CITY OF PORTLAND BUREAU OF TRANSPORTATION

2019

New Mobility Snapshot

JULY 2020

PBOT
PORTLAND BUREAU OF TRANSPORTATION

alta
PLANNING + DESIGN

Driven by innovation and emerging technology, new mobility services bring new opportunities to help Portlanders and visitors get around. If managed properly, new mobility can help meet city mobility, climate, and equity goals.

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ACKNOWLEDGMENTS

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Cover Illustration from PBOT's 2019-2022 Strategic Plan

JULY 28, 2020

Letter from the Director

With the COVID-19 pandemic affecting daily life and the latest surge in the Black Lives Matter movement, the world has changed since PBOT began working on this report in November 2019.

While this report highlights new mobility trends from November 2018 to November 2019, it has become clear that our travel patterns look fundamentally different in 2020. Physical distancing, the evolution of the COVID-19 pandemic, and economic disruption have impacted how we live and how we move around cities.

As travel dynamics shift in cities across the nation, the role of new mobility has shifted as well. Change remains constant in mid-2020. For example, some people are choosing bike-share and e-scooters for trips they might once have taken by transit or ride-hailing services, especially in areas where lower traffic and street reconfigurations designed to support businesses and improve access create a safer walking and riding environment.

Other recent examples include:

- For many workers, working remotely has become the new reality. In early March, remote work platforms gained tens of millions of new users within the space of a week or two, and it remains unclear how many schools, colleges and workplaces will open in 2020.
- However, frontline workers—who often had less access to mobility before the pandemic—still need convenient and affordable access to essential jobs.
- Even as work trips have decreased, trips to meet basic every needs are still necessary, and new mobility services can provide options for those trips.
- As people stay at home, more and more are relying on urban delivery services to have food, groceries, or other items brought safely to their front doors. However, whether these frontline workers are paid and treated fairly and the impacts of these trips on retailers and the transportation system remain unknown.
- The crisis has accelerated previously occurring trends across the new mobility industry, ranging from consolidation of micromobility companies to the vertical integration of ride-hailing and food-delivery companies, for example.

These trends are revealing what cities may need as we emerge from the crisis, including the role of shared micromobility in providing physically distanced mobility options; the need for lower-traffic streets to provide space for people to operate bike-share and e-scooters safely, supporting mental and physical health; the need to reallocate parking space to support business operations in the right-of-way; the need to provide affordable ride-hailing options—such as PBOT's Pandemic Mobility Support program—to complement transit service; and the impact that working at home could have on traffic congestion in a post-COVID-19 world.

All of these trends point to the need for cities to retain the ability to manage their streets, and the services that operate on them, so they can remain flexible and respond to ever-changing dynamics. As PBOT manages the transportation system to serve Portlanders during the ongoing COVID-19 crisis, we are tracking these developments carefully, working to give people access—and to keep them safe.

Additionally, Portland, like other cities, is responding to urgent calls for racial justice in the form of new investments and policies that support Black Portlanders and other people of color. We acknowledge that people can only use bike-share and e-scooters if people are safe and feel safe doing so—and that Portlanders of color face threats of discrimination, harassment, and violence in the right of way. PBOT commits to moving forward with this knowledge and responding to these dynamics in future new mobility and active transportation work. At the same time, we call upon all Portlanders to acknowledge the roles we have in keeping each other safe in our shared public space.

Portland's long-term climate and equity goals will continue to guide our work, even as we respond day-to-day to acute human needs. We will use what we have learned over the past few months to inform our strategies moving forward—and to better understand how new mobility can support the transportation needs of our community.

Chris Warner
Director
Portland Bureau of Transportation

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New mobility in Portland

Moving people and goods in a changing landscape

Over the past decade, new technology has propelled a suite of "new mobility" services, profoundly changing how many people travel.

"New mobility" refers to transportation services that are connected to or enabled by digital technology. Examples include ride-hailing companies like Uber and Lyft, station-based bike-share, and dockless fleets of bikes and electric scooters.

In Portland, Oregon, the numbers tell a compelling story: residents are using these new ways to travel around the city. **Since ride-hailing services began in Portland, riders have taken at least 33 million private for-hire trips. The BIKETOWN bike-share system has seen over 1.1 million trips since it launched in 2016, and shared e-scooters have provided almost 1.7 million trips in 2018 and 2019 alone.** While autonomous vehicles (AVs) have received extensive media coverage nationally and the city has developed a permitting process for AV testing, no such testing has occurred in Portland.

These numbers—and others like them—make it clear that new mobility services have great potential to help get people to where they need to go and deliver goods conveniently. At the same time, new mobility can create new problems related to traffic congestion, carbon emissions, and safety challenges for all road users. For example, ride-hailing services may compete with public transit and exacerbate inequities in transportation access, and e-scooter riders need safe places to travel on the street so they do not create safety concerns on sidewalks.

Across the board, new mobility innovations require careful—yet agile—management strategies to ensure they support city goals.

Compiled by the Portland Bureau of Transportation (PBOT), this report is intended to set the stage for decisions about how to manage rapidly emerging innovations to create safe, equitable, and sustainable travel options for the people who live and travel here.

Glossary

New mobility
Transportation services that are connected to, enabled by, or (re)defined by digital technology. Can include fleets of vehicles that are shared among users and made available for rental, including bike-share, scooter-share, car-share, and moped-share

Micromobility
Small, human- or electric-powered low-speed transportation vehicles such as bicycles, scooters, skateboards, and mopeds

Car-share
Fleet-based or peer-to-peer services that allow users to rent a car by the mile, hour, or day

Private for-hire
Services that allow users to hire a ride, including taxis, transportation network companies, limousines, and pedicabs

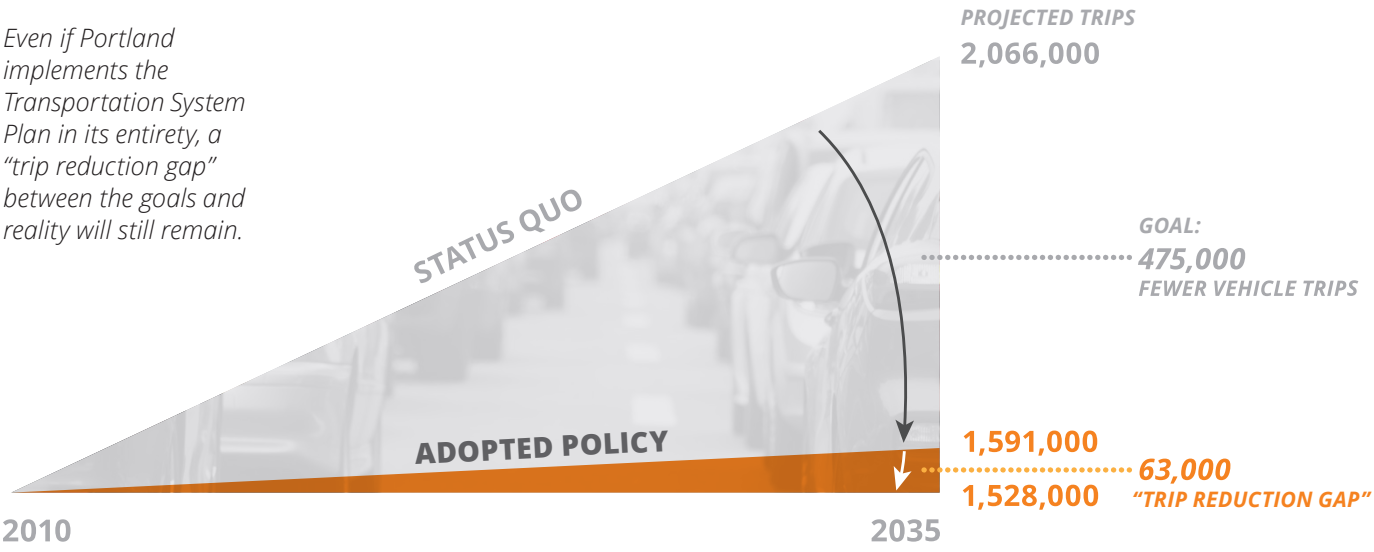
Transportation network company (TNC)
A type of private for-hire company that offers ride-hailing services that match users with drivers through mobile apps

Achieving city goals: A safer, more efficient transportation system

The City of Portland has adopted aggressive goals to limit climate-harming emissions and shift trips from single-occupancy vehicles (SOV) to other modes. Portland's 2015 Climate Action Plan establishes a target to reduce local carbon emissions 40% from 1990 levels by 2030 and 80% by 2050. To achieve these ambitious goals, we are certain about one thing: the number of single-driver and single-passenger trips must decrease.

At the same time, the city is growing fast. With an additional 260,000 residents expected by 2035, Portland needs every tool possible to help people move around efficiently. Even if we successfully implement all the strategies to support walking, bicycling, and transit in the city's long-range transportation plan, we'll likely still see an estimated increase of 63,000 SOV trips by 2035. New mobility services, if managed correctly, may help change that trajectory.

Even if Portland implements the Transportation System Plan in its entirety, a "trip reduction gap" between the goals and reality will still remain.



Closing the "trip reduction gap"

If managed effectively, new mobility services offer tools and innovations that could help close this "trip reduction gap" between our goals and our current trajectory. By creating attractive alternatives to car ownership and shifting trips, these new services could enable people to meet their daily needs in ways other than driving or riding alone.

Setting the stage for future analysis and management

PBOT's Strategic Plan poses two questions: Will a decision advance equity and address structural racism? Will it reduce carbon emissions? These two questions frame how PBOT works to achieve the goals of Portland's Climate Action Plan, Vision Zero Action Plan, and Transportation System Plan.

Answering these questions requires an understanding of current trends and an ability to track and measure impacts of those trends.

This report shares a "snapshot" of the new mobility landscape in Portland at the time of writing in December 2019 to provide a baseline for future analysis.[1] The report documents usage trends for several new mobility modes—private for-hire services (including Uber and Lyft), car-share, BIKETOWN bike-share, and shared e-scooters. The first section offers historical trends for each mode. The remaining sections describe emerging trends and issues based on a one-year summary of data from November 1, 2018 to November 1, 2019.

Regulation and partnership to advance city goals

PBOT provides a regulatory framework for new mobility services operating as part of our transportation system because we are responsible for safeguarding the public interest in the right-of-way. This responsibility may require new or modified laws and regulations if a new mobility innovation does not fit into the existing regulatory system. Beyond acting as a regulatory body, PBOT's relationship to new mobility providers will depend on the state of the market as well as alignment of the service with city and bureau goals. Choices could range from simply allowing a new mobility service to operate to actively partnering with one or more providers. PBOT's relationship with a service could vary based on geographic location or population served. For example, the city subsidizes wheelchair-accessible vehicle (WAV) rides through private for-hire companies but more passively allows the operation of other ride-hailing services.

PBOT is just beginning to articulate this framework to guide regulation of new mobility services and providers; the framework will likely change over time.

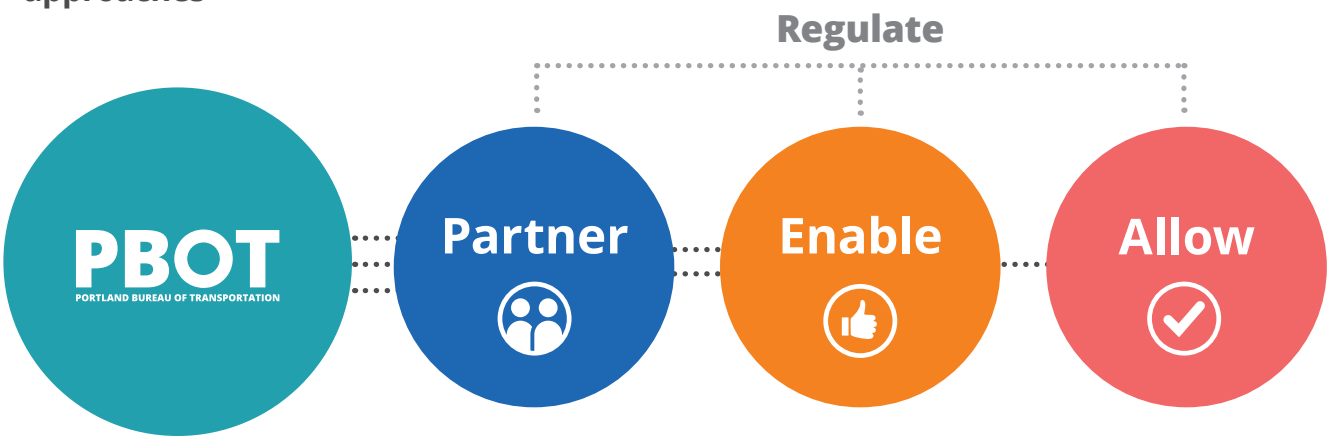
Allow (and Regulate)
For new mobility services where a competitive market has been established, or where the service does not closely match city goals and priorities, PBOT may choose to simply allow the service to operate, subject to existing—or new—regulatory requirements. This approach would not involve actions or incentives to promote or facilitate the service.

Enable
Where new services add value to the transportation system and pose little risk, PBOT may regulate and provide incentives to enable operation at the same time. For example, PBOT has provided subsidized parking spaces for car-share services.

Partner
For services that clearly advance city and bureau goals, particularly those around core values like improving safety, advancing equity, and reducing climate-harming emissions, PBOT may choose to partner with private-sector companies. For example, PBOT acts as a partner in Portland's bike-share program, BIKETOWN, by providing active staff participation in day-to-day management and programming.

Some regulation is required in each of these scenarios. PBOT assesses the impacts of a service and determines the appropriate approach to advance city goals.

A range of regulatory approaches



2019 New Mobility Snapshot data and sources

Private for-hire: Data reflects all trips that started within the City of Portland as reported by private for-hire companies. This includes both taxi trips and TNC trips, with TNCs accounting for the vast majority of trips. PBOT does not currently collect data on private for-hire trips that start outside the city. At the time of publication, most private for-hire companies had completed their reporting; a few were still finalizing their data within the review period. Due to this, all private for-hire trip counts should be viewed as estimates.

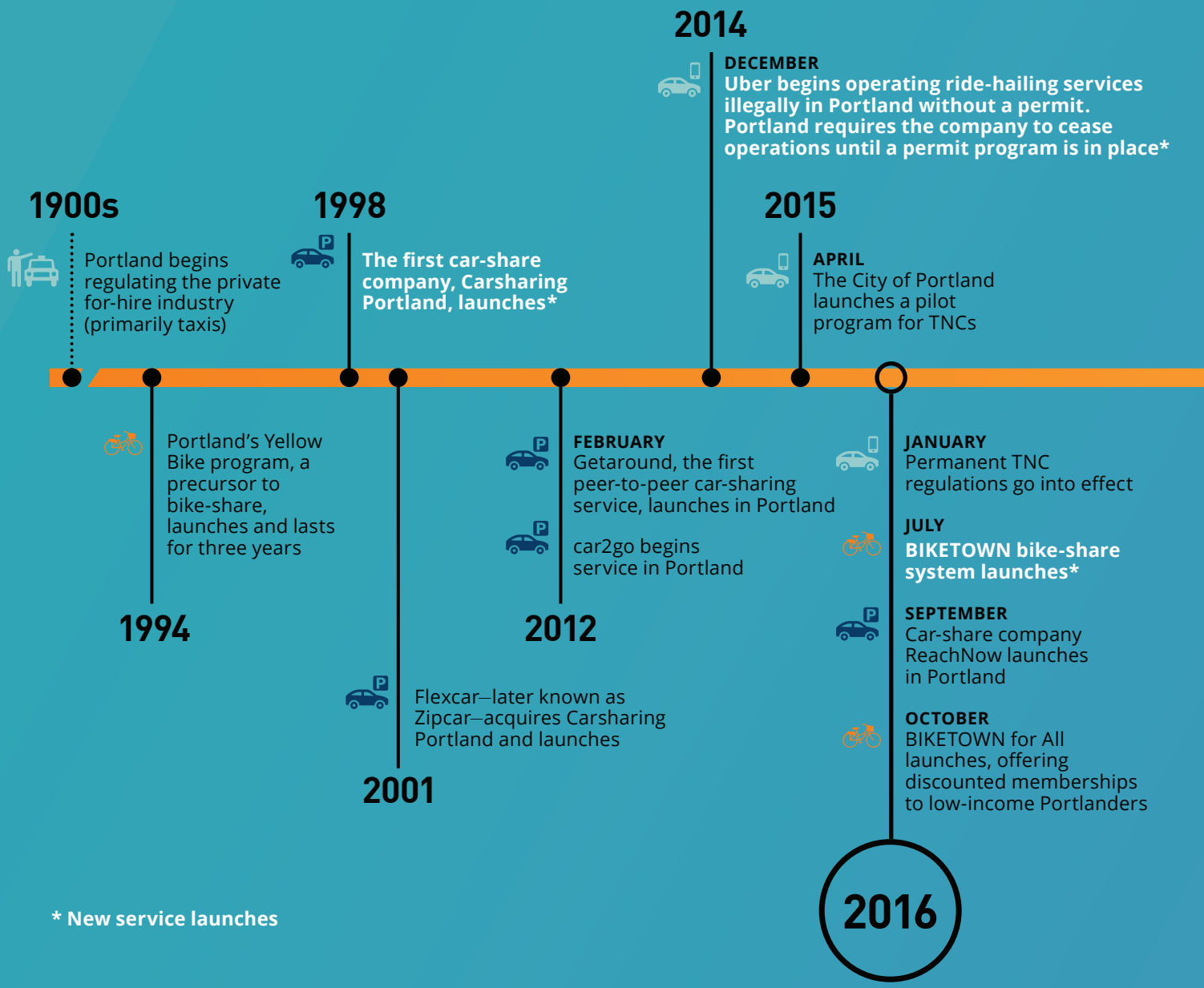
Car-share: Reported trends are based on data that companies voluntarily shared with the city.

Bike-share: Trip data from system users was reported by Social Bicycles, the software and hardware provider for BIKETOWN, Portland's bike-share program. Trip records longer than four hours were kept, but the duration was changed to null. Trips less than one minute long were deleted. Trip records greater than 100 miles in distance were kept, but the distance was changed to null. Trips less than 0.01 mile were deleted.

Scooter-share: Data reflects trips initiated in the City of Portland during the first e-scooter pilot (July 23–November 20, 2018) and the first seven months of the second pilot (April 26–November 1, 2019). Trip records longer than four hours were kept, and the duration was changed to null. Trips less than one minute long were deleted. Trips greater than 40 miles in distance were kept, but the distance was changed to null.

The data for each mode was cleaned to remove unexplained outliers that may have resulted from technological errors in reporting.

02 The evolution of new mobility in Portland



*** New service launches**

2017

MAY
BIKETOWN expands service area and institutes zones that allow free parking out-of-station in the Central Eastside and at Portland State University

JULY
Adaptive BIKETOWN begins offering adaptive bicycle access to people with disabilities

2018

MARCH
BMW and Daimler merge car-share companies ReachNow and car2go into ShareNow

APRIL
Uber acquires JUMP, the equipment provider for BIKETOWN

MAY
BIKETOWN makes all rides free for National Bike Month, doubling rides over May 2017 to nearly 80,000

JUNE
BIKETOWN expands service area to include more eastside neighborhoods

JULY
PBOT launches 120-day e-scooter pilot program*

Portland State University students receive free BIKETOWN memberships

Lyft acquires Motivate, the operator of BIKETOWN

OCTOBER
BIKETOWN Pay-It-Forward campaign provides first month free for all BIKETOWN for All members

2018

FEBRUARY
PDX WAV launches, offering on-call wheelchair-accessible ride-hailing for Portlanders with disabilities

APRIL
PBOT launches second e-scooter pilot program

JULY
ReachNow exits Portland

NOVEMBER
car2go/ShareNow ends service in Portland

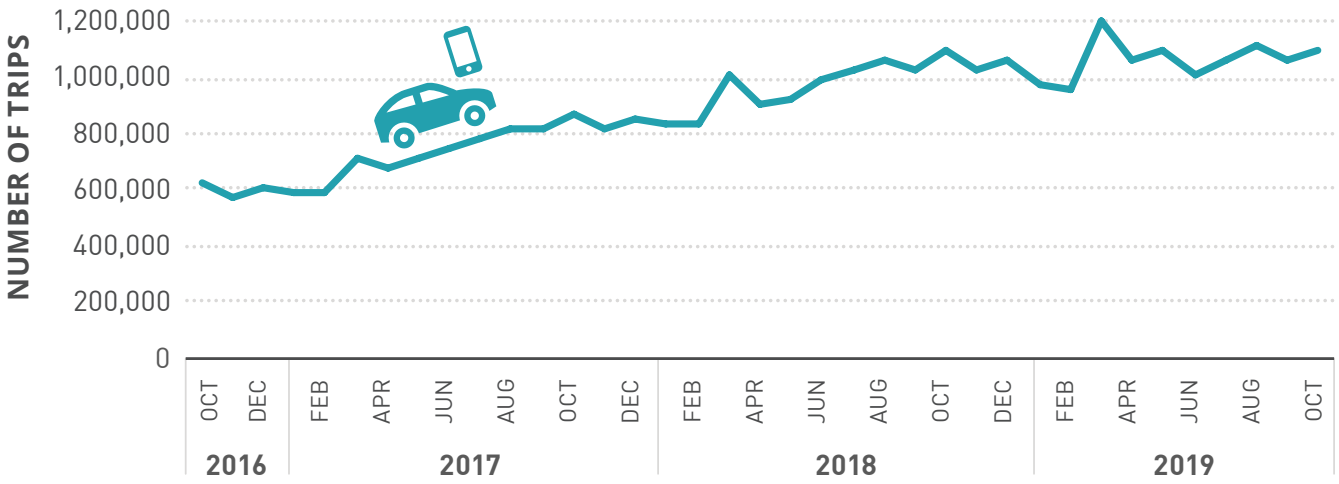
2019

Private for-hire services

Taxis have carried Portlanders since the early 1900s, when the city first began regulating the industry. Ride-hailing via personal smartphone began with the rogue launch of Uber in 2014, which the city piloted until the official integration of these services into its private for-hire program in 2016. Since then, the number of private for-hire trips taken each year in Portland has grown steadily from 2 million in 2016 to over 12 million annual trips by the end of 2019. There are more than 12,000 taxi and TNC drivers registered in Portland.

Nearly
13 MILLION TRIPS
by the end of 2019

Private for-hire trips (2016-2019)



Car-sharing services

Car-share companies enable sharing through online platforms or smartphone applications. In 1998 Portland was the birthplace of CarSharing Portland, the first North American car-sharing service.[2] In response, PBOT adopted policies to encourage car-share, recognizing that the new service helped reduce car ownership—and, in turn, the number of drive-alone trips.

Pricing structures and business models include station-based, peer-to-peer, and free-floating. Different types of car-share serve different purposes—from grocery store trips to multi-day out-of-town travel. For example, Zipcar sees an average trip distance around 39 miles in Portland, suggesting it is used primarily for longer-distance trips outside the city. Car-share services enable members to avoid the expense of owning a car yet still have convenient access to the benefits of a car.

Car2Go/ShareNow's exit from Portland in November 2019 marks the departure of the last major "free-floating" car-share service in Portland.[3] PBOT hopes to see other car-share companies operate in Portland in the near future and is evaluating the regulatory and incentive structures needed to support car-share operations.

Peer-to-peer car-share

Peer-to-peer car sharing services like GetAround and Turo allow car owners to rent out their car via smartphone app. Rates accrue by the day and vary based on the model of the car. Like peer-to-peer home rentals, these services connect car owners wanting to earn money when their car is not in use with residents who do not own a car (or do not own the right kind of car for their trip). GetAround and Turo launched in Portland in 2012 and 2016, respectively. PBOT's sole involvement in these services is to permit on-street parking spaces, if car-share companies request one. GetAround currently has 12 permitted parking spaces in city garages, and Turo has none.

Bike-share program

Known as BIKETOWN, Portland's bike-share system launched in 2016 with **1,000 bicycles over a 10-square-mile service area.** Riders have taken more than **1.1 million trips** since 2016, with a sharp rise in 2018, when the system was expanded to allow for "dockless" parking outside of designated stations. Trips were somewhat lower in 2019, perhaps reflecting the introduction of e-scooters or a need for updated technology. The BIKETOWN for All program for Portlanders living on low incomes has seen remarkable success, with BIKETOWN for All members comprising 14% of all members and taking 20% of annual member trips. In the coming years, PBOT will replace existing bikes with electric-assist bikes and the service area and fleet will expand.

Over
1.1 MILLION TRIPS
since 2016

Scooter-share program

In July 2018, smartphone-enabled shared e-scooters arrived in Portland as part of a four-month pilot. Scooters were sweeping the U.S., launching with and without permission in multiple cities. Portland designed the pilot to test whether shared e-scooters could help reduce driving trips and help achieve city goals. Early results were promising: Riders took **700,369 trips** on **2,043 scooters** between July and November, and 34% of those trips were reported to replace car trips.[4]

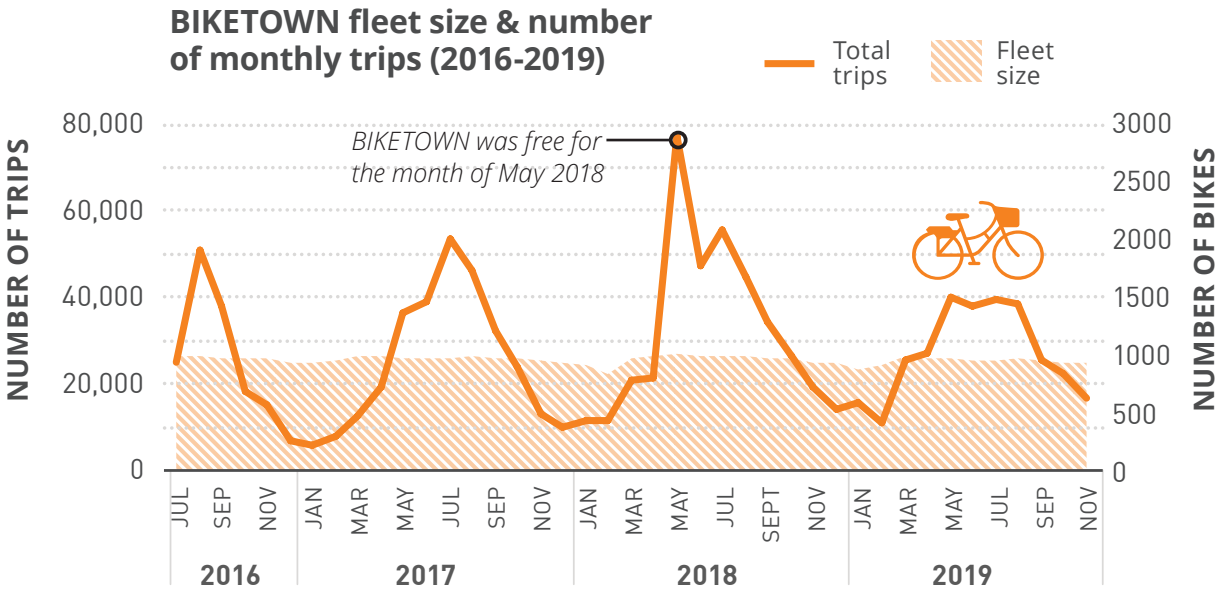
In 2019, the city launched a second, ongoing e-scooter pilot. This pilot began with fewer scooters but offers an incentive structure that permits more scooters to companies that support city goals for mobility, safety, equitable access, and climate action. At the end of 2019, **2,865 e-scooters** from five companies were permitted to operate on Portland's streets. Riders have taken **more than one million trips** on these scooters.

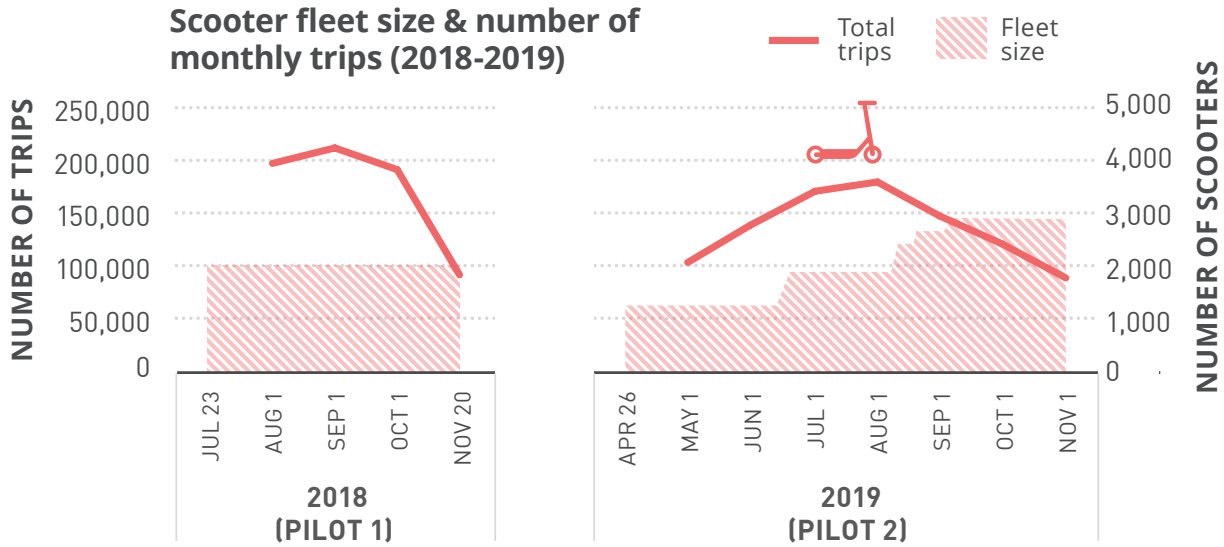
1st e-scooter pilot
2,043 E-SCOOTERS from three companies

700,369 TRIPS
between July and November 2018

Peak of 2nd e-scooter pilot
2,887 E-SCOOTERS from six companies

Over
1 MILLION TRIPS
in 2019





Parking and new mobility

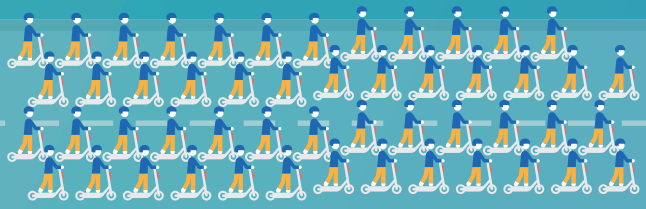
New mobility is changing parking, as well. Increasingly, private for-hire companies compete for pickup and drop-off space in the curb zone—often in locations previously set aside for private car parking. E-scooters and bike-share need dedicated space as well, either in the street or on sidewalks in space adjacent to the "through zone" for people walking.

Even drivers of private automobiles benefit from new mobility via the smartphone-based Parking Kitty app, which allows them to pay for parking remotely and could in the future provide information on parking availability and wayfinding.

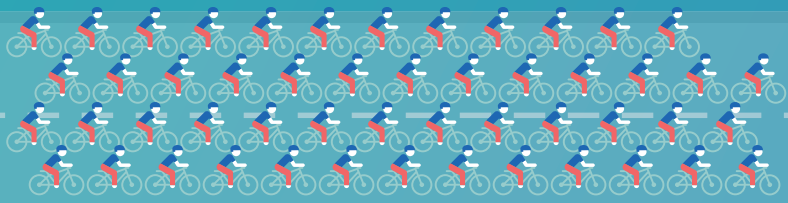
Parking Kitty makes payment quick, efficient, and convenient—drivers can also extend their parking time from their phone—and it streamlines enforcement for PBOT staff.

03 Mobility: *Are people and goods getting where they need to go?*

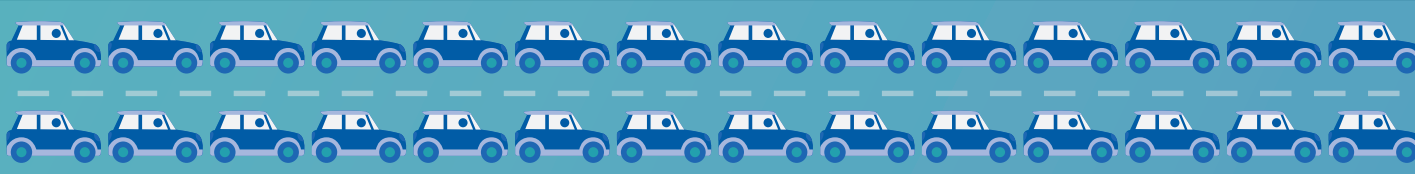
51 PEOPLE ON 1 BUS



51 PEOPLE ON SCOOTERS

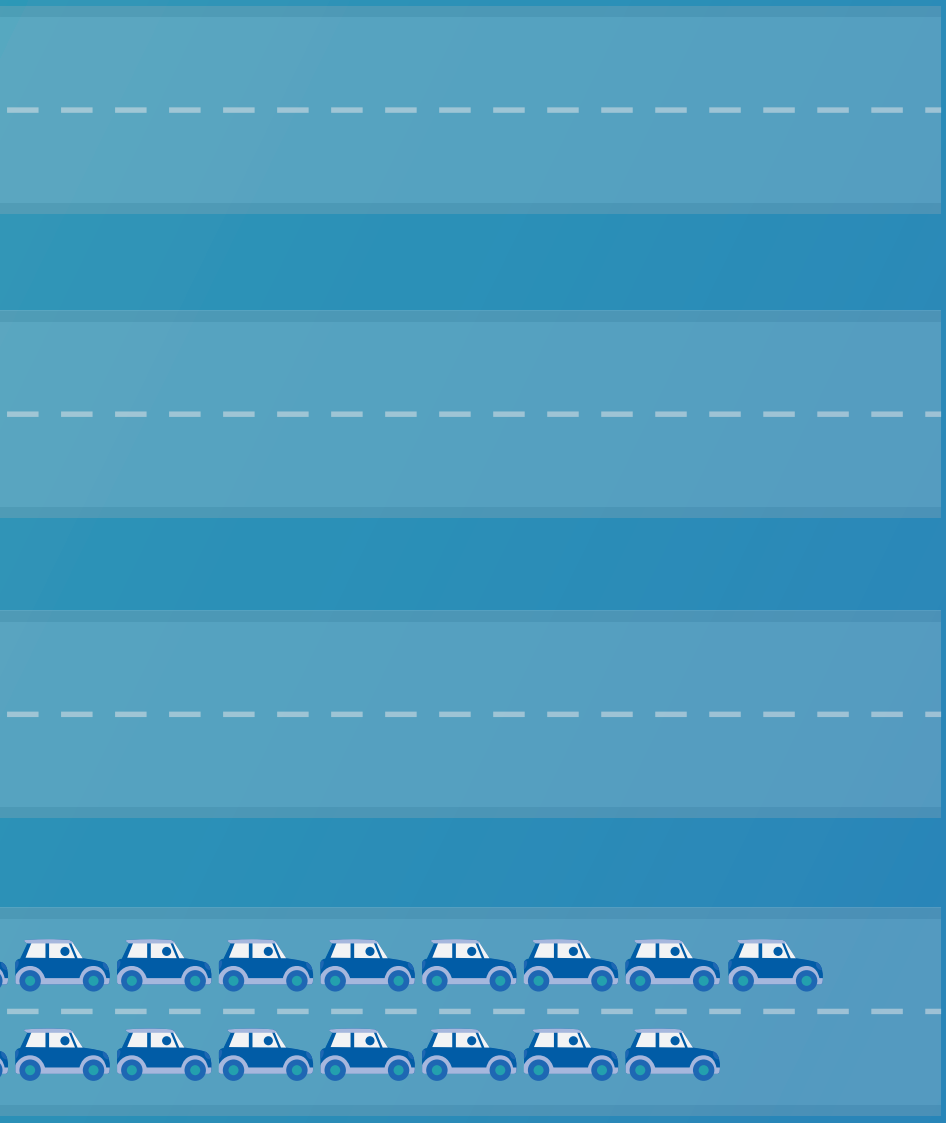


51 PEOPLE ON BIKES



51 PEOPLE IN CARS (ABOUT 1.2 PEOPLE/CAR)

As a rapidly growing city with aging infrastructure and limited space, Portland faces challenges echoed by cities throughout the U.S. While our population is expanding, our roadway space is not.



In 2010 Portland's population was 580,000; by 2035 it is expected to be about 860,000. A growing population can contribute to traffic congestion—and the inequities, harmful emissions, and frustrating congestion associated with additional car trips. In response, Portland is working to create safe places for people to walk, ride a bike, and use transit, as well as programs and innovations that encourage options other than driving.

In the quest to move more people in the same amount of space, new mobility can be an important piece of the puzzle. Shared services that can help more people get around without owning a personal vehicle could reduce drive-alone and single-passenger trips. E-scooters and bike-share—particularly electric-assist bikes—can provide quick, convenient travel options that shift people out of cars, take up less road space, and create fewer harmful emissions.

MOBILITY

How are people traveling?

Different trip distances, average trip duration, and time of day for each mode reflect how people use various new mobility services.

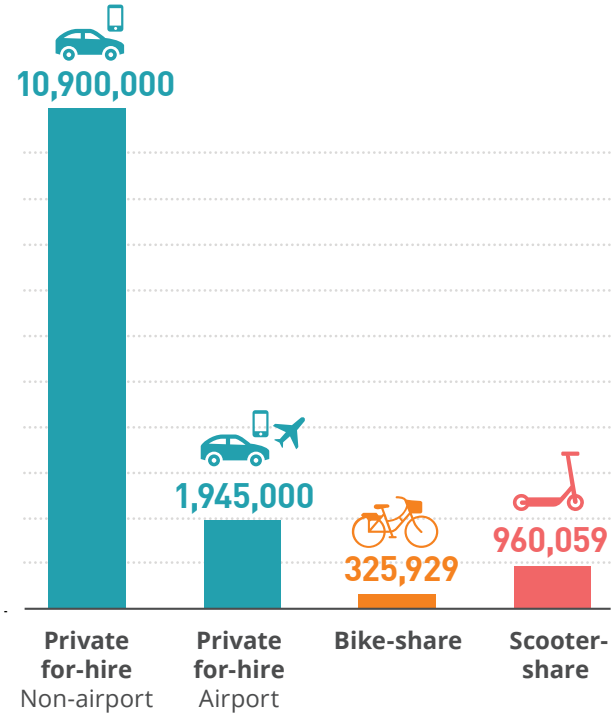
E-scooter riders tend to make short trips to destinations that are close together, and BIKETOWN trips are a little longer on average.

Compared to other modes, private for-hire sees slightly weaker commute peaks on weekdays and clear night-time peaks on weekends, meaning trips are more spread out throughout the day. At nearly seven miles, private for-hire trips to the airport were almost three times as long as other private for-hire trips.

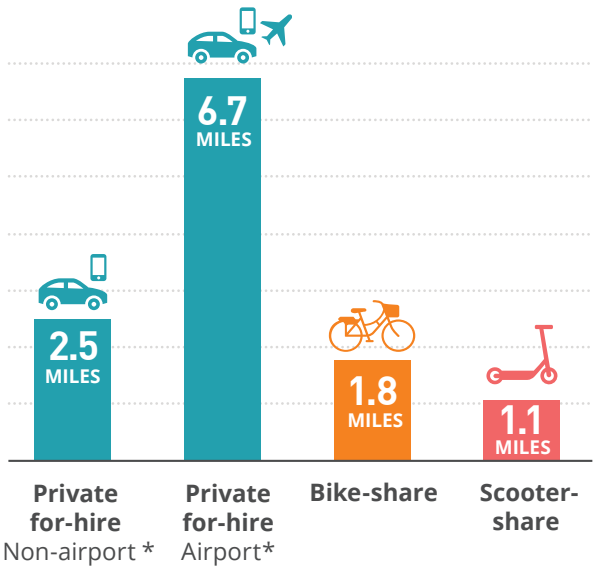
Average bike-share, scooter-share, and private for-hire trips are similar in duration. Since the private for-hire average includes longer airport trips, the average suggests that some shorter private for-hire trips could be served by bike-share or scooter-share.

Car-share tells a different story. People often used free-floating car-share, like car2go, for trips within the city, perhaps to carry bulky items or travel to places where other modes weren't available. On the other hand, the long average trip duration—almost 6 hours—of station-based car-share, like Zipcar, suggests people used this mode to take trips out of town.

Number of trips in 2019



Average trip distance in 2019



** Average private for-hire distances were estimated based on trip start and trip end locations.*

Average trip duration

Private for-hire

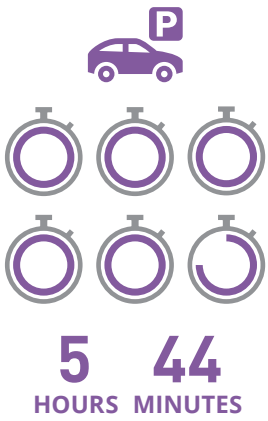
Scooter-share

Bike-share subscribers

Bike-share casual users

Free-floating car-share

Data not available for Portland. This is the median trip time from three U.S. cities.



Station-based car-share

MOBILITY

When are people traveling?

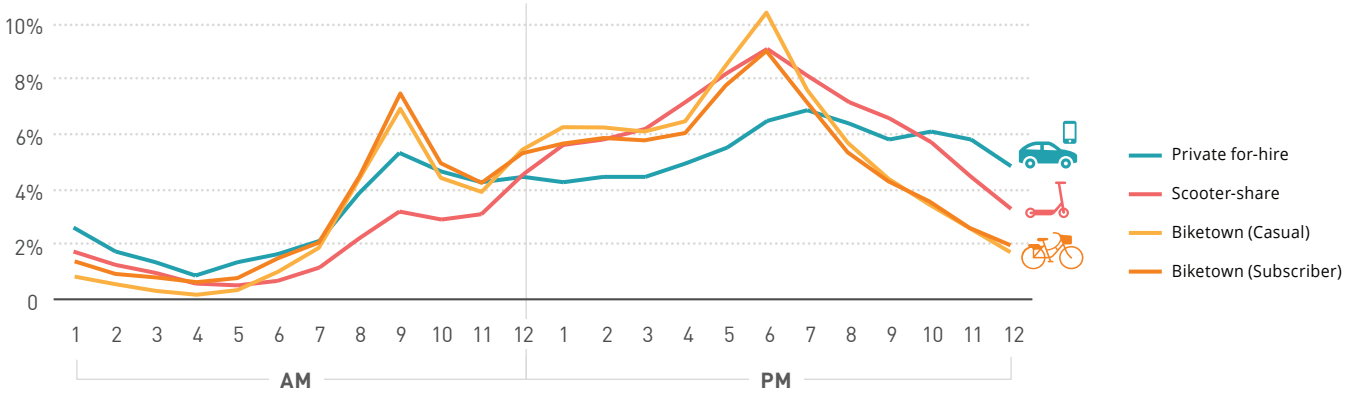
The charts below compare travel by mode throughout the day, both on weekdays and weekends, during the period from November 1, 2018 to November 1, 2019.

On weekdays, BIKETOWN—including both members and pay-as-you-go riders—sees clear A.M. and P.M. peaks, suggesting that BIKETOWN is an important means of getting to and from work.

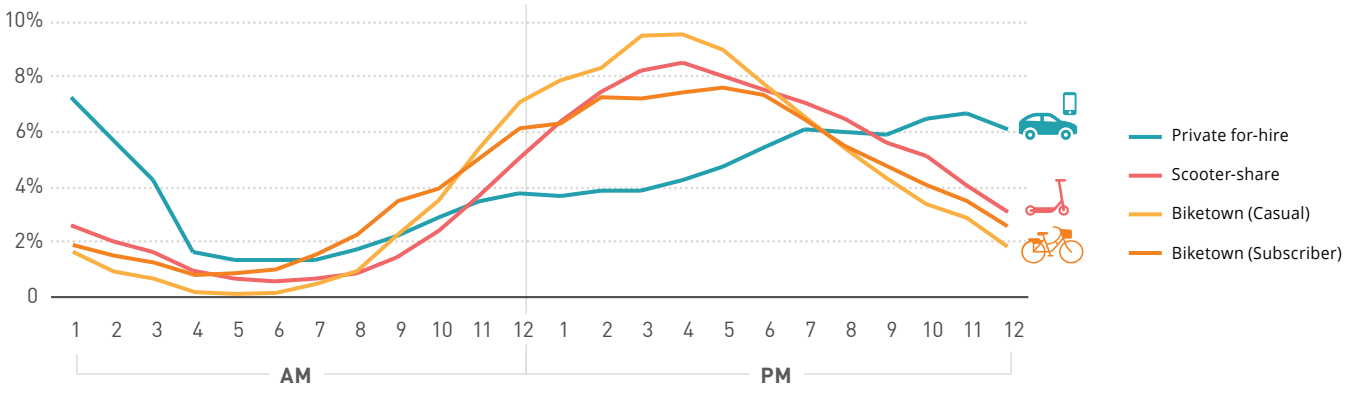
Private for-hire sees slightly weaker commute peaks on weekdays and clear nighttime peaks on weekends.

E-scooter trips generally rise until the P.M. peak on weekdays and reach an earlier mid-afternoon peak on weekends suggesting both commute and non-commute trips.

Proportion of weekday trips by hour



Proportion of weekend trips by hour



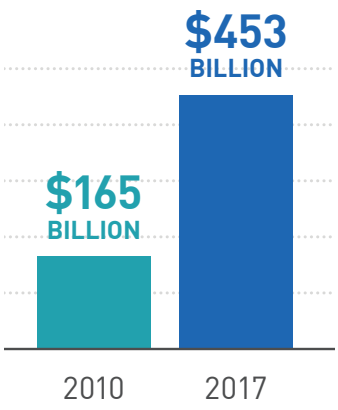
E-commerce and urban delivery

E-commerce has grown exponentially in recent years across the U.S.—from $165 billion in 2010 to $453 billion in 2017.[5] Long-haul truck trips have gotten shorter, but freight vehicle miles traveled still increased by 18% from 2011 to 2016 due to significant growth in short-haul and last-mile truck trips.[6]

While electric trikes, hand carts, and electric cargo vans can relieve some of this burden in Portland, e-commerce deliveries still pose major challenges for traffic congestion, safety, carbon emissions, and curb management.

E-COMMERCE has nearly

TRIPLED



The average number of

MONTHLY ONLINE DELIVERIES DOUBLED

from

2.5 to **5**

PER HOUSEHOLD

between **2009** and **2017**[7]

Moving goods in new ways

New mobility opens possibilities for more efficient ways to move goods in the city. As e-commerce continues to grow, solutions from e-bike delivery to aerial drones and autonomous robots offer both risks and rewards. These new forms of last-mile delivery can impact carbon emissions, traffic congestion, loading space, and land use. Management strategies must ensure these modes operate safely, limit impacts to the right of way, protect privacy, and reduce environmental impact.

PBOT has conducted a study on the impacts of e-commerce and will analyze new mobility freight solutions further in the 2020 update of the city's Freight Master Plan.

MOBILITY

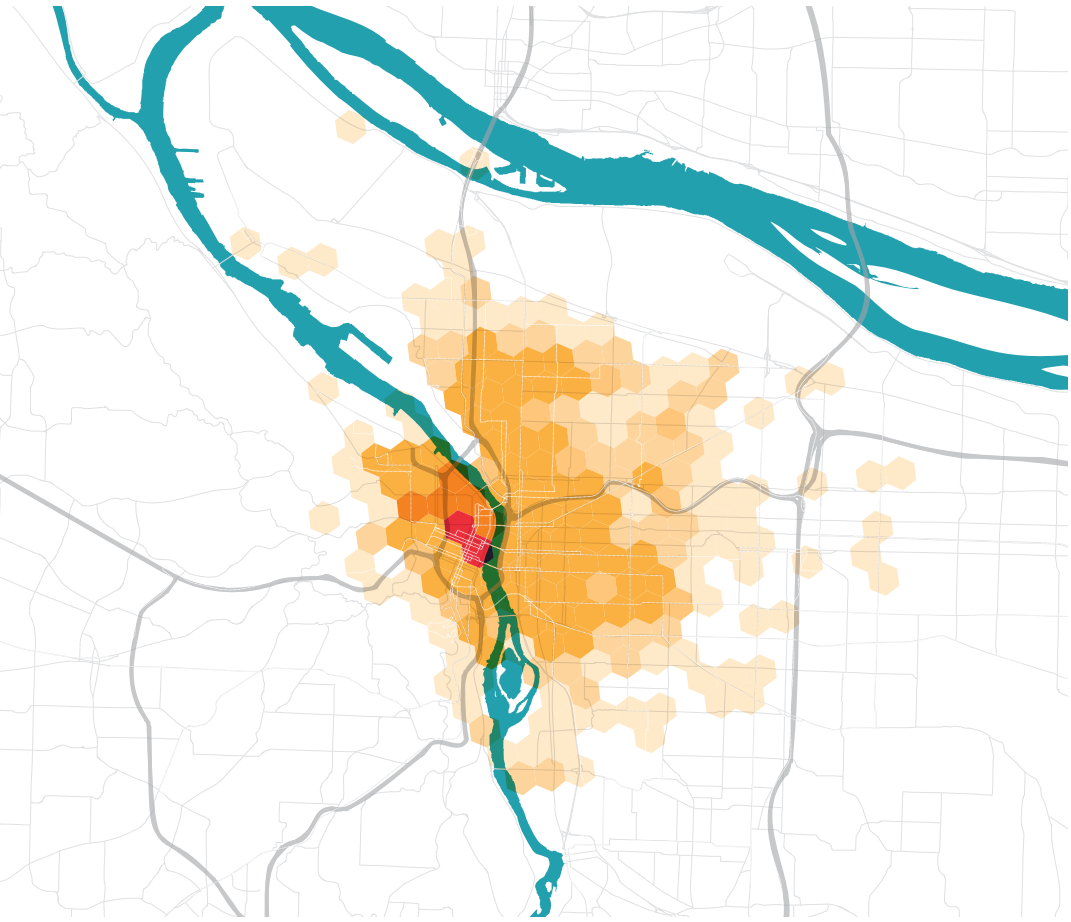
Where are people traveling?

The maps show how many trips started or ended in geographical hex bins across the city from November 1, 2018 to November 1, 2019 for each mode.

E-scooter trips mostly occurred in the Central City, where many shops, restaurants and jobs are located. However, PBOT required that e-scooter companies deploy 15% of their fleet in East Portland, which led to more rides in those areas than may have occurred otherwise.

BIKETOWN trips were focused in Portland's close-in neighborhoods. Upcoming service area expansions mean more trips will happen in more parts of Portland in the future.

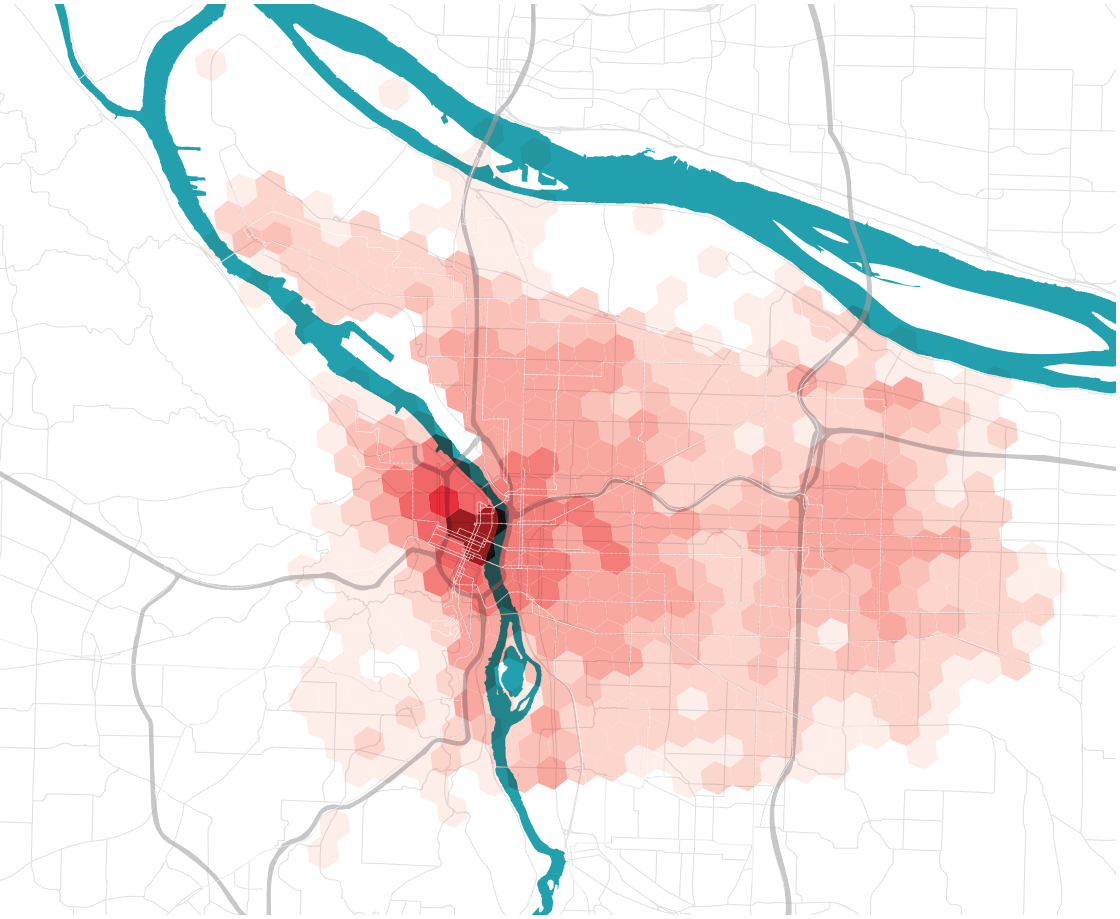
Downtown and the airport were the most popular locations for private for-hire trips, accounting for almost half of all trips. Of the nearly 13 million total trips, about 2 million occurred at the airport, and another 2 million occurred downtown. Three percent occurred between the airport and downtown.



BIKETOWN trips

Today, BIKETOWN trips **occur largely in the Central City and in inner neighborhoods.** The service area recently expanded to include more eastside neighborhoods and will expand further in the coming years.

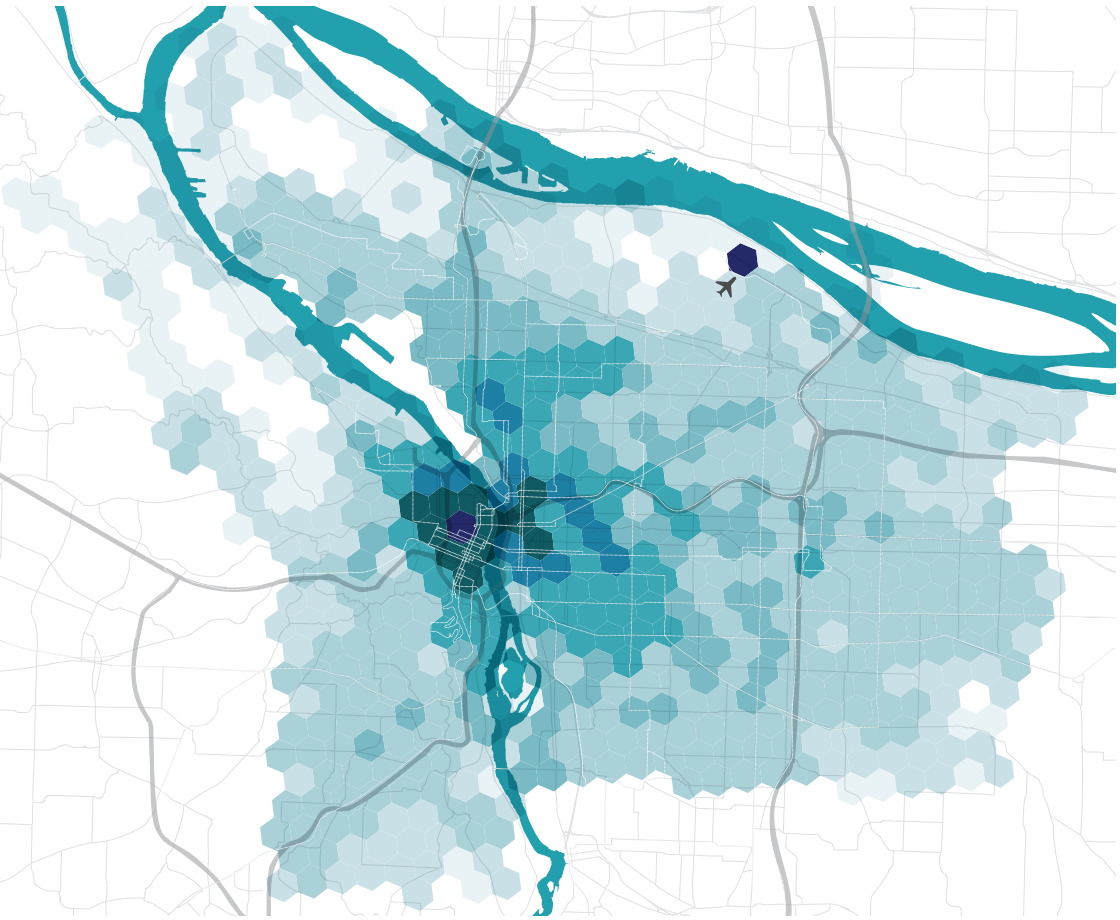
- Transit (MAX light rail and bus)
- 50,001 - 62,000 trips
- 25,001 - 50,000
- 1,001 - 25,000
- 501 - 1,000
- 101 - 500
- 10 - 100



E-scooter trips

E-scooter trips show broader coverage than BIKETOWN. Trips were concentrated downtown, but **nearly every part of the city saw at least ten scooter rides.**

- Transit (MAX light rail and bus)
- 150,001 - 235,000 trips
- 100,001 - 150,000
- 50,001 - 100,000
- 10,001 - 50,000
- 1,001 - 10,000
- 501 - 1,000
- 101 - 500
- 10 - 100



Private for-hire trips

While private for-hire trips occur throughout the city, **31% of trips begin or end at the airport or downtown.** In addition, nearly 3% of trips occur between these two locations.

- Transit (MAX light rail and bus)
- 1,000,001 - 2,047,000 trips
- 300,001 - 1,000,000
- 150,001 - 300,000
- 50,001 - 150,000
- 25,001 - 50,000
- 5,001 - 25,000
- 501 - 5,000
- 10 - 500

04

2019 NEW MOBILITY SNAPSHOT

Climate: *Are carbon emissions decreasing?*

Portland is part of a global movement of cities working to create low-carbon urban environments to support future generations.

*Our City Council is committed to a **40% reduction in carbon emissions by 2030**, and an **80% reduction by 2050**.[8] With 42% of carbon emissions coming from motor vehicles, we have hard work ahead of us.[9]*

Understanding climate impacts

Reaching our ambitious transportation emission targets will require a shift away from car trips and toward walking, bicycling, transit, and trips powered by electricity. Portland's 2035 Comprehensive Plan sets out a series of mode shift targets to reduce vehicle miles traveled (VMT) over time. Today, in the face of rapid growth, Portland's transportation emissions are trending in the wrong direction.

New mobility services may help reduce this trend if they replace motor vehicle trips with modes powered by low-carbon electricity and renewable fuels—especially non-polluting shared micromobility trips.

Conversely, private for-hire trips are likely increasing VMT—and the negative impacts that go along with it—due to "deadheading," or miles driven alone between passenger trips.

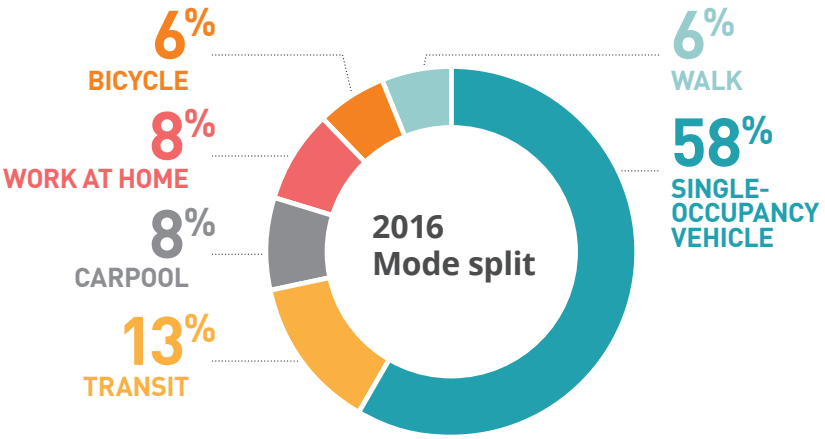
Portland will respond to these challenges by collecting data to track progress—and acting on findings with management strategies that support low-carbon modes like walking, bicycling, e-scooter riding, taking transit, and taking more multi-passenger car trips.

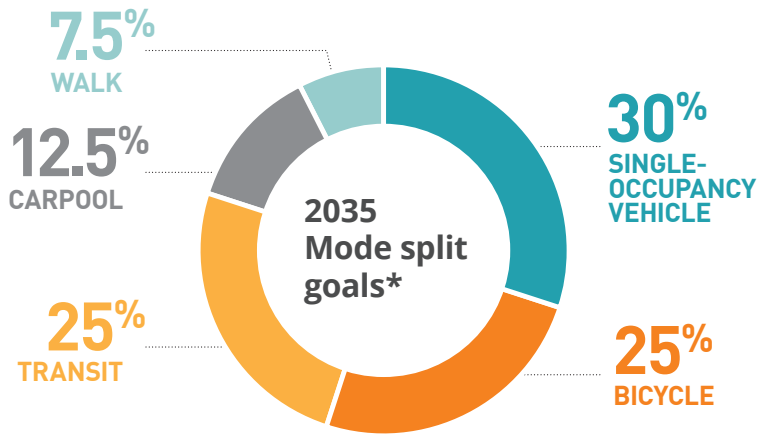
Reducing reliance on car ownership

Owning a personal vehicle offers convenient mobility but is expensive and can be surprisingly inefficient.

The average car sits idle for 95% of the day, and the average annual cost of owning that car is $9,282.[10] Reducing car ownership can help individuals save money. It also reduces the likelihood of driving alone, which can help ease traffic congestion, and frees up parking space for more productive uses like housing, offices, retail, and green space. People who don't own cars tend to walk, bike, and use transit more.

BIKETOWN and e-scooters can supplement transit, walking, and personal bikes for everyday trips. Ease of access and broad availability helps people rely on these new mobility services for their daily trips. Private for-hire services can fill a need when other options aren't feasible, and car-share allows people to venture out of the city to hike, explore, or see family and friends.



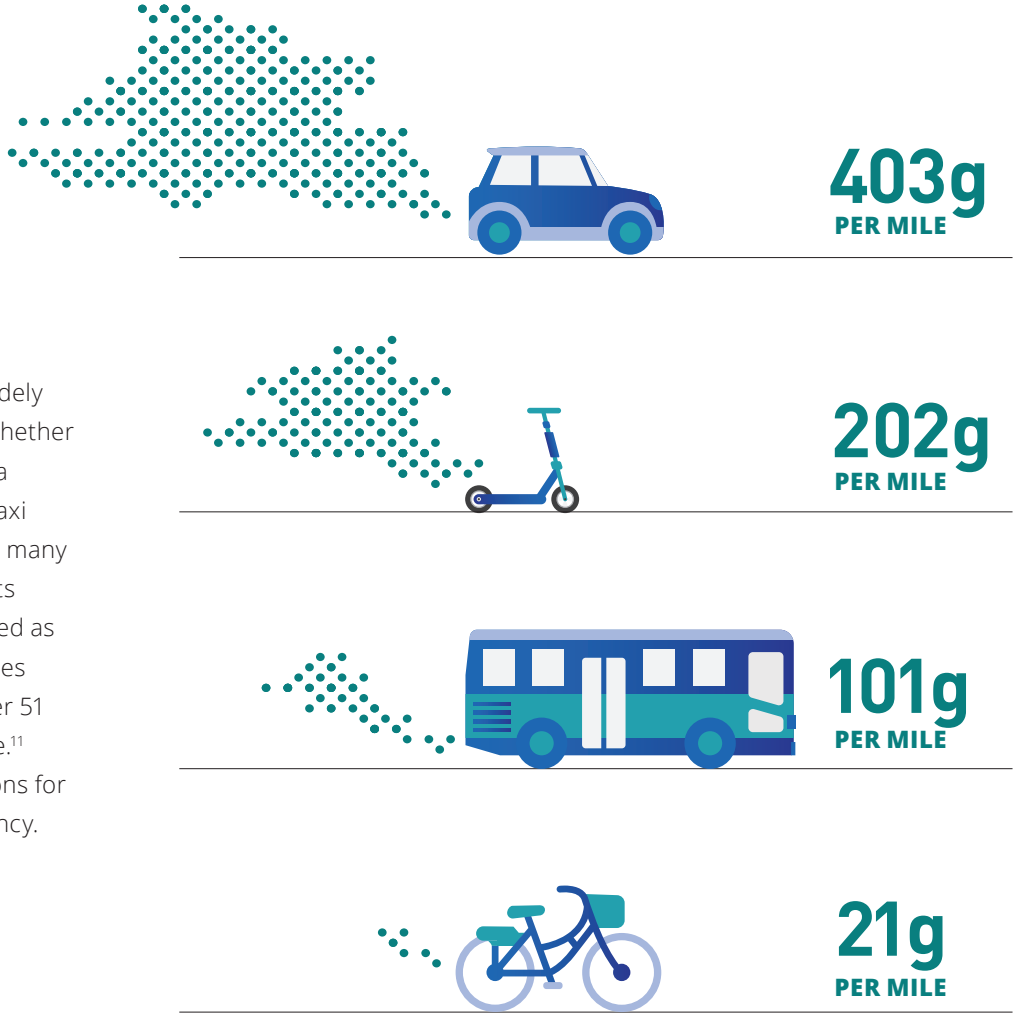


** Work at home 10% (calculated outside the modal targets above)*

CLIMATE

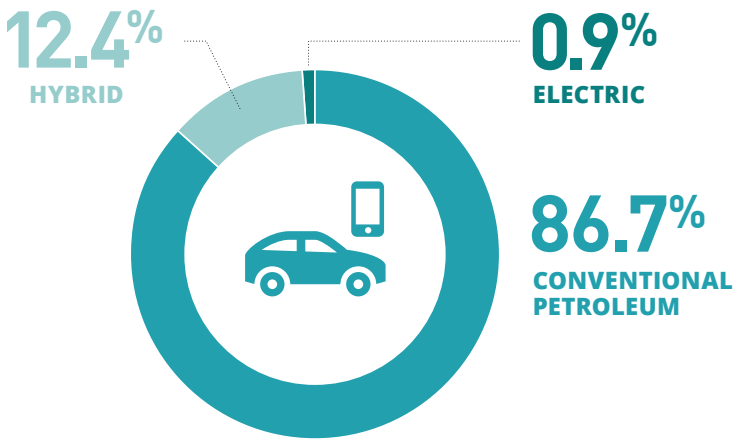
Greenhouse gas emissions per passenger mile

Carbon emissions vary widely by mode. A typical car—whether privately owned, used as a TNC vehicle, or part of a taxi fleet—emits over twice as many carbon dioxide equivalents per passenger mile traveled as an e-scooter, over five times as many as a bus, and over 51 times as many as a bicycle.[11] Estimated carbon emissions for buses depend on occupancy.



Private for-hire fleet makeup

A majority of the existing private for-hire vehicle fleet in Portland—86.7%—is powered by conventional petroleum engines. Another 12.4% are hybrid vehicles, and 0.9% are electric.



Assessing the life cycle impacts of e-scooters

Portland's second e-scooter pilot program includes a first-in-the-industry requirement that e-scooter companies conduct a life cycle analysis (LCA) according to international standards. These reports will help Portland understand the full environmental impact of this new mode across all stages of a scooter's lifetime, from raw material extraction through manufacturing, use, repair, and disposal.

Early research suggests that the greatest opportunity to reduce a scooter's overall life cycle impact lie in the vehicle production process and materials, as well as lowering the vehicle miles driven by car or van to rebalance, charge, and repair scooters.

It is important to note that a comprehensive study comparing life cycle impacts across new mobility modes—or against life cycle impacts of private vehicles—has not yet been done.

05

2019 NEW MOBILITY SNAPSHOT

Equity:
Are new mobility services accessible and affordable?

Careful management, regulation, and partnership are needed for new mobility to benefit historically underserved Portlanders, including people of color, low-income residents, and people with disabilities.

As housing prices rise and many Portlanders are displaced into outlying areas with more limited transit service, new mobility can either provide new travel options for historically underserved Portlanders or exacerbate inequities by further undermining the transit system that low-income Portlanders depend on. A history of housing discrimination, racist planning practices, and inequitable transportation investments has meant that people of color are more likely to be displaced by gentrification.[12] Displacement to outlying areas creates greater reliance on private vehicles and results in longer travel times and higher travel costs.

As the transportation sector changes, new mobility services often cost more than transit options that no longer serve displaced Portlanders efficiently. Grocery store trips and medical appointments may require longer and more expensive private for-hire rides. While these new services fill a gap, some forms of new mobility cost several times the price of a transit pass—and some modes may not be available at all.

Careful regulation, management, and partnership are needed for new mobility to benefit historically underserved Portlanders, including people of color, low-income residents, and people with disabilities.

For example, some residents do not have access to a bank account or smartphone. A lack of safe bike infrastructure can make bike and scooter use uninviting or even dangerous. New mobility companies often focus their services on more affluent close-in areas. Despite a requirement that e-scooter companies offer low-income pricing plans, those plans were poorly marketed and little used.

These barriers are being overcome. For example, Portland's **BIKETOWN for All** program has expanded access to biking for low-income residents, and the **Adaptive BIKETOWN** program offers opportunities for people with disabilities to ride bikes.

Examples like BIKETOWN for All suggest that with effective requirements—and effective partnerships—new mobility can serve all Portlanders, instead of reinforcing existing inequities.

Transportation Wallet for residents of affordable housing

In summer 2019, PBOT partnered with seven affordable housing providers to pilot its **Transportation Wallet** incentive program with their residents. This pilot offered free and reduced-cost transportation options including TriMet passes, BIKETOWN memberships, and credits for e-scooters, car-share, and accessible private for-hire rides. City and company staff at each site helped residents sign up for these options.

The program reached over

500

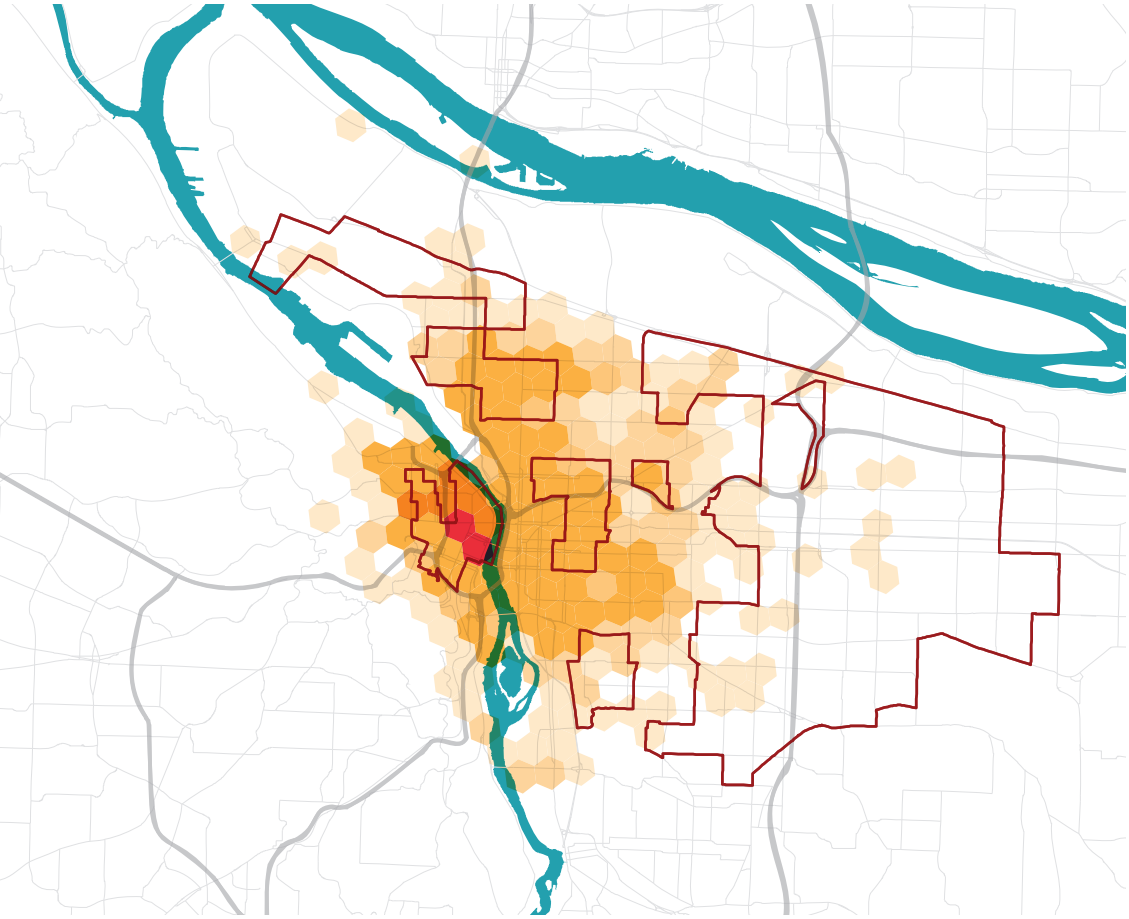
LOW-INCOME RESIDENTS IN TEN LANGUAGES

EQUITY

Geographic access to new mobility

The maps on these pages show how many trips started across the city, which illustrates both consumer demand and where people can access these services. Darker colors indicate a higher concentration of trips.

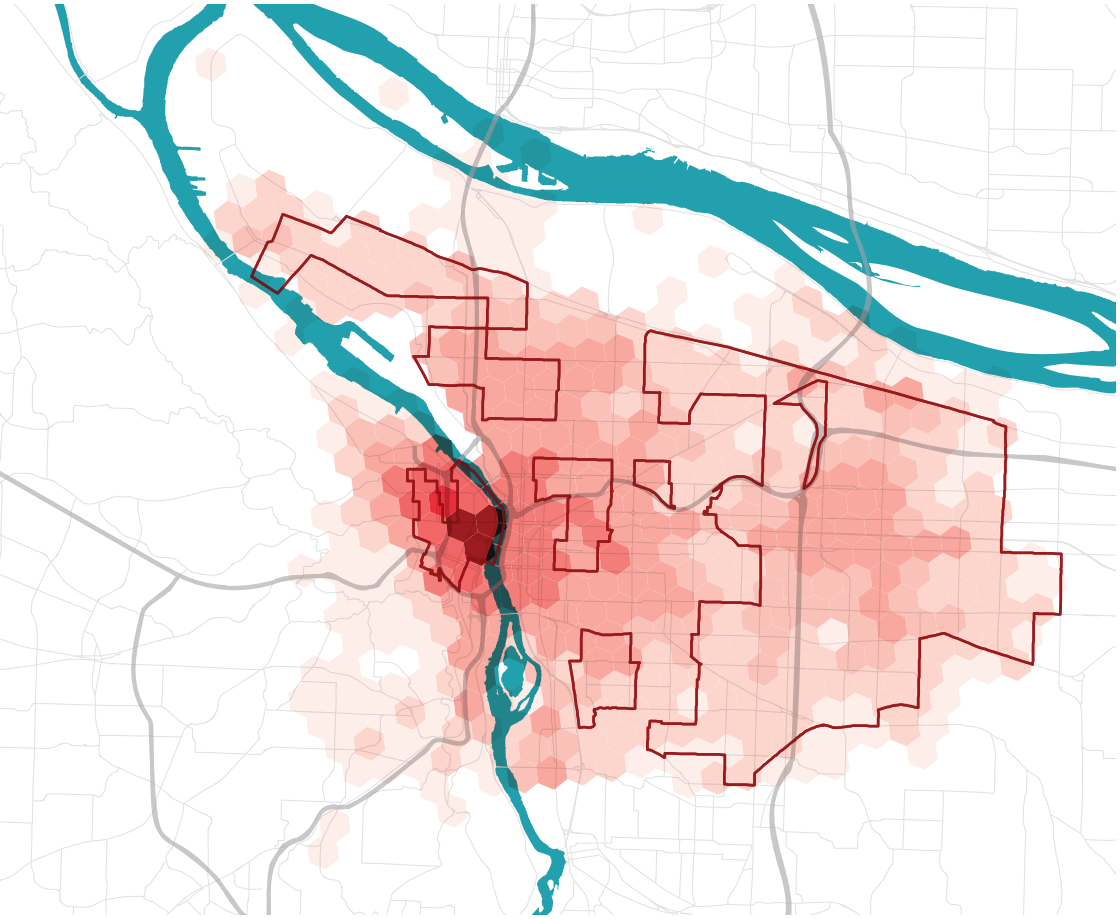
The outlined areas show census tracts that scored the highest on PBOT's Equity Matrix, which takes into account race and income, and they are adjusted for population. These two indicators are the most significant predictors of who has access to transportation; have the most intersectionality with other forms of oppression, including disability; and keep race central to decision-making.[13]



BIKETOWN access

While most BIKETOWN trips started in the Central City and inner neighborhoods, **nearly half of Portland's Equity Matrix areas saw a considerable number of trip starts**. BIKETOWN plans to expand its service area and convert the fleet to electric-assist bicycles, making longer trips in East Portland more feasible, convenient, and attractive.

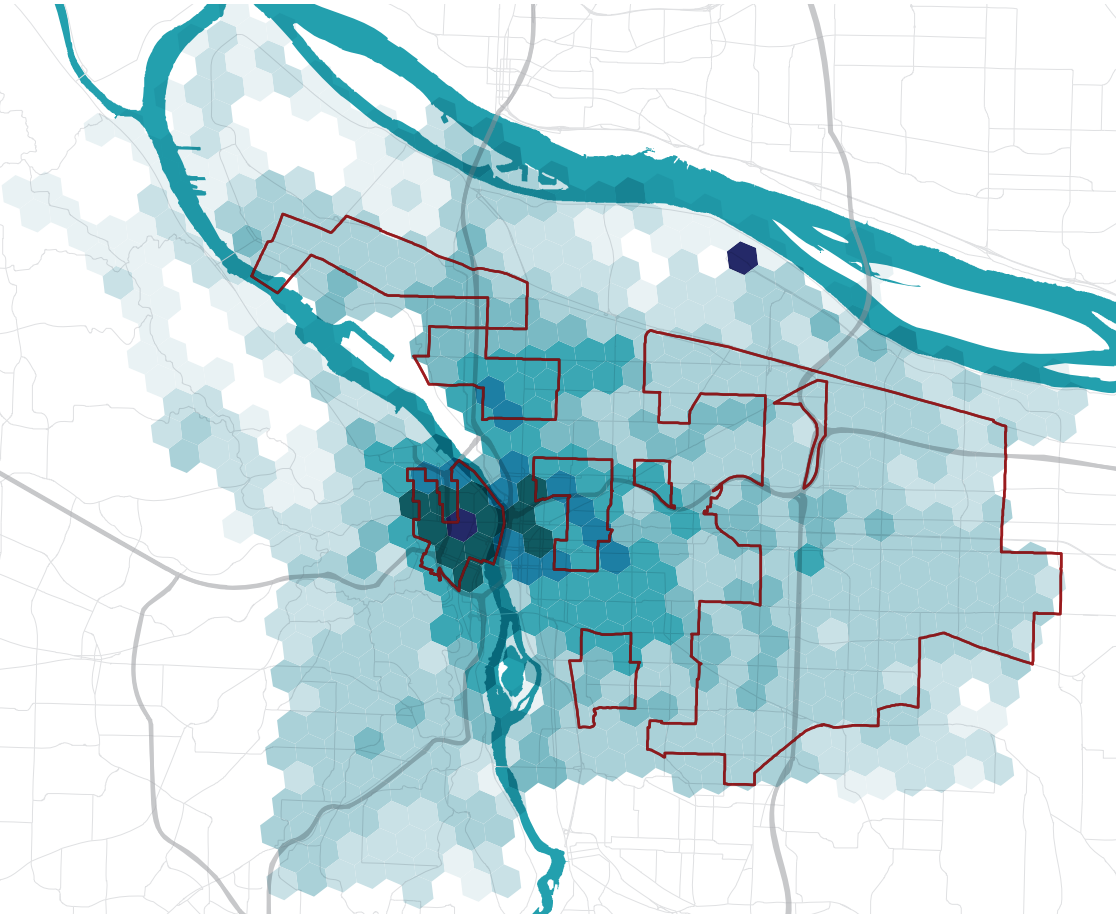
- 50,001 - 62,000 trips
- 25,001 - 50,000
- 1,001 - 25,000
- 501 - 1,000
- 101 - 500
- 10 - 100
- Equity Matrix Areas



E-scooter access

The vast majority of e-scooter trips start in the downtown core. Even with a requirement for e-scooter companies to deploy 15% of their fleet in East Portland, **only 5.5% of trips were taken in East Portland neighborhoods, which comprise nearly half of the city's land area.**

- 150,001 - 235,000 trips
- 100,001 - 150,000
- 50,001 - 100,000
- 10,001 - 50,000
- 1,001 - 10,000
- 501 - 1,000
- 101 - 500
- 10 - 100
- Equity Matrix Areas

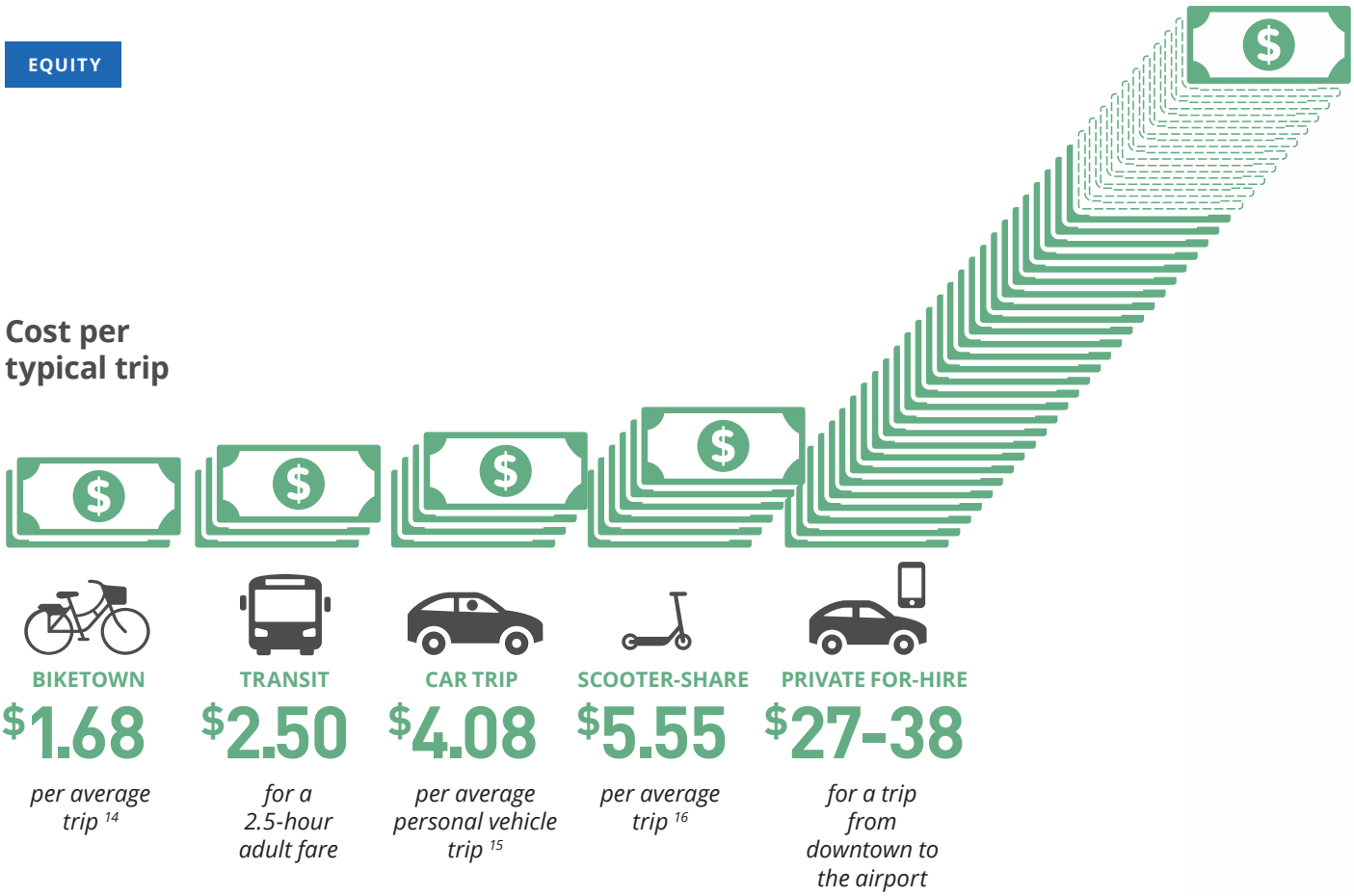


Private for-hire access

Many private for-hire trips begin downtown or at the airport. Aside from a small part of the Central City, **Equity Matrix areas see relatively few trip starts.**

- 1,000,001 - 2,047,000 trips
- 300,001 - 1,000,000
- 150,001 - 300,000
- 50,001 - 150,000
- 25,001 - 50,000
- 5,001 - 25,000
- 501 - 5,000
- 10 - 500
- Equity Matrix Areas

EQUITY



Economic access to new mobility

The average per-trip cost of new mobility services varies widely by mode and in comparison to other modes like transit and private vehicles. Some of these modes are relatively affordable for low-income Portlanders, while others are out of reach.

Private for-hire trips are more expensive than any other mode. E-scooters are also more expensive than other modes, and although companies are required to offer discounted pricing plans for people living on low incomes, uptake of these plans is very low. However, one company noted that Portland has the highest rate of low-income plan signups of all its markets—which suggests significant room to improve marketing, outreach, and use of low-income plans both locally and nationally.

The average BIKETOWN ride is the cheapest at $1.68 for a 21-minute ride. BIKETOWN has also had more success in serving low-income Portlanders, with 14% of all members participating in the BIKETOWN for All discounted-fare program. In contrast, private for-hire and car-share do not offer low-income pricing options.

In addition to cost, requiring people to use credit/debit cards and smartphones can create barriers to access. Some people do not have a bank account or do not want to link their account to an app. Others do not have smartphones and need an alternative to app-based systems.

BIKETOWN for All enables members to pay in cash, and over 500 do. Only some e-scooter companies offer cash payment options and, while some are effective, others are inconvenient—though a PBOT e-scooter user survey indicates significant interest in these options. Private for-hire and car-share offer no cash payment options.

Low-income pricing options by mode

BIKETOWN

14%

of members are **BIKETOWN FOR ALL MEMBERS**

838
BIKETOWN for All members

512
Cash-paying users

2,078
PSU students receive **free annual memberships**

Everyone
has the ability to use BIKETOWN **without a smartphone**

SCOOTER-SHARE

On average, across all scooter companies, only

0.9%

of signups are **LOW-INCOME PLAN SIGNUPS**

59% of low-income respondents said they **did not know about low-income payment plans**

38% of low-income respondents said they were interested in **paying with cash** but did not know how

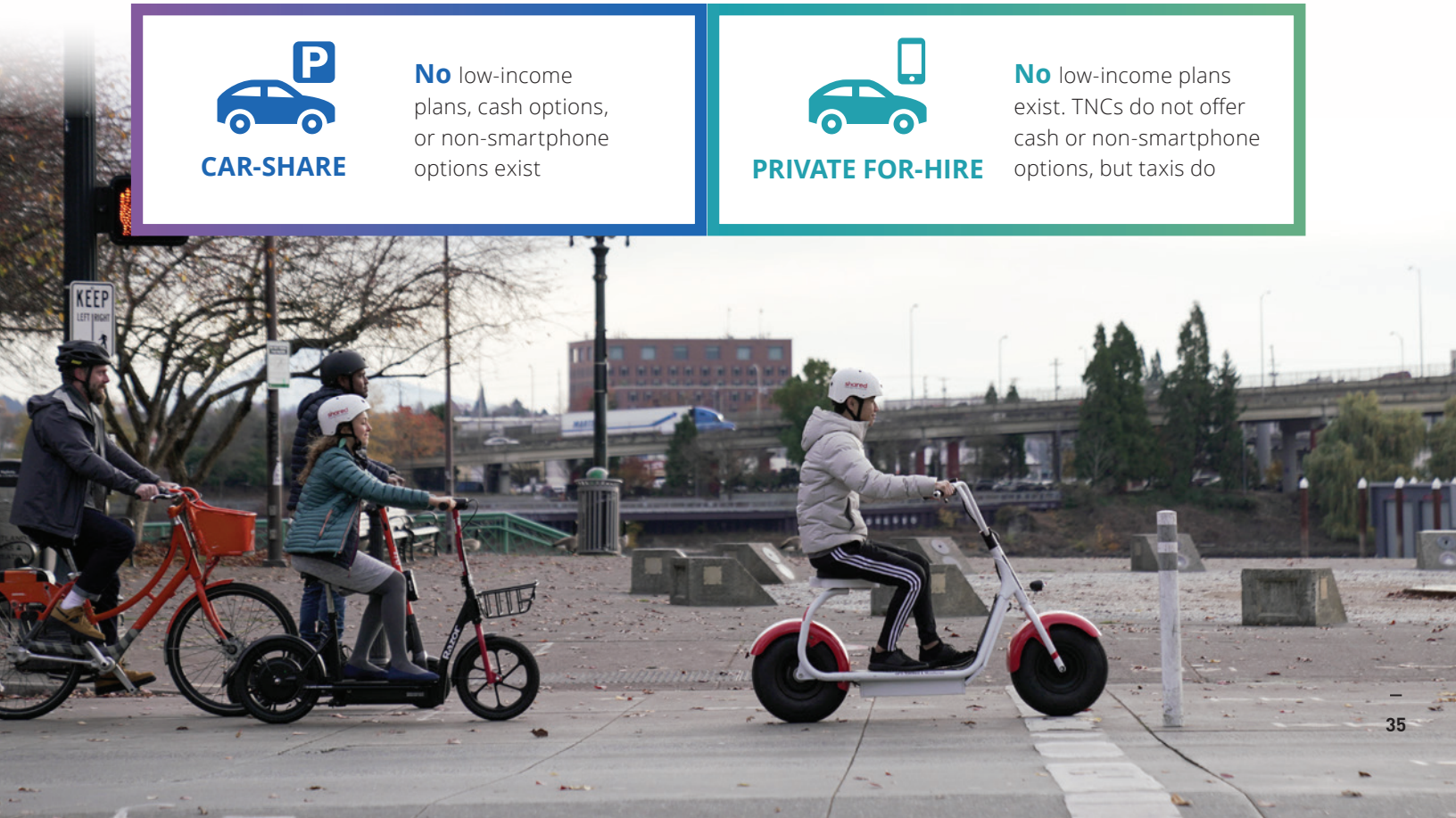
25% of low-income respondents said they were interested in renting **without a smartphone** but did not know how

CAR-SHARE

No low-income plans, cash options, or non-smartphone options exist

PRIVATE FOR-HIRE

No low-income plans exist. TNCs do not offer cash or non-smartphone options, but taxis do



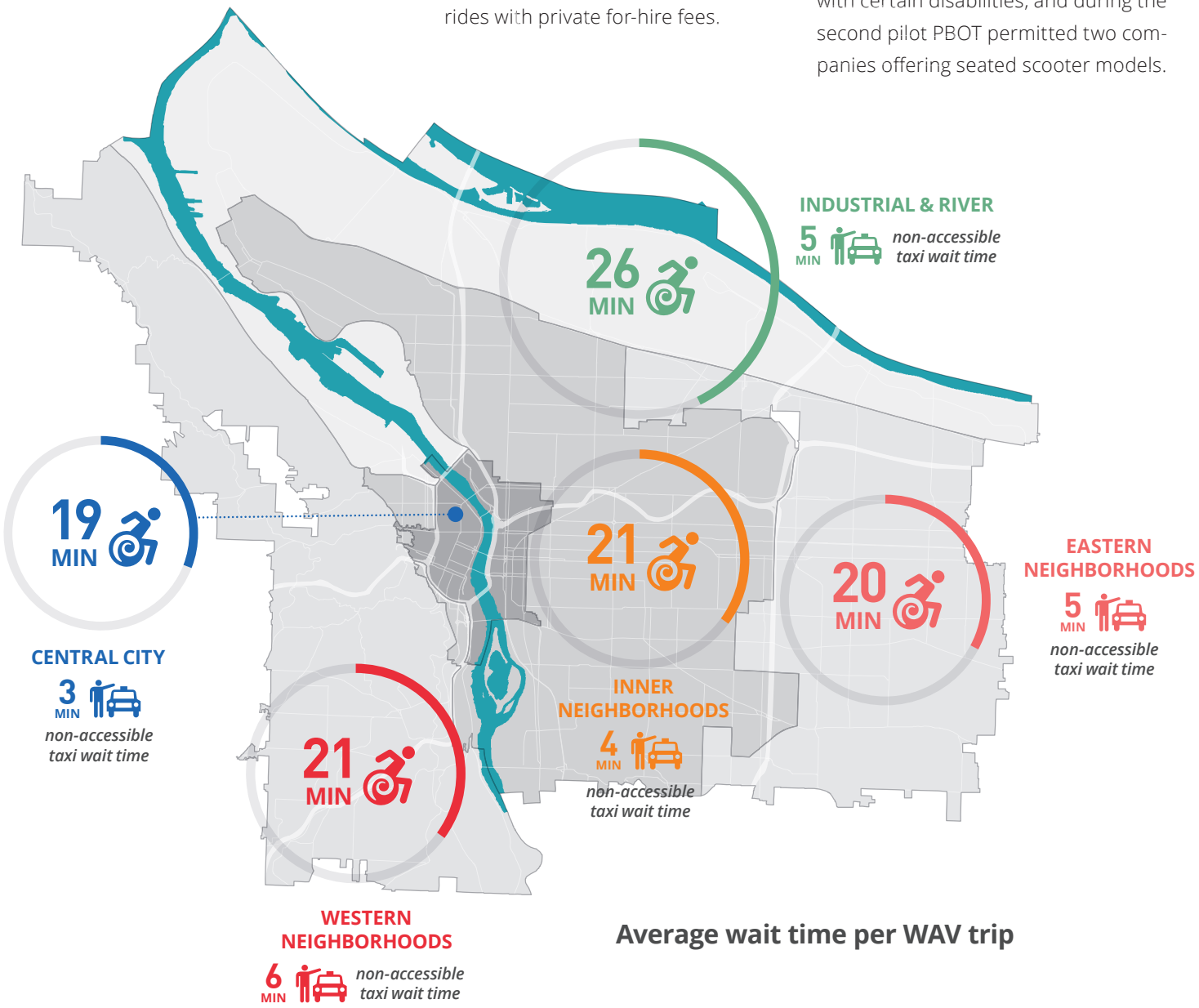
EQUITY

Physical ability and access to new mobility

People who rely on wheelchairs or other mobility devices to get around face unique transportation challenges. Unlike transit, new mobility services are not federally regulated and are not required to provide accessible services. To create more equitable access, Portland requires private for-hire companies to provide on-demand rides in wheelchair accessible vehicles (WAV) for Portlanders with disabilities and subsidizes those rides with private for-hire fees.

In addition, Portland's Adaptive BIKETOWN service offers adaptive bicycle rentals for people with disabilities. The planned conversion of the BIKETOWN fleet to electric-assist bicycles will make riding a bike easier for some Portlanders.

During the 2018 E-Scooter Pilot Program, PBOT heard that a more stable scooter design could make riding a scooter more accessible for people with certain disabilities, and during the second pilot PBOT permitted two companies offering seated scooter models.



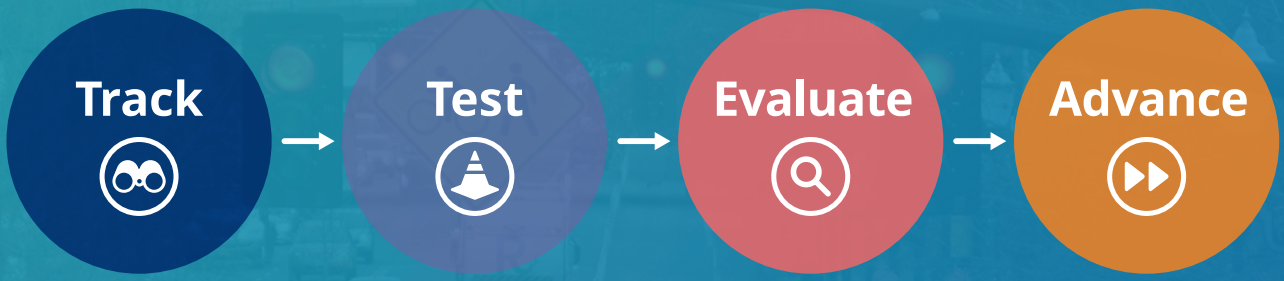
Average wait time per WAV trip

PDX WAV

Launched in February 2019, PDX WAV offers on-demand wheelchair-accessible taxi, Lyft, and Uber rides for Portlanders with disabilities. Rides are available 24/7, are required to arrive within 30 minutes, and maintain the same fares as other private for-hire services. Users call 503-865-4WAV to arrange a ride. PBOT is currently developing a smartphone app for the service.

The map on the previous page compares wait times for PDX WAV's accessible taxi service (to non-accessible taxi services) for each pattern area of the city, which are geographic areas created in Portland's 2035 Comprehensive Plan. Though WAV rides take longer to reach users than non-accessible taxi and TNC rides, all parts of Portland are seeing average times that meet WAV's 30-minutes-or-less goal.[17]

06
What's next?



***Understand the landscape** of new and emerging technologies and their potential in Portland*

***Develop pilots** and temporary installations to identify opportunities and challenges*

***Monitor outcomes** of pilots and testing in relation to city goals*

***Take steps** to allow partner, or regulate new mobility to advance city goals*

In the face of rapid change, Portland aims to leverage the potential of new mobility services to create a greener, more equitable transportation system.

New Mobility is evolving as we read these words. Like other cities across the U.S., Portland sees the potential of these new modes to provide better transportation choices for more people. But advancing city goals will require agility, innovation, and strong partnerships. Traditionally risk-averse governments will need to test new solutions quickly and be open to setbacks along the way.

Today's era of climate crisis adds a further sense of urgency. The International Governmental Panel on Climate Change estimates that we have 10 years to significantly reduce carbon emissions to limit the most catastrophic effects of climate change.[18]

At the same time, a widening gap in income and wealth across racial lines means many Portlanders are left without accessible and affordable ways to get to school, work, and other everyday destinations. Climate disruption will only exacerbate these disparities.

In the face of rapid change, Portland aims to leverage the potential of new mobility services to create a greener, more equitable transportation system. We are testing regulatory strategies and building partnerships with companies and community organizations to define management approaches for emerging technologies.

We are using pilot programs—like the 2015 TNC pilot and the 2018 and 2019-20 e-scooter pilots—to understand the landscape before finalizing permanent regulations. Portland will continue this approach with as-yet unidentified new technologies. For some of these new modes, pilot programs will test whether and how these new services could advance city goals.

Becoming more nimble means adapting long-standing practices. Some agencies have accelerated and streamlined processes and contracting in response to rapid market change. For example, Los Angeles Metro created a program to accept unsolicited transportation innovation proposals from private-sector companies. These proposals proceed through an alternative to the traditional procurement process and have allowed the agency to pilot projects such as an aerial tram, mobile tolling, and transit signal priority.

Moving forward, PBOT will continue to adapt our processes and teams to collaborate across disciplines. We will continue to pilot new mobility modes and work more broadly to advance Portland's Smart City PDX initiative and New Mobility Strategy, working to leverage the power of data and technology to improve people's lives.

Endnotes

1 *The New Mobility Snapshot serves as a first step toward meeting Action 15 of PBOT's New Mobility Strategy, which calls for an annual report on the performance of mobility service providers with recommended strategies to further city goals.*

2 *Car-sharing got its start 20 years ago, here in Portland." Portland Tribune, March 28, 2018. https://pamplinmedia.com/sl/390915-282595-car-sharing-got-its-start-20-years-ago-here-in-portland*

3 *Ehlers, Maximilian. "Important Update Regarding car2go Operations in North America." car2go, September 27, 2019. https://blog.car2go.com/2019/09/27/important-update-car2go-north-america/*

4 *2018 E-Scooter Findings Report. Portland Bureau of Transportation, January 15, 2019. https://www.portlandoregon.gov/transportation/article/709719*

5 *Quarterly Retail E-Commerce Sales: 4th Quarter 2017." U.S. Census Bureau News, U.S. Department of Commerce, February 16, 2018. https://www2.census.gov/retail/releases/historical/ecomm/17q4.pdf*

6 *Hooper, Alan and Dan Murray. E-Commerce Impacts on the Trucking Industry. American Transportation Research Institute, February 2019. https://truckingresearch.org/wp-content/uploads/2019/02/ATRI-Impacts-of-E-Commerce-on-Trucking-02-2019.pdf*

7 *McGuckin, N. and A. Fucci. Summary of Travel Trends: 2017 National Household Travel Survey. Federal Highway Administration, July 2018. https://nhts.ornl.gov/assets/2017_nhts_summary_travel_trends.pdf*

8 *Climate Action Plan. City of Portland and Multnomah County, June 2015. https://beta.portland.gov/sites/default/files/2019-07/cap-2015_june30-2015_web_0.pdf*

9 *Multnomah County 2017 Carbon Emissions and Trends. Bureau of Planning and Sustainability, September 18, 2019. https://beta.portland.gov/sites/default/files/2019-09/climate-data-report-final.pdf*

10 *Edmonds, Ellen. "Your Driving Costs." AAA, September 12, 2019. https://newsroom.aaa.com/auto/your-driving-costs/*

Schmitt, Angie. "It's True: The Typical Car Is Parked 95 Percent of the Time." Streetsblog USA, March 10, 2016. https://usa.streetsblog.org/2016/03/10/its-true-the-typical-car-is-parked-95-percent-of-the-time/

11 *Carbon dioxide equivalents per passenger mile are based on the following:*

- *Bike = 21g CO2e/passenger km = 34g CO2e/passenger mile (Blondel, Benoit, Chloe Mispelson, and Julian Ferguson. Quantifying the CO2 Savings of Cycling. European Cyclists' Federation ASBL, November 2011. https://ecf.com/files/wp-content/uploads/ECF_BROCHURE_EN_planche.pdf)*
- *Bus = 101g CO2e/passenger km = 163 g CO2e/passenger mile (ibid.)*
- *Car = 4.03 x 10-4 metric tons CO2e/mile = 403 g/mile ("Greenhouse Gases Equivalencies Calculator - Calculations and References." Environmental Protection Agency, 2019. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references)*
- *Scooter = 202 g CO2e/passenger mile (Hollingsworth, Joseph, Brenna Copeland, and Jeremiah X Johnson. "Are e-scooters polluters? The environmental impacts of shared dockless electric scooters." Environmental Research Letters, August 2, 2019. https://doi.org/10.1088/1748-9326/ab2da8)*

12 *History of Racist Planning in Portland. City of Portland Bureau of Planning and Sustainability, September 2019. https://beta.portland.gov/bps/history-racist-planning-portland*

13 *"Equity Matrix." Portland Bureau of Transportation, 2017. https://www.portlandoregon.gov/transportation/74236*

14 *Average BIKETOWN trip cost calculation is based on the average trip duration of 21 minutes at a cost of $0.08 per minute for pay-as-you-go users.*

15 *Average car trip cost calculation is based on average annual car ownership cost divided by the average number of car trips taken per year. AAA estimates average annual car ownership costs to be $9,282 (https://newsroom.aaa.com/auto/your-driving-costs). Average number of trips per year is derived from the Oregon Household Activity Survey conducted in Portland in 2011 (via Roger Geller, https://www.portlandoregon.gov/transportation/article/452524). The survey found an average of 9.2 total trips per day and a 72.4% drive mode split for an average of 6.66 drive trips per day. To reach an annual number of trips, 6.66 was multiplied by 342 travel days per year (instead of 365) to adjust average weekday travel data to account for different travel patterns on weekends and holidays. This resulted in an average of 2,278 trips per year, otherwise noted as $9,282 / (6.66 * 342) = $4.08/trip.*

16 *Average e-scooter trip cost calculation is based on an average trip duration of 14 minutes applied to the cost plans for each company at the time of publication. An average across each scooter company was taken to reach $5.55.*

- *Bird: $1 + $0.29/minute + $0.25 street use fee = $5.31*
- *Lime: $1 + $0.33/minute + $0.25 street use fee = $5.87*
- *Razor: $1 + $0.34/minute + $0.25 street use fee = $6.01*
- *Spin = $1 +$0.27/minute + $0.25 street use fee = $5.03*

17 *All WAV passenger wait times are determined by trips reported to PBOT as non-scheduled trips requested through the service provider.*

18 *Special Report: Global Warming of 1.5°C. Intergovernmental Panel on Climate Change, 2018. https://www.ipcc.ch/sr15/*