



New Mobility: Planning in a New Era of Transportation

May 29, 2018

Jean Crowther, AICP – Alta Planning + Design

Presenter



Jean Crowther, AICP
New Mobility Group Leader
Alta Planning + Design

National Dialogue



Coco Briseno

California DOT

Deputy Director,
Planning and Modal
Programs



Thomas Byron

Florida DOT

Assistant Director of
Strategic Development



Annie Chang

SAE International

Project Manager,
Technical Programs,
Global Ground Vehicle
Standards



Jean Crowther

Alta Planning & Design

Senior Planning
Associate



George Ivanov

Waymo

Manager, Policy
Development and
Regulatory Affairs



Corey Ershow

Lyft

Transportation Policy
Manager



King Gee

American Association of
State Highway and
Transportation Officials

Director of Engineering
and Technical Services



Reema Griffith

Washington State
Transportation
Commission

Executive Director



Art Guzzetti

American Public
Transportation
Association

Vice President for Policy



Larry Head

University of Arizona

Acting Dean, College of
Engineering



Link to TRB Forum 2018 White Paper: https://altaplanning.com/resource_categories/industry-resources/

TRB Forum Website: <http://www.trb.org/TRBAVSMForum/AVSMForum.aspx>

Understanding Implications



Not just Mobility: How E-bike Share Can Spark a Design Revolution



**Complete Streets 2.0:
Responding to The Fast Pace
of Change in Transportation**



**Promoting Active
Transportation Safety in
Preparation for Autonomou...**

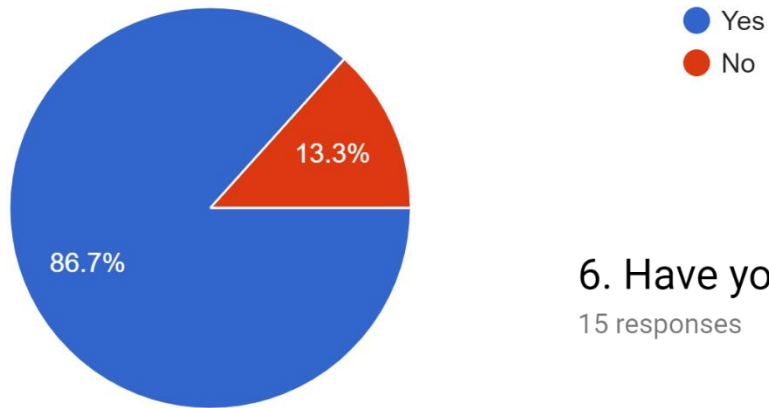
Today's Focus

1. Terms
2. How did we get here?
3. Use Cases
4. Responses & Reactions
5. Implications

Today's Focus

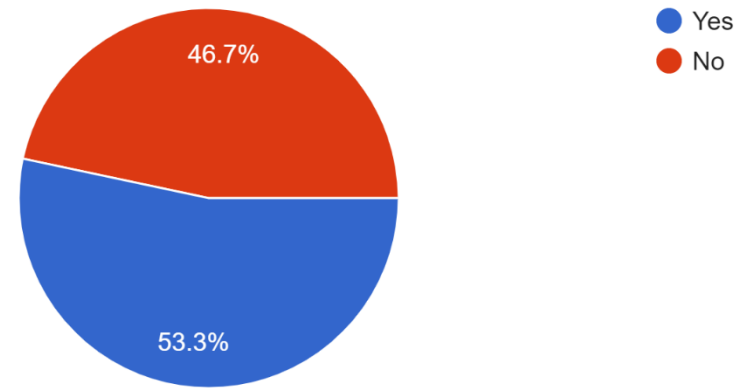
5. Have you ever used Uber or Lyft to go somewhere?

15 responses



6. Have you ever ridden bike-share or scooter-share?

15 responses



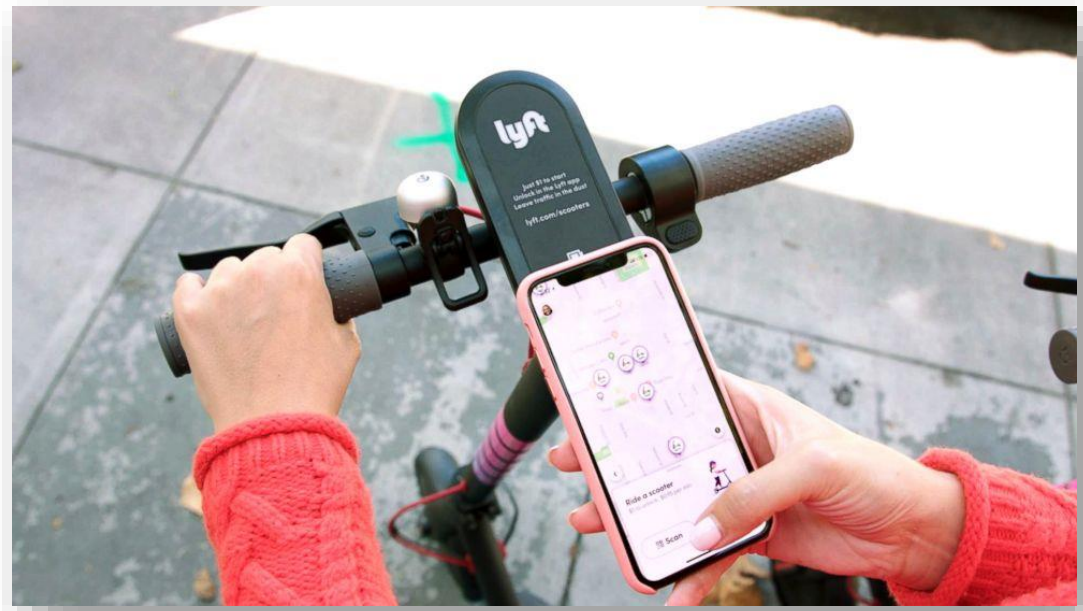
What is New Mobility?

Transportation services that are enabled, defined, or redefined by digital technology.



What does that look like?

- App-based
- Real-time
- Point-to-point
- On-demand
- Multimodal
- Shared
- Electric



Shared Micro-Mobility

“All shared-use fleets of small, full, or partially human-powered vehicles such as bikes, e-bikes, and e-scooters.”

- NACTO

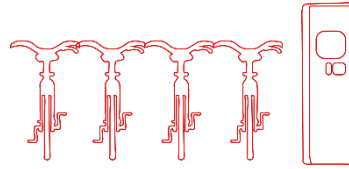
NACTO Shared Micromobility in the U.S.: 2018



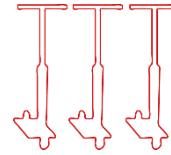
Shared Mobility Terms



carsharing



bikesharing



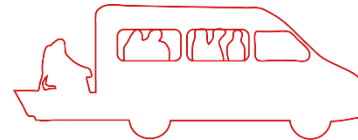
scooter sharing



ridesharing



ridehailing



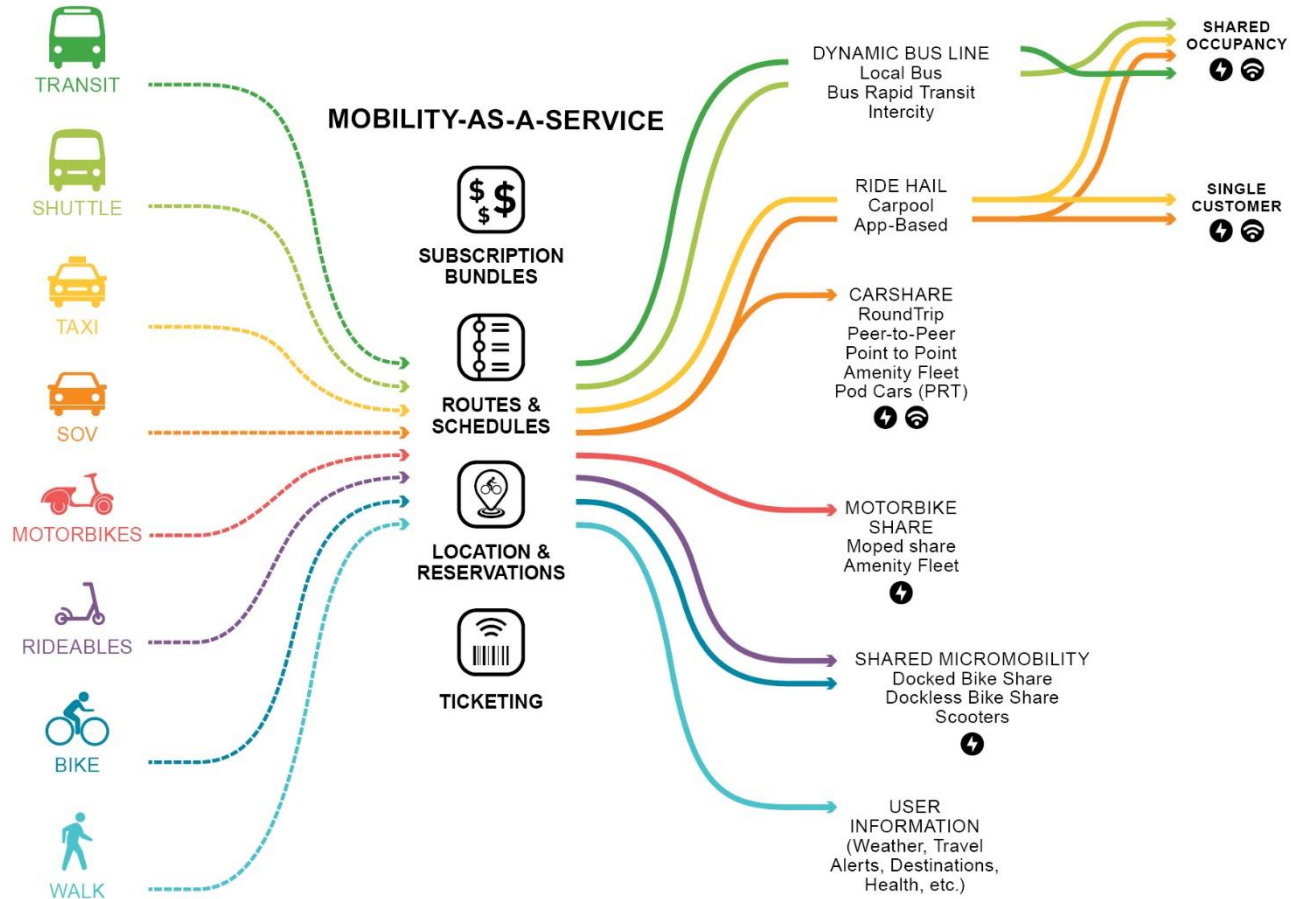
microtransit

Taxonomy: <https://www.sae.org/shared-mobility/>

What is Mobility Management?



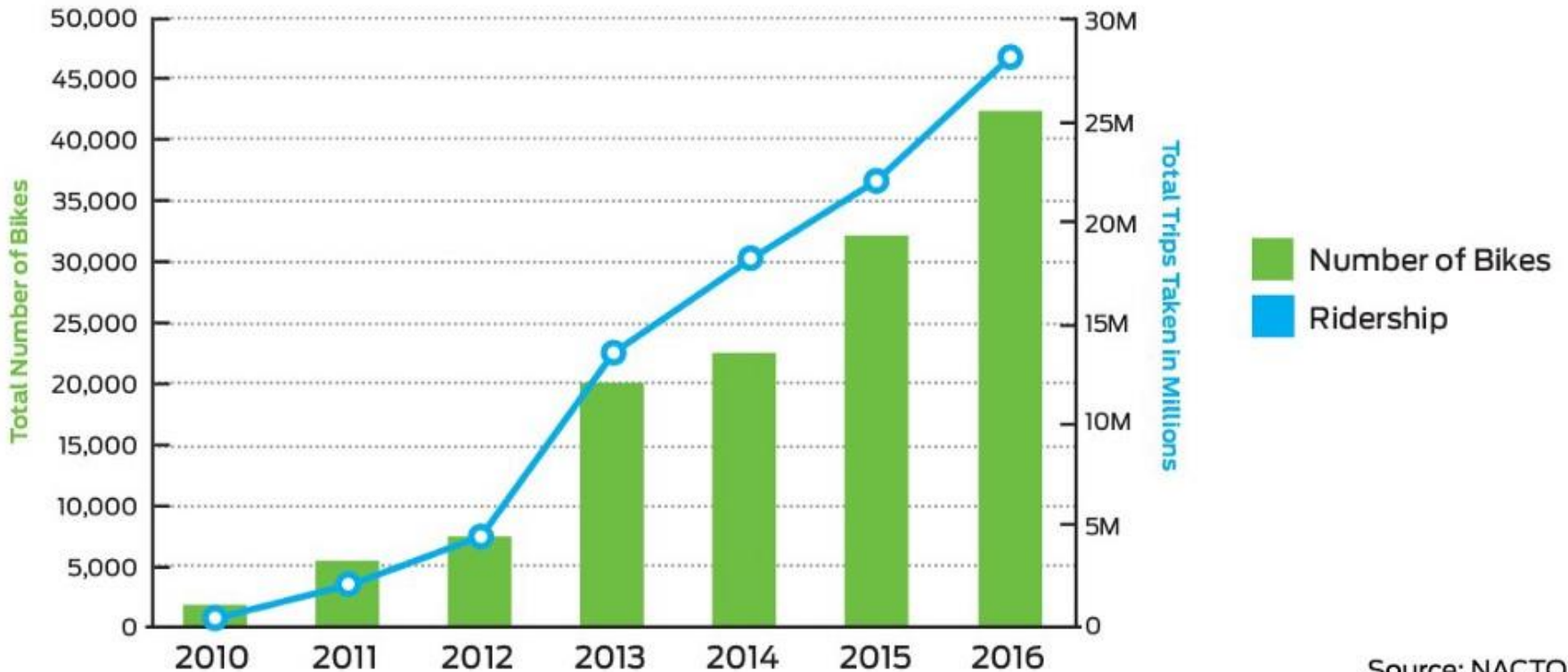
Mobility-as-a-Service



How Did We Get Here?

How We Got Here

Bike Share Growth in the US



Source: NACTO

2017+
Dockless



A01600 1214

2018+ Expanding the Suite



Volume + Market Share



Multimodal Private Sector

https://www.bicycling.com/news/a26558471/uber-jump-bikes/

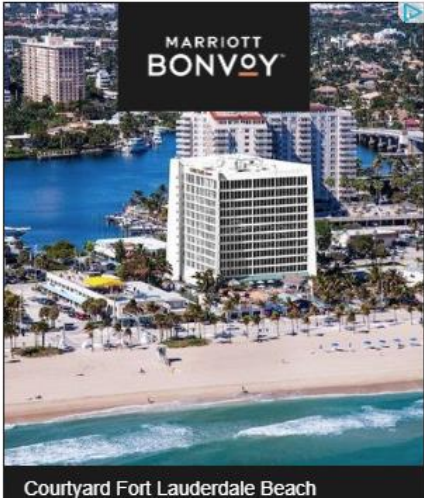

Alta GMAIL 23 Alta Planning + Des... ADP Workforce No... ARC Framework Test Cas... Contents - The Fra... Egnyte Google Docs WSDOT ATP - Proje...

Bicycling BIKES & GEAR TRAINING NEWS SUBSCRIBE NEWSLETTER Q US

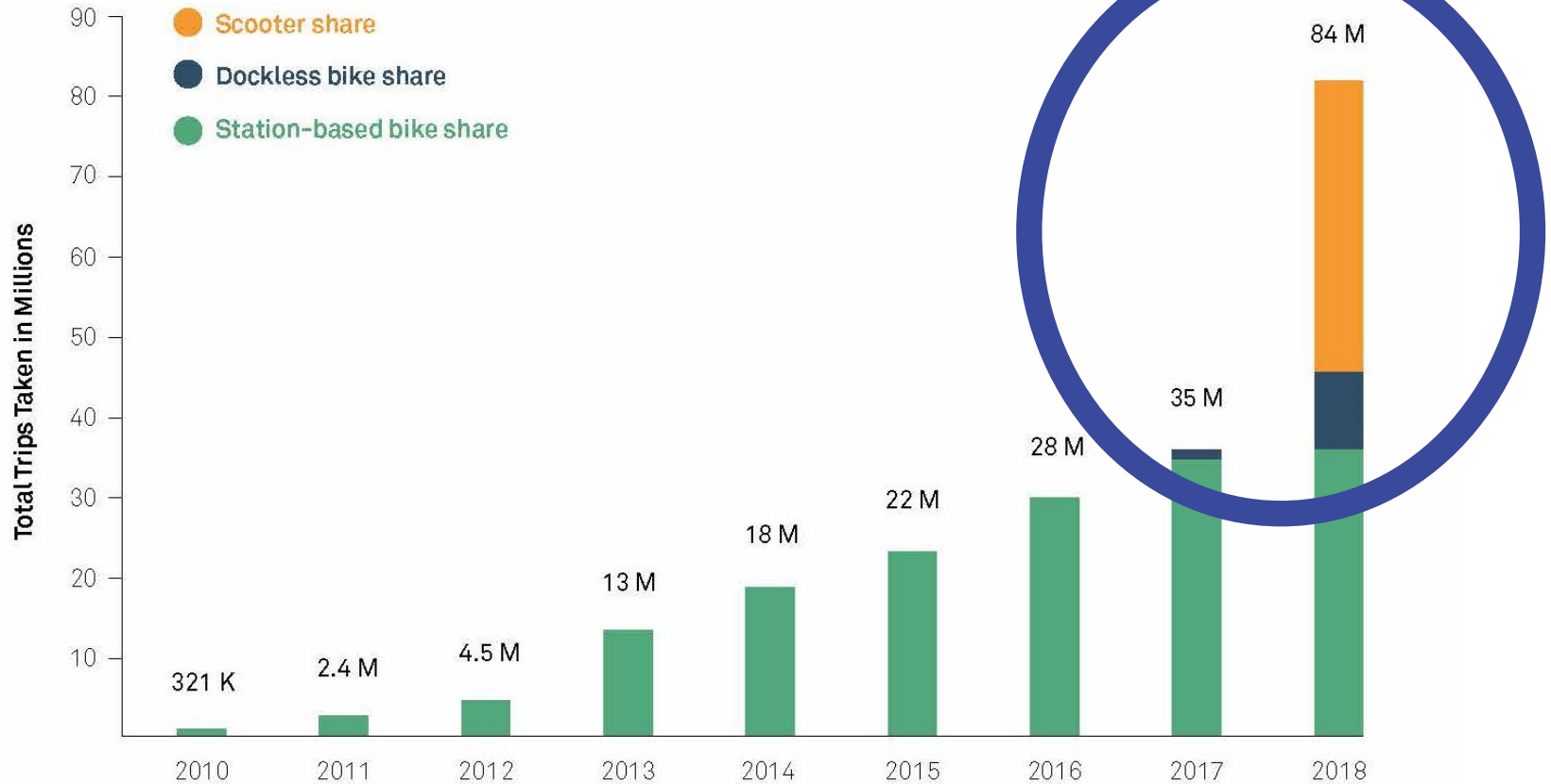
Uber's Electric Bikes May Be More Popular Than Its Cars

PEOPLE IN SACRAMENTO RENTED JUMP BIKES AT A HIGHER RATE THAN THEY HAILED UBER DRIVERS IN OCTOBER.

BY DANIELLE ZICKL Feb 28, 2019

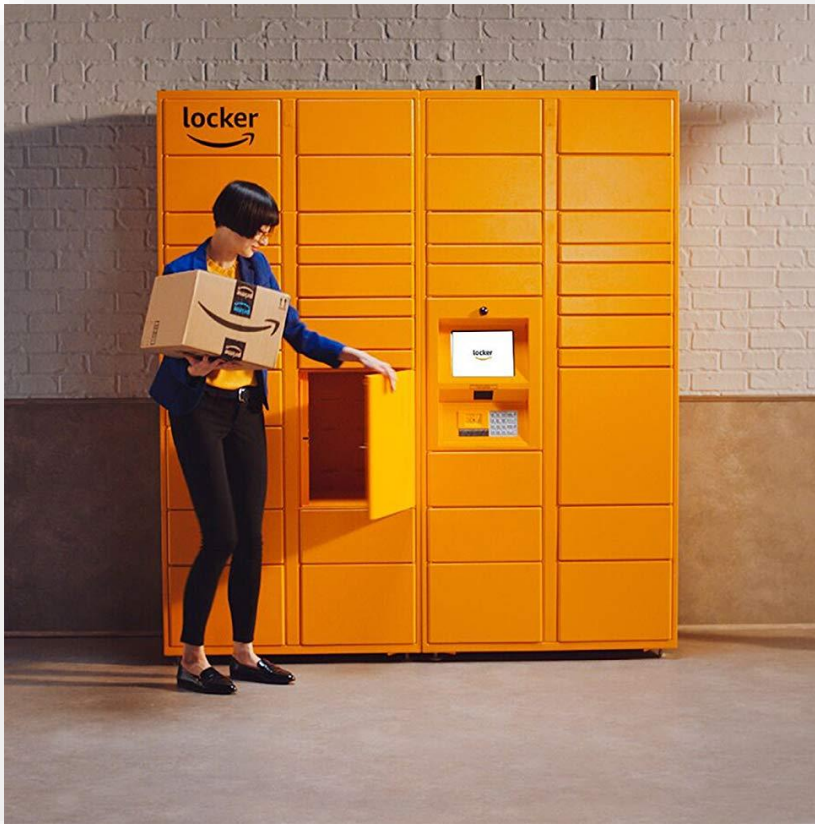


NACTO Shared Micromobility in the US: 2018



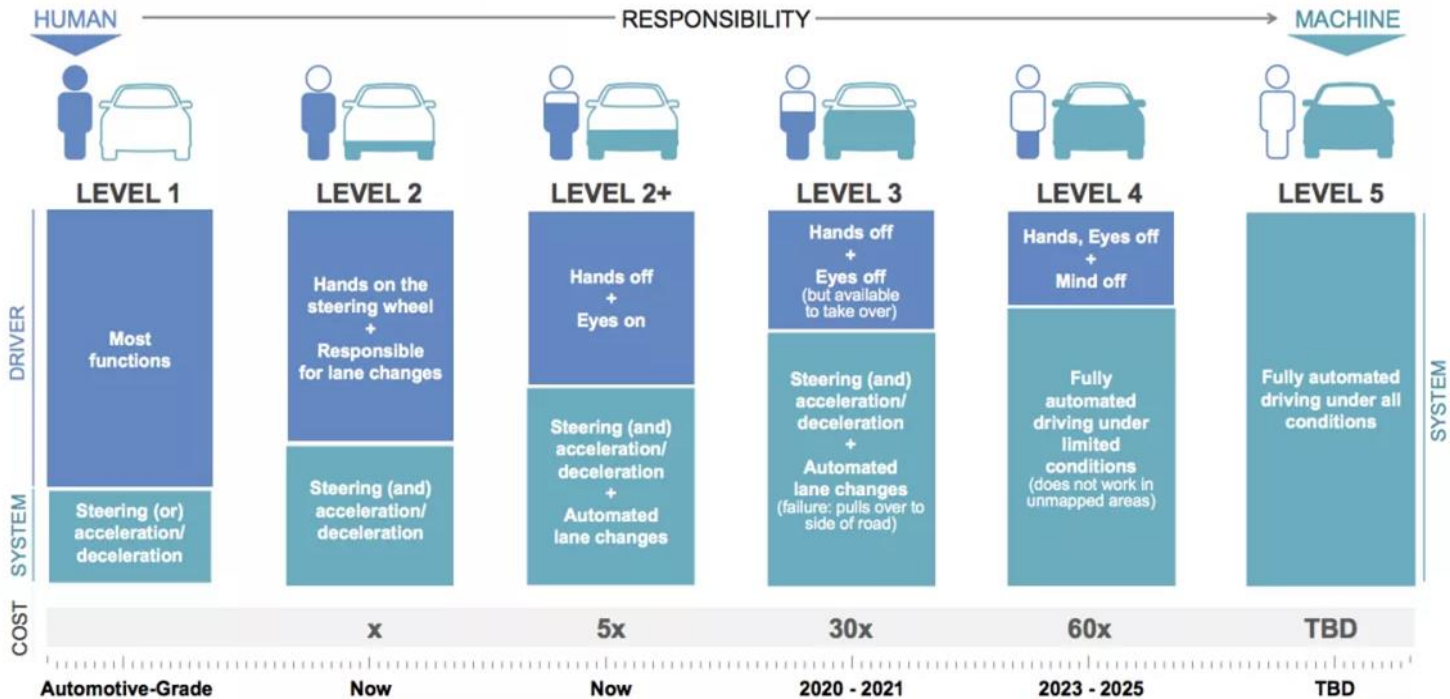
84 Million Trips on Shared Micromobility in 2018

E-Commerce, Logistics, Deliveries



Definitions: Connected/Autonomous Vehicles

AUTONOMOUS DRIVING Level of Automation, Cost, Timing



Source: Fiat Chrysler

Use Cases

First/Last Mile Access to Transit

Take Via to Transit – Your New Car-Free Commute in Southeast Seattle!

April 16, 2019 by Molly Wright



Visit our Website



CATEGORIES

ARCHIVES

CONTACT US

Call 206-684-ROAD

Tweets by @seattledot



Ridehailing or \$10m Parking Garage?



Transit-Linked Public/Private/Partnership



go monrovia

Launching March 17, 2018

Join us this St. Patrick's Day, Saturday, March 17, 2018, as we roll out our community's new set of wheels, and celebrate the launch of GoMonrovia - a program designed to give Monrovians more options to get around town!

9 AM - WELCOME
10 AM - COMMUNITY BIKE RIDE!
Choose to take a free ride on a LimeBike, or bring your own bike! Must be 13 years or older to ride a LimeBike, and children under 18 years old must wear a helmet.

lyft

\$0.50/ride anywhere in the Monrovia service area

LimeBike

\$1.00 for 30 minutes



go monrovia

NEW **lyft PRICING EFFECTIVE JUNE 1**

<p>\$5.00</p> <p>CLASSIC RIDE</p> <p>Travel anywhere within the service area!</p> <p>Private ride or for groups up to 4 passengers</p> <p>No stops before reaching final destination</p>	<p>\$2.50</p> <p>SHARED RIDE</p> <p>Select a shared ride and receive 50% off regular price when traveling in the service area!</p> <p>Up to two (2) passengers</p> <p>Possible stops before reaching final destination</p>	<p>\$0.50</p> <p>SHARED RIDE</p> <p>Those traveling to and from Old Town Monrovia or the Metro Gold Line Station will pay just \$0.50!</p>
--	---	--

Trail Access + Campus Mobility



Public Services

NEWS

TRANSPORTATION

Florida town is first in the world to test autonomous school shuttles [Updated]

3

The government has ordered the pilot program be stopped immediately

By **Liz Stinson** | Updated Oct 23, 2018, 11:45am EDT



Urban Delivery



First/Last 500 Feet



Freight



BUSINESS NEWS MAY 21, 2019 / 3:08 AM / 8 DAYS AGO

Self-driving trucks begin mail delivery test for U.S. Postal Service

Heather Somerville

4 MIN READ



(Reuters) - The U.S. Postal Service on Tuesday started a two-week test transporting mail across three Southwestern states using self-driving trucks, a step forward in the effort to commercialize autonomous vehicle technology for hauling freight.

Air Taxis

Miami High-Rise Projects Prepare For The Future Of Flying Cars

December 7, 2018 at 2:16 pm Filed Under: [Flying Cars](#), [Local TV](#), [Miami](#), [talkers](#)



Big Data – Expanding What We Know

SMART CITY PDX



HIGH TECH FOR SAFER STREETS:

The Traffic Safety Sensor Project

When it comes to designing safer streets for all users, accurate information is crucial. The engineers and safety experts who design the streets need to know how people use the streets, including where people typically walk, bike and drive. They need to know how fast people are driving and where pedestrians typically cross the street. In the past, gathering this information was a very laborious and time-consuming process.

But now thanks to new sensor technology, it has become much easier to gather these insights into how people are traveling on our streets and where the danger spots are. With the information provided by these sensors, traffic and safety engineers can produce better street designs. The Smart City PDX Traffic Safety Sensor Project will pilot the use of these sensors on three of Portland's most dangerous streets: 122nd, Hawthorne and Division. PBOT staff will use the sensor information to make recommendations about future changes to make it easier for people to travel safely along these and other Portland streets.

About the Sensors: The sensors, which are manufactured by project partner, Current by GE, have hardware and software that allow them to collect information about environmental conditions, parking and transportation activities.

The City of Portland complies with all non-discrimination, Civil Rights laws including Civil Rights Title VI and ADA Title II. To request reasonable accommodations, medical facilities, or accessible phone contact, PBOT at 503.825.5165, or use City TV: 503.825.6808, or Oregon Relay Service: 711.



TRANSPORTATION

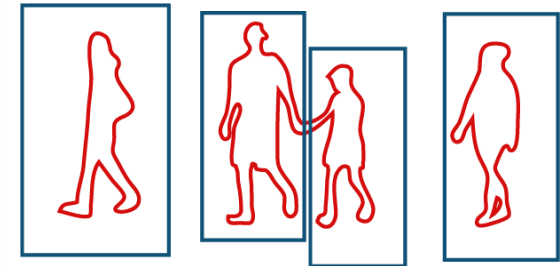
Massachusetts Cities Tackle Pedestrian Safety with Data

Cambridge and Somerville are investing in traffic analytics technology to assess how and why pedestrians and cyclists are under increasing risk of an accident on their streets and what can be done to improve safety.

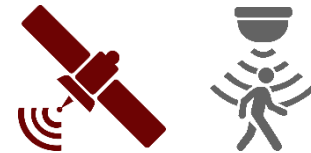
BY SKIP DESCANT / MARCH 26, 2016



Source: <https://www.govtech.com/fs/transportation/Massachusetts-Cities-Tackle-Pedestrian-Safety-with-Data.html>



counters



trace data

Source: <https://www.portlandoregon.gov/TRANSPORTATION/article/682644>

Responses & Reactions



SUBSCRIBE

ROUTE  FIFTY

MANAGEMENT

INFRASTRUCTURE

TECH & DATA

SMART CITIES

PUBLIC SAFETY

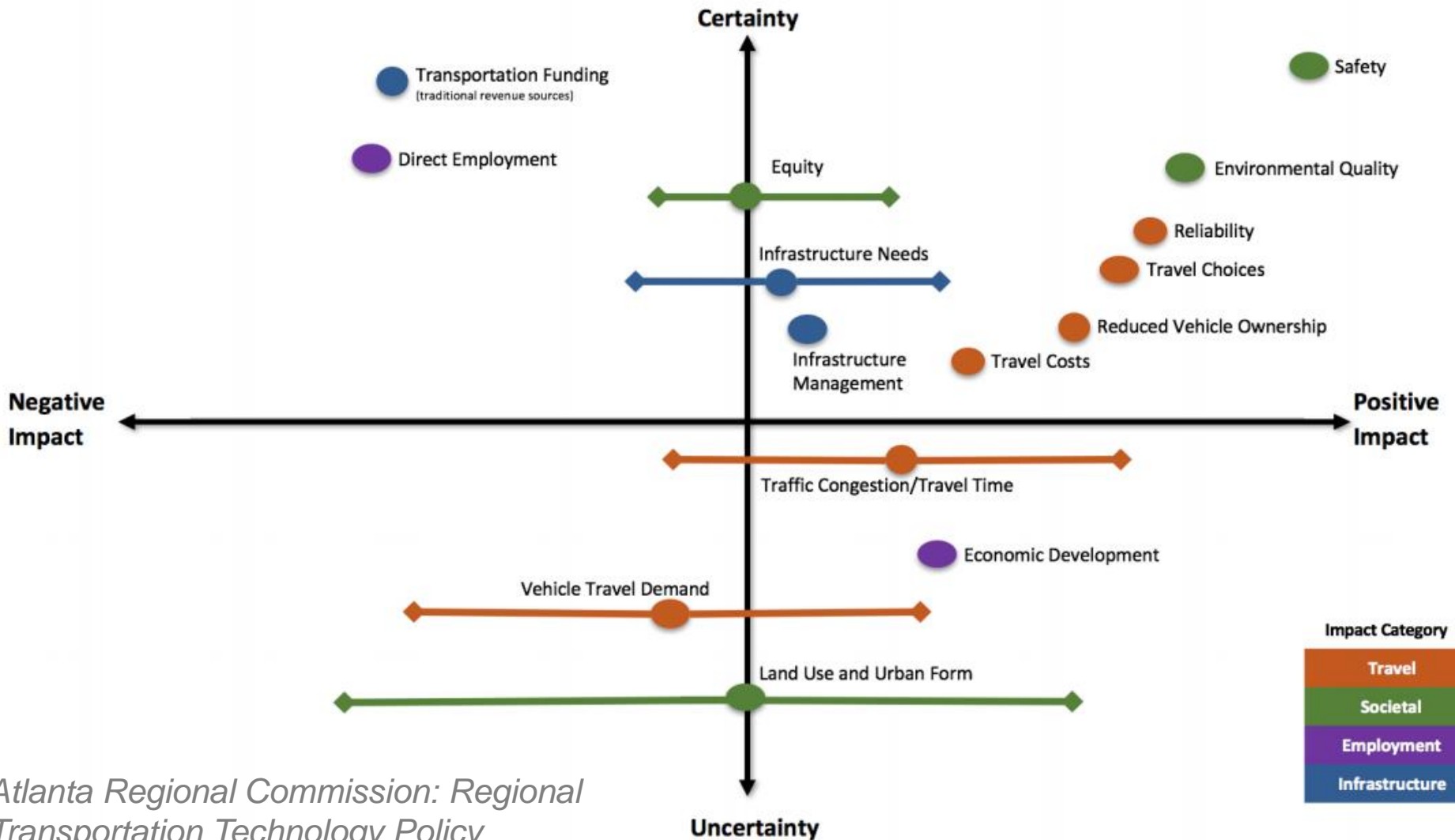
HEALTH & HUMAN

Tech Is Forcing State Leaders To Rethink Transportation Departments



*“The irony in transportation is we tend to plan 25 years ahead, ... the only thing we know about 25 years from now is it will be nothing like today.”
Stephanie Pollack, Secretary of Transportation for the Massachusetts DOT*

Implications of Transportation Technology Trends



Planning Transitions

WHAT DO WE HAVE?

Community Values
Inventory & Baseline
Assumptions

What are trends?
What are uncertainties?
How could things change?

WHAT DO WE WANT?

Community Engagement
Forecasts
Goals & Metrics

What is probable or likely?
What's in our control?
How do we compare?
What is preferred?

HOW DO WE GET THERE?

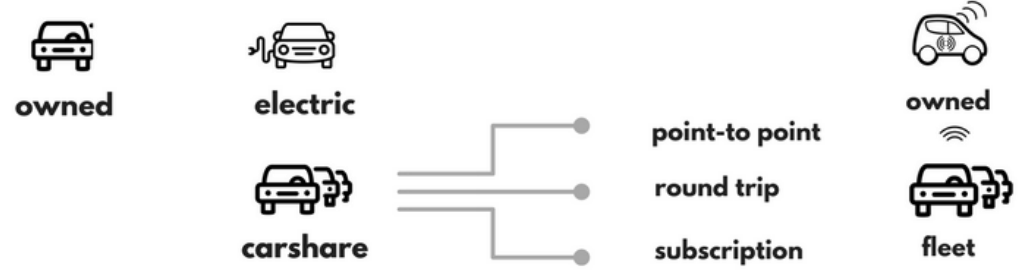
Objectives & Policies
Programs & Budgets
Projects

How can we test & scale?
When do we intervene?
How do we integrate
into programs?

How Do We Handle Transitions?

Existing → Trending → Emerging → Future

Cars



Shuttle



Parking



How Do We Handle Transitions?

Existing



Trending



Emerging



Future



private & public



private on-demand microtransit



driverless - operator segregated lane assigned routes/stops



driverless without operator



Tipping Points for approving microtransit

successful pilot & subsidies
ridership metrics
number of transit feeds
financial projections



Tipping Points for limited AV shuttles

successful pilot - private lanes
successful pilot - public streets
safety protocol
ridership goals



Tipping Points for full scale AV shuttles

pilot - scaled, on-demand
safety protocol
congestion metrics
equitable service metrics
financial projections

Autonomous Vehicles

“[Uber] expects it will be a long time before one of its biggest investments, self-driving cars, is ready for wide-scale deployment”

Chief Scientist at Uber Advanced Technologies Group on April 9, 2019

Source: <https://www.insurancejournal.com/news/national/2019/04/09/523200.htm>



Download: <https://altaplanning.com/resources/promoting-active-transportation-safety-in-preparation-for-autonomous-vehicles/>

Policy Response

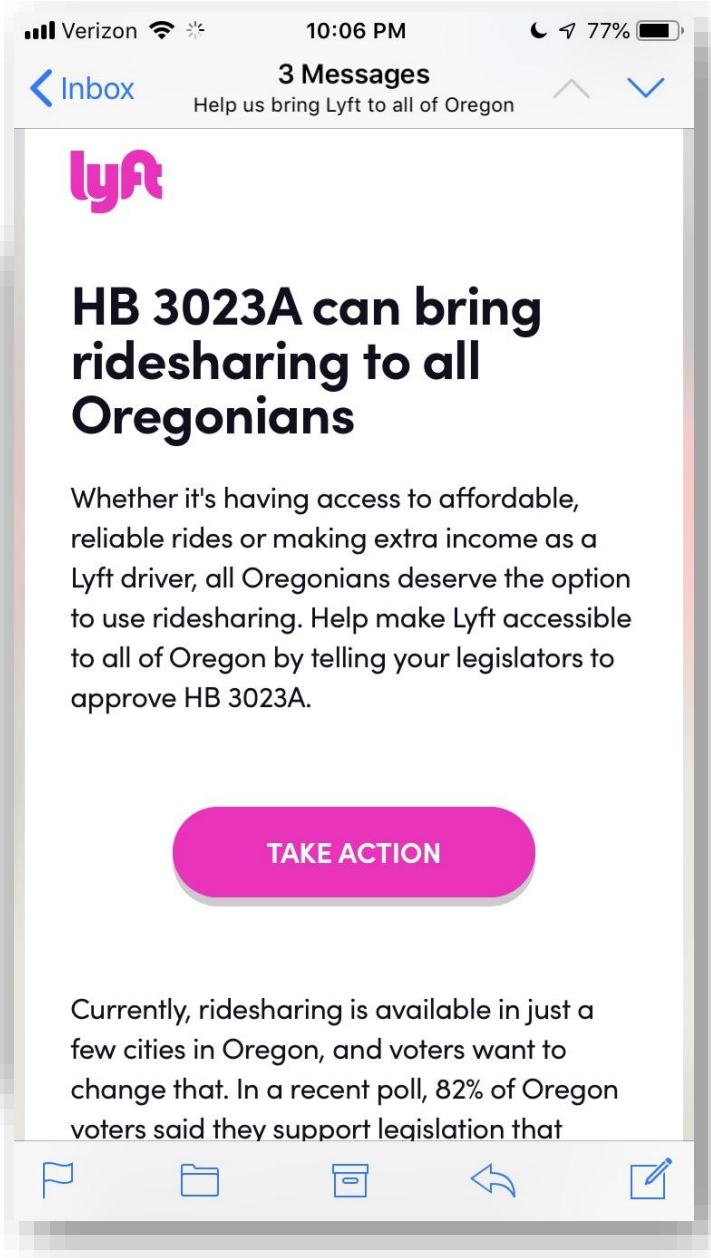


Dockless bikes are moving into many American cities. Who gets to regulate them? // Edgar Su/Reuters

A New State Preemption Battlefield: Dockless Bikesharing

JOSH COHEN FEB 13, 2018

Florida lawmakers are weighing a bill that would override a city's ability to regulate the new private bikesharing companies.



Setting and Signaling Priorities



Setting and Signaling Priorities



PRINCIPLES FOR NEW MOBILITY

We envision a city by and for the diverse, dynamic people who call Seattle and the region home. As we work to integrate new mobility options into the city we love, our core principles will guide us:



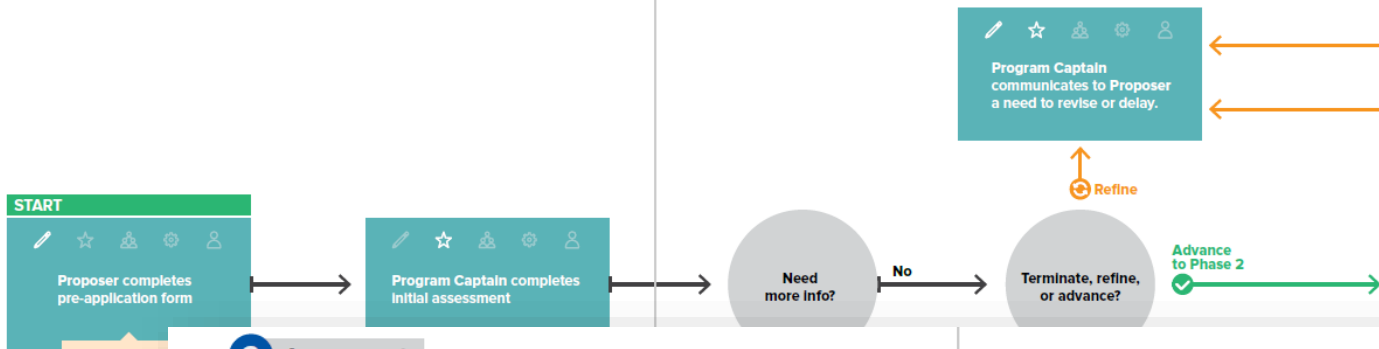
- + Put people and safety first
- + Design for customer dignity and happiness
- + Advance race and social justice
- + Forge a clean mobility future
- + Keep an even playing field



Source: City of Seattle <https://newmobilityseattle.info/>

Evaluation Frameworks

1 Initiation

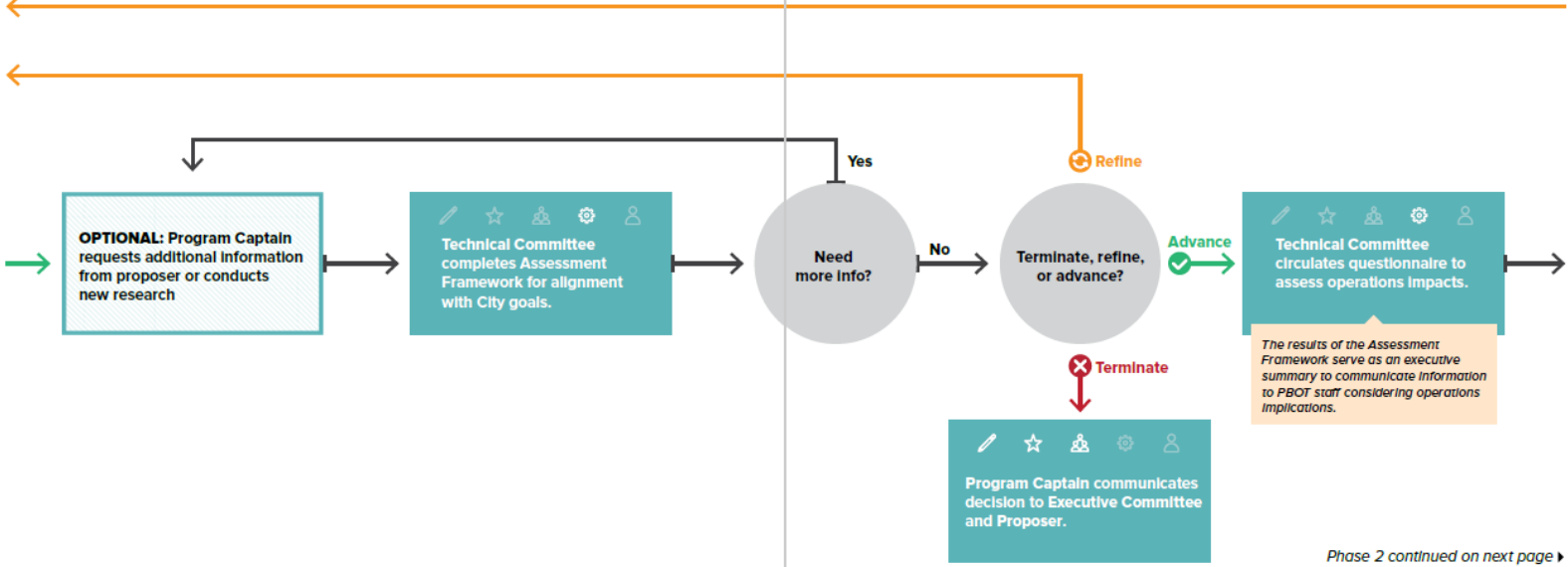


2 Assessment

Proposer may be internal to PBOT or an external provider.

LEGEND

- Phase Step
- Decision Point
- Optional Step
- Note




The results of the Assessment Framework serve as an executive summary to communicate information to PBOT staff considering operations implications.

From Procurement to Permitting

- City-authorized
- Non-exclusivity
- Privately operated
- Equity requirements
- Cost-neutral/Revenue-generating
- Less control, and more uncertainty

Managing for Safety





CITY OF FORT LAUDERDALE

Dockless Mobility User Guidelines

Ride respectfully and safely

- Dockless scooters are authorized for use on sidewalks
- Always yield to pedestrians
- One person per scooter or bike
- Never drink and ride
- Always obey traffic laws
- Wear a helmet whenever possible
- Never leave the City of Fort Lauderdale, as surrounding cities may not have permitted dockless bikes and scooters




Park courteously

- Always leave at least 4 feet clear on the sidewalk
- Always park bikes and scooters upright using their kickstands
- Never park on private property, in the street, or in on-street parking spots
- Never block:
 - Wheelchair ramps
 - Business entrances
 - Fire hydrants
 - Parking spots
 - Street furniture (benches, trash cans, etc.)

Fix or report issues you find

- If you see a fallen scooter or bicycle, be a good neighbor and upright it, if able.
- Submit major issues to:
 - the dockless bike or scooter provider via their app
 - or the City of Fort Lauderdale via the LauderServ app or by calling the 24-hour Customer Service Center at (954) 828-8000.

For more information, please contact the Transportation and Mobility Department at (954) 828-4826 or docklessmobility@fortlauderdale.gov.

www.fortlauderdale.gov/docklessmobility |    Follow us on social media & tag us! Use #docklessinFTL

If you would like this publication in an alternate format, please call (954) 828-4755 or email strategiccommunications@fortlauderdale.gov. ♻️ Printed on recycled paper.

Managing for Equity

Seattle: (2017): if 2,000 vehicle, must operate 20% in priority areas.

Los Angeles (2018): Cap at 3,000 with option to add 2,500 vehicles if operating in disadvantaged communities, another 5,000 if operating in San Fernando Valley + 70% reduced per vehicle fee

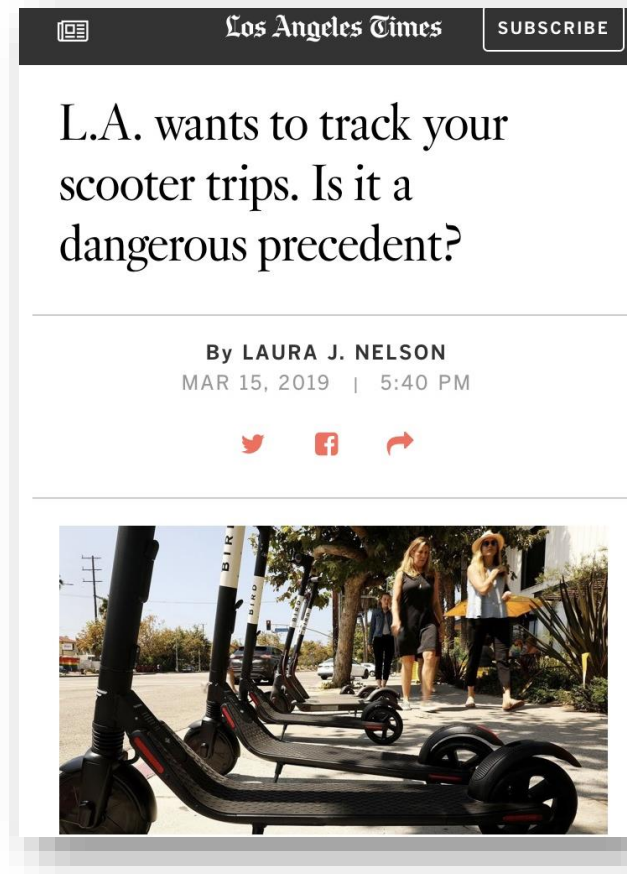
Portland (2019): up to 1,250 vehicles; if meets or exceeds an average of 2-3 trips per scooter per day in East Portland may be eligible for up to 35% allotment increase

Data Standards

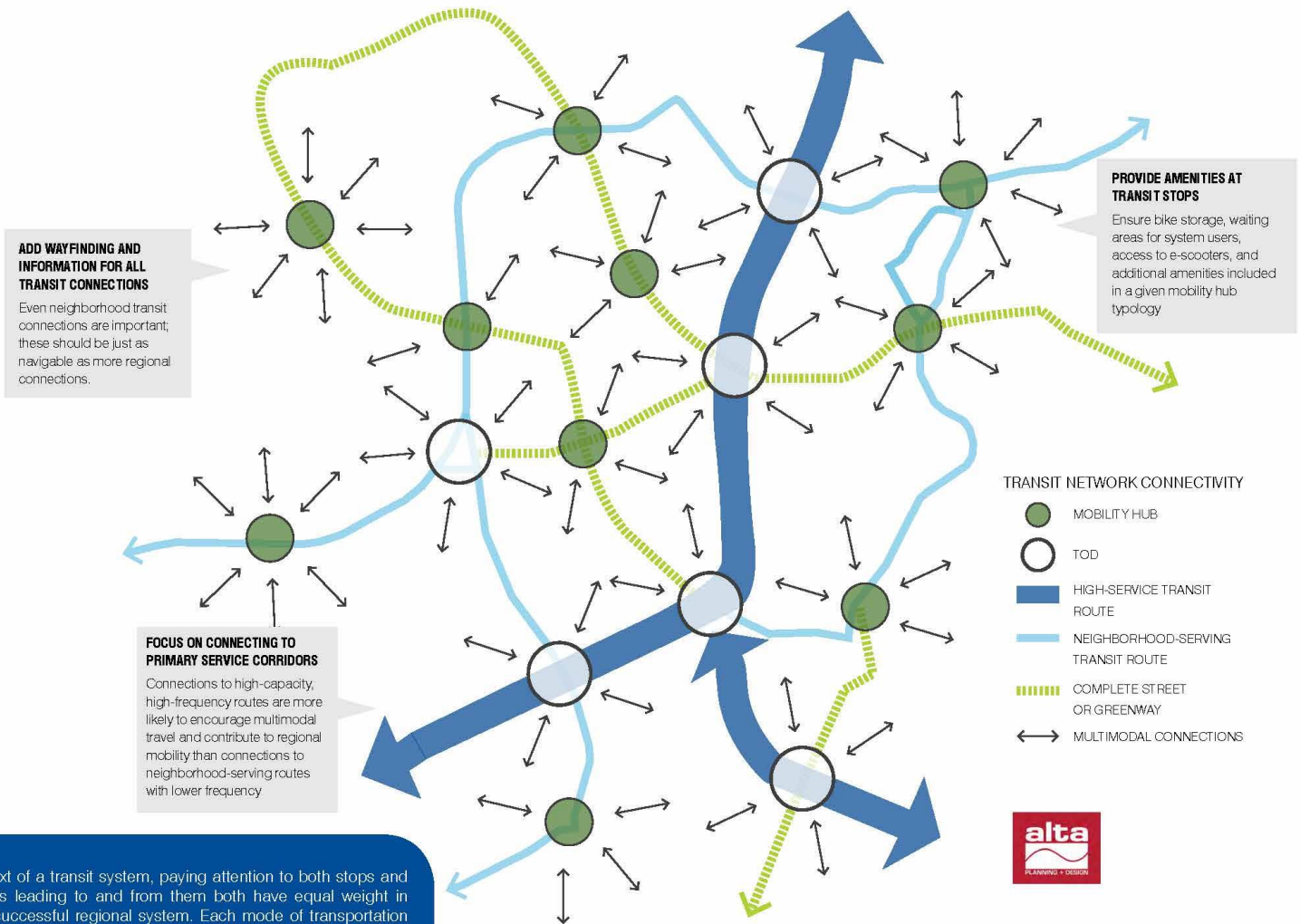
*“For Los Angeles, the goal should be to get and **retain the minimum amount of data necessary** to managing the right of way. Big Brother doesn’t need to know where you ride a scooter, but the public should be assured **that government has the tools to make sure for-profit companies are good stewards of the public space.**”*

– LA Times Editorial Board

<https://www.latimes.com/opinion/editorials/la-ed-scooters-privacy-los-angeles-20190322-story.html>



Mobility Hubs – Expanded Access



In the context of a transit system, paying attention to both stops and the corridors leading to and from them both have equal weight in creating a successful regional system. Each mode of transportation has its own requirements and methods to function, and **FOCUSING ON HOW THESE RELATE TO EACH OTHER IS CRITICAL FOR DEVELOPING A FLUID NETWORK.**



Curb Management



POTENTIAL DESIGN FEATURES

- » All of the features from Level 1, in addition to:
- » Loading zone for ride-sourcing (e.g. Uber, Lyft), freight, and autonomous vehicles
 - » Establishing private shared mobility pick-up and drop-off areas allows for curb pricing policies to be established and monitored locally.
- » Seating and tables
- » Real-time transit information
 - » Including information on whether or not the on-vehicle bus racks are full

Complete Streets 2.0



**PRIORITIZED
USES**



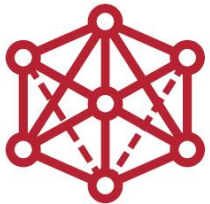
**SAFE BY
DESIGN**



**POINT-TO-POINT
TRIPS**



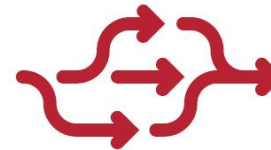
MULTIMODALISM



**COMPLETE
NETWORKS**



**DIGITAL
INFRASTRUCTURE**



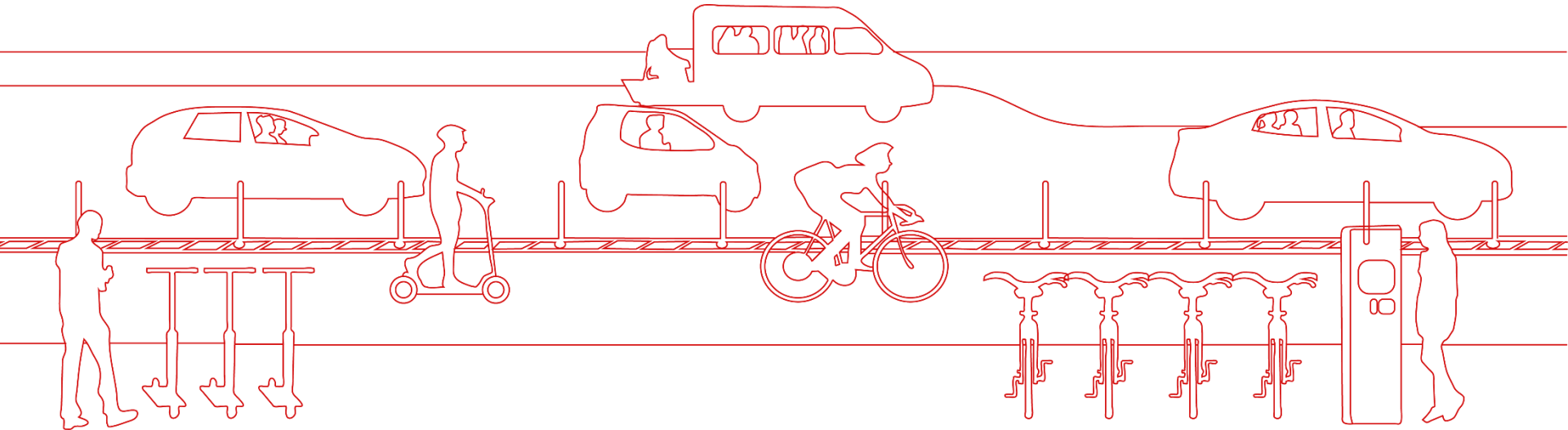
ADAPTABILITY



**OUTCOMES
BASED**

IMPLICATIONS

Expanded Choice



Taxonomy: <https://www.sae.org/shared-mobility/>

Mode Choice

San Francisco (2018):

- 53% said that they chose Lime's scooter over a car for their last trip
- 39% of riders reported that they used Lime to get to or from public transportation

Portland (2019):

- 34% of Portland riders took an e-scooter instead of driving a personal car or ridehailing
- This percentage jumped to 48% for visitors.

Expanded Mobility

HOME HOW IT WORKS FEATURES **GO GO** GRANDPARENT FAMILY UPDATES PRICING SIGN UP

Affordable senior transportation.

Use Lyft or Uber without a smartphone. 24/7 operators monitor rides & offer support. Text alerts keep families in the loop.

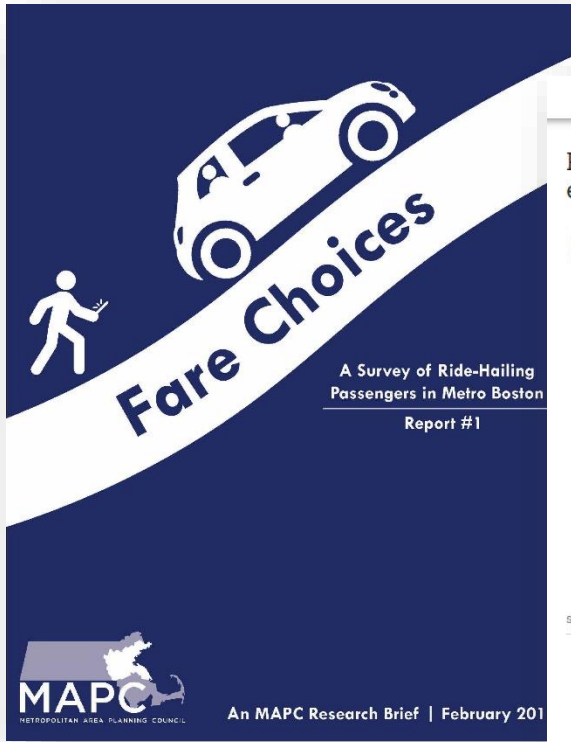
Call 1 (855) 464 - 6872 or
Email me a brochure

Uber Health HOW IT WORKS ABOUT FAQ CONTACT US LOGIN GET STARTED →

Provide rides with Uber Health

GET STARTED →

Evaluating Shared Mobility



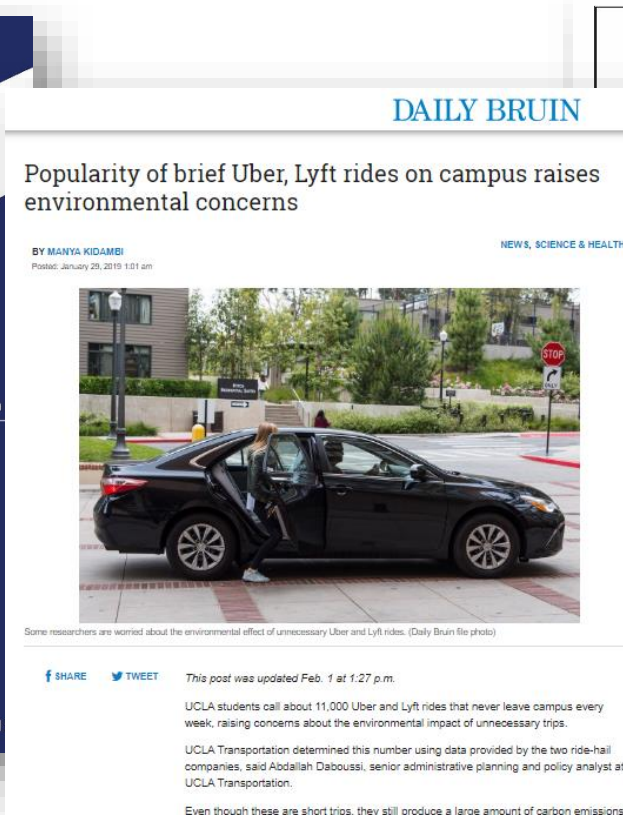
Fare Choices

A Survey of Ride-Hailing Passengers in Metro Boston
Report #1

MAPC
METROPOLITAN AREA PLANNING COUNCIL

An MAPC Research Brief | February 2018

Source:
<http://www.mapc.org/wp-content/uploads/2018/02/Fare-Choices-MAPC.pdf>




DAILY BRUIN

Popularity of brief Uber, Lyft rides on campus raises environmental concerns

BY MANYA KIDAMBI
Posted: January 29, 2019 1:01 am

NEWS, SCIENCE & HEALTH



Some researchers are worried about the environmental effect of unnecessary Uber and Lyft rides. (Daily Bruin file photo)

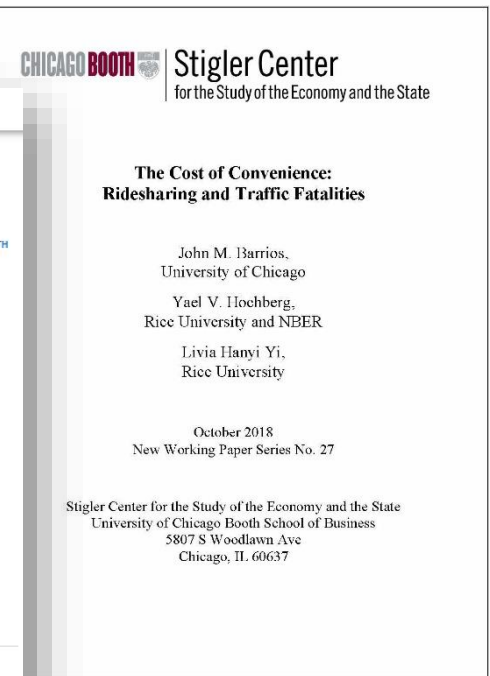
[SHARE](#) [TWEET](#) *This post was updated Feb. 1 at 1:27 p.m.*

UCLA students call about 11,000 Uber and Lyft rides that never leave campus every week, raising concerns about the environmental impact of unnecessary trips.

UCLA Transportation determined this number using data provided by the two ride-hail companies, said Abdallah Daboussi, senior administrative planning and policy analyst at UCLA Transportation.

Even though these are short trips, they still produce a large amount of carbon emissions.

Source: <http://dailybruin.com/2019/01/29/popularity-of-brief-uber-lyft-rides-on-campus-raises-environmental-concerns/>



CHICAGO BOOTH | **Stigler Center**
for the Study of the Economy and the State

The Cost of Convenience: Ridesharing and Traffic Fatalities

John M. Barrios,
University of Chicago
Yael V. Hochberg,
Rice University and NBER
Livia Hanyi Yi,
Rice University

October 2018
New Working Paper Series No. 27

Stigler Center for the Study of the Economy and the State
University of Chicago Booth School of Business
5807 S Woodlawn Ave
Chicago, IL 60637

Source:
<https://research.chicagobooth.edu/media/research/stigler/pdfs/workingpapers/27thecostofconvenience.pdf>

Congestion (to come?)

Zhang @ Georgia Tech

18% of households could reduce vehicle ownership, which would reduce total rates of vehicle ownership by 9.5%

VMT generation in metro area will rise by 13.3%

Model assumed 1) no change in travel, 2) vehicles only shared by households (not shared between households); 3) 100% market penetration 4) also assumes that the family members are not going to share their trips

An estimated 39,141 people lost their lives on all modes of our transportation system in 2017.

THE VAST MAJORITY

37,133

deaths were from **motor vehicle crashes.**



SOURCE: <https://www.transportation.gov/AV>



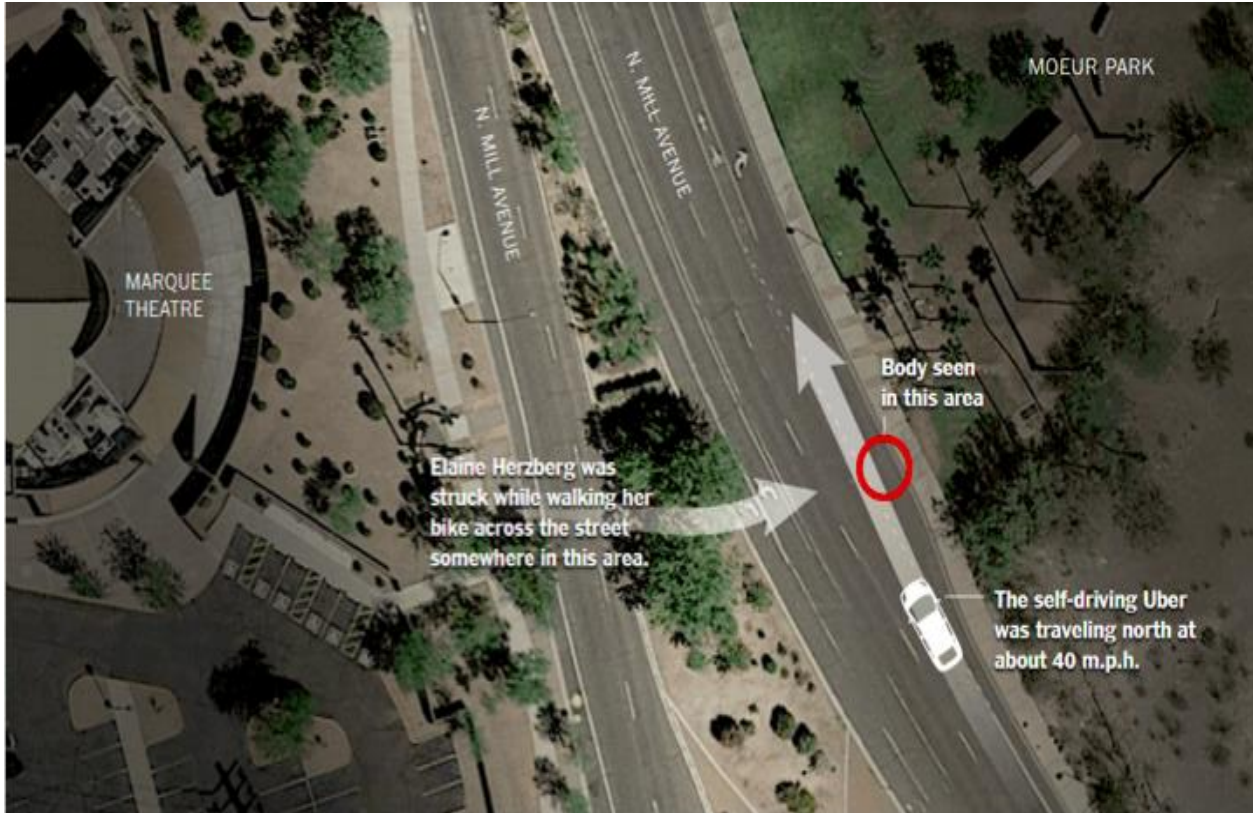
DRIVER FACTORS

Of all serious motor vehicle crashes,

94%

involve driver-related factors, such as **impaired driving, distraction, and speeding or illegal maneuvers.**

March 2018 Fatality



Source: New York Times

Autonomous Vehicles

Technology has come a long way - but there are still some important developments being made.

Detection Problem: AV's do not see and anticipate people walking and bicycling as well as they do vehicles.

Communication Problem: Currently pedestrians, bicyclists and drivers make eye contact to communicate intent - especially at a 4-way intersection scenario.

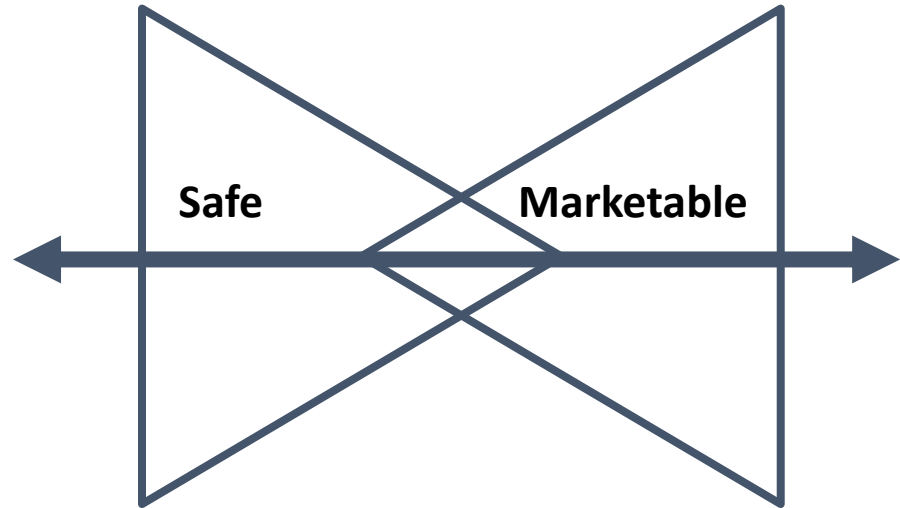
Paradox of Safe Crossings: AVs that stop for pedestrians at any time/location may lead to impaired traffic flow or, in response, physical restrictions to pedestrian access or further criminalizing jaywalking.



Source: <https://www.theverge.com/2018/7/30/17622540/drive-ai-self-driving-car-ride-share-texas>

Safe - OR - Marketable?

Self-driving cars can and will be safe only directly in inverse proportion to their marketability.



Expanded Mobility?



Will Autonomous Vehicles Be Accessible to People with Disabilities?

By Tim Frisbie | October 31, 2017 | News

 No Comments

 2

 1



RECENT POSTS

[The Shared-Use Mobility Center Announces the On-Ramp, a New Program to Help Transit Agencies Develop Innovative Partnerships to Advance Mobility On Demand](#)






[Mobility on Demand On-Ramp - Request for Proposals](#)

[What Can Transit Agencies Learn from TNCs' Late-Night Popularity?](#)

[6 Opportunity Areas Cities Can Pursue to Expand Shared Mobility](#)

E-Scooter Safety

Figure 1 - Fewer e-Scooter Injuries in Bike-Friendly Cities

	TOTAL BIRD REPORTED INJURIES PER MILLION MILES	"PEOPLE FOR BIKES" SAFETY SCORE
 San Diego	32.4	3.0
 Austin	32.8	3.0
 Phoenix Area	37.3	1.5
 Dallas	38.7	1.5
 San Antonio	51.2	1.0



Equity in Bike Share

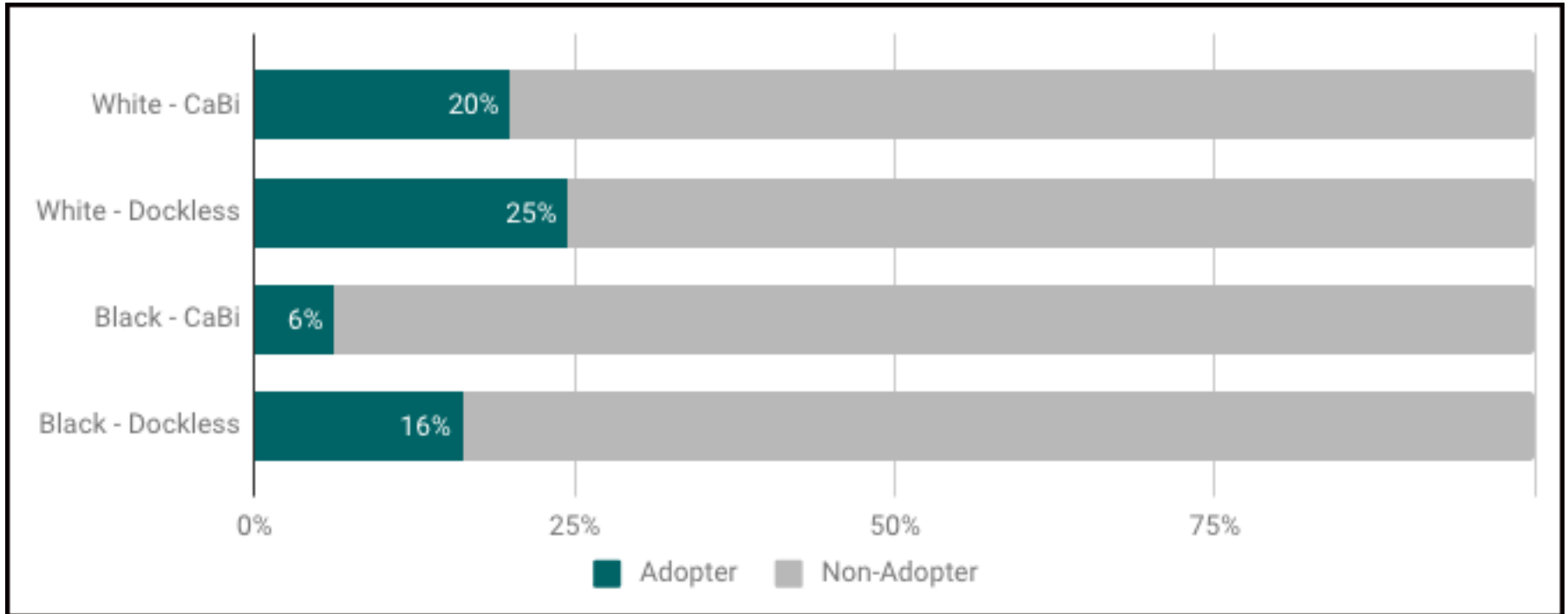
- 32% of cities with station-based systems had an income-based program (in 2017)
- Eligibility for a discount is important
- Not knowing enough about bike share is a barrier for people of color
- Other concerns specific to people of color

Equity in Bike Share

City Lab research shows that affordability and other equity improvements cannot make up for lack of geographic access.

Baca, A. (2018). "What Cities Need to Understand About Bikeshare Now," Citylab. Citylab.com

Equity of Dockless Micromobility?



Clelow, R. November 15, 2018.

<https://medium.com/populus-ai/measuring-equity-dockless-27c40af259f8>

Strategies for Equity

- Equitable rights of way
- Alternatives to digital platform
- Integration with transit fare payment/programs
- Affordability
- Community programming + safety outreach
- Service area reach + vehicle availability
- Complaint response time to preserve right of way
- Multilingual
- Pilot + Evaluate

Contact Us



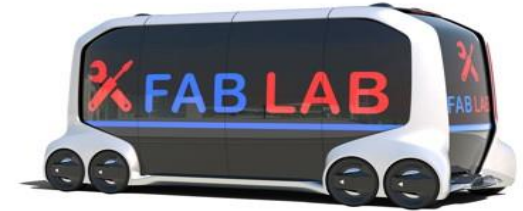
Jean Crowther, AICP

Alta Planning + Design

jeancrowther@altaplanning.com

Competition: Atomized Travel

*“Need a new pair of shoes? Summon the mobile shoe palette and try on different sizes as you travel from here to there.”
The Verge,
January 8, 2018*



Direct to Consumer


- Frictionless Transportation
- User Experience
- Gig Economy

Frictionless Transportation

DAILY BRUIN

Popularity of brief Uber, Lyft rides on campus raises environmental concerns

BY MANYA KIDAMBI NEWS, SCIENCE & HEALTH
Posted: January 29, 2019 1:01 am



Some researchers are worried about the environmental effect of unnecessary Uber and Lyft rides. (Daily Bruin file photo)

[SHARE](#) [TWEET](#) *This post was updated Feb. 1 at 1:27 p.m.*

UCLA students call about 11,000 Uber and Lyft rides that never leave campus every week, raising concerns about the environmental impact of unnecessary trips.

UCLA Transportation determined this number using data provided by the two ride-hail companies, said Abdallah Daboussi, senior administrative planning and policy analyst at UCLA Transportation.

Even though these are short trips, they still produce a large amount of carbon emissions.

Source: <http://dailybruin.com/2019/01/29/popularity-of-brief-uber-lyft-rides-on-campus-raises-environmental-concerns/>

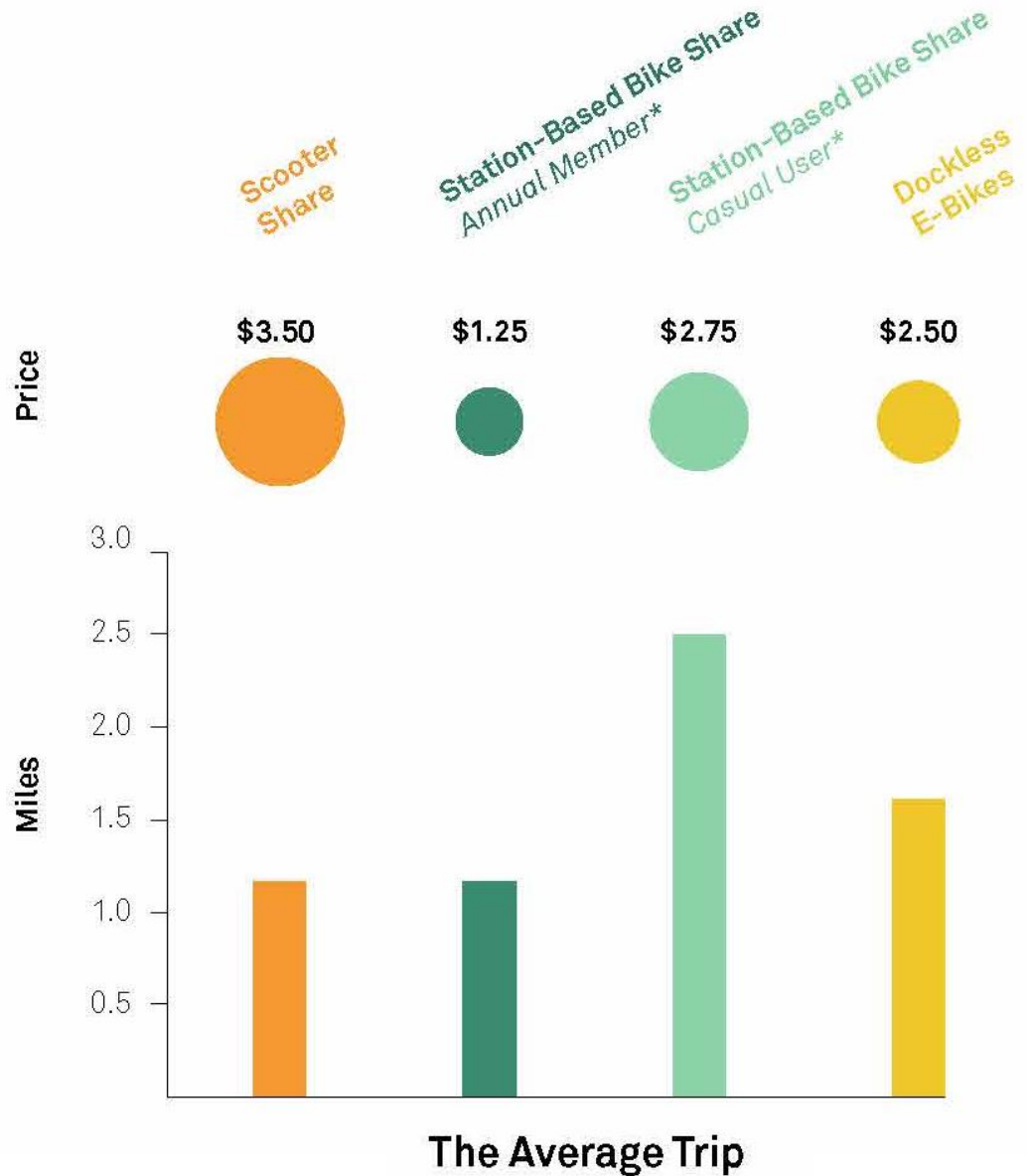
Complete Networks



Affordability

- Fees and average distance vary by market
- Station-based bike share systems reducing fees

NACTO, Shared Micromobility in the U.S.: 2018



Today's Focus

- Mobility options that should be considered when designing complete streets
- Impact on all users and people indirectly impacted by their use (pedestrians)
- Insights on policy development/urban design
- More insight on bike-share and scooter-share.
- Creative solutions for mobility in redevelopment areas that are capacity constrained and shortage of parking.

Definitions: LSAV

Low Speed Autonomous Vehicles

- Operate at speeds lower than 25-35 mph
- Operate on fixed routes, off street or in specific areas or zones
- Some are NEV's that have been adapted to be autonomous vehicles



Definitions: HSAV

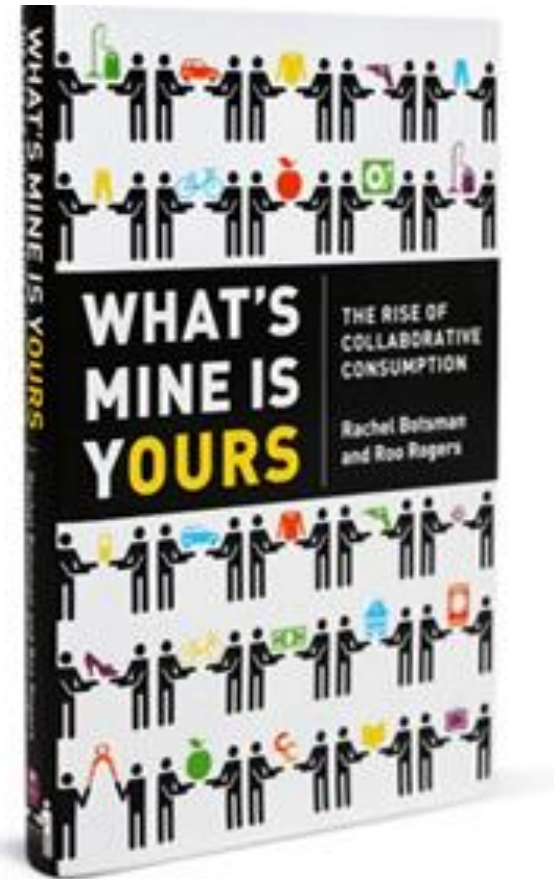
High Speed Autonomous Vehicles

- Operate up to or exceeding highway speeds
- Mix with vehicular traffic on typical roadways (depending on the state and test-case scenario)
- Not for use on paths or off-street conditions



How Did We Get Here?

- Internet/Social Media
- Smart Phone
- Sharing Economy
- Collaborative Consumption
- Gig Economy
- Amazon (Instant Gratification)



wework



Equity in Bike Share

Among cities with station-based bike share systems, 32% have an income-based discount program,... a 33% increase since 2016.

National Association of City Transportation Officials, (2017). “Bike Share in the U.S.: 2017,” Nacto.org.

Equity in Bike Share

A large majority of survey respondents said... **eligibility for a discounted membership** was very important to their decision to get a bike share membership.

McNeil, Nathan, Jennifer Dill, John MacArthur, Joseph Broach, Steven Howland. Breaking Barriers to Bike Share: Insights from Residents of Traditionally Underserved Neighborhoods. NITC-RR-884b. Portland, OR: Transportation Research and Education Center (TREC), 2017.

Equity in Bike Share

Is not knowing enough about bike share a barrier? *Yes for.....*

- 34% of low-income people of color
- 19% of higher income people of color
- 7% of higher income white people.

McNeil, Nathan, Jennifer Dill, John MacArthur, Joseph Broach, Steven Howland. Breaking Barriers to Bike Share: Insights from Residents of Traditionally Underserved Neighborhoods. NITC-RR-884b. Portland, OR: Transportation Research and Education Center (TREC), 2017.

Equity in Bike Share

Other concerns among people of color:

- Traffic safety
- Personal safety
- Liability and hidden fees

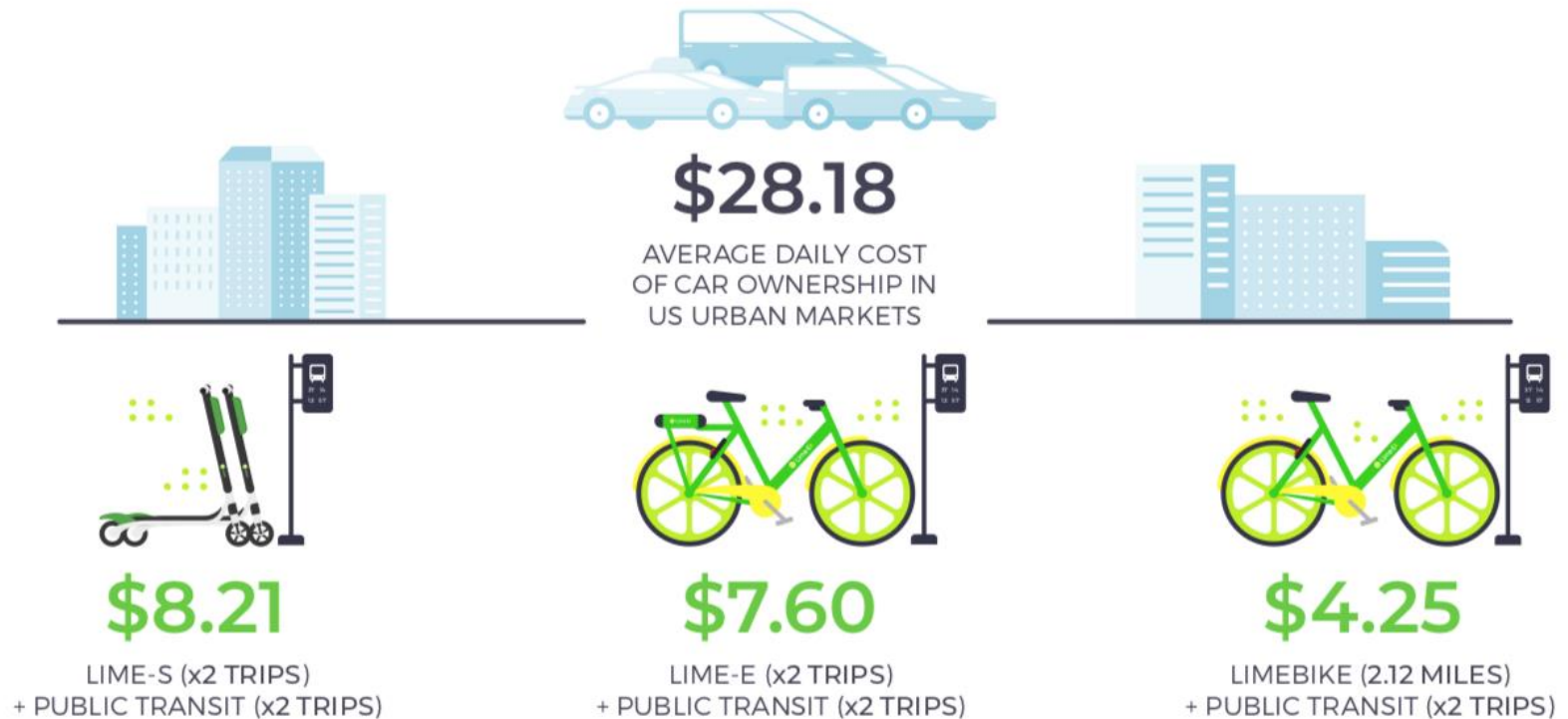
Schneider, B. (2017). "What Keeps Bike Share White," Citylab. Citylab.org.

Shifts in Micromobility

Seattle (2017): 30 percent of the city's population tried dockless bike share, a percentage which is roughly the same across the city's largest racial groups.

Portland (2018): 74 percent of local scootershare users reported never riding BIKETOWN and 42 percent never bicycling.

Affordability.... and Staying Power?



Source: LIME https://www.limebike.com/hubfs/Lime_Official_One_Year_Report.pdf