CRCOG Regional Micromobility Feasibility Study

October 2022

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

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1. Executive Summary

Study Purpose

The CRCOG Regional Micromobility Feasibility Study is a project by the Capitol Region Council of Governments (CRCOG), exploring the feasibility of, and pathways to, implementing a regional micromobility program. The Metro Hartford region has been pursuing development of such a system for almost a decade, with the 2014 *Metro Hartford Bikeshare Feasibility Study* outlining a vision for a multi-jurisdictional bikeshare system. To date, the only large-scale micromobility system operating in the region is Hartford's Superpedestrian scooter program. The success of that program has generated interest in revisiting the feasibility of establishing a true regional system.

What is Micromobility?

"Micromobility" is an umbrella term for a range of low-speed shared-use personal transportation solutions, including (but not limited to) bikeshare and scootershare. Micromobility can be human powered (pedal bicycles) or electrified (e-scooters or e-bikes).

Why Should We Plan for Micromobility?

Micromobility is the fastest growing mode of transportation in the US Between 2014 and 2019, micromobility trips in the US increased by 618 percent to 136 million trips in 2019 (NACTO, 2020). Micromobility provides an economical means to make short trips or to access transit for longer trips. For communities across the Capitol region, micromobility is a way to expand car-free mobility, connect people to public transportation, and reduce the environmental footprint of transportation. As micromobility continues to grow in popularity **the region has an opportunity to proactively develop a coordinated strategy for introducing and managing these services.**

Regional Vision

CRCOG and a group of regional stakeholders established an updated vision and mission for micromobility in the region:

> **Vision:** A region where both residents and visitors of all incomes and abilities can travel in a convenient and sustainable way that benefits environmental and personal health.
>
> **Mission Statement:** To provide a high quality micromobility program that is safe, reliable, affordable, accessible, equitable, and flexible, connecting users to where they want to go.

Four goals were identified to carry out the defined vision and mission statement:

Goal 1: Micromobility is a sustainable transportation system that reduces the region's dependency on automobiles.

Goal 2: Micromobility connects people to places throughout the region.

Goal 3: Micromobility supports an equitable, healthy, and vibrant region.

Goal 4: Micromobility is an economically sound system that operates with full transparency and accountability.

Market Study

To help define the geographic scope and use case for a micromobility program, the study team completed a market study that explored a range of factors such as socio-demographics, travel demand, quality of bicycle infrastructure, and location of key destinations. Micromobility is most suitable for higher density locations, where there is a concentration of users who can access myriad destinations over a short distance. Major employers, colleges/universities, hospitals, transit hubs, and parks are all possible attractors.

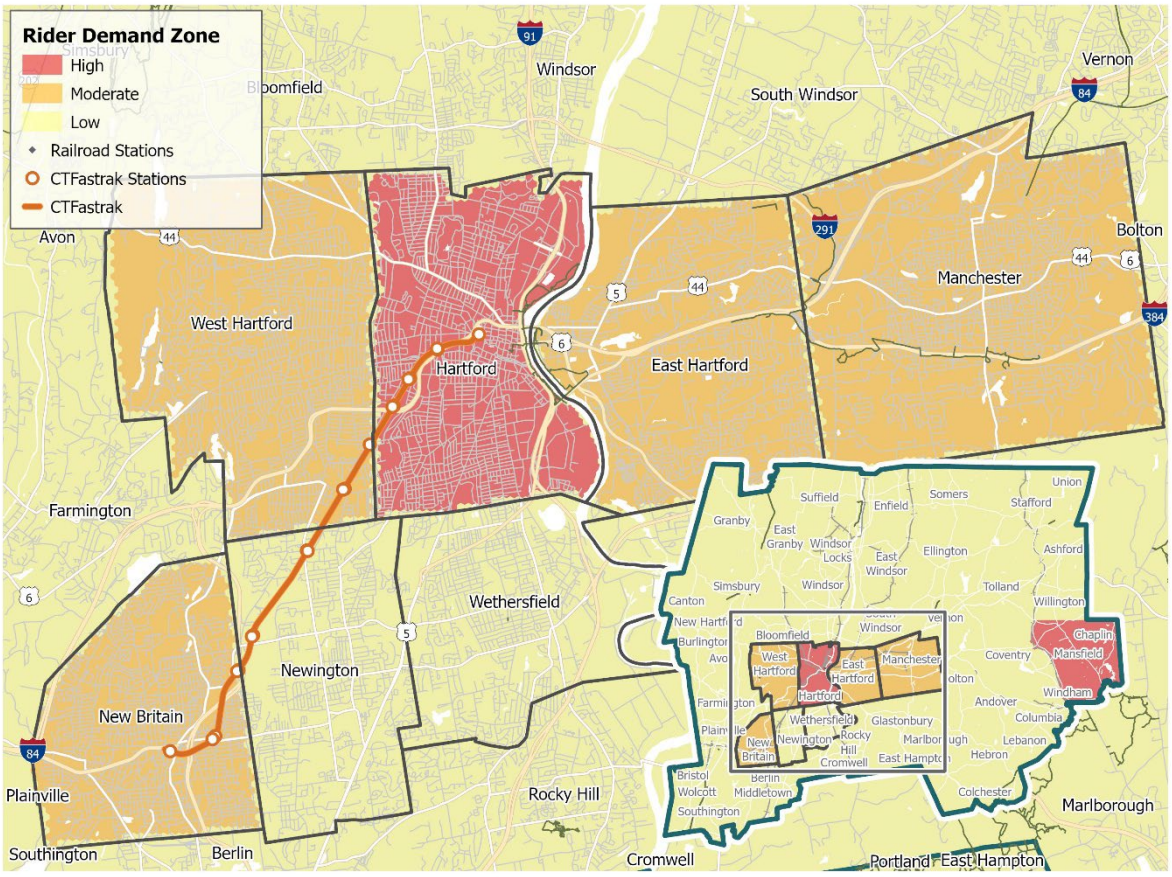

Figure 1: CRCOG Region Jurisdictions Categorized by Typology

The study team concluded a system could be developed based on three tiers of demand (**see Figure 1**):

- High Ridership Markets: Hartford and Storrs are the communities with the greatest demand for micromobility and would serve as the regional "core."
- Moderate Ridership Markets: New Britain, West Hartford, East Hartford, and Manchester are secondary markets that show demand but ideally should be implemented as extensions to the core system instead of stand-alone programs.
- Lower Ridership Markets: The remaining parts of the region have lower demand or undetermined demand. There may be more limited opportunities for targeted expansion beyond moderate ridership markets, such as connecting Newington town center to CT*fastrak*.

Recommendations

The study team recommends pursuing a regional dockless micromobility program owned and operated by a private operator(s) that is collectively negotiated, procured, and managed by participating jurisdictions in the region—a **Micromobility Collective**. The private operator[1] would be solicited through a request for proposals (RFP), much like how CRCOG and Hartford have contracted their scooter program. Procuring a system collectively has several benefits:

- The region can bundle together high ridership markets like Hartford with lower demand markets to entice an operator to serve a larger geographic area.
- A single procurement and harmonized regulations lower the barrier of entry for new jurisdictions to join the program, while providing the vendor regulatory predictability.
- By relying on a private vendor to own and operate the system, the participating jurisdictions limit their liability, financial commitment, and management burden. The main public cost of the system will be oversight and enforcement of the micromobility operator, a function that could be shared across the participating jurisdictions.

The existing scooter program in Hartford operates without a public subsidy. Whether or not a public subsidy is needed for a larger regional program could be determined during the procurement and negotiation process. Factors like the type of vehicles, geographic scope, required programming, and any fee caps could drive the need for subsidies. Other communities around the country have supported privately owned and operated systems in a variety of ways: funding bicycle infrastructure like new bike lanes and trails; constructing mobility hubs that provide safe, reliable, and contained places to park vehicles; subsidizing certain types of passes or fares (e.g., low-income pass program); and setting a guaranteed minimum revenue for the operator.

Publicly-Owned Alternative

The study team explored the feasibility and cost of establishing a publicly owned micromobility program. Unlike the mobility collective option, under this alternative a public entity (or entities) would own and fund the system, including being responsible for procuring the equipment and covering any operating

[1] Ideally the program would have a single operator but there could be multiple operators providing different kinds of vehicles (e.g. bikes, scooters, mopeds).

shortfall. In this scenario, a private vendor would manage day-to-day operations for a pre-determined fixed fee. Such a program could be considered if a regional micromobility collective fails to attract a private firm to own and operate a regional system. It is a secondary option due to its greater cost, implementation complexity, and lack of a clear champion.

2. Introduction

This study takes a fresh look at the feasibility and logistics of implementing shared micromobility in Connecticut's Capitol region. This study builds on prior work to develop a regional bikeshare program. In 2014, the Capital Region Council of Governments (CRCOG) and Greater Hartford Transit District (GHTD) developed the *Metro Hartford Regional Bikeshare Feasibility Study*, which envisioned the creation of a regional public bikeshare program. A lack of funding, vendor bankruptcy, and inability of any one community or organization to take on the administration of such a system, and finally, once a regional RFP was issued for regional bikeshare, the COVID-19 pandemic resulted in the plan never being implemented.

Since that study was completed, the bikeshare industry has undergone seismic changes. As new technologies like electric assist bicycles (e-bikes) and shared scooters were introduced, the term "bikeshare" became too limiting. This constellation of personal, low-speed, shared-use vehicles became known collectively as "micromobility." While in 2014 the industry was driven by public and non-profit investments in bikeshare, today privately funded and operated micromobility programs account for the largest share of micromobility trips.

In 2021, a private firm called Superpedestrian launched a successful scootershare program here in Hartford. The program today hosts 500 vehicles during peak periods and has facilitated approximately 200,000 trips in its first year of operations. Superpedestrian owns and operates the program under a contract with CRCOG and the City of Hartford.

The success of the Superpedestrian scooter program has generated renewed interest in a regional micromobility program. The CRCOG region is composed of 38 towns and cities. Jurisdictional boundaries pose political and usage barriers to micromobility. A regional program would allow the region to plan and manage a micromobility in a collective manner. A single regional system, as opposed to several independent jurisdiction-procured systems, would create a more seamless experience for consumers and ensure the Capitol region remains attractive to potential micromobility operators.

The report is divided into the following chapters:

- **Strategic Framework:** Discussion of the region's vision, mission, goals, and objectives for micromobility.
- **Background and Trends**: Review of micromobility industry trends, myths, and facts.
- **Market Study:** Analysis of the market for micromobility in the CRCOG region, including recommendations on system size and geographic scope.
- **Implementation:** Discussion of two strategies for implementing micromobility in the CRCOG region.

3. Strategic Framework

Vision and Mission

A vision and mission statement were developed to guide the expansion of micromobility in the region to best meet the needs of its users. The vision and mission statement were informed by regional plans and refined through stakeholder input.

> **Vision:** A region where both residents and visitors of all incomes and abilities can travel in a convenient and sustainable way that benefits environmental and personal health.
>
> **Mission Statement:** To provide a high quality micromobility program that is safe, reliable, affordable, accessible, equitable, and flexible, connecting users to where they want to go.

Goals and Objectives

Four goals were identified to carry out the defined vision and mission statement. The goals focus on sustainability, mobility, equity, health, and economic need. The objectives listed beneath each goal are designed to be measurable and actionable components of each goal.

Goal 1: Micromobility is a sustainable transportation system that reduces the region's dependency on automobiles.

- Establish micromobility as a tool for improving access to public transit, especially to CT*fastrak* stations.
- Ensure micromobility is cost competitive to alternative modes.
- Ensure micromobility is a safe and comfortable mode for all users.

Goal 2: Micromobility connects people to places throughout the region.

- Establish a framework for micromobility that can be scaled to a regional level.
- Ensure micromobility is a seamless part of the region's transit network that maximizes the number of destinations one can reach, providing enhanced connectivity to work, school, leisure, basic necessities, and home.

Goal 3: Micromobility supports an equitable, healthy, and vibrant region

- Ensure micromobility expands access for underserved and disadvantaged communities.
- Establish micromobility as an amenity to attract business investments, tourism, and residents to the region.
- Market micromobility options as a tool to promote an active lifestyle and reduce pollution from motor vehicles.

Goal 4: Micromobility is an economically sound system that operates with full transparency and accountability.

- Ensure that the region's micromobility program is responsive to the public.
- Develop a governance structure that meets the region's needs today and in the future.
- Ensure the program is operated in a financially stable manner to support system growth and maintenance.
- Act as a transparent operation by clearly communicating system performance.

4. Background & Trends

What is Micromobility?

The definition of micromobility has evolved over time with the introduction of new modes and technology. Micromobility describes transportation services that are 1) shared-use, 2) lightweight, and 3) personal-use vehicles that are person-powered (e.g., bicycle), powered by a small electric motor, or a combination of the two. While programs like bikeshare have been around since the 1960s, modern micromobility services rely on a few key innovations:

- Automated management of vehicles, notably unlocking and locking of the vehicle.
- User account management, including automated payment and linking trips to users to discourage theft.
- Real-time (or near real-time) tracking of vehicles through either GPS tracking or connected stations.

Recent History

Bikeshare has experienced significant changes in its technology, form, and operating models over the last decade. When CRCOG first looked at the feasibility of a regional bikeshare system in 2014, there were a few dozen programs in North America. Today the number exceeds 200 programs. In 2014, there were only a handful of for-profit bikeshare operations. Most programs at the time were organized by local governments and non-profits; these programs relied on a mix of public subsidies, sponsorships, and charitable donations to sustain themselves.

By the late 2010s, the industry began to see a fundamental shift in its business model. Over $2 billion in venture-capital backed funding flooded into the bikeshare space.[2] Several start-ups launched dockless, free-floating bikeshare programs. Unlike earlier systems, cities with dockless operators often had multiple services competing against one another. These companies began experimenting with alternative technologies such as dockless e-bikes and scooters. As bikeshare no longer described the range of modes operated by this budding industry, the term micromobility was coined.

Since 2017, the industry has been characterized by aggressive competition, with start-ups focused on gaining market share. Transportation Network Companies (TNCs) Uber and Lyft made major micromobility acquisitions, with an interest in cementing their respective apps as all-inclusive mobility as a service (MaaS) platforms.[3] The shift in the industry has had pros and cons for jurisdictions. While communities have struggled to update their regulations and oversight procedures at the same pace as new technologies and companies emerged, this shift allowed jurisdictions that lacked funding to start or expand their own micromobility program to benefit from the new competition by partnering with private firms looking to expand their operations.

[2] Eliason, Jason, Start it Up: The Future of Micromobility, Medium, January 15, 2021
[3] Teale, Chris Lyft's Motivate acquisition part of industry-wide move toward integrated transit options, Smart Cities Dive, July 5 2018

Today, the industry is at a major inflection point. After years of rapid growth, companies are now feeling greater pressures to become profitable and are less willing to enter risky markets, including suburban communities and smaller cities that have lower demand. The COVID-19 pandemic also impacted the industry, as lockdowns and public health concerns led to ridership declines and even the temporary suspension of some systems. Fortunately, micromobility ridership has rebounded faster than other public modes like transit.

A recent report by McKinsey and Associates estimates that by 2030 the industry will be valued at over $300 billion, an over six-fold increase from today.[4] The high valuation is based on predictions that micromobility companies will continue to consolidate, technology improvements will keep reducing operating costs, and cities will continue to reduce permit fees – in support of transportation alternatives to the car. The question remains how many operators (and what consumer price points) will allow micromobility companies to become financially self-sustaining.

System Type

Micromobility modes can be divided into two broad categories – docked and dockless. **Docked** services utilize stations where users can pick-up and return bicycles. A few, like the now defunct Bike New Haven system, utilize hybrid or "dumb dock" system, in which the bikes are similar to dockless bicycles, and the stations are essentially designated bicycle racks. However, most docked systems embed the digital hardware and locking mechanisms on the stations themselves, although a few docked systems have GPS units on the bicycles themselves.

Dockless, or free-floating systems, allow users to start or end a trip without the use of a station. Dockless systems embed digital hardware and the locking mechanism onto the vehicle itself. A user can merely end their trip in any permitted location, which could be a specified parking area, any public bike rack, or parked properly anywhere on a public sidewalk.

In many cases, dockless micromobility can be just as simple to find and use. The GPS or RFID technology that creates a virtual geographic boundary that establishes and enforces approved parking and travel zones (geofencing) has become increasingly accurate. Overall, the traveling public has become increasingly familiar with app-based maps and navigation.

An article in the Journal *Transport Reviews* in 2020 found that "the dockless design of bike-sharing systems significantly improves users' experiences at the end of their bike trips. Individuals are unburdened from needing to find an open dock. Additionally, the high flexibility and efficiency of dockless bike-sharing often makes the bike-sharing systems' integration with public transit even tighter than that of traditional public bikes, providing an efficient option for first/last-mile trips."[5]

[4] The Future of Micromobility: Ridership and Revenue in Crisis, McKinsey and Associates, 2020

[5] Zheyan Chen, Dea van Lierop & Dick Ettema (2020), Dockless bike-sharing systems: what are the implications?, Transport Reviews, 40:3, 333-353, DOI: 10.1080/01441647.2019.1710306.

Figure 2: Bike New Haven's dock-based system - on launch day in February 2018

The hybrid docked/dockless model works well in Portland, OR, where the reliability of the docks is especially attractive paired with the flexibility of returning a bike anywhere (for a fee). According to the National Association for City Transportation Officials (NACTO), this system is not easily replicated in less densely populated cities, however. NACTO's *2018 Micromobility in the US* report states that "smaller station-based bikeshare systems without a dense network of stations or a large number of bikes had low vehicle utilization rates, as the factors that make a bikeshare system successful—a high number of bikes conveniently placed over a large area—were absent."

A 2021 study from the National Center for Sustainable Transportation at UC Berkeley[6] found that dockless bikeshare systems can provide greater availability of bikes for disadvantaged communities than for other communities, attracting more trip demand because of a larger service area and frequent bike rebalancing practices. The study's authors also noticed that the existence of electric bikes helps mitigate the bikeshare usage gap between disadvantaged communities and other communities.

Finding for CRCOG

While there are a variety of system types on the market, the study team feels that a dockless system may be the most appealing option for the CRCOG region as it allows for greater operating flexibility and lower capital costs. A dockless system could feature designated parking areas to address concerns with right-of-way management.

[6] Jaller, M., Niemeier, D., Qian, X., & Hu, M. (2021). Dock-based and Dockless Bikesharing Systems: Analysis of Equitable Access for Disadvantaged Communities, UC Davis: National Center for Sustainable Transportation.

Vehicle Type

One important global trend in bikeshare is that communities that have welcomed bikeshare into their transportation network have also welcomed other shared (and electric) mobility devices such as scooters, e-bikes, and mopeds. A 2021 study comparing utilization of various micromobility vehicles in Zurich, Switzerland showed that the density of vehicles, trip duration, and time of day influenced people's decisions about what type of vehicle they preferred. For morning commutes, docked bikeshare was the most popular. E-scooters were mostly used for very short trips, while bikes and e-bikes were used for substantially longer trips.[7]

Scooters continue to grow in popularity, and according to a 2019 study by students at MIT's "Senseable Cities" Lab, achieve an average utilization of 1.17 trips per vehicle per day, relative to the average of 0.47 trips per day a shared bicycle is used.[8]

A study published in 2021 showed that electric bikes are ridden farther—and in less densely populated areas—than conventional bicycles.[9] The popularity of e-bikes is also supported by the number of e-bike sales to consumers—up 145 percent from 2019 to 2020, more than double the rate of classic bike sales.[10] Most of the largest US bikeshare systems are introducing e-bikes into their fleets. In cities where e-bikes are introduced alongside traditional bikeshare they have generally seen much higher utilization. Electrified micromobility reduces the physical strain of riding and can be especially attractive to older adults or those riding in hilly terrain.

While electric modes continue to gain in popularity, it is important to consider that all shared electric vehicles require battery charging. Operators generally use two different approaches to ensure batteries remain charged. Most systems in North America utilize centralized charging. Street technicians can replace depleted batteries or pick up vehicles and charge batteries at a centralized location. This approach requires limited fixed charging infrastructure but requires staff to actively manage batteries across the network. Alternatively, some operators utilize charging stations in the field, typically built into docked micromobility stations. This type of in-field charging remains uncommon due to the cost of capital equipment and station hardwiring.

While still relatively uncommon in the US, there is growing interest in adaptive micromobility – vehicles that can accommodate users with certain mobility constraints. Examples of adaptive vehicles can range from seated tricycles to recumbent bicycles. In the last year, Helbiz, Lime, and Bird have introduced micromobility devices that can be attached to a manual wheelchair. Lime and Helbiz have also piloted seated adaptive scooters for users who cannot stand unassisted for long periods of time.

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[7] Daniel J. Reck, He Haitao, Sergio Guidon, Kay W. Axhausen, Explaining shared micromobility usage, competition and mode choice by modelling empirical data from Zurich, Switzerland, Transportation Research Part C: Emerging Technologies, Volume 124, 2021, https://www.sciencedirect.com/science/article/pii/S0968090X20308445

[8] Rui Zhu, Xiaohu Zhang, Dániel Kondor, Paolo Santi, Carlo Ratti, Understanding spatio-temporal heterogeneity of bike-sharing and scooter-sharing mobility. Computers, Environment and Urban Systems, Volume 81, 2020. Accessed on 11/30/2021 at https://www.sciencedirect.com/science/article/pii/S0198971519305812

[9] Si'an Meng, Anne Brown, Docked vs. dockless equity: Comparing three micromobility service geographies, Journal of Transport Geography, Volume 96, 2021. Accessed 11/30/2021 at https://www.sciencedirect.com/science/article/pii/S0966692321002386

[10] Accessed on 11/30/2021 at https://www.nytimes.com/2021/11/08/business/e-bikes-urban-transit.html

Findings for CRCOG

Electrified micromobility is likely to generate substantially more usage compared to non-electric micromobility modes. The region would benefit from permitting a range of micromobility vehicles (including scooters).

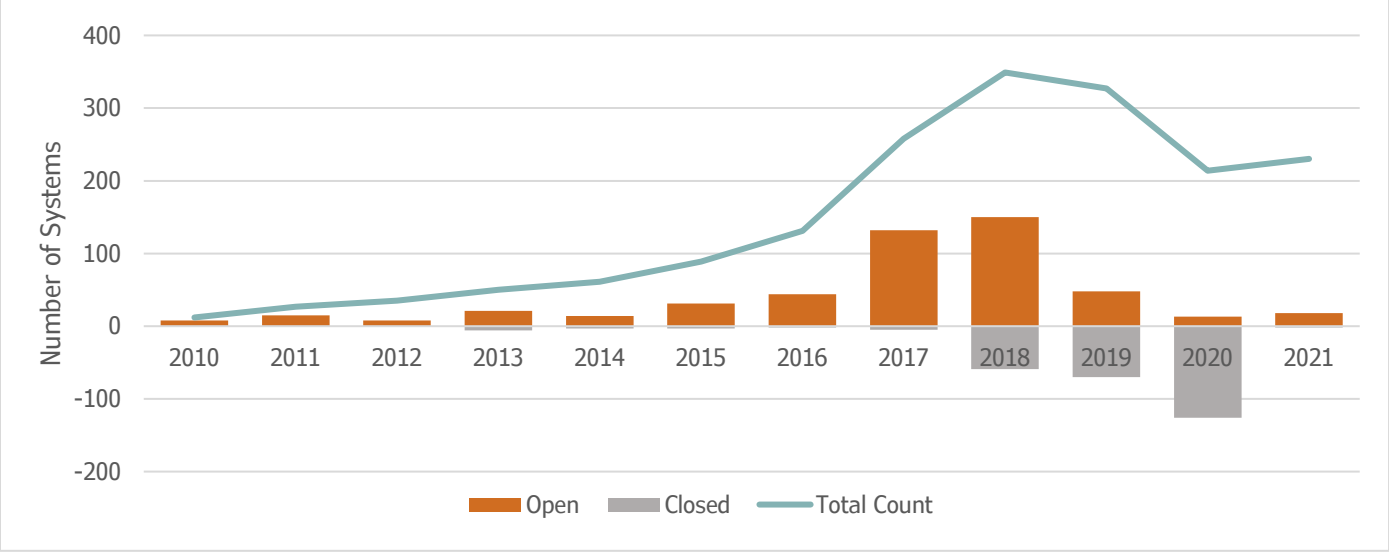
Industry Growth Trends

As shown in **Figure 3**, annual growth of bikeshare in North America was slow but steady until 2016. During the 2017-2018 period, the arrival of free-floating ("dockless") systems allowed bikesharing to proliferate – including Lime's dockless bikeshare in Hartford (which has since closed). The dip in bikeshare systems that happened in 2019/2020 can be attributed to several factors:

- The unsustainable business models some vendors were employing
  - Vehicles not designed for repetitive, commercial use
  - Costs to ride (i.e., per minute) not well calibrated / simply too low
  - Multiple vendors in a single market
- Challenges in accessing bicycles and parts - due to demand outpacing supply, and manufacturing and shipping logistics
- Pandemic-related closures of systems
- A wider industry shift toward scooters.

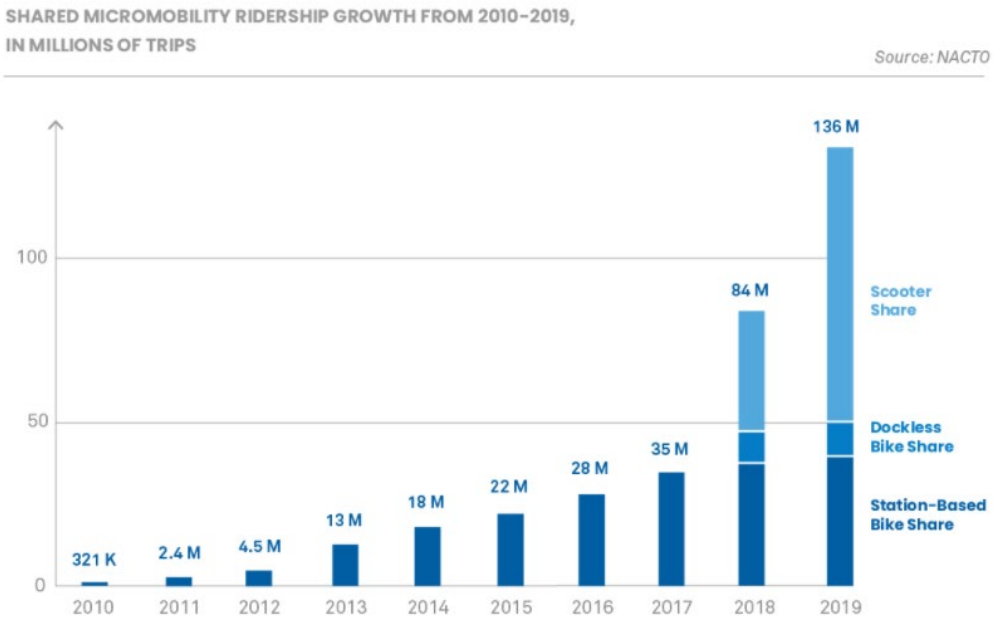
Data from 2021 shows modest renewed growth in the number of bikeshare systems. The pandemic re-introduced demand for bikeshare, as people concerned about using confined public transportation options chose the personal, door-to-door solution bikeshare provides.

Figure 3: Number of Bikeshare Systems Over Time, data from Meddin Bike-Sharing World Map Mid-2021 Report



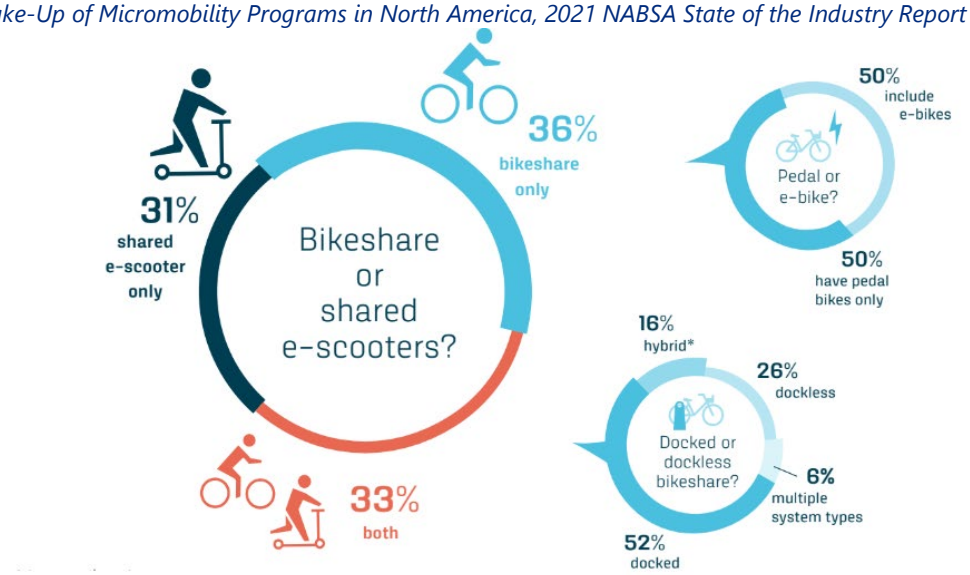
It should be noted that the decline in the number of bikeshare systems did not impact overall bikeshare ridership as the programs that closed contributed only a small share of overall ridership (see **Figure 4**). Since 2018, bikeshare ridership has remained steady nationwide, even as scooter usage has grown exponentially. Scooters today account for about two-thirds of micromobility usage nationwide.

Figure 4: North American Micromobility Ridership by Year, 2020 NACTO State of Micromobility Report[11]



As shown in **Figure 5,** of nearly 300 North American jurisdictions with a micromobility program, the majority offer bikeshare, either as the sole micromobility mode (36 percent of communities), or in conjunction with scooters (33 percent of communities). Increasingly, jurisdictions are choosing to offer a combination of scooter and bikeshare options, opting for hybrid docked/dockless bikeshare, and including e-bikes in their fleets.

Figure 5: Make-Up of Micromobility Programs in North America, 2021 NABSA State of the Industry Report



[11] Shared Micromobility in the US: 2019, NACTO, August 2020

Findings for CRCOG

Micromobility has weathered the COVID-19 pandemic better than many other transportation services. The industry has seen rapid growth in the popularity of e-scooters, that today account for two-thirds of all micromobility trips.

Safety

Micromobility services bring with them a certain amount of risk for both users and other road and sidewalk users. According to the US Consumer Product Safety Commission, there were a total of 25,400 emergency room visits attributed to e-scooters (both shared e-scooters and personally owned vehicles) in 2020.[12] For reference, there were an average of 3.4 million emergency room visits for motor vehicle crash injuries from July 1, 2017 to July 1, 2018.[13] While the increase in e-scooter accidents is alarming, the growth of scootershare ridership has outpaced this increase in accidents.

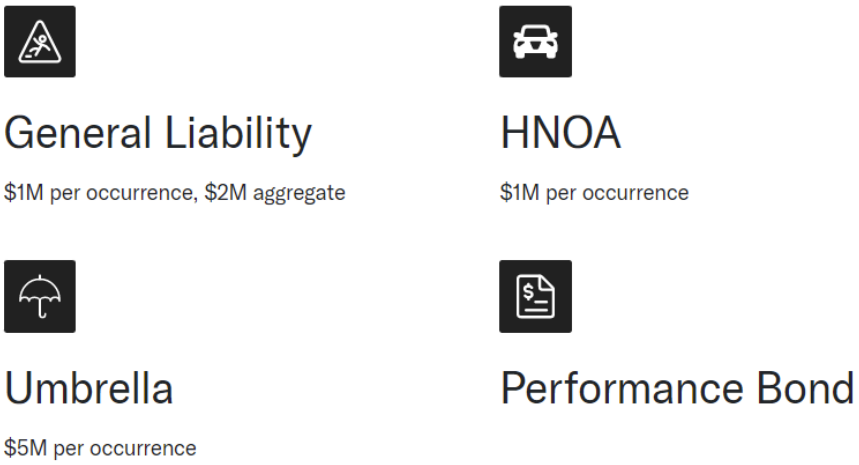
A recent study of injuries on electric scooters by the CDC found that 48 percent of dockless scooter injuries sampled in Austin, Texas resulted in head trauma.[14] Low rates of helmet use contribute to high rates of head injury; a study of emergency room visits in Southern California found that of the 249 patients with injuries related to scooters, only 10 were wearing a helmet and 100 had sustained some head trauma.[15] There are a few possible reasons why scooters have a higher injury rate: the instability of the vehicles themselves, especially earlier models that had smaller wheels; the public's unfamiliarity with scooters (most bikeshare users know how to cycle prior to using bikeshare); and a lack of standard protocol for where scooters are ridden. In Connecticut, e-bikes and e-scooters are afforded the same rights and responsibilities as conventional (pedal) bicycles. See attached **Appendix A** and **Appendix B** for State legislation governing e-bikes and e-scooters.

In addition to the safety of those riding a scooter or bicycle, there is a safety risk to pedestrians, especially with regard to dockless equipment. If parked improperly on a sidewalk or on a roadway, dockless vehicles can block the public right-of-way and pose a safety hazard. Like drivers, micromobility users who fail to follow traffic laws endanger pedestrians.

The micromobility industry has addressed safety in several ways. More robust vehicle design, improved lighting, and more advanced self-diagnostics make the vehicles themselves safer. Initiatives to provide or discount helmets for riders, encouraging them to bring their own helmets, and providing rider safety information videos, as well as guidance on the vehicle and in-app, are among the personal safety measures that have improved and expanded since the earliest days of micromobility. However, the rider must take personal responsibility for attending to these.

[12] Injuries Using E-Scooters, E-Bikes and Hoverboards Jump 70% During the Past Four Years, US Consumer Product Safety Commission, 2020.
[13] Davis D, Cairns C. Emergency department visit rates for motor vehicle crashes by selected characteristics: United States, 2017–2018. NCHS Data Brief, no 410. Hyattsville, MD: National Center for Health Statistics. 2021.
[14] Dockless Electric Scooter Injury Study, Austin Public Health, 2018; Micromobility Products-Related Deaths, Injuries, and Hazard Patterns: 2017-2019, Consumer Protection Bureau, 2020
[15] Trivedi, Tarak K et al. Injuries Associated with Standing Electric Scooter Use, Journal of the American Medical Association, 2019; 2(1)

According to FounderShield—a company that insures micromobility companies—the following are the minimum insurance requirements a micromobility company must meet to operate a public system (HNOA = Hired and Non-Owned Auto Insurance):[16]



Note that it is standard practice for micromobility operators to indemnify host municipalities of liability in the case of accident, injury, or insurance claim.

Rider education features and programs are provided in the app used to register for and access micromobility vehicles. These include mandatory safety quizzes, destination mapping features, and in-app compliance measures with tiered penalties to encourage proper use of vehicles.

Infrastructure—primarily bike lanes—is also expanding to provide safer places for bike and scooter riders to travel. Some communities charge micromobility providers a fee per vehicle or per ride that can be used to pay for safer facilities. The City of Miami reports that it has received about $2.4 million under its electric scooter share pilot program, which has funded new bike lanes. Electric bicycles may be ridden where bicycles are permitted to travel in the State of Connecticut – with exceptions for unpaved trails and paths – unless specifically permitted. Each municipality in Connecticut may regulate where e-bikes are permitted through local ordinance. See **Appendix A** for Connecticut's *Act Concerning Electric Bicycles, Traffic Control and Parking and Traffic Authorities*.

Finally, improvements in technology and operating procedures have addressed certain safety concerns that are especially prevalent with dockless and/or electrified systems. Geofencing means operators can set location-specific speed restrictions, for example limiting how fast riders can travel in a public park as opposed to on city streets. Geofencing and parking verification procedures, while not infallible, help to ensure riders properly park their vehicle at the end of the trip in the designated location, and companies can even require photo evidence of properly parked vehicles to also help ensure proper parking at the end of a ride.

[16] https://foundershield.com/industry/micro-mobility/

Findings for CRCOG

Safety is a major concern related to micromobility. A regional system should incorporate the latest technologies to regulate where and how fast users ride to reduce accidents or improper usage. Any operator should have an adequate insurance policy and indemnify host jurisdictions of liability in case of accident. Finally, user engagement and outreach can increase awareness of safe rider practices, including helmet usage.

Culture and Etiquette

Micromobility companies have developed effective ways of nudging riders towards positive behavior. Users view in-app prompts, may experience automatic slowing or stopping in restricted zones, and receive incentives for parking in locations that aid in fleet rebalancing and equitable distribution of vehicles. In-app rider education features and programs including mandatory, customizable safety quizzes, inclusion of destination mapping features which provide suggested safety routes and more. They also incorporate an in-app compliance measure with tiered penalties to encourage proper use of vehicles. Efforts to build a community of users—through local hiring, engaging local community leaders, reaching out to local residents at events, providing rider training classes, and offering discounted fares to riders on limited incomes—builds a culture of respect and recognition of micromobility as legitimate transportation.

Findings for CRCOG

Similar to safety, rider culture and etiquette will be shaped by both technology (speed restrictions, no ride zones) and user education/engagement.

Financial Sustainability

There has been a growing understanding that micromobility systems are more than just for recreation but are a viable form of transit, and like bus and road networks, require public investment. New provisions in the infrastructure bill make funding available for bikeshare systems and allow membership costs to be covered by pre-tax commuter benefits.

There remains a major division in the micromobility industry between not-for-profit and for-profit programs. Many bikeshare systems continue to rely on public funding, sponsorships, and charitable giving to supplement rider revenue. Private dockless bike and scooter operators have long operated at a loss although as firms go public, there is new pressure from shareholders firms to make a profit. In the last few years, the private micromobility industry has made steps to become more financially sustainable. Private dockless operators have seen modest industry consolidation, having increased their user fees to generate more revenue, and have invested in more robust vehicle technology to increase vehicle lifespan.

Findings for CRCOG

The industry is likely more risk-adverse than a few years ago. Operators will be looking for a value proposition in the CRCOG region instead of investing in the market for growth's sake.

Environmental Sustainability

Shared bikes, e-bikes, and electric scooters are built to be more durable than they were initially, and their life spans are now counted in years rather than months. They must, however, be maintained; redistributed (usually referred to as "rebalancing"); and, if electric, charged. The process for doing this maintenance, moving, and charging generally requires the use of gas- or diesel-powered service vehicles, adding vehicle miles and emissions to local air. Swappable batteries can cut down on some of this service vehicle travel because only the batteries—not scooters or bikes—need to be transported. Also, newer batteries with better storage capabilities allow longer trip distances, reducing the number of charges required per day. Superpedestrian's electric scooters can travel up to 60 miles on a charge. Considering the average 1.4 miles per trip and 3-4 trips/day the vehicles in Hartford receive, charging of each electric scooter is only required once or twice per week.

Communities should require clarity from operators on these aspects when procuring micromobility services, considering full "life cycle" emissions associated with the manufacturing process, batteries, replacement frequency, and rebalancing, as well as the broader circular economy principles.

Findings for CRCOG

From an environmental standpoint, the region would benefit from selecting vendors with robust and proven technology.

Equity

Without a specific equity focus from micromobility providers, there are many barriers that prevent micromobility systems from being accessible and equitable. Barriers may be physical, such as when there are not enough vehicles located in equity areas and/or not sufficient bike or pedestrian infrastructure in equity areas for users to feel safe. Even when physical access is not the issue, many equity populations are less likely to have access to a smartphone or credit card to use app-based micromobility. There are knowledge and disability status barriers as well, from lack of familiarity with the system itself or the ability to ride a standard bike or scooter. Finally, there is the perception of micromobility accompanying gentrification and displacement, and thus not viewed by low-income and minority communities as something "for us."

Despite these barriers, many micromobility programs have worked to build equitable and accessible systems. Some key equity strategies, include:

- **Physical Access:** Ensure that vehicles and stations (if applicable) are located in a diverse range of neighborhoods.
- **Cost Barriers:** Low-income users are more price sensitive. To ensure the system is accessible to everyone in the community, systems either subsidize the price for all users or make available discounted fares for income-eligible individuals. An administratively easy way to manage low-income passes is to have them tied to State or Federal assistance programs.
- **Payment System Barrier:** Ensure the system is accessible to users without access to a credit card by allowing payment through other platforms, including prepaid cards and cash.

- **Knowledge Barrier:** Ensure the public is aware of the system and knows how to use it. Conduct community outreach that includes trusted community members serving as system ambassadors. Support rider education and group rides.

Findings for CRCOG
Incorporate equity and accessability requirements into future program to address usage barriers. The success of the existing program in Hartford in a good model to expand on.

Open Data

The North American Bikeshare and Scooter Association (NABSA) has developed open data standards to help facilitate data and information sharing. The Mobility Data Specification (MDS) has standardized the generation and reporting of data that can be easily shared to inform planning decisions and integration with transit and other transportation modes. Similarly, the General Bikeshare Feed Specification (GBFS) has created a standardized format to integrate micromobility systems into existing trip planning platforms like Google Maps.

The micromobility data management platforms, such as *Ride Report* and *Populus* provide data from shared bikes and scooters that can inform:

- A basis for decisions regarding subsidies (e.g., data demonstrates reduction of single occupancy vehicle use as a result of shared mobility operations at scale)
- Inclusion and accessibility goals (e.g., is there adequate vehicle supply in underserved areas?)
- Encouraging the use and discoverability of shared mobility so as to reduce congestion (e.g., where in the city should parking areas be created?)
- Safeguarding the quality of the public space and promote safety (e.g., at what places is shared mobility creating nuisance/unsafe situations in the public space?)[17]

Findings for CRCOG
Development of open data standards benefits both jurisdictions and the public. Requirements should be incorporated into future micromobility contracts.

Conclusion

Micromobility has undergone rapid changes in the handful of years since it became widespread in North America. Dockless technology and the arrival of e-scooters and e-bikes have made micromobility systems more resilient and fluid. Vehicle design and advances in GPS and sensor technology will continue to make individual rides safer and more predictable, and an archive of data and literature on best practices has developed to inform new systems. Perhaps most importantly, a paradigm has emerged in which municipalities partner with micromobility companies to fill an important transportation need.

[17] Mobility Data Standards: What they are and How to Implement Them, Populus, 2021.

5. Market Study

As part of the market study, the study team conducted an existing conditions analysis to understand the region's current conditions and its potential suitability for micromobility. The study team identified activity centers based on regional concentrations of jobs and population. A range of sociodemographic data were evaluated to determine specific sub-markets for micromobility. All findings are detailed in the subsequent sections.

Activity Centers

Regional activity centers, based on job and population densities, are shown in **Figure 6** through **Figure 8.**

Figure 6 shows the population density of the City of Hartford, including surrounding jurisdictions of West Hartford, East Hartford, and New Britain. The inset shows these areas within the context of the larger CRCOG region. Hartford is the most densely populated community in the CRCOG region by a large margin. New Britain and Manchester also stand out as dense population centers. Outside of these jurisdictions, only a few small nodes of high population densities exist, notably the community of Storrs (largely due to the student population at the University of Connecticut campus). Much of the region features low density suburban and exurban land-uses.

Figure 7 shows the job density in the region. Similar, to population density patterns, Hartford has the largest concentration of jobs within the CRCOG region, followed by Storrs (again due to the University of Connecticut Campus), with some lower concentrations of density in Manchester, Glastonbury Center, Newington, New Britain, Windsor, Windsor Locks, and Enfield.

Finally, **Figure 8** shows the sum of population and job density per acre in the Hartford region and surrounding CRCOG area in the inset. As shown in the previous two maps, the largest concentrations are in Hartford, West Hartford, East Hartford, New Britain, Manchester, and Mansfield (Storrs). Smaller concentrations can be found in the surrounding areas of these jurisdictions as well as smaller or less dense communities like Windsor Locks and Enfield. Within Hartford, the highest density is in the downtown business district and near the hospital, and progressively decreases in the surrounding neighborhoods.

Figure 6: Population Density

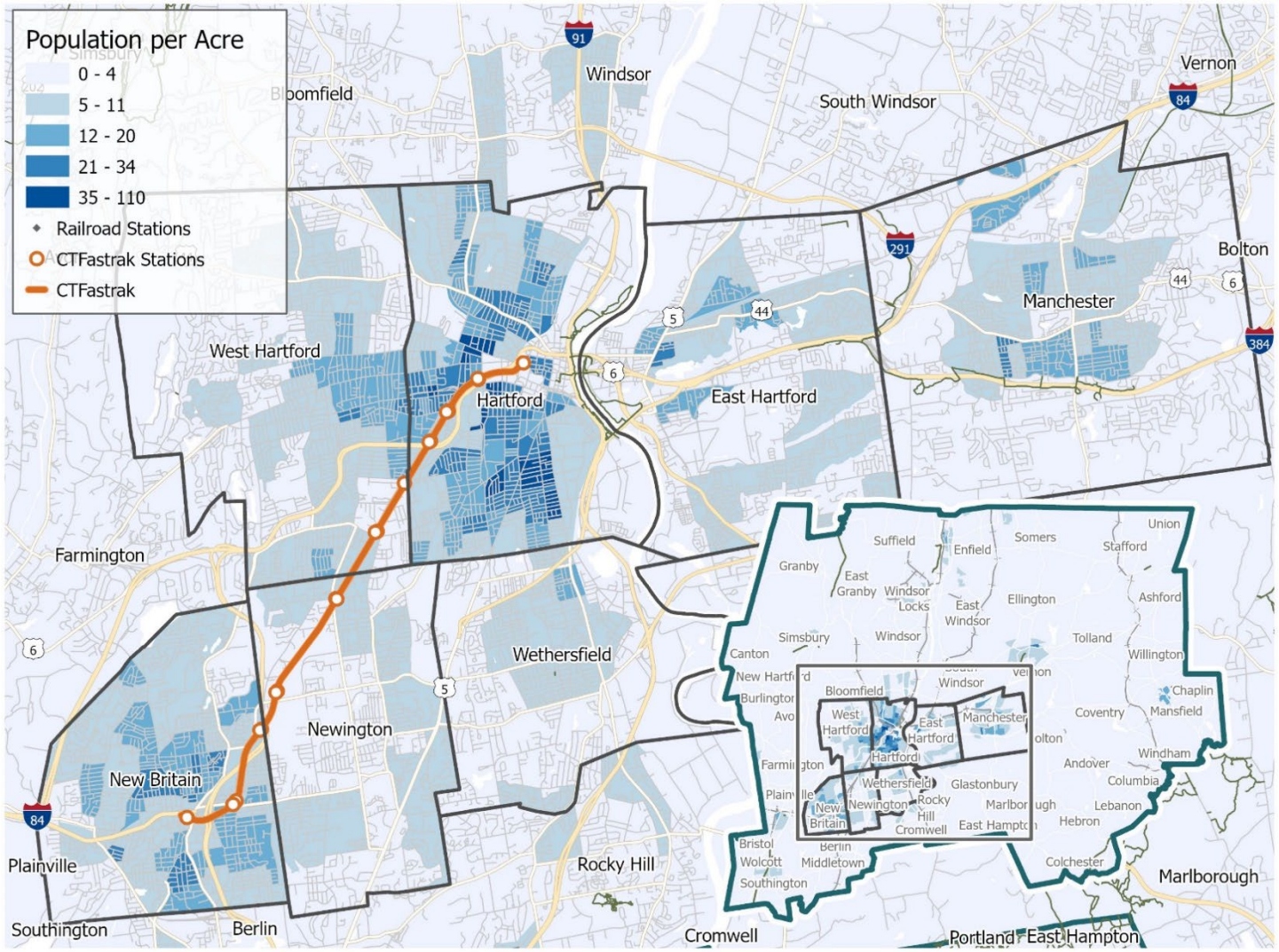


Figure 7: Job Density

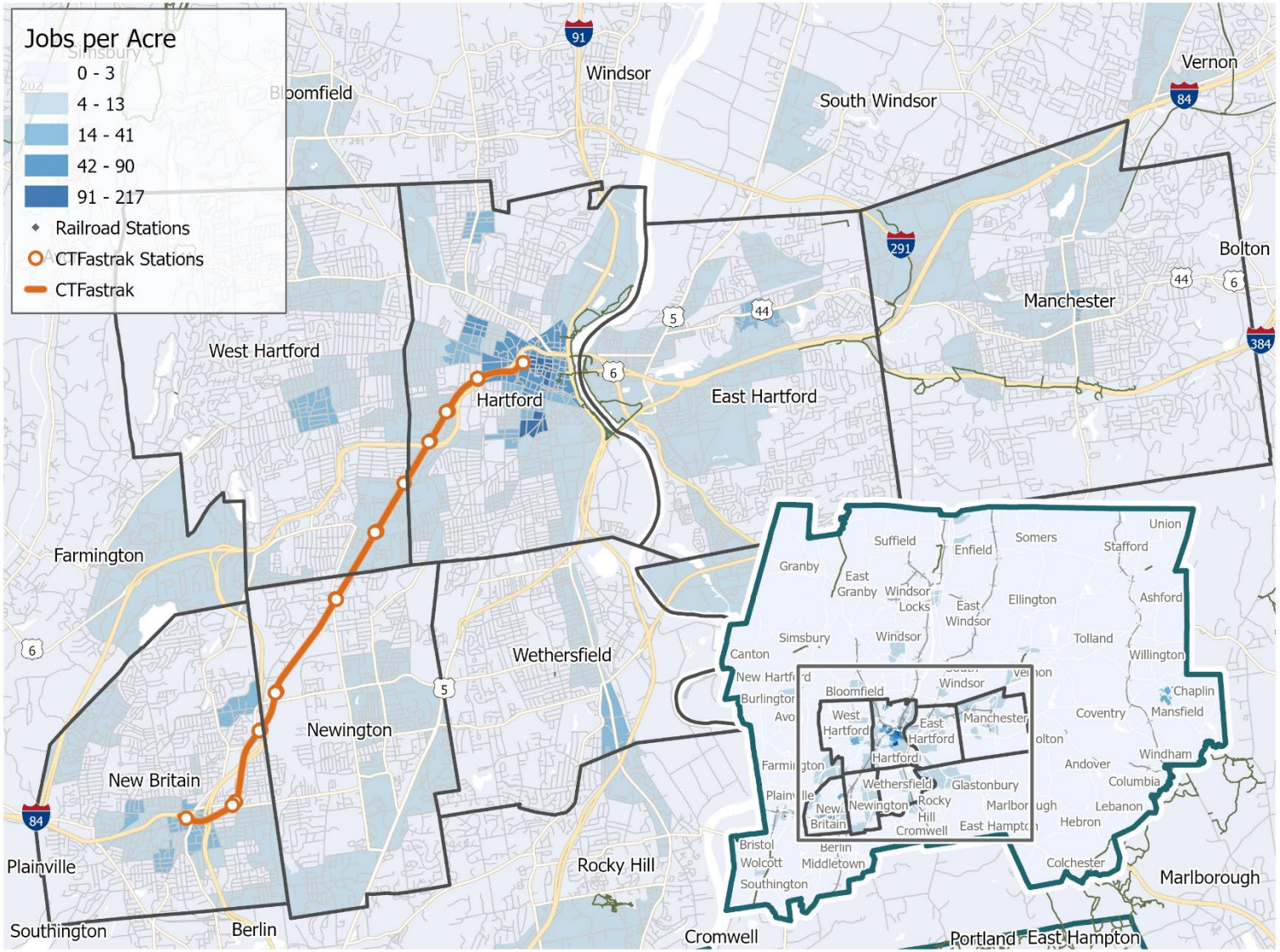
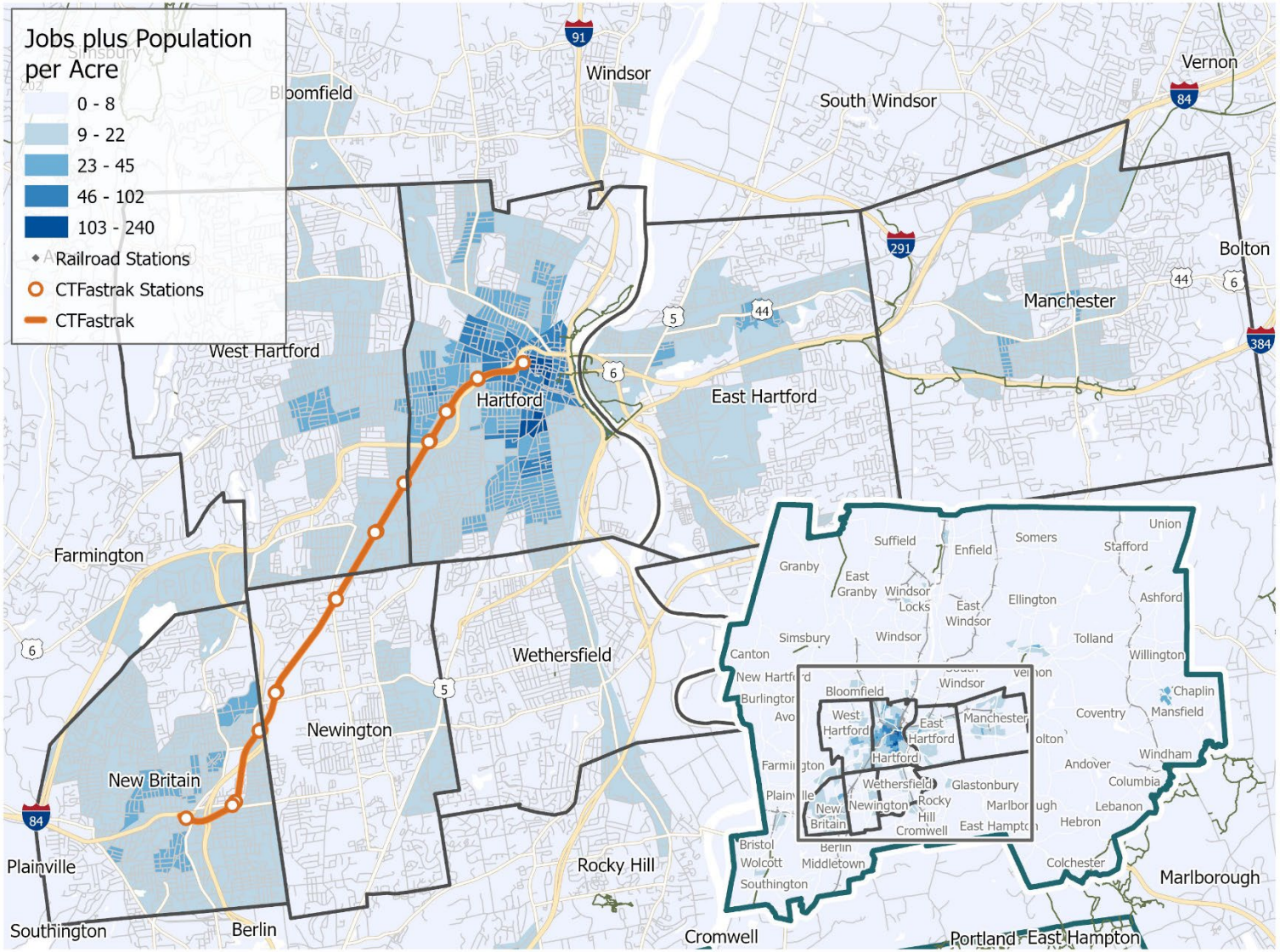


Figure 8: Population + Job Density

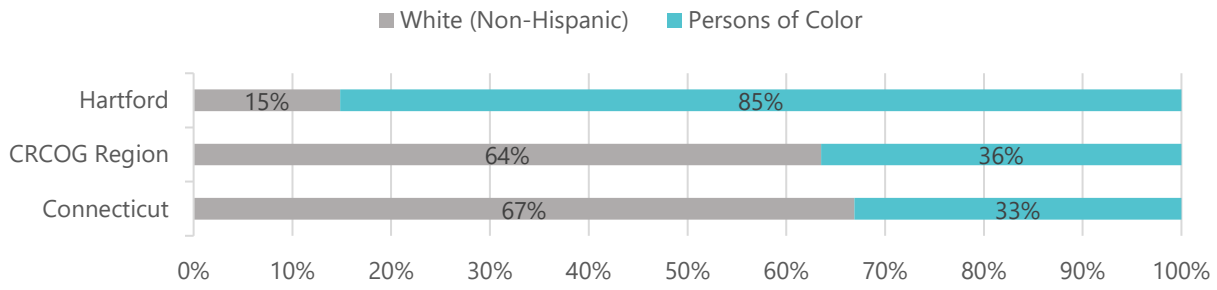


Demographics

Figure 9 through **Figure 12** highlight key demographic indicators for the CRCOG region, with the City of Hartford and State of Connecticut provided as a point of reference.[18]

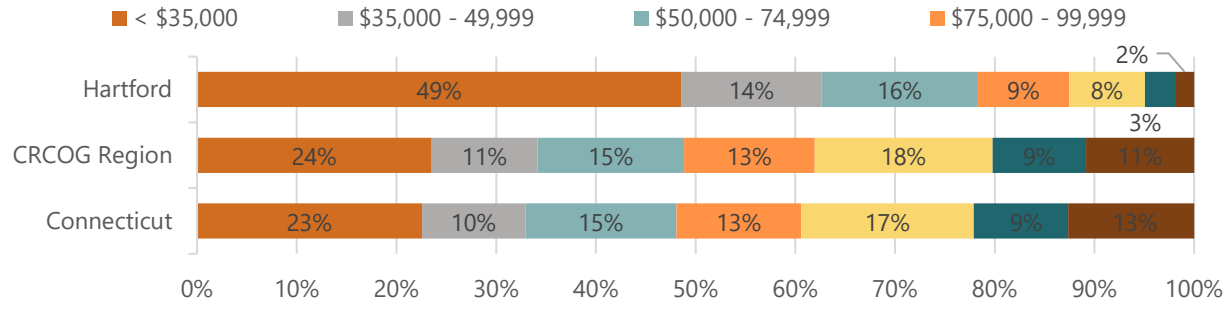
People of Color (defined as those who identify as Hispanic and/or by a race other than White) historically have been underserved by transportation improvements and represent a target audience to ensure any future micromobility system equitably serves the region. The CRCOG region has a slightly larger proportion of the population identifying as persons of color compared to the state, with the largest concentration—representing the vast majority of the population—found in Hartford (**Figure 9**). East Hartford, New Britain, and Manchester also stand out due to their racial diversity (not shown). While race and ethnicity does not directly replace to micromobility demand, it helps inform equity and engagement strategies.

Figure 9: Study Area Demographics



The CRCOG region sees a similar distribution of household incomes as the state overall (**Figure 10**). Hartford has the largest concentration of low-income households in the region, followed by New Britain, East Hartford, and Manchester. Low-income populations are typically more transportation cost burdened and disproportionately benefit from new low-cost mobility options.

Figure 10: Annual Household Income

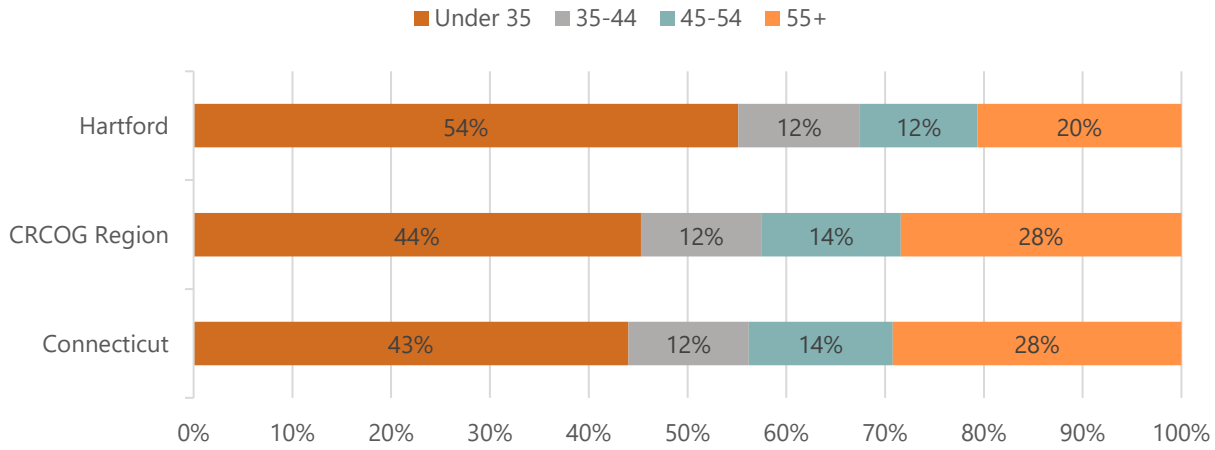


The age breakdown of the CRCOG region and the state is nearly identical, with 43-44 percent under 35 and 28 percent over 55. The City of Hartford is comparatively much younger than the CRCOG region and

[18] Unless overwise notes, all socio-demographic statistics come from the US Census, American Community Survey, 2020 5-Year counts. Note that some percents do not add up to 100% due to rounding.

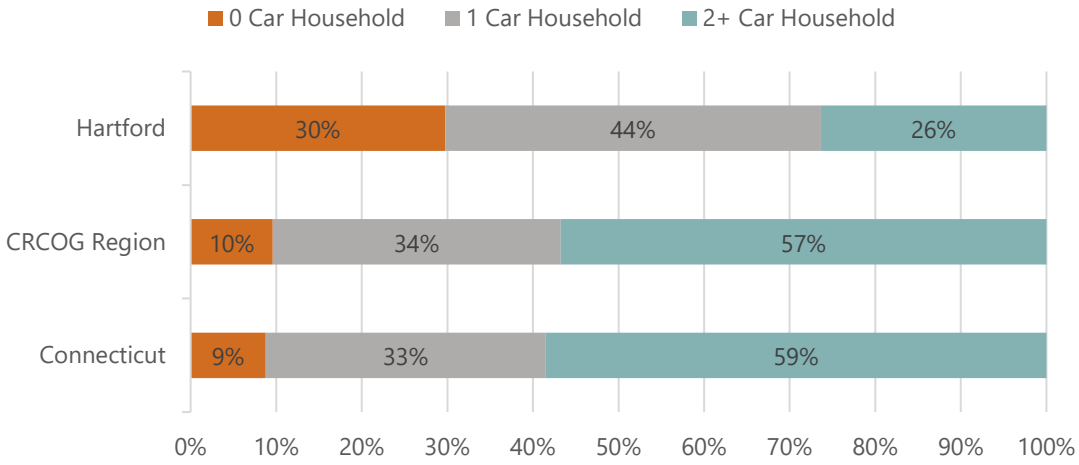
the state, with 54 percent of the population under 35 and only 20 percent over 55 (**Figure 11**). Other towns with high concentrations of younger residents include Mansfield (which encompasses Storrs, home to UConn) and New Britain. Younger populations are of note as they are more likely to use micromobility than older populations.

Figure 11: Age of Population by Geographic Area



The CRCOG region and the state also have similar proportions of households with car access, with the majority of households (57 and 59 percent, respectively) owning two or more cars. By contrast, 30 percent of households in Hartford City are car free—nearly triple that of both the CRCOG region (10 percent) and the state (9 percent)—and another 44 percent of households own only one car (**Figure 12**). Zero and one car households are of interest when studying micromobility since they are more likely to be reliant on public transit or other alternative modes.

Figure 12: Car Ownership by Geographic Area



Micromobility Suitability & Demand

To identify where micromobility could be most successful in the CRCOG region, the study team conducted a propensity analysis that aggregates a range of factors related to ridership demand and public need for micromobility.

Methodology

The propensity analysis includes a series of measures that relate to high micromobility demand, including employment density, population density, concentration of retail activity, existing mode share for bicycle commuters, and availability of bicycle infrastructure. Additional factors, such as the density of low-income and non-white populations and locations of regional colleges and universities were also incorporated in accordance with the region's goals and unique needs.

Table 1 lists the measures included in the propensity analysis as well as the weighting of each measure used in the model. Certain measures were given a higher weighting, indicating the perceived importance of that measure to micromobility demand. Population and employment density, for example, were assigned a higher weight than other factors because they are the factors most significantly correlated with higher micromobility ridership.

The measures included in the propensity model have been normalized to a scale of negative one to two, with two representing the maximum value and negative one the minimum value. The measures used in this analysis are largely based on absolute numbers (e.g., the number of bicycle commuters or low-income population per square mile) rather than percentages (e.g., proportion of a population that is low income). This approach was taken so that each measure gauges the total population impacted by micromobility.

Table 1: Propensity Measures and Weighting

Metric	Measure	Source	Weight
Population	Density	American Community Survey (ACS) 2019 5-year averages	2
Population 150% of federal poverty line*	Density	ACS 2019 5-year averages	1
Non-White Population	Density	ACS 2019 5-year averages	1
Employment	Density	Longitudinal Employer-Household Dynamics (LEHD) 2018	2
Retail and Hospitality Employment**	Density	LEHD 2018	1
Bicycle Commuters	Density	ACS 2019 5-year averages	1
Points of Interest	Count	Connecticut Open Data Website	1
Colleges & Universities	Count	Connecticut Open Data Website	2
Parks	Count	Connecticut Open Data Website	1
Bicycle Trails	Density	Connecticut Open Data Website	2
CTfastrak Station & Commuter Rail	Distance	Connecticut Open Data Website	1
Elevation	Delta	United States Geological Survey	-1

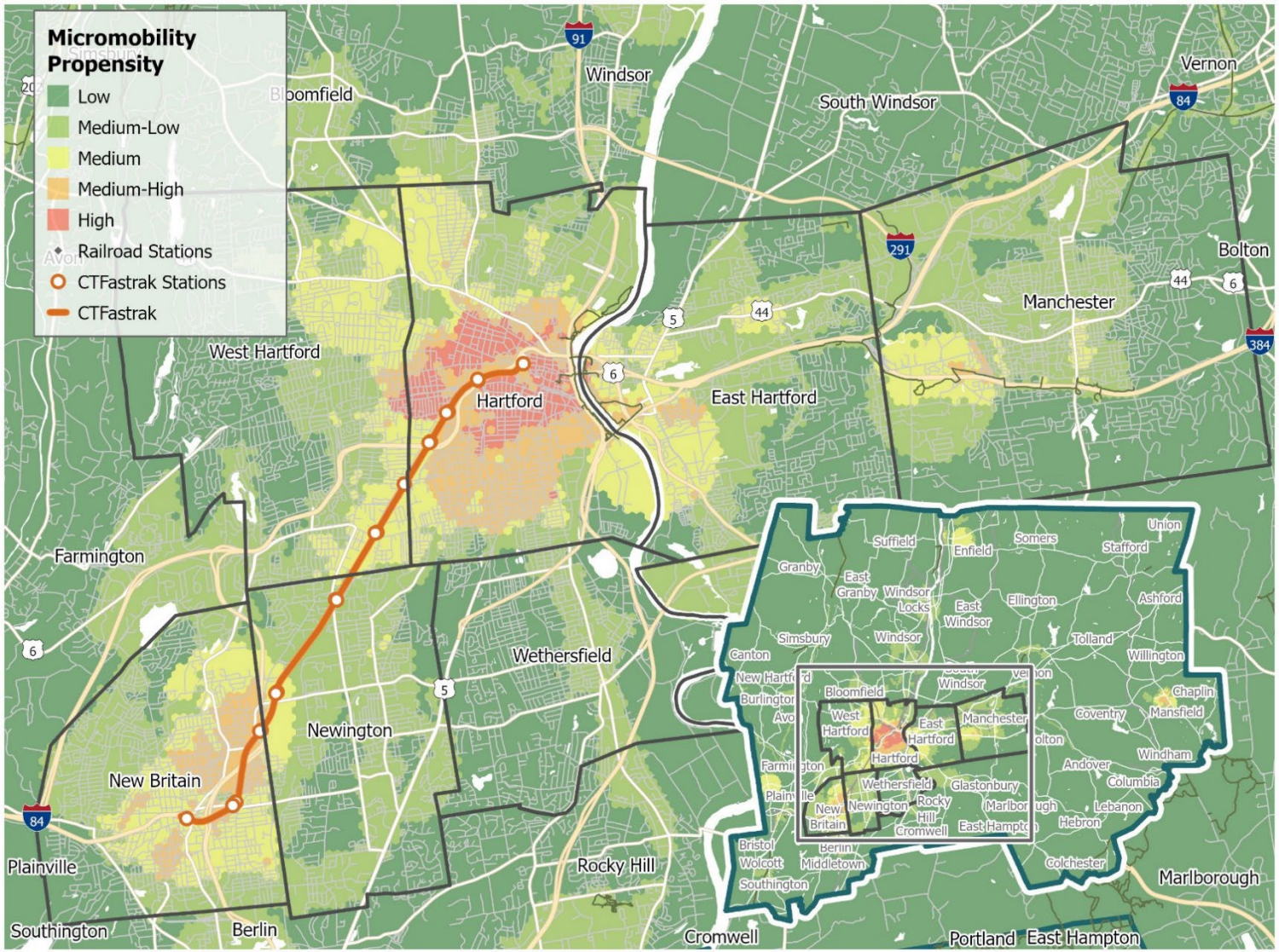
**Definition for low-income*

***Proxy for retail activity*

Results

Based on criteria and metrics applied, **Figure 13** shows the results of the propensity analysis, highlighting areas with the highest demand and suitability toward micromobility. Areas with the highest propensity are downtown Hartford and New Britain, with propensity generally declining as one moves away from these centers. Notably, there is also medium to medium-high propensity along the length of CT*fastrak*, as well as in East and West Hartford, Manchester, Wethersfield, and Mansfield (i.e., Storrs). These results make sense when compared to national trends in micromobility usage, as micromobility riders tend to be younger and more transit-dependent, and usage is higher in areas of higher job and population density and with higher-quality transit.

Figure 13: Bikeshare Suitability



Market Demand

To help model ridership and revenue, the CRCOG region was broken into three tiers of demand: high, moderate, and low. These tiers were defined based on market analysis findings, including areas of high propensity, concentrations of job and population densities, existing bicycle infrastructure and transit connections, and the locations of regional colleges and universities.

The high-demand zones represent the core markets for micromobility in the region. These zones could host stand-alone micromobility programs due to their concentration of jobs, people, and key destinations. The moderate-demand zones represent communities that have more modest demand for micromobility and would ideally be implemented as part of a larger regional program instead of a stand-alone system. Many of the moderate markets see significant volumes of travel beyond their jurisdictional borders. The remaining areas not categorized as high or moderate typologies were assigned as low. These areas show less demand than other places within the CRCOG region and may not have sufficient density to support micromobility.

The defined demand zones were based on jurisdictional boundaries and are shown in **Figure 14**. High typology areas include Hartford and Storrs, while areas such as West Hartford, East Hartford, Manchester, and New Britain are categorized as moderate.

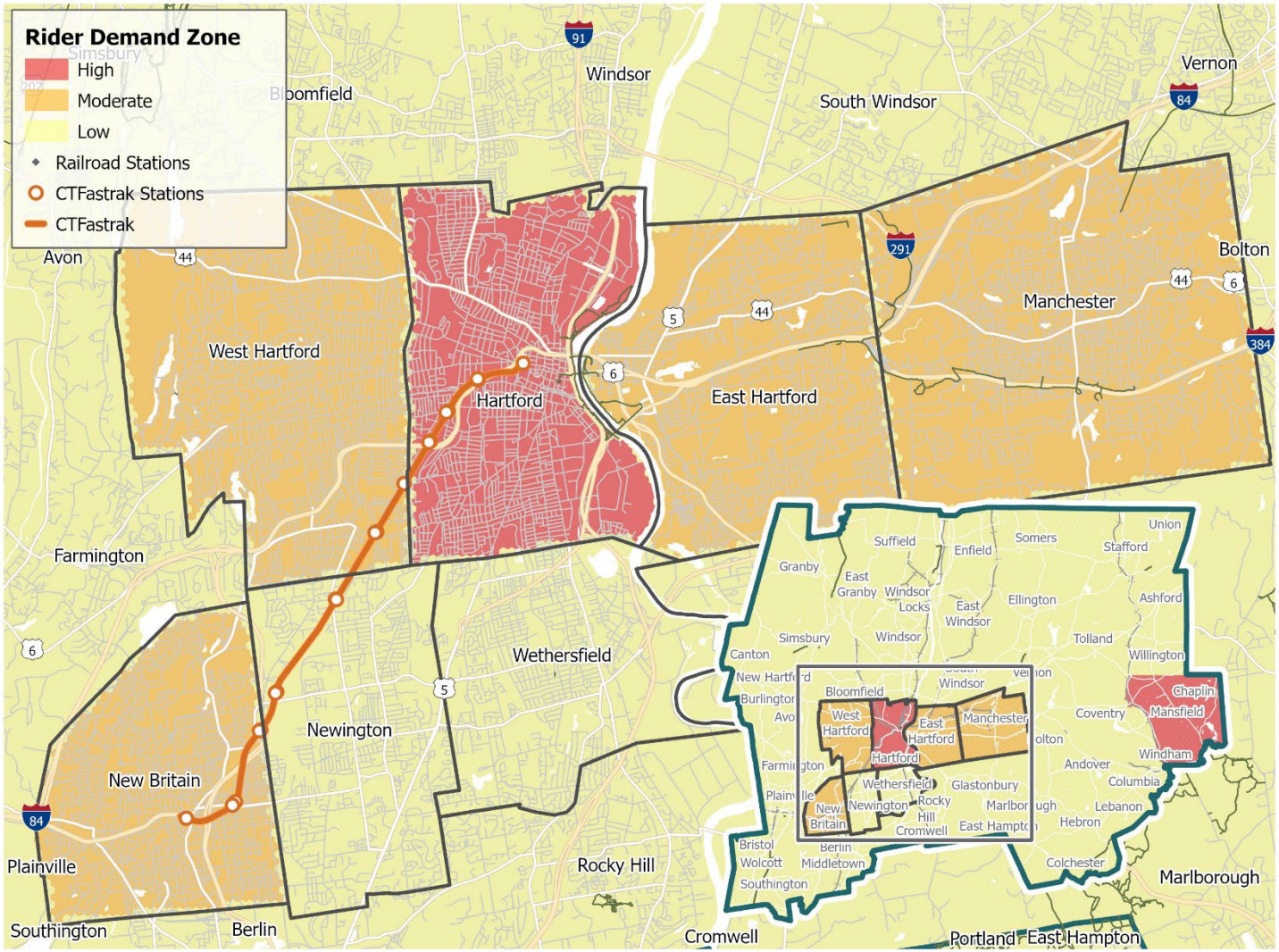
The study team used a sketch-planning approach to determining system size. The team started by identifying 184 key locations that could be served by micromobility. Locations included both major destinations (e.g., retail corridor, hospital) as well as locations that could conveniently serve high or moderate propensity areas within a quarter mile range. The study team assumed a vehicle count of 7.5 vehicles per location in high demand areas and 5.0 vehicles in moderate or low demand areas. The analysis resulted in a count of vehicles (agnostic whether they are bikes or scooters) by market demand zone.

The estimates assume micromobility coverage in all high- and moderate-demand markets. The only micromobility implementation envisioned for low-demand markets are in Farmington, Wethersfield, and Newington (listed together below as "Other"), where a more limited deployment of micromobility could connect to CT***fastrak*** or nearby destinations in Hartford. System sizes are indicated in **Table 2**. Note that these are just estimates and actual number of vehicles deployed should be adjusted based on demand. Moreover, estimates reflect expected demand and geographic coverage need. For example, while Mansfield covers a larger area than Hartford, Storrs (where the study team expects the greatest demand in Mansfield) is a fairly compact area.

Table 2: Estimated System Sizes for Regional Deployment

Demand Zone	Jurisdiction	Vehicles
High	Hartford	500
	Storrs / Mansfield	100
Moderate	East Hartford	100
	West Hartford	125
	New Britain	200
	Manchester	50
Low	Other	<100
Total		1,175

Figure 14: Rider Demand Zones



Note: Zones are based on jurisdiction boundaries. In certain communities (e.g., Mansfield, West Hartford) demand is concentrated in a smaller activity center.

Key Takeaways

Several key takeaways of the CRCOG region and the viability of micromobility have been developed based on this market study. Key takeaways are summarized as follows:

- **Existing Conditions:** The existing conditions analysis identified regional activity centers based on job and population densities. The densest activity centers are in Hartford, New Britain, Manchester and Storrs. A sociodemographic analysis of the region showed that Hartford has the largest concentration in the region of historically disadvantaged populations, including persons of color and low-income households. Car ownership in Hartford is notably lower than that of the CRCOG region and state.
- **Microtransit Suitability & Demand:** Micromobility suitability and demand was assessed through a propensity analysis highlighting areas most suitable for, and supportive of, micromobility. The highest expected demand for micromobility is in Hartford, Storrs, and New Britain. West Hartford, East Hartford, and Manchester had significant areas of moderate demand.
- **Demand Zones:** The region was split into three ridership demand zones—high-, moderate-, and low-demand—to reflect the varying degrees of microtransit suitability and demand across the region. High-demand areas include Hartford and Storrs, moderate-demand areas include East and West Hartford, Manchester, and New Britain. High-demand zones have an estimated total need of 600 vehicles to meet regional demand, while moderate-demand zones have a total estimate of 500 vehicles. The total need for the region is approximately 1,175 vehicles.

6. Implementation

This section outlines strategies for implementing a regional micromobility program. The region faces multiple paths to implementation, with this study focusing on the two most feasible strategies. The implementation plan builds on the market analysis to develop a clear framework for implementing a micromobility program in the region, covering topics such as program ownership and governance, operations, technology, and funding.

Overview of the Implementation Process

Developing the Business Model

The first step for the region in implementing a micromobility program is to determine the program's business model. There is great diversity in how micromobility systems are organized and operated. In the simplest terms, the region would need to identify an approach to the following (**Figure 16**):

- **Ownership and Governance:** Who owns the equipment and holds the financial risk; is the system managed at the regional or local level; how do individual jurisdictions coordinate and make joint decisions?
- **Operations:** How are program operations structured; is a third-party or private entity responsible for day-to-day operations?
- **Technology:** What type of vehicles (bikes, e-bikes, scooters) will be used; will there be stations or hubs; will the system be docked, undocked, or a hybrid; what method is used by riders to access equipment; what kind of technology is used to monitor the program?
- **Funding:** What are the program funding needs; who is responsible for covering program capital and operating costs; what opportunities for public funding are available?

Figure 15: Components of a Business Model

This implementation plan outlines two different business model alternatives composed of ownership/governance, operations, technology, and funding recommendations.

During the development of the business model, the region will need to identify and empower a regional champion to help shepherd the development of the program. A local champion, be it a single jurisdiction, regional entity, or state agency, will be key for facilitating discussions among the many program stakeholders.

Procurement and Fundraising

The next phase of implementation is to execute the business plan. The two alternatives envisioned in this study would require procurement of an operator to run or manage the program. This stage of the implementation process is also where the participating jurisdictions define their scope of cooperation and enter into any necessary agreements with one another or a regional entity (e.g., interlocal agreement). This stage is also where the jurisdictions should complete the fundraising process through the solicitation of funding such as private sponsorships and public grants.

Preparing for Launch

Once funding is secured and procurement is completed, the final stage of implementation is preparing for program launch. This is the time for public outreach and education campaigns. Any necessary supporting infrastructure would be constructed at this time.

Micromobility Alternatives for the CRCOG Region

The following sections present details on the two micromobility alternatives for the CRCOG region:

- **A Regional Micromobility Collective:** A group of jurisdictions in the region form a consortium and collectively contract (through a joint-RFP) micromobility services from a private operator. The participating jurisdictions would collectively manage and oversee the contract, while the system itself would remain wholly owned, and largely funded, by a private entity.
- **Publicly-Owned Regional Bikeshare Program:** A publicly owned approach to micromobility wherein jurisdictions in the CRCOG region *own* the capital equipment and are responsible for administering the micromobility program, with day-to-day operations *contracted* to a private company. As a public program, the responsibility to plan, manage, and fund the system would fall on the participating jurisdictions and/or regional agency(s). We assume this program would be exclusively bikeshare due to the rarity of publicly-owned scooter programs.

As explained below, this study concludes that the Regional Micromobility Collective is the most likely to succeed in the CRCOG region.

Table 3 presents a summary of the two micromobility alternatives for the CRCOG region, highlighting key features and considerations of each alternative. As explained below, this study concludes that the Regional Micromobility Collective is the most likely to succeed in the CRCOG region.

Table 3: Comparison of the Two Alternatives

	Alternative One: Regional Micromobility Collective	Alternative Two: Regional Publicly-Owned Bikeshare
What is it?	▪ The micromobility system itself would be privately owned and operated. ▪ The program would be managed through a standardized regional RFP or permitting program. ▪ Participating jurisdictions would harmonize operating requirements. ▪ Responsibility for system oversight could be split between jurisdictions and a single regional manager. ▪ Limited need for public funding. Funding could be targeted to cover program administrative costs, subsidize parts of the system that would otherwise fail to generate sufficient rider revenue, fund discounted passes, construct supporting infrastructure, or support marketing and outreach.	▪ Public ownership and control of the system. ▪ Requires guaranteed funding for capital and operating needs from system owner. ▪ Assumed to be limited to bikeshare as there are few peer examples of publicly owned scootershare programs. ▪ Typically a third-party vendor operates the system for a fee. Vendor indemnifies public owner of liability.
Pros	▪ Builds on existing regional experience partnering with private firms to deliver micromobility. ▪ Low level of public resources (financial and staff time) needed.	▪ Does not rely on volatile private micromobility market. ▪ Greater degree of public control as the region would own all the equipment and make all decisions around station location and operating standards. ▪ More options to direct public funding to the system as the program would feature various operating and capital funding needs.
Cons	▪ Relies on private company to sustain the program. ▪ Jurisdictions would need to agree to standard operating requirements, vehicle types, and enforcement mechanisms.	▪ Require significant financial and staff resources to develop and implement. ▪ Likely limited to bikeshare due to lack of suppliers of other equipment like scooters.
Examples	▪ Sacramento (CA) regional micromobility program ▪ MOVE PGH (Pittsburgh, PA)	▪ Capital Bikeshare (Washington, DC) ▪ MoGo (Detroit) ▪ Valley Bike (Pioneer Valley)

Alternative One: Regional Micromobility Collective

Description of Alternative

Under this alternative, participating jurisdictions in the CRCOG region would (ideally) collectively manage a regional micromobility program. The system itself would be privately owned and operated, with the vendor (or multiple vendors) selected through a competitive RFP process. This alternative is a natural progression to how scooter share is operated in Hartford; however, instead of each jurisdiction negotiating contracts and managing the program separately, interested communities would join together to create a single standardized micromobility procurement, with a consistent approach to program management and enforcement. The goal of a micromobility collective is to establish a regional system that provides mobility irrespective of jurisdictional boundaries. By harmonizing micromobility requirements and undertaking a joint procurement effort, participating jurisdictions have greater negotiating leverage with vendors, while providing micromobility operators a higher degree of consistency and economies of scale.

Why this is the Preferred Approach

The study team believes that this alternative is the preferred approach for the CRCOG region as it **expands off the business model of Hartford's existing Superpedestrian system, can be implemented at a low cost to the public, and is flexible to accommodate changing needs**.

The Regional Micromobility Collective ("the Collective") is **not resource intensive and requires limited staff and no major financial commitments** from participating jurisdictions, whereas the regional system of bikeshare, as discussed below, has significant staff and funding requirements. A collectively managed program would limit the administrative and enforcement burden on individual jurisdictions, reducing the barrier-of-entry to micromobility for CRCOG towns that do not have the resources or expertise to manage a system of their own.

In addition, this approach has **a flexible structure and fits well with the region's existing micromobility offerings.** The micromobility industry is fast evolving and technology and customer preferences change rapidly. This approach to micromobility does not lock the region into one vehicle technology and will allow the region to evolve as needed without making a major capital investment.

Finally, **the Collective gives the jurisdictions in the CRCOG region bargaining power**. As a unified group, the Collective can negotiate a contract for the members as a whole—no single jurisdiction must undergo a procurement process with a micromobility provider on their own. This reduces an administrative burden for both the private micromobility operators and the jurisdictions in the region. This also helps ensure that jurisdictions that do not make economic sense to serve on their own are more feasible and attractive to providers who have the opportunity to serve an entire region.

Management and Governance

Under this alternative, the Regional Micromobility Collective will oversee and administer the micromobility program for the CRCOG region. The Collective will be made up of those jurisdictions who choose to participate in the micromobility program as well as other regional entities, like CRCOG or CTDOT, who have a stake in micromobility and transportation as a whole in the region. The members of the Collective will form a governing body and will work together to layout a regulatory framework for micromobility as

well as continued program oversight and management once the micromobility program is up and running.

Several key characteristics of the micromobility program should be determined at the Collective level and be consistent across the region. This includes:

- Types of vehicles allowed to operate
- Number of permitted operators
- System size
- Operating requirements, such as operating standards (e.g., frequency of equipment inspection, minimum complaint response time, vehicle availability standards) and data sharing requirements
- Regulations regarding right of way management, such as sidewalk operation, inclement weather procedures, and parking[19]
- Vehicle distribution requirements to ensure equitable distribution of vehicles by jurisdiction

The Collective should also set guidelines on program fees and enforcement. Harmonized regulations and a single procurement process will allow the region to collectively negotiate a micromobility contract. While certain jurisdictions may not make economic sense to serve on their own by a micromobility operator, they may be feasible as part of a larger regional system.

Procurement and Negotiations

A primary responsibility of the Collective will be to lead the procurement process and negotiations with private micromobility providers. There are two approaches to bringing in dockless micromobility providers: releasing a Request for Proposals/Request for Qualifications (RFP/RFQ) or creating an open permitting process. A permitting process can be run on a rolling basis while RFP/RFQs typically require all the interested operators to apply at one time, allowing the Collective to evaluate bidders all together instead of merely permitting operators that meet the minimum permit requirements on a first-come-first-served basis. **An RFP is the preferred procurement method for the CRCOG region so that it can partner and build a long-term relationship with a limited number of private micromobility providers.**

The following provides an overview of the elements that can be included in an RFP (or permit).

Management Structure of Existing Scooter Program

Currently, CRCOG holds a Master Contract with Superpedestrian, a private company that owns and operates scootershare. The contract was awarded through an RFP process for an exclusive operator.

Hartford is presently the only jurisdiction participating under this Master Contract and has a Side Letter Agreement with CRCOG. Moreover, Hartford has a scope of work with Superpedestrian that outlines additional contract and operational requirements.

Private Micromobility Operator Responsibilities

In a competitive RFP/RFQ process, the Collective should require bidders to detail their capabilities and commitments to engaging the following functions associated with daily operations, such as field inspections, rebalancing of vehicles,

[19] Some customization between participating jurisdictions regarding parking is possible. For example, individual jurisdictions could define no-ride or no-parking zones. The goal is to have a consistent set of parking rules to reduce confusion among users.

performance tracking, and crisis management. Required activities for a bidder should be listed in the RFP, including:

- Maintenance and support for all equipment
- Management of back-end systems, such as IT and payment platform
- Development and maintenance of a website
- Customer support call-center
- Liability insurance coverage for the program
- Equipment installation
- Data reporting and sharing (see Recommended Reporting Requirements)

To ensure bidders have the capability to deliver high-quality services, the Collective should ask service providers to share qualifications and demonstrate expertise in micromobility and operations management.

Service Metrics

Service metrics are important to help the Collective evaluate and track performance of micromobility operators. While there is a wide range of potential service metrics, the list below provides some common types of metrics used to oversee operations.

- **Rebalancing requirements:** Rebalancing of vehicles to ensure supply is available across the system. For dockless systems that is accomplished by requiring operators maintain a minimum number of vehicles by geography. For example, an operator in the CRCOG region would need to ensure that a minimum number of vehicles are available in each jurisdiction per day. Generally, stricter rebalancing requirements increase operating costs for the operator.
- **Fleet deployment:** Deployment standards provide guidelines for maximum and minimum fleet sizes. Standards can also set requirements for average number of vehicles in operation at any given time to ensure maximums are being utilized. Fleet deployment standards should be based on the number of vehicles in the field (parked and in-use vehicles). The market analysis provides a guide for an appropriate number of vehicles by jurisdiction across the CRCOG region.
- **Inspection and maintenance:** Contracts should stipulate how often vehicles are inspected. These standards are typically seen in public-private micromobility partnerships and are not typical in a private micromobility permit program. When included in agreements, vehicles are typically required to be inspected within a certain number of hours of a complaint. All vehicles, regardless of whether they received a complaint, need to be inspected at regular intervals; the most common standard among systems is every 30 days.
- **Customer service standards:** Contracts could stipulate quality of service standards including call center wait times and customer satisfaction ratings. These standards are more typically seen in public-private micromobility partnerships like Valley Bike and are not included in the typical micromobility permit due to the difficulty of tracking and enforcing these standards.

- **Complaint resolution:** The operator should respond to complaints from the public in an efficient and timely manner. Service metrics should outline a maximum response time for complaints submitted to the operator.
- **Liability and insurance requirements:** Micromobility operators should be required to meet minimum insurance levels and indemnify the Collective and its members from any liability related to their operations. In addition to proof of insurance, the Collective could consider a performance bond to ensure compliance.

Recommended Reporting Requirements

Through its contract with the micromobility operator(s), the Collective should outline what data the micromobility operators are required to provide the jurisdictions. The following is a list of types of data commonly requested from operators.

- Ridership and usage:
  - Daily, monthly, and annual ridership
  - Trips per vehicle
  - Anonymized trip start and end points
- Fleet data:
  - Vehicle type
- Operations and maintenance
  - Rebalancing activity
  - Service disruptions or suspensions
  - Number of vehicles in the fleet and in service
  - Collision summary
  - Complaint logs and resolutions
- User Equity
  - Discount pass uptake rate

In addition, the Collective should also consider how standard data formats, such as General Bikeshare Feed (GBFS) and Micromobility Data Specification (MDS), can be incorporated into reporting requirements.[20] These resources are valuable for transportation planning and identifying bicycle and pedestrian needs.

Existing Data Standards

Two widely used data formats exist for micromobility: **General Bikeshare Feed (GBFS)** and **Mobility Data Specification (MDS)**. Modeled after the General Transit Feed Specification and developed by the North American Bikeshare Association, GBFS "defines a common format to share the real-time status of a shared mobility system," with the express purpose to enable clear information exchange between multiple parties. GBFS is intended to be accessible to the public and can be used to aid in traveler trip planning.

MDS, developed by the Open Mobility Foundation, is a digital tool intended to help cities manage transportation in the public right-of-way by standardizing communication and data-sharing between public entities and private micromobility operators. Through APIs, MDS helps private shared mobility companies share real-time and historic vehicle data with cities, which helps inform policy decisions. Notably, to be compliant with MDS specifications, private micromobility operators must publish a publicly available GBFS feed.

Contract Length

The ideal length for a contract may vary, and determining the correct contract length is a balancing act. **Longer contracts provide greater stability for the operator, who in turn may be willing to agree to**

[20] North American Bikeshare Association (2021). *GBFS & Open Data*. https://nabsa.net/resources/gbfs/., Open Mobility Foundation (2020). *About MDS,* https://www.openmobilityfoundation.org/about-mds/.

more generous contract terms, whereas a shorter contract allows jurisdictions an easy exit in cases where an operator is underperforming. In general, permits tend to be shorter than contracts gained through a more formal bidding process, which often require a more significant and involved review and contracting. For reference, CRCOG's current contract with Superpedestrian will last for up to five years, and Hartford renews its statement of work annually.[21] The program could be launched as a one-year pilot, with the option to extend contract for subsequent years; this would provide the Collective to make contractual adjustments based on the first year of operations.

Jurisdiction-Level Contract Customization

While one of the goals of a region-wide micromobility procurement is to harmonize operating requirements among jurisdictions, one-size does not fit all, and some degree of contract customization will be needed. The procurement process could allow jurisdictions to negotiate contract riders that set out additional terms and conditions if they do not conflict with the ability to operate an interjurisdictional system from an operational perspective. The following types of terms could be customized to the jurisdiction:

- Delineate no-go areas where vehicles cannot be used such as specific streets, parks, or trails.
- Delineate "slow-zone" areas where the user's speed is restricted below the systemwide speed limit.
- Dictate specific enforcement policies and procedures. For example, one jurisdiction may delegate impounding of improperly parked micromobility vehicles to parking enforcement staff while another may elect to house those responsibilities with the police.
- While ideally standardized across jurisdictions, individual jurisdictions could have some latitude to set their own fines and penalties if needed.
- Jurisdictions may want to set their own vehicle rebalancing and distribution requirements to achieving geographic and social equity objectives.

Program Enforcement and Oversight

Another vital task of the Collective will be to carry out micromobility program oversight and enforcement activities. Program oversight and enforcement will be an essential part of the regulatory framework the Collective develops for micromobility in the region. **Clear guidelines and standard operating procedures for micromobility operators are imperative for ensuring a safe and successful program.** While operators play an active role in program oversight and enforcement, the Collective is ultimately responsible for both setting regulations and ensuring that those regulations are met by private operators.

It is the responsibility of the operator to comply with set standards and fix any issues that arise. Setting clear guidance upfront sets expectations and will give the Collective weight in enforcement, should a contracted micromobility operator fail to comply with regulations.[22]

[21] CRCOG (2021). *CRCOG Regional No-Cost Bikeshare RFP*. https://crcog.org/wp-content/uploads/2019/06/CRCOG-Regional-Bikeshare-RFP_FINAL_BINDER.pdf

[22] National Association of City Transportation Officials (2019). *Guidelines for Regulating Shared Micromobility.*, https://nacto.org/sharedmicromobilityguidelines/.

Program Monitoring

Once a regulatory framework is in place, the Collective is responsible for monitoring the program and providing data oversight. Oversight responsibilities can be split between the participating jurisdictions and the Collective as a whole. **There are three primary methods for program monitoring: data sharing between the Collective and micromobility operators, random spot checks in the field, and customer/constituent complaint tracking.**

Data sharing between the Collective and a micromobility operator is an important tool for checking compliance. The system data provided by a micromobility operator can be used by the Collective to ensure that fleet minimums and/or maximums as well as rebalancing and distribution requirements are met.

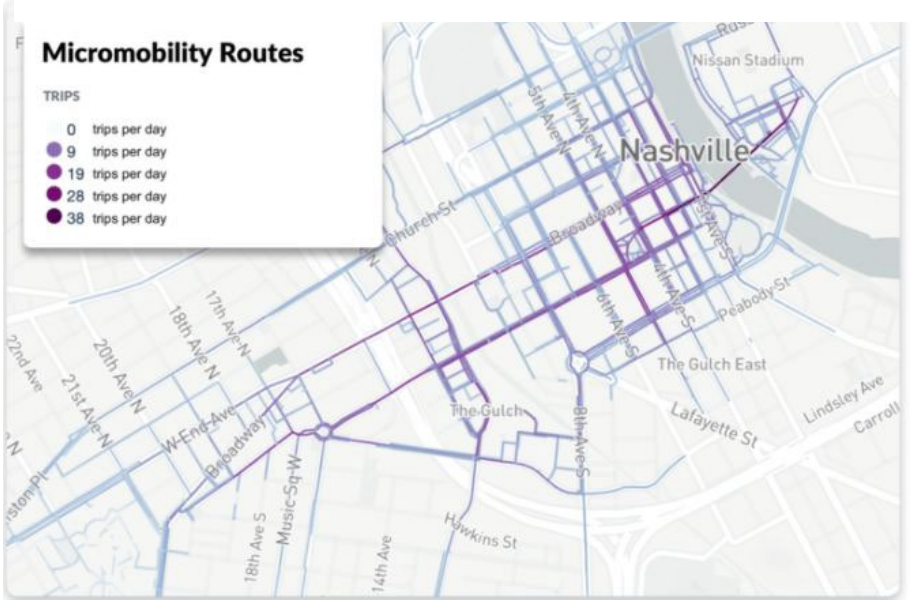
In addition to data sharing, another useful tool for program oversight are manual spot checks. While data is useful, it is also important to monitor micromobility vehicles in the field. The Collective can do random spot sampling and compliance checks on an ongoing basis to help monitor the program. These spot checks provide the Collective with insights on its micromobility program that cannot necessarily be captured in data reports, such as parking compliance or vehicle upkeep.

Beyond regular spot checks, the Collective and/or the participating jurisdictions can collect complaints and other information about the micromobility program directly from the public using online portals. The information gathered from the public can help the Collective track issues and can highlight problem areas in the public right-of-way that may require extra monitoring. In Hartford, for example, the public is directed to report issues directly to Superpedestrian or Hartford's 311 system.[23]

There are also several third-party tools available to jurisdictions to monitor and manage micromobility operations, such as Populus, Swiftmile, and Passport Inc.[24] CRCOG previously piloted the use of Populus (**Figure 17**), a platform for cities to manage mobility data. Among its many features, Populus can be used for evaluating travel patterns and where micromobility vehicles are parked.[25] Under a Collective, the region could jointly procure a license for such a platform, instead of relying on individual jurisdictions to procure the necessary software. This would allow for consistency between jurisdictions regarding the data that is collected and analyzed and would likely result in cost savings for each jurisdiction.

[23] City of Hartford (2022). *Scooter Share System,* https://www.hartfordct.gov/Government/Departments/DDS/DDS-Divisions/Planning-Zoning/Scooter-Share-System.
[24] Populus (2021). https://www.populus.ai/; Swiftmile (2022), https://swiftmile.com/; Passport Labs, Inc (2022), https://www.passportinc.com/.
[25] Populus (2021). https://www.populus.ai/.

Figure 16: Populus Interface



Contract Enforcement

Equally as important as clear oversight protocols are guidelines for micromobility program enforcement. Enforcement here is defined as the tools available to the Collective and the individual jurisdictions within the Collective to ensure both customers and the program operators are following agreed upon rules and guidelines.

Enforcement can come in a variety of forms and can include a system of escalation, where the number or frequency of violations can increase the severity of a penalty. Jurisdictions with micromobility programs have used the following penalties when micromobility operators fail to comply with stated regulations: **temporary permit suspension, fleet size reductions, and fines**. Some jurisdictions also ban operators from picking up impounded vehicles from an impound lot for two to three days to help incentivize compliance.[26]

In addition to penalties, **jurisdictions may require a performance bond be paid by any private micromobility operator who is permitted to operate within the jurisdiction**. Jurisdictions levy this bond either as a lump sum (typically around $10,000) or as a per vehicle fee (typically ranging from $20/device to $100/device). This bond is essentially used as a security deposit and aims to help incentivize private operators into compliance and to protect public property. Several jurisdictions that responded to a 2019 survey by NACTO utilize performance bonds, including Austin, Baltimore, Bellevue (WA), Denver, Durham, Fort Lauderdale, Los Angeles, Seattle, and Washington, DC.[27]

[26] National Association of City Transportation Officials (2019). *Guidelines for Regulating Shared Micromobility.*, https://nacto.org/sharedmicromobilityguidelines/.
[27] National Association of City Transportation Officials (2019). *Guidelines for Regulating Shared Micromobility.*, https://nacto.org/sharedmicromobilityguidelines/.

Rider Enforcement

In addition to penalties for private operators, the Collective has a handful of options for ensuring the riding public follow established rules and regulations when using shared micromobility vehicles. **Technology, like geofencing, can help ensure that vehicles are parked in designated hubs or parking areas** and not in the public right-of-way. In addition, **geofencing can be used to enforce vehicle speeds as well as prevent use in designated areas.** Most micromobility operators today are capable of using geofencing technology and are continuing to evolve the technology to improve accuracy.

Marketing campaigns and other publicly available information can also help ensure the system's customers are well informed on proper use of the system. This can include information on where it is safe and appropriate to operate a vehicle and where and how they should be parked. These marketing campaigns can be led by the Collective, the private operator, and/or other partners. In Chicago, for example, permitted vendors were required to develop a marketing and community outreach plan as well as host a community event for education and outreach to educate users on the proper use of their vehicles.[28]

Complaint Management

Micromobility programs will inevitably generate complaints or issues from the public, such as:

- Improper parking of vehicles / blocking public right-of-way
- Improper or unsafe usage of vehicles by users. While certain issues may require engaging the user, systematic solutions like revising no-ride areas, speed restrictions, and parking locations may be able to address these problems.
- Vehicle vandalism

The Collective and participating jurisdictions should establish a clear process for communicating and resolving complaints. Ideally the process of resolving operating issues is streamlined and efficient while reducing the burden placed on individual jurisdictions. In a micromobility program, complaints and issues may be directed to a variety of places: directly to the operator through the call center or app; to local staff; directly to the program manager; through a 3-1-1 system or similar public resource for non-emergency calls; the police; or local elected officials. The study team recommends that all issues and complaints be directed to the program operator.

The Collective's program manager should be provided a copy of complaints on a regular basis (ideally daily, with a weekly and monthly aggregate metric made available as well). The program manager should have access to a database to see how any complaints were resolved. If complaints are not resolved within a pre-determined timeframe (e.g., 24-hours), the complaint should be sent directly the program manager for follow-up and resolution with the operator. If necessary, representatives from individual jurisdictions can be brought in to discuss problems.

[28] City of Chicago (2018). *City of Chicago Permit Requirements – For Dockless Bikeshare Vendors Only,* https://www.chicago.gov/content/dam/city/depts/cdot/bike/general/Chicago_DoBi_Pilot_Program_Updated_06.29.18.pdf .

The governance committee is another venue for any major issues to be discussed and resolved. Jurisdictions should have access to complaints being submitted to the system and a transparent understanding of the type, frequency, and resolution of complaints.

Technology Constraints

Micromobility technology is rapidly changing, and a variety of different vehicles are on the market. The Collective should have some authority in deciding what types of vehicles and technology should be used in the region. Vehicles that could be operated within a shared micromobility program include pedal bikes, electric scooters and bikes, mopeds, and cars. The pros and cons of the most common vehicles provided by private operators are detailed in **Table 4**.[29]

While several different types of vehicles are available—and the structure of the Regional Micromobility Collective allows for flexibility in the vehicle types operating in participating jurisdictions—**e-bikes and scooters will most likely be the primary vehicles available**. Most private operators maintain a fleet of scooters, some with the addition of e-bikes and/or mopeds. For example, Superpedestrian, which operates in Hartford already, currently only offers scooters.[30] Lime, which previously operated in Hartford, offers both scooters and e-bikes (and mopeds more limitedly).[31] **There is little appetite from the private sector to operate pedal bikes, as most customers gravitate to vehicles with electric assist**.

Adaptive Micromobility

Accessibility for users with disabilities is a major challenge for micromobility. Historically, micromobility programs have struggled to accommodate these users as traditional bicycles and standing scooters are not an option for users with certain disabilities. Detroit's MoGo was an early pioneer in adaptive vehicles, providing adaptive bicycles to users that could be picked up at a fixed rental location (as opposed to MoGo's bikeshare stations). In the last year, several dockless micromobility providers (e.g., Helbiz, Lime, and Bird) have previewed adaptive solutions such as:

- Motorized adaptor for wheelchairs
- Recumbent bicycles
- Seated scooters, tricycles, or quadracycles

Both Lime and Bird are piloting accessible vehicle options in a limited number of markets. Vehicles are typically reserved ahead of time, with vehicles delivered to the user's address or at a predetermined pick-up and drop-off location. While the introduction of adaptive micromobility is a welcome addition, these programs have yet to provide the same on-demand flexibility of free floating micromobility, which can be accessed without prior planning or reservations.

[29] Transportation For America (2021). *Shared Micromobility Playbook,* https://playbook.t4america.org/.
[30] Superpedestrian, https://www.Superpedestrian.com/link-e-scooter/.
[31] Lime, https://www.li.me/en-US/home.

Table 4: Pros and Cons of Common Micromobility Vehicle Types

Vehicle Type	Pro	Con
Pedal Bike	• Easy to deploy • Low barrier to entry • Health benefits of riding • Does not require charging • Can include storage basket	• Almost no private systems operate pedal bike programs today • Less popular with riders than e-bikes or e-scooters • Take up more space than scooters when parked • Requires physical exertion, which can be difficult for some riders
E-Bike	• Easier to ride than a pedal bike • Comfortable for longer trips • Can include storage basket • Per vehicle ridership higher than conventional bikes • Faster than conventional bikes	• More expensive and heavier than conventional bikes and e-scooters • Requires regular charging • Worse vendor availability than scooters, only a few operators • Take up more space than scooters when parked
E-Scooter	• Less expensive to procure than electric bikes • Per vehicle ridership higher than conventional bikes • Faster than conventional bikes • Lightweight and simple to ride • Several vendors operate e-scooter systems • Takes up less physical space than a typical bike	• Requires regular charging • Confusion from riders on where to ride and store safely • No cargo capacity
Adaptive Bike	• Creates additional mobility for individuals with differing abilities • Available in a variety of vehicle types	• May require prior user reservation of installation assistance from a professional in the case of wheel-chair adaptive devices • May require additional safety features • Not easily integrated into wider micromobility system

Funding and Resources

Program Costs

Program costs to the member jurisdictions of the Regional Micromobility Collective are expected to be low. **No financial support is required from the jurisdictions to pay for vehicles and other equipment,** which represents the largest up-front cost of publicly owned micromobility programs. Because the private operator is also responsible for the day-to-day operations and administrative work can be shared among

the Collective's members, staffing needs are also expected to be low for this alternative. Based on the experience of other jurisdictions and assuming all operations and marketing activities would be the responsibility of the vendor, jurisdictions would need to devote collectively approximately one FTE to manage a region-wide system. These needs may be temporarily greater during program launch **Management activities could be centralized to one person working on behalf of all participating jurisdictions or spread across each jurisdiction**.

Operating Fees

Many jurisdictions cover the cost of program management through fees paid by the system operator. These fees can be applied on a per vehicle basis or as a flat fee per month. In addition to helping cover the administrative cost of the program, these revenues are also sometimes earmarked to help fund infrastructure, such as bike lanes or micromobility vehicle parking corrals.[32] In Portland, Oregon, for example, revenues generated from the city's micromobility program are placed into a dedicated account and are used to cover administrative costs such as permit development, application review, enforcement, and evaluation as well as funding for safe travel infrastructure, dedicated parking, and equity programs.[33]

In determining whether to charge fees to the operator, CRCOG should look at the total value proposition of the micromobility services being provided. **The operating fees charged to a vendor may reduce their willingness to make other concessions, such as a lower-cost fare program or providing vehicles in lower ridership markets.** Currently, Hartford does not charge Superpedestrian any fees to operate scooters, and conversations with Superpedestrian and Hartford have highlighted the benefit of this approach. Two major benefits are year-round operation of scooters, rather than only operating in the spring and summer, and a subsidized pass option for any users receiving some form of government assistance.

Program Subsidy

While the Superpedestrian scooter program in Hartford does not rely on any public money, a larger regional system may require some level of public subsidy to support its long-term viability. Offering a subsidy is beneficial for a few reasons:

- Provides public-sector partners with more leverage to place requirements or extract commitments from the operator. For example, it may be uneconomical to provide accessible vehicles in a system without a subsidy.
- Increases the long-term sustainability of the program by establishing a predictable source of funding for the operator.
- Can be used to reduce the price of the program to the consumer when tied to an overall price cap or equity program.

There are a few examples of state and local funding being used to subsidize operations of a private micromobility program. In Sacramento, for example, Lime, which operates both scooters and e-bikes in the city, is subsidized by the Sacramento Area Council of Governments (SACOG) which provides a

[32] Transportation For America (2021). *Shared Micromobility Playbook,* https://playbook.t4america.org/.
[33] City of Portland (2018) "TRN-15.01 – New Mobility – Shared Electric Scooters," https://www.portland.gov/policies/transportation/new-mobility/trn-1501-new-mobility-shared-electric-scooters.

monthly per bike stipend when the trips per vehicle per day falls below a certain threshold. This stipend only applies to Lime's fleet of e-bikes, and not the scooters the company also operates in the city. In addition, Lime shares revenue with SACOG and its partners when the trips per vehicle per day rises above a certain threshold. Details on the subsidy payments and revenue sharing are included in **Table 5.** Sacramento and Lime entered into this agreement in late 2020, when ridership was particularly uncertain and unstable due to the pandemic. This model helps incentivize a micromobility operator to stay in a market, even if ridership dips, as it did in Sacramento in 2020.[34]

Table 5: SACOG-Lime Subsidy and Revenue Sharing Details

Payment Type	Trips per Vehicle per Day (TVD)	Payment Amount
Subsidy Payments	0.5 TVD	$0.70 per active vehicle in service per day
	1.0 TVD	$0.62 per active vehicle in service per day
	1.5 TVD	$0.55 per active vehicle in service per day
	2.0 TVD	$0.38 per active vehicle in service per day
Revenue Sharing	3.5 TVD	$0.05 per trip

Another option is to use public funding to **subsidize equity pass options**. This ensures that the micromobility program in the region is accessible for all potential customers. Tying public funding to equity passes relieves the private operator from providing reduced cost passes and helps maintain public involvement in the program. In the CRCOG region, tying equity passes to public funding could also provide an opportunity to link a micromobility program with the existing Go CT pass through CT*transit*, which uses fare capping to ensure any applicable discounts are applied to a user's transit ride.[35] In linking a micromobility program's fare system with CT*transit*, the micromobility program will be integrated into the region's existing transit system.

Finally, public funding could also be used to **subsidize infrastructure for micromobility**. This includes the construction of bike lanes as well as the purchase and installation of micromobility hubs. Improved infrastructure indirectly supports the micromobility program, helping make it a more appealing and viable option for users.

Outstanding Questions

The preceding sections provide an overview of Alternative One: Regional Micromobility Collective, highlighting the recommended governance structure, regulatory framework, procurement process, technology, and funding. While this document lays out a framework for implementing the Collective,

[34] SACOG (2020), "Potential Extension of the program Agreement with Lime", https://www.sacog.org/sites/main/files/file-attachments/2_-_potential_extension_of_lime_agreement_complete.pdf?1606945955

[35] CTtransit (2022), "Go CT Card," https://www.cttransit.com/fares/go-ct-card.

several key questions still remain, which will need to be answered to move forward from planning to full implementation. These questions include:

- Where will the Collective be housed? Examples of potential organizations include existing regional entities (e.g., CRCOG), a local jurisdiction that can serve as the program champion (e.g., Hartford), or state agency (e.g., CTtransit)
- What are the necessary steps to formalize the Collective? For example, what is the legal and governance structure for participating jurisdictions in the region?
- Is there a jurisdiction or regional entity with the capacity and interest to manage the Collective?
- Do jurisdictions in the region have the capacity to participate in the Collective (in a managing or non-managing role)?

Alternative Two: Regional Public Bikeshare Program

Description of Alternative

Alternative Two is the **publicly owned and managed micromobility alternative**. Under this alternative, participating jurisdictions in the CRCOG region will own equipment and manage a bikeshare program for the region, similar to Valley Bike in the Pioneer Valley region in Massachusetts and Capital Bikeshare in Washington, DC. Day-to-day operations of the system would be contracted out to a private company (such as rebalancing and charging) and the jurisdictions would provide oversight as well as financial support to the program.

Why this is a Secondary Approach

While this alternative builds off a familiar bikeshare model, it is considered a secondary approach for the CRCOG region. Because participating jurisdictions are the program owners in this alternative, they are ultimately **responsible for covering system capital and operating costs**, including any operating shortfalls. **The participating jurisdictions must be committed and active partners in the system** which, given existing financial and capacity constraints, may not be feasible.

In addition to the financial and staff commitments, a regional bikeshare system would operate separately from **and likely in direct competition with the existing Superpedestrian scooter program** in Hartford, or any scooter program, by potentially taking away some of its user base. Further, any public system would be likely be restricted to bicycles. Nearly all scooter operators in the United States are privately owned and the vehicles are not available for purchase by third-parties, including public sector organizations.

Ownership and Governance

This plan assumes the system will be owned by participating jurisdictions in the CRCOG region, with operations contracted to a third-party vendor. This is a typical approach for regional bikeshare systems and allows for public control of the program.

Under this plan, day-to-day operations and management are conducted by a contracted third-party vendor. There are three likely contracting structures.

- Participating jurisdictions could each contract with the same operator, as is the structure for Capital Bikeshare in Washington, D.C.
- A single regional entity could contract with the operator and establish inter-local agreements that solidify roles and responsibilities, as is the structure for the Metropolitan Transportation Commission in the Bay Area.
- One (lead) jurisdiction could contract with the operator, with contract riders for each of the other participating jurisdictions, as is the structure for Valley Bike in the Pioneer Valley.

Regardless of the contracting structure, the program will appear unified to the public, so equipment can flow between participating jurisdictions in the CRCOG region freely. The contracted operator would be responsible for ensuring minimum standards of bikes are located within each jurisdiction and the participating jurisdictions would, in turn, collectively ensure that equipment is well maintained across the service area.

Funding and Subsidy

Establishing a regionally owned public micromobility program is a large financial commitment and will require funding for both capital and operating costs. Operating costs include the administration of each jurisdiction's contract with a third-party operator, marketing and promotion costs, and general program administration costs. Capital costs include the purchase of bicycles and other equipment, replacement costs for stolen or vandalized equipment, and equipment at the end of its useful life.

Anticipated Program Costs

The following presents a cost estimate for implementing a publicly owned regional system of bikeshare. These costs estimates were developed to provide CRCOG and member jurisdictions with a data driven understanding of the financial requirements for implementing a bikeshare system and illustrates the cost to the region if it funded both operating and capital costs. The financial plan assumes a system consisting of 1,175 e-bikes and estimates the expected capital and operating revenue and costs over five years. The study team made several assumptions on capital and operating costs to develop the estimate, using data from existing programs as a starting point. These estimates are meant to be conservative and minor adjustments, such as reducing the number of e-bikes and adding pedal bikes, could have a big impact on costs. Details on the specific capital and operating inputs are included in **Appendix C.**

Implementing a regional system of bikeshare in the CRCOG region will require a significant capital investment. As shown in **Table 6**, the initial capital investment in the system would cost close to $3.7 million, all of which is attributable to purchasing equipment, namely e-bikes. After new equipment is purchased and installed to launch the program, no new capital costs are expected within the five-year timeframe. The model assumes that all of the bikes purchased would be e-bikes. These bikes are popular with system users, but they are considerably more expensive than conventional bikes. The model only includes costs for minimal station infrastructure, including paint and bollards to designate preferred parking locations. Installing more substantial stations could increase the up-front capital costs.

Table 6: Program Startup Capital Costs

New Capital Costs	
# of New E-Bikes	1,175
Equipment and Installation Costs	**$3,685,000**

The system is expected to generate just under $5.7 million in revenue over five years, all of which will be generated through user fees, as shown in **Table 7**. System revenues could increase if the program brought on a title sponsor as well as station or bike sponsors. In recent years, Dunkin' Donuts purchased the naming rights for a minor league ballpark in Hartford for approximately $500,000, and naming rights for Hartford's professional soccer stadium was valued at approximately $430,000.[36] Sponsorships can provide a strong source of revenue for the system, but previous efforts to establish a regional bikeshare program in the CRCOG region were unsuccessful in finding a title sponsor. There is currently no private sector champion for bikeshare in the region who could help fund the program. Advertising on stations and bikes can also provide additional revenues for the system; however, local limitations on outdoor advertising can make revenues from this source infeasible.

Operating costs for the program are expected to total about $13.3 million over five years. This results in a cost recovery ratio of 42 to 45 percent per year and a per year operating subsidy need between $1.3 and $1.6 million. This cost recovery ratio is consistent with peer systems. Most public bikeshare systems in the United States cannot cover all of their operating costs from user revenues alone; a mix of sponsorships, advertising revenue, and public funding are required to cover the operating balance. Note that the expected cost recovery rate compared favorably to other modes like public transit.

Table 7: Program Operating Costs

Operating Costs ($1,000)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Annual Ridership (1,000s)	**358,000**	**358,000**	**358,000**	**358,000**	**358,000**
User Revenue	$1,073	$1,127	$1,127	$1,183	$1,183
Operating Revenue Subtotal	**$1,073**	**$1,127**	**$1,127**	**$1,183**	**$1,183**
Contractor Operating Costs	$2,252	$2,506	$2,556	$2,607	$2,659
Administrative Costs	$122	$125	$127	$130	$132
Marketing	$15	$16	$16	$16	$17
Operating Cost Subtotal	**$2,390**	**$2,646**	**$2,699**	**$2,753**	**$2,808**
Cost Recovery Ratio	45%	43%	42%	43%	42%
Operating Balance	**-$1,316**	**-$1,519**	**-$1,572**	**-$1,570**	**-$1,625**

[36] Zach Spedden (2020) "Hartford Athletic Shopping Dillon Stadium Naming Rights" *Soccer Stadium Digest*, https://soccerstadiumdigest.com/2020/03/hartford-athletic-shopping-dillon-stadium-naming-rights/ and Sports Business Journal (2015), "Dunkin' Donuts Signs Naming-Rights Deal for New Minor League Ballpark in Hartford" https://www.sportsbusinessjournal.com/Daily/Issues/2015/06/11/Facilities/Hartford.aspx.

Implementing a public bikeshare program in the CRCOG region requires an investment of about $15.4 million over five years, as shown in **Table 8**. This estimate includes the annual operating budget shortfall, which totals about $7.6 million over five years, the initial capital investment of about $3.7 million, and ongoing state of good repair costs, including $836,000 over five years for equipment replacement due to theft and vandalism and $656,000 annually for a capital reserve fund. While state of good repair costs are expected to be low until equipment begins reaching the end of their useful life, setting funds aside in a capital reserve fund makes equipment replacement more feasible when the time comes.

Table 8: Funding Need

Constrained Funding Balance ($1000s)						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Year Total**
Operating Balance	$1,316	$1,519	$1,572	$1,570	$1,625	$7,603
Capital Costs	$3,844	$164	$167	$171	$174	$4,520
Capital Reserve Fund Contribution	$656	$656	$656	$656	$656	$3,278
Total Fundraising Need	**$5,816**	**$2,339**	**$2,395**	**$2,396**	**$2,455**	**$15,401**

Potential Funding Sources

In addition to private revenue sources, such as advertising and sponsorships, a number of public funding sources are available to help cover both the capital and operating costs for implementing a public micromobility program. The Infrastructure Investment and Jobs Act (IIJA), passed in November 2021, expanded rules around a number of federal transportation funding programs and established numerous new programs that provide both capital and operating funds for micromobility. These sources as well as some state funding sources are summarized in **Table 9.**

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Table 9: Public Funding Sources

Funding Source	Description
Transportation Alternatives Program (TAP)	The Transportation Alternatives Program (TAP) represents 10 percent of each state's Surface Transportation Block Grant program funds and can be used to fund a variety of projects, including micromobility projects.[37]
Congestion Mitigation and Air Quality Improvement (CMAQ) Program	Administered through the Federal Highway Administration, CMAQ funds are available to state and local governments for transportation projects that help meet the requirements of the Clean Air Act by reducing congestion and improving air quality[38]. Eligible programs include pedestrian and bicycle projects, transit improvement programs, congestion reduction and traffic flow improvements, and funding for transportation demand management programs. For micromobility, CMAQ funds can be used for capital and operating costs as well as to fund programs to increase system equity.[39]
Carbon Reduction Program	Part of the IIJA, the Carbon Reduction program can be used to fund the planning, design, and construction of on- and off-road active transportation facilities as well as right-of-way improvements. For micromobility, the funds can be used for complete street designs that integrate micromobility infrastructure, such as docking stations and/or protected lanes.[40]
Active Transportation Infrastructure Investment Program	Part of the IIJA, the Active Transportation Infrastructure Investment Program provides funding for active transportation projects and can be used to fund micromobility equipment (stations and vehicles) as part of active transportation networks.[41]
Sustainable CT Community Match Fund	Sustainable CT is a voluntary certification program to recognize thriving and resilient Connecticut municipalities. The Community Match Fund provides "fast, flexible funding and support for engaging your community on wide-ranging sustainability projects."[42] Funding is limited to jurisdictions registered with Sustainable CT, which includes much of the CRCOG region. A bikeshare program would support sustainability in the CRCOG region and aligns with some of Sustainable CT's priorities. This funding program is small.
Community Connectivity Grant Program	The Connecticut Department of Transportation's Community Connectivity Grant Program aims to improve accommodations for bicyclists and pedestrians across the state. The program awards funds ranging from $125,000 to $600,000 for construction activities.[43] While these funds could not be used to fund bikeshare operations, they could be used to construct bikeshare station hubs and/or roadway improvements that would support a bikeshare program.
CT Communities Challenge Grant	Funded through the Connecticut Department of Economic and Community Development, the CT Communities Challenge Grant Program funds projects that improve livability, vibrancy, and convenience and appeal of communities throughout the state. Projects funded through this grant program can include the following

[37] Jackson Pierce (2022), "What does the new infrastructure law mean for micromobility?" Transportation for America, https://t4america.org/2022/02/23/the-new-infrastructure-law-micromobility/.
[38] Federal Highway Administration, "Congestion Mitigation and Air Quality Improvement Program." https://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.cfm.
[39] Jackson Pierce (2022), "What does the New Infrastructure Law Mean for Micromobility? Transportation for America, https://t4america.org/2022/02/23/the-new-infrastructure-law-micromobility/.
[40] Ibid.
[41] Jackson Pierce (2022), "What does the New Infrastructure Law Mean for Micromobility? Transportation for America, https://t4america.org/2022/02/23/the-new-infrastructure-law-micromobility/.
[42] Sustainable CT (2022), "Sustainable CT Community match Fund," https://sustainablect.org/funding.
[43] Community Connectivity Program (2022), https://portal.ct.gov/DOT/PP_Intermodal/CTConnectivity/CT-Connectivity-CCGP .

Funding Source	Description
	elements: transit-oriented development, downtown/major hub development, essential infrastructure, housing, mobility improvements, and public space improvements.[44] Funds could likely only be applied to a bikeshare program's capital costs.
Urban Act Grant Program	Part of the Connecticut Department of Economic and Community Development, the Urban Act Grant Program is open to municipalities in the state designated as economically distressed, public investment communities, or urban centers. Funds for this grant program are intended to promote community conservation and development and improve quality of life for urban residents of the state. Eligible projects fall within a range of categories including economic and community development, transportation, housing, recreation development, solid waste disposal, public safety, and social services related projects.[45]

Technology

Unlike the first alternative, the study team envisions Alternative 2 to consist solely of bicycles, most likely e-bikes, and not scooters. Today there is little precedent for a publicly owned scooter program and all existing scootershare programs are owned and operated by private vendors. The backend technology and equipment for micromobility is not readily available to the public sector. Interestingly that is not the case for bikeshare, where several companies sell equipment to public owners.

[44] CT Communities Challenge Grant (2022), https://portal.ct.gov/DECD/Content/Business-Development/05_Funding_Opportunities/CT-Communities-Challenge-Grant.
[45] Urban Act Grant Program (2022), https://portal.ct.gov/DECD/Content/Community-Development/03_Funding_Opportunities/Capital-Infrastructure-Grants/Urban-Act-Grant-Program.

Marketing

Marketing is essential for building a ridership base for a micromobility program in the CRCOG region. **A new program would have limited name recognition in the region, so the long-term success of micromobility will rely on marketing.** Beyond encouraging more people to use the system, marketing can contribute to system equity. Word of mouth marketing often means that familiarity with bikeshare follows existing social networks and may lead to under awareness of bikeshare in some communities. Other programs have used a range of strategies from traditional marketing to community engagement and ambassadors to help attract people to the system. For example, MoGo in Detroit has a Youth Ambassador program to make bikeshare more accessible to young people as well as a Neighborhood Ambassador program, with ambassadors who share information throughout their communities.[46] The financial model estimates that marketing activities will make up approximately one percent of the annual program operating costs. See **Figure 18** for examples of marketing collateral from other programs.

Figure 17: Example Marketing Material

Several options are available for marketing a regional micromobility program. The private company operating the system could be expected to lead all marketing and promotional activity. In addition, the participating jurisdictions in the CRCOG region could rely on existing community organizations and TDM programs for marketing.

[46] Mogo (2021). *Neighborhood Ambassadors.* https://mogodetroit.org/mogo-for-all/neighborhood-ambassadors/. And Mogo (2021). *Youth Ambassadors.* https://mogodetroit.org/mogo-for-all/youth-ambassadors/.

7. Conclusion

The CRCOG Regional Micromobility Study explores the feasibility and logistics of implementing a regional micromobility system. The success of scootershare in Hartford demonstrates that there is a market for micromobility in the Capitol Region. The study team found that the greatest potential demand in the region's densest and most compact communities such as Hartford, West Hartford, East Hartford, New Britain, and Manchester. The large concentration of students in Storrs, Hartford, and New Britain, also provides a natural market for micromobility services.

A key barrier to micromobility in the CRCOG region (and Connecticut in general) is the decentralized nature of local government. The CRCOG region alone is home to 38 jurisdictions, most of which are too small to support a micromobility program on their own. For the region's patchwork of towns and cities, developing and regulating a micromobility program can seem daunting. The study team believes that for micromobility to succeed at a regional scale, some type of joint governance and oversight structure is needed to reduce or eliminate entirely the burden on local governments to procure and manage the program.

This study identifies two possible approaches to micromobility. The preferred alternative is to create a regional micromobility Collective to jointly procure and manage a private micromobility operator. This model would mirror what CRCOG and the City of Hartford are already successfully doing but on a larger scale. This model would rely on private operators to provide and operate the program, reducing the risk burden placed on jurisdictions. Public funding could be used to build supporting infrastructure, lower the cost of pass prices, and provide financial incentives to the operator to serve a larger market and areas of the region that generate less revenue.

The second feasible option is to create a publicly owned program along the lines of Valley Bikeshare in Massachusetts's Pioneer Valley. In such a system, a public entity or entities would procure and own the system, with a private vendor managing operations on behalf of the owner. This business model is less dependent on the private sector and ensures the region retains maximum control over program pricing, service quality, and geographic scope. This option is considered a secondary alternative for the region as it would require more significant public funding and program management than the regional Mobility Collective.

This study represents merely the first step in creating a regional micromobility program. As outlined in the implementation plan, the region faces several choices around how to structure and regulate a program. The study team sees several next steps for the region to pursue a regional program:

1) CRCOG and regional stakeholders should continue engaging with local jurisdictions to identify participants in a regional pilot.
2) Establish a governance committee consisting of jurisdictions and any regional organizations planning to be involved in a regional pilot (e.g., CRCOG, CTDOT). Adopt committee bylaws and any necessary agreements to establish the program governance and management framework.
3) Identify an organization or organizations that can serve as regional program manager.
4) Procure a vendor to operate the regional pilot program.
5) Execute the pilot program and continue to evaluate its performance.

Appendix A

Excerpts from Connecticut's Act Concerning Electric Bicycles, Traffic Control and Parking and Traffic Authorities

Sec. 3. Section 14-1 of the 2018 supplement to the general statutes is repealed and the following is substituted in lieu thereof (*Effective October 1, 2018*):

Terms used in this chapter, sections 1 and 2 of this act and this section shall be construed as follows, unless another construction is clearly apparent from the language or context in which the term is used or unless the construction is inconsistent with the manifest intention of the General Assembly:

(13) "Class 1 electric bicycle" means an electric bicycle equipped with a motor that engages only when the rider operates the electric bicycle's foot pedals, and that ceases to engage when the electric bicycle reaches the speed of twenty miles per hour;

(14) "Class 2 electric bicycle" means an electric bicycle equipped with a motor that may be used exclusively to propel the electric bicycle, and that ceases to engage when the electric bicycle reaches the speed of twenty miles per hour;

(15) "Class 3 electric bicycle" means an electric bicycle equipped with a motor that engages only when the rider operates the electric bicycle's foot pedals, and that ceases to engage when the electric bicycle reaches the speed of twenty-eight miles per hour;

Sec. 10. Subsection (a) of section 14-286a of the general statutes is repealed and the following is substituted in lieu thereof (*Effective October 1, 2018*):

(a) Every person riding a bicycle, as defined in section 14-286, or an electric bicycle, as defined in section 14-1, as amended by this act, upon the traveled portion of a highway shall be granted all of the rights and shall be subject to all of the duties applicable to the driver of any vehicle subject to the requirements of the statutes relating to motor vehicles, except as to those provisions which by their nature can have no application and except that each town, city or borough and the Office of the State Traffic Administration within its jurisdiction as provided in section 14-298, as amended by this act, shall have authority to regulate bicycles and electric bicycles as provided in section 14-289, as amended by this act, and said section 14-298, as amended by this act, and except as provided by section 14-286c, as amended by this act. No parent of any child and no guardian of any ward shall authorize or knowingly permit any such child or ward to violate any provision of the general statutes or ordinances enacted under section 14-289, as amended by this act, relating to bicycles or electric bicycles.

Sec. 11. Section 14-286b of the general statutes is repealed and the following is substituted in lieu thereof (*Effective October 1, 2018*):

(a) Any person operating a bicycle or an electric bicycle, as defined in section 14-1, as amended by this act, upon a roadway at less than the normal speed of traffic shall ride as close to the right side of the roadway as is safe, as judged by the bicyclist, except when:

(1) Overtaking or passing another vehicle proceeding in the same direction;

(2) Preparing for a left turn at an intersection or into a private road or driveway;

(3) Reasonably necessary to avoid conditions, including, but not limited to, fixed or moving objects, parked or moving vehicles, bicycles, pedestrians, animals, surface hazards or lanes that are too narrow for a bicycle or an electric bicycle and a motor vehicle to travel safely side by side within such lanes;

(4) Approaching an intersection where right turns are permitted and there is a dedicated right turn lane, in which case a bicyclist or electric bicyclist may ride on the left-hand side of such dedicated lane, even if the bicyclist or electric bicyclist does not intend to turn right;

(5) Riding on a roadway designated for one-way traffic, when the bicyclist or electric bicyclist may ride as near to the left-hand curb or edge of such roadway as judged safe by the bicyclist or electric bicyclist; or

(6) Riding on parts of roadways separated for the exclusive use of bicycles or electric bicycles, including, but not limited to, contra-flow bicycle lanes, left-handed cycle tracks or bicycle lanes on one-way streets and two-way cycle tracks or bicycle lanes.

(b) Persons riding bicycles or electric bicycles, as defined in section 14-1, as amended by this act, upon a roadway shall not ride more than two abreast except on paths or parts of roadways set aside for the exclusive use of bicycles or electric bicycles. Persons riding two abreast, as provided in this subsection, shall not impede the normal and reasonable movement of traffic, and, on a laned roadway, shall ride within a single lane.

(c) No person riding upon any bicycle, electric bicycle, as defined in section 14-1, as amended by this act, motor-driven cycle, roller skates, skis, sled, skateboard, coaster, toy vehicle or any other vehicle not designed or intended to be towed shall attach the same or such person to any vehicle moving or about to move on a public roadway nor shall the operator of such vehicle knowingly permit any person riding a bicycle, electric bicycle, motor-driven cycle, roller skates, skis, skateboard, coaster, sled, toy vehicle or any other vehicle not designed or intended to be towed to attach the same or such person to such vehicle so operated or about to be operated, provided any person operating a bicycle solely by foot or hand power may attach a bicycle trailer or semitrailer thereto, provided such trailer or semitrailer is designed for such attachment.

(d) No person operating a bicycle, as defined in section 14-286, or an electric bicycle, as defined in section 14-1, as amended by this act, upon a roadway, path or part of roadway set aside for exclusive use of bicycles or electric bicycles shall carry on such bicycle or electric bicycle a passenger unless such bicycle or electric bicycle is equipped or designed to carry passengers, provided any person who has attained the age of eighteen years may carry any child while such person is operating a bicycle propelled solely by foot or hand power, provided such child is securely attached to his person by means of a back pack, sling or other similar device. The term "child", as used in this subsection, means any person who has not attained the age of four years.

(e) No person operating a bicycle, as defined in section 14-286, or an electric bicycle, as defined in section 14-1, as amended by this act, shall carry any package, bundle or other article which prevents such person from using both hands in the operation of such bicycle or electric bicycle. Each person operating such bicycle or electric bicycle shall keep at least one hand on the handlebars thereof when such bicycle or electric bicycle is in motion.

(f) Violation of any provision of this section shall be an infraction.

Sec. 12. Section 14-286c of the 2018 supplement to the general statutes is repealed and the following is substituted in lieu thereof (*Effective October 1, 2018*):

(a) Each person riding a bicycle or an electric bicycle, as defined in section 14-1, as amended by this act, upon the traveled portion of a highway and intending to make a left turn after proceeding pursuant to the provisions of section 14-244 or subsection (b) of this section may, in lieu of the procedure prescribed by section 14-241, approach as close as practicable to the right-hand curb or edge of the highway, proceed across the intersecting roadway and make such turn as close as practicable to the curb or edge of the highway on the far side of the intersection, provided such procedure is not prohibited by any regulation issued by any town, city, borough or the Office of the State Traffic Administration.

(b) Each person riding a bicycle or an electric bicycle, as defined in section 14-1, as amended by this act, upon the traveled portion of a highway and intending to make a right turn may in lieu of the procedure prescribed by section 14-244, before turning and while in motion or if stopped while waiting to turn signal such turn by extending his right hand and arm horizontally with forefinger extended.

(c) No person operating a bicycle or an electric bicycle, as defined in section 14-1, as amended by this act, upon the traveled portion of a highway and intending to make a right or left turn shall be required when making a signal of such intention to make such signal continuously.

Sec. 13. Section 14-288 of the general statutes is repealed and the following is substituted in lieu thereof (*Effective October 1, 2018*):

(a) Each bicycle or electric bicycle, as defined in section 14-1, as amended by this act, operated upon the public highway, during the times or under the conditions as provided in subsection (a) of section 14-96a, shall display a lighted lamp upon the forward part of such bicycle or electric bicycle. Such lamp shall, when lighted, emit a white light which in clear weather shall be visible at a distance of not less than five hundred feet in the direction in which such bicycle or electric bicycle is proceeding. Each bicycle or electric bicycle shall also, at all times, be equipped with a reflector or reflecting tail light lens, which reflector or lens shall be attached to the rear of such bicycle or electric bicycle in such manner as to reflect rays of light thrown upon the same, and such reflector or reflecting tail shall be visible at a distance of not less than six hundred feet from the rear when illuminated by the head lamps of a motor vehicle. Such bicycle or electric bicycle shall also be equipped with reflective material so placed and of sufficient size and reflectivity to be visible from both sides of such bicycle or electric bicycle at a distance of not less than six hundred feet when illuminated by the head lamps of a motor vehicle. Each bicycle or electric bicycle shall also, at all times, be equipped with a braking device sufficient to enable the operator thereof to stop within twenty-five feet on dry, level and clean pavement when moving at a speed of ten miles per hour. No person shall equip a bicycle or an electric bicycle with a siren or device which emits a whistle or use a siren or device which emits a whistle while operating a bicycle or an electric bicycle.

(b) Operation of a bicycle or an electric bicycle, as defined in section 14-1, as amended by this act, in conflict with any provision of this section shall be an infraction.

Sec. 14. Section 14-289 of the general statutes is repealed and the following is substituted in lieu thereof (*Effective October 1, 2018*):

Each town, city and borough shall have authority to make any ordinance not inconsistent with section 14-286 or 14-288, as amended by this act, or any regulation of the Office of the State Traffic Administration issued pursuant to section 14-298, as amended by this act, respecting governing and controlling the use of bicycles and electric bicycles, as defined in section 14-1, as amended by this act, within such town, city or borough, with appropriate penalties for violation thereof, which ordinances may include provisions requiring annual licensing of bicycles or electric bicycles and providing for registration of any sale of, or change of ownership in, a bicycle or an electric bicycle.

Appendix B

Anact Regulating Electric Foot Scooters (PA 19-162—sHB 7141) Transportation Committee

SUMMARY: This act defines "electric foot scooters" (e-scooters) and generally gives e-scooter riders the same rights, privileges, and duties that existing law provides for bicycle riders. The act also (1) generally allows municipalities to regulate e-scooters, to the extent that state law does not conflict with such regulations, and (2) requires the Office of the State Traffic Administration's (OSTA) regulations to cover e-scooter operation on highways and roads under its jurisdiction.

The act also expands the state's vulnerable user law to (1) cover instances when a driver causes "substantial bodily harm" to a vulnerable user and (2) make e-scooter riders vulnerable users under the law.

Lastly, the act (1) requires e-scooter riders under age 16 to wear helmets; (2) expands the acceptable helmet standards for bicyclists, electric bicycle (e-bikes) riders, and others; and (3) makes numerous technical and conforming changes related to e-scooters and e-bikes.

EFFECTIVE DATE: October 1, 2019

E-SCOOTER DEFINITION

The act defines "electric foot scooter" as a device that:

1. weighs 75 pounds or less;

2. has two or three wheels, handlebars, and a floorboard that can be stood on while riding;

3. is both electric motor- and human-powered; and

4. has a maximum speed of 20 miles per hour or less, with or without human propulsion on a paved level surface.

STATE AND LOCAL REGULATION OF E-SCOOTERS

The act generally authorizes OSTA to regulate e-scooters within its jurisdiction (i.e., on state highways and roads on state-owned property). The office has this authority with respect to bicycles and e-bikes.

By law, OSTA must adopt regulations governing highways and roads in its jurisdiction, including the operation of motor vehicles and bicycles. The act additionally requires these regulations to cover e-scooter operation.

Existing law authorizes municipalities to regulate bicycles, as long as their ordinances do not conflict with state laws or regulations. The act extends this authority to allow municipalities to regulate e-scooters. Thus, among other things, municipalities can adopt ordinances requiring annual licensing of e-scooters or registration of e-scooter sales and ownership changes.

PARKING E-SCOOTERS

The act allows a person to park an e-scooter on any sidewalk, as long as (1) it is parked in a manner that does not impede the reasonable movement of pedestrians or other sidewalk traffic and (2) doing so is not prohibited by a municipal ordinance or OSTA regulation.

CONFORMING CHANGES TO TREAT E-SCOOTERS LIKE BICYCLES

The act makes conforming changes to treat e-scooters like bicycles and e-bikes. Among other things, it:

1. exempts e-scooters from emissions inspections;

2. requires e-scooter riders to comply with driving laws applicable to bicycles (e.g., signaling before turning);

3. requires motor vehicle operators to treat e-scooters like bicycles (e.g., when passing);

4. imposes a 100% surcharge on fines for certain moving violations involving a motor vehicle and an e-scooter;

5. prohibits parents and guardians from authorizing or knowingly permitting their wards to violate state laws or local ordinances on e-scooters; and

6. makes it an infraction not to equip e-scooters with lights and reflectors.

HELMET REQUIREMENTS

E-Scooter Helmet Requirements

Under existing law, helmets must generally be worn by (1) e-bike riders and passengers and (2) anyone under age 16 who rides a bicycle, non-motorized scooter, or skateboard or who wears in-line or roller skates.

The act additionally requires e-scooter riders under age 16 to wear helmets. It also requires the Department of Consumer Protection to post on its website material concerning the dangers of riding an e-bike or e-scooter without a helmet and promoting the use of helmets while riding them, which it must do under existing law for bicycles, skateboards, and roller and in-line skates.

Helmet Standards

The act expands the acceptable helmet standards by requiring anyone who must wear a helmet to wear one that conforms to specifications established by the American National Standards Institute (ANSI), the United States Consumer Product Safety Commission (CPSC), the American Society for Testing and Materials (ASTM), or the Snell Foundations' Standard for Protective Headgear for Use in Bicycling. Under prior law, (1) helmets worn by e-bike riders and passengers had to meet the standards set by CPSC or ASTM and (2) other helmets had to meet the standards set by ANSI or the Snell Foundation. The act requires businesses that rent e-scooters to provide helmets to renters that meet the applicable standards, as they are required to do under existing law for bicycle rentals.

Finally, the act makes a corresponding change by extending the sales tax exemption for bicycle helmets to include helmets that conform to CPSC or ASTM standards. By law, unchanged by the act, the exemption applies to helmets that meet standards set by ANSI and the Snell Foundation.

Appendix C

Financial Model Assumptions

To develop the financial model for Alternative 2, the study team made a series of assumptions. Some of these (e.g., revenue per user, ridership) are based on historical data from other bikeshare systems across the county that have similar characteristics to the CRCOG region. Other future-year assumptions, such as maintenance costs, are forecasts based off limited end-of-life data and are at this time merely a best estimate. All operating and capital costs have been inflated to year of expenditure dollars at a two percent annual rate.

Ridership and User Revenue

Ridership

The CRCOG region's ridership per bicycle is projected to remain flat in all five years of the plan. A zero percent assumption was considered a conservative estimate. The peak versus off-peak ridership assumptions for the three ridership typologies are shown in **Table 10**.

Table 10: Ridership Assumptions

Typology	Trips per Day/Bike	
	Peak	Off-Peak
Low Demand	0.25	0.25
Moderate Demand	0.50	0.50
High Demand	1.25	1.25

Revenue

User revenue is generated through membership fees and per minute trip fees. User revenue was calculated based on historical ridership data in peer systems, and historical revenue data was used to identify the user fees that an average rider incurs. Based on the data, user revenue is estimated at $3.00 per trip. To be conservative, no non-user revenues, like advertising or sponsorship revenues, were included in the model.

Operating Costs

Operating cost assumptions are based on data from peer jurisdictions. Operating costs are calculated based on a per dock/parking location fee of $90. In addition to this fee, the model estimates about $15000 annually for fixed marketing costs and $120,000 annually for annual administrative costs, like a bikeshare program coordinator position.

Capital Assumptions

Equipment Costs

Equipment costs include basic components of a bikeshare system: station fixed costs, like the kiosk and solar array; station variable costs, such as docks and base plates; and the bicycles, both conventional and electric. The equipment costs in the budget were based on current and historical equipment costs borne by peer systems. The model assumes all stations in the system will be light stations with limited infrastructure. Based on this data, the model assumes an average cost for new stations of $2,500. If full stations are added to the system, the cost would increase substantially from the estimated cost of light stations. The estimated cost of an e-bike is $2,826. No pedal bikes were included in the model.

State of Good Repair

The model considers long-term state of good repair (SGR) costs and assumes that equipment has a certain probability of replacement in any given year. Equipment is expected to be replaced in total at the end of its useful life. The model assumes that e-bikes will need to be replaced every five to seven years; however, historical data on e-bikes is limited. Stations are assumed to need replacement every nine to 12 years. **Table 11** shows the breakdown of life cycle assumptions by equipment type.

Table 11: Equipment Life Cycle Assumptions

E-Bikes				
Years After Initial Deployment	5	6	7	8
Proportion of Fleet	15%	50%	25%	10%
Stations				
Years After Initial Deployment	9	10	11	12
Proportion of Stations	10%	25%	25%	40%