attach to wheelchairs, and others. Read about the San Francisco Municipal Transportation Agency's adaptive bike share program here.

Shared micromobility operators rebalance – or relocate – devices daily to meet public demand at different times and locations. Micromobility operators can use this regular process to ensure that they rebalance devices to areas that are underserved and disadvantaged (FHWA, 2022).

RESILIENCE AND ADAPTATION

Expanding access to micromobility can reduce the need for dedicating space to vehicle movement and storage, which can in turn enable other uses of limited urban land area (USDOT, 2023).

COST SAVINGS

Income-based pricing is a key component of ensuring equitable access to shared micromobility options. When shared micromobility trips are less expensive than riding the bus, particularly when buses connect to transit, they become more realistic options for price-sensitive riders (NACTO, 2023).

In 2022, the average cost of a 1.5-mile trip for regular bike and e-bike systems ranges from $2.30 to $5.50 depending on membership and pay-by-ride options. These costs are significantly less than average ridehailing and taxi rides in most cities for the same distance (NATCO, 2023).

Cost of typical shared micromobility trips (Source: NACTO, 2023)

The average cost of discounted memberships averaged $3.25 per month in 2022, with some systems costing as little as $5 for the entire year.

COST CONSIDERATIONS

There are several business and funding models available within shared micromobility. Typically, shared bicycle systems in the U.S. are public-private partnerships, while scooter shares are for-profit ventures.

Some systems require investment and cost-sharing from local governments, especially station-based, or "docked" systems that are most suitable for large, dense cities. Dockless systems tend to be lower-cost or free for local governments and may require private micromobility companies to pay the municipality/region/state for an operating permit.

COST OF IMPLEMENTATION

Costs of a shared micromobility project include administrative, capital equipment costs, and operation and maintenance costs. Capital costs for micromobility devices range from $400-800 for a non-electric bicycle up to $3,000-4,000 for electric bicycles. Docking stations, depending on features and station size, cost between $30,000 and $60,000 (Clean Mobility Options, 2022).

The estimated annual cost for the Dockless Micro-mobility Pilot Program in West Hollywood in FY21-22 was approximately $200,000, not counting staff time. This includes $170,000 for operations and $30,000 for capital. The program generated a revenue of $90,000 from operator permit fees which were directed to the city's General Fund (West Hollywood City Council, 2022).

The City of Boston proposed allocating $2 million in 2024 for its Bluebikes system, with funds specifically earmarked for discounted passes and for buying the system's first electric pedal-assist bikes (MilNeil, 2023).

FUNDING OPPORTUNITIES

FHWA compiles pedestrian and bicycle activities and their likely eligibility under U.S. Department of Transportation surface transportation funding programs in this table.

FHWA's **Congestion Relief Program**, established under BIL, provides competitive grant funding for programs that reduce congestion through pricing roadway use and parking, among other methods of decreasing congestion. This would have the benefit of encouraging other modes of travel that take up less road space, such as shared micromobility, while recapturing some of the value associated with road maintenance and construction from those who use the roads most.

FHWA's **Carbon Reduction Program** (CRP) funds projects designed to reduce transportation carbon dioxide (CO_2) emissions from on-road highway sources. CRP funds can be used for a variety of micromobility and active transportation projects.

FHWA's **Congestion Management and Air Quality Improvement (CMAQ) Program** supports surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. The BIL continues the CMAQ Program to provide a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act, including shared micromobility projects.

FHWA's **Active Transportation Infrastructure Investment Program (ATIIP)** supports planning and active transportation implementation (mobility options powered primarily by human energy, including bicycling and walking) at the network scale, rather than on a project-by-project basis. Improvements in active transportation networks under ATIIP will expand and improve active transportation and promote it as a low-emissions transportation option.

FHWA's **Surface Transportation Block Grant (STBG) Program Transportation Alternatives Set-Aside** requires FHWA to sets aside 10% of national STBG funds for a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities; recreational trails; safe routes to school projects; vulnerable road user safety assessments; and active transportation projects.

FTA's **Local Match Waiver for Complete Streets** waives the non-federal match for the Metropolitan Planning Program and the State Planning and Research Program for Complete Streets planning activities, such as sidewalks, bicycle lanes, bus lanes, public transportation stops, crossing opportunities, median islands, accessible pedestrian signals, curb extensions, modified vehicle travel lanes, streetscape, and landscape treatments. This waiver provides incentives for applicants to undertake complete streets projects, improving opportunities for shared micromobility.

USDOT's **Reconnecting Communities and Neighborhoods (RCN) Program** provides grants to improve multimodal transportation access, to foster equitable development, and to remove, retrofit, or mitigate highways or other transportation facilities that create barriers to community connectivity. Projects that improve walkability, safety, and affordable transportation access are eligible for funding.

COMPLEMENTARY STRATEGIES

Shared micromobility services complement active transportation networks by offering convenient, low-barrier options for short-distance trips, thereby encouraging individuals to choose sustainable modes of transportation and reducing reliance on private vehicles.

Coordinating transportation planning activities across sectors, jurisdictions, and levels of government provides more opportunities to support shared micromobility as a low- and no-emission transportation option.

Micromobility delivery services rely on shared micromobility systems. Leveraging bicycles and scooters for last-mile deliveries, these services contribute to the efficient movement of goods while complementing efforts to reduce traffic congestion and emissions in urban areas.

Trip planning and modal integration techniques, including new technology platforms, can improve access to linking public transit services with shared micromobility.

View All Strategies

CASE STUDIES

SHARED MOBILITY SERVICES PILOT - SANTA MONICA, CA

Santa Monica, CA began a Shared Mobility Services Pilot in 2018 allowing four private companies to provide shared mobility services, including e-scooters and e-bicycles, to the community. The city carefully crafted the program to enable flexibility and collaboration with the participating companies in order to encourage data sharing, equity, and accessibility within the system.

Source: City of Santa Monica.

Findings from the pilot indicate that 49% of shared mobility trips replaced trips that otherwise would have been driving or ride-hailing, showing the program's success in reducing congestion and emissions.

E-SCOOTER PILOT AND BIKESHARE EXPANSION - CHICAGO, IL

Chicago Department of Transportation (CDOT) committed to expanding its shared micromobility program in 2019. CDOT launched an e-scooter pilot and expanded the city's Divvy docked bikeshare program, adding 10,500 new electric-assist bikes and 175 new stations. CDOT coordinated extensively with community partners during this expansion to provide traditionally underserved communities with improved access to shared micromobility devices. A report on Chicago's e-scooter pilot found they fill a mobility gap for lower-income residents and help travelers choose active transportation.

Spotlight on Kansas City

Shared micromobility operators provide eligible users with prepaid passes so that they do not need to use a credit card to pay for scooter use.

GOTCHA BIKESHARE - BATON ROUGE, LA

In partnership with East Baton Rouge City-Parish and Blue Cross and Blue Shield of Louisiana, Gotcha has launched Baton Rouge's bike share program, featuring 500 electric pedal-assist bikes across 50 mobility hubs in the city, LSU, and Southern. The initiative aims to provide an accessible and affordable micro-transit option, promoting active mobility and contributing to the city's smart city objectives. With 50 hub locations, riders can access bikes through the Gotcha app, facilitating reduced traffic congestion, shortened trip times, and enhanced tourism. Sponsors and partners, including Blue Cross and Blue Shield of Louisiana, Baton Rouge General, and academic institutions, contribute to the success of the program. The bike share system supports health, sustainability, and community connectivity, aligning with Baton Rouge's commitment to improving lives and reducing traffic-related challenges.

Source: SMILIES (Shared MicromobIlity for affordabLe-accessIbIE houSing)

Source: Baton Rouge Downtown Development District

ENHANCING MOBILITY ACCESS FOR LOW-INCOME RESIDENTS - FORT SMITH, AR

In Fort Smith, Arkansas, a shared micromobility pilot program was launched to address transportation challenges faced by low-income residents, who often lack reliable public transit options. Funded by a $1.2 million grant from the National Science Foundation, the program introduced 40 bikes, including electric and traditional options, strategically placed in low-income neighborhoods to improve access to jobs and essential services. As of April 2024, the pilot has logged over 12,000 miles with 60% of trips taken by low-income users, and 36% of surveyed participants indicated they would have used a personal vehicle for their trips.

E-BIKE LIBRARIES - DENVER, CO

Denver has established shared e-bike libraries in the Globeville and Elyria-Swansea neighborhoods, funded by a $40 million annual Climate Protection Fund. These libraries provide free e-bikes to low-income residents, addressing the area's limited transit options while promoting sustainable transportation. In their first full year, the libraries served approximately 40 members, who collectively rode over 18,922 miles, with 28% of their trips replacing car journeys. Additionally, participants reported significant improvements in their ability to access jobs and essential services, underscoring the program's impact on daily mobility and community health.

Source: Northeast Transportation Connections (NETC)

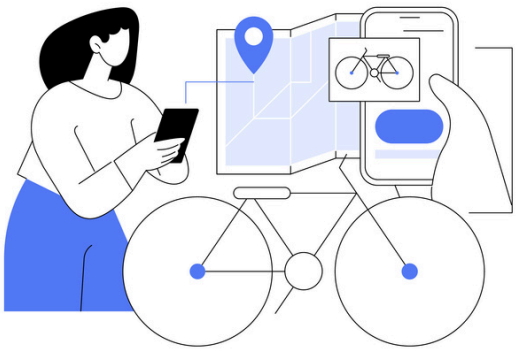
IMPLEMENTING SHARED MICROMOBILITY & MICRO TRANSIT: **WHAT TO READ NEXT**

Over 360 cities and counties in the United States already have shared micromobility systems – the technology is well-proven and readily available. As a good starting point, see NABSA's webinar on "Shared Micromobility 101: Foundations and Tips for Setting up a Shared Micromobility System". The webinar includes information on system design principles, outlines different business and operating models along with funding questions and recommendations, and best practices in community engagement.

For a deeper dive into shared micromobility, read NACTO's 2023 Shared Micromobility in the U.S. and Canada Report and NABSA's 2023 State of the Industry Report.

USDOT provides several resources on shared micromobility, including:

- FHWA Micromobility Webpage
- Shared Micromobility and Equity Primer
- Proven Safety Countermeasures – see the Pedestrian/Bicyclist Countermeasures
- Interactive Bikeshare and e-Scooter Map
- Urban E-Mobility Toolkit



In 2021, the City of Denver established successful private-public partnerships with micromobility companies to operate dockless bikes and e-scooters. Shared micromobility ridership in Denver grew to 5 million registered trips in 2022, 13 times that of the previous station-based bicycle system. See the following resources:

- Denver's Scooter and Bike Share Program (includes information on Equity and Discounted Pass Programs)
- FHWA Livability Feature on E-Bikes and Equity and Climate Goals
- Denver Ride Report: Micromobility Dashboard

The Mobility Project Implementation Toolkit, designed by California's Clean Mobility Options Program, helps state and local governments implement mobility projects. It guides users through budgeting, hiring decisions, and community engagement, helps with procurement and contracting, and assist with site selection.

Bike or e-bike lending libraries are often run by community-based organizations or public libraries to provide free or low-cost access to bikes or e-bikes for different periods of time (e.g., from hours to several weeks or months). Read more about starting an e-bike library, and about the Athens County Public Libraries Book-a-Bike program.

RESOURCES

GENERAL RESOURCES

FHWA Strategic Agenda for Pedestrian & Bicycle Transportation (2024-2028): This resource charts a roadmap of activities that support active transportation initiatives for the next 5 years.

FHWA Bicycle and Pedestrian Program webpage: This webpage includes resources on micromobility.

The Bureau of Transportation Statistics Docked Bikeshare Ridership Map: The map currently includes 2020-2023 monthly counts for 14 bike share systems.

North America Bikeshare and Scootershare Association (NABSA) provides several resources related to shared micromobility including:

- Foundations and Tips for Setting Up a Shared Micromobility System webinar: The webinar includes an overview of shared micromobility, system design principles, system setup, community engagement best practices, and case studies.
- Incorporating Shared Micromobility in Electric Vehicle Charging Projects: This publication explored the benefits of incorporating shared micromobility in EV charging projects.
- 2023 State of the Industry Report: This annual report provides the state of shared micromobility in the United States.

National Association of City Transportation Officials' 2023 Shared Micromobility in the U.S. and Canada Report: This annual report provides shared micromobility statistics and trends across the United States and Canada.

Better Bike Share Partnership Resources: This website offers a range of shared micromobility resources including case studies, conference presentations, one-pagers, videos, research and reports, sample materials, and toolkits.

National League of Cities' Micromobility in Cities: The Current Landscape: This resource provides an overview of shifts in micromobility, how micromobility works in cities, equity considerations, and case studies.

Environmental Protection Agency (EPA) provides several resources related to micromobility:
Smart Growth website: This website hosts resources to help local governments and community leaders. For example, the Smart Location Database contains metrics that enable evaluation of the relative transportation emissions associated with specific sites.

Green Infrastructure website: This website includes resources to help communities design and build streets that incorporate trees, plants, and other green infrastructure techniques to make active transportation more pleasant while also providing multiple other benefits.

Travel Efficiency Assessment Method (TEAM): This resource provides a framework to estimate the potential future emission reductions. The program includes more than 75 DOE-designated coalitions act locally in urban, suburban, and rural communities across the country.

Complete Trip ITS4US Program: This $40 million multimodal effort is led by the ITS JPO and supported by the USDOT Office of the Secretary, Federal Highway Administration, and Federal Transit Administration jointly working to solve mobility challenges for all travelers with a specific focus on underserved communities, including people with disabilities, older adults, low-income individuals, rural residents, veterans, and limited English proficiency travelers. This program prioritizes an individual's ability to travel from origin to destination without using a personal vehicle and without encountering gaps in the travel chain.

US DOT Technical Resources for Active Transportation Planning Design and Implementation: This website provides a range of relevant technical resources including guidance on procurement, pilot funding, project development assistance, and direct assistance in preparing Federal grant applications.

TOOLKITS AND MODELLING APPROACHES

Shared-Use Mobility Center: Shared Mobility Benefits Calculator: This calculator is a tool for cities to estimate the emissions benefits from deploying various modes of shared mobility. Using these estimates, policymakers can envision and set goals towards reducing congestion, household transportation costs, and carbon emissions from personal vehicles.

FHWA CMAQ Toolkit: This toolkit includes a Shared Micromobility tool to estimate the emissions benefits of shared bike and shared scooter projects.

RMI's E-Bike Impact Calculator Tool for Local Governments: The e-bike calculator estimates the impact of e-bikes as a substitute for short vehicle trips; it also estimates the impact of an e-bike incentive program. Impacts are provided in terms of GHG emissions and VMT reductions, as well as cost savings.

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For more information visit the DOT Climate Change Center, https://www.transportation.gov/priorities/climate-and-sustainability/dot-climate-change-center