KITTELSON & ASSOCIATES

PGE MICROMOBILITY MARKET STUDY AND RECOMMENDATIONS FOR UTILITY ACTIONS

Portland, OR

August 5, 2024

PGE Micromobility Market Study and Recommendations for Utility Actions

Portland, OR

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List of Acronyms and Abbreviations

CBIAG	Community Benefits & Impacts Advisory Group
CFP	Clean Fuels Program
CPSC	Consumer Product Safety Commission
DCF	Drive Change Fund
DEQ	Department of Environmental Quality
E-bike	Electric bicycle
EV	Electric vehicle
EW2W	Electric Ways to Work (Metro Regional Transportation Options Program)
GEM	Green Energy & Mobility Program (PCEF program)
GHG	Greenhouse gas
HB	House bill
IOU	Investor-owned utility
MFS	Metropolitan Family Service (nonprofit organization)
MPO	Metropolitan Planning Organization
OAR	Oregon Administrative Rule
ODOT	Oregon Department of Transportation
OHSU	Oregon Health & Science University
OPAL	Organizing People Activating Leaders (nonprofit organization)
OPUC	Oregon Public Utilities Commission
ORS	Oregon Revised Statutes
PBOT	Portland Bureau of Transportation
PCEF	Portland Clean Energy Fund
PEBEL	Portland E-Cargo Bike Educational Lot (Metro Regional Transportation Options Program)
PEV	Personal electric vehicle
PGE	Portland General Electric
PSU	Portland State University
SAE	Society of Automotive Engineers
TE	Transportation electrification
TEINA	Transportation Electrification Infrastructure and Needs Analysis (ODOT report)
TEP	Transportation Electrification Plan
TMA	Transportation Management Association
TREC	Transportation Research & Education Center (at Portland State University)
UL	Underwriters Laboratories
VMT	Vehicle miles traveled

Section 1
Executive Summary

Executive Summary

This Micromobility Market Study was commissioned by Portland General Electric (PGE) to explore any potential utility role in supporting electric micromobility (micromobility) in the PGE service area. The study provides background and recommendations to support PGE's consideration of how micromobility could contribute to transportation electrification (TE) efforts within the utility role of equitably *planning* for, *serving*, and *managing* increasing electric vehicle (EV) load.

This study is motivated by an outcome of PGE's past TE planning efforts. During community outreach for the 2023 Transportation Electrification Plan (TEP), it was identified that the high cost of EVs is a barrier for underserved communities and that EVs are not an option for non-drivers, leading to an interest in micromobility as an equitable, accessible form of TE. Micromobility is understood to include electric bicycles (e-bikes), electric scooters, and other light personal electric vehicles (PEVs). PGE's involvement in micromobility to-date has been administering grants for four small-scale e-bike lending libraries through the Drive Change Fund (DCF), which is funded through Oregon Department of Environmental Quality's (DEQ) Clean Fuels Program (CFP).

FUNDING AND FOCUS

The study is funded through the Oregon CFP. To provide harmony with the CFP and regional decarbonization goals, the recommendations provided in this study rely on the capability of micromobility to reduce greenhouse gas (GHG) emissions by enhancing transportation options and providing equitable access to TE.

Electric utilities in Oregon are required by state laws and rules to file regular TEPs which identify a portfolio of actions that increase access to TE, including among underserved communities. Efforts are to stimulate innovation and competition, assist in managing the electric grid, and create an attainable net benefit for customers. This study provides the following background as the utility considers whether involvement in micromobility can support these goals:

- An assessment of the existing landscape of micromobility use and programming inside and outside the PGE service area, including an overview of market trends and emerging opportunities
- Program benchmarking, cataloging existing micromobility programs within PGE's service area and how utilities have played a role in micromobility across the U.S.
- Best practices and considerations for PGE's potential activities
- Recommendations for utility actions for various target outcomes, planning periods, and budgets

STAKEHOLDER ENGAGEMENT

Ten external stakeholder listening sessions were conducted to gather perspectives on micromobility devices and programs. These sessions were essential for understanding community needs and informing the recommendations developed in the report. Participants highlighted the following considerations:

- The importance of quality equipment and partnership with community organizations and vendors to provide training, maintenance, support, and accessories like helmets, locks, and rain gear

- Key components of effective and equitable community outreach
- Barriers to accessing and using micromobility, including a lack of safe infrastructure, cost, cultural resistance to cycling, and challenges with parking and charging in multifamily dwellings
- Support for PGE's DCF and a desire to see it provide more support for micromobility

Four internal PGE stakeholders were interviewed to develop an understanding of key considerations, opportunities, and constraints specific to PGE and the utility space.

EXISTING MICROMOBILITY PROGRAMS AND OPPORTUNITIES FOR PARTNERSHIPS

As PGE considers becoming engaged in micromobility, it should consider where its efforts may complement or amplify the work of others in and around its service area. Nationwide, many state, regional, and local governments, nonprofit organizations, and electric utilities have introduced e-bike purchase incentives. These incentives, in addition to a smaller number of lending libraries and educational, informational, and community-specific engagement and outreach programs further the adoption of micromobility. The following programs are being conducted in the PGE service area:

- **Forth**, **Metropolitan Family Service**, and **The Street Trust** operate an e-cargo bike lending library and educational program.
- The **Portland Clean Energy Fund** currently operates a small-scale e-bike incentive program and a lending library and will introduce the nation's largest e-bike purchase incentive program in 2025.
- **Lime** and **BIKETOWN** programs lower financial barriers to accessing shared micromobility.
- The **Portland Bureau of Transportation** provides a Universal Basic Mobility program called Transportation Wallet which issues credits for public transit and bike and scooter share. The Bureau is also piloting a zero-emission delivery zone in downtown Portland, working closely with **B-Line**.
- **Suma** operates an app that aggregates opportunities to access discounts and subsidies including the discounted use of Lime scooters. The program facilitates access by unbanked people.

There are many potential partnerships that could ensure the success of any utility actions and integration with other planning and programming in the region, including state, regional, and local governments, transit agencies, community-based organizations, businesses, research institutions, and other utilities.

POTENTIAL UTILITY ROLES

Dozens of electric utilities have become engaged in micromobility over the last decade across the U.S. Based on a review of existing programs, potential utility roles in the space include the following:

- **Outreach and education**, including through bill inserts, digital information, community events, and support of other organizations who do outreach work
- **Supporting device uptake**, including through purchase incentives, qualified product lists, partnerships with retailers, and rental or lease programs
- **Supporting charging,** including through charging hardware incentives, and installing and maintaining charging infrastructure
- **Enabling make-ready infrastructure**, including through make-ready wiring incentives and installing make-ready infrastructure
- **Utility service connections**, including through expedited application and connection processes and installing service connections to support charging

RECOMMENDATIONS FOR UTILITY ACTION

Based on stakeholder interviews, review of existing programs, and project team subject matter experience, a menu of recommendations is provided for three timescales in line with PGE's TEP cycle. Near-term recommendations are readily actionable and may be completed under the current TEP using existing funding and little administrative overhead. Mid-term opportunities and long-term considerations demand various levels of investment and complexity. Detailed program designs are not developed; rather, general opportunities and considerations are noted, and resources are provided to support future program development efforts.

Recommended actions that establish programs which directly support micromobility will require funding through the CFP or another non-ratepayer source. Such actions are outside of the vehicle agnostic utility role to plan for, serve, and manage the loads from TE.

The recommendations are provided with supporting details in tables in Appendix E.

Near-Term Recommendations (2024-2025)

- Develop targeted informational education campaigns
- Continue community engagement on micromobility leading into the next TE plan
- Promote Portland Clean Energy Fund (PCEF) e-bike incentive and consider complementary incentive in adjacent communities
- Provide information, test rides, and e-bikes for PGE employees
- Emphasize eligibility of micromobility projects for DCF grants; consider setting aside earmarked funding for such projects

Mid-Term Opportunities (2026-2028)

- Engage in continuous community engagement across TE planning and program design efforts
- Develop coordinated education and communication campaign with partners across Oregon
- Cultivate an approved product list to be included on PGE Marketplace
- Include micromobility charging in Business and Multi-family Make-Ready Pilot and the Affordable Housing EV-Ready Funding
- Provide a private micromobility device purchase incentive, funded through the CFP
- Establish micromobility device lending libraries, funded through the CFP
- Support device storage by installing charging infrastructure in private residences and businesses, funded through the CFP
- Pilot device storage and charging infrastructure in the public right-of-way, funded through the CFP
- Establish an employer-based demo and incentive program, funded through the CFP
- Administer a fleet device purchase incentive, funded through the CFP
- Provide support for shared micromobility programs, funded through the CFP

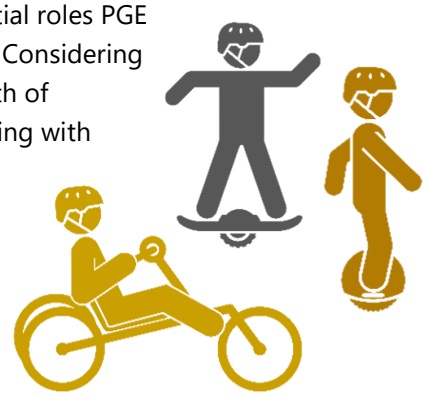
Long-Term Considerations (beyond 2028)

- Engage in continuous community engagement across TE planning and program design efforts
- Monitor micromobility adoption and update vehicle electrification forecasts as needed
- Continue engagement and pilots to identify needed micromobility charging infrastructure and integration with other transportation modes

Program design best practice and recommendations for longitudinal efforts to be considered as PGE or partner roles with any utility actions include the following:

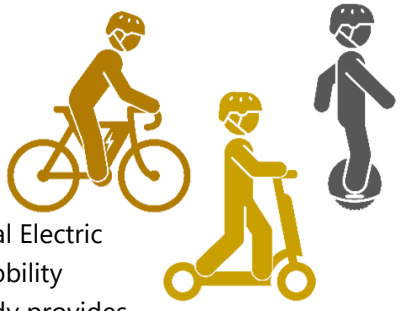
- Foster **continuous community engagement** in planning and potential program design
- Provide **wraparound services** for customers new to micromobility
- Develop a **streamlined application process** to promote equity and inclusion
- Introduce **education and communication campaigns**, internally and externally
- Support **pilot programs** to foster innovation
- **Continuously evaluate** program outcomes
- **Collaborate with large-scale efforts** to foster partnerships and reduce duplicated effort
- Support the development of **local industry**
- **Center safety** in communications and outreach
- Plan for the **program lifecycle** to ensure full value
- Consider **seasonality** for investments - riding is more fun in the sun!
- Recognize the importance of **quality equipment** for safety, serviceability, and experience
- Focus on the **biggest barriers to participation**: infrastructure, cost, and storage

This Micromobility Market Study provides an overview of the potential roles PGE can play in micromobility as a complement to its existing TE efforts. Considering the utility role, PGE can provide TE programs that support the growth of micromobility by focusing on equity and accessibility and coordinating with partner organizations to design comprehensive support for its customers as they consider micromobility as an option to access the benefits of TE. Taken holistically, utility support for micromobility has the potential to benefit the community and contribute to broader environmental goals. The recommendations offered in this report are designed to inform PGE's actions in the near, mid, and long term, ensuring a structured and impactful approach.



Section 2
Introduction

Introduction



MOTIVATION AND SCOPE

This Micromobility Market Study was commissioned by Portland General Electric (PGE) to explore any potential utility role in supporting electric micromobility (hereafter referred to as micromobility) in the PGE service area. The study provides background and recommendations to support PGE's consideration of how micromobility could contribute to utility transportation electrification (TE) efforts. Options for utility action are recommended which align with the existing landscape of micromobility programming in the PGE service area and with the utility role of equitably *planning* for, *serving*, and *managing* increasing electric vehicle (EV) load.

This project is the outcome of past transportation electrification (TE) planning efforts from PGE. PGE's 2023-2025 TEP details the utility's efforts to support charging, fleet electrification, consumer education, electric grid integration, and innovation, including a focus on underserved communities.[1] During community outreach for the plan's development, it was identified that the cost of EVs is prohibitive for underserved communities and that EVs are not an option for non-drivers. As a result, there is an interest in micromobility as an equitable, accessible form of TE. The development of PGE's micromobility approach was listed as an emerging opportunity in the plan. The resulting study – this report – was to "define a micromobility strategy for the company's activities which aligns with the utility's role to determine if a future program would be needed," and to "include evaluation of risks and safety concerns."

The study is funded through the Oregon Department of Environmental Quality (DEQ) Oregon Clean Fuels Program (CFP). To provide harmony with the CFP and regional decarbonization goals, the recommendations provided in this study rely on the capability of micromobility to reduce greenhouse gas (GHG) emissions and provide equitable access to TE.

Utilities in Oregon are required by state laws and rules to file regular TEPs which identify a portfolio of actions that increase access to TE, including among underserved communities. Efforts are to stimulate innovation and competition, assist in managing the electric grid, and create an attainable net benefit for customers. This study provides background for PGE as the utility considers whether involvement in micromobility can support these goals.

PGE's involvement in micromobility is currently limited to the administration of grants for four small-scale e-bike lending libraries through the Drive Change Fund (DCF), which is funded through the CFP.

This study contains an assessment of the existing landscape of micromobility use and programming inside and outside the PGE service area, including an overview of market trends and emerging opportunities. Program benchmarking catalogs existing micromobility programs within PGE's service area and how utilities have played a role in micromobility across the U.S. Best practices and considerations for PGE's potential activities are summarized, and recommendations for utility actions are provided.

[1] PGE's 2023-2025 TEP was approved by the Oregon Public Utilities Commission (OPUC) in Order 23-380, OPUC Docket UM 2033.

STAKEHOLDER ENGAGEMENT

External Stakeholder Listening Sessions

Ten (10) external stakeholder listening sessions were convened to provide perspectives on micromobility and program design via a collaborative effort between PGE and the consultant team. Over 40 stakeholders representing a comprehensive cross-section of perspectives, involvement, and interest in micromobility were convened within a defined set of nine categories:

- Utilities with micromobility program experience (2 listening sessions)
- State-level public policy
- Small and medium-size cities
- Shared system accessibility & mobility
- Uptake and promotion programs
- Equity & transportation justice
- Parking & charging
- Logistics & freight
- Retailers, manufacturers, & micromobility users

Participants were invited from the public, private, and nonprofit sectors and included individuals possessing personal, professional, and advocacy experience with micromobility; the result was a diversity of experience in different community types that make up the PGE service area. Participating organizations from each listening session are detailed in Appendix A.

Combined, the perspectives gathered provide a wide-ranging understanding of the opportunities and barriers associated with micromobility. In these sessions, participants were explicitly asked what they would like to see from PGE's potential involvement in micromobility. Many of the participants' suggestions have been integrated into the recommendations included in this report.

The following is a list of high-level takeaways from these discussions, in relative order of prevalence.

- **Quality equipment and partnerships** with local bike shops are essential and widespread within micromobility incentive and adoption programs. These partnerships ensure that devices are safe, functional, and can be reliably and cost-effectively repaired. Programs often require Underwriters Laboratories (UL) listed batteries and purchase from reputable manufacturers via brick-and-mortar shops. There is a need for increased regulation to ensure the safety of micromobility device batteries.
- **Equitable outreach for micromobility programs** should include technical support for applications (including translation services), a tier-based approach to income qualification, pre-qualification options, an inclusive planning process, and strong partnerships with trusted community-based organizations. Culturally appropriate education and support are important for reaching diverse demographics in micromobility programs. Investing in relationship building and providing compensated engagement can foster stronger community ties and participation.
- **The Oregon Clean Fuels Program, specifically the Drive Change Fund** is a relevant funding source for micromobility initiatives. Frequently raised ideas for the use of the DCF included creating a dedicated section for micromobility within to attract more applicants, supporting shared use programs, and investing in community-based pilot programs.
- **Safe infrastructure** is needed for micromobility users, particularly protected bike lanes and secure storage. A special need exists in multi-family housing where secure storage is not always available or adequate. Addressing concerns about theft is vital for user satisfaction and program success.

- **Micromobility incentive programs** reliably reduce vehicle miles traveled (VMT) and GHG emissions. These programs are often funded from environmental and TE sources due to their role in emissions reduction. Programs are led by utilities, states, cities, and nonprofit organizations.
- **A wide variety of devices are used** in the PGE service area, with higher proportions of e-bikes, mid-sized cargo e-bikes, and e-trikes. Smaller devices like one-wheels and e-scooters are present but less common outside of shared systems.
- **Primary uses for micromobility** include commuting, first/last mile connectivity, urban freight, and recreation. Freight delivery and fleet use are growing sectors in micromobility. These sectors provide value in economic development and microenterprise, offering new opportunities for investment in TE.
- **Wraparound support**, such as providing or giving funds for the purchase of accessories including helmets, rain gear, locks, and lights, is important to user success. To maintain behavior change, new users also need continued support as they run into challenges when adopting micromobility.
- **Long-term financial sustainability** is important for micromobility programs. There is concern – borne out by history - about short-term programs quickly exhausting their funding, with many purchase incentive programs quickly becoming oversubscribed.
- **Effective micromobility program models** include subsidizing individual device purchases via point-of-sale rebates, developing accessible parking and charging infrastructure, and shared use programs integrating with public transit. Success always includes outreach campaigns that reach a broad swath of the population able to receive the benefits of the program.
- **Outside of urban areas,** recreation and commuting are key use cases for micromobility. Urban cities offer more programming than suburban or rural communities, and there is an access and funding gap for these areas.
- **Legal clarification** on appropriate ages and locations to ride will accelerate widespread adoption and address user concerns.
- **Opinions on public charging** are split; most users charge at home, but there is demand for public charging among super-users, delivery drivers, and those with older devices. Available public charging is often underutilized in the PGE service area.

Internal Stakeholder Interviews

Four (4) internal interviews were conducted with PGE staff who have expertise relevant to the project:

- Eva DeCesaro – Senior Product Portfolio Specialist
- Gregory Alderson – Manager, Government Affairs
- Kelly Yearick – Clean Fuels Program Manager
- Rachel Cohen – Senior Strategy and Planning Analyst

Discussion topics for these interviews included existing knowledge and appetite for micromobility involvement at PGE, opportunities and barriers for PGE's involvement, feedback received from customers, equity considerations, and PGE's role within the context of the state of Oregon, the Portland region, and existing micromobility programming.

The following is a list of high-level takeaways from these discussions, in relative order of prevalence.

- **The Clean Fuels Program and Drive Change Fund** were repeatedly identified as relevant funding sources for micromobility initiatives. Suggestions involved allocating funds specifically for micromobility projects and making the application process more straightforward. Funding could be directed towards individual ownership, shared-use programs, or infrastructure programs.
- **Equity** considerations are central to micromobility programming. PGE has existing methods of centering equity in program design and implementation, including initiatives like the Community Benefits & Impacts Advisory Group (CBIAG). There is a need for multi-platform, multi-lingual approaches, compensated engagement, and partnerships with community-based organizations.
- **There is customer interest in micromobility** – especially e-bikes – as an affordable alternative to electric vehicles.
- **PGE is a trusted source** of information regarding electricity and electrical devices, and there is an opportunity for the utility to educate its customers and promote micromobility. Providing accessible and educational resources can help customers make informed decisions. This outreach should include information on cost, safety, legality, and storage to address common customer concerns. PGE+ is an existing framework for reaching customers.
- **Multifamily housing residents** need additional support to adopt micromobility solutions. A lack of secure and accessible parking and charging infrastructure are significant.
- **Partnerships with local organizations** are required for effective micromobility programs. Participants encouraged collaboration with local partners like the Portland Bureau of Transportation (PBOT), Lyft, and BIKETOWN to support infrastructure and shared use programs. Collaboration can help in securing additional funding and resources for implementation.
- **Key barriers to micromobility** adoption include the cost of devices, access to safe storage, device maintenance, clarity on legal use and locations, and battery and component safety concerns.
- **Securing internal buy-in at PGE** is key to the success of micromobility programs. Education and internal engagement about micromobility are needed to secure support within the organization.
- **Programs promoting high-quality equipment** including UL listed batteries, trusted manufacturers and partnerships with local bike shops can help ensure safety and reliability.
- **Regulatory frameworks** play a significant role in the development and implementation of micromobility programs. The established Oregon CFP is seen as providing flexibility that other funding sources do not offer. Planning for new programs should align with the filing schedule of PGE's regular TE plans.
- **Continuous stakeholder engagement** is a pre-requisite for long-term micromobility program development, ensuring programs are resilient and adaptable to changing needs. Ongoing stakeholder engagement ensures transparency and maintains momentum throughout the development process. The PGE Customer Conversations market research community offers the opportunity to include underserved communities in program design and marketing.
- **Public transportation and micromobility** were significant topics during the rapid needs assessment for underserved communities. By considering micromobility within the larger transportation system, PGE can create more cohesive and effective programs.

Section 3
Micromobility Market Assessment

Micromobility Market Assessment

This section describes the current micromobility market and provides an assessment of market trends.

DEFINING MICROMOBILITY

Micromobility devices – often collectively referred to as electric micromobility, e-micromobility, or micromobility – are typically defined as lower-weight, lower-speed vehicles that are operated through some combination of human power and an onboard battery and electric motors. Onboard motors are able provide power assistance to riders as they pedal and/or independently propel the vehicle using a throttle. While non-powered vehicles, like a standard bicycle, may also be considered under the micromobility definition; they are not included for the purposes of this report. The vast majority of existing micromobility programs focus on privately-owned e-bikes or on shared e-bikes and electric scooters. However, a wider suite of micromobility vehicles may be considered for inclusion in PGE's potential programming.

- Including a variety of devices "grows the pie" to include people that cannot or will not bike. Most existing programming includes e-bikes alone.
- Integrating accessible adaptive devices – such as recumbent e-bikes – into programs is essential for inclusivity.

The development of a formal definition of micromobility is underway in Oregon. The 2023 *Electric Micromobility in Oregon* supplemental report to the *Transportation Electrification Infrastructure and Needs Analysis* (TEINA) from the Oregon Department of Transportation (ODOT) defines micromobility devices as "small mobility devices that can travel up to 30 mph and are powered (at least in part) by electric drive trains", including e-bikes, e-scooters, and other micromobility devices.[2] A micromobility work group was established by the State in June 2024 to convene stakeholders across Oregon and develop recommendations for policy to be adopted during the 2025 legislative session.

Conversion Kits

Conversion kits convert a non-powered bicycle to an e-bike by adding a battery and motor. This is a low-cost, low-waste option to access micromobility and allows bikes of almost any size and form factor to be electrified. Conversion kits pose quality control and safety challenges; they are typically installed by the user, rather than a trained bicycle mechanic, and may be installed on a bicycle with components that are not designed to handle the weight, acceleration, and speed of an e-bike. As a wider variety of ready-made e-bikes has become available and their purchase prices have decreased, the market share of conversions has drastically decreased. A decade ago, half of all e-bikes in the U.S. were conversion kits. Today, less than 6% are ("A Survey of North American Electric Bicycle Owners", PSU).

[2] Report: Electric Micromobility in Oregon: A TEINA Supplemental Report (ODOT)

Micromobility Under Current Law

Oregon law provides definitions relevant to the consideration of a definition for "micromobility." Detailed definitions for e-bikes, e-scooters, small personal electric vehicles (PEVs), personal mobility devices, electric mopeds, and electric motorcycles, are provided in Appendix B.

Recent legislation (OR House Bill 4103, effective January 1, 2025, amending Oregon Revised Statutes (ORS) 801.258 "Electric assisted bicycle") has provided an updated definition of "electric assisted bicycles", being "a bicycle that is equipped with an electric motor", stratified by three classes. All classes are required to be equipped with pedals.

E-Bike Class (per OR HB 4103)	1	2	3
Throttle	No	Yes	No
Top speed (mph)	20	20	28

Ownership Models

Micromobility devices may be owned by individuals, shared in publicly accessible systems, or managed by a business or government entity. Each of these models caters to different use cases and provides different opportunities for utility involvement, as outlined in the table below.

Micromobility Ownership Models			
	Private	**Shared**	**Fleet**
Characteristics	■ Devices owned by individuals ■ Users typically charge at home, occasionally at work; rarely in public	■ Devices are rented on a time basis ■ Current trend towards swappable batteries; charging occurs at an off-site location ■ Can have fixed docking stations or be "free floating" ■ Systems typically have defined and geofenced service areas ■ Often serves as a supplement to public transit	■ Dedicated devices used for business operations ■ Devices typically charged at a hub location ■ Can include delivery fleets to serve customer needs or internal fleets for organizational use supporting job functions
Opportunities	■ Maximizes potential for GHG reduction through VMT substitution ■ Offers the most straightforward program evaluation and justification	■ Higher rates of acceptance and use among communities without strong traditions of cycling and with barriers to individual ownership ■ Simpler interface with public transportation systems ■ Many existing equity-focused initiatives	■ High potential for GHG reduction through VMT substitution ■ Emerging opportunity with demonstrated success, globally ■ Opportunities for direct partnerships; lower likely administrative costs compared to programs supporting individuals or households

USER EXPERIENCES

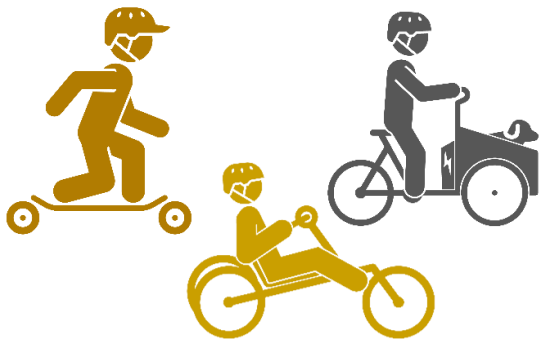
The most typical reason for micromobility adoption is reducing automobile dependency; many users are able to forgo vehicle ownership or avoid the purchase of an additional household vehicle. Others are able to replace many vehicle trips, reducing the time, financial, and emotional costs from parking, fueling, maintaining, and operating a vehicle. Regular trips like commuting are most easily completed with micromobility. The added utility from electric assist provides significant opportunity for micromobility to replace more vehicle trips than non-powered alternatives. There is significant adoption among parents, particularly for cargo and mid-tail e-bikes that are designed to readily carry small passengers. Because of their increased range and speed, people with latent demand for non-car travel may be especially attracted to micromobility solutions in more suburban and rural areas due to sprawled land use.

Most users currently charge at home. Micromobility devices are trending toward larger sizes and higher-capacity batteries over time, making charging away from home a less acute need. Replacement chargers can cost well over $100, and they are typically easy to steal. As a result, few people are comfortable leaving their device charging unattended in public.

Storage in multifamily housing is challenging due to the weight and size of micromobility devices, particularly when staircases are the only access point to residential units. Fire risk and theft are also increased concerns for multifamily housing given proximity to neighbors and shared storage spaces.

In 2023, the City of Portland Bicycle Count report found that e-bikes comprised 17% of all bikes counted, and that micromobility devices accounted for 21% of all small things with wheels (16% e-bikes, 4% e-scooters, 0.4% one-wheels). E-bike use rates were highest in wealthier areas of the City. One-third of e-bike riders were women, and a 4% higher proportion of women counted on bikes were riding e-bikes. 1.8 million trips were taken on BIKETOWN and shared scooters in Portland in 2023.[3]

Due to the complexity of shared systems and the small share of privately-owned micromobility devices that are not e-bikes, demographics have been much better-studied for e-bike owners than for other micromobility users. Based on a 2023 survey of e-bike owners in the U.S. and Canada, e-bike owners are most often white and male. However, the proportion of women, people under 45, and people over 65 riding e-bikes have increased over time. E-bike owners are typically affluent and highly educated. Less than 15% have physical limitations that make riding a non-electric bicycle difficult or impossible. Less than 7% do not own a car. Over 85% of owners bought their e-bikes new; less than 6% used conversion kits. Over 80% had removable batteries. Over half of reported trips not induced by the e-bike replaced a motor vehicle trip. Owners usually have positive experiences with their e-bikes, with 95% indicating that they enjoy their overall riding experience, and over three-quarters indicating that they would rather ride their e-bike than drive a car.[4]



[3] Report: 2023 Portland Bureau of Transportation (PBOT) Bicycle Counts
[4] Thesis: A Survey of North American Electric Bicycle Owners (PSU)

TRENDS AND OPPORTUNITIES IN THE MICROMOBILITY MARKET

Use Cases

Personal use cases for micromobility include commuting to work and school, first/last mile integration with public transit, riding for recreation, and more complex utilitarian trips including passengers and/or multiple stops. With the introduction of a larger number of purchase incentives and other uptake programs targeted at lower-income populations, the user base for micromobility devices is likely to grow among less wealthy populations.[5] There is an opportunity to further support uptake by shift workers and gig workers with atypical travel patterns that may not be well-supported by public transit.[6]

Personal and shared devices provide different, but equally important, utility to users. Privately owned devices are typically used for more regular, recurring trips, such as commuting, while shared devices are more often used for one-off trips or as a supplement to transit. Shared bicycles and e-bikes are often used for longer, more regular trips than shared scooters; two-thirds of shared e-scooter trips are less than one mile long.[7] In Portland, shared scooters replace vehicle trips around one third of the time, more often replacing walk, bike, and transit trips.[8]

Freight delivery and fleet use are small but growing use cases. Business use is identified as an area where investment in TE can intersect with economic development and microenterprise. Logistics applications for micromobility currently include business-to-business (B2B) deliveries, municipal services, and public/private partnerships. Businesses currently adopt micromobility for economic efficiency, marketing potential, and alignment with sustainability goals.[9] There is significant potential to expand logistics uses for micromobility through the establishment of neighborhood hubs, active community engagement, and partnerships with existing programs.[10]

An emerging segment of the market is small businesses or gig work – where micromobility devices are used as delivery vehicles or retail and/or marketing platforms. This segment should not be overlooked – micromobility devices used in this fashion may be a lifeline to employment.

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[5] See the *Utility and Other Program Benchmarking* section for discussion of these and other micromobility programs being conducted by utilities, nonprofits, private companies, and governments of all levels.
[6] Gig work is a job that lasts for a predetermined amount of time and is often administered through a mobile application or website. Many food delivery and on-demand taxi companies employee gig workers to provide their services. Food delivery services are an example of gig work that may be conducted on an micromobility device.
[7] Report: Trend or Fad? Deciphering the Enablers of Micromobility in the U.S. (SAE)
[8] Report: 2019 E-Scooter Findings Report (PBOT)
[9] Paper: E-trikes for urban delivery: An empirical mixed-fleet simulation approach to assess city logistics sustainability (Azad et al.)
[10] White Paper: Biking the Goods: How North American Cities Can Prepare for and Promote Large-Scale Adoption of E-Cargo Bikes (UW)

Device Characteristics

E-bikes are the dominant micromobility device and a growing segment of the market. U.S. e-bike sales doubled between 2019 and 2020, and again between 2020 and 2022 to an estimated one million units sold nationwide in 2022 and over 2.5 million sold to-date.[11] Sales growth is likely to have slowed down following the "bike boom" spurred by the COVID-19 pandemic. Nonetheless, e-bikes are being adopted at a high rate, outpacing unit sales for electric vehicles in 2021.[12]

As purchase prices have fallen and a wider variety of e-bike models have become available, users are adopting e-bikes for a wider variety of use cases, often incorporating more complex trips, and carrying passengers and/or cargo. There is a current trend towards mid-sized e-bikes as riders seek out the utility and range of larger e-bikes while maintaining the storage footprint and maneuverability of a standard bicycle. With pedal assistance, riders can enjoy the added comfort and stability of larger tires. The increased weight and size of larger e-bikes presents new barriers for storage and portability.

Battery technology is becoming more efficient over time, increasing the range of e-bikes on the market today. Combined with the ability of larger e-bikes to pack larger or multiple batteries, range anxiety is decreasing in the population of riders, reducing the need for out-of-home charging, even for more complex trips. Batteries typically lose range over time; as vehicles age, users may have to choose between purchasing replacement batteries, or altering their charging behaviors to accommodate reduced ranges. This shift may mean that a higher proportion of users will charge outside of their homes in the future.

A wider variety of e-bike models straddle the definitions of e-bike and electric motorcycle are becoming more popular. However, the majority of the market is still made up of e-bikes that fit the three-class system to comply with the status quo regulatory framework in the U.S., which Oregon will adopt in 2025.

Over time, shared micromobility devices have become more feature-rich and sport more robust construction to combat abuse and vandalism. The current generation of Lime scooters feature a swappable battery, allowing for battery exchange rather than requiring the devices to be transported elsewhere for charging. The exchangeable batteries are also compatible with Lime's bikeshare bikes, which increases the serviceability of the shared systems together. Lyft has piloted a powered docking station model that is compatible with both their scooters and e-bikes in a limited number of markets. Lime recently introduced a seated scooter model with a cargo bucket. Safety features incorporated into both Lime and Lyft scooters include sidewalk riding detection, lights, reflectors, handbrakes, and airless tires.

It is important to note that the market for personal, commercial, and shared micromobility devices is still relatively nascent. There have been limited efforts to encourage standardization in taxonomies, classifications, and charging and motor technologies. The Society of Automotive Engineers (SAE) has established a proposed taxonomy structure and data sharing standards, and the U.S. Consumer Product Safety Commission (CPSC) and the New York City Council's Initiative 663-A point to UL testing standards for the electrical components of micromobility devices. There is no charging port, voltage, or wattage standard for micromobility devices today; however, most power supplies are designed to work from a standard 120V outlet – like a Level 1 electric vehicle charger.

[11] Thesis: Survey of North American Electric Bicycle Owners (pdx.edu)
[12] Article: U.S. E-bike Sales Outpaced Electric Cars in 2021 (Bloomberg)

Section 4
Utility & Other Program Benchmarking

Utility and Other Program Benchmarking

Government, private, and nonprofit entities have supported micromobility through a wide variety of mechanisms, including grants, demonstration projects, community outreach and education, and provision of charging infrastructure and right-of-way and transportation routes. In addition, many transportation network companies (e.g., Lime, Bird, Lyft, Uber) and nonprofit groups provide access programs for shared micromobility systems. Some utilities are beginning to offer micromobility programs to their customers and partners, often as a component of TE programs. Benchmark research was conducted to describe utility and other micromobility programs. Programs were surveyed through a review of utility databases and academic literature, research on specific offerings, and stakeholder interviews. This section provides an overview of different program types and includes examples of illustrative programs.

Electric utility involvement in TE is governed by Oregon law and administrative rules. Specific to PGE and micromobility, several statutes (Oregon Revised Statutes, ORS), rules (Oregon Administrative Riles, OAR), and Oregon Public Utilities Commission (OPUC) Orders are most relevant, summarized below.

Statute, Rule, or Order	Summary
ORS 757.357	**Accelerating Transportation Electrification:** Requires utilities to file plans and programs to support TE and to make reasonable efforts to ensure that at least one-half of bill surcharge amounts are used to support TE in underserved communities. Transportation electrification means "use of electricity from external sources to provide power to all or part of a vehicle," where a vehicle is "a vehicle, vessel, train, boat, or any other equipment that is mobile."[13, 14]
OAR 340-253	**Oregon Clean Fuels Program**: Identifies how electric utilities can generate credits from the CFP and how carbon intensities of electricity are calculated.
OAR 860-087-0020 and -0030	**Transportation Electrification Plan:** Sets requirements for utility TEPs, including: 1) Integrate all of an electric company's TE actions into one docket 2) Identify a portfolio of actions that increase access to electricity as a transportation fuel, including in low- and moderate-income communities, stimulate innovation and competition, assist in managing the electric grid 3) Deploy transportation in a way that creates an attainable net benefit for the customers of the electric company
OPUC Order 18-376, amended in OPUC Order 22-314	**Principles and Process for Utility Use of Revenue from Clean Fuels Program:** Sets principles for utility use of clean fuels funding, specifically 1) Support the goal of electrifying Oregon's transportation sector 2) Provide the majority of benefits to residential customers 3) Provide benefits to traditionally underserved communities 4) Programs are developed collaboratively and transparently 5) Maximize use of funds for implementation of programs

[13] ORS 757.357 (1)(d)
[14] ORS 757.357 (1)(e)

UTILITY ROLES

While electric micromobility has recently become more of the TE ecosystem, utilities already have decades of experience with developing and delivering EV, energy efficiency, and appliance programs. The following identifies potential utility roles and customer-facing program types applicable to micromobility. Many utilities include multiple roles and program types in their portfolio of programs, based on their local circumstances, customer needs, and stakeholder feedback. As PGE works to further refine and define the programs it may offer in micromobility, this can serve as a guide to help identify the right roles for PGE.

Utility Role	Utility Program Type Options
Outreach and Education	■ Bill inserts ■ Digital information ■ Community events ■ Supporting non-government and community organizations who do outreach work
Supporting Device Uptake	■ Purchase incentives ■ Qualified product lists ■ Partnered retailers ■ Rental or lease programs
Supporting Charging	■ Make-Ready Wiring incentives for installing 120V outlets with residential bike storage ■ Installing and maintaining dedicated 120V outlets for charging in public and semi-public locations, and in conjunction with EV charging
Utility Service Connections	■ Expedited Application and Connection Processes ■ Installing Service Connections to support charging

Utilities also perform many roles outside of customer programs that can support new technology adoption, including micromobility. These include the following:

- **Innovation**: Utilities can support innovation in new greenhouse gas reduction technologies, energy use technologies, or community improvement. PGE has already done significant work to support innovation in TE, including funding for some micromobility pilots through the DCF.
- **Energy Supply**: Utilities plan for and ensure the delivery of electricity for all uses, including TE.

UTILITY-LED PROGRAMS

Based on the survey of utility activities to support micromobility, common roles and program types for utilities were noted. Purchase incentive programs are currently the most prevalent, but a number of utility programs supporting charging and innovation were also noted. Given the number of utilities in the U.S., it is likely that there are other program types not captured here. For brevity, education and outreach programs were not included, as many utilities offer some information around all types of electric mobility and PGE already has considerable experience with these types of programs.

A variety of utility types have existing micromobility programs, including municipally owned utilities, non-profit cooperatives, and public utility districts. Five investor-owned utilities (IOU) are known to have existing micromobility programs: Consolidated Edison (NY), Green Mountain Power (VT), PacifiCorp (OR), PGE (OR), and Xcel Energy (CO).

Utility Role	Utility Offering Program	Program Summary	Funding Mechanisms Used
Supporting Device Uptake	Eugene Water and Electric Board	$300 purchase rebate on new adaptive or regular e-bikes or e-trikes or professionally installed conversions	■ Utility rates ■ Public benefits charges ■ Carbon reduction funding ■ Grants (may require matching funds)
	Redwood Coast Energy Authority	$150-$1000 e-bike voucher (incentive based on type of e-bike and income qualification) that can be redeemed at local bike shops and combined with the California Air Resources Board e-bike incentives	
	Holy Cross Energy	$50 for new e-bikes used to replace vehicle miles, flexibility for custom rebates for other alternative electric transportation (e.g., off-road, snowmobiles)	
	Green Mountain Power (IOU)	$200 rebate or point-of-purchase discount for e-bikes and conversion kits worth at least $500, for commuters switching from fossil fuels	
	Burlington Electric Department	$300 rebate for purchase of new electric bikes, available as a point-of-sale rebate from partnered local retailers or through post-purchase rebate for other retailers	
	Cape Light Compact	Voucher towards purchase of e-bikes covering up to 90% of cost or $1500 for income qualified residents. Additional $125 voucher for accessories	
Supporting Charging	Austin Energy	Electric Drive provides a mobility hub for shared mobility (bikes and cars) and charging for all levels of electric vehicles, including 120V outlets intended for charging micromobility devices	■ Utility rates
	Sacramento Municipal Utility District	SMUD is part of a consortium providing a mobility hub that includes ports for EVs and electric shuttles, and, eventually, shared e-bikes	
	Consolidated Edison (and other New York State utilities) (IOU)	Incentives of up to 100% of utility make-ready infrastructure (utility service and transformers) and 50% of customer-side make-ready infrastructure (meter pans and wiring, electrical panels, fire suppressant, and wiring/conduit) in disadvantaged communities or in qualified multi-unit dwellings	
	Xcel Energy (IOU)	Xcel installs and maintains on-site wiring at no cost to customers in selected commercial sites and Community Charging sites under its Electric Vehicle Supply Infrastructure Program, including sites which support micromobility	
Innovation Programs	Eugene Water and Electric Board	EWEB's Electric Mobility Community Grants covers up to $30,000 or 100% of project costs for non-profit, academic, or public organizations towards electric mobility projects	■ Utility rates ■ Carbon reduction funding
	PacifiCorp (IOU)	Pacific Power's Oregon Electric Mobility grants cover up to 100% of eligible costs for studying, planning, promoting, or deploying electric transportation technology and projects in underserved communities, including support for developing applications	
	Portland General Electric (IOU)	PGE's DCF provides grants for vehicle incentives, approved chargers, education and outreach, and innovative projects	
	Xcel Energy (IOU)	Xcel Colorado's Transportation Electrification Plans include specific funding for innovative projects that can be specified in its program portfolio through a 60-day process	

EXISTING MICROMOBILITY PROGRAMS IN THE PGE SERVICE AREA

Existing micromobility programs in the PGE service area are concentrated around the City of Portland and are all focused on e-bikes. There are e-bike lending libraries, a ride-to-own program, employer-based promotion programs, low-income shared mobility programs, small-scale e-bike purchase incentives, one planned large-scale e-bike purchase incentive, and a planned zero emission delivery zone. The following is a non-exhaustive list of employers, community, income-qualified, and public programs increasing access to micromobility in the PGE service area. Non-public programs are organized by the funder.

PGE Drive Change Fund

- **Oregon Health & Science University (OHSU) Novel Interventions in Children's Healthcare (2019)**: Five e-bikes, loaned to patients who use them for physical activity and/or as a method for transportation to and from work.
- **Community Cycling Cener (2020)**: Four e-bikes to conduct a COVID response food pantry delivery program and support educational and outreach events and internal trips. Funding was also used to train CCC mechanics to maintain the e-bikes and expand the organization's service capabilities.
- **The Portland Bureau of Transportation BIKETOWN For All Program (2020):** Ride credits and discounts for young riders through the BIKETOWN For All shared e-bike access program.
- **Portand State University Vike Bike Rental Program (2020):** 25 e-bikes to supplement an existing low- or no-cost bike rental program for at-need students.
- **Power to the Pedal Shared E-Bike Program (2022):** E-bike lending library managed by the Westside Transportation Alliance in partnership with the City of Tigard targeting residents of two low-income multi-family housing complexes. Bikes are located on-site and available only to residents.[15]
- **Ride2Own (2023):** E-Bike lending and purchase incentive program managed by The Street Trust in partnership with We All Rise active in three Portland metro communities: Milwaukee, Parkrose, and Hillsboro. Qualifying low-income participants receive a free e-bike and accessories to ride for one year, while engaging regularly with the program team to share their experience. Upon successful completion participants are given their e-bikes permanently.[16]
- **City of Salem Compact Street Sweeper (2023):** Used to clear bikeways and pedestrian spaces.

Employer-Based Programs

- **Oregon Health & Science University (OHSU) MyCommute:** Bike lending library and incentive program managed by Go By Bike for OHSU students and employees offering both traditional and e-bikes for loans of up to 14 days.[17] Employees and students are qualified for a $200 point-of-sale credit for the purchase of any bike from one of two local e-bike shops, an additional $100 credit after checking a loaner bike out, and an e-bike loan with Point West Credit Union.[18]

[15] Webpage: Power to the Pedal e-bike lending library (WTA TMA)
[16] Webpage: Ride2Own E-Bike Program
[17] Webpage: OHSU Loaner Bike program (Go By Bike)
[18] Webpage: OHSU bikeshare program

- **Westside Rides:** E-bike lending library and incentive program managed by the Westside Transportation Alliance available to employees of Nike and Intel. For a onetime $25 fee, employees receive an e-bike for one month to use in addition to accessories including lock, helmet, lights, reflective harness, and wraparound support including maintenance, route planning, and rider education. After the trial participants receive a 5-10% discount for individual purchase from one of two local e-bike shops.[19]

Metro Regional Transportation Options Program

- **Portland E-Cargo Bike Educational Lot (PEBEL):** E-cargo bike lending library and educational program managed by Forth in partnership with Metropolitan Family Service (MFS) and The Street Trust. The program provides loans of four different e-cargo bike models to individuals in North and East Portland, targeted towards but not limited to clients of MFS. Participants can borrow a bike for up to one week and fill out surveys before and after their trial. Accessories including lock, helmet, pannier bags, and lights are provided. The program is a complement to Electric Ways to Work (EW2W), allowing EW2W participants to test ride PEBEL bikes prior to purchase, and referring qualifying PEBEL participants to EW2W for purchase.[20]

Portland Clean Energy Fund

- **Electric Ways to Work:** An incentive program for individual e-bike purchases from Forth and Metropolitan Family Service, Electric Ways to Work provides low-income Portland residents with access to electric vehicles including e-bikes. The program provides a $500 point of sale rebate to Portland residents in households at or under 80% of the area median household income, and a 20% discount at a local e-bike shop. All e-bikes are required to be purchased at local brick-and-mortar shops and to be from trusted brands. Additional support includes $250 for the purchase of safety gear.[21]
- **Green Energy & Mobility Program (GEM):** GEM is a program from Forth providing clean transportation opportunities and renewable energy to two houseless services centers in Portland. At Bybee Lakes Hope Center, the program created an e-bike lending library for residents to use for employment, basic needs, and recreational uses. The library consists of 30 e-bikes from local manufacturer Vvolt.[22]
- Upcoming PCEF Incentive: The Portland Clean Energy Fund (PCEF) has earmarked $20M for the design and administration of an e-bike purchase incentive program. Starting in summer 2025, income-qualified households will receive rebates to redeem at bike retailers in Portland. Cargo and adaptive bikes will receive higher incentives, and a portion of the rebate will be designated for locks, safety equipment, and other accessories. PCEF will also concurrently conduct an education and outreach campaign.[23] By dollar amount, it will be the largest e-bike rebate program in North America to-date.[24]

[19] Webpage: Westside Rides E-bike Trial Program (WTA)
[20] Webpage: Electric Ways to Work Program (Forth)
[21] Webpage: Portland Electric Ways to Work program (MFS)
[22] Webpage: Green Energy & Mobility (Forth)
[23] Plan: Portland Clean Energy Fund (PCEF) Climate Investment Plan
[24] Webpage: E-Bike Incentive Programs of North America Tracker (PSU)

Public Shared Micromobility

There are currently two shared micromobility providers in the PGE service area, each of which provides a benefits program for qualifying low-income individuals. Lime is a private company that operates electric scooters in Portland and Tualatin. The Lime Access program provides discounted rides to qualifying low-income residents and students.[25] BIKETOWN is a partnership between Lyft and the City of Portland that provides electric bicycles in Portland. The *BIKETOWN For All* program provides free BIKETOWN memberships to qualifying low-income residents and students, including free unlocks, discounted per-minute rates, and a monthly credit.[26] The City of Portland recently reached an agreement with Lyft to operate a fleet of shared scooters in the city. Starting in 2024, there will be approximately 3,500 shared scooters available in Portland between Lime and Lyft. There are a limited number of BIKETOWN e-bikes in Beaverton, available only to Nike employees.

The Portland Bureau of Transportation provides a Universal Basic Mobility program called Transportation Wallet. The stated goals of the program are to encourage people to drive less, try new travel modes, manage on-street parking demand, reduce issuances of parking permits, and alleviate the burdens of transportation costs for people living on low-incomes. The program is available to residents of the Central Eastside and Northwest Parking Districts, qualified low-income individuals, and new residents of certain new multifamily buildings. The Wallets come loaded with credits for public transit and e-bike- and scooter share.[27]

Shared mobility services like BIKETOWN and Lime require users to have online banking, track personal information, and typically command high startup and per-minute costs. The Portland-based nonprofit Suma provides a commerce app that aggregates opportunities to access discounts and subsidies, including access to discounted use of Lime.[28] Users are validated through participation in a list of local, state, and federal partner programs. Local program partners are located across Portland and Multnomah County. The platform also provides privacy protection, operating between Lime and the end-user to protect personal information.

City of Portland Zero-Emission Delivery Zone Pilot

The Portland Bureau of Transportation (PBOT) will be piloting a Zero Emission Delivery Zone near City Hall in downtown Portland in the second half of 2024. A small number of curbside loading zones will be restricted to zero emission vehicles, including cargo delivery trikes. PBOT is working closely with B-Line, a Portland-based delivery trike company, on the Zone's planning and implementation. The City is targeting a second round of grant funding to pilot the concept in another area of the City and refine the model.

[25] Webpage: Lime Access
[26] Webpage: BIKETOWN for All
[27] Webpage: Portland bureau of Transportation (PBOT) Transportation Wallet Program
[28] Webpage: Suma

OTHER NOTABLE MICROMOBILITY PROGRAMS

Many government entities, non-profit organizations, for-profit companies, and community-based organizations have provided notable micromobility programs outside of the PGE service area; the table below provides some examples. The E-Bike Incentive Programs of North America Tracker from Portland State University provides a larger and more detailed list of incentive programs and lending libraries.

Type	Entity	Program Summary
Purchase Incentives	California Air Resources Board & Pedal Ahead	Pedal Ahead is currently furnishing the biggest statewide e-bike purchase incentive to date. The successes and challenges of the program will be informative for future statewide efforts.
	Colorado Energy Office	The Can Do Colorado Community Challenge provided grants for e-bikes and e-scooters to low-income essential workers.
	City and County of Denver	Denver's wildly popular incentive has been repeatedly re-funded since its introduction in 2022. Additional benefits are provided for low-income recipients and e-cargo bikes. Low-income applicants may indicate their qualification through Xcel Energy's programming.
	Nelson, British Columbia	The municipal government offers up to $8,000 CAD in financing to purchase an e-bike at an interest rate of 3.5%.
Charging Infrastructure	ODOT	The West Coast Electric Highway includes micromobility charging with public EV charging.[29]
Lending Libraries	Local Motion	Six e-bike lending libraries are available throughout Vermont, allowing participants to try an e-bike for a few days at a time.
	San Diego Association of Governments	125 recipients were provided with an e-bike on loan. The bikes will become theirs through a "Ride-to-Own" agreement when they ride at least100 miles per month over two years, record trips, and share regular feedback about the experience.
	Google	Google provided e-bike loans to employees with an option purchase the bike at a discount at the end of the six-month trial period.
Employer-Based	Amazon, Google, OHSU	Many employers and local governments offer incentives, loans, or lending libraries for their employees for business or personal use to promote uptake and reduce operational costs and GHG emissions.
Outreach and Education	Rhode Island Bike Coalition	A nonprofit organization gathered state legislators for an e-bike test ride. The Oregon Micromobility Network (formerly E-Bikes For All) has conducted past legislator outreach events in Oregon.
Battery Safety and Sustainability	New York City	In response to a growing number of battery charging fires, the City is piloting a program where participants can swap depleted batteries for fully charged ones at a certified and controlled facility.
	Call2Recycle & PeopleForBikes	In a collaborative industry effort, many bike shops now accept used e-bike batteries, which they collect and send for recycling.

[29] More relevant guidance is available from this report: Incorporating Shared Micromobility in Electric Vehicle Charging Projects (North American Bikeshare & Scootershare Association)

Section 5
Program Design Considerations

Planning Utility Involvement

This section outlines the key considerations for PGE's potential actions in micromobility. Further considerations identified in the stakeholder outreach and research for this report are provided in Appendix C.

IDENTIFYING NEEDS

The research for this project, including stakeholder interviews, benchmarking research, and academic research, identified five major areas that can address barriers and support growth of micromobility, which are summarized here.

Enable access to micromobility devices

- **Barriers**: Different user groups identified different barriers to access, but common themes included financial barriers to purchase of micromobility devices, lack of knowledge of availability and use of micromobility devices amongst individuals and businesses, and failure of some programs to account for additional items needed to use micromobility devices, such as helmets, lights, and weather-appropriate clothing, and challenges with devices or program access for mobility-limited people.

Improve infrastructure to use micromobility devices

- **Barriers**: Major infrastructure barriers raised included lack of safe use lanes, lack of locations to park micromobility devices, security of parked micromobility devices, and lack of charging locations.

Support ongoing use of micromobility

- **Barriers**: Stakeholders identified barriers in locations for maintenance and repair of micromobility devices, lack of training programs for maintenance and repair, proprietary nature of parts for many devices, unclear re-use and recycling measures, especially for batteries, and lack of user etiquette.

Catalyze innovation in devices and uses

- **Barriers**: Stakeholders and research identified the rapid advancement in technology and uses of micromobility, but also noted challenges with funding trials and finding trial locations.

Provide supportive policy for micromobility

- **Barriers**: Policy barriers to the growth of micromobility highlighted challenges with transportation funding, building codes, right-of-way use, transit and micromobility, and lack of common equipment safety standards.

MAXIMIZING BENEFITS

The benefits of micromobility are similar to those for EVs. Chiefly, TE adoption reduces GHG and other harmful pollutant emissions. Micromobility devices also provide additional benefits relevant to utility goals:

- **GHG emissions savings** come from both moving to smaller, lighter forms of transportation that require less energy to run, but also from shifting from traditional higher-emission fossil fuels to low- or no- emissions electricity as fuel for vehicles. The reduced weight of micromobility vehicles results in significantly less particulate matter pollution from brake and tire wear when compared to private vehicles, especially heavier EVs. The smaller vehicles also use less material to manufacture, providing upstream emissions savings.
- **Equitable access to TE** enabled by micromobility devices provides economic efficiency for systems and users. By using micromobility options for moving people and freight, financial savings can accrue from multiple sources. Micromobility devices cost less to purchase, fuel, and maintain, saving customers money directly. Shared micromobility options can reduce initial costs to try and use micromobility, allowing more customers, including those with lower incomes, to participate in electric transportation as a transportation option. In addition to these direct cost savings, there are also indirect cost savings. Micromobility takes up less physical space than traditional cars and trucks, requiring less transportation infrastructure. In addition, micromobility devices do not require specialized charging infrastructure - just an outlet - and use less energy per person-mile or freight-mile than electric cars and trucks, reducing energy infrastructure requirements and costs.
- **Further benefits to customers** include the following:
    - **Transportation options and accessibility** are improved, especially for those people who have impaired mobility or specialized use cases, like transporting children or pets. While micromobility cannot meet all transportation needs, it can be an enabler over shorter trips.
    - **Economic development** is enabled through the ecosystem of supplying and supporting micromobility transportation and through innovative ways of moving people and goods. The lower cost and smaller footprint of a micromobility device presents a lower initial cost to starting or running a business in the space and provides a lower-cost logistics option for lean startups or small-scale businesses.
    - **Exercise** is encouraged by getting users to move and get fresh air, improving health and productivity. Despite a decreased physical workload compared to non-powered active transportation modes, micromobility users often see an increase in total activity levels due to an increase in frequency of use.
    - **Fun**: customers clearly indicated an interest in micromobility in community outreach for the current TEP, and research supports the fact that riding small, electric devices is a lot of fun.[30] Micromobility programs conducted by PGE are likely to be immensely popular with customers and offer the utility an opportunity to foster good will with the community.

[30] Paper: A North American Survey of Electric Bicycle Owners (PSU)

CENTERING EQUITY

Most stakeholders identified the importance of acknowledging the inherent inequity in today's transportation system and working to design micromobility programs that help reduce that inequity. Important inequities in today's transportation system include siting of road infrastructure in neighborhoods of color and/or lower incomes, lack of safe walking or rolling spaces, lack of transit access, inequity in fees that support transportation systems, interaction with affordability of housing, and disproportionate impacts of pollution and climate change caused by transportation.

Stakeholders identified opportunities for pursuing transportation equity through micromobility by reducing transportation costs and using micromobility to support new businesses at lower cost than traditional transportation modes. Many suggestions from stakeholders on aspects of equity in micromobility are described in the *Stakeholder Engagement Summary* linked in Appendix A.

House Bill 2165 – "Underserved Communities"

Oregon House Bill 2165 (2021) established a 0.25% ratepayer surcharge for Oregon utilities with 25,000 or more customers. This funding is to be used for TE efforts under the utility's OPUC-approved TE plan. At least half of the collected amount is to be used to support "underserved communities," defined as "residents of rental or multifamily housing" or "communities of color, communities experiencing lower incomes, tribal communities, rural communities, frontier communities, coastal communities and other communities adversely harmed by environmental and health hazards." The measure is effective through January 2, 2031.

The stakeholder discussions and research that supported this work are a first step towards ensuring that PGE's support of micromobility enhances equity. PGE's community engagement framework for TE provides the next step in engagement for exploring micromobility options. However, a key tenet of equity is ongoing engagement with impacted communities. This should include discussions through the Transportation Electrification Long-Term Underserved Community Engagement, as well as engagement with underserved communities using the PGE Community Engagement Framework, Greenlining Institute's Mobility Equity Framework, and the City of Portland's Pricing Options for Equitable Mobility (POEM) framework, as PGE is doing for its other programs.

ENGAGING PARTNERS

Local partners and their related activities related to micromobility include:

Oregon Department of Transportation (ODOT): The Oregon Transportation Plan is the statewide multi-modal plan to support Oregon's transportation needs in the most climate-friendly, equitable, and safe way for the next 20 years.[31] It calls for reducing per-mile GHG emissions by 77% and reducing per-capita VMT by 20% by 2050, partially by increasing non-car/non-truck modes of transportation. ODOT also oversees Carbon Reduction Plan funding from the Bipartisan Infrastructure law, some of which will support micromobility growth, and recently completed the report *Electric Micromobility in Oregon: A*

[31] Webpage: Oregon Transportation Plan Update (ODOT)

TEINA Supplemental Report, which outlines statewide recommendations to encourage micromobility. This report and its recommendations are designed to help PGE complement and support that state strategy.

Metropolitan Planning Organizations (MPOs): Oregon's eight MPOs support comprehensive transportation planning and projects and help direct transportation funding in Oregon's most populated areas. Each has a plan for reducing GHG emissions and directs federal and state funding that supports infrastructure and programming, some of which may be leveraged to support micromobility. PGE should collaborate efforts with the Portland and Salem/Keizer MPOs to ensure micromobility programs are coordinated and PGE investments are leveraging federal funding opportunities where possible.

Local Municipalities: Local municipalities build and operate local transportation systems, including the infrastructure needed for micromobility and shared mobility programs. Some are also engaged in micromobility programming; most notably, the City of Portland is currently developing a large-scale e-bike purchase incentive program. In addition, municipalities determine use of local rights-of-way, necessary for the infrastructure to support riding, parking, and charging micromobility devices. Many of them are eager to expand micromobility use in their communities, and PGE should coordinate with them to ensure local regulations and PGE programming are working together to support this goal.

Transit Agencies: Transit agencies are important partners in implementing micromobility programs. Existing shared mobility programs have shown significant utility for first- and last-mile connectivity with transit. PGE should work with transit agencies to continue to explore how utility actions can enhance synergies between micromobility and transit.

Community Based Organizations: Community based nonprofit organizations can provide important conduits to connect with communities to design micromobility programs and services that meet their needs while serving as trusted and culturally competent sources of information. Several nonprofit organizations in the PGE service area have been leading advocates for micromobility and have designed and implemented a range of innovative projects that demonstrate the value of this technology. PGE can partner with nonprofit organizations in the region to help design and deliver many of the initiatives recommended in this report.

Businesses: Many types of businesses support micromobility and are supported by it. A list of many retail locations providing sale and service of e-bikes in the PGE service area is provided in Appendix D. There are also related businesses engaged in designing and building micromobility device, including Vvolt and Icicle Tricycles. In addition, many businesses benefit from micromobility through using devices to support their own operations at lower cost than traditional vehicles; B-Line is the most prominent service providing micromobility freight service in the PGE service area, and many gig workers utilize micromobility devices for food and grocery delivery. Some businesses, like OHSU, leverage the value of micromobility through employee commuting options programs. PGE can and should work with these businesses to leverage the economic development and cost reduction benefits of micromobility.

Research Institutions: Multiple academic institutions in the region boast extensive experience and expertise in micromobility research and best practice dissemination. Portland State University (PSU) has conducted multiple e-bike experience surveys and supported several promotion efforts over the past decade; recent publications from PSU provide guidance for the development of e-bike purchase incentives. The University of Washington Urban Freight Lab maintains focus areas and disseminates best practice in cargo bikes, curb management, and other topics highly relevant to business uses for

micromobility devices. Anne Brown at the University of Oregon regularly conducts research in shared micromobility, especially concerning equity. These organizations can provide PGE support in program optimization and evaluation.

Utilities: PacifiCorp and the Eugene Water and Electric Board (EWEB), as well as many utility providers throughout the country, have been engaged in micromobility programming for some time. PGE should seek to learn from their experiences and mimic their successes.

CONSIDERING SAFETY

The use of micromobility introduces a number of objective risks. Many can be effectively reduced through riding technique, route choice, and quality equipment. However, risks are felt asymmetrically across the population and are impossible to alleviate entirely. Communication of these risks and their mitigation techniques will be essential to minimize liability when promoting micromobility.

Vulnerable Road Users

Users of micromobility devices are vulnerable road users. Riders are subject to physical harm through interactions with drivers and other road users, and safe transportation infrastructure is lacking in the majority of the PGE service area. Riders are also exposed to the elements, as well as to harassment and assault due to the open-air nature of the vehicle. Mitigation techniques for physical and personal safety risks include effective route choice, practice of riding skills, knowledge of roadway laws and best practices, and provision of quality equipment and accessories.

While there may be asymmetrical safety risks between device form factors, safety data quality for micromobility is an emerging issue. Traditional crash and injury reporting mechanisms have not yet adapted to reflect these emerging modes of transportation. As such, robust data is not yet available to support claims for differences in safety outcomes between devices.

Theft

Micromobility devices demand high prices on the resale market and are difficult to track due to their lack of vehicle registration, making them attractive targets for theft. While quality locks and storage options can mitigate this risk, there is no comprehensive solution to this issue. As a result, education on theft prevention techniques, provision of secure parking, and theft protection support, such as through insurance providers, are potential aspects to utility action in the space.

There are two major providers for bicycle registration and theft recovery support: Project 529 and Bike Index. Bike Index is based in Portland and may readily participate as a partner in PGE actions.

Charging Fires

Charging micromobility devices presents risks of battery fires. Many reported fires from micromobility charging have resulted from multiple lower-quality devices being charged from too few sources, such as from a power strip. These risks can be significantly reduced through the use of quality equipment and education of charging techniques. PGE should consider requiring UL or other similar certifications for any batteries supported with utility funds and include charging education efforts in any programs.

Section 6
Recommended Utility Actions

Recommended Utility Actions

Recommendations for utility actions were generated based on a review of existing micromobility programs, suggestions received during stakeholder engagement, and conversations with industry experts, PGE partners, and the project team. Recommendations include a range from distinct, actionable programs to more generic options for PGE's consideration with respect to participation in emerging market trends.

These recommendations are designed to fit within PGE's role of planning for, serving, and managing TE load. If successful, these efforts will increase equitable access to TE, reducing carbon emissions in turn. Additionally, recommended actions position PGE as a leader in micromobility, acting as a hub for information and educational experience, providing make-ready infrastructure, and fostering innovation.

Recommended utility actions are provided on three distinct time scales:

- **Near term recommendations**: these actions are specific, actionable, and readily implementable in the current TEP cycle (2024-2025). They may be completed with existing funding sources and require little coordination with external partners.
- **Mid-term opportunities**: these actions are emerging opportunities for PGE's involvement in micromobility that should be considered for inclusion in the next TEP (2026-2028), with the final list of actions in the TEP to be determined in collaboration with communities and stakeholders. Options are provided at various levels of funding and complexity.
- **Long-term considerations**: these activities will result from the evolution of micromobility market trends over the coming years, will require a higher degree of preparation and coordination over time, and should be considered for future TEPs (beyond 2028).

Tables with further details for each set of recommendations are provided in Appendix E.

Many of the recommended actions are similar to existing activities from various entities in and around the PGE service area, as noted in previous sections. In these cases, PGE should consider opportunities to amplify partners' existing efforts with greater funding or coordination, or to provide a scaled version of the program to a wider population or service area. Designing complementary efforts that more directly align with utility role and goals will generally be possible.

These recommendations are generally similar to the stated goals of other planning efforts in the PGE service area, most notably the 2023 *Electric Micromobility in Oregon* TEINA supplemental report from ODOT. Opportunities for collaboration with statewide efforts a likely to emerge as ODOT's activities ramp up following recent state-level legislative momentum.

NEAR-TERM RECOMMENDATIONS (2024-2025)

Near-term recommendations for beneficial investments by PGE center around education and awareness of the benefits of micromobility for PGE staff and customers, and integration of micromobility into existing TE efforts. These near-term recommendations can fit within the suite of TE programs that PGE already offers, supporting access, infrastructure, and innovation now, while continuing engagement with stakeholders to scope future programs.

Recommendation	Benefits	Funding
Develop targeted informational education campaigns	■ Address a key information gap cited by customers ■ Reaffirm PGE as a trusted advisor and electrification leader to customers ■ Support customer participation in future programs	Existing funding for TE education and outreach
Continue community engagement on micromobility leading into the next TE plan	■ Ensure utility activities reflect customer needs ■ Include underserved communities ■ Improve equity of TE program offerings	Existing funding for TE planning
Promote the Portland Clean Energy Fund (PCEF) e-bike incentive and consider complementary incentive in adjacent communities	■ Amplify partners' activities that complement TE planning goals ■ Increase access to micromobility for customers ■ Facilitate participation from underserved communities	Existing funding for TE education and outreach
Provide information, test rides, and e-bikes for PGE employees	■ Strengthen internal PGE understanding of micromobility ■ Develop internal support for future actions ■ Reduce PGE operational GHG emissions	Existing funding for TE education and outreach
Emphasize eligibility of micromobility projects for DCF grants; consider setting aside earmarked funding for such projects	■ Advance innovation in micromobility programs, technologies, and uses ■ Pilot programs for later investment ■ Improve equity of TE program offerings	Existing funding from the DCF

MID-TERM OPPORTUNITIES (2026-2028)

These mid-term opportunities will allow PGE to provide comprehensive support for micromobility adoption through community engagement, education, incentives, and infrastructure. Some mid-term opportunities are extensions of near-term recommendations. These opportunities focus on reducing barriers to micromobility adoption and ongoing use across a broad set of residential and business customers. As the micromobility area continues to evolve and grow, these actions also foster innovation and establish the learnings and foundations for future efforts.

Recommendation	Benefits
Engage in continuous community engagement across TE planning and program design efforts	■ Ensure utility activities reflect customer needs ■ Include underserved communities ■ Improve equity of TE program offerings
Develop coordinated education and communication campaign with partners across Oregon	■ Address a key information gap cited by customers ■ Reaffirm PGE as a trusted advisor and TE leader ■ Support customer participation in future programs
Cultivate an approved product list to be included on PGE Marketplace	■ Reaffirm PGE as a trusted advisor and TE leader ■ Ensure that devices and accessories used by customers are safe
Include micromobility charging in Commercial and Multi-family Make-Ready Program and the Affordable Housing EV-Ready Funding	■ Reduce GHG and other emissions ■ Improve equity of TE program offerings ■ Amplify infrastructure adequacy and accessibility
Provide a private micromobility device purchase incentive, funded through the CFP	■ Reduce GHG and other emissions ■ Improve equity of TE program offerings
Establish micromobility device lending libraries, funded through the CFP	■ Reduce GHG and other emissions ■ Improve equity of TE program offerings
Support device storage by installing charging infrastructure in private residences and businesses, funded through the CFP	■ Reduce GHG and other emissions ■ Improve equity of TE program offerings ■ Amplify infrastructure adequacy and accessibility
Pilot device storage and charging infrastructure in the public right-of-way, funded through the CFP	■ Amplify infrastructure adequacy and accessibility ■ Encourage innovation in devices and uses
Establish an employer-based demo and incentive program, funded through the CFP	■ Reduce GHG and other emissions ■ Increase equitable access to TE by collaborating with employers of underserved customers
Administer a fleet device purchase incentive, funded through the CFP	■ Reduce GHG and other emissions ■ Encourage innovation in devices and uses
Provide support for shared micromobility programs, funded through the CFP, to: 1. Expand service areas 2. Provide equitable access 1. Develop charging infrastructure in the right-of-way	■ Reduce GHG and other emissions ■ Improve equity of TE program offerings ■ Amplify infrastructure adequacy and accessibility

LONG-TERM CONSIDERATIONS (BEYOND 2028)

The long-term considerations presented are issues and opportunities that will take some time to develop, as they involve long-term planning and coordination across many stakeholders.

Learnings from pilots and program in the near and mid-terms, PGE's ongoing stakeholder engagement, and the evolving policy and regulatory framework for micromobility will further define these and other opportunities over the next five years as PGE considers micromobility programming after 2028. Some pilots and programs may continue into the long-term, and other new needs and opportunities are likely to arise.

Recommendation	Benefits
Engage in continuous community engagement across TE planning and program design efforts	■ Ensure utility activities reflect customer needs ■ Include underserved communities ■ Improve equity of TE program offerings
Monitor micromobility adoption and update vehicle electrification forecasts as needed	■ Reduce GHG and other emissions ■ Adapt PGE's *Plan, Serve, and Manage* model
Continue engagement and pilots to identify needed micromobility charging infrastructure and integration with other transportation modes	■ Reduce GHG and other emissions ■ Amplify infrastructure adequacy and accessibility ■ Encourage innovation in devices and uses

RECOMMENDED LONGITUDINAL EFFORTS

The following are goals and processes that should be considered throughout any utility actions taken.

Community Engagement

- Provide representation and input throughout the planning processes
- Consider compensated engagement to pave the way for stronger relationships with community members and partners
- Provide hands-on learning experiences and no financial penalties for mistakes
- Consider cultural barriers, such as reticence to use bicycles in general, helmet use conflicting with hair care, and the need for community-specific programs

Wraparound Services

- Provide support for users through the first few months of use; a single scary or unpleasant experience may cause a person to not revisit micromobility options
- Launch programs in the spring to reduce weather-related barriers
- Minor mechanical challenges like a flat tire offer sufficient barriers to adoption for many people. Ensure easy access to service that is geographically and technologically appropriate

Streamlined Application Process

- Provide application support for target groups
- Provide automatic pre-qualification and notification for individuals and households elligible for income-qualified programs

Education and Communication Campaigns

- Provide infomation on electrification, battery safety, and grid impacts
- Normalize the technology, spread awareness of its benefits, and elicit culture change
- Amplify safety content
- Share information about involvement in the space that may otherwise go unnoticed
- Include micromobility devices among existing TE programs and protocol
- Focus on inclusivity – translate materials, minimize jargon
- Message the "why" behind micromobility adoption; environmental, health, equity, and personal benefits

Provision of Pilot Programs

- Demonstrate the viability and benefits of micromobility; earn community and stakeholder support
- Foster innovation and trial activities for scaled investment

Continuous Evaluation

- Calculate activities' return on investment, and compare results to other TE efforts
- Partner with academic and industry subject matter experts

Alignment with Large-Scale Efforts

- Frame actions with carbon reduction and mode shift to leverage opportunities for further funding
- Reflect goals stated in ODOT's Electric Micromobility in Oregon: A TEINA Supplemental Report

Support Local Industry

- Ensure an adequate support network for device service while creating local employment opportunities
- Consider opportunities to prioritize micromobility companies that are based in the PGE service area, including Icicle Tricycles , B-Line, and Vvolt/Showers Pass

Section 7
Appendices

Appendix A – Stakeholder Engagement Summary

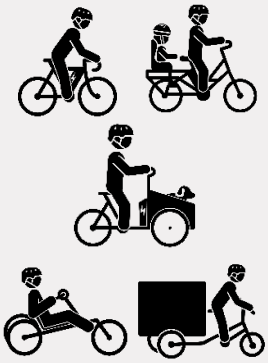
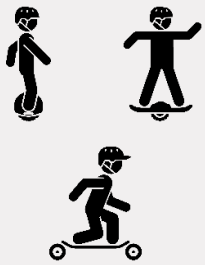
External Stakeholder Interview Participants

Session	Participating Organizations
Utilities (1)	■ Holy Cross Energy ■ Eugene Water and Electric Board ■ Redwood Coast Energy Authority ■ Austin Energy
Utilities (2)	■ Con Edison ■ Burlington Electric ■ PacifiCorp ■ Vermont Energy Investment Corporation
State Policy	■ ODOT ■ Northwest Energy Coalition ■ Climate Solutions ■ Oregon Department of Energy
Smaller Cities	■ The City of Eugene ■ The City of Beaverton ■ The City of Tigard
Accessibility and Mobility	■ Lime Scooters ■ The City of Portland Bureau of Transportation
Uptake and Promotion Programs	■ Portland State University's Transportation Research & Education Center (PSU TREC) ■ The City of Portland Bureau of Environmental Services ■ The Street Trust ■ Cascadia Mobility
Equity	■ Community Cycling Center ■ We All Rise ■ Central City Concern ■ Verde ■ OPAL Environmental Justice
Parking and Charging	■ Leeb Architects ■ Go By Bike ■ The City of Portland Bureau of Planning and Sustainability ■ Dero Bike Racks
Logistics	■ University of Washington Urban Freight Lab ■ Icicle Tricycles ■ B-Line Delivery
Users, Retailers, and Manufacturers	■ CycleOregon ■ Portland eRiders ■ BikeLoud ■ PBOT Bicycle Advisory Committee ■ Vvolt ■ The eBike Store

Link to the Stakeholder Engagement Summary

- https://acrobat.adobe.com/id/urn:aaid:sc:US:f9d80613-b5bb-479b-b9a5-c87c22c3ba7d

Appendix B – Micromobility Vehicle Definitions

Possible Devices for Inclusion in Micromobility Programming		
Device		**Typical characteristics – Oregon Revised Statutes (ORS) Definition (if applicable)**
E-Bikes		■ ORS 801.258 "Electric assisted bicycle." ■ Speed limited to 20 or 28 mph ■ Two or three wheels ■ Has pedals ■ May provide pedal assistance or be equipped with a throttle ■ Form factors include cargo bikes, cargo tricycles, recumbents, and adaptive bikes for people with disabilities
E-scooters		■ ORS 801.348 "Motor assisted scooter." ■ Limited to 24 mph, 1000W ■ Two or three wheels ■ Footboard platform ■ May or may not have a seat
Small personal electric vehicles (PEVs)		■ ORS 801.259 "Electric personal assistive mobility device." ■ Speed limited to 15mph ■ Self-balancing on two non-tandem wheels ■ Transports one person in a standing position ■ Often modified by the user ■ Wide variety of form factors (some outside of the ORS definition), including electric unicycles, hoverboards, electric skateboards, and segways
Personal mobility devices		■ Typically low speed (less than 10 mph) ■ Three or four wheels ■ Designed to assist people with limited mobility ■ Form factors include wheelchairs and mobility scooters
Electric mopeds		■ ORS 801.345 "Moped." ■ Speed limited to 30 mph ■ Two or three wheels
Electric motorcycles		■ ORS 801.365 "Motorcycle." ■ Not speed limited ■ Two or three wheels

Further relevant definitions in ORS include the following:

- A "pedestrian" is any person afoot or confined in a wheelchair under ORS 801.385.
- Pedestrians and riders of skateboards, roller or in-line skates, scooters, bicycles, mopeds, and motorcycles are considered vulnerable users of a public way under ORS 801.608.
- Vehicle characteristics are defined for golf carts (ORS 801.295) and snowmobiles (ORS 801.490).

Appendix C – Additional Program Design Recommendations

This section includes a variety of program design best practice recommendations gathered from stakeholder outreach, literature review, and review of existing programs.

RECOMMENDATIONS BY ACTIVITY TYPE

Community Outreach

- Engage in physical events in communities to increase engagement.
- Partner with local community-based organizations to develop perspectives from customers in different communities.
- Provide all materials available in multiple languages and formats.
- Incorporate education on the basics of different micromobility devices, including lessons on how to use them.
    - Create opportunities for hands-on learning, device practice and demonstration.
- Host programs in school; this mechanism has been better funded in the past.
- Emphasize driver education and promote micromobility benefits to enhance safety and adoption.

Direct Purchase Subsidies, Incentives, and Distribution of Free Devices

- Consider tiered benefits by income level, other qualifiers.
- Approve individuals or households for rebates using information from other income-qualified programs.
- Provide point-of-sale rebates to lower barriers to participation for low-income populations.
- Incentives should cover peripherals like theft protection and safety and security accessories.
- Provide reimbursement for bike shops under a robust process that ensures fast turnaround and ensures funding to minimize the liability taken on by participating retailers.

Support of Shared Micromobility

- Eliminate upfront costs and provide financial assistance to increase accessibility. Shared systems have comparatively low upfront costs to users, making them available to a wider range of incomes.
- Capitalize on a strong interest in regional collaboration for bikeshare programs to lower costs and improve accessibility across city boundaries.
- Provide specific support for unbanked people. Collaborate with Portland-based nonprofit Suma.
- Consider pursuing integration with transit passes.
- Establish rental programs based at transit stations.
- Pilot parking and charging stations.

Infrastructure Provision

- Support the development of dedicated infrastructure to facilitate a broad range of use cases, including safe and comfortable bike lanes and pathways.
  - Smaller cities face challenges with existing infrastructure and need to ensure safe and comfortable riding environments. Strategic infrastructure development is key.
  - The suburbanization of poverty provides a challenge for adoption among low-income communities because infrastructure in outlying areas is typically less safe than in central cities.
- Develop a network of charging infrastructure to provide for a variety of needs.
  - Public parks and grocery stores are identified as key locations for charging stations. Outdoor dining is an opportunity for charging – activity is supervised.
  - Other public charging will need to be secured – bike lockers or similar.
  - Workplaces are an opportunity for out-of-home charging
    - May not be necessary for A-to-B-to-A commutes but may unlock more complex trips. This is a chicken and egg problem.
  - Installation of public charging infrastructure alone will not be sufficient to encourage use; education and communication efforts must accompany installations.
  - Charging infrastructure may be developed as a social hub.
    - Spaces can house charging opportunities for fleet systems and individual devices.
    - A "loophole" in the development code may allow the establishment of a logistics center in a neighborhood if a given percentage of the development is used for commercial purposes.

PLANNING FOR THE PROGRAM LIFECYCLE

Micromobility is a fairly new and quickly evolving mode of transportation. To support maximizing a program's potential, planning and implementation should account for a complete lifecycle of any program, including adequate time for community and stakeholder engagement in design, appropriate scale and timing of the program, provision of wraparound services, and learnings from the program. This is especially important when bringing new participants to the micromobility market, who may not be as fast to take advantage of program opportunities or fully realize its benefits. Several stakeholders interviewed commented on challenges with incentive programs that were quickly oversubscribed, leading to customer disappointment. Other stakeholders commented on the need for innovation and flexibility, emphasizing learnings over scale of programs initially. Public-facing programs are very often oversubscribed and quickly exhaust available funding; potential recipients may be disappointed in this case without adequate communication of expectations and funding constraints.

The Importance of Quality Equipment

High-quality micromobility devices ensure longer service lives, less frequent maintenance schedules, easier access to maintenance, higher performance, on-device safety, and charging fire safety. When purchased directly from a local bike shop, customers can be assured that their device will be of acceptable quality and be locally serviceable. Sub-par devices may not have brakes or drivetrain components designed to bear the increased loads from a heavier, more powerful electrified device. Requirements for UL listed batteries help to mitigate safety concerns related to charging fires. Conversion kits that add an electric motor to a non-powered bicycle exacerbate quality-control and component performance concerns.

High quality accessories like locks, helmets, and rain gear keep riders and their devices safe and should be encouraged or supported. Shared bike storage rooms are not necessarily secure, underscoring the need for high-quality locks. Because micromobility devices do not vastly exceed the speeds of non-powered bicycles, standard bike helmets are sufficient for most users. Quality rain gear keeps riders comfortable and concentrated on the task at hand, increasing their safety on the road.

SEASONALITY

Uptake is most easily encouraged in the springtime when prospective users are excited to spend more time outside. Beginning one's micromobility experience during a Pacific Northwest winter can result in repeated unpleasant experiences, especially because finding appropriate winter riding gear requires significant investment and trial and error. Such unpleasant experiences often dissuade potential users from continuing to use micromobility devices, even once conditions improve.

PGE should aim to time programs that distribute devices or incentivize uptake such that the bulk of users receive benefits in the spring. This will allow for sufficient time under more ideal weather conditions to allow behavior changes to become habit before challenges from adverse weather conditions become more severe in the fall.

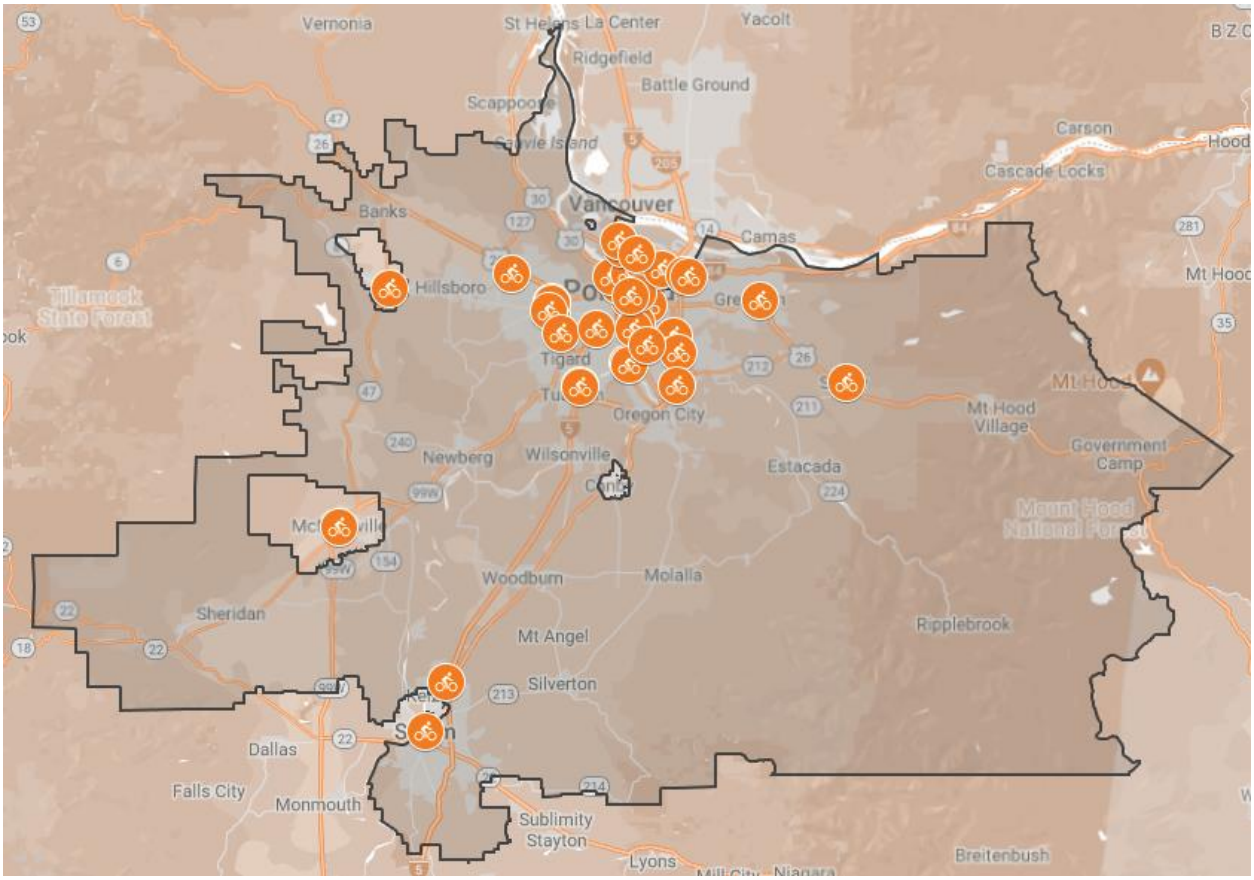
Appendix D – E-Bike Shops

The following vendors were identified in June 2024 as offering e-bikes or conversion kits for sale or providing service for e-bikes. All are located in or near the PGE service area. No brick-and-mortar vendors were identified to be providing service or sale of PEVs. Many further big-box stores sell micromobility devices; the devices sold in these settings are much more likely to be low-quality, improperly assembled, and difficult to service, and should not be included in prospective programs.

- Brock Ebikes
- Cascade Bikes
- Clever Cycles
- Cynergy E-Bikes
- Electric PDX
- Lakeside Bicycles
- Mokwheel E-Bikes
- New World eBikes
- Nomad Cycles PDX
- Olson's Bicycles
- Pedego Electric Bikes
- Phat Ego
- pXcycle
- Recumbent PDX
- REI (Clackamas Town Center, Tanasbourne, Cedar Hills, Bridgeport, Keizer Station)
- River City Bicycles
- Sandy Bicycles
- Santiam Bicycle
- Sellwood Cycle Repair
- Southwest Bicycle
- Splendid Cycles
- The eBike Store
- The Outer Rim Bicycle Shop
- The Urban Wheeler
- Tommy's Bicycle Shop
- Trek Bicycle (Beaverton, Slabtown, Hollywood, Westmoreland, Happy Valley, Lake Oswego)
- Universal Cycles
- Upcycles
- Vvolt
- West End Bikes

E-bike retail and service opportunities are well-distributed throughout the PGE service area. However, there are a few notable population centers with no or relatively few commercial e-bike services available.

- Hillsboro
- Aloha
- Sherwood
- Oregon City
- Newberg
- Wilsonville
- Canby
- Woodburn
- Estacada
- Molalla
- Silverton
- Estacada
- East Portland
- Troutdale
- Mt. Hood



Map: bike shops providing e-bike sales and/or service in and around the PGE service area

Appendix E – Table of Recommended Utility Actions

The following tables provide details on the recommended utility actions across each planning period. Previous actions can be carried over into the next timeframe. For example, actions taken in the near term can be continued in the mid-term. Recommendations are presented as a menu – not all are meant to be undertaken simultaneously.

Funding Amount Legend		Implementation Complexity Legend	
$	= less than $10k	★	= little coordination required, likely uses existing funding
$$	= $10k-100k	★★	= some coordination required, likely uses existing funding
$$$	= $100k-1M	★★★	= higher level of coordination, requires identification of new funding
$$$$	= $1M+		

NEAR-TERM RECOMMENDATIONS (2024-2025)

#	Recommended Action	Opportunity	Motivation	Funding Amount	Implementation Complexity	Role of Partnerships
1	Develop targeted informational education campaigns	■ Normalize micromobility as an option within other TE efforts ■ Focus on safety, electrification, and the environmental and economic benefits of micromobility	■ Leverage PGE's status as a trusted source of information for electrification	$	★	■ Coordinate and amplify each other's campaigns
2	Continue community engagement on micromobility leading into the next TE plan	■ Continue to engage customers participating in existing community engagement efforts and customers representing identified target audience(s) for involvement	■ Pursue equity in micromobility and TE activities ■ Reflect the stated needs of PGE customers ■ Establish mechanism for continuous learning ■ Communicate PGE's efforts to-date	$-$$	★	■ Engage with different customer groups; many potential partners have existing relationships
3	Promote Portland Clean Energy Fund (PCEF) e-bike incentive and consider complementary incentive in adjacent communities	■ Support access to incentive for PGE customers ■ Assess opportunities for complementary activities, including incentives outside of Portland	■ Amplify partners' activities that complement TE planning goals ■ Increase access by PGE customers ■ Reduce customer confusion and frustration	$-$$	★★	■ PCEF is administering an e-bike incentive program starting summer 2025
4	Provide information, test rides, and e-bikes for PGE employees	■ Provide opportunities for relevant staff to experience e-bikes firsthand through demo events and a lending library ■ Share micromobility information in internal communications ■ Incorporate e-bikes into existing EV programming for staff ■ Identify opportunities to incorporate micromobility into PGE business use	■ Strengthen internal PGE understanding of micromobility ■ Develop internal support for future micromobility involvement ■ Reduce PGE operational emissions	$$	★	■ Organize ride events ■ Collaborate with a Transportation Management Association (TMA)
5	Emphasize eligibility of micromobility projects for DCF grants; consider setting aside earmarked funding for such projects	■ Allow community organizations to identify appropriate programs ■ Encourage applications for: – Expanded geographic and demographic access to shared systems – Enhancement of freight and business applications – Establishment of lending libraries – Provision of support services for users and outreach to new communities – Other opportunities identified in mid-term and long-term and TEINA report	■ Pilot a variety of program models to be considered for higher levels of funding ■ Foster innovation in the micromobility space ■ Support customers using existing community relationships	$$-$$$	★★	■ Disseminate program opportunities ■ Provide valuable programming for the community groups they serve

MID-TERM OPPORTUNITIES (2026-2028)

#	Opportunity Action	Opportunity	Motivation	Funding Amount	Implementation Complexity	Role of Partnerships
6	Engage in continuous community engagement across TE planning and program design efforts	■ Working with PGE's community outreach framework, bring community voices into program planning	■ Ensure TE programs reach all of PGE's customers ■ Further decrease GHG emissions through complementary programs	$	★	■ Engage with different customer groups; many potential partners have existing relationships
7	Develop coordinated education and communication campaign with partners across Oregon	■ Enhance informational education campaigns developed by PGE in the near-term ■ Amplify partners' campaigns to avoid duplicated efforts.	■ Incorporate all forms of electric micromobility into utilities' status as a trusted source of information for electrification	$	★★	■ Jointly ensure coordinated and amplified communications
8	Cultivate an approved product list to be included on PGE Marketplace	■ Consider including micromobility devices, charging hardware, and/or accessories ■ Structure to provide a streamlined mechanism to provide a micromobility device purchase incentive, if desired	■ Function as a liaison between customers and product providers, collecting TE expertise ■ Ensure adoption of safe and effective devices and charging equipment	$	★★	■ Provide local purchase and delivery ■ Ensure that devices will have accessible service opportunities ■ Provide wraparound support and educational opportunities
9	Include micromobility charging in Business and Multi-family Make-Ready Pilot and the Affordable Housing EV-Ready Funding	■ Expand micromobility charging options for multi-family residential customers ■ Allows e-mobility based businesses to participate in programs	■ Assist with a need heard repeatedly in stakeholder outreach	$-$$	★	■ Prioritize installation locations ■ Communicate with communities
10	Provide a private micromobility device purchase incentive, funded through the CFP	■ Focus on bringing new participants into the micromobility market and providing access for those with barriers ■ Coordinate with PCEF and any other incentives ■ Likely to be oversubscribed; expect competition for funding and demand for program recurrence	■ Increase private ownership rates of micromobility devices ■ Decrease GHG emissions by decreasing VMT ■ Increase access to TE, transportation options, especially for customers without incomes to support EVs	$$$	★★★	■ Engage with different customer groups throughout program design, administration ■ Provide wraparound support and educational opportunities
11	Establish micromobility device lending libraries, funded through the CFP	■ Provide shared access to micromobility devices at specific locations ■ Focus on providing access to micromobility for those with barriers to individual ownership	■ Decrease GHG emissions by decreasing VMT ■ Increase equitable access to TE, transportation options, especially for customers without incomes to support EVs	$$-$$$	★★★	■ Engage with different customer groups throughout program design, administration ■ Provide wraparound support and educational opportunities
12	Support device storage by installing charging infrastructure in private residences and businesses, funded through the CFP	■ Focus on private devices or location-specific shared fleets ■ Opportunity to alleviate key barrier to adoption among low-income populations	■ Reduce a barrier to micromobility adoption, especially in multi-family housing ■ Increase equitable access to TE	$$-$$$	★★★	■ Install storage facilities ■ Engage with different customer groups throughout program design, administration ■ Prioritize investment locations ■ Communicate activities
13	Pilot device storage and charging infrastructure in the public right-of-way, funded through the CFP	■ Include both shared and private devices ■ Enhance integration with public transportation, key destinations ■ Integrate with existing PGE pole charging pilot project	■ Explore the need for publicly accessible charging infrastructure ■ Evaluate the potential for dock-based shared mobility charging, decreasing emissions from service vehicles	$$-$$$	★★★	■ Coordinate with right-of-way managers, shared mobility providers ■ Identify best-practice and current needs

#	Opportunity Action	Opportunity	Motivation	Funding Amount	Implementation Complexity	Role of Partnerships
14	Establish an employer-based demo and incentive program, funded through the CFP	■ Provide accessible hands-on experience with micromobility devices ■ Provide a flexible transportation option for shift workers ■ Coordinate with other trip reduction efforts in the region	■ Encourage mode shift for commuters, decreasing emissions	$$-$$$	★★★	■ Prioritize opportunities ■ Evaluate program designs and outcomes ■ Collaborate with Transportation Management Associations (TMAs)
15	Administer a fleet device purchase incentive, funded through the CFP	■ Focus on businesses with fleet vehicles that may be feasibly replaced with e-cargo bikes	■ Decrease GHG emissions by decreasing VMT ■ Increase jobs in micromobility ■ Achieve higher utilization of charging infrastructure	$$$	★★★	■ Identify opportunities and needs
16	Provide support for shared micromobility programs, funded through the CFP, to: 3. Expand service areas 4. Provide equitable access 5. Develop charging infrastructure in the right-of-way	■ Reach communities without strong traditions of cycling and with barriers to individual ownership ■ Support existing low-income access through transportation wallets, BIKETOWN For All, Lime Access ■ Support latent demand for shared services in more suburban parts of PGE's service area	■ Decrease GHG emissions by decreasing VMT ■ Increase equitable access to TE, transportation options, especially for customers without incomes to support EVs	$$-$$$$	★★★	■ Engage with different customer groups; many potential partners have existing relationships ■ Providers allow system access and provide program support ■ ODOT may provide matching funds and partnership ■ Cascadia mobility may serve as nonprofit operator ■ Local jurisdictions, transit agencies, and major businesses may provide additional funding

LONG-TERM CONSIDERATIONS (BEYOND 2028)

#	Consideration Action	Opportunity	Motivation	Funding Amount	Implementation Complexity	Role of Partnerships
17	Engage in continuous community engagement across TE planning and program design efforts	■ Continue to engage customers participating in existing community engagement efforts and customers representing identified target audience(s) for involvement	■ Identify changing needs in an evolving market ■ Communicate progress of PGE's efforts to-date	$	★	■ Engage with different customer groups; many potential partners have existing relationships
18	Monitor micromobility adoption and update vehicle electrification forecasts as needed	■ Use current electrification forecast by mode to support charging needs and energy forecasting ■ Consider the effects of VMT substitution from micromobility adoption	■ Support TE planning efforts ■ Estimate effects of PGE's actions ■ Identify changing needs in an evolving market	$	★	■ Collaborate with existing regional and statewide modeling efforts from Metro and ODOT
19	Continue engagement and pilots to identify needed micromobility charging infrastructure and integration with other transportation modes	■ Support emerging modes and uses of micromobility ■ Encourage innovation in charging technologies and applications	■ Identify changing needs in an evolving market ■ Foster innovation in micromobility	$$	★★	■ Engage with mobility nonprofits and community-based organizations to identify opportunities and needs