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E-Micromobility White Paper

A Primer for Florida Transportation Professionals and Policymakers

November 4, 2025

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1.1 INTRODUCTION

Electric micromobility (e-micromobility) is changing how people move through cities, offering flexible, fun, low-emission options for short trips and filling in first/last mile connections. In Florida and across the U.S., the growing use of these devices is reshaping travel behavior; exacerbating long-standing infrastructure, safety, and policy challenges; and raising new questions to be addressed by policy makers, planners, and engineers. The 2021 Florida Strategic Highway Safety Plan acknowledges this shift in modal behavior and highlights micromobility as an evolving emphasis area.[1] This white paper explores the current issues and opportunities for better integrating e-micromobility into Florida's transportation system, framed within broader national trends. It offers recommendations to support safe and effective use, followed by an in-depth look into the current policy landscape in Florida, nationwide trends, and current state of safety and operational challenges.

The United States Department of Transportation defines an e-micromobility device as "any small, low-speed, electric-powered transportation device, including electric-assist bicycles (e-bikes), electric scooters (e-scooters), and other small, lightweight, wheeled electric-powered conveyances."[2] E-micromobility devices are typically designed for one rider, except for some cargo bikes and Class 3 e-bikes that can accommodate a passenger.

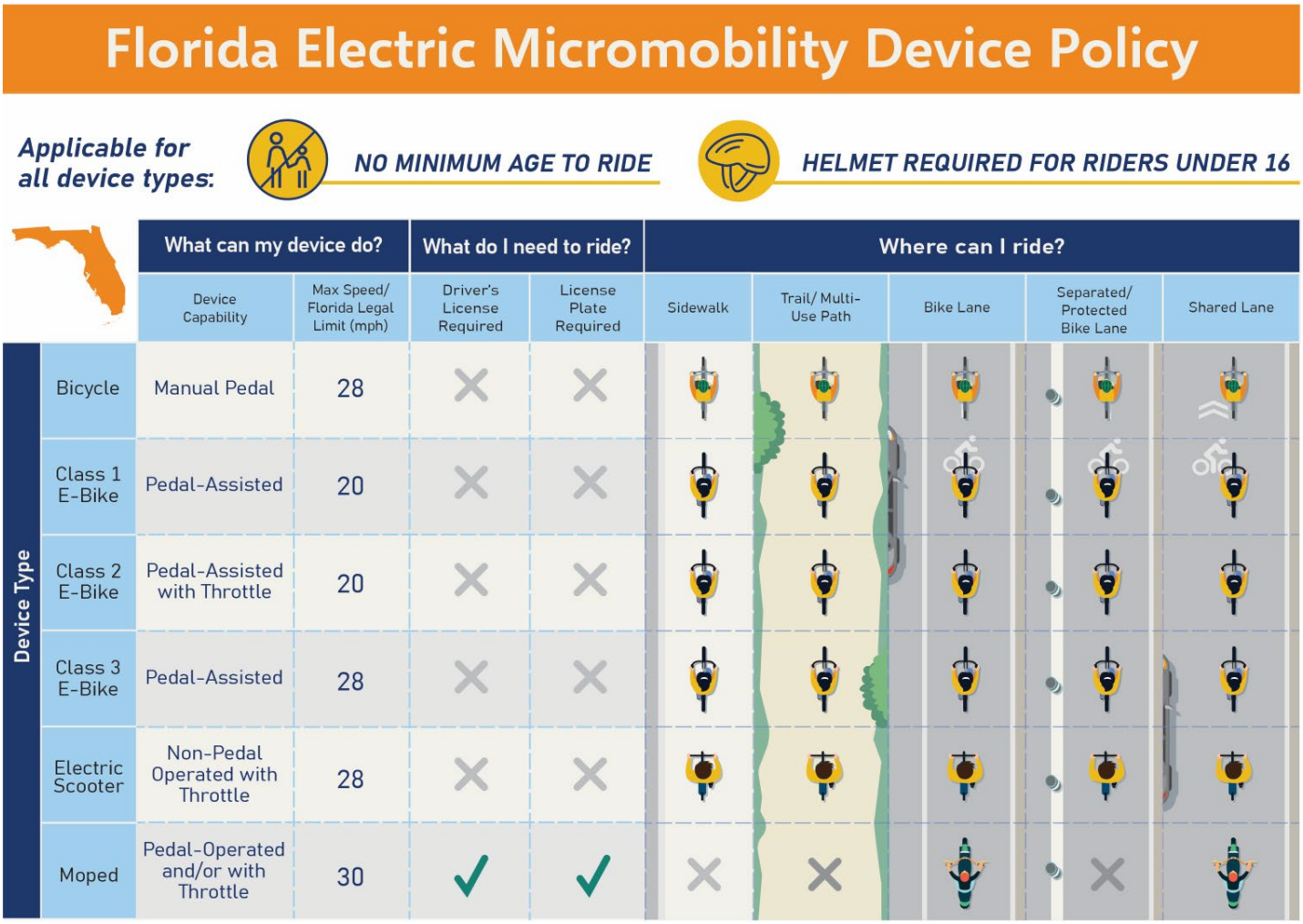
E-micromobility devices are most commonly accessed through personal ownership or shared e-micromobility programs provided by privately owned fleet providers. In Florida, ridership trends of personally owned e-devices are not currently available, as most of the state's existing counter technology cannot differentiate between e-devices and traditional human-powered devices. However, data from shared e-micromobility programs across the state indicates a growing role for e-micromobility as an integral mode in the transportation network despite recent challenges related to affordability and fluctuating fleet provider presence that have influenced usage patterns across Florida.

As e-micromobility usage rises in Florida, traffic safety remains a critical issue. In Central Florida, pedestrian crashes are declining, but crashes involving bicyclists and e-micromobility users are increasing, underscoring the need for targeted safety measures.[3] As more residents shift toward e-micromobility devices, the transportation system faces new safety challenges, particularly where infrastructure has not kept pace with shifting needs. The rapid growth of micromobility usage has often outpaced local governments' ability to update codes and redesign streets, adding to potential points of conflict in the public right-of-way.

Regulations for personally-owned devices are largely governed by state statutes and local ordinances, whereas regulations for fleet providers are typically governed at the local level. Many states, including Florida, have updated legal definitions for e-micromobility classifications. Recently, Florida Senate Bill 462 changed the definition of micromobility devices and increased speed to a maximum speed of 28 miles per hour (mph) for human and non-human powered devices like bicycles, electric bicycles, motorized scooters, or other devices owned by individuals or part of a shared fleet. **Figure 1** provides a summary of the e-micromobility device regulations in Florida.

While states often set the regulatory framework for e-micromobility devices, local jurisdictions often have discretion to adopt policies that align with or diverge from state regulations. This misalignment between state and local rules can lead to inconsistent practices, making enforcement difficult and creating confusion for device riders and other road users. In parallel, there is limited oversight of the consumer market. There are few regulations governing who manufacturers and retailers can sell to, how devices are designed (in terms of speed, weight, and safety), or how devices can be modified after purchase. This lack of uniform regulation and consumer oversight poses significant challenges for ensuring safe and consistent e-micromobility use.

Figure 1: Florida Electric Micromobility Policy



Sources:
Age requirements – 2023 Florida Statutes Chapter 316 Section 2128(3)
Helmet requirement: Florida statutes Chapter 316 Section 2065
Location of where micromobility devices are allowed: Florida Statutes Chapter 316 Section 20655
License plate requirement: Florida Statutes Chapter 316 Section 2128 (3)
Bicycle maximum speed: Florida Statutes Chapter 316, Section 003, Senate Bill 462, and House Bill 567
Class 1 e-bikes speed: Florida Statutes Chapter 316 Section 003

This white paper focuses on commonly used e-micromobility devices, including Class 1-3 e-bikes, e-scooters, and mopeds, and examines the operational and safety challenges agencies face in managing their adoption. It also identifies actionable opportunities to advance supportive legislation, improve design practices for transportation facilities to safely accommodate electric micromobility, and recommend non-engineering programs that enhance safety and adoption. Other devices such as mobility scooters, golf carts, or neighborhood electric vehicles (NEVs) may be considered part of the e-micromobility landscape but were excluded from this paper.

1.2 RECOMMENDATIONS FOR ADVANCING SAFE & EFFECTIVE ELECTRIC MICROMOBILITY

As the number of e-micromobility devices and trips increases nationwide, various levels of government have implemented policies, programs, and infrastructure solutions to regulate and adapt their transportation networks for e-micromobility. Drawing from nationwide examples, the following section outlines recommendations for integrating strategies to support e-micromobility devices in a safe, efficient, and effective manner. See Sections 1.4 through 1.6 for additional detail and implementation guidance.

1.2.1 POLICY RECOMMENDATIONS

The policy landscape for e-micromobility is still evolving, with many jurisdictions working to keep pace with rapid growth, changing travel behavior, and new fleet providers emerging regularly. The following section outlines key recommendations to support safe and well-managed implementation at varying levels of governments.

- **Enhance Crash Reporting:** As e-micromobility use grows, states need accurate data to understand its impact on road safety and inform effective policies. Establish state-level collision report forms with specific fields to consistently identify e-micromobility device involvement.
- **Regulate E-Micromobility Fleet Providers**: Establish permit systems for fleet providers to better manage, maintain, and distribute devices. Through permit requirements, local agencies can require fleet providers to share data on crashes, travel speeds, and trip patterns to help prioritize infrastructure improvements and targeted enforcement. It also offers agencies the opportunity to incorporate additional in-app features to enforce speed limits and discourage unsafe behavior.
- **Implement Context-Sensitive Speed Caps:** Speed limits provide a practical way to enhance safety while also allowing access and minimizing conflicts of shared e-micromobility devices in crowded areas. Agencies could adopt lower speed limits in locations with potential pedestrian conflicts, especially shared-use paths, around transit hubs, etc., using geofencing technology to automatically adjust speeds for vehicles that are part of a shared e-micromobility program within these and other restricted zones. For people using personal devices, clear signage and other enforcement strategies could reduce potential conflict.
- **Establish Parking Policies:** Parking policies can reduce challenges such as sidewalk clutter and conflicts in pedestrian zones while ensuring devices support broader accessibility and mobility goals. Many cities are implementing designated parking areas and corrals to manage space efficiently and maintain clear sidewalks. For shared e-micromobility scooters, ensure fleet providers require users to submit a photo of parking properly, clear of a sidewalk, and at a designated parking location.

1.2.2 PROGRAMMATIC RECOMMENDATIONS

Programs provide safety, education, and behavioral reminders to improve road behavior for all modes. The following programmatic recommendations are examples of how jurisdictions have effectively responded to the surge in electric micromobility popularity.

- **Public Safety Campaigns:** Safety campaigns, whether focused on digital engagement (e.g., videos on social media) or in-person (e.g., lawn signs), can encourage positive roadway behaviors. Analyze crash and citation data to identify target audiences that would benefit most from a safety campaign.
- **Training Courses for the Most Vulnerable Riders:** School-aged children typically have no formal roadway skills training and are the most vulnerable users on roads. To promote responsible riding and improve safety education, require school-aged students to complete a safety course covering safe riding, traffic laws, and helmet use before permitting them to ride e-bikes and e-scooters to school.
- **First-Offense Safety Course Option:** Instead of issuing a punitive ticket for the first offense, require riders to complete a road safety course specifically tailored to e-micromobility to promote safer riding behaviors.

- **Expand Incentives:** Rebates and tax credits can encourage e-bike adoption by reducing cost barriers and can assist agencies with reaching mode shift goals.
- **Illegal Battery Replacement Programs**: Develop an incentive program to promote the replacement of high-risk, illegal e-micromobility batteries, which are more prone to overheating or catching fire, with safer, compliant alternatives.

1.2.3 INFRASTRUCTURE RECOMMENDATIONS

Designing safer, more efficient roads is key to supporting the growth of e-micromobility and will improve safety for all road users. Design strategies like wider bike lanes and better visibility are already in use in parts of Florida and can help safely integrate e-micromobility into the transportation network. The following recommendations should be considered in areas with high e-micromobility ridership.

- **Add or Widen Existing Bike Lanes**: Adding or expanding bike lanes creates greater separation from vehicle traffic and allows faster e-micromobility devices to pass slower, human-powered users more safely.[4] This approach is particularly effective in areas where sidewalk riding is a common concern.
- **Establish Self-Enforcing Strategies:** Manage speeds to reduce collision severity and speed differentials between users by implementing bike lane chicanes, techniques for visual lane narrowing, and appropriate crossing treatments. Reinforce these measures with feedback strategies, including real-time speed displays and posted speed limit signs, to clearly communicate expected travel speeds to riders.
- **Update Road Markings and Signage**: Clear, consistent signage and pavement markings help communicate rules and expectations, especially where new micromobility regulations are in place or in areas with frequent conflicts.
- **Daylight Intersections for Better Visibility:** Improving sightlines near intersections is important for e-micromobility users, who often travel at higher speeds than traditional bicyclists. Better sight lines at conflict points can help prevent crashes. As the design speed of bikeways where high e-micromobility use and higher speeds are expected, design details such as sight distance, width, tapers, and protected corner designs become additional considerations.[5]
- **Adequate queuing space:** Provide space for side-by-side waiting at intersections to allow faster riders to move ahead at the intersection.
- **Protected Corner Design:** Design protected corners to allow for different travel speeds and accommodate larger devices such as e-cargo bikes and devices with trailers.
- **Provide Charging Infrastructure in Public Places**: Incentivize the use of electric micromobility by providing secure parking and free device charging. Where feasible, parking should have enough space to accommodate cargo bikes. Additionally, converting one or two vehicle parking stalls into secure bike parking with charging capabilities can increase the number of people who can arrive at a destination, as electric micromobility devices require less space than cars.
- **Develop Standards for On-Street Bike Corrals and Docked Stations:** Consistent design standards for bike parking, including standards for corrals and docking stations, ensure safe placement and minimize interference with pedestrians, vehicles, and other roadway users.

1.3 FLORIDA POLICY LANDSCAPE

1.3.1 STATEWIDE AND LOCAL POLICY EXAMPLES

As of July 1, 2020, e-bikes and e-scooters have the same rights and responsibilities as bikes.[6] They may be operated on roads, streets, bike lanes, multi-use paths/trails, and sidewalks, unless restricted by local ordinance. Riders are not required to possess a driver's license, register their vehicles, or carry insurance. Helmets are only mandated for individuals under the age of 16. Although state law doesn't restrict sidewalk usage, municipalities and counties retain the Home Rule[7] to impose stricter regulations, such as banning scooters on downtown sidewalks or implementing geofencing for shared mobility programs.

To better understand how this state level framework is interpreted and applied at the county and local level, a literature review was conducted examining micromobility policies across several Florida jurisdictions. This review focused on key areas including device classification, facility and operational restrictions, speed and age limitations, enforcement practices, and educational or training requirements.

Table 1 summarizes these policies and programs established in the state of Florida, identifies gaps and overlaps, and offers insight into how agencies are navigating the opportunities and challenges posed by this rapidly evolving mode of transportation.

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Table 1: Review of Florida Agency Ordinances and Statues

Jurisdiction	Permits Required for Fleet Providers	Helmet Requirement	Speed Limits	Sidewalk Riding	Designated Parking	Infrastructure Focus	Enforcement Strategies	Transportation Disadvantaged and Data Policies
Florida Statutes	N/A	Helmet use is mandated by Florida law for e-bike riders under 16 years of age	Defined by Class 1 e-bike: 20 mph Class 2 e-bike: 20 mph Class 3 e-bike: 28 mph	Does not prohibit (Home Rule) but requires yielding the right of way to any pedestrians and giving an audible signal before overtaking and passing pedestrians	N/A	N/A	Violating e-bike laws in Florida results in the same consequences as regular traffic offenses by motorists	N/A
Senate Bill 462/House Bill 567 (Adopted 2025)	Yes	Not specifically addressed; helmet use remains governed by existing Florida statutes	Yes, establishes maximum speed limits for electric micromobility vehicles according to classification	Yes, does not prohibit sidewalk riding unless specifically restricted by local ordinance	Not addressed; regulation of parking zones is delegated to local governments	Not addressed; the bill does not include provisions related to infrastructure development or investment	Not detailed; enforcement authority is generally delegated to local jurisdictions without specific mechanisms	Not addressed; the bill does not include provisions on data privacy/ sharing related to micromobility use
Orange County	Yes	No	Travel at speeds of no more than 10 mph	Allowed but devices may not exceed 10 mph	Parking in designated areas approved by the county	Only ride on county approved service areas	Impounding if found in violation	No
Osceola County	Does not specifically mention, but a petition can be submitted by homeowners, HOA, business association etc.	Does not specifically mention but permit forms require fleet providers to provide safety plans including helmet requirements	Does not specifically mention but permit forms require fleet providers to provide safety plans including speed limits, geofencing etc.	Allowed	Does not specifically mention but permit forms require fleet providers to provide information on designated staging areas, docking stations, and ADA compliance	Doesn't specifically mention	Fines up to $500 per violation. Public information and awareness plan that community will implement to monitor micromobility activities during permit application	No

Jurisdiction	Permits Required for Fleet Providers	Helmet Requirement	Speed Limits	Sidewalk Riding	Designated Parking	Infrastructure Focus	Enforcement Strategies	Transportation Disadvantaged and Data Policies
Seminole County	As of Fall 2025, Seminole County does not have an adopted e-micromobility ordinance. A Draft Ordinance was released in August 2025 which included device classifications and specific county trail regulations, such as restrictions for Class III e-bikes on countywide trail network, posted speed limits, and proper passing protocol.							
City of Orlando	Yes	No	No	Allowed, but some exceptions	Requires parking in designated areas	Does not specifically mention	No	Fleet providers required to share data
St. Johns County	No	Under 18 mandatory	When operating on a pedestrian path, speed limit of 10 mph or less.	Careful while operating on the sidewalk and verbally announce approach as described in Florida statutes	Requires parking in designated areas	No	Traffic citations and safety education for teens and children	No
City of St. Petersburg	Yes	Not required, but encouraged	15 mph in high-use areas	Prohibits sidewalk riding	Requires parking in designated corrals	Allowed to ride on bike lanes or streets with a posted speed limit of 30 mph or less, or shared trails	Fines and citations	Yes, reduced fee for low-income people
Neptune Beach	No	Not specifically addressed; helmet use remains governed by existing Florida statutes	Limits e-bikes on the beach to 15 mph	No bicycles, e-bikes, skateboards, roller skates, or personal mobility devices may be operated on the sidewalk within the city in a reckless manner at speed in excess of 15 mph	No	No	Violations are enforced as non-criminal infractions	None

Jurisdiction	Permits Required for Fleet Providers	Helmet Requirement	Speed Limits	Sidewalk Riding	Designated Parking	Infrastructure Focus	Enforcement Strategies	Transportation Disadvantaged and Data Policies
Atlantic Beach	No	Not specifically addressed; helmet use remains governed by existing Florida statutes	Yes, 10 mph on sidewalk and multi-use path	Yes, but prohibited from exceeding 10 mph speed and must yield to pedestrians and provide audible signal before passing pedestrians	No	No	Fines and citations	None
City of St. Augustine	Yes	Not specifically addressed; helmet use remains governed by existing Florida statutes	Not defined explicitly	Allowed with conditions	Yes, parking in designated parking areas	Not addressed	Fines from $50 to $500	No
City of Tampa	Yes	Not specifically addressed; helmet use remains governed by existing Florida statutes	Yes, 15 mph	Restricted in certain areas	Yes, parking at designated corrals.	Partial	The city monitors geofenced zones and fines for improper parking	Partial

Jurisdiction	Permits Required for Fleet Providers	Helmet Requirement	Speed Limits	Sidewalk Riding	Designated Parking	Infrastructure Focus	Enforcement Strategies	Transportation Disadvantaged and Data Policies
Miami-Dade County	Yes	Not specifically addressed; helmet use remains governed by existing Florida statutes	Yes, max speed 20 mph	Prohibits sidewalk riding	Yes	No	Fines	No
City of Fort Lauderdale	Yes	Not specifically addressed; helmet use remains governed by existing Florida statutes	E- scooters may not exceed 12 mph, and e-bikes may not exceed 15 mph	Restricts sidewalk riding if bike paths and lanes are provided, but allows city manager to establish restrictions on where devices can operate	Yes, in docked bike-share stations	Partial- supports bike-share with physical docking infrastructure	Not detailed	Operators must provide details on how users can utilize the service without a smartphone and provide service citywide

1.3.2 EXAMPLES OF E-MICROMOBILITY FLEET PROVIDER PARTNERSHIPS

The following section describes how select agencies in Florida are effectively partnering with fleet providers to manage shared e-micromobility programs on their streets.

The **City of Coral Gables**[8] established a regulatory framework that balances public interests with the operational needs of fleet providers. Through a collaborative process with fleet providers and City staff, the City has developed regulations allowing a maximum of two fleet providers, with no more than 300 e-scooters deployed at any time. Fleet providers are required to rebalance daily. City staff meet with vendors monthly and receive monthly reports on ridership, crashes, incidents, average trip distance, total miles traveled, and trip duration. City staff are notified immediately when a crash or incident occurs. Additional requirements included establishing in-app education in advance of riding, user agreements, ID scanning to confirm age, and geofencing maximum speeds in designated areas to manage speeds and operations.

The **City of Orlando** has ordinances that prohibit riding micromobility devices, including bicycles and scooters, on sidewalks and bicycle paths where posted, and requires these devices to be parked in designated areas.[9] The City also enforces vendor data-sharing agreements to track usage patterns and compliance, supporting informed decisions on fleet sizes and deployment zones[10] and has included e-micromobility as in integral part of the City's Comprehensive Plan Transportation Element.[11] In the City of Orlando, scooter share permit holders are also required to conduct six safety training classes per year to promote safe riding practices among users.

The **City of Miami** launched a phased, shared e-scooter pilot program in April 2018, testing slow-speed geofencing in high-pedestrian areas like Brickell and Mary Brickell Village. After evaluating pilot data, the city refined regulations on parking and enforcement strategies to address newly discovered safety challenges, such as sidewalk clutter and pedestrian conflicts. Additionally, they expanded deployment to better integrate with transit hubs and other focus areas[12].

The **City of Tampa** requires fleet providers to meet permit standards for parking compliance, fleet rebalancing, and incident reporting. The city requires vendors to deploy equitably across the city and distribute e-micromobility parking corrals by dividing the city into 15 deployment zones. Tampa requires all e-scooter trips to start and end at designated parking corrals. Fleet providers must report monthly penalty fees for improper parking and offer bounty payments to users who return misplaced devices. Additionally, the City is installing intersection bulb-outs to double as additional corrals and address safety challenges at intersections.[13] Concurrently, the City of Tampa established a robust micromobility education program, including helmet requirements, safety consultations, e-bike rodeos, and community campaigns to promote safe and responsible use of e-bikes and scooters.[14]

1.4 CURRENT SALES AND RIDERSHIP TRENDS

This section outlines the current state of the e-micromobility market, including sales growth, ridership trends, trip characteristics, and rider demographics in the United States and Florida, where data is available.

1.4.1 SALES GROWTH

E-micromobility sales have surged in recent years. In 2021, e-bike sales in the U.S. exceeded those of electric cars.[15] An estimated 1.1 million e-bikes sold in the U.S. in 2022, nearly four times the number sold in 2019[16] and far greater than the 652,000 electric cars sold the previous year.[17] Import data suggests 1.7 million e-bikes were imported into the U.S. in 2024[18] and forecasts predict the e-micromobility market will nearly double from 2022 to 2030 in North America, growing from $30 billion to $56 billion.[19]

The expansion of e-micromobility technology, particularly in battery costs and production, has played a key role in increasing affordability and adoption. Over the past three decades, lithium-ion battery cell costs have fallen by 97%,[20] with expectations that average battery costs may nearly halve again within the next three years.[21] These improvements have not only reduced prices but also enhanced performance. New battery technologies have increased device range by up to 25%,[22] allowing e-micromobility devices to travel farther on a single charge and making them a more practical and appealing alternative to cars for everyday trips.

1.4.2 RIDERSHIP TRENDS

E-micromobility ridership continues to grow across both shared and personal devices. The number of trips in the United States using shared e-micromobility devices—including dockless bikes, dockless scooters, and station-based bikes—increased by 280% from 2017 to 2023, rising from 35 million to 133 million annual trips.[23]

Statewide, Florida has experienced dynamic changes in mode shift from both shared and privately owned e-micromobility devices. Prior to the pandemic, micromobility paired with transit experienced a 31% increase in usage.[24] Lime, one of the e-micromobility operators in South Florida, announced in 2020 that nearly 250,000 riders in Fort Lauderdale and Miami had taken over one million scooter trips since the service launched in late 2018 and early 2019, respectively. According to a survey of South Florida riders, these scooter trips replaced an estimated 383,000 car trips, covering more than 1.16 million miles and reducing vehicle miles traveled by approximately 445,000 miles.[25] Similarly, shared e-micromobility program ridership in the City of Orlando witnessed a significant increase from 2018 to 2023, growing from approximately 16,900 annual trips in 2018 to over 435,600 trips in 2023.[26]

While shared e-micromobility programs demonstrate an ongoing increase in ridership, recent data indicates these shared programs have become significantly more expensive than other public transportation options. For example, a typical 30- to 35-minute pay-as-you-go trip on a station-based bike share system averages approximately $3.85 for a one-way human-powered bike trip and $7.00 or more for a one-way e-bike trip. These costs can accumulate to approximately $14 per day for commuting, rendering bike share a less attractive option for potential users seeking affordable daily transportation.[27] As the cost of individual trips on shared e-micromobility devices continues to rise, the decreasing cost of personal device ownership may encourage a shift toward personally owned devices. A recent consumer survey conducted by McKinsey found that nearly one-third of respondents plan to use micromobility more frequently, and nearly half intend to shift from private cars to more sustainable modes of transportation.[28] To better understand whether this shift is occurring in Florida, improved and expanded count technologies are needed to capture usage trends more accurately across both shared and personally owned devices.

1.4.3 TRIP CHARACTERISTICS

E-micromobility is most commonly replacing trips of fewer than three miles in urban areas.[29] Research from the University of California, Davis, identified three key patterns in micromobility use: first, micromobility trips (including shared, personal, human-powered, and electric devices) most commonly replaced walking trips; second, bike-share users were more likely than scooter-share users to substitute transit for an e-micromobility device, particularly for work-related travel; and third, e-scooters often generate new trips for social and recreational purposes.[30] Recent e-scooter fleet provider data found that average trip distances have grown 26% from the start of the pandemic to 2024.[31] These results demonstrate how adoption of e-micromobility devices can reduce car dependency for longer commuting trips and, if adequately placed, for shorter recreational or discretionary trips in the urban environment.

1.4.4 PERFORMANCE TRACKING

Some cities now include structured performance metrics such as utilization thresholds, parking and no-ride zone compliance to guide vendor behavior and adjust fleet operations based on real-world performance data.[32] The City of Tampa requires all vendors to provide specific performance metrics as part of the permit agreement. These metrics are tracked over six-month periods and include minimum utilization rate of 0.5 rides per vehicle per day, corral parking compliance (with penalties or fleet adjustments based on incident counts), and no-ride zone compliance. The City then allows vendors who exceed their performance metric requirements to expand their fleet, while underperforming vendors are required to reduce fleet size. This marks a shift from previously unstructured oversight, emphasizing accountability and positioning micromobility as a legitimate transportation option.[33]

1.4.5 RIDER DEMOGRAPHICS

Comprehensive e-micromobility user demographic data by age, income, race, and gender is limited, making it difficult to fully analyze ridership trends and patterns. While younger users, particularly school-aged youth and urban commuters, are often perceived as the primary users, e-micromobility devices are also making it easier for older adults to continue riding as they age. Different age groups may also use these devices in distinct ways: younger users often rely on devices for point-to-point transportation, while older adults may use them for recreation or leisure. As shown in **Figure 2**, The North American Bikeshare Association found that shared e-micromobility users are disproportionately younger (18 to 24 and 25 t9o 44 years old), white, and male.[34] Income trends show that both higher-income riders (earning over $100,000) and very low income riders (earning under $15,000) are overrepresented among users. [35] A similar trend is occurring in the City of Orlando, who found that users of their e-scooter pilot program were generally younger and more affluent.[36]

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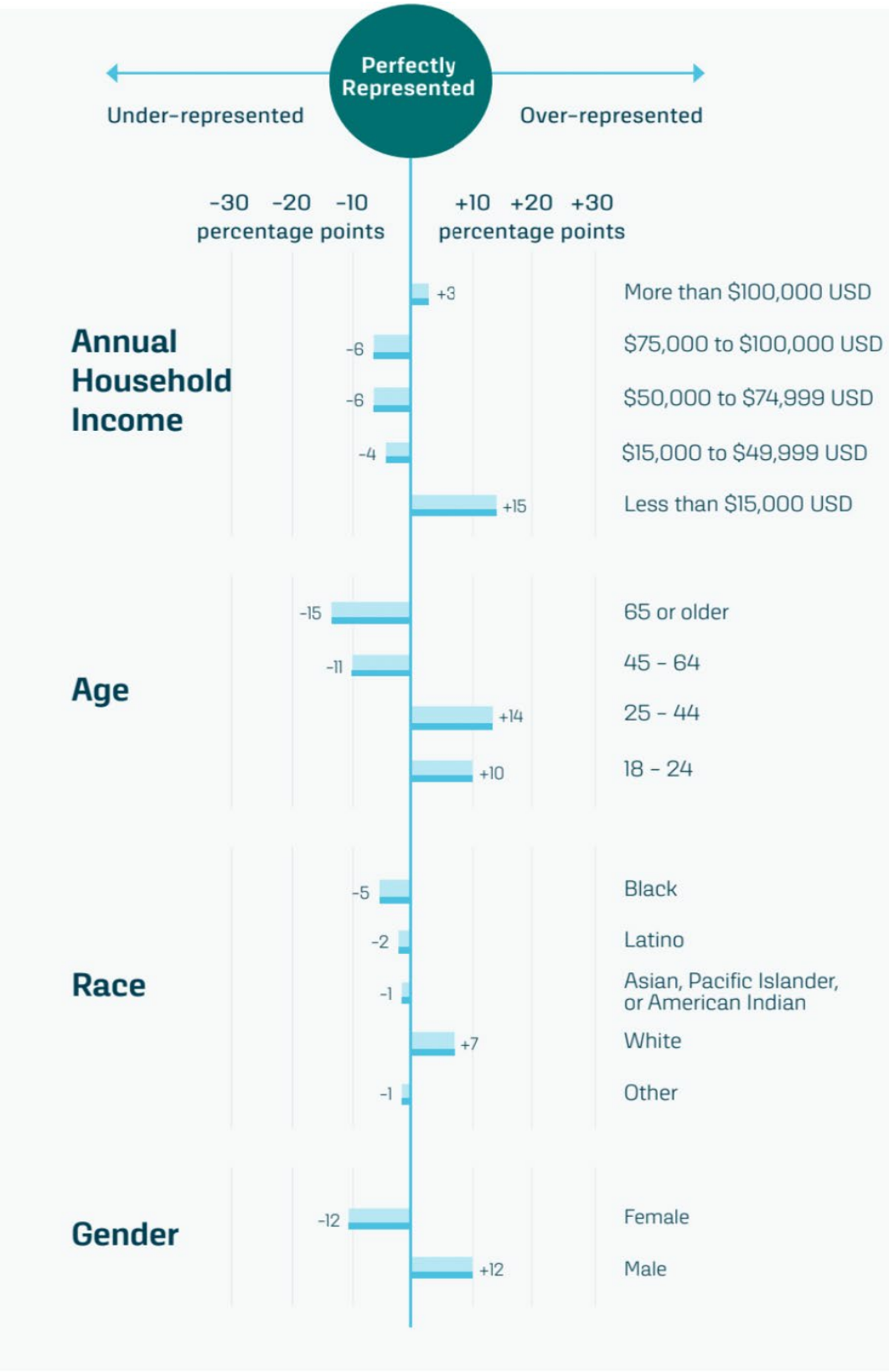
Figure 2: Demographics of Shared E-micromobility Device Users



Source: The North American Bikeshare Association (2024)

1.5 POLICY AND PROGRAM CONSIDERATIONS

This section outlines key policy and program considerations to support effective integration of e-micromobility, drawing from examples in Florida and throughout the United States.

1.5.1 INCENTIVE PROGRAMS TO SUPPORT POLICY GOALS

As electric bikes grow in popularity across the U.S., many states and cities have introduced purchase incentives, such as rebates and tax credits, to encourage e-bike adoption and reduce the cost to purchase an e-micromobility device.[37] These programs help reduce cost barriers, promote sustainable mobility, and expand access to reliable, low-cost transportation.

Eligibility criteria often varies by state and program but typically include residency requirements, e-bike classifications, purchase price caps, and application processes. The California Bicycle Coalition operates a voucher program that requires applicants to be below 300% of the federal poverty limit. Other program requirements include selecting an eligible e-bike and owning it for at least one year.[38] Although Florida has not yet passed a statewide incentive, a proposed Federal Electric Bike Incentive Credit Bill[39] introduced in 2023 would offer eligible residents a tax credit of up to 30% (maximum $1,500) on e-bike purchases under $8,000. Locally, the City of Tampa implemented an e-bike voucher program which provides an upfront discount for all city residents to use at a local bike shop.[40] All City of Tampa residents aged 18 and older are eligible, with income-based credits available up to a maximum of $3,000. About 400 vouchers were issued in the program's first two years.[41] This program, which is funded through parking revenue, helps reduce the cost of entry for purchasing e-bikes and stimulates the local economy.

To improve access for residents with fewer transportation options, some agencies require the placement of micromobility devices in areas that have historically been underserved. The City of Orlando requires fleet providers to provide reduced rates for Supplemental Nutrition Assistance Program (SNAP) recipients and imposes a staging requirement so that 20% of micromobility fleets are located in areas with higher needs to improve affordability and access for communities such as the Parramore neighborhood in Downtown Orlando.[42]

Other agencies have used incentive programs to help address critical safety challenges with e-micromobility adoption. One of the most prominent safety issues has been fires caused by illegal batteries. Users obtain illegal batteries online, using them instead of legal batteries because they are sold for a fraction of the price of legal batteries.[43] In response to a rise in battery-related fires, the New York City Department of Transportation launched a pilot e-bike trade-in program that allowed eligible delivery workers to replace their unsafe devices with legal, fire-safe devices or batteries at no cost.[44] By reducing the prevalence of unsafe devices, this program mitigated the risks of fires caused by indoor charging. The City of Orlando is updating its curb management inventory to assess safety, parking, and battery management issues related to micromobility devices. As part of this effort, the city is developing battery safety guidelines informed by emerging concerns in other cities and plans to revise its vehicle requirements to ensure the safe integration of micromobility into Orlando's transportation network.[45]

1.5.2 REGULATORY INCONSISTENCIES

E-micromobility safety is also challenged by inconsistent policies and enforcement across jurisdictions. States and cities vary widely in how they define, regulate, and permit e-micromobility devices. As stated in **Table 1**, agency regulations vary. For example, some agencies allow sidewalk riding while others prohibit it. These inconsistencies create confusion for all road users and complicate an enforcing agency's ability to manage and enforce laws effectively. Without standardized rules or consistent enforcement, it becomes difficult to promote safe and predictable behavior among users.

1.5.3 SAFETY CAMPAIGNS

A recent report from the U.S. Consumer Product Safety Commission (CPSC) found that injuries related to e-scooters and e-bikes increased by 21% between 2021 and 2022, with over a third of the injured between 2017 and 2022 being children aged 14 and younger.[46] This demonstrates a need for improved road safety education for a group of users who have no formal training in road rules. In response to the rise of teenage use and crashes, Carlsbad, California requires students to attend a two-day police-approved safety course, then submit proof of completion to their school to receive a parking permit sticker for their bike or e-bike.[47] Other successful programs, such as Marin County's Youth E-Bike Safety Committee, launched a widespread campaign providing information on local regulations about who can ride devices and where they can be ridden using digital and in-person techniques.[48]

Differing from national data, FDOT research states that the highest share of fatal and serious injury crashes occurs among age groups 20-39 years.[49] Additional research is needed to determine effective safety campaigns for reaching this age demographic; FDOT currently provides educational materials for agencies, law enforcement, and riders. Current programs combine high-visibility enforcement such as increased presence of law enforcement officers with education programs targeting youth, people experiencing houselessness, and audiences likely to engage with FDOT's digital media campaigns.[50] Education specifically on the proper e-micromobility device behaviors and safety of e-bikes remains limited.[51]

1.5.4 PARKING

Improperly parked personal and shared e-micromobility devices can obstruct pedestrian pathways, create tripping hazards, and limit accessibility for people with disabilities. In high-demand areas, scattered or clustered devices may also block emergency access points or interfere with vehicle sightlines, introducing further safety concerns and contributing to negative public perceptions of e-micromobility. To address these challenges, cities and fleet providers are using a combination of strategies that improve parking compliance, maintain clear pathways, and support e-micromobility sustainability.

Several Florida agencies have implemented strategies to enhance parking compliance. The City of Tampa's bikeshare system penalizes users for trips that end outside of docking stations and provides discounts for trips that end at a station.[52] City of St. Petersburg, which requires e-micromobility device riders to operate in roadways with a posted speed limit of 30 mph or less, strategically places scooter corrals adjacent to bike facilities and qualifying roadways. This approach encourages riders to remain within lower-stress, safer travel environments.[53]

For dockless and personal devices, cities are increasingly exploring the integration of charging infrastructure into bike parking or corrals to support the growing use of micromobility. In 2024, the Joint Office of Energy and Transportation released a funding opportunity announcement aimed at improving access and efficiency of charging personal and shared electric micromobility devices outside the home.[54] Projects ranged from introducing e-cargo bikes into the existing bike-sharing system in Pittsburgh to piloting e-bike charging stations that do not require a technician to manually replace the battery. New charging devices on the market promote stations as part of an agency's revenue generation.[55]

1.5.5 CRASH REPORTING

To understand the true safety challenges of e-micromobility use, states need accurate data to inform effective policies and solutions. State-level collision reporting often lacks information on e-micromobility crashes because officer reporting is inconsistent and the reporting forms lack specific fields to identify e-micromobility device involvement, requiring extra effort to extract this information from unstructured data. This inconsistency limits decision-makers' ability to fully understand roadway challenges not only in Florida, but in states across the country. A recent noteworthy effort to combat this reporting issue is New York State's Senate Bill SB 9419,[56] which includes identification of e-scooters and e-bikes in collision records.

As of Fall 2025, the State of Florida has prepared an update to the Florida Traffic Crash Report form to include e-micromobility devices; rollout of the revised form is expected in 2028. Specific agencies and institutions, including New York City, the City of Los Angeles, University of Central Florida, and City of Tampa, require shared micromobility fleet providers to share collision data as part of their permitting process.[57] While the City of St. Petersburg, has established a partnership with its the Police Department to update the Public Works staff anytime a collision involved e-micromobility users, which allows the city to track and analyze local trends.[58]

1.5.6 ENFORCEMENT

Enforcement approaches vary from jurisdiction to jurisdiction and often depend on violation type. At the University of Florida, for example, parking an electric micromobility device improperly may result in the device being impounded.[59] In New York City and Honolulu, if a user runs a red light on an e- bike, they may receive a criminal summons as opposed to a moving violation issued to vehicles.[60] Meanwhile some other agencies are exploring non-punitive punishments. Carlsbad allows individuals cited for eligible violations to attend a bicycle/e-bike safety course instead of facing punitive measures.[61]

In Florida, local enforcement efforts reflect a mix of education and compliance-focused strategies. Notably, the City of Orlando Police Department monitors compliance of shared use trails with officers on bicycle, which not only makes officers more approachable but enables them to access all parts of the shared use trail. The City of Orlando also partners with Best Foot Forward to conduct educational enforcement at high-risk crosswalks, emphasizing education over punitive measures to encourage safe behavior among users.[62] Similarly, at the state-level, FDOT leads targeted enforcement efforts on high crash corridors.[63] University of Central Florida (UCF) employs an education-first enforcement strategy that emphasizes helmet distribution, initial social media outreach, and issuing warning citations rather than heavy-handed penalties. This approach has helped increase rider awareness and compliance, contributing to a notable decline in severe crashes. Additionally, pedestrian complaints have dropped to nearly zero over the past couple of years, reflecting improved safety and community acceptance.

While established regulations provide a framework for enforcement, officers often face challenges distinguishing between micromobility device types, rider age groups, and other regulatory factors that are difficult to identify in the field. Effective enforcement may require increased training to help officers differentiate among device classifications, particularly where local restrictions apply, though visual similarities between models continue to make accurate identification challenging in practice.

1.5.7 AGE REQUIREMENTS

Florida Statute 316.2068 does not have an age requirement to operate e-micromobility devices but does require individuals under the age of 16 to wear a properly fitted and securely fastened bicycle helmet that meets applicable safety standards in order to operate these devices. Agency interviews conducted as part of this research highlighted increasing concern over teens and middle schoolers who are using e-micromobility devices without a clear understanding of road rules, traffic laws, or safe riding practices.[64] As of now, there is no ongoing public discussion at the state level to adopt more conservative age restrictions.

Some states have imposed age restrictions on e-bike use. In California, riders must be at least 16 years old to operate a Class 3 e-bike, and helmet use is required. Further expanding on this restriction, California Assembly Bill 2234 allows jurisdictions within San Diego County to elect to prohibit individuals under 12 years of age from operating Class 1 or Class 2 electric bicycles[65]. A violation results in a warning notice, followed by a $25 fine for subsequent offenses. As of Fall 2025, the City of Coronado is the only agency to adopt age restrictions aligning with this provision, prohibiting individuals under 12 from operating Class 1 and 2 e-bikes, and those under 16 from operating Class 3 e-bikes. The city also restricts e-bike usage on sidewalks, beaches, and in parks.

1.5.8 REGISTRATION AND INSURANCE REQUIREMENTS

In most states, e-micromobility devices are classified similarly to human-powered bicycles, allowing them to avoid the stricter registration, licensing, and insurance requirements that apply to motor vehicles. This is an emerging topic that will continue to evolve as personal devices become more adopted in transportation networks.

Whether an e-bike requires registration depends on state and local regulations, influenced by factors such as e-bike classification, motor power, and maximum speed.

New York City lawmakers recently proposed a law that would require e-bike registration.[66] Several states currently require registration for Class 1 and 2 e-bikes including Hawaii, New York, and North Dakota, while Class 3 e-bike registration is required in Alabama, Alaska, Connecticut, Hawaii, Massachusetts, New Jersey, New York, and North Dakota. Riding an unregistered e-bike can result in fines or impoundment in states like Hawaii and New York. Additional penalties may apply if an uninsured or unlicensed e-bike is involved in a crash.[67] Requiring registration for personal e-micromobility devices may improve accountability, theft prevention, and crash reporting.

While most states do not currently require insurance or licensing for e-micromobility devices, some states, including Hawaii and North Dakota, mandate liability insurance for high-powered e-bikes (motor exceeding 750 watts or speed over 28 mph), and Alaska and Massachusetts require a bicycle-micromobility license for certain models. Minimum insurance requirements for fleet providers is common. While encouraging or requiring personal liability coverage for personal device users can help ensure damages and injuries are addressed in the event of a crash, it could also make ownership less accessible and place a financial burden on users. In Florida, e-micromobility devices are currently not subject to registration or insurance.

1.5.9 ESTABLISHING OPERATIONAL HOURS

Some agencies have restricted micromobility operations during nighttime hours, when the severity of crashes involving riders under the influence tends to be higher. For example, St. Petersburg implemented time-of-day restrictions to reduce the risk of late-night collisions and continues to adjust these hours as conditions evolve.[68] For instance, following an analysis of crash trends, the City adjusted its operating hours to restrict micromobility use from midnight to 5 am.

1.6 INFRASTRUCTURE CONSIDERATIONS

This section outlines best practices for designing infrastructure for e-micromobility, citing research from design guidance documents, agency interviews, and the Florida Department of Transportation.

1.6.1 FACILITIES IN RIGHT-OF-WAY

One of the most pressing safety challenges for e-micromobility users is the lack of dedicated infrastructure. Many streets lack dedicated or protected facilities, forcing e-micromobility users to choose between sharing the road with fast-moving vehicles or mixing with pedestrians on sidewalks—both options present significant safety risks. On 10th Street in Atlanta, city staff found that under normal conditions, 1 in 3 people on bicycles and e-scooters choose to ride on the sidewalk. When the city implemented a week-long pop-up bikeway, however, staff found that only 1 in 15 people chose to ride on the sidewalk.[69] Florida agency interviews revealed that in areas lacking dedicated infrastructure, agencies generally prefer to allow sidewalk riding rather than require riders to share travel lanes with motor vehicles. This emphasizes the need for riders using the sidewalk to comply with local standards and safe behaviors when mixing with other modes, such as maintaining a slow speed, providing safe passing distances, and using a bell or sound device to alert pedestrians.[70]

Bikeway design speed may be higher on bikeways, such as regional facilities or bicycle superhighways, where a higher use of e-bikes, e-scooters, or recreational cyclists might be expected. A higher design speed would affect design details such as positioning of red curbs (no parking zones), tapers, bikeway width, speed management, and protected corner design;[71] however, it is critical that agencies ensure design speed accommodates for slower riders when a facility is expected to serve as an all ages and abilities network. AASHTO uses 15-mph as the design speed for their bicycle facility guidance document, as this represents the average comfortable speed for typical bicyclists.[72] Additionally, bikeways should be wide enough to let users of different speeds and device types pass safely and comfortably.[73]

1.6.2 SHARED-USE PATHS

Shared-use paths are often the most comfortable facilities within an active transportation network as they provide separation from vehicle traffic and are typically accompanied by additional streetscape amenities. However, as usage increases, especially with higher-speed e-devices, maintaining safety and comfort becomes more difficult. Refer to the AASHTO Guide for the Development of Bicycle Facilities[74] and NACTO Urban Bikeway Design Guide[75] for best practices on preferred widths, when to separate path users and strategies to do so effectively, and guidance at trail crossings.

Speed limits should be established on heavily used shared-use paths and complemented with self-enforcing strategies such as speed sensors to provide real-time feedback to riders, chicanes or lateral shifts within the path, additional markings to visually narrow the facility, and mini traffic circles at trail crossings to manage speeds of all users on the facility.[76] On heavily used trails in City of Orlando, trail etiquette signage, additional pavement markings, and asphalt surface changes are being added to encourage lower speeds and reduce conflicts.[77]

1.6.3 SPEED DIFFERENTIALS

E-micromobility devices often travel faster than traditional bicycles or pedestrians but slower than cars, creating unpredictable speed differentials that can lead to conflicts when modes are not separated in time or space. These mismatches are especially challenging on roadways without dedicated bike facilities and shared use paths, where different modes are operating in the same lanes and often lack clear delineation or signage to promote good user behavior. In addition to greater conflict potential, the severity of collisions involving e-micromobility is also heightened due to the increased mass and speed of these devices compared to human-powered alternatives.[78] Kinetic energy, which depends on both mass and speed, provides a useful framework for understanding why e-micromobility collisions may be more severe, but there is currently a lack of high-quality crash data that consistently captures the involvement of e-micromobility in collisions, limiting the ability to fully assess and address these risks. To the extent possible, speed differentials should be minimized so that the difference in speed between users does not exceed 10 mph across various device types.[79]

Slow-speed zones are a useful tool for managing shared e-micromobility programs in areas with high pedestrian activity. While these zones do not apply to personally owned or non-electric devices and are not legally enforceable speed limits, they geofence or cap shared e-micromobility devices speeds in specific areas. For example, Baltimore's Inner Harbor Promenade has an 8-mph cap on shared e-micromobility devices to improve pedestrian safety, while adjacent bikeways allow full speeds to maintain mobility.[80] While helpful, slow-speed zones should not replace investment in dedicated bike infrastructure. Cities can use shared micromobility trip data to understand ridership patterns, prioritize needs, and effectively communicate trade-offs with the public.[81]

In response to a growing concern about managing speeds of different modes, the Seminole County Trails & Greenways Plan identified nine pilot locations for targeted improvements. Improvements focused on reducing speeds in high-conflict areas by redesigning vistas, separating modes where sightlines are limited, adding trail speed limit signage, and establishing trail-user priority at crossings through raised crossings and added signage.[82]

1.6.4 PROTECTED CORNERS

A recent Florida Department of Transportation study of micromobility crashes from 2018 to 2022 found that 9% of e-micromobility crashes resulted in fatal or severe injuries, with over half occurring at or near intersections.[83] The leading contributing factor was motorist failure to yield, and most crashes happened in daylight and clear weather. A protected corner design slows turning vehicles and improves visibility at intersections, making it easier for drivers to see and yield to e-micromobility device users, bicyclists, and pedestrians. Protected corners can be designed to accommodate varying device speeds and/or larger devices approaching the intersection in the bike facility, such as cargo bikes or devices with trailers.[84]

1.7 CONCLUSION

This white paper is intended to inform transportation professionals and policymakers about the best practice strategies and tools available to support the safe and effective adoption of e-micromobility. In addition to offering examples from Florida and across the nation, it highlights key research gaps to be addressed with this evolving transportation device, including the need for more detailed crash data, feedback data on effective safety education programs for adult users, and continued monitoring of safe infrastructure performance. By advancing these efforts, agencies can better integrate e-micromobility into transportation networks while enhancing safety and access.

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