



Micromobility Share Feasibility Report

January 2025



This report was funded in part through grants from the Federal Highway Administration, U.S. Department of Transportation. The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data, and for the use or adaptation of previously published material, presented herein. The contents do not necessarily reflect the official views or policies of the Arizona Department of Transportation or the Federal Highway, U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation. Trade or manufacturers' names that may appear herein are cited only because they are considered essential to the objectives of the report. The U.S. government and the State of Arizona do not endorse products or manufacturers.

Acknowledgements

This study has been created thanks to the work of the Micromobility Share Stakeholders group and outside agencies and experts

MICROMOBILITY SHARE WORKING GROUP

Kate Morley, Executive Director, MetroPlan
Kim Austin, Transportation Demand Management Planner, MetroPlan
Aubree Flores, AmeriCorps Fellow, MetroPlan
Erin Stam, Director, NAU Parking and Shuttle Services
Jenny Niemann, Climate Action Section Director, City of Flagstaff
Martin Ince, Multimodal Transportation Planner, City of Flagstaff
Chris Phair, Transportation Planner, City of Flagstaff
LaReina Reyes, Associate Transit Planner, Mountain Line
Estella Hollander, former Planning Manager, Mountain Line
Ty Holliday, Montoya Fellow, Mountain Line & MetroPlan
Jamie Larson, Housing and Transportation AmeriCorps VISTA, City of Flagstaff

OUTSIDE EXPERTISE

Carlton Johnson, City of Flagstaff
Sam Beckett, City of Flagstaff
Eve-Lyn Wolters, Coconino County Health and Human Services
Hunter Hebert, Downtown Business Alliance
Nathan Pope, Senior City Planner Denver Department of Transportation and Infrastructure
Devin Mason, City Planner Associate Denver Department of Transportation and Infrastructure
Trevor Thomas, City of Santa Monica Senior Transportation Planner
Allison Moore-Farrell, City of Boulder Senior Transportation Planner
Michael McNoldy, City of Austin Project Coordinator
Rachel Ruhlen, City of Fort Collins Transportation Planner

INTRODUCTION

The goal of this report is to provide an overview of state of micromobility share programs including their benefits and challenges, and to provide recommendations and strategies for partners to consider in the implementation a micromobility share program.

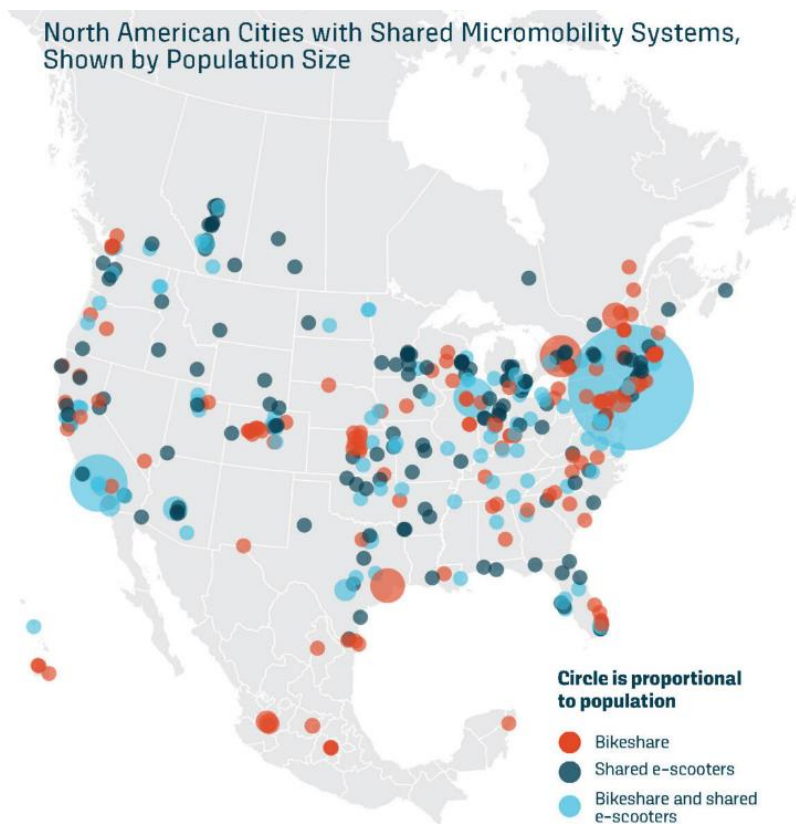
The report is based upon Mountain Line’s 2017 Bikeshare Feasibility Study but the scope has been broadened to include micromobility and updated with the latest best practices. MetroPlan has led this multiagency effort in recognition that all of MetroPlan’s member agencies will benefit from and be impacted by the implementation of a micromobility share program in the region because devices will cross jurisdictional boundaries.

Micromobility refers to modes of transportation that include very light, low-occupancy vehicles such as electric scooters (e-scooters), electric skateboards, bicycles, and electric pedal-assisted bicycles (e-bikes). Micromobility share programs provide communities with access to short-term rentals of micromobility devices. These equitable and environmentally friendly transportation options and have rapidly expanded in the United States over the past five to ten years. As of June 30, 2024, according to the US Department of Transportation, dockless bikeshare systems serve 49 cities and e-scooters serve 130 cities in the US: *Source: (NABSA, 2023)*

At least **421** cities in North America had a **scootershare or bikeshare** system in 2023.

This includes:

- 371 cities in the United States
- 41 cities in Canada
- 9 cities in Mexico



Flagstaff is well-suited for micromobility: the average daily trip is about 4 miles in length and about 60% of all trips are less than 5 miles ([City of Flagstaff Active Transportation Master Plan \(ATMP\), 2018](#)), ideal distances for micromobility share programs to work. Micromobility share systems tend to be popular among populations common to Flagstaff: tourists, college students, professionals and those with limited transportation options. Converting these trips to micromobility modes reduces air pollution, congestion, and the cost of living, while improving health, community connection and supporting the City’s climate action goals. Technology breakthroughs are quickly advancing systems, and new business models are making it easier for small communities to effectively manage systems.

The timing for Flagstaff to study micromobility share implementation is appropriate and needed due to interest from community members, the private sector, and the increase in personal electric devices already in use.

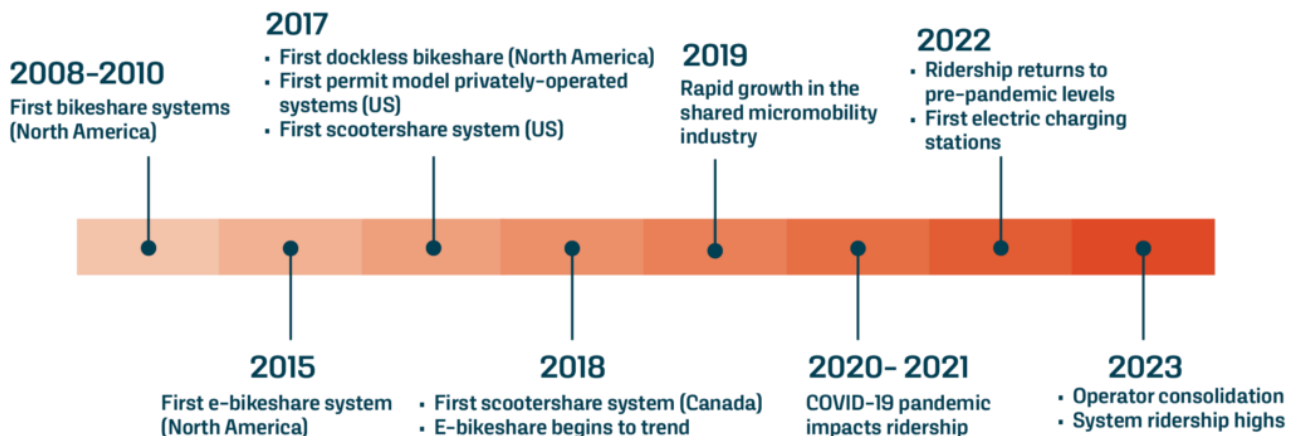
MICROMOBILITY SHARE BACKGROUND

There are a variety of models for micromobility share programs. Consistent amongst all programs is that riders do not own the devices and are not responsible for maintenance. Instead, the micromobility devices are publicly available and rented for a set period of time. The devices are then parked in designated parking locations, or in docked or geofenced areas, for use by other riders. Today, these shared programs generally offer e-bikes and e-scooters because they are more popular than traditional bicycles. These device types also allow for a wider variety of users including people with disabilities, older adults, and her to people with limited ability to ride a bicycle. Scooters are particularly popular because of the ability to wear any type of clothing and shoes while riding bicycles can be more limiting.

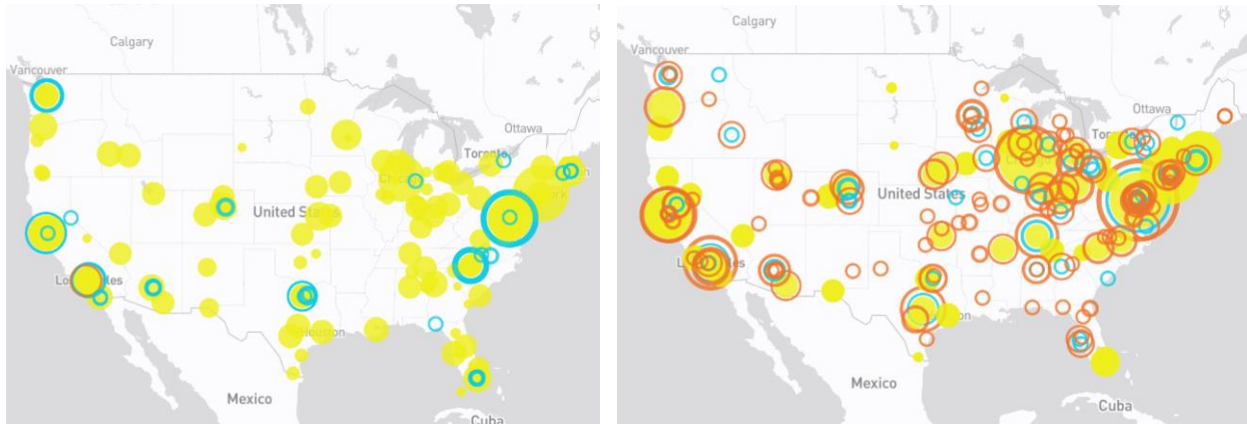
Micromobility share programs began as pedal powered bikeshare programs around 2008. E-bike systems were introduced in 2015 and scooter share systems were first introduced in 2018. The chart below highlights other key evolutions in micromobility over the years.

Micromobility’s evolution in the US: 2008 – 2023

Source: (NACTO, 2022)



The two charts below show the growth of micromobility share systems in the us between 2017 and 2024. Yellow indicates docked bikeshare, blue are dockless bikeshare and orange indicates- scooters.



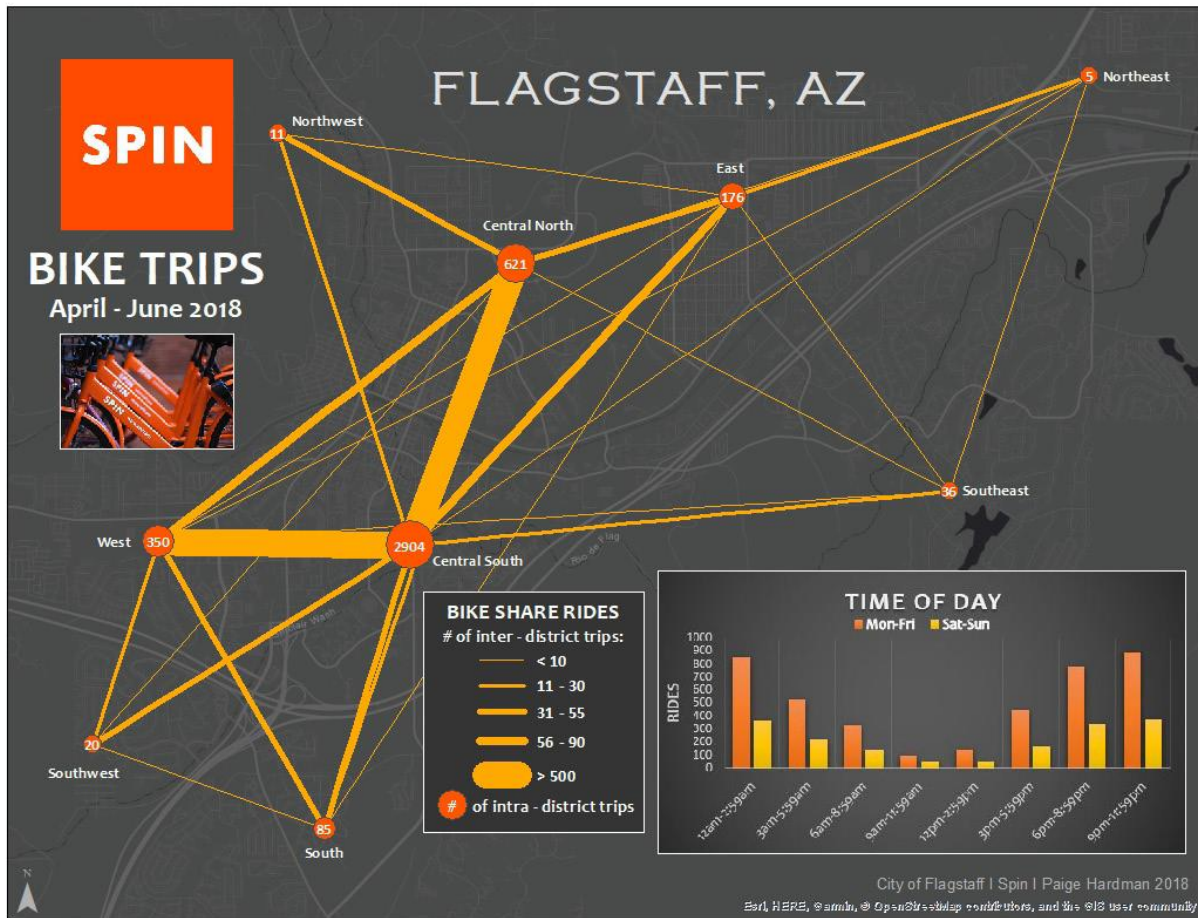
Maps comparing the increase in micromobility share programs in North America (2017-2024)

HISTORY OF MICROMOBILITY SHARE IN FLAGSTAFF

In 2018, Flagstaff partnered with [SPIN](#) for a pilot bike-share program. The program lasted five months and was deemed a success because in those six months, over 10,000 trips were taken covering almost 11,000 miles. SPIN trips were most likely to take place on the south side of town and between Northern Arizona University (NAU) and downtown Flagstaff. Most trips occurred between the hours of 7pm and 3am. In SPIN's first month of operation alone, shared bikes were used more than 25 times per day, traveling 1,390 miles in Flagstaff and by almost unique 1,000 riders.

In 2019, the City of Flagstaff hosted a Request for Proposal (RFP) process for bikeshare providers and contracted with [GOTCHA](#) to provide bike share in 2020. The contract included many requirements to provide for a well-run and equitable program including cash payment options for the unbanked, redistribution of bikes to equity areas and Flagstaff-based customer service. Unfortunately, the COVID pandemic and supply chain issues led to GOTCHA cancelling the contract before their bikes came to Flagstaff.

Both programs used the model of partnering with private systems to operate the program rather than establishing a City run program. This model decreases costs for Cities, both operational and in staff time though there is some loss of control over elements of the program. Most US systems, particularly smaller systems, follow this model.



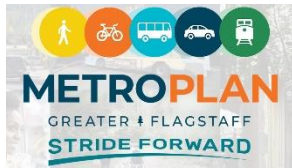
REGIONAL GOALS AND POLICIES SUPPORTING MICROMOBILITY SHARE

The implementation of a micromobility share program is identified in and supports many regionally adopted plans, goals and policies, including the following:



Flagstaff Regional Plan

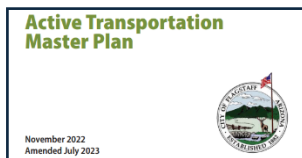
- Policy T 1.1: Integrate a balanced, multi-modal transportation system
- Policy T 1.5: Manage the operation and interaction of all modal systems for efficiency, effectiveness and safety, and to best mitigate traffic congestion
- Policy T 1.6: Provide and promote strategies to increase alternative modes of travel and demand for vehicular travel to reduce peak period traffic
- E 1.5: Promote and encourage the expansion and use of energy efficient modes of transportation such as public transport, bicycles, and pedestrians
- LU 18.5: Plan for and support multi-modal activity centers and corridors
- Policy E&C.2.2: Promote investments that create a more connected and efficient community, decrease emissions from transportation and build energy, and strengthen climate resiliency.



MetroPlan Long Range Transportation Plan: Stride Forward

Supports:

- City, County and Mountain Line to make transportation investments to improve residents' equitable access to jobs, goods, housing, schools and services; can reduce vehicle miles traveled.
- Benefits of transportation options to support carbon neutrality goals and reduce traffic congestion
- Tactical urbanism: concept aiming to quickly and affordably involve and integrate communities, use local artists and create a safer, accessible and equitable environment
- Multimodal plans and studies: provide guidance for future bicycle and pedestrian networks, prioritize multimodal improvements and help develop implementation strategies.
- Vehicle Miles Traveled (VMT) reduction and transportation behavior change



City of Flagstaff Active Transportation Master Plan

- Goal 1.5: Work with city transportation partners to unify multimodal (bike/ped) networks
- Goal 2.5: Improve and enhance existing bike/ped facilities to meet the basic levels of functionality and accessibility
- Complete transportation system with principles optimizing existing infrastructure, enhancing mobility choices and safety

The Flagstaff Carbon Neutrality Plan

City of Flagstaff Carbon Neutrality Plan

- Goal T.5: Increase the availability and use of Pedestrian infrastructure, including FUTS, as a critical element for a safe and livable community
- Goal T.6: Provide bicycling as a safe and efficient means for transportation and recreation
- Goal T.7: Provide a high-quality, safe, convenient and accessible public transportation system, where feasible, to serve as an attractive alternative to single-occupant vehicles
 - T.7 Action: Launch a new micromobility share program (in years one-three)
- DD-3: Encourage Flagstaff residents and visitors to walk, bike, roll, and take the bus
- DD-4: Transform transportation policies and plan to incorporate greenhouse gas emissions analysis and reduce dependence on driving
- DD-6: Proactively invest in protecting Flagstaff's clear air status

COMMUNITY GOALS FOR MICROMOBILITY

It is important to identify and prioritize the community's particular goals when creating a micromobility share program. Having clear goals in mind can help steer those priorities. For example, if the main priority is equity, a community might ensure the devices are available in low-income areas when designing the redistribution requirements. If, however, the program's main goal is environmental

benefits, costly redistribution efforts may not be worth the added expense, vehicles miles traveled to redistribute devices, and oversight. Identifying priority goals is important to make these decisions. In January of 2017, a survey was distributed via the Flagstaff Community Forum website asking about goals and potential usage of a bikeshare system. The most important reasons for pursuing micromobility share were identified:

1. Provide transportation options
2. Reduce congestion
3. Reduce parking demand
4. Promote health benefits
5. Reduce air pollution

MICROMOBILITY BENEFITS

Below is a list of common goals communities have for why they implemented micromobility share programs and a description of how such programs can help reach goals.

AFFORDABLE TRANSPORTATION OPTIONS

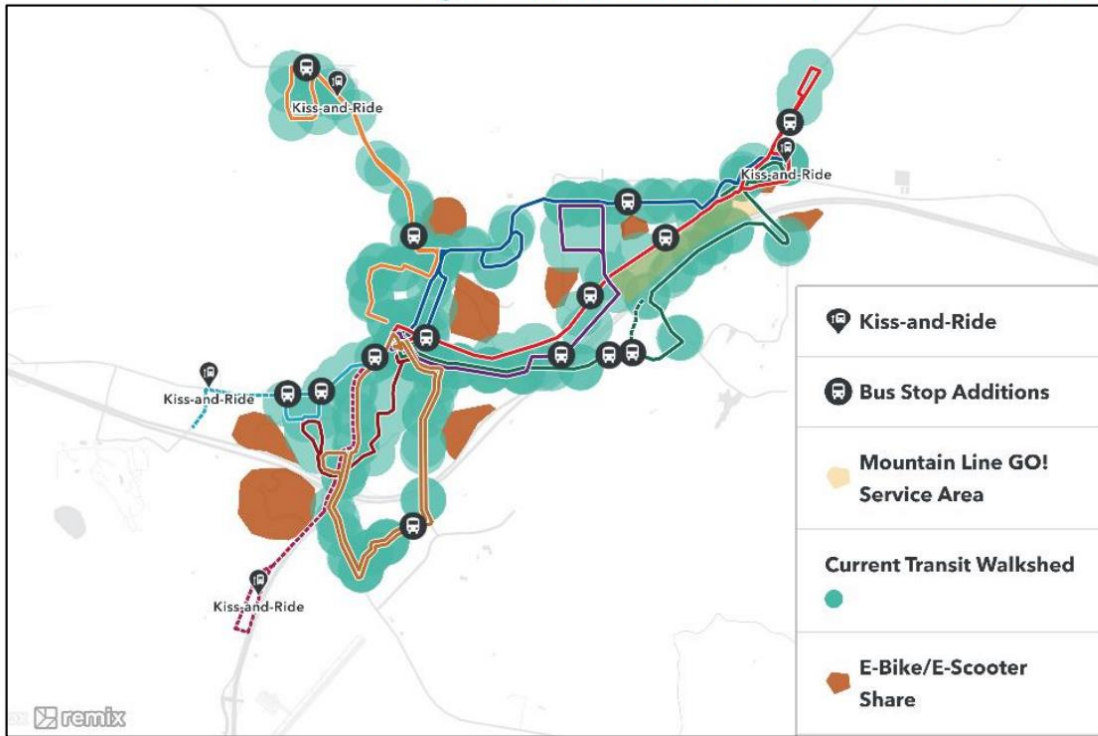
According to the American Automobile Association (AAA), the average annual cost of owning and operating a mid-size car is nearly \$12,000 while annual micromobility-share memberships are usually \$100-\$300 annually. This equates to car ownership costing up to 25% of a person's annual income whereas regular use of micromobility share programs account for about 1% of average annual income. Many cities also offer special membership rates for low-income residents or tie memberships to transit passes to increase micromobility share affordability.

Micromobility share can also extend transit's reach and provide a solution to the difficult first and last mile portion of a transit trip. Micromobility devices increase options for getting to and from the bus and extend the hours of transportation options beyond Mountain Line's hours. Mountain Line's [Flagstaff In Motion](#) identifies locations in the City where micromobility is best suited to fill gaps in the transit system.

Financial needs have a big impact on the ways people use micromobility services. Research from the Monash Institute of Transport Studies explored a program called [Lime Access](#), which subsidizes e-scooter access for low-income riders. Lime Access riders are more likely to use the service for essential trips, like grocery shopping and medical appointments, compared to full-price riders who primarily use it for social and recreational outings. These riders are also more likely to link their trips with public transit.

Micromobility shares provide flexibility for converting some trips from car to other device throughout the day by allowing for one-way bike or scooter trips. These trips can be paired with carpool, transit, drop-offs and other alternatives to single occupancy vehicle trips without someone having to commit to leaving their car behind for full day.

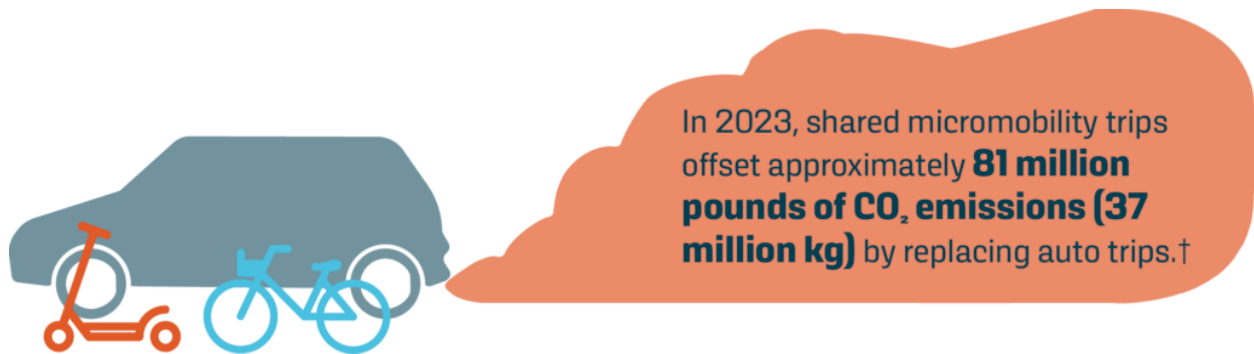
Figure 10. Recommended improvements to access



Brown bubbles indicate locations where micromobility share is better suited to bring transit riders to the bus than route a bus through the neighborhood.

CONGESTION

In communities where micromobility share is a transportation option, surveys have shown approximately 20 to 40 percent of annual member micromobility share trips replace what would otherwise have been a short automobile trip. According to the North American Bikeshare and Scooter Share Association, in 2022, shared mobility offset approximately 74 million pounds of carbon dioxide emissions by replacing auto trips across North America. *Source: (Time magazine, Sept. 2024)*



Source: (NABSA, 2023)

HEALTH

According to Johns Hopkins, transportation is one of the most underappreciated but significant determinants of health and well-being. Micromobility can help solve social needs such as access to health care, healthy foods, employment, and other important health determinants. Blue Cross Blue Shield has sponsored two micromobility share programs in the US, and Kaiser Permanente sponsors Denver’s B-Cycle. This investment shows health care insurance companies recognize the benefits of micromobility share programs.

**Physical Activity
& Exercise**



**North Americans gained almost
24 million hours
of additional physical activity**
through shared micromobility creating
new trips and replacing motorized trips.

Source: (NABSA, 2023)

Additionally, some employers offer micromobility share as a part of their Health and Wellness programs. The Director of CDC says that physical activity is the closest thing we have to a magic pill. Even twenty minutes of movement per day, the average length of a micromobility share commute, contains significant benefits. Key locations for the micromobility devices, according to Coconino County Health and Human Services, would be jails, hospitals, and health centers.

“The micromobility movement is exploding, not only bringing convenience to city residents—but presenting a chance to address long-standing public health transportation issues that affect health equity”.

(John Hopkins BSPH, 2022)

ENVIRONMENT AND AIR POLLUTION

Micromobility share can help reduce fossil fuel consumption and related air quality impacts. According to MetroPlan's *Stride Forward* plan, the implementation of a micromobility share program in Flagstaff, AZ, could save approximately **2.6 million vehicle miles traveled (VMT)** annually. This reduction is anticipated by providing residents and visitors with an alternative transportation option for short trips, which typically make up a significant portion of VMT in urban areas.



Source: (NABSA, 2023)

The goal of the micromobility share program would be to encourage the use of bikes, e-bikes, and scooters for everyday trips that reduce reliance on single-occupancy vehicles and contribute to a reduction in overall traffic congestion and greenhouse gas emissions.

REDUCING PARKING DEMAND

Micromobility can provide access to areas where parking is limited without taking up valuable spaces by providing alternatives to driving to reach those places. This makes it particularly valuable for bringing people to places such as NAU's campus, high schools and the downtown area. It can also be a valuable part of high occupancy housing developments which can support alternative transportation options by providing micromobility parking areas for residents.

TOURISM

Micromobility-share programs should be designed to operate with a focus on residents. However, research published in the *Journal of Sustainable Transportation* demonstrated the significant demand tourists can have for micromobility-share programs. Micromobility-share allows for freedom to explore a city in an affordable and fun way. Tourists use these programs to explore urban destinations in a leisurely way. They stop frequently at popular tourist attractions, local retail outlets, restaurants and bars along the way.

Micromobility share also allows for the economic and social benefits of tourism activity to be distributed more widely throughout a community because visitors can move about a larger area of a community without driving. In Flagstaff, this could be tourists riding the FUTS to the Museum of Northern Arizona, up Mars Hill to Lowell or over to Sunnyside to visit local businesses in the area. Some communities have even developed micromobility tours supported by apps to encourage their use and encourage tourists to particular destinations.

Reaping the full benefits of micromobility-share programs and tourism depends on encouraging visitors to use these devices. Ways to do this include developing safety guidelines and aids to increase ease of

use and where to properly ride, such as digital cycling guides, maps, apps and companion programs with local businesses.

ECONOMIC DEVELOPMENT:

A micromobility share program encourages tourists and residents to use bikes, e-scooters, and other shared vehicles for local trips rather than relying on vehicles. This has been show to result in more people spending money locally — whether it's at coffee shops, restaurants, attractions, or other small businesses along their routes. The reason is thought to be that people moving at slower speeds are able to “window shop” more and see good they may want and are also more able to stop to run into a shop quickly than those in a car who may not want to find parking and walk to their destination.

New research shows that low-income people increasingly use micromobility systems to connect with public transit to access destinations including school, work and shopping, making them important tools for equity and economic growth.

Finally, establishment of a micromobility share program would likely create at least one local job for the maintenance and redistribution of devices.

PEER CITIES

Comparisons of peer cities can provide performance metrics that can be used to evaluate and predict the use of a micromobility share program in Flagstaff. The information below reviews micromobility share programs in a sample of cities.

City	Population	Agreement	Companies	Fleet size	Staff time	City Role	Equity provisions
Austin, TX	964,000	Permit	Bird, Lime	6,781	3 full time staff	paid	Bird and Lime Access
Bend, Oregon	106,184	Request for Proposals	Bird	250			Bird Access
Boulder, Colorado	105,898	Request for Proposals	Lime, BCycle	515	30% of one staff member's staff time	paid	Lime Access
Colorado Springs, Colorado	488,664	Request for Proposals	Lime	609	no staff time spent	paid	Lime Access
Fort Collins, Colorado	170,376	Request for Proposals	Spin	420	25% of one staff member's staff time		Spin Access
Grand Junction, Colorado	69,412	Request for Proposals	Bird, Lime	375	20-40 hours of staff time a month	neither	Bird and Lime Access
Logan, Utah	54,000	Request for Proposals	Bird	200		paid	Bird Access

Lubbock, Texas	261,000	Permit	Lime	200			Lime Access
Santa Monica, California	89,922	Permit	Spin, Veo, Wheels	1,593	50% of one staff member's time	paid	Spin Access
Spokane, Washington	229,447	Request for Proposals	Lime	551		paid	Lime Access
St George, Utah	104,578	Request for Proposals	Spin	250			Spin Access

Several cities have implemented micromobility programs using either a request for proposals (RFP) contract process or a permitting system, each tailored to their specific needs and resources. After communicating with several program managers of cities with characteristics similar to Flagstaff, the following data was collected.

In Grand Junction, Colorado, the city is transitioning its 20-month pilot program to a permanent permitting system after initially selecting Bird and Lime through an RFP contract process. The program exclusively offers e-scooters but aims to encourage fleet diversity, such as e-bikes, in future agreements. The responsibilities are split amongst city staff members with the average total amount of time spent managing the program is 20 - 40 hours per month. A \$6,000 permitting fee and a 10¢ per ride fee covers staff and infrastructure costs.

Boulder, Colorado uses an RFP contract process with one provider for e-scooters (Lime) and another for e-bikes (BCycle). Approximately 30% of one full-time employee (FTE) is dedicated to tasks such as permitting, compliance, equity programs, and managing sidewalk parking challenges for dockless scooters. The city finds having one provider per mode works well for its size (~105,000 population).

Similarly, Fort Collins, Colorado selected Spin through an RFP contract in 2021 and allocates 25% of one staff member's time to the program. The staff member has said she could allocate 10% of her staff time but in detriment to the success of the program. Collaboration with Colorado State University has led to improved outcomes for the program in Fort Collins, enabling innovative strategies such as adaptive trike libraries and better parking infrastructure. Fort Collins recommends using RFPs and contracts over permits for greater flexibility in adapting to changes.

In California, Santa Monica dedicates significant resources to managing its shared micromobility program. On an ongoing basis, the program requires approximately 50% of the time of a senior-level planner and 10% of a Code Enforcement officer. The planner's responsibilities include daily monitoring of program metrics such as device deployment, utilization, and distribution; regular check-ins with micromobility operators; responding to community complaints; conducting field checks of operating zones; reviewing and updating policies; and performing analytical tasks like comparing trip patterns to a separate docked bikeshare system operated by LA Metro. Additional duties involve managing procurements for supportive services like third-party data dashboards, coordinating with the city's legal department, and developing safety messaging for shared mobility users. The Code Enforcement officer's time is primarily spent addressing non-permitted deployments, such as impounding devices from

unpermitted operators. However, Santa Monica notes that the Code Enforcement allocation could benefit from an increase beyond the current 10% of a single officer’s time.

Santa Monica also invested heavily in upfront work to establish the program, including researching and drafting Administrative Regulations, creating Municipal Code updates, planning and designating drop zones, and conducting fieldwork. This foundational effort involved not only planners but also higher-level staff, such as city lawyers and mobility division managers.

In Austin, Texas, the city caps the number of providers at two and requires semi-annual permitting. The program is managed by three full-time staff who oversee permitting, compliance, special events, and public engagement. The city has also developed “Director’s Rules” to regulate fleet sizes, safety standards, and fee structures, which ensures clear expectations for providers. Strong relationships with providers have been key to program success. In contrast, Colorado Springs, Colorado manages its program with no dedicated staff time, reflecting a more hands-off approach.

City	Austin, TX	Missoula, MT	Bloomington -Normal, IL	Logan, UT	Tucson, AZ	Lubbock, TX	Bend, OR	Santa Monica, CA
Population	964,000	75,000	167,000	54,000	543,000	261,000	106, 184	88,925
Bike/Scooter or both	Bicycle	Scooter	Both	Scooters	Bicycle	Scooters	Bicycle	Both
Quantity			50 bikes 200 scooters	200				
Type	Docked	Dockless	Dockless	Dockless	Docked	Dockless	Dockless	Docked
Managing Agency	CapMetro (transit)		City of Bloomington (partnership with Indiana University)		City of Tucson		City of Bend	Santa Monica DOT

Washington, D.C. has become a shining example of how micromobility is done right. The nation’s capital is home to a mixed fleet of over 18,000 vehicles from standing scooters to pedal-assist e-bikes and throttle-assist e-bikes. The program provides assistance to those in need. The program requires each operator to provide unlimited, free 30-minute rides to people who qualify for assistance, and the city

will refund part of the permit fee paid by operators depending on the proportion of miles traveled by people that qualify.

ANALYSIS: RISKS AND CHALLENGES

Below is a summary of real and perceived risks and barriers to a micromobility share program. A strong mitigation plan can overcome or avoid most risks and barriers. Following the table are more in depth descriptions of the risks and strategies identified in the table.

RISKS AND CHALLENGES	IMPACT SCORE	RISK FOR WHOM?	POTENTIAL STRATEGIES TO MITIGATE RISK AND CHALLENGES
Parking concerns: availability of device parking, devices blocking sidewalks, ADA access, businesses	High	City / NAU	<ul style="list-style-type: none"> • Use the encroachment permit process through Community Development • Consult the City’s Expanded Use of Right of Way committee in designating parking areas • Require geofencing in high traffic areas via app managed by vendor • Consider placement of hubs at key location • Ensure vendor staff to monitor device parking and relocation are available 365 days per year. • Require devices be parked at a bike rack when in downtown, Sawmill or on NAU campus • Install more bikes/ scooter racks and/or parking hubs • Identify approved bike parking locations • Ensure vendor accessibility and responsiveness for complaints or user issues • Upfront fees or penalties to incentivize proper parking • Designate pre-approved parking locations • Incentivize additional bike or scooter parking • Require vendor to supply bike or scooter or racks
Sign code may hinder advertising which limits traditional funding stream	Med	Vendor	<ul style="list-style-type: none"> • Develop model and budget without reliance on advertising at stations or hubs revenue. • Allow ads on bikes as done on vehicles/ Mountain Line
Personal injury while riding/injury liability	High	City / NAU, Vendor, User	<ul style="list-style-type: none"> • Liability waivers • Insurance requirements of vendor • Partner with local bike shops for helmet rental • Advertise law that people 18 and under must have helmet for riding bikes • Rental agreement assuming risk with usage • Contract liability to third party operator • Ensure the safety features on bikes are maintained in timely fashion including bikes, brakes and bells

RISKS AND CHALLENGES	IMPACT SCORE	RISK FOR WHOM?	POTENTIAL STRATEGIES TO MITIGATE RISK AND CHALLENGES
Compliance with ordinances: Lack of clarity where use is allowed and illegal riding (downtown sidewalks, FUTS, etc)	Low	City / NAU/ User	<ul style="list-style-type: none"> • Use geofencing to slow down or turn off devices in appropriate areas • Consider changes to the code to increase uniformity and understanding • Clarify responsible party in event of ticket • Have regulations appear on app before devices can be rented • Conduct Rider education campaign
Infrastructure Limitations	Med	City	<ul style="list-style-type: none"> • Provide bike routes map at micromobility share hubs, website and on app • Direct users to bike shops for hard copy maps • Promote use of the Transit App and use of comfortable bike trip planning options
Device theft	Low	Vendor	<ul style="list-style-type: none"> • Include GPS units on bikes • Add parking locations in visible areas to discourage theft
Winter Conditions	Low	Vendor	<ul style="list-style-type: none"> • Vendor can reduce number of devices available, to match demand • Track data in line with snowfall and seasons for evaluating possible hibernation to reduce operating costs • Partner with bike shops to promote cold weather bike gear • Outfit devices for winter as appropriate • Reduce costs as needed • Hibernate devices in the winter months or during periods of snow. • The City Streets and PROSE teams should be involved in the parking plan development as it related to clearing snow
Equity- Pricing and payment options	Med	City, Vendor	<ul style="list-style-type: none"> • Create a system that allows for cash access to device rentals • Offer limited free daily passes • Create links to transit app • Create other revenue sources to offset costs
Equity- People with disabilities, seniors and youth, families	Med	City	<ul style="list-style-type: none"> • Provide trikes, hand bikes and other accessible bikes or scooters • Provide multi-size bikes or scooters • Incentivize different type of bikes or scooters • Partner with Northern Arizona Adaptive Sports, the Commission on Inclusion and Adaptive Living
Equity- Distribution	Med	Vendor, City	<ul style="list-style-type: none"> • Operate system city-wide. Include plan for redistributing bikes to low-income neighborhoods • Include re-distribution requirements in vendor agreement

RISKS AND CHALLENGES	IMPACT SCORE	RISK FOR WHOM?	POTENTIAL STRATEGIES TO MITIGATE RISK AND CHALLENGES
Limited staff time to oversee program, complaints etc.	High	City, NAU	<ul style="list-style-type: none"> Hire or contract with micromobility share staff to specifically oversee the system vendor compliance Operator fees should include enough revenue to pay for support staff <ul style="list-style-type: none"> Design agreements to assign all system responsibility to the vendor
Concerns from local bike shops	Low	City	<ul style="list-style-type: none"> Bike shops can apply to RFP for micromobility share Increase partnership with local bike shops
Public Perception	High	City, NAU Vendor	<ul style="list-style-type: none"> Develop marketing campaign Work with Downtown Business Alliance and neighborhood associations Ensure routine and effective bike maintenance Respond quickly to complaints
Negative ridership effects on Mountain Line	Low	Mountain Line, City	<ul style="list-style-type: none"> Track and assess ridership pick up and drop off data by day, time of day, location geography Connect payment/fare systems Connect apps to show both bus and micromobility share
Devices leaving jurisdiction boundaries	Low	Vendor	<ul style="list-style-type: none"> Regional approach Geofencing technology Alerts that pop up on vendor app when leaving boundaries Require vendors to retrieve devices from other jurisdictions as needed.
Company viability: potential liability and responsible clean-up of devices if the company leaves Flagstaff	Med	City, NAU	<ul style="list-style-type: none"> Require a performance bond Select vendors through RFP Broad indemnification required from vendors Add administrative or trip fee to ride fees Help promote the program

EXTENDED DISCUSSION OF RISK

PARKING CHALLENGES- HIGH

Dominating Bike Parking

In popular destinations, such as downtown and other major activity centers, it is possible that micromobility share program devices could dominate the available bike parking in the area. Pre-planning for parking locations is a key step in implementation. Installing more bike racks and hubs, and using geofencing to identify parking locations, can help reduce the possibility of a bike parking shortage. Its also possible to require or incentivize the vendor provide additional parking racks or pay for hub locations.

Blocking Sidewalks, ADA Access, Businesses

The possibility of devices being left in locations where they block access to businesses and sidewalks is a concern. Having plenty of parking spaces with adequate frequency can encourage appropriate parking. It is important to have a clear parking plan from the outset to include micromobility hubs in crowded area. The plan should be developed in coordinated with the City's Expanded Use of Right of Way committee, NAU and the Downtown Business Alliance. It is also important vendors set up a monitoring system and a public request system to ensure devices can be reported and are removed from certain locations in an agreed upon time frame.

Financial incentives are also useful and can be applied to both the rider and the vendor. Financial incentives for riders can prohibit devices from being turned off (with usage fees continuing to be charged) if the device is not in an approved location. Alternatively, vendors can charge fines when a device is reported as poorly parked. Apps can notify users of appropriate parking spaces or require devices to be left in designated locations. Financial incentives for vendors can be the return of a portion of permit fees annually for timely compliance with relocating poorly parked bikes or similarly creating a returnable deposit. Timeframes for removal are typically set at two hours.

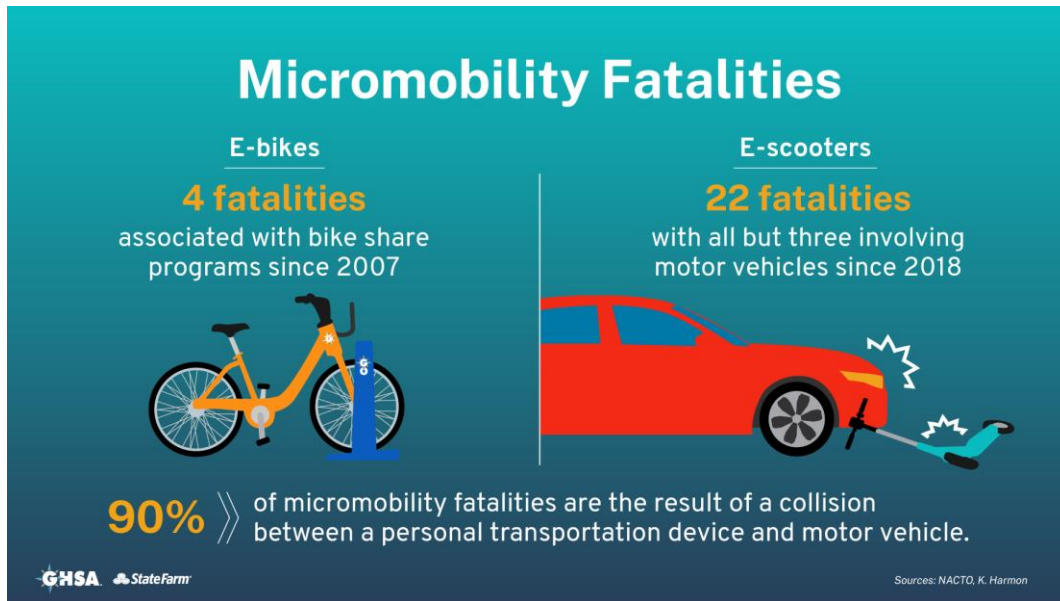
Winter parking can be handled in several ways. Often, ridership drops and companies choose to hibernate many or all devices to protect their assets. Approved parking locations may also be more selective in winter since ridership is likely to be lower anyway. Many cities receiving significant annual snowfall are successfully operating systems and are a resource for additional strategies.

SIGN CODE LIMITATIONS: Medium

Many micromobility share programs are funded through a robust advertising program. The City of Flagstaff sign code does not allow for signs at bus stops and/or parking stations. However, marketing can be allowed on device baskets or potentially through the device design for a title sponsor. Ultimately, it will be the responsibility of a vendor to ensure their business model can succeed in Flagstaff. Any procurement for such programs should be explicit about sign code allowances.

PERSONAL INJURY AND LIABILITY: HIGH

The potential safety impacts of micromobility share programs include collisions with other road users (pedestrians, bicycles and vehicles), single-device crashes by the device user, and unsafe operations if users do not follow existing rules and regulations or impede traffic. Recommended mitigation of those safety impacts can include implementing protected bike lanes, policy development and implementation for device regulation, plans for harsh weather conditions, education for users, the use of technology for user limitations and management, and requiring vendors to provide a broad indemnification clause in their contract. Even though injury is a risk with micromobility share programs, they have grown in popularity and functionality with more than 10 billion micromobility trips taken globally and more than 300 billion in the US in 2023 alone, since their inception.



In addition, Micro-mobility for Europe created a first ever fact sheet on incident data involving shared e-scooters in Europe. <https://cdn.li.me/content/uploads/LIME-SAFETY-REPORT-FOR-SCOOTERS-IN-PARIS.pdf>. The truth is a majority of the danger on city streets are cause by vehicles. To improve the safety of vulnerable road users, it is recommended to (1) invest in protected infrastructure, (2) recognize all vulnerable users and implement safety precautions for their protection, and (3) encourage enforcement and proper usage of these micromobility devices.

Still, the risk of liability for injury is an important consideration. Liability waivers and contracting to a third party or private device-share company should be considered.

LIABILITY

Minimizing the city's liability risk in a micromobility share program may involve a combination of proactive legal, operational, and safety measures. Below are several strategies that could be used to mitigate these risks:

1. Clear and Comprehensive Liability Waivers

- **User Agreements:** Ensure that the micromobility share vendor requires all users to sign a comprehensive liability waiver that acknowledges the risks associated with using the devices. This can reduce the city's liability if a user is injured while riding.
- **Indemnification Clauses:** Include indemnity clauses in contracts with micromobility providers, where they assume responsibility for accidents or injuries caused by their vehicles or operations. This will help shield the city from liability.
- **Informed Consent:** Ensure that users acknowledge the risks (e.g., potential injury, property damage) before riding by making such warnings explicit and visible in the app and at point-of-use locations.

2. Insurance Requirements

- **Insurance Coverage for Operators:** Mandate that micromobility providers carry appropriate insurance coverage that covers the city, the service provider, and the users in case of

accidents, injuries, or property damage. This could include general liability, product liability, and accident insurance.

- **City's Insurance Protection:** Ensure that the city has its own liability insurance to cover its potential exposure related to public safety, city property damage (like street furniture or infrastructure), or other related risks.

3. Clear Regulations and Policies

- **Safety Standards:** Implement and enforce safety regulations for both riders and vehicles. This may include requirements for helmets (either mandatory or incentivized), speed limits, and safety checks on the vehicles.
- **Designated Parking and Riding Zones:** Define specific locations for parking the vehicles and set rules about where they can be ridden (e.g., not on sidewalks, in bike lanes, or within certain high-traffic areas). This helps control how and where users interact with the infrastructure, minimizing accident risks.
- **Speed and Usage Restrictions:** Set speed limits for vehicles, particularly in crowded urban areas or near pedestrian zones. Restrictions could also apply to high-risk times or locations (e.g., near schools, hospitals, etc.).

4. Regular Maintenance and Inspections

- **Vehicle Safety and Maintenance:** Require operators to conduct regular maintenance and inspections of vehicles to ensure they are safe to use. This includes checking brakes, lights, tires, and other key safety features. Prompt repair and replacement of defective units can prevent accidents.
- **Maintenance Logs:** Have operators keep detailed records of maintenance and repairs that can be audited by the city or relevant authorities.

5. Education and Outreach

- **Rider Education:** Provide educational materials or campaigns to inform users about how to safely operate micromobility devices, including proper riding techniques, road safety, and laws regarding their use (e.g., not riding under the influence of alcohol, riding in bike lanes, etc.).
- **Operator Training:** Ensure operators train users on how to properly use the vehicles through tutorials or on-screen prompts in apps, including guidance on starting, stopping, and riding safely.

6. Data Collection and Incident Reporting

- **Incident Tracking:** Require that all accidents and incidents involving the shared vehicles be reported to the city or regulatory body for review. This helps identify trends, problem areas, and potential risks.
- **Data-Driven Insights:** Use the data collected from micromobility apps (e.g., trip data, accident reports, locations of frequent crashes) to adjust policies, improve safety, and minimize risks in real-time.

7. Data Privacy and Security

- **Privacy and Data Protection:** Given the use of mobile apps for rentals, cities should ensure that operators comply with data privacy laws. Protecting user data prevents legal issues and potential litigation related to privacy breaches.
- **Tracking Devices:** Ensure that all vehicles are equipped with GPS tracking, which can help in accident investigations, deter theft, and aid in monitoring vehicle use patterns.

8. Encourage Safe Riding Behavior

- **Incentive Programs:** Cities can work with operators to encourage safe riding through incentives, such as discounts for users who wear helmets or avoid risky riding behaviors (e.g., riding on sidewalks).

- **Behavioral Monitoring:** Implement technology that detects unsafe riding behavior (e.g., speeding, riding on sidewalks) and provides automatic warnings or fee penalties through the app.

9. Collaboration with Law Enforcement

- **Police Enforcement:** Work with local law enforcement to enforce traffic laws specific to micromobility vehicles. This includes ticketing for violations such as improper parking, riding under the influence, or riding without a helmet.
- **Real-Time Enforcement Tools:** Collaborate with micromobility companies to develop mechanisms where operators can flag riders who exhibit dangerous behavior or violate regulations, and ensure penalties are consistent with city laws.

Helmets

Renting helmets presents challenges for many micromobility share programs and most do not offer helmet rental, or they provide helmets for purchase at discounted rates. Helmets for children under 18 are required by law in the City of Flagstaff, and a minimum age limit of 18 can be set for renting micromobility devices, to minimize this risk. It is possible to provide helmets with device usage, but operations can be costly for cleaning and maintaining helmets. Alternatively, many programs work with local bike shops to offer discounted helmets for purchase with memberships. It may also be possible to have bike shops offer helmet rental. Helmet use should be strongly encouraged as a means of preventing injury.

COMPLIANCE WITH LOCAL ORDINANCES : LOW

Ensuring that micromobility share users understand and comply with local ordinances is an important factor to take into consideration when implementing a micromobility share program. Certain precautions can be utilized to ensure users comply with ordinances such as clarifying where the devices should and should not be ridden and the responsible party in the event of a ticket, using geofencing to limit usage in certain areas or control speeds, having rules pop-up on the vendor’s app for the user to review before the bike can be taken, and education prior to reservation of the devices. The City may also want to review its code to ensure the rules are consistent and easy to understand.

INFRASTRUCTURE LIMITATIONS: MEDIUM

Successful micromobility share programs have strong bike networks. The [Flagstaff Urban Trail System \(FUTS\)](#) provides a strong foundation for this, as does the existing bike network. However, it is important to recognize gaps in the system and direct riders to bike lanes and alternate routes to ensure they feel comfortable and become repeat riders. In the future, the City of Flagstaff Regional Transportation Plan 2030 and the Active Transportation Master Plan both recommend more streets being redesigned as [Complete Streets](#), and the Regional Plan also contains policies for creating more biking and micromobility infrastructure. Its important the city continue the work they are doing to improve the multimodal network.

Mountain Line’s Transit App also provide low stress bike options to users who input origin and destination options. Promotion of this and/ or similar tools direct riders to the places with the best infrastructure. It may be possible to integrate these tools with the micromobility share app directly.

THEFT- LOW

Many cities worry about theft of devices based on early programs which suffered capital losses due to theft. However, technological advancements including GPS tracking and advanced locks have

significantly reduced thefts, with most programs reporting a maximum of 1-2 thefts per year. Ensuring devices have the latest anti-theft technology can reduce losses. Additionally, this Plan suggests that the City partner with a third party operate to implement such a program, putting the risk of theft back on the vendor.

WINTER CONDITIONS- LOW

Winter months often limit opportunities for robust ridership in micromobility share programs. Some programs find ridership is so low they can save money or at minimum break even by “hibernating” bikes in the winter. Storage for bikes is required to accommodate hibernation. Meanwhile, Chicago, Seattle, Philadelphia, Boulder, New York City, Montreal and others all operate successful micromobility shares despite winter conditions. The City of Denver does not allow devices to be ridden during occasional times of inclement weather but otherwise permits year-round usage. The City of Flagstaff Streets Division and Parks, Recreation, Open Space, and Events teams should be included in the discussion early in the process, particularly as it relates to parking devices in places that allow for street maintenance.

EQUITY- MEDIUM

It is possible for a micromobility share program to operate without stated equity goals. However, if equity is a goal of such a program, the following considerations should be considered:

Pricing and ease of payment systems

Payment systems can be a barrier to accessing devices for those who do not have smart phones or are unbanked. Providing a variety of payment options can help make the micromobility share system more accessible to people with different income levels. Partnering with Mountain Line, downtown parking and local businesses may be options to provide cash and/or smartphone-less access and make mobility services operate interchangeably. Providing subsidized or free rides for low-income residents could be accomplished through an application and qualification process. Other important considerations include having a call number for the unbanked to pay and unlock the devices, and quick sign-ups on an app system, especially for one-time users or visitors. Coconino County Health and Human Services can be a vital partner for the distribution of free or subsidized passes.

Unique populations

It is possible to offer a variety of bikes for people with various disabilities, seniors and even youth. Funding for accessible bikes may be through grant opportunities to serve the elderly and people with disabilities. Some micromobility share programs have even offered a variety of bike sizes to accommodate youth. Other adaptable bicycles may be available and can be negotiated with the vendor to mitigate this risk. Local groups including the Commission on Inclusion and Adaptive Living and Northern Arizona Adaptive Sports can partner in serving these communities.

Device Distribution

If equity is a key goal of a program, its important that devices are available in low income and equity areas. Vendors can be required to redistribute bikes throughout town. Its also recommended the program be allowed City wide and not limited to a particular area such as NAU only.

STAFF TIME- HIGH

Staff oversight of a program will be required and could be impactful. Decisionmakers should consider to whom the duties of responding to complaints, working with the vendor(s) and general oversight should

fall and if a new position may be needed to manage these aspects of the program. Under the SPIN program, full time support was not required however it did take staff time to manage. In addition, responsibility should be put on private vendors to respond to complaints, proactively resolve issues and ensure safe and effective system operations. Staff roles should be to redirect issues back to the vendors.

BIKE SHOP COMPLAINTS- LOW

Micromobility share programs could potentially take business away from bike shops in the area. Though most shops rent long-term (half or full day) bikes or mountain, these customers tend not be the same users as micromobility share riders, but some may have similar models. There is no way to eliminate this threat in a private system, but existing bike shops could benefit by competing for the contract for maintenance and redistribution needs. Information and marketing incorporated with the micromobility share program can refer people to bike shops to purchase helmets and other bike gear. Clear guidelines and expectations should be set prior to beginning any micromobility share program.

PUBLIC PERCEPTION- HIGH

The way the public perceives the micromobility share system can have a large impact on the system's success in the community. As a result, it is important to develop a marketing campaign and work with businesses in the area to create a positive image of the micromobility share before a program is implemented. Keeping bikes well-maintained and responding to complaints in a timely manner can also help create a positive public image of the micromobility share system. It is very important to mitigate this risk to avoid losing support for continued or future micromobility share programs.

RIDERSHIP EFFECTS ON MOUNTAIN LINE- LOW

Integrating shared micromobility with public transit offers opportunities to complement fixed-route transit networks and address first- and last-mile issues. It can also offer faster and more cost-effective mobility options for most trips, contributing to urban resilience, better air quality, lower greenhouse gas emissions and livable communities. Mountain Line can track and assess ridership data to determine the impact a micromobility share system has had on their ridership however saw no such impact during the SPIN trial. They might be able to connect their online payment system and Mountain Line app to the micromobility share system. Mountain Line has studied the impact of micromobility share programs and produced a map areas micromobility would specifically support transit because they are areas where additional routes are needed and not feasible but where micromobility devices would support access to established routes.

DEVICES LEAVING JURISDICTION BOUNDARIES - LOW

Devices will migrate into different jurisdiction boundaries (i.e. city to county), especially between the City, ADOT right of way and County Islands. The best solution is a regional approach that allows for and acknowledges that riders will need to cross boundaries. In addition, if needed, geofencing, alerts, and working with partner are all possible solutions to issues that may arise. MetroPlan's interagency nature is allowing all members to consider these issues in this Plan and raise concerns.

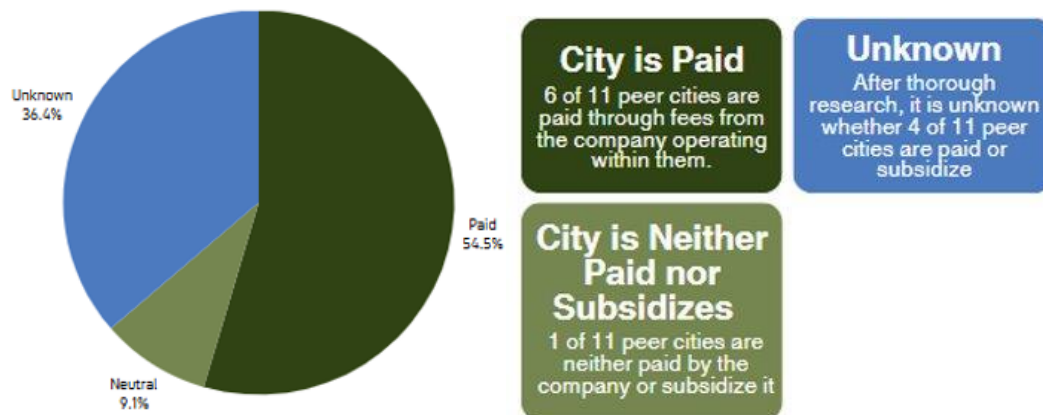
COMPANY VIABILITY- MEDIUM

Over the last 5 years, micromobility models have evolved and the number of private companies has dwindled to only a few operators that have developed a sustainable business model. By allowing a vendor to enter the market through an RFPc contract process, the financial viability of company can be considered.

It is important to understand company viability for two reasons, one is to create a micromobility share program with community support in case the model should change over time. Secondly, in the event a provider goes out of business, it will be important to understand responsibilities for cleanup from the program. This can be done through performance bonding and/or including mitigation strategies within a vendor contract.

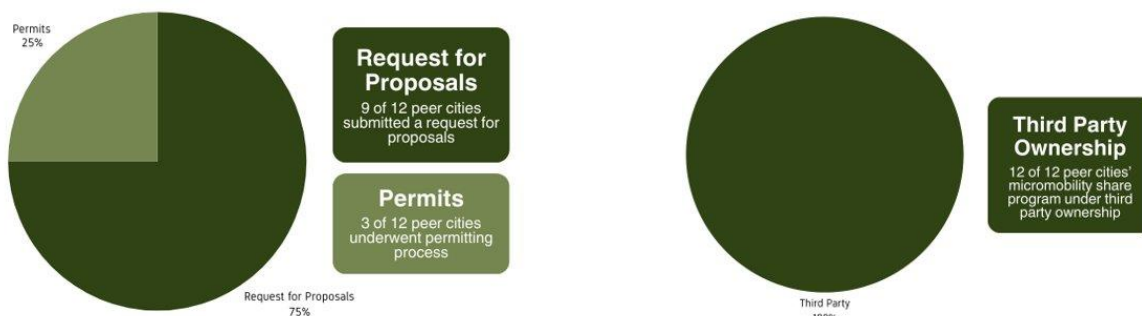
Changes in estimated ridership or fare structure may impact anticipated financial returns and is important to the long-term viability of a micromobility share program. Marketing a micromobility share program in partnership with the Downtown Business Alliance, Discover Flagstaff, neighborhood associations and NAU can increase visibility and usage for the program and reduce this risk.

Finally, the city can collect an administrative fee or require bonding that would help cover any costs if a vendor were to leave.



PROGRAM APPROACH- CONTRACTING AND PERMITTING

Below are examples of business models for both a permit-only and request for proposals (RFP) contract model share programs. Of 12 peer cities researched, 75% used and RFP and 25% used permits. One hundred percent used third party ownership rather than owning themselves.



RFP (REQUEST FOR PROPOSAL) CONTRACT FOR A MICROMOBILITY SHARE PROGRAM

Section 1: Introduction

1.1 Purpose

The City of Flagstaff seeks proposals from qualified vendors to operate a micromobility share program. The program will allow residents and visitors to rent shared electric scooters, bikes, or other micromobility devices for short trips within Flagstaff's urban area.

1.2 Objective

The objective of the micromobility program is to provide affordable, environmentally friendly, and convenient transportation alternatives that reduce traffic congestion, lower emissions, and enhance accessibility across Flagstaff.

Section 2: Scope of Work

2.1 Service Area

The program will cover designated areas within the City of Flagstaff, including downtown Flagstaff, business districts, residential areas, educational institutions, parks, and other key points of interest.

2.2 Fleet Composition

Proposals should include a fleet of electric scooters, bicycles, and/or other micromobility vehicles. The vendor must provide maintenance, operation, and customer support services for the fleet.

2.3 Operations

- **Hours of Operation:** The service should be available 7 days a week, from 6:00 AM to 10:00 PM (may vary based on city needs).
- **Maintenance:** The vendor must ensure that vehicles are regularly maintained, charged, and available for use.
- **Technology Platform:** The vendor must provide an easy-to-use mobile app or alternative for vehicle reservations, payments, and tracking.

2.4 Pricing Model

The vendor must propose a pricing structure based on per-minute or per-trip rates, including discounts for low-income riders, students, or other groups, and free rides during special events.

2.5 Environmental and Safety Standards

The vendor must comply with all state and local regulations concerning environmental sustainability and ensure vehicles meet safety standards for operation.

Section 3: Proposal Requirements

3.1 Company Qualifications

- Provide information on the vendor's experience in micromobility services.
- Submit a business plan detailing the operations, revenue model, and scalability of the program.

3.2 Technical Proposal

- Outline the fleet management system, the types of vehicles proposed, and the technology platform.
- Provide an implementation timeline for rolling out the service, including vehicle deployment, mobile app integration, and customer support setup.

3.3 Financial Proposal

- Outline all costs to the city, including revenue sharing models, infrastructure investment (if any), and any incentives or subsidies for riders.
- Propose a flexible pricing structure.

3.4 Insurance and Liability

Provide proof of insurance, including liability coverage for vehicles, users, and third parties, in accordance with Flagstaff's legal requirements.

Section 4: Evaluation Criteria

4.1 Proposal Evaluation

Proposals will be evaluated based on the following criteria:

- **Experience:** Relevant experience operating micromobility programs.
- **Education:** Proposed education of the devices, safety mechanisms and where to park/ride
- **Innovation:** Proposed technologies, fleet management systems, and user experience.
- **Sustainability:** Commitment to reducing carbon emissions and using green energy.
- **Cost Efficiency:** Fair and transparent pricing structure.
- **Community Engagement:** Strategies to promote the program and ensure inclusivity.

Section 5: Terms and Conditions

5.1 Duration of Agreement

The vendor term will be for an initial period of 3 years, with the option for annual renewals based on performance.

5.2 Performance Metrics

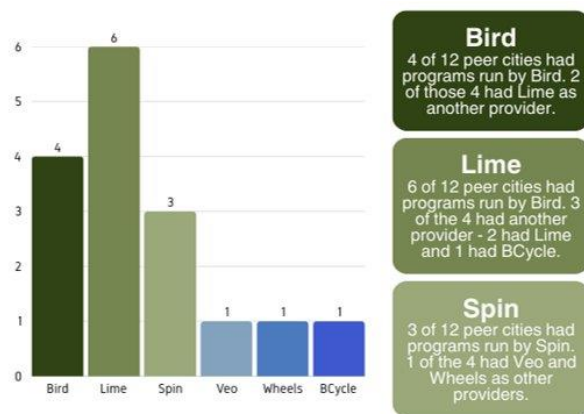
The vendor will be held to specific service levels, including vehicle availability, response times for maintenance, and customer satisfaction targets.

5.3 Reporting and Audits

The vendor will be required to submit monthly reports detailing fleet usage, financial performance, and other relevant data.

PERMIT BUSINESS MODEL FOR THE MICROMOBILITY SHARE PROGRAM

A permit business models take a free-market approach and minimizes government intervention while encouraging competition and innovation. This model can attract various private providers to operate, each offering different pricing structures, technologies, and service models. Its important to note that the micromobility share vendor market evolved and there are not as many vendors to compete as there were prior to 2020.



1. Initial Setup and Infrastructure

- **City Role:** Flagstaff will not provide direct infrastructure but will designate public parking spaces for micromobility devices (e.g., scooter/bike stations) and possibly invest in road and sidewalk improvements to accommodate these vehicles.
- **Private Operator Responsibilities:** Vendors will be responsible for maintaining fleets, operating apps, and managing customer support systems.

2. Revenue Model

1. Pricing Structure:

- a. **Pay-Per-Minute or Pay-Per-Trip:** Vendors will determine their rates, typically \$1 to \$2 per unlock and \$0.25 to \$0.40 per minute of use.
- b. **Subscription Plans:** Riders can opt for monthly or annual memberships, which provide discounts for frequent users (e.g., \$15/month for unlimited rides under 30 minutes).
- c. **Dynamic Pricing:** Prices could fluctuate based on demand (e.g., higher costs during rush hours or special events).

2. Revenue Sharing:

The city may take a small percentage (e.g., 5%-10%) of the revenue from rentals in exchange for the right to operate within the city limits. This would be negotiated based on local needs and policy goals.

3. Incentives for Vendors:

- a. **Bonuses for Coverage:** Vendors can earn additional revenue based on maintaining vehicles in under-served neighborhoods or during off-peak hours.
- b. **Reduced Parking Fees:** Vendors who meet certain sustainability or community engagement goals could receive reduced or waived fees for designated parking areas.

3. Competition and Innovation

- **Multiple Operators:** The city could allow several vendors (e.g., Lime, Bird, Spin, or local startups) to compete in the market, which would encourage innovation, service quality, and lower prices.

- **Market-based Entry and Exit:** New companies can enter the market by meeting the city’s basic operational requirements, and underperforming companies can exit, creating a competitive landscape.
- **Technology Differentiation:** Companies can compete through technology (e.g., better mobile apps, improved vehicle design, AI-powered fleet management) and service quality (e.g., cleaner vehicles, faster response times).

4. User Experience and Inclusivity

- **Low-Income and Discount Programs:** Vendors must offer subsidized rates for low-income individuals and students to increase accessibility.
- **Flexible Payment Systems:** Riders can pay with credit cards, mobile payments, and other digital options. Cash payments could also be made available for unbanked users.
- **Accessibility Features:** Devices should be designed to accommodate people with disabilities, such as scooters with lower seats for ease of use or vehicles with handles for users with mobility challenges.

5. Sustainability and Safety

- **Green Energy:** Encourage vendors to use electric vehicles and source power for charging from renewable sources.
- **Safety Initiatives:** Vendors must ensure proper safety equipment (helmets, etc.), as well as data-driven strategies to reduce accidents, including vehicle speed limitations in high-risk areas.
- **Environmentally Conscious Practices:** Vendors should recycle old vehicles and batteries, and reduce emissions through efficient logistics (e.g., using electric vehicles for fleet rebalancing).

This RFP and free-market business model examples outline a pathway for Flagstaff to implement a sustainable and efficient micromobility share program. Through a competitive, innovative market with clear performance criteria, the city can provide high-quality transportation options for its residents and visitors.

RECOMMENDATION

Flagstaff has features of demographics, density, and infrastructure that have been correlated to successful micromobility share programs elsewhere. A micromobility program would support many adopted goals and policies of the City, as referenced above in Supporting Policies and Goals. MetroPlan and Mountain Line recommend partners explore the establishment of micromobility share programs and guidelines in their region using the best practices and risk mitigation tools mentioned above.