

Seattle Department of Transportation

NEW MOBILITY PLAYBOOK



Version 1.0

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Seattle
Department of
Transportation

MORE MOBILITY

MORE INFORMATION

MORE SEATTLE

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CONTENTS

WELCOME TO SEATTLE	6
1 OUR CHANGING LANDSCAPE	8
In the Early Decades of the Century	11
The Year is 1910	12
Seattle’s Vision and Values for Transportation	14
Seattle Today	15
Seattle and New Mobility	17
New Mobility Trends	20
The Rapidly Changing World of Urban Transportation	21
2 OUR DIRECTION	22
The Upside	24
The Downside	27
Principles for New Mobility	32
3 OUR PLAYBOOK	34
Our Plays	36
Our First Moves	43
Our Invitations to Innovators	45
We’re Just Getting Started	46
Appendix A. Further Actions	
Appendix B. Shared Mobility Study Technical Report	
Appendix C. Preliminary Automated Mobility Policy Framework	
Appendix D. Regulatory Considerations for the Shared Mobility Landscape	

Note: Appendices can be found at www.seattle.gov/transportation/newMobility.htm

WELCOME TO SEATTLE

Welcome to Seattle, one of the fastest-growing cities in America.

Our population increased by over 121,000 between 2006 and 2010, with 20,000 people moving into the city from 2015 to 2016 alone. The pace of our growth is accelerating and could seriously strain our transportation system. But, this is Seattle and we know all about the upsides and downsides of change. We are responding and adapting.

Seattle voters have approved new funding for transportation through the city's \$930 million Levy to Move Seattle as well as the region's \$54 billion Sound Transit 3 initiative. We are building new light rail and streetcar lines, expanding bike routes that are safe for all ages and abilities, building more sidewalks and expanding high frequency bus services—and we are seeing results. Between 2010 and 2016, downtown Seattle added nearly 45,000 new jobs. Over the same span, the number of downtown commuters driving alone grew by only about 2,000 people. Everyone else—95 percent of new commuters—chose to walk, bike, or take transit to get to work.

At the same time, the way we get around our cities is changing faster than it has since the advent of the automobile. Seattleites can still choose tried-and-true options like the bus, the light rail, or the streetcar and they can walk, ride their bike, or drive their car. But new transportation modes are rapidly emerging. Today, Seattleites can get to work on a shared bike or in a shared car. They can hail a ride or join a vanpool. They can use technology to coordinate a trip across the city using any combination of these options, and they can book many of these services on their phones.

These new travel options—technology-enabled, on-demand, shared—are what we call new mobility. New mobility has the potential to provide greater convenience, improve safety, and make transportation more equitable and affordable for us all. But it could just as easily take our cities in another direction, toward congested roads, unsafe streets, insecure data, and exclusive, expensive services that benefit only a few.

Seattle has a history of welcoming and fostering innovation, especially in transportation. Boeing, UPS, and Flexcar (one of the first car sharing companies) were all launched in Seattle. We were one of the first cities to regulate Uber and Lyft. We are the first city to permit dockless bike-share systems like Spin and Limebike. And we are home to local, mobility-focused startups like Luum, mobility service innovators like ReachNow, and Amazon, a company that is changing urban transportation patterns all over the world.

Seattle generates innovation, but the future of our city will be shaped by our shared values. We are committed to equity and racial and social justice. We acknowledge that misguided decisions and plans in the last century, particularly in transportation policy and infrastructure, often made life harder for our neighbors who were already at a disadvantage. So, as we embrace new transportation technology, we seek to shape it in a way that ensures our city's evolving transportation system works better for all of us. We must ensure new mobility puts people first.

That's why we created this Playbook. The New Mobility Playbook is a set of plays, policies, and strategies that will position Seattle to foster new mobility options while prioritizing safety, equity, affordability, and sustainability in

our transportation system. With state-of-the-art infrastructure, community engagement, and thoughtful regulation, we hope to strike a balance between technology's drive toward what's new and our city's essential commitment to equity and social justice.

The Playbook is as flexible as it is groundbreaking, with an extensive scope that addresses everything from shared transportation to data management to impacts on the local labor market. We're getting started immediately with 20 "first moves," a set of strategic actions that will test new ways of getting around while laying the groundwork for meaningful change. We're also looking further ahead, establishing policies now to prepare for automated vehicles, the evolving role of drones, and other innovations we cannot yet imagine or predict.

By leading the way and creating a city where new mobility works in service to the people, we hope to establish a foundation for other cities and innovators to build on, with today's technology and whatever comes next. We also hope to collaborate with innovators and experts worldwide—the Playbook includes an open invitation to join us so we can learn from each other, pilot new solutions, and share ideas, best practices, and findings from the field.

We're all in this together, and the future will be determined by how we navigate this new frontier. Now is the time to lead. We invite you to join us in shaping the Seattle of tomorrow.

Sincerely,



Scott Kubly
Director, Seattle Department of Transportation
(SDOT)



1

OUR CHANGING LANDSCAPE







Corner of 3rd Avenue and Seneca Street looking northwest

IN THE EARLY DECADES OF THE CENTURY...

New technology is transforming transportation systems in cities across the country. There are new vehicles on the streets, new services, and new ways to travel.

These innovations could lead to safer, more vibrant cities, but they could also disrupt existing services, reduce options, increase prices, and upend current business models. They could supplement public transit or compete with our investments in buses, streetcars, and light rail.

City administrators need to accommodate new technologies while also ensuring that innovations benefit the people living and working in our cities. Cities will need new infrastructure and new policies and rules to manage the rapidly changing transportation system.

Some jobs may change dramatically or go away altogether, but there are also new opportunities, new skills to learn, and new industries about to emerge.



Corner of 3rd Avenue and Seneca Street looking northwest, 1910

...THE YEAR IS 1910

The year is 1910, and the B-type double-decker bus, the first mass-produced motorized bus, has just begun service in London. In the United States, the Ford Model T, the first mass-produced car, has begun to take over city roads. Sales of the Model T eventually reach more than 15 million Model Ts, ushering in the age of the automobile.

Motorized cars and buses were faster than previous technologies and saved cities thousands of dollars in the costs of clearing horse manure from the streets. Over the next few decades, they completely transformed American cities, leading to streets, public spaces and commerce designed to serve the automobile—often at the expense of people.

Gas stations, car repair shops, and auto showrooms popped up on street corners. Stables, blacksmiths, and groomsmen disappeared. In 1916, the same year Congress approved the

Federal Aid Road Act, New York City held its last horse auction—there were simply no more buyers.

Highways to the suburbs

Parking garages, parking meters and Interstate highways soon followed, and with them came an exodus from cities to new communities built on former farm fields. In 1918, Chicago's Hotel La Salle built the first multi-story parking garage. In 1935, Oklahoma City installed the first parking meter. Highway building exploded in 1956 when President Eisenhower signed the Federal Highway Act.

The new highways powered the construction of suburbs and exurbs. Along with racist local and federal housing and zoning regulations and rapacious real estate developers, the automobile—and the new roadways built to accommodate it—encouraged people (particularly middle- and upper-class white people) to move away from the urban core, resulting in disinvestment, racial disparity, and city decay.

Cities for cars

The automobile industry started in the 1890s with hundreds of startup companies but consolidated until only three remained: General Motors, Ford, and Chrysler. The Big Three dominated not only the automobile industry and the national economy, but also urban planning and policy.

The car and related technologies and innovations delivered on the promise of economic growth, middle-class jobs, and mobility on demand. At the same time, they contributed to massive economic, social justice, and environmental inequities.

In reshaping our existing cities and planning new cities optimized for privately owned cars, we took down mass transit systems, disconnected and razed whole communities (usually communities of color), and created new ways to exclude people by race and income. As we narrowed sidewalks to widen roads, our cities became uncomfortable to

people walking. As we re-engineered our streets to prioritize speed over safety, our roads became hostile to anyone not traveling in a car.

Cities for people

In the opening decades of the 21st century, we face a similar challenge. With another onslaught of new transportation technology, how will we mold our city into a more livable, vibrant, and equitable place? How do we manage these new services so they improve our transportation system and ensure that it works for all of Seattle?

With cars, we forced our city to adapt to the technology instead of shaping the technology to serve the people living and working in our city. The New Mobility Playbook is our chance to forge a different future.



SEATTLE'S VISION AND VALUES FOR TRANSPORTATION

At the Seattle Department of Transportation (SDOT), our vision is a vibrant Seattle with connected people, places, and products. Our mission is to deliver a high-quality transportation system for the city of Seattle.

SDOT is focused on creating a safe, interconnected, vibrant, affordable, and innovative city for all. We value:

A Safe City

We will not accept traffic deaths as an inevitable part of traveling together in a safe city. *Our goal is to eliminate serious and fatal crashes in Seattle.* Safety also means being prepared for a natural disaster by seismically reinforcing our bridges to withstand earthquakes.

An Interconnected City

More travel options doesn't always equate to an easy-to-use, interconnected system. *Our goal is to provide an easy-to-use, reliable transportation system that gives you the options you want when you need them.*

A Vibrant City

A vibrant city is one where the streets and sidewalks hum with economic and social activity. People meet and shop and enjoy the beautiful city we live in, side by side with goods delivery and freight shipping. *Our goal is to use Seattle's streets and sidewalks to improve the city's health, prosperity, and happiness.*

An Affordable City

Our goal is to give all people high-quality and low-cost transportation options that allow them to spend their money on things other than transportation. The transportation system in an affordable city improves the lives of all travelers – those with the latest model smart phones in their pockets and those without.

An Innovative City

Demographic changes and technological innovation are radically reshaping transportation. *Our goal is to understand and plan for the changes of tomorrow, while delivering great service today.* This includes newer, more nimble approaches to delivering projects and programs to our customers.



SEATTLE TODAY

Seattle was the fastest growing big city in the U.S. in 2016¹, but growth is putting pressure on our infrastructure and straining our affordability.

On average, 57 people move to the city every day, nearly 1,600 a month, and we are on track to add 120,000 more residents by 2035. Our new neighbors are attracted to the Puget Sound’s beautiful environment and the booming local economy that’s projected to add 115,000 jobs in the next two decades.

Growth is putting pressure on our city’s infrastructure and making it more expensive to live here. We are investing in our transportation system to accommodate this continuing growth and maintain our quality of life, preserve our environment, and protect our diverse communities. We’re expanding transportation options so people can safely and easily take transit, walk, and bike, rather than driving for most trips.

We are seeing success. Through our Vision Zero plan to end traffic deaths and serious injuries by 2030 and our Safe Routes to School programs, Seattle is now one of the safest big cities in America for people walking and riding bikes.²

A shift toward transit

Despite our surging population and job growth, auto traffic is not growing as fast. More people are taking public transit to get to work, and fewer people who work downtown are driving alone:

- The share of people driving alone to commute downtown fell from 35% in 2015 to 30% in 2016.
- From 2015 to 2016, Seattle’s transit ridership grew at the highest rate in the nation (4.1%).
- From 2000 to 2016, the share of people taking transit to commute downtown increased from 29% to 47%.³

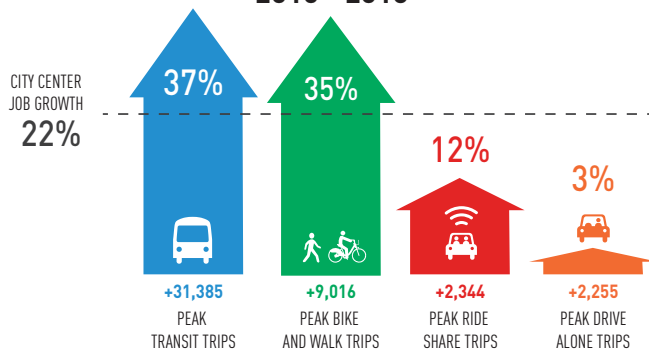
Public transit—our original and most vital “shared mobility” mode—is the backbone of our transportation system. By the end of 2017, 64% of Seattle households will live within a 10-minute walk of a frequent bus route, where riders wait 10 minutes or less for the next bus.

More options, more affordability

When people have a range of safe, reliable transportation options, our city becomes more affordable. **On average, owning a car in King County adds about \$12,500 a year to the household budget.** Our investments will reduce household transportation costs and enable Seattleites to live a car-free or car-lite lifestyle.

While there is still work to be done, we believe our city has entered a beneficial self-reinforcing cycle when it comes to transportation options. As more people choose to walk, bike, or take transit, the demand increases for more services and infrastructure; as we add services and build infrastructure, we invite more people to walk, bike, or take transit. With our partners, Sound Transit and King County Metro, we are expanding Seattle’s light rail and streetcar systems,

JOB GROWTH - PEAK TRIPS BETWEEN 2010 - 2016



¹Jul. 1, 2015, to Jul. 1, 2016 - U.S. Census.

²Vision Zero, May 2017.

³National Transit Database, 2016.

increasing the reach and reliability of RapidRide services, and adding or expanding express and local bus routes. We are also making walking and biking infrastructure safer for people of all ages and abilities.

Looking ahead

As we invest in the city's public infrastructure, private services are expanding their options, too, and providing new and intriguing ways to get around. Services like car sharing and ride-hailing are providing flexibility and further reducing the need to own a car. Day to day, people can rely on walking, biking, and transit but still have access to a car where and when they need one.

Move Seattle, our 10-year strategic plan for transportation, sets our priorities and guides our investments for building a transportation system that's convenient, affordable and provides many options. City residents overwhelmingly supported Move Seattle through the Transportation Levy to Move Seattle, Voters

approved the levy in 2015, committing \$930 million over nine years to fund projects that improve safety for all travelers, maintain our streets and bridges, and invest in reliable, affordable travel options for our growing city.

People of color, LGBTQ people, women, people with disabilities, low-income households, and other historically marginalized groups continue to experience systemic discrimination and exclusion. Our challenge is to advance new mobility and access to opportunity for all, while preventing residential, commercial, and cultural displacement. By ensuring transportation options work for everyone, particularly historically underrepresented communities, we can play a key role in advancing racial and social justice.

In the early decades of the 21st century, we are excited to explore new technologies and service innovations that could help us deliver an even better, more equitable transportation network.



SEATTLE AND NEW MOBILITY

While walking, biking, and taking public transit will remain the backbone of the city's transportation system, new technologies and service innovations are giving Seattleites more options and more convenience.

To get around the city and the region, our ORCA cards let us get on the bus, the ferries, Link Light Rail, and the Seattle Streetcar. We can choose from ride-hailing (like Uber and Lyft, taxis, and for-hire services) and car sharing services (like ReachNow, Zipcar, and Car2Go). We can arrange to join a carpool or split a ride with strangers. Free-floating bike share services allow people to pick up and drop off shared bikes all over the city. Neighborhoods that previously fell outside the Pronto Cycle Share service area, gained access to bike share overnight.

On the horizon

Soon, technology will expand our options even more. "Microtransit" services may offer the possibility of using vans or small buses to transport passengers. "Mobility hubs" will bring multiple options together at one location to allow easy transfers and individualized solutions.

These new and emerging services are enabled by the internet, mobile data, and the smartphones in our pockets. Mobile apps help us find the best

driving route, catch the right bus, or bike the least hilly route. Mobile payment systems allow us to book services and pay for them automatically.

Technology is rapidly changing, and we're going to see even more innovations. Some will lead to sustained successes; others will rise and fall. The future could hold automated or driverless vehicles, drones on wheels, and drones in the air delivering goods. We may even see drones that can carry passengers across our city's air space.

The new mobility

These systems allow communications between travelers, vehicles, and the infrastructure that governs them. They could even be run by artificial intelligence that not only manages the routes, but also allows users to "talk" to the vehicle they are using.

This emerging, technology-enabled, seamless, nearly door-to-door transportation system is what we call the new mobility. It allows Seattleites to treat urban transportation as a customizable, on-demand service. They can book and pay for different transportation services as they go, based on what they need.

ASSISTANCE FROM TECHNOLOGY

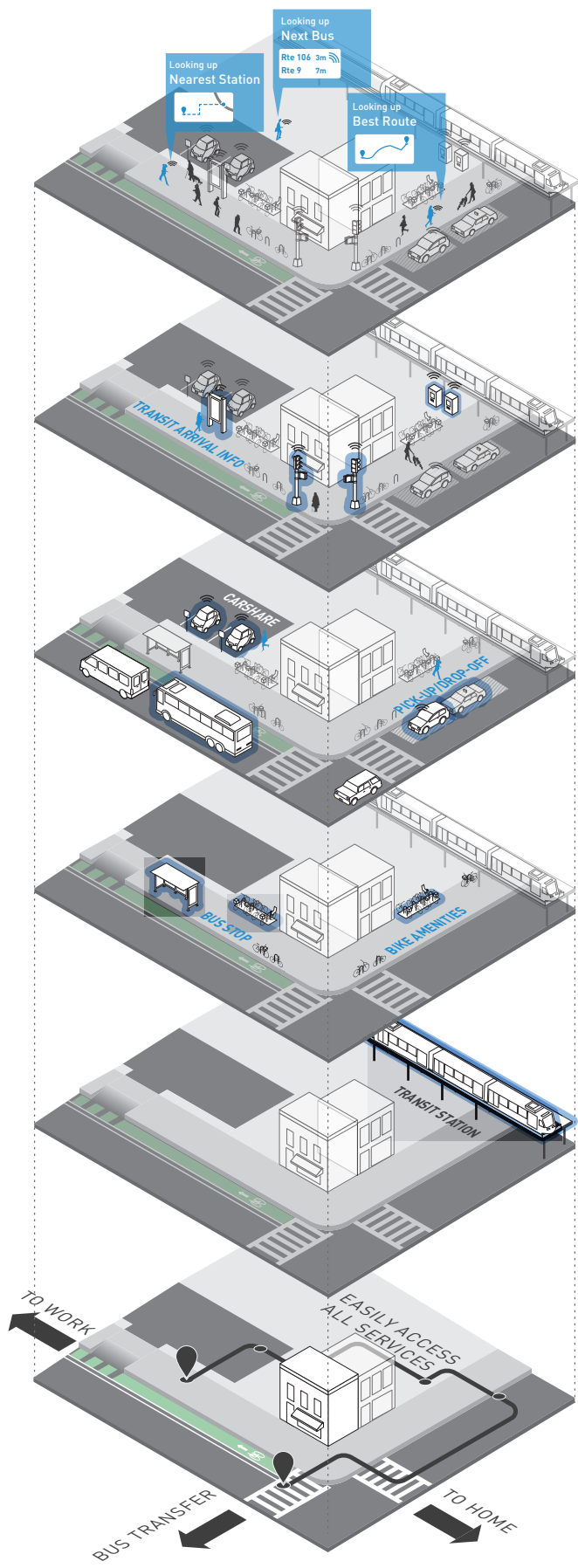
REAL-TIME NAVIGATION

MOBILITY SERVICES

INFRASTRUCTURE SUPPORTING MOBILITY

TRANSIT STATION

CONNECTIONS



Seattle's streets, sidewalks, and transit infrastructure are the conduit that move people throughout the city. More recently, shared mobility services (including public transit), real-time travel information, and other digital technologies are providing "à la carte" mobility and customer experience offerings that get people where they want to go based on their needs. These new ways that people interact with transportation infrastructure are at the heart of what we refer to as the new mobility.



Tech and the city

Seattleites tend to be tech-savvy. Our residents take over a million app-enabled ridehail and car share trips every month. This, along with the increase in transit use, is why we have fewer people driving to work alone. And yet 15% of Seattle residents do not have internet access at home and roughly a third do not have access to a mobile device.⁴

Many of these new mobility services are electric, and the share of electric vehicles across the transportation sector will accelerate rapidly in the coming years. In addition to significantly reducing pollution, the transition to electric transportation will demand coordination with the electricity sector to tap new mobility into the electric grid.

Most of the new, tech-enabled services require a credit card or a bank account, putting the out of reach for many lower-income households, especially those with poor credit or with no bank accounts.

Many ride-hailing services don't accommodate people in wheelchairs and other people with disabilities. Research from MIT and the University of Washington also shows that ride-hailing services can discriminate against people of color or of particular ethnicities.⁵ And liability risks associated with car share programs place disproportionately burdensome costs on low-income people who can't take on those risks.

Seizing the moment

New mobility could greatly benefit the people of Seattle, but it also brings risks. We created the New Mobility Playbook so we can blaze a trail toward a new mobility that works for us all. With the five plays, we are rethinking how we manage our streets to deliver an equitable transportation system in this new environment. Together, we are working to ensure that Seattle becomes an even safer, more interconnected, more vibrant, more affordable, and more innovative city.

We aim to update this Playbook every six months to reflect the dynamic nature of new mobility services and the rapid changes in transportation technology.

⁴2014 Information Technology Access and Adoption Report, City of Seattle.

⁵"Researchers from Stanford, MIT and the University of Washington find rideshare drivers discriminate based on race and gender." Stanford News, October 2016.

NEW MOBILITY TRENDS



Information is the new infrastructure.

We tend to think about the transportation system as a set of physical infrastructure—roads, bridges, sidewalks, traffic lights—along with the vehicles that use the infrastructure. But increasingly the infrastructure is becoming virtual—it's the sensors and control systems that we use to manage flow and movement and the data we collect and use to improve our travel options.

The new information infrastructure includes bike and pedestrian counters, the traffic signal controls that sense and smooth out traffic flow, and the systems that tell us if our bus or train is running on time. It's the internet-connected sensors that track vehicle speed and driver behavior and the ride-hailing apps that track our routes to determine the fare.

The flow of data will only increase as Seattleites continue to navigate the city in new ways. All that data (and the data about the data) will give us a valuable, up-to-the-minute, understanding of how people are getting around Seattle—and how we can improve the experience of getting around. To make the most of the data, we need to invest in information infrastructure: the systems to store and analyze the data, and the people to manage the systems and interpret the findings.



People will share mobility.

Whether taking public transit, hailing a ride, or using a car share vehicle, more and more people are choosing shared mobility services to get around the city. Shared mobility—the services that allow temporary use of a shared vehicle, usually for a fee—allows Seattleites to get a ride or borrow a vehicle at their convenience. Shared mobility includes public and private transportation services that fit varied needs: from a pickup truck to haul furniture to a ridehail limo for a fancy date to the public bus to get to work.

Because shared mobility services require fewer vehicles but serve more trips, they have the potential to reduce the number of vehicles on the road, reduce traffic congestion, and decrease the need to dedicate valuable space to parking.



Clean energy will power transportation.

Transportation pollution is responsible for over two-thirds of Seattle's carbon footprint, but clean hydroelectric power fuels our electrical grid, and electric vehicle technology continues to improve. New research by Bloomberg New Energy Finance forecasts that electric vehicles could take up 35% of new light duty vehicle sales by 2040.⁶

This creates ideal conditions to electrify the local transportation system. The City's Drive Clean Seattle initiative aims to transition our transportation sector from polluting fossil fuels to clean, carbon-neutral electricity by purchasing and promoting electric vehicles and adding infrastructure to make it easier for Seattleites to go electric.



Automakers are shifting to shared, electric, connected, and automated.

A recent McKinsey & Company report predicted that new mobility services could drive down the volume of car sales by more than 30% by 2030.⁷ Automakers are adapting to this shift in consumer needs and demands by developing new technologies and positioning themselves as mobility service providers. Automakers and technology firms have invested billions of dollars in the research, development, and deployment of automated vehicles and connected vehicle technology.

While demand for car ownership will likely continue well into the future, the automakers' pivot toward automated vehicle production and shared fleet services will create new mobility options, revenue models, and partnership opportunities.

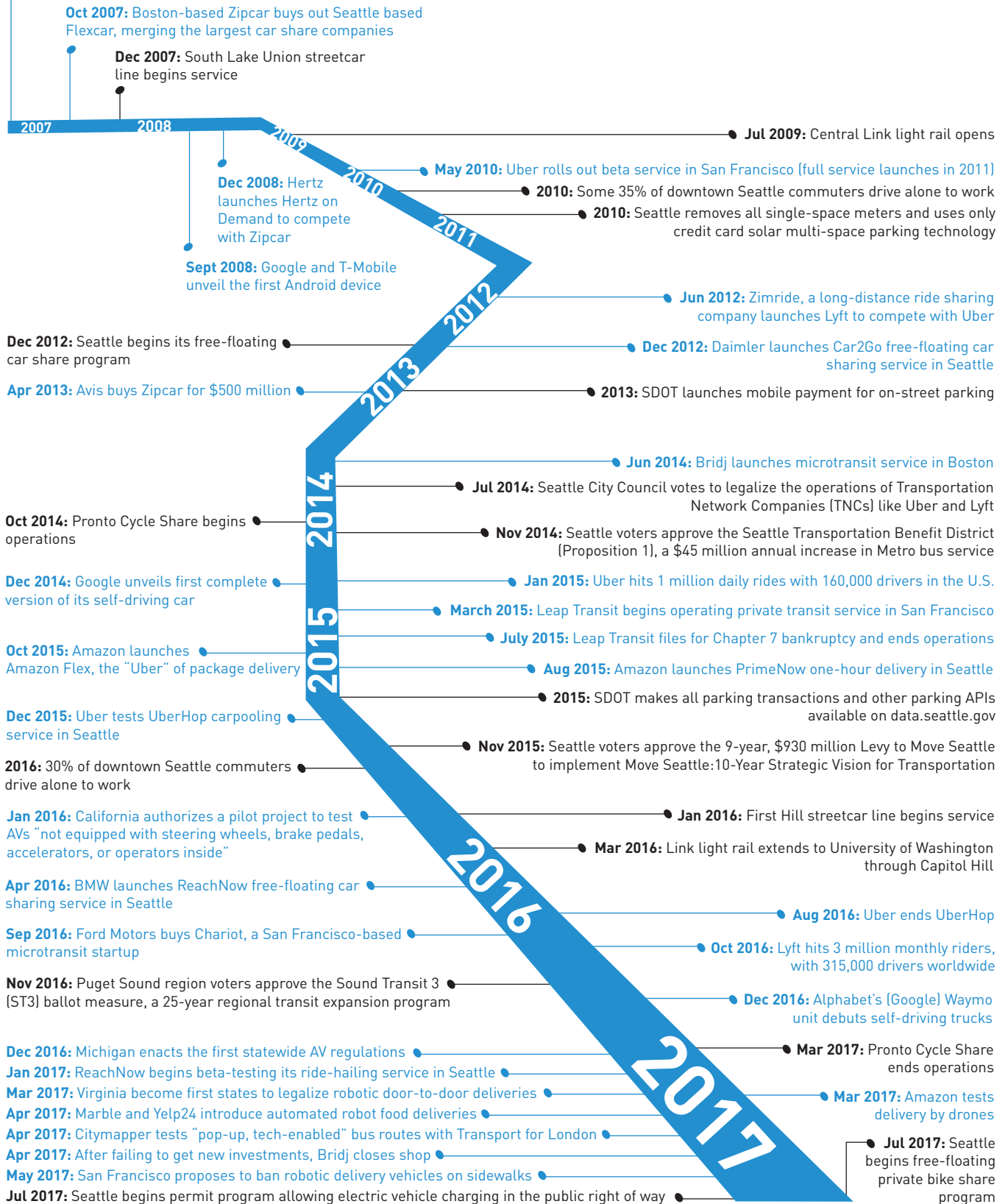
⁶*New Energy Outlook*. Bloomberg New Energy Finance, 2016.

⁷"How shared mobility will change the automotive industry," McKinsey & Company Automotive & Assembly, April 2017.

THE RAPIDLY CHANGING WORLD OF URBAN TRANSPORTATION

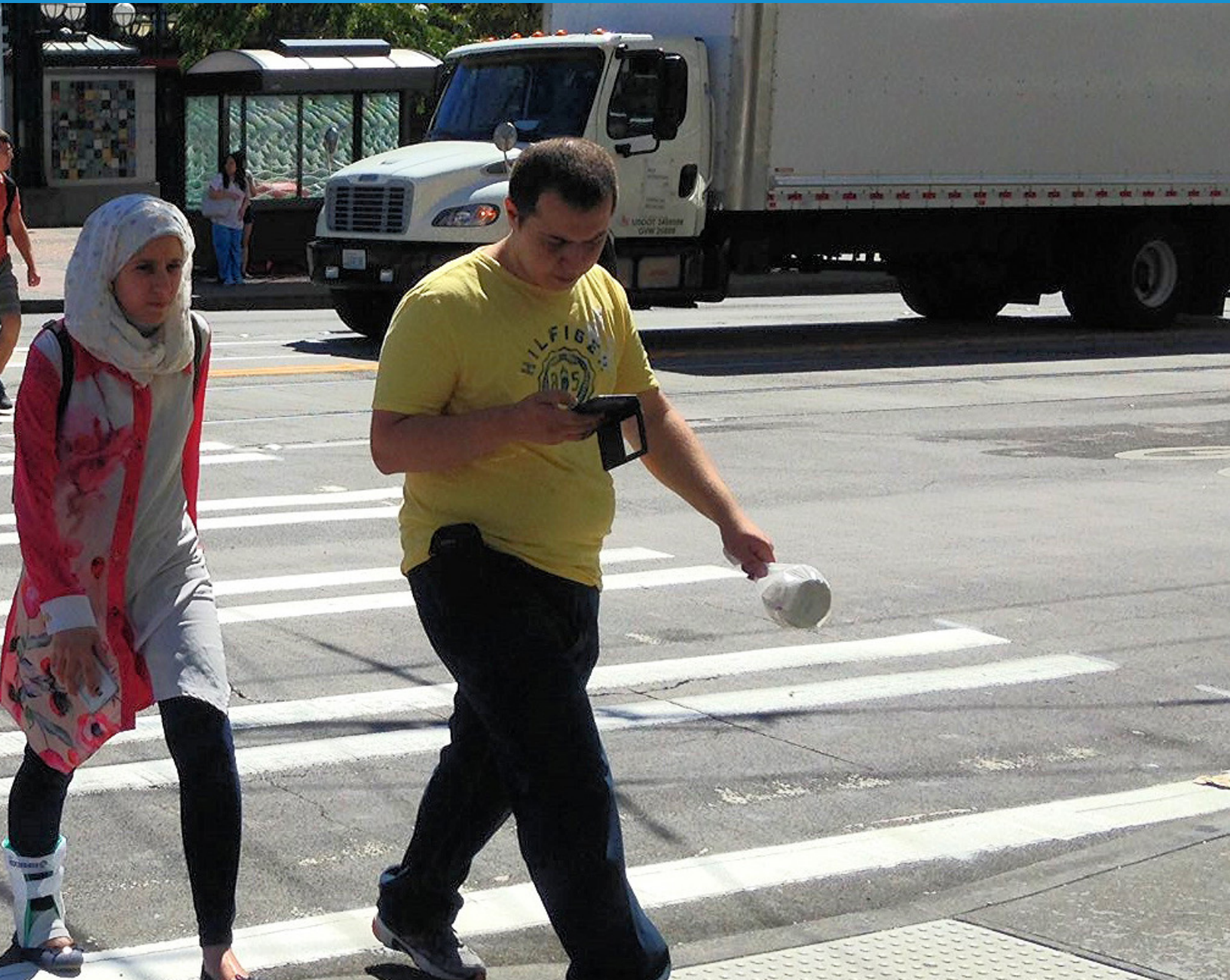
Jan 2007: Apple unveils the iPhone, begins the marketplace for phone apps

- **New mobility service or technology**
- **Key SDOT milestone**



2 OUR DIRECTION





New technologies transforming transportation have the potential to provide great benefits to Seattle—upsides that could result in more convenience, safety, equity, and affordability. But new mobility carries risks, too. There are potential downsides, from increased congestion and pollution to less support for public transit.

Our job is to manage the emerging mobility system so everyone can benefit from the upsides, while protecting against the downsides. Together, we can create a transportation system that works for us all.



THE UPSIDE

Potential benefits of new mobility

1. We can accommodate growth without increasing congestion

New mobility options, paired with transit, could replace or reduce the use of private cars, especially if shared automated vehicles become a reality. By 2030, as many as 108,000 privately owned cars could come off the streets of Seattle—a 27% reduction. If fleets of shared, automated vehicles go into service, there could be an astonishing 45% fewer cars in Seattle.

Before autonomous vehicles hit our streets, giving up one's vehicle could equate to roughly \$10,000 in cost savings for people who regularly use public transit, car share, ride-hailing, and bike share services.⁸

This shift away from private cars would not only prevent traffic from worsening, it also could save road space by reducing the need for parking. Privately owned cars are usually driven for 1.5 to two hours a day. The rest of the time, they're stored in parking lots, garages, and on our streets. Storing personal cars is a burden on our limited public right-of-way—Sightline Institute estimates that parking takes up between 10 and 20 percent of the area of cities in the Pacific Northwest.⁹ It also contributes to our ongoing housing affordability crisis.

New mobility services could free up precious city space so we can put it to more productive use, like dedicated transit lanes, wider sidewalks, safer bikeways, or public parks and plazas.

⁸See Appendix B for more details.

⁹www.sightline.org/2013/08/08/park-place/

2. We can enable more transportation options

New mobility services can complement public transit, adding convenience and flexibility to the transportation system. For example, with new mobility, someone could share a ride to a transit station, then take rapid transit, then get off at another station where they could use bike share, ride share, or car share to get to their destination.

New mobility could also add predictability to our monthly transportation expenses. Data-driven mobility platforms could allow us to decide how much we want to spend on transportation each month and then provide us with the most cost-efficient ways to travel every day.¹⁰

New mobility services could benefit people with disabilities and older adults by expanding their options for getting where they need to go—as long as they are comfortable using the technology. Research has shown that the more options older adults have, the better positioned they are to age in place.

3. We can build a more responsive transportation system

With vehicles that can carry many people at once, public transit will remain the most efficient way to move large numbers of people. Yet, public transit becomes less efficient in areas and times in which fewer people use it.

Partnerships with new mobility providers may have great potential to offer more responsive services at more cost-efficient rates in certain geographies and at certain times of the day. For example, we analyzed the cost of paying for ride-hailing fares as an alternative to providing transit service and found that paying for ride-hailing fares could be a more cost-efficient way to provide as many as 5% of transit trips by bus. The majority of these trips occur late at night and early in the morning,

when bus ridership is lower and service is less frequent. While there are additional important factors to consider, if those trips could be served by new mobility, Metro could reallocate resources to provide even more frequent service in corridors in need of more service.

The data generated by new mobility could also revolutionize the way we plan the transportation system and direct resources. We could operate more nimbly while also making better-informed policy decisions and investments. We could have more responsive transportation management and may even be able to forecast and correct for problems before they occur.

¹⁰Appendix B includes an economic analysis that estimates how many households could forgo car ownership in favor of shared mobility, and, in return, realize significant financial savings.

4. We can create a more equitable transportation system

Coupled with high-quality public transit, new mobility enables self-determination. When people can decide how to get from one place to another, quality of life improves. And when great options are available to everyone, we all have an opportunity to thrive, regardless of race, ethnicity, ability, age, sex, or income.

New mobility services could lead to greater equity by connecting workers to jobs that are currently difficult to get to on public transit. This is especially true of commute trips that don't start or end in downtown or in the peak periods. For example, someone who lives in Lake City could get to a job in Georgetown without having to go through downtown, saving time.

New mobility services could help the city provide more efficient and cheaper transportation to those who can afford it least. The data that these services generate will help us understand the unseen biases in the transportation system so we can correct them. We can then create incentives and regulation to make sure the system serves everyone. We could also better target subsidies to those who need them most.

The new mobility paradigm could potentially offer new, better-paying, and technology-based job opportunities. Entire new industries are being created. If actively engaged, we could align workforce pipelines and development opportunities with community partners.

5. We can have a safer and greener transportation system

The transportation sector generates over a quarter of the country's greenhouse gas emissions, a key contributor to climate change. In Seattle, transportation pollution represents over two-thirds of our carbon footprint.

If they shift people away from driving a private car, new mobility services could significantly reduce harmful emissions. By 2030, that could mean 85,000 fewer daily trips of people driving alone—a 4.4% decrease from 2014 daily trips. Emissions would decrease even more if we required all new mobility vehicles to run on electricity. See Appendix B for more detail.

Fully automated vehicles could also reduce vehicle crashes. Automation will remove risky driving behavior, anticipate collision factors, and control speeding, making the streets even safer for people on foot, people on bikes, and people in vehicles.



Missing any upsides?
Email newmobility@seattle.gov



THE DOWNSIDE

Potential risks of new mobility

1. We could have more congestion and more pollution

Recent research out of San Francisco, New York City, and Denver shows that ride-hailing services like Uber and Lyft are adding to traffic congestion. While these services may be reducing private car use, they are also putting more cars on the road—cars that are cruising already-congested areas, circling as they wait for customers, and sometimes blocking travel lanes.

Recent research from the San Francisco County Transportation Authority found that ride-hailing makes up roughly 15% of all trips within San Francisco.¹¹ Last year, ride-hailing services appear to have added more than six million miles of driving on New York City's streets. From 2013 to 2016, ride-hailing added an estimated 7% to existing miles driven in the most congested areas of Manhattan, Brooklyn, and Queens. There is also data coming from London and Washington D.C. that shows e-commerce has increased deliveries and put more delivery trucks on the road.

We don't currently have the same data available, but preliminary analysis suggests an increase in cruising in downtown Seattle. This behavior is very different from the circling pattern of drivers looking for parking. We estimate that as much as half of the vehicles cruising and circling downtown are ride-hailing vehicles, including taxis, for-hire, and ridesourcing services.

Automated vehicles may not require parking, but they could also increase congestion. Especially if they are privately owned, automated vehicles could transport children too young to drive or older adults unable to drive. While this is great for personal mobility, it could mean more vehicles on the road. Automated vehicles could also run without passengers (or zero occupancy vehicles) in between rides. Apart from potentially adding to traffic congestion, new mobility vehicles that run on fossil fuels would increase the city's total greenhouse gas emissions.

Without strategic action by the City and its partners, we risk people using lower-occupancy automated vehicles and ride-hailing services to take more and longer trips. We need policies that require and incentivize clean energy for new mobility services and require fully autonomous vehicles be electric and part of shared fleets. We also need the right mix of incentives and disincentives to keep ride-hailing, even autonomous vehicles from cruising around empty while they wait for customers.

¹¹"TNCs Today: A Profile of San Francisco Transportation Network Company Activity", San Francisco County Transportation Authority, June 2017.

IS RIDE-HAILING CONGESTING NEW YORK CITY?

New York City had been seeing an increase in traffic congestion rates over the last few years. Their transportation managers suspected that ride-hailing was a part of the problem, but they didn't have the data to support the analysis. Using data from taxis (which are required to have GPS tracking) and from bus, subway, and bike share (all equipped with GPS) allowed researchers to infer that up to 7% of the additional congestion in Manhattan was likely from Uber and Lyft vehicles.

In February 2017, New York City's Taxi and Limousine Commission unanimously approved a rule that would require ride-hailing providers to share their data on the locations of pick-ups and drop-offs. The data will help the city understand where the biggest demand for service is so they can respond with better traffic management, new policies, or improved public transit. Data can help the city predict where congestion is likely to happen. Data can also show where services like Uber and Lyft don't go—despite demand—to see if the exclusion is discriminatory.¹²



¹²"The secret Uber data that could fix your commute," WIRED, February 3, 2017.

2. New mobility services could lead to more inequity

New mobility services should be affordable, intuitive, and available to people of all backgrounds. As Seattle becomes more culturally diverse, we will be challenged to ensure equitable access to new mobility services.

Almost a fifth of Seattle residents were born in another country. Close to a quarter of residents speak a language other than English at home.¹³

New mobility services could leave already marginalized populations behind if:

- The service is marketed in only one or two languages or is culturally inappropriate
- The services are too expensive
- The physical locations of the services exclude communities of color or low-income neighborhoods
- The services do not accommodate the unique needs of families with children, youth, older adults, women, or people with disabilities
- The algorithm or the human providers discriminate against LGBTQ, people of color or of certain ethnicities using names or pictures
- Some residents do not know how to use these services
- Not all Seattleites can access or pay for shared mobility services because they lack a bank account

While 72% of Seattleites own a laptop and 66% own a mobile device (a smartphone or a tablet), at least 15% of Seattle's residents have no internet service at home. Home internet access is even lower for immigrant and refugee families.¹⁴ Residents earning under \$20,000 per year are about 25% less likely to use the internet than those earning more than \$100,000 per year.

Many shared mobility services require users to have a smart phone and have a debit or credit card to register or pay for service. Prices of smartphones are dropping and more and more Seattleites have access to one, but access to credit is still a barrier. How do "unbanked" people who do not have credit cards, debit cards, or checking and savings accounts, and the "underbanked" who have poor or unreliable access to formal financial services benefit from new mobility? An FDIC survey showed that roughly 4% of households in the Seattle-Tacoma-Bellevue area qualify as unbanked, while 16% are underbanked.¹⁵

Without proper oversight and solutions to ensure equity, we risk advancing transportation options that are not accessible to a significant portion of the population.

¹³American Community Survey, 2014.

¹⁴2014 Information Technology Access and Adoption Report, City of Seattle.

¹⁵2015 National Survey of Unbanked and Underbanked Households, Federal Deposit Insurance Corporation, 2015.

3. We could erode the support and resources for public transit

Public transit—the original and most vital “shared mobility” mode—is the most efficient and cost-effective way to move people through the city. Public transit also makes the city more affordable, accessible, and vibrant.

New mobility services could compete with public transit. While research shows that people who use ride-hailing services are also more likely to use transit, we could see a shift if new mobility services deliver convenience and affordability that undercuts public transit. If we are not careful, every trip shifted from transit

to a lower occupancy shared mode will could exacerbate congestion, contribute to longer travel times for other travelers, and reduce the cost-effectiveness of public transit.

The shift toward shared mobility services and electric vehicles could impact the funding streams we depend upon to maintain, operate, and expand our transportation system and services. Revenues from the gas tax, commercial parking tax, and parking meters will likely decrease, compelling us to identify new and creative funding sources to support and continue to enhance public transit.

4. We could disrupt the economy and lose jobs faster than innovation creates them

Seattle is home to tens of thousands of licensed ride-hailing vehicle drivers. There is an ongoing legal dispute over whether the drivers are contractors or employees, and another fight on whether they can unionize. And yet, all these jobs could be threatened if new mobility services shift rapidly to autonomous vehicles.

We could also lose jobs if new mobility services eat into the ridership of public transit. Fewer riders translates into lower farebox revenue for public transit, which could result in reduced services and lay-offs. The changing nature of urban goods delivery could also see major job losses for delivery drivers.

5. We could have systems we don't understand, can't manage, and can't protect

We cannot effectively manage our streets without the right data. But currently, Seattle does not have access to the real-time and historic data generated by many new mobility services. This lack of access can create an uneven playing field between the City of Seattle and the service providers.

While we need to ensure the privacy of users and protect each company's ability to compete, we also need to make sure the system is safe and equitable. Data allows us to understand and assess the impacts of new mobility services and technologies on the transportation network.

Without proper access to data and secure, modern systems to protect and analyze it, we risk being unable to protect our communities and residents. New mobility services driven by artificial intelligence could make decisions we can't understand or interrogate.¹⁶ Further, malicious actors could hack and compromise the computer systems that run these services. There are also documented cases where new mobility providers used their algorithms to deceive authorities.¹⁷

We need policies and safeguards that allow us to understand and better manage these systems.



Missing any downsides?
Email newmobility@seattle.gov

¹⁶See "The Dark Secret at the Heart of AI," MIT Technology Review, April 2017.

¹⁷See "Uber faces criminal probe over the secret 'Greyball' tool it used to stymie regulators," L.A. Times, May 5, 2017.

PRINCIPLES FOR NEW MOBILITY

As new mobility presents both upsides and downsides, we must guide our actions with clear principles. These principles reflect our city and regional values,¹⁸ aligning the opportunities presented by innovative mobility services with our commitment to serving the public good. Our approach to mobility innovations and shared transportation in Seattle will be driven by the following:

Put People and Safety First	The public right-of-way is our most valuable and most flexible public space. Our streets should prioritize access for people, amplifying the role and value of walking, biking, and transit in Seattle. We respect the desire to retain and use privately owned vehicles but will continue to manage the transportation system to move people and goods safely and efficiently. Safety is paramount, no matter how you get around Seattle. Our streets should be comfortable and intuitive for our most vulnerable travelers (people walking and biking). Shared, automated, and other new mobility models should not only advance our Vision Zero safety goals, they should also maintain consumer protections.
Design for Customer Dignity and Happiness	Transportation happiness is a key indicator of the 21st century Seattle Department of Transportation. We will not only simplify and enhance the user experience of public transit and new mobility services, we will also continue to promote a diversity of transportation choices. Dignified public transit and new mobility services must accommodate people with mobility impairments, non-traditional schedules, and families that need flexible mobility options.
Advance Race and Social Justice	Mobility, whether shared, public, private, or automated, is a fundamental human need. Everyone needs a barrier-free transportation system and affordable transportation options that are understandable and accessible to all who want to use them. New mobility models should also promote clean transportation and roll back systemic racial and social injustices borne by the transportation system.
Forge a Clean Mobility Future	We are committed to climate action. We will transition our transportation sector to one that furthers our climate goals and builds replicable models for the rest of the world. New mobility services should use clean energy and expand human-powered transportation.
Keep an Even Playing Field	Data infrastructure is foundational to understanding, operating, and planning in a constantly changing transportation system. Partnerships and a fair and flexible regulatory environment will nurture and expand new mobility ideas, companies, jobs, and workforce training.

¹⁸We collaborated with King County Metro on these Principles for New Mobility.

3 OUR PLAYBOOK





OUR PLAYS

New mobility is constantly changing and evolving. New startups with new services continue to enter the market and our transportation system. New players could pop-up one month and suddenly fold six months later.

As this era of rapid change plays out around us, there are two elements of our transportation system that do not change:

1. Our hard infrastructure (sidewalks, roads, bridges, etc.)
2. Our mission, vision, values, and goals

These two elements establish the parameters for where and how new mobility innovations are tested and deployed. This is our playing field. We know it. We will protect it. We will play to succeed.

We will work with new mobility through five “plays” so that new technologies adapt to, rather than reshape, our city. These plays, along with a set of concrete strategies, will help us achieve the ideal outcomes and avoid the most problematic

scenarios. They will guide the way we want new mobility to work for the city and our residents, the way the Seattle Department of Transportation works, and the way we prepare for rapid, unpredictable change.

Over the next 18 months, we will implement our *First Moves*—our immediate (and even current) actions—and we will issue Invitations to *Innovators*, calling upon them to bring their solutions to Seattle and help us achieve our goals.

Appendix A provides additional details about the strategies that can achieve our five plays over the next five years—with the understanding that trends and technologies will continue to rapidly change.

Each play, corresponding strategy, first move, and further action is based in our principles for new mobility and help us achieve Seattle’s five core values.

Our five plays are to:

PLAY 1:

Ensure new mobility delivers a fair and just transportation system for all

PLAY 2:

Enable safer, more active, and people-first uses of the public right of way

PLAY 3:

Reorganize and retool SDOT to manage innovation and data

PLAY 4:

Build new information and data infrastructure so new services can “plug-and-play”

PLAY 5:

Anticipate, adapt to, and leverage innovative and disruptive transportation technologies

PLAY 1:

Ensure new mobility delivers a fair and just transportation system for all



IF WE LEAVE IT TO CHANCE...

There are more transportation choices, but only for those who can afford it. New mobility innovations cannibalize resources and erode support for public transportation. Workers are vulnerable to disruptions. The city becomes disconnected.

IF WE SHAPE IT...

More affordable and better integrated transportation choices make the city and the region more accessible to people with disabilities and the disadvantaged. Public transit flourishes. The transportation workforce earns a living wage and is resilient to disruptions.

We must ensure that shared mobility services provide dignified, reliable, and affordable transportation options that are accessible to all. We will make targeted investments and broker partnerships to integrate new technology and ensure seamless connections to and between shared mobility modes. New services should be attentive to the needs of people of color, low-income, immigrant, refugee and aging populations, women, families, youth, LGBTQ people, and people with disabilities. New mobility options and technology must fight against the displacement of vulnerable communities and develop the living wage transportation workforce of tomorrow. We will:

Strategy 1.1: Advance shared mobility equity programs targeting people of color, low-income, immigrant, refugee, youth, and aging populations, women, LGBTQ, and people with disabilities

Strategy 1.2: Deploy digital equity solutions to ensure everyone has access to app-enabled mobility options

Strategy 1.3: Advance as diverse an array of payment options as possible to improve access to app-enabled mobility options

Strategy 1.4: Ensure new mobility services are ADA accessible across the region

Strategy 1.5: Ensure new mobility complements and enhances the public transit system

Strategy 1.6: Develop integrated shared mobility hubs to seamlessly connect people to and between mobility services



PLAY 2:

Enable safer, more active, and people-first uses of the public right of way



IF WE LEAVE IT TO CHANCE...

Car ownership may go down, but vehicle miles traveled (VMT) increase, leading to more congestion. Ride-hailing services crowd our curbs and e-commerce demands overwhelm our goods delivery system. The urban environment becomes more hostile to people walking, people with disabilities, older adults, and people riding bikes. Overwhelmed by these changes, our streets lose vibrancy.

IF WE SHAPE IT...

We expand the network of pleasant public spaces and people-friendly streets. We can accommodate more green space as our population grows, which encourages more walking and biking. People feel safe walking along and across streets. Serious traffic collisions are eliminated and Seattle attains Vision Zero. The streets function well and goods are delivered efficiently.

New mobility services can potentially move more people using fewer vehicles. This would reduce the need for car storage (parking) and help us align our streets with our right of way priorities: mobility, access for people, and activation first; storage last. We can change the way we use our streets, sidewalks, and curbs. We can provide more space to people, while accommodating urban goods delivery. Managed appropriately, new mobility services can help us fulfill our Transit, Pedestrian, Bicycle, and Freight Master Plans, as well as achieve the goals of our Move Seattle strategy.

We will harness the efficiency benefits of shared mobility to make way for a future with great pedestrian spaces and community places, no fatal and serious traffic collisions, more reliable transit, and safe, convenient routes for people of all ages and abilities to ride their bikes. We will also partner with regional logistics leaders and startups to implement innovative policies and services that facilitate the movement of urban goods and e-commerce deliveries. We will:

Strategy 2.1: Recover street space and expand the public realm as the demands for access shift

Strategy 2.2: Ensure that new mobility advances our Vision Zero goal of ending traffic deaths and serious injuries on city streets by 2030

Strategy 2.3: Support the development of efficient urban goods delivery and new freight technology solutions



PLAY 3:

Reorganize and retool SDOT to manage innovation and data



IF WE LEAVE IT TO CHANCE...

Lack of capacity and knowledge leads the city government to over-regulate in some areas, and is preempted from critical regulatory and auditing functions in other areas. City government stifles innovation or is susceptible to unintended consequences.

IF WE SHAPE IT...

The city becomes a proving ground for innovation, improving transportation options for residents. Our data infrastructure allows us to manage the transportation system in real-time, providing anticipatory responses and strengthening protections against emerging threats.

We will advance innovative, data-driven policies, services, technologies, and projects that create an abundant mobility marketplace with options for all. The Seattle Department of Transportation will be a 21st Century DOT, accommodating changing consumer expectations and leveraging disruption in the mobility industry to meet our desired outcomes. We will engage in a two-way dialogue about new mobility. We will also be transparent as we test and learn about new ideas, daylighting our successes and lessons learned. We will pivot to new funding mechanisms as our gas tax and parking revenue sources deplete over time. This will require data-driven, anticipatory governance and a fresh perspective on organizational structures, staff skills, procurement rules, and partnerships. We will:

Strategy 3.1: Manage risk related to emerging mobility services

Strategy 3.2: Foster a culture of innovation and proficiency in new mobility solutions

Strategy 3.3: Understand the mobility needs of the community

Strategy 3.4: Continuously update citizens about mobility innovations

Strategy 3.5: Pursue nimble regulations that meet the public good while spurring innovation

Strategy 3.6: Establish new transportation funding mechanisms in response to the changing financing landscape

Strategy 3.7: Build strategic mobility partnerships with King County Metro, Sound Transit, and other public and private entities

Strategy 3.8: Attract mobility companies, services, and jobs to Seattle's burgeoning mobility industry cluster

Strategy 3.9: Encourage travel behavior that ensures people can move safely and efficiently

PLAY 4

Build new information and data infrastructure so new services can “plug-and-play”



IF WE LEAVE IT TO CHANCE...

Disconnected systems and lack of interoperability creates new transportation silos. Data asymmetries leave users in the dark and allow private mobility players to game the system. Transportation technologies are vulnerable to cyber attacks.

IF WE SHAPE IT...

We create clear rules for testing new technology, piloting new services and prototyping in the city. The results of prototypes are clearly evaluated against the city’s values and goals. Successful prototypes can scale rapidly. Services that don’t work can “fail gracefully.” Transportation data is open and interoperable. Finding your way around the city without your own car is easy. Seattleites can purchase transportation services when they need them.

Our streets flow with a rich stream of data generated by traffic sensors, on-vehicle sensors, and mobile data from ride-hailing, car share, and other services. This flow of data could give us more insights into emerging travel patterns and the effects of new mobility services on the way people use transportation. But the flow of data is currently unstructured and our community has concerns about privacy. We will advance solutions that protect publicly identifiable information, while expanding our data infrastructure. We will relay travel information in culturally sensitive and appropriate ways.

Approaching data not just as information, but also as infrastructure, will help us build a better platform for delivering Mobility as a Service: generating abundant shared mobility options, digital mobility marketplaces, seamless fare payment solutions, incentives and subsidies, and access to real-time mobility data.

This data infrastructure will also help us develop clear rules so startups can roll out their prototypes and pilot services in Seattle. We will:

Strategy 4.1: Access relevant data to ensure the public good is served

Strategy 4.2: Facilitate trusted data flows between connected vehicles, sensor infrastructure, personal devices, and community digital devices

Strategy 4.3: Develop analytical tools that model the evolving state of mobility

Strategy 4.4: Establish an open marketplace for Mobility as a Service

Strategy 4.5: Simplify and enhance the fare payment experience

Strategy 4.6: Unlock new opportunities for trip planning

PLAY 5

Anticipate, adapt to, and leverage innovative transportation technologies



IF WE LEAVE IT TO CHANCE...

The transportation system is unable to adapt to or leverage innovations when the city gets locked into dead-end technologies, much like how governments got locked into Blackberry phones for years even while iPhone and Android were becoming ubiquitous.

IF WE SHAPE IT...

Seattle leads in transportation thinking and practice. New mobility accelerates a virtuous cycle that makes the city safer, more affordable, more livable, more vibrant. Technology adapts to the city and what we want it to be. Quiet, zero emission vehicles that run on clean energy dramatically reduce climate and noise impacts.

In Seattle, we have a long tradition of testing new technology, including the roll out of our mobile parking payment app and pay stations. By establishing a policy framework that anticipates new, potentially disruptive technologies, we will harness new mobility to meet our broader community goals. Our vision for automated mobility focuses on shared transportation, connected movement, and clean vehicle technology. We will pursue these technologies to complement our robust investments in transit. We will manage the negative impacts of single-occupant and zero occupant vehicles. We will also advance innovations in electric mobility and other clean fuels. We will take action to ensure that, by 2030, at least 30 percent of all light duty vehicles registered in Seattle are electric. And, we will collaborate with other cities, experts, and global leaders to exchange successful policy and technological innovations. We will:

Strategy 5.1: Establish a comprehensive set of people-first policy parameters to introduce and manage fully shared, electric, connected, and automated vehicle¹⁹

Strategy 5.2: Use pilots and promotions, to manage the technological and cultural shift to automated technology

Strategy 5.3: Promote the shift toward electric shared mobility services

Strategy 5.4: Support King County Metro in their effort to achieve a zero-emissions fleet by 2034



¹⁹See Appendix C for our preliminary policy framework, which will be updated periodically.

OUR FIRST MOVES

While planning and vision are critical to shaping our transportation landscape, we must also take immediate actions to jump start changes that can benefit our city and lay the groundwork for future innovation.

The following 20 “first moves” represent the most foundational and strategic actions that will set us up for success over the long-term. Each first move corresponds to a specific play and strategy.

These first moves will allow us to jump start changes that will make our transportation system more sustainable, get ahead of negative impacts for vulnerable communities, and expand access to new technologies and transportation options.

Over the next 18 months, we will...

Establish the following policies:

1. Adopt the preliminary Automated Mobility Policy Framework (see Appendix C) as an ordinance and require annual updates to reflect changes within the automated mobility industry **(Strategy 5.1)**
2. Adopt a policy framework and permit program that enables electric vehicle charging in the public right of way **(Strategy 5.3)**
3. Develop a set of principles to guide ongoing regulatory and legislative efforts—including a protocol for updates (see SDOT’s regulatory principles in Appendix D) **(Strategy 3.5)**
4. Craft a free-floating bike share policy framework to extract the most benefit out of privately funded bike share systems **(Strategy 3.1)**
5. Partner with King County Metro and Sound Transit to develop a microtransit policy framework and pilot its ability to serve first-/last-mile connections, emerging transit markets, and capacity relief needs **(Strategy 1.5)**

Initiate the following programs:

6. Build staff capacity for data analytics, technology investments, pilot delivery, and policy-making **(Strategy 3.2)**
7. Host community conversations with transportation advocates, social justice-oriented community-based organizations, and community members to understand broader challenges and opportunities related to new mobility **(Strategy 3.3)**
8. Work with regional and national partners to establish a neutral trusted data platform that houses data from new mobility service providers, sensors, and other data sources, automates data analytics, and enables predictive analytics **(Strategy 4.2)**
9. Develop a Mobility as a Service platform that enables an open marketplace for mobility aggregation apps to compete and meet customer needs **(Strategy 4.4)**
10. Develop a Shared Mobility Hub program with a public-facing brand, actionable Implementation Plan (including a regional definition of shared mobility hubs, a hub typology, access hierarchy, siting plan, financing, phasing, and other implementation considerations), and demonstration sites **(Strategy 1.6)**
11. Develop a digital data master plan to take stock of our data, establish data sharing standards, and create data handling and privacy standards for the trusted data platform, Mobility as a Service platforms, and connected infrastructure **(Strategy 4.1)**
12. Democratize and test technology in the public right of way such as interactive digital kiosks and other information interfaces **(Strategy 4.6)**
13. Develop a multi-income level shared mobility subsidy program **(Strategy 1.1)**

Conduct the following research:

14. Work with the University of Washington's Urban Freight Lab to understand the impacts and benefits of e-commerce and other emerging shared goods delivery models in Seattle **(Strategy 2.3)**
15. Conduct a Racial Equity Toolkit for the New Mobility program to ensure shared mobility initiatives promote, rather than roll back, equity **(Strategy 3.1)**
16. Analyze the labor implications of automated and electric mobility strategies to mitigate job loss, identify new growth areas for people of color, low-income, immigrant, and refugee communities, and pinpoint workforce development and training needs **(Strategy 5.2)**

Prototype or pilot the following projects:

17. Expand 3-minute passenger loading zones citywide from which ridesourcing and microtransit services can be required to pick-up and drop-off passengers (i.e., "pin drops" are tied to physical passenger loading zones) **(Strategy 2.1)**
18. Develop new solutions for the Wheelchair Accessible Taxi (WAT) program to reduce operating costs, meet customer expectations, and work more efficiently across jurisdictional boundaries **(Strategy 1.4)**
19. Strategically site electric vehicle fast charging infrastructure at shared mobility hubs to facilitate electric shared mobility **(Strategy 5.3)**
20. Establish a permit process that allows sensor infrastructure providers to expand the network of sensors at intersections and multiply vehicle-to-infrastructure (V2I) communications citywide **(Strategy 4.2)**

OUR INVITATIONS TO INNOVATORS

We're looking for innovators and creative thinkers in fields like technology, transportation and government to bring their solutions to Seattle.

Many of the strategies included in the Playbook will require collaboration with government agencies, private companies, and community groups to achieve our shared vision for the future of transportation in Seattle. As we implement the Playbook, there will be opportunities for partners to:

- Collaborate on solutions to equity challenges
- Work for change in the community
- Launch or prototype a new product or service
- Advise on technology
- Contribute to policies and proposals

We invite you to join us by sharing your contact information and initial thoughts at www.newmobilityseattle.info.

We invite innovators to help us answer the following questions:

1. How might we open up data from new mobility services in a way that serves the public good, but also protects the privacy of users?
 2. How might we obtain frequently updated data (even up-to-the-minute data) on how new mobility services are impacting the transportation system and furthering racial and social justice?
 3. How might we design new mobility services so they work just as well for people with disabilities (including the neurodiverse) and for older adults?
 4. How might we allow people to pay for new mobility services without a credit card or a bank account?
 5. How might we create information interfaces for new mobility that do not require a smartphone, a gadget, or a screen?
 6. How might we create localized test procedures that allow us to safely test prototypes on city streets?
 7. How might we create incentives and nudges to encourage people to use the most economical, most operationally efficient, and environmentally-friendly shared or new mobility service?
 8. How might we encourage and create a system that uses data, technology, and new delivery vehicles to deliver e-commerce and urban goods?
 9. How might we use technology to make the street friendlier to people walking and biking?
 10. How might we use sensors that tell us very useful information about how people are using our roads, streets, sidewalks, and public spaces while respecting their privacy?
 11. How might we make sure human providers and drivers of new mobility services are economically resilient?
 12. How might we redesign our procurement process so we can find innovative solutions and better partner with the private sector?
-



If you have ideas that are relevant to our questions above, please email us at newmobility@seattle.gov.

WE'RE JUST GETTING STARTED...

In Seattle, we know that innovation and new technology, when applied in service to the greater good, can reshape the world for the better. The people of Seattle have driven the personal computer revolution, changed the way we shop and read, engineered revolutionary aircraft, and spread gourmet coffee across the globe, all while taking the necessary steps to ensure racial and social equity as our city changes.

Now, as transportation becomes increasingly shared, active, self-driving, electric, and data-driven, we look forward to building upon our legacy of innovation to ensure the fast-paced changes in mobility contribute to a city that is safer, more sustainable, and more equitable.

The New Mobility Playbook offers guidelines and a game plan to address emerging technologies and prepare for changes that are yet to come. We expect to update the Playbook every six months as new opportunities and challenges emerge. We look forward to collaborating with you to adapt and improve the Playbook and begin implementing solutions that will create a transportation system that works for us all.



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APPENDIX C

PRELIMINARY AUTOMATED MOBILITY POLICY FRAMEWORK

PRELIMINARY AUTOMATED MOBILITY POLICY FRAMEWORK FOR SEATTLE

The automaker and transportation technology industries are investing billions of dollars to advance automated vehicle (AV) research and development. The industry envisions bringing the technology to market within the next decade. Automated vehicles have the potential to dramatically reduce traffic deaths and serious injuries, helping us achieve our Vision Zero safety goals. Shared automated fleets could also strengthen connections to and from public transit, and dramatically reduce the personal costs of mobility. But how do we transition to a future with connected and automated vehicles without exacerbating congestion and land use impacts? Automated vehicles will be a reality in Seattle and we must be prepared to extract the best outcomes from their arrival.

Like any other emerging technology, the City of Seattle must shape how automated mobility impacts and benefits our citizens even as the details of the technology are in flux. We will plan for the inevitable emergence of connected and fully automated vehicles with a historical lens. Cities around the country continue to learn tough lessons from overreliance on the automobile. As a new model of automobility is introduced to Seattle, we have a century's worth of experience understanding and managing the impacts of motor vehicles. As automated vehicles arrive in Seattle, we must ask: What do we want our city to look like? To what extent should we use these new technologies to ensure our citizens are included, happier, healthier, safer, and more financially secure?

“New disruptive technology has the potential to remake city streets, and policies must directly address their expected widespread impact on safety, mobility, and land use”

– NACTO, [Policy Recommendations for the Future of Automated Vehicles](#)

The following policy framework directs us toward a future with fully automated, shared, connected, and electric mobility, and advances Seattle as a walkable, bikeable, transit-oriented, and innovation friendly city in the future. Our approach balances innovation with setting clear expectations for management and operating parameters. We aim to:

1. Continue prioritizing the needs of people walking, biking, and taking transit and leveraging the growth of our robust transit network
2. Support the development and testing of automated mobility technology, learning from the pilots and partnerships with local and national technology and operating equipment manufacturers (OEMs)
3. Establish clear policy parameters that ensure automated vehicles help achieve the Mayor's five core values and our shared and emerging mobility principles —not counteract them

Building on the National Association of City Transportation Officials' (NACTO) Policy Statement on Automated Vehicles, released in June 2016, Seattle's automated mobility policy framework is organized according to seven policy pillars. While we intend to adopt the policy framework by City Council ordinance, the policy directives highlighted below should be reassessed periodically to mirror, not only the dynamic nature of the automated mobility industry and new advancements in supply and demand side mobility strategies, but also the complex dynamics related to shifting from human-operated vehicles to fully automated vehicles. This is a starting point that will be monitored and updated as the field advances.

What are the ground rules for regulating automated vehicles?

In 2016, the United States Department of Transportation (USDOT) and the National Highway Traffic Safety Administration (NHTSA) establish draft regulatory guidance on federal and state agency roles regarding the manufacture and operation of automated vehicles. USDOT and NHTSA have broad authority to set Federal Motor Vehicle Safety Standards, vehicle design requirements, and cyber security elements. State agencies play a role in licensing drivers and vehicles, setting liability rules, and establishing pilot regulations, among other controls.

But what is the role of local governments? Under the City of Seattle’s police powers, we can develop and enforce automated vehicle-specific traffic laws, dedicate right-of-way for automated vehicles, manage and price parking, and establish specific requirements related to levels of automation. We can also manage system impacts and introduce road use pricing schemes to manage demand. Finally, fleet services that are licensed by the City of Seattle could be required to meet basic requirements related to data sharing, equity, and accessibility.

Figure 1: Federal, state, and local regulatory authority over automated vehicles

Federal	State	Local
<ul style="list-style-type: none"> • Safety standards • Base privacy and data sharing requirements • Cyber security • Equipment and manufacturing standards • Vehicle design • Infrastructure planning and funding • Funding for AV operations • Research funding • Public communication 	<ul style="list-style-type: none"> • Infrastructure planning and funding • Funding for AV operations • Research funding • Human driver licensing • Motor vehicle registration • Insurance and liability regulations • Traffic laws and regulations • Safety inspections • Pilot regulations • Demand and system management for State and Interstate highways 	<ul style="list-style-type: none"> • Demand and system management for local streets • Parking/curbspace • Land use regulation • Curb and road use fee setting • Local transportation financing • Traffic laws and regulations • Data sharing for system planning and real-time operations

PRINCIPLES FOR AUTOMATED MOBILITY

Embracing technology alone will not meet our city’s needs. In the end, automated vehicle technology is only one of the future tools that could help us achieve our broader community goals. We leverage innovation to support our transit network and provide ubiquitous mobility for all. We use shared automated vehicle services and other emerging mobility technologies in service of our core values: To become a safe, interconnected, vibrant, affordable, and innovative city.

Leveraging automated mobility to meet our core values requires an intentional, outcome-driven, and anticipatory approach to policy direction. As with any other shared or innovative mobility solution, automated mobility will be driven by the following principles.

Put People First	The public right of way is our most valuable and most flexible public space. Our streets should prioritize access for people, amplifying the role and value of walking, biking, and transit in Seattle. We respect the desire to retain and use privately-owned vehicles; but will continue to manage the transportation system to move people and goods safely and efficiently. Safety is paramount, no matter how you get around Seattle. Our streets should be comfortable and intuitive for our most vulnerable travelers (people walking and biking). Shared, automated, and other new mobility models should not only advance our Vision Zero safety goals, they should also maintain consumer protections.
Design for Customer Dignity and Happiness	Transportation happiness is a key indicator of the 21st Century Seattle Department of Transportation. We will not only simplify and enhance the user experience of public transit and new mobility services, we will continue to promote a diversity of transportation choices. Dignified public transit and new mobility services must accommodate people with mobility impairments, non-traditional schedules, and families that need flexible mobility options.
Advance Race and Social Justice	New mobility, whether shared, public, private, or automated, is a fundamental human need. Everyone needs a barrier-free transportation system and affordable transportation options that are understandable and accessible to all who want to use them. New mobility models should also promote clean transportation and roll back systemic racial and social injustices borne by the transportation system.
Forge a Clean Mobility Future	We are committed to climate action. We will transition our transportation sector to one which furthers our climate goals and builds replicable models for the rest of the world. New mobility services should use clean energy and expand human-powered transportation.
Keep an Even Playing Field	Data infrastructure is foundational to understanding, operating, and planning in a constantly changing transportation system. Partnerships and a fair and flexible regulatory environment will nurture and expand new mobility ideas, companies, jobs, and workforce training.

REGULATION AND PARAMETERS

The following policies establish regulations and operating parameters that standardize automated vehicle behavior to ensure their operations are safe, shared, connected, and electric.

Policy RP1: Enact a “people and transit first” approach to automated mobility ensuring our streets safely move people and goods and prioritize transit, based on the following right-of-way priorities (in order):

1. Modal plan priorities
2. Access for people
3. Access for commerce
4. Activation
5. Greening
6. Minimized storage
7. Minimized zero occupancy vehicles

Policy RP2: Allow a combination of human-driven (SAE Level 0 or 1) and fully automated vehicle operations (SAE Level 4 or 5) within the City of Seattle to eliminate the dangers of partial automation (SAE Level 2 and 3), such as creating a false sense of security, instilling distracted driving, and exacerbating driver error.

Levels of Automation

Automated vehicles—whether they are private vehicles, buses, trains, or freight vehicles—provide different levels of automation or human driven functions depending on the type of task or operating scenario. The Society of Automotive Engineers (SAE International) developed a six-level taxonomy governing the varying degrees and types of vehicle automation and associated levels of human interaction.

SAE LEVEL 0	NO AUTOMATION	At SAE Level 0, the human driver performs all driving tasks across all driving scenarios
SAE LEVEL 1	DRIVER ASSISTANCE	At SAE Level 1, an automated system on the vehicle can complement the human driver’s performance of either steering or acceleration/deceleration in some driving scenarios. The human driver is responsible for monitoring the driving environment.
SAE LEVEL 2	PARTIAL AUTOMATION	At SAE Level 2, an automated system on the vehicle can conduct both steering and acceleration/deceleration in some driving scenarios, while the human continues to monitor the driving environment and performs the rest of the driving tasks
SAE LEVEL 3	CONDITIONAL AUTOMATION	At SAE Level 3, an automated system, in some driving scenarios, can conduct all parts of the driving task and can monitor the driving environment. However, the human driver must be ready to take back control when the automated system requests.
SAE LEVEL 4	HIGH AUTOMATION	At SAE Level 4, an automated system can conduct all parts of the driving task and can monitor the driving environment in some driving scenarios. Within these select driving scenarios, the human driver does not need to be ready to take control of the vehicle.
SAE LEVEL 5	FULL AUTOMATION	At SAE Level 5, the automated system can perform all driving tasks in all driving scenarios. Human passengers need not be attentive or even capable of driving the vehicle.

Source: SAE International Standard J3016: Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems

Policy RP3: Hard code the following base operating parameters into connected and automated vehicles:

- Maximum operating speeds for automated vehicles on City arterials non-arterial streets at legal limits to ensure our streets are safe, comfortable, and vibrant.
- Passenger occupancy requirements for non-transit vehicle use of transit lanes.
- Functional classification system for automated vehicles and network of peak period smart lanes dedicated to SAE Level 4 and 5 automated vehicles. This includes, but not limited to:
 - Fully automated vehicle only lanes (no human operation allowed)
 - Full access for automated vehicles with SAE automation Levels 1, 2, 4, and 5
 - Limited access for low-occupancy automated vehicles
 - Zero access for automated or human-operated vehicles
- Time-based access restrictions on geofenced congestion management corridors and districts.
- Transit priority at all intersections along frequent transit corridors.

Policy RP4: Collaborate with federal and state policymakers to ensure SDOT's core local controls and police powers related to automated vehicle regulation are not preempted.

Policy RP5: Establish time-based access restrictions or pricing for geofenced congestion management corridors and districts for certain vehicle types (e.g., automated freight, single-occupant, and zero occupant vehicles during peak travel periods).

Policy RP6: Require shared automated vehicle fleets to use fully electric vehicles.

Policy RP7: Require submission of detailed data from automated owned vehicles, shared fleet services, commercial fleets, freight, and transit to neutral data platforms (including vehicle speeds, crash and near miss reports, average latency of vehicle-to-infrastructure and vehicle-to-vehicle data flows, trip time, trip route, trip origins and destinations, vehicle occupancy, pavement quality, and environmental conditions).

Policy RP8: Protect the privacy of individuals by anonymizing personally identifiable data generated by connected and automated vehicles.

EQUITY AND ACCESSIBILITY

The following policies ensure that automated mobility and other future transportation innovations are designed with a racial and social justice lens, accommodating the wide cross section of Seattleite's abilities and backgrounds.

Policy EA1: Ensure the benefits of automated mobility are equitably distributed across all segments of the community and that the negative impacts of automated mobility are not disproportionately borne on traditionally marginalized communities.

Policy EA2: Ensure shared automated vehicle fleets consider the safety needs of vulnerable populations and loading needs of seniors, families with children, and individuals with mobility impairments.

Policy EA3: Establish equitable performance standards and penalty structures for shared automated vehicle fleet wait time and declined rides as a way to eliminate discriminatory practices.

Policy EA4: Require a percentage of shared automated vehicle fleet vehicles to be ADA-compliant to meet the needs of people with disabilities.

Policy EA5: Identify and require shared automated vehicle fleets to serve markets that are underserved by transit and focus on connecting people to high quality transit spines.

Policy EA6: Acknowledge and mitigate the labor implications of automated mobility, particularly in the for-hire, freight, and public transit industries, among others.

Policy EA7: Conduct a publicly-visible community consultation and outreach process to understand concerns, needs, and opportunities related to the impending automated mobility paradigm.

Policy EA8: Establish a City-owned transportation network company digital platform to incubate smaller shared automated vehicle fleet businesses, mitigating the risk of mobility monopolies in Seattle

PILOTS AND PARTNERSHIPS

The following policies direct SDOT to establish partnerships and pilots that advance automated vehicle testing, particularly new models of mobility service delivery.

Policy PP1: Develop strategic pilot partnerships to test automated vehicle technology in Seattle's climate, hilly terrain, and urban traffic conditions.

Policy PP2: Develop strategic research partnerships to determine needs and effectiveness of physical infrastructure, connected sensor infrastructure, and requirements for personal digital devices.

Policy PP3: Work with our region's transit agencies to ensure automated vehicles support safer transit operations and grow the public transit market.

Policy PP4: Work with our region's transit agencies to pilot new automated transit service delivery models that improve first- and last-mile transit connections and cost effectively serve unproductive geographic markets, while recognizing the impact on labor.

Policy PP5: Leverage research support from the University of Washington to analyze the safety implications of automated vehicle operations and integrate policy and operational recommendations into SDOT's work implementing the Vision Zero Action Plan.

Policy PP6: Partner with shared automated vehicle fleet services and operating equipment manufacturers to develop and promote family-friendly shared automated fleet services.

Policy PP7: Promote changes in urban goods movement by participating in automated freight vehicle pilots that focus on "last 50 feet" delivery challenges, hub-and-spoke delivery models, and aerial and surface drone delivery.

Policy PP8: Work with PSRC and other local cities to update the base assumptions in the activity-based regional travel demand model to reflect ongoing changes to travel time costs, transportation costs, travel options through Mobility as a Service platforms, vehicle shedding and suppression, and transit expansion, among others.

INFRASTRUCTURE AND STREET DESIGN

The following policies establish expectations related to right-of-way allocation, intersection control, transit access, and connected infrastructure under an automated mobility paradigm.

Policy IS1: As vehicle ownership decreases and reliance on shared automated vehicle fleets increases:

- Capitalize on system efficiencies to implement our Transit, Bicycle, and Pedestrian Master Plans.
- Capitalize on opportunities to invest in placemaking features and expand the pedestrian realm.
- Identify and phase in corridors and zones dedicated to transit, walking, biking, and high-occupancy automated vehicles only.

Policy IS2: Establish multimodal level of service (MMLoS) or another vehicular level of service alternative as the default intersection performance measure to ensure efficient person movement, but also safer and more comfortable intersections.

Policy IS3: Work with our region's transit agencies to ensure automated vehicles support safer transit operations and grow the public transit market.

Policy IS4: Maintain intersection traffic control (e.g., signal control, stop control, and traffic calming devices) to ensure comfortable crossings for people walking and biking.

Policy IS5: Consider the loading needs of shared automated fleet services at shared mobility hubs to ensure seamless connections to and from high quality transit.

Policy IS6: Expand SDOT's sensor network to track automated vehicle use, enable vehicle platooning, and ensure safe and efficient automated vehicle operations.

Policy IS7: Partner with the private sector to expand the city's network of Vehicle-to-Infrastructure (V2I)-enabled sensors (e.g., roadside units) on Seattle Department of Transportation and Seattle City Light infrastructure in the public right-of-way.

Policy IS8: Collaborate with operational equipment manufacturers, technologists, and federal AV policymakers to establish outcome-based vehicle form factors that change the way we design and operate streets.

Policy IS9: Develop a citywide network of shared residential streets to be operationalized when Level 4/5 automated vehicles consist of a majority of all personal and shared fleet vehicles licensed in Seattle.

Policy IS10: Expand passenger loading zones citywide to ensure safe and efficient loading operations for shared automated vehicle fleet services.

MOBILITY ECONOMICS

Automated vehicles will have profound implications on the way we fund and manage our transportation system. The economics of automated vehicles will likely compound congestion levels by increasing per capita miles driven and creating new opportunities for zero-occupant travel and enterprise robotaxi services. These scenarios must be acknowledged and mitigated. Likewise, shared automated vehicle fleets as well as electric vehicles will dramatically reduce gas tax and parking revenues, changing our financial approach to managing, operating, and maintaining the public right-of-way. The following policies provide direction on the types of funding mechanisms that could be advanced in the automated mobility paradigm. The policies also establish the pricing and demand management tools necessary to ensure automated vehicles are primarily used for shared mobility trips, limit inefficient trips, and maximize the value of our public transit investments.

Policy ME1: Develop a tiered and dynamic per mile road use pricing mechanism for automated vehicles operating in highly congested areas and corridors of Seattle:

- Tier 1 (elevated surcharge): Zero-occupant automated vehicles
- Tier 2 (base surcharge): Single-occupant automated vehicles
- Tier 3 (reduced surcharge): Automated vehicles using smart lanes with less than three passengers (see Policy RP3)
- Tier 4 (no surcharge): Automated vehicles using smart lanes with three or more passengers (see Policy RP3)
- Tier 5 (additional surcharge on Tiers 1-3): Peak travel period surcharge for all non-public transit vehicles trips with less than three passengers, including freight.

Policy ME2: Incentivize shared automated vehicle trips that provide access to public transit service at shared mobility hubs.

Policy ME3: Integrate shared automated vehicle fleet application programming interfaces (API) into Mobility as a Service platforms to ensure all shared fleet options are available to consumers.

Policy ME4: Continue Commute Trip Reduction and Transportation Demand Management investments that encourage in high-occupancy vehicle trips, particularly those trips that leverage our region's investment in STBD service enhancements and high capacity transit.

Policy ME5: Assess and establish alternatives to parking and state gas tax revenue sources, including, but not limited to, zero- and low-occupancy fees, curb side dwell time fees, per mile road use charges, cordon tolling, and peak period surcharges.

Policy ME6: Provide road use fee discounts or incentives for 3+ passenger occupancy in automated vehicles.

Policy ME7: Monetize and sell SDOT-owned sensor data to be used for data aggregations and connected vehicle optimization.

Policy ME8: Provide road use fee discounts or incentives for automated vehicle trips that combine a mobility and goods delivery function (e.g., fee offsets for deliveries made on behalf of delivery companies).

Policy ME9: Mandate connected vehicle technology in all vehicles and data sharing to establish clear understanding of travel demand and enable financial auditing of fee revenues.

LAND USE AND BUILDING DESIGN

The following policies reaffirm our commitment to building dense, vibrant, and transit-oriented communities. These policies also redirect development and parking standards to reflect new and dynamic relationships between automated vehicles and the built environment.

Policy LB1: Ensure automated vehicles advance our land use goals and capture the value of transit-oriented development.

Policy LB2: Require future development and building standards to be future-compatible, reflecting advances in shared automated mobility and shifts toward e-commerce and new urban goods movement and delivery models.

Policy LB3: Consider the advancement of new passenger and delivery form factors in the design of buildings and public spaces (e.g., smaller vehicles, drone delivery services, and smaller vehicles for last mile deliveries).

Policy LB4: Working with the Seattle Office of Planning and Community Development and Department of Construction and Inspections, update the zoning code to:

- Ensure all new parking is adaptively reusable for retail, distribution, and other uses (including mandating higher floor heights and above-ground parking to enable retrofits).
- Require new parking to be furnished with Level 2 EVSE charging infrastructure.
- Phase out off-street parking requirements as demand for personal vehicles decreases, and redirect these developer cost savings toward affordable housing and transportation demand management incentives.
- Integrate digital kiosks and other smartscaping features into the design of buildings so that residents, tenants, and passersby can gain access to mobility information, community data, and Mobility as a Service platforms.
- Integrate surface street and aerial drone delivery into building design and operations.