DRAFT

Emerging Mobility Evaluation Report

Evaluating Emerging Mobility Services and Technologies in San Francisco

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

APRIL, 2018

Contents

ACKNOWLEDGEMENTS

We wish to thank the following individuals who contributed to the development of this report:

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

Warren Logan, Senior Planner
Tilly Chang, Executive Director
Jeff Hobson, Deputy Director of Planning
Joe Castiglione, Deputy Director of Technology, Data and Analysis
Drew Cooper, Senior Planner
Michelle Beaulieu, Senior Planner

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

Ed Reiskin, Director of Transportation
Tom Maguire, Director of Sustainable Streets Division
Viktoriya Wise, Chief of Staff, Sustainable Streets Division
Darton Ito, Director of Innovation
Danielle Harris, Senior Planner
Darryl Yip, Assistant Planner
Sarah Jones, Planning Director
Kate Toran, Director of Taxis and Accessible Services
Annette Williams, Accessible Services Program Manager
Lisa Walton, Chief Technology Officer
Rhett Paranay, Assistant Performance Analyst

WSP

Rachel Zack
Karlina Wu
Sierra Laventure-Volz
Katharina McLaughlin

PEER REVIEWERS

Susan Cleveland-Knowles, Deputy City Attorney, General Counsel to the SFMTA

Timothy Doherty, SFMTA Senior Planner

Mari Hunter, SFMTA Senior Planner

Alex Jonlin, SFMTA Assistant Planner

John Knox-White, SFMTA Planning Programs & Education Manager

Heath Maddox, SFMTA Senior Planner

Carli Paine, SFMTA Land Use Development and Transportation Integration Manager

Sandra Padilla, SFMTA Senior Planner

Lars Peters, SF Environment Senior Zero Emissions Vehicle Advisor

Ryan Reeves, SFMTA Associate Planner

Kathleen Sakelaris, SFMTA Regulatory Affairs Manager

Andy Thornley, SFMTA Senior Analyst

The preparation of this report has been financed through a grant from the U.S. Department of Transportation and the Federal Highway Administration. Content of this report does not necessarily reflect the official views or policy of the U.S. Department of Transportation.

SAN FRANCISCO COUNTY
TRANSPORTATION AUTHORITY

1455 Market Street, 22nd Floor, San Francisco, CA 94103
TEL 415.522.4800 FAX 415.522.4829
EMAIL info@sfcta.org WEB www.sfcta.org

EXECUTIVE SUMMARY

New technologies are rapidly enabling innovations in transportation modes and services. These technologies include ride hailing services such as Lyft and Uber; microtransit services such as Chariot; courier network services such as Postmates; and autonomous vehicle technologies. In some cases, these new services complement San Francisco's policies and goals; in other cases, they conflict.

This report takes the first comprehensive look at the rapidly evolving emerging mobility sector in San Francisco. This report establishes an inventory of services operating in San Francisco, a set of Guiding Principles for emerging mobility services and technologies, and evaluates how these services and technologies align with the city's long-range transportation goals in relation to a healthy environment, livability, economic competitiveness, and world-class infrastructure, and through transportation lenses such as equity and affordability. This report provides a framework allowing the city to strike a balance between the emerging mobility sector and the city's Guiding Principles. Numerous recommended policies, pilots and research contained in this report will allow San Francisco to actively partner with emerging mobility providers to jointly improve our transportation system.

The results of this report will inform ConnectSF (the city's long-range transportation plan) and the next update of the San Francisco Transportation Plan (SFTP); provide a roadmap for guiding future Transportation Authority policies and initiatives in the emerging mobility sector; and, inform the SFMTA Emerging Mobility Strategy Report.

Defining Emerging Mobility

The following are the different service and technology types and examples of each.

TYPE OF SERVICE	EXAMPLES OF SERVICE PROVIDERS (BOLDED COMPANIES ARE ACTIVE IN SAN FRANCISCO)
Electric Standing Scooter Sharing	Bird, Lime, Spin *
Bike sharing	B-Cycle, Bluegogo, **Bay Area Bike Share/Ford GoBike (operated by Motivate), JUMP Bike (operated by Social Bicycles)**, Limebike, Scoot, Zagster
Scooter Sharing	Renault's Twizy, **Scoot**, Toyota's iRoad
Car sharing	Car2go, **Getaround**, GIG, **Maven, Zipcar**
Ride sharing	Blablacar, **Scoop**, Tripda, **Waze Carpool**
Ride hailing	**Flywheel, Lyft, Uber,** Via
Microtransit	Bridj, **Chariot**, Leap, Night School, Via**
Courier Network Services	**Amazon's Flex, Caviar, FedEx, Good Eggs, Grubhub, Instacart, Postmates, Omni, UPS**
TYPE OF TECHNOLOGIES	**EXAMPLES OF TECHNOLOGY PROVIDERS (BOLDED COMPANIES ARE ACTIVE IN SAN FRANCISCO)**
Autonomous Vehicles	Cruise/GM, EasyMile, Ford, Lyft, Mercedes, Renault/Nissan, Navia, Nvidia, Tesla, Uber, Waymo, Zoox***
Robots + Drones	Amazon Prime Air, Marble, Starship

* Electric standing scooter sharing was not included in the evaluation because their service was introduced after the evaluation period

** Bridj, Leap and Night School are no longer in operation but are presented as examples of microtransit services

*** The full list of autonomous vehicle developers and their activities is currently unknown

GUIDING PRINCIPLES FOR EMERGING MOBILITY

In June 2017, the Transportation Authority and the SFMTA adopted ten Guiding Principles to serve as a framework for evaluating emerging mobility services and technologies, identifying 10 ways to meet city goals, and shape future areas of studies, policies, and programs. The vision is for emerging mobility services and technologies to align with the Guiding Principles on balance. However, not every Guiding Principle may be relevant to each service or technology type.

Safety

Emerging Mobility Services and Technologies must be consistent with the City and County of San Francisco's goal for achieving Vision Zero, reducing conflicts, and ensuring public safety and security.

Transit

Emerging Mobility Services and Technologies must support and account for, rather than compete with, public transit and encourage use of high-occupancy modes.

Equitable Access

Emerging Mobility Services and Technologies must promote equitable access to services. All people, regardless of age, race, color, gender, sexual orientation and identity, national origin, religion, or any other protected category, should benefit from Emerging Mobility Services and Technologies, and groups who have historically lacked access to mobility benefits must be prioritized and should benefit most.

Disabled Access

Emerging Mobility Services and Technologies must be inclusive of persons with disabilities. Those who require accessible vehicles, physical access points, services, and technologies are entitled to receive the same or comparable level of access as persons without disabilities.

Sustainability

Emerging Mobility Services and Technologies must support sustainability, including helping to meet the city's greenhouse gas (GHG) emissions reduction goals, promote use of all non-auto modes, and support efforts to increase the resiliency of the transportation system.

Congestion

Emerging Mobility Services and Technologies must consider the effects on traffic congestion, including the resulting impacts on road safety, modal choices, emergency vehicle response time, transit performance, and reliability.

Accountability

Emerging Mobility Services and Technologies providers must share relevant data so that the city and the public can effectively evaluate the services' benefits to and impacts on the transportation system, and determine whether the services reflect the goals of San Francisco.

Labor

Emerging Mobility Services and Technologies must ensure fairness in pay and labor policies and practices. Emerging Mobility Services and Technologies should support San Francisco's local hire principles, promote equitable job training opportunities, and maximize procurement of goods and services from disadvantaged business enterprises.

Financial Impact

Emerging Mobility Services and Technologies must promote a positive financial impact on the city's infrastructure investments and delivery of publicly-provided transportation services.

Collaboration

Emerging Mobility Services and Technology providers and the city must engage and collaborate with each other and the community to improve the city and its transportation system.

EVALUATING EMERGING MOBILITY

Using the adopted Guiding Principles for Emerging Mobility Services and Technologies, the Transportation Authority collaborated with the SFMTA, the emerging mobility industry, and community stakeholders to develop a series of evaluation criteria related to the ten Guiding Principles. That criteria included quantitative, outcome-based questions and policy and design features associated with the service and mobile application.

Evaluation results summary

1. Pilots and permits lead to better performance

Companies that have performed pilots with San Francisco public agencies have provided data and experience that has informed development of permit systems for those mobility types. The resulting permit systems for bike share, scooter share, and microtransit have guided these mobility types to be more aligned with the Guiding Principles. There are opportunities to strengthen and harmonize the various permit programs. In addition, the City does not yet have a standardized process to proactively conduct pilots and incorporate innovative service types and new companies into the city's permitting and planning systems.

2. Inadequate data

The city does not have adequate data from enough emerging mobility companies to fully evaluate how well emerging mobility services are aligned with our Guiding Principles. Other researchers have produced important studies and findings about some emerging mobility services, but more traveler trip data and surveys are needed to characterize SF travel markets and individual traveler choices.

3. Opportunities for equitable access

Many emerging mobility services are available during late-night hours, on weekends, and/or in areas less well covered by public transit. This may provide opportunities to increase mobility for people with disabilities and increase access for people underserved by public transit.

4. Conflicts with public transit

San Francisco is a Transit-First city, but inadequate data means we do not have comprehensive information on how the emerging mobility sector is impacting transit ridership or our capital investments. While some services play a useful first/last-mile connection role, no emerging mobility companies have implemented design features or policies that our methodology identified as directly supportive of transit.

5. Impacts on safety

With the exception of Microtransit providers, operator training is inconsistent among emerging mobility services; almost no providers test operators following training. As a consequence, many services may exhibit roadway conflicts at curbs, in transit-priority lanes and on sidewalks - all of which may have significant impacts, particularly on vulnerable roadways users. Additionally, many emerging mobility services may contribute to distracted driving, which also decreases roadway safety.

6. Impacts on congestion

Because we have inadequate data, we do not fully understand how this sector is impacting travel mode choice behavior and congestion. We do know that many emerging mobility services rely on city rights-of-way and curbs. The city and the emerging mobility companies have not consistently coordinated to develop a robust curb management approach. Other researchers have found mixed impacts. For ride-hailing in particular, our TNCs Today study found that ride-hail vehicles in San Francisco are concentrated during times of day and neighborhoods of the city where traffic is most congested. A UC Davis study found that adoption of ride-hailing is likely to result in a net increase in vehicle miles traveled due to competition with public transit. Other studies have found that users of other mobility services chose to drive personal vehicles less frequently.

RECOMMENDATIONS

1. Partner

Proactively Partner

The SFMTA and the Transportation Authority should develop a framework for emerging mobility pilots that considers this study's evaluation results and encourages the city to proactively partner with companies to develop innovative solutions to address unmet city transportation needs. This framework should consider partnerships with transportation companies, employers, developers, and civic and neighborhood organizations.

2. Measure

Collect Emerging Mobility Data and Conduct Research

San Francisco public agencies should develop a data reporting and warehouse strategy to coordinate and consolidate existing data streams. Additionally, the city should employ a travel decision study to understand travel behavior. Such a study could be combined with a mobile application pilot that studies traveler choices and factors that inform them.

3. Regulate

Regulate and Recover Costs

The SFMTA should harmonize existing permit programs related to emerging mobility and create a framework for new services. The emerging mobility permit program should administer a permit fee that considers the full cost to plan for and regulate these services. Similarly, the city should seek regulatory and/or impact fees to mitigate effects these services have on safety, city resources and investments, as warranted by research studies. The permit must also require a standard set of data necessary to conduct ongoing evaluation of these services and include standards for equitable provision of services to underserved areas and to people with disabilities.

4. Bridge

Bridge Mobility and Access Gaps

The city should develop a user study to more clearly understand who uses emerging mobility services and for what purposes. This study should focus on equity gaps for low-income users and issues related to disabled access. The SFMTA and the Transportation Authority should also develop pilots to fill mobility and access gaps, such as for paratransit, late night transportation, school-related transportation, and in areas less well-covered by public transit.

5. Prioritize

Support and Prioritize Public Transit

The Transportation Authority and the SFMTA should continue to support the expansion of transit-priority facilities. The Transportation Authority and the SFMTA should collaborate in developing a series of studies related to rights-of-way prioritization, vehicle miles traveled, financial impacts, and cost-recovery. To support these studies, the Transportation Authority and the SFMTA should conduct pilot programs that improve first and last mile connectivity to transit stations.

6. Enforce

Enforce Safe Streets

The SFMTA and the Police Department should increase enforcement of known emerging mobility conflict areas throughout the city and consider piloting enforcement blitzes to encourage safe operation. Similarly, they should seek legislative authority and implement a pilot that automates enforcement to promote safety, ensure more systematic adherence to traffic rules, and reduce enforcement costs. The SFMTA should also develop a Vision Zero study that studies collision rate trends and unsafe operations, determines whether there is a correlation with emerging mobility services, and identifies recommendations to reduce traffic fatalities.

7. Price

Manage Congestion at Curbs and on City Roadways

The SFMTA and the Transportation Authority should prioritize developing a curb management strategy that allocates and prices curb access appropriately. Such a strategy should be supported by curb management pilots with emerging mobility services and through a curb management prioritization study. The SFMTA should also develop and implement an emerging mobility streets design guide to reduce modal conflicts. Finally, based on current congestion levels on San Francisco roadways, San Francisco should move toward implementing a decongestion pricing and incentives system, whether through cordons or roadway user fees, to manage roadway congestion.

FOREWORD

San Francisco is at the epicenter of disruptive change and technological transformation across multiple industries. Transportation has emerged as the latest sector to undergo rapid, significant shifts. More and more people are hearing about, or using, car sharing, bike sharing, and/or ride hailing services. It doesn't stop there. Sidewalk robots and self-driving cars are under development as well. Stand on nearly any San Francisco street for a few minutes and you'll see many examples of these innovative services and technologies.

Transportation is changing for so many of us because of these emerging mobility services and technologies. And that can be exciting -- and challenging. These nascent services open up new transportation choices, but the shifting landscape is not smooth or accessible to everyone. The city established a Transit First Policy, over 40 years ago,laying out San Francisco's desire to find ways to move increasing numbers of people and goods, not vehicles. Over the years, climate and equity imperatives have also grown in importance. As new services and technologies enter our city, San Francisco public policy and transportation agencies are keen to better understand the new transportation landscape and actively partner with private entities -- or manage where necessary -- to maximize benefits and minimize impacts.

During the past year, the San Francisco County Transportation Authority has worked collaboratively with the San Francisco Municipal Transportation Agency (SFMTA), other public agencies, elected officials, city advocacy groups, neighborhood stakeholders, and industry professionals to deliver this Emerging Mobility Studies Report. We've held workshops, focus groups, and dozens of meetings, working together to develop our Emerging Mobility Services Guiding Principles policy framework and to identify ways to improve transportation for everyone in San Francisco. This report is the product of many hands, and the project team is thankful to the many individuals who helped contribute their valuable time, energy, expertise, and data to bring it together.

Data-driven analysis is central to the Transportation Authority's work. We pride ourselves on our ability to provide objective and comprehensive research for San Francisco, the Bay Area, and the rest of the country. This report documents numerous policies and design features that emerging mobility companies have implemented that contribute to the city's Guiding Principles. We also document where companies have practices that conflict with the Guiding Principles. Finally, you will also find instances in this report when we say "we don't know." There are many aspects about these companies that we don't yet understand because we lack sufficient data to inform us. We invite companies to share their data with us to demonstrate how they are helping San Francisco meet its goals.

The results of this report, and the recommendations presented, are intended to continue the conversation about the ways in which emerging mobility service and technologies are helping or hindering the city in meeting its goals, what policies exist that may contribute to success, and where there is room for improvement. San Francisco -- its residents, public agencies, community groups, business groups, and the private sector -- must work together every day to improve our transportation system.

Transportation Authority Mission

The San Francisco County Transportation Authority's mission is to make travel safer, healthier, and easier for all. We plan, fund, and deliver local and regional projects to improve travel choices for residents, commuters, and visitors throughout the city. The Transportation Authority Board consists of the eleven members of the San Francisco Board of Supervisors, acting as Transportation Authority Commissioners.

INTRODUCTION

Purpose and need

New technologies are rapidly enabling innovation in transportation modes and services. These technologies include ride hailing services like Lyft and Uber; microtransit services such as Chariot; and autonomous vehicle technologies, among many others. Some of these services are so new, they operate in legal gray areas and their impacts on the transportation system have gone unmeasured. The Emerging Mobility Studies Report is intended as a resource guide to understanding how emerging mobility services and technologies are helping San Francisco meet its documented transportation goals.

Chapter 1 of this report provides an inventory of the defined emerging mobility types.

Chapter 2 identifies the city's 10 Guiding Principles for Emerging Mobility Services and Technologies. Together, these principles chart a course for how this sector can help San Francisco meet its goals.

Chapter 3 explains how we developed the emerging mobility evaluation criteria. This includes outcome metrics used to determine alignment with the Guiding Principles and policy and design features that may contribute to the Guiding Principles.

Chapter 4 investigates how the emerging mobility sector aligns with each of the 10 Guiding Principles and what policies and design features they've implemented that may contribute to the Guiding Principles.

Chapter 5 describes how each of the mobility types (for example, car sharing or bike sharing) align with the Guiding Principles. The results of this evaluation focus on all emerging mobility services and technologies – not on specific companies.

Given the lack of data about outcome metrics, many questions remain. In general, both Chapter 4 and 5 provide a snapshot in time of how the myriad policy and design features emerging mobility services and technologies have implemented are performing against dozens of indicators, within the 10 Guiding Principles. There are many more questions that may be asked of all or some of these services or technologies in the future.

Chapters 6, 7, and 8 provide a series of policy recommendations and next steps, future research, and pilot opportunities for emerging mobility services and technologies. Each are intended to continue the collaborative spirit created during this study effort and to encourage new transportation innovations that improve San Francisco's transportation system.

Report provides guidance

The Emerging Mobility Studies Report will help guide San Francisco's response to existing and future services and technologies and coordination between the city's various public agencies and their respective work plans, including:

- The San Francisco County Transportation Authority (Transportation Authority), responsible for congestion management, grant programming, and long-range transportation planning;
- The San Francisco Municipal Transportation Agency (SFMTA), responsible for the management of all ground transportation in the city. The SFMTA has oversight over the Municipal Railway (Muni) public transit, as well as bicycling, paratransit, parking, traffic, walking, and taxis;
- The San Francisco Department of the Environment, (SF Environment) whose transportation goals are to reduce emissions from commute trips and encourage the transition from fossil fuels to renewable energy sources.

Along with the above named city agencies, the Emerging Mobility Studies Report will help inform other planning activities, including:

- ConnectSF, the collaboration between the Transportation Authority, the Planning Department, and SFMTA to build an effective, equitable, and sustainable transportation system for San Francisco's future. ConnectSF will define a 50-year vision of San Francisco's future that represents our priorities, goals, and aspirations as a city within the larger Bay Area, and then determine what transportation system we will need to build to make that future a reality.

1. DEFINING EMERGING MOBILITY

Definition

As a preliminary step in the Emerging Mobility Studies, the Transportation Authority identified a working definition for "Emerging Mobility Services and Technologies" as a private or nonprofit transportation service or technology that uses public roads and sidewalks and automates at least three of the following characteristics:

✓ Driving	✓ Routing	✓ Reservations/Orders
✓ Vehicle Tracking	✓ Billing	✓ Customer Feedback
✓ Matching/Sharing	✓ Crowd-sourced Routing	✓ Vehicle Locking/Unlocking

Table 1: Inventory of Emerging Mobility Services and Technologies

TYPE OF SERVICE	EXAMPLES OF SERVICE PROVIDERS (BOLDED COMPANIES ARE ACTIVE IN SF)	ROLE OF TECHNOLOGY
Electric Standing Scooter Sharing	Bird, Lime, Spin*	Reservations, vehicle tracking, unlock/locking, billing, customer feedback
Bike sharing	B-Cycle, Bluegogo, **Bay Area Bike Share/ Ford GoBike (operated by Motivate), JUMP Bike (operated by Social Bicycles)**, Limebike, Scoot, Zagster	Reservations, vehicle tracking, unlock/locking, billing, customer feedback
Scooter Sharing	Renault's Twizy, **Scoot**, Toyota's iRoad	Reservations, routing, vehicle tracking, billing
Car sharing	Car2go, **Getaround**, GIG, **Maven Zipcar**	Reservations, vehicle tracking, unlock/locking, billing, customer feedback
Ride sharing	Blablacar, **Scoop**, Tripda, **Waze Carpool**	Reservations, routing, vehicle tracking, billing, customer feedback
Ride hailing	**Flywheel, Lyft, Uber**, Via	Reservations, routing, vehicle tracking, billing, customer feedback
Microtransit	Bridj, **Chariot**, Leap, Night School, Via**	Tracking, crowdsourcing routes, billing, customer feedback
Courier Network Services	**Amazon's Flex, Caviar, FedEx, Good Eggs, Grubhub, Instacart, Postmates, Omni, UPS**	Reservations/ordering, vehicle tracking, billing, customer feedback
TYPES OF TECHNOLOGIES	**EXAMPLES OF SERVICE PROVIDERS (BOLDED COMPANIES ARE ACTIVE IN SF)**	**ROLE OF TECHNOLOGY**
Autonomous Vehicles	Cruise/GM, EasyMile, Ford, Lyft, Mercedes, Renault/Nissan, Navia, Nvidia, Tesla, Uber, Waymo, Zoox***	Driving, reservations, vehicle tracking, routing
Robots +Drones	Amazon Prime Air, Marble, Starship	Reservations/ordering, vehicle tracking, billing, customer feedback, lock/locking

* Electric standing scooter sharing was not included in the evaluation because their service was introduced after the evaluation period

** Bridj, Leap and Night School are no longer in operation but are presented as examples of microtransit services

*** The full list of autonomous vehicle developers and their activities is currently unknown

INVENTORY OF EMERGING MOBILITY SERVICES AND TECHNOLOGIES IN SAN FRANCISCO

Bike sharing

B-Cycle, Bluegogo, **Bay Area Bike Share/Ford GoBike (operated by Motivate), JUMP Bike (operated by Social Bicycles),** Limebike, Scoot, Zagster

Bike sharing is a system of bicycles that is available to users to access as needed for point-to-point or round-trip trips, traditionally to station kiosks in dense urban areas. **Docked, or station-based, bike share** systems in the United States generally partner with local jurisdictions and mostly offer subscriptions that include unlimited short trips. The Metropolitan Transportation Commission (MTC) and the San Francisco Municipal Transportation Agency (SFMTA) have partnered with Motivate to expand the pilot Bay Area Bike Share system. Now rebranded as "Ford GoBike", the system is privately owned and operated by Motivate with sponsorship from the Ford Motor Company. In 2017, **stationless bike share** came to North America and the Bay Area, employing free-floating bicycles that do not have fixed stations and are accessible via mobile application for a per-trip fee. Dockless systems are proliferating quickly, in part because of significant venture capital backing and low-cost equipment and operations which allow them to establish service without public subsidy. San Francisco has recently created a permitting program for dockless bike share systems, which has permitted JUMP Bikes to operate under a limited pilot. In some dockless systems (e.g. JUMP Bike), the bikes must be locked to a stationary object, such as a bike rack. In others (e.g., Limebike), the bikes lock to themselves.

Scooter share

***Scoot**, Renault's Twizy, Toyota's iRoad*

Scooter sharing is the shared-use of a fleet of scooters. The scooters are often electric. Systems usually allow for both point-to-point and round trips. Members can rent the scooters by the minute.

Car sharing

*Car2go, **Getaround,** GIG, **Maven Zipcar***

Car sharing services provide users access to short-term car rentals. There are multiple models of car share. **Round-trip** car share providers let users reserve a vehicle from the same pick-up spot they return the vehicle to. This model is the most common. Among round-trip car share providers, those with company-owned fleets are sometimes referred to as "traditional" car share providers, as this was the first type of large-scale car sharing in North America. **Peer-to-peer** car share services, which are typically round-trip, enable car owners to rent their cars out as part of car share fleet. **Point-to-point/One-way** car share providers allow users to pick-up and drop off cars anywhere within a defined geographic region. The point-to-point car sharing program allows car sharing organizations to park vehicles in most types of on-street spaces such as defined residential areas and metered spaces. This is the fastest growing model of car sharing, but no point-to-point car share model exists yet in San Francisco. San Francisco currently has round-trip and peer-to-peer car sharing.

Ride sharing/Carpool Services

***Waze Carpool, Scoop**, Blablacar, Tripda*

Ride sharing is the third-party service of matching of riders and drivers with similar shared destinations, enabling them to split the cost of the ride. Unlike ride hailing, the driver is not fare-motivated to take the trip. Ride share drivers are neither employees nor independent contractors; they are compensated directly by passengers for only the cost incurred by the driver for providing the service. There are two types of

emerging mobility ride sharing services: dynamic matching, which is the matching of riders to drivers on-demand (such as Waze Carpool), and the pre-scheduled matching (such as Scoop), where travelers enter their desired pickup and drop-off schedule and drivers and riders are matched in advance of their trip. .

Ride hailing

***Lyft, Uber, Flywheel**, Via*

Ride hailing services match riders with drivers, on-demand. While often referred to as "ride sharing", we use the term "ride hailing." Unlike ride share drivers, ride hail drivers are fare-motivated, providing transportation to another party to earn a profit, and typically do not share a destination with their passengers. Ride hail companies known in California as Transportation Network Companies (TNCs), are regulated at the state level by the California Public Utilities Commission (CPUC), unlike taxis which are regulated locally. Ride hailing companies are further distinguished from taxis in several key ways: they may not accept street hails, only prearranged rides; there is no regulatory limit on the number of vehicles allowed to operate simultaneously; and fares are not regulated. **Ride splitting** is the assigning of fares traveling along similar routes to one car, and enabling the splitting of the fare. Split rides are offered on ride hailing services, and their rides are typically between 40 and 60 percent less than regular service rides.

Microtransit/Private Transit Vehicles

***Chariot**, Via, Bridj, Leap, Night School*

Microtransit is a privately-operated transit service, enabled by technology, that usually operates along a dynamically generated route or a fixed route generated from crowd-sourced requests. Microtransit focuses on commuters' experience, emphasizing comfort and convenience, and offering van or shuttle service, typically at a higher price than public transit. Microtransit companies' service delivery can differ in fleet mix (buses or vans), route structure (fixed or dynamic), and, more recently, fleet ownership. Microtransit is distinguished from private shuttles (commonly known in San Francisco as "Tech Shuttles") because microtransit services are open to the public, they charge individuals instead of employers, and automate several characteristics including routing, billing, customer feedback, and reservations. Currently Chariot is the only microtransit service provider in San Francisco. Microtransit providers operating only in San Francisco are subject to SFMTA Private Transit Vehicle permit requirements. Those that operate across city lines are subject only to State regulations. Chariot has applied for a Private Transit Vehicle permit and is working with the SFMTA to conform its operations to SFMTA permit requirements.

Courier network services

Amazon's Flex, Good Eggs, Caviar, Instacart, Grubhub, Postmates, Omni

Courier Network Services are companies that operate an application-based platform to provide immediate delivery to customers using couriers who may make deliveries by motor vehicle, bicycle, on foot, or by other mode. These couriers are on-demand local delivery contractors.

Autonomous Vehicle Services

*Uber, Lyft, **Cruise/GM**, Ford, EasyMile, Renault/Nissan, Mercedes, Zoox, Navia, Nvidia, **Tesla**, Waymo and many others*

According to the UK Department of Transport, "a fully autonomous vehicle (AV) is capable of completing journeys

safely and efficiently, without a driver, in all normally encountered traffic, road, and weather conditions." Vehicles are currently equipped with different autonomous systems, such as automatic parking and braking. The Society of Automotive Engineers has defined five "Levels of Autonomy." The first three levels require some level of human intervention, whereas, there is no human intervention required at levels 4 & 5.

AVs have the potential to drastically change our infrastructure, traffic and parking needs, insurance policies, and much more. It remains unclear what direction and magnitude AVs will have on each of those topics. AVs are continually growing in a number of markets, including car share and ride hailing fleets (TNCs), shuttle services, and personal vehicles.

Robots and Drones

Amazon Prime Air, Marble, Starship

Robots are machines that are programmed by a computer to carry out tasks automatically. Courier Network Services have taken an interest in using robots for delivery, using sidewalks. These companies, such as Marble and Starship, route, lock/unlock, and drive autonomously, allowing users to securely receive goods.

Drones are flying robots. Users control the drone's flight path remotely via GPS and onboard sensors. Drones can also fly autonomously along software directed flight paths embedded in their system, working with GPS and sensors.

Use cases for drones vary widely and include insurance claim validation, wind turbine inspection, construction site management, agriculture, live gas flare inspection, first aid, security, flash flood, organ transplant delivery, and more. In a study conducted in 2015 by the National Technology Readiness Survey, 50 percent of the almost 1000 survey participants desired receiving packages from remote-controlled drones and 48 percent said pilotless autonomous drones. Both were almost 10 percent more desirable than owning or ride hailing an autonomous vehicle.

2. POLICY FRAMEWORK FOR EMERGING MOBILITY

Developing the policy framework

Representatives from the Transportation Authority and the SFMTA conducted outreach with tech-sector, agency, and community representatives to gather feedback from emerging mobility providers related to business approach, infrastructure and policy constraints, and long-term growth strategies. Over a dozen interviews were conducted across all nine mobility service and technology types.

In addition to industry interviews, the Transportation Authority and the SFMTA conducted a series of focus groups with community stakeholders, advocacy partners, and public agencies about each individual guiding principle. Finally, draft guiding principles were presented at various public agency committees that focus on transportation related topics.

Interagency Support

The Transportation Authority collaborated closely with the SFMTA. The two agencies formed a steering committee designed to identify core policy issues related to emerging mobility and to assign various staff members to key working groups.

Emerging Mobility Stakeholder Interviews

- Bay Area Bike Share/Motivate
- Car2Go
- Cruise GM
- Easymile
- Ford Smart Mobility
- GIG Car share
- Lime
- Lyft
- Maven
- Omni
- Postmates
- Social Bikes
- Swifte
- Uber
- Scoop
- Scoot
- Waze Carpool
- Zagster Bike share
- Zipcar

Guiding Principles for Emerging Mobility

In June 2017, the Transportation Authority and the SFMTA adopted ten Guiding Principles to serve as a framework for evaluating emerging mobility services and technologies. These principles will be used to identify ways to meet city goals, and inform future studies, policies, and programs. These Guiding Principles reflect dozens of adopted city policies, plans, and strategies, and are synthesized to relate to emerging mobility.

Not every Guiding Principle may be relevant to each service or technology type. In some cases, a service or technology type may not meet all of the principles consistently. This report attempts to evaluate whether a service or technology aligns with each Guiding Principle, based on quantitative metrics. Additionally, this report considers policies and design features that emerging mobility services and technologies have implemented that may contribute to or detract from the Guiding Principles. To the extent possible, the Transportation Authority and the SFMTA will work with the service providers to encourage them to meet the Guiding Principles or may choose to limit their access to city resources if they do not sufficiently meet the principles.

THE 10 GUIDING PRINCIPLES FOR EMERGING MOBILITY

Safety

Emerging Mobility Services and Technologies must be consistent with the City and County of San Francisco's goal for achieving Vision Zero, reducing conflicts, and ensuring public safety and security.

Transit

Emerging Mobility Services and Technologies must support and account for, rather than compete with, public transit and encourage use of high-occupancy modes.

Equitable Access

Emerging Mobility Services and Technologies must promote equitable access to services. All people, regardless of age, race, color, gender, sexual orientation and identity, national origin, religion, or any other protected category, should benefit from Emerging Mobility Services and Technologies, and groups who have historically lacked access to mobility benefits must be prioritized and should benefit most.

Disabled Access

Emerging Mobility Services and Technologies must be inclusive of persons with disabilities. Those who require accessible vehicles, physical access points, services, and technologies are entitled to receive the same or comparable level of access as persons without disabilities.

Sustainability

Emerging Mobility Services and Technologies must support sustainability, including helping to meet the city's greenhouse gas emissions reduction goals, promote use of all non-auto modes, and support efforts to increase the resiliency of the transportation system.

Congestion

Emerging Mobility Services and Technologies must consider the effects on traffic congestion, including the resulting impacts on road safety, modal choices, emergency vehicle response time, transit performance and reliability.

Accountability

Emerging Mobility Services and Technologies providers must share relevant data so that the city and the public can effectively evaluate the services' benefits to and impacts on the transportation system, and determine whether the services reflect the goals of San Francisco.

Labor

Emerging Mobility Services and Technologies must ensure fairness in pay and labor policies and practices. Emerging Mobility Services and Technologies should support San Francisco's local hire principles, promote equitable job training opportunities, and maximize procurement of goods and services from disadvantaged business enterprises.

Financial Impact

Emerging Mobility Services and Technologies must promote a positive financial impact on the city's infrastructure investments and delivery of publicly-provided transportation services.

Collaboration

Emerging Mobility Services and Technology providers and the city must engage and collaborate with each other and the community to improve the city and its transportation system.

3. EVALUATING EMERGING MOBILITY IN SAN FRANCISCO

Purpose of Evaluation

Using the adopted Guiding Principles for Emerging Mobility Services and Technologies, the Transportation Authority collaborated with the SFMTA, the emerging mobility industry, and community stakeholders to develop a methodology for evaluating how the services in the San Francisco Bay Area are helping the city meet its goals.

First, the Transportation Authority used the goals identified in the Guiding Principles to develop a series of quantitative outcome metrics that formed the evaluation criteria for the emerging mobility services. Second, project staff identified policy and design features related to each Guiding Principle that may contribute to the measurable outcomes identified in the Guiding Principles. The purpose of the evaluation effort was 1) to identify where the services and technologies were helping the city meet its goals; 2) to identify where there is a negative impact or room for improvement; and 3) to identify where future research is needed. From those results, the Transportation Authority has developed a series of policy recommendations, alongside future research and pilot opportunities to fill knowledge gaps (see chapters 6).

Developing Evaluation Criteria

Community Outreach and Workshop

The Transportation Authority and SFMTA invited representatives from public agencies, advocacy groups, and the emerging mobility sector to a workshop to help develop evaluation criteria and ways to measure alignment with the Guiding Principles. The workshop also served as an opportunity for Transportation Authority staff, agency partners, advocacy and community groups, and emerging mobility representatives to meet and learn from each other's perspectives. Often, participants shared similar concerns or feedback and proposed different innovative ways to measure success. Participants shared concerns, feedback, and different ways to measure success, in order to develop this study's key evaluation questions. Participants also discussed their desire for public agencies to continue staffing a collaborative stakeholder working group on this topic.

Industry Evaluation Questionnaire

Following the emerging mobility workshop and the internal collaboration between the Transportation Authority and SFMTA, project staff created an industry questionnaire (see appendix #). The questionnaire, developed using the 10 Guiding Principles for Emerging Mobility Services and Technologies, asked emerging mobility companies to demonstrate to the city how their service or technology is helping San Francisco meet its goals, both with quantitative data and to confirm the presence or absence of policy and design features they have implemented that contribute to advancing the Guiding Principles.

Conducting the Evaluation

The Transportation Authority worked with partner agencies, including the SFMTA and the San Francisco Department of the Environment (SF Environment), to collect and analyze data and research related to the emerging mobility evaluation. In addition, the Transportation Authority distributed the final emerging mobility questionnaire to all participants of the Emerging Mobility workshop. Emerging mobility companies were encouraged to share relevant data that would provide the Transportation Authority with insights into their companies' product trends.

Many emerging mobility companies participated in the questionnaire. However, most companies provided little to no quantitative data to demonstrate alignment with the Guiding Principles. The Transportation Authority supplemented industry responses with available reports and research. In sum, the emerging mobility evaluation has limited quantitative information to determine how these services align with our Guiding Principles.

Many participating companies did document policies and design features they have implemented that may contribute to the city's goals. Their responses were aggregated by service type (such as car sharing and bike sharing). The Transportation Authority also researched information available on company mobile applications and websites to understand service policies and design features. The evaluation results provide a clear snapshot of the extent to which companies are implementing policies and design features that contribute to our Guiding Principles.

Lastly, the results presented in this chapter focus primarily on a comparison between service types and less about the scale of these services. In general, the Transportation Authority has limited data on the total vehicle miles traveled and the total number of trips conducted for each of these emerging mobility types, thus limiting our ability to scale these evaluation results. As the Transportation Authority continues research into emerging mobility services and technologies, we will work to measure vehicle miles traveled and total trips of each of these emerging mobility service types.

EVALUATION CRITERIA AND POLICY AND DESIGN FEATURES

The following table lists the evaluation criteria used to evaluate each emerging mobility sector within each Guiding Principle. The evaluation criteria have two components: (a) **"outcome metrics"** which are objective measures that use data to evaluate the degree to which an Emerging Mobility service is aligned or misaligned with a Guiding Principle; and (b) **"policy and design features"** which are attributes of a service that are thought to contribute to attaining a Guiding Principle, although the actual contribution is unknown or unproven. The outcome metrics are almost entirely unknown due to insufficient sharing of data by emerging mobility providers.

Safety

Emerging Mobility Services and Technologies must be consistent with the City and County of San Francisco's goal for achieving Vision Zero, reducing conflicts, and ensuring public safety and security.

OUTCOME METRIC	
1	**OPERATIONAL SAFETY** Number of collisions per 100,000 service miles
POLICIES AND DESIGN FEATURES	
2	**OPERATIONAL SAFETY** Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)
3	**OPERATIONAL SAFETY** Safety training is required
4	**OPERATIONAL SAFETY** Service has hours of service program for both revenue and non-revenue hours and checks DMV Record Duty of Service log
5	**UNSAFE DRIVING PENALTIES** Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action
6	**PERSONAL SECURITY** Service requires background checks of operators.
7	**PERSONAL SECURITY** Service provides 24-hour service with a human response in a timely manner.

Transit

Emerging Mobility Services and Technologies must support and account for, rather than compete with, public transit and encourage use of high-occupancy modes.

OUTCOME METRIC	
1	**TRANSIT COMPETITION** Total and percentage of trips shifted to and from transit to emerging mobility service
2	**FIRST AND LAST MILE** Total trips provided to transit stations, and as a share of all trips
POLICIES AND DESIGN FEATURES	
3	**TRANSIT DISCOUNTS** Service provides discounted fares to transit hubs
4	**TRANSIT CONNECTIONS** Service provides in-app information on public transit connections or alternatives

Equitable Access

Emerging Mobility Services and Technologies must promote equitable access to services. All people, regardless of age, race, color, gender, sexual orientation and identity, national origin, religion, or any other protected category, should benefit from Emerging Mobility Services and Technologies, and groups who have historically lacked access to mobility benefits must be prioritized and should benefit most.

	OUTCOME METRIC
1	USER STATISTICS Percentage of service users who are defined as low-income (compared with general population)
2	ACCESS TIME Average access times for trips originating from Communities of Concern (compared to average access time for trips not originating in a Community of Concern)
3	INCREASING ACCESS AND MOBILITY Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)
	POLICY AND DESIGN FEATURES
4	FARE PRODUCTS Service offers low-income fare products
5	MULTI-LANGUAGE SUPPORT Service offered in multiple languages through app AND web
6	PAYMENT INSTRUMENT Offers payment alternatives for users without access to smartphones or internet
7	PAYMENT METHOD Service accepts alternative methods to pay besides credit/debit card
8	INCREASING ACCESS AND MOBILITY Availability of service on weekends
9	INCREASING ACCESS AND MOBILITY Availability of Service in underserved areas
10	INCREASING ACCESS AND MOBILITY Availability of service between 9p.m. and 5a.m.

Disabled Access

Emerging Mobility Services and Technologies must be inclusive of persons with disabilities. Those who require accessible vehicles, physical access points, services, and technologies are entitled to receive the same or comparable level of access as persons without disabilities.

	OUTCOME METRIC
1	USER STATISTICS Percentage of service users who identify as people with disabilities
2	ACCESS TIME Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips
3	INCREASING ACCESS AND MOBILITY Total trips provided to people with disabilities
	POLICY AND DESIGN FEATURES
4	FLEET ACCESSIBILITY Accessible vehicles are provided

5	**TRIP FARE** Cost of trip for people with disabilities vs. non-disabled fares
6	**508 COMPLIANCE** Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; low-tech options for those without access to computer or mobile phone
7	**ACCESSIBILITY MARKETING** Mobile app and web platforms feature access and use information for persons with disabilities
8	**ACCESSIBILITY GUIDELINES** Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedures for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)

Sustainability

Emerging Mobility Services and Technologies must support sustainability, including helping to meet the city's greenhouse gas (GHG) emissions reduction goals, promote use of all non-auto modes, and support efforts to increase the resiliency of the transportation system.

OUTCOME METRIC	
1	**FLEET EMISSIONS** Percentage of vehicles that are zero emissions vehicles
2	**FLEET EFFICIENCY** Average vehicle fuel efficiency
3	**AVERAGE VEHICLE OCCUPANCY** People miles traveled (PMT) divided by vehicle miles traveled (VMT)) for the service type
4	**SERVICE EMISSIONS** Net increase/decrease in GHG
POLICY AND DESIGN FEATURES	
5	**FLEET EMISSIONS** Policies prioritize clean/renewable energy vehicles

Congestion

Emerging Mobility Services and Technologies must consider the effects on traffic congestion, including the resulting impacts on road safety, modal choices, emergency vehicle response time, transit performance, and reliability.

OUTCOME METRIC	
1	**SERVICE VMT (SHORT TERM AND LONG TERM)** Net change in VMT during a.m. peak, p.m. peak, and daily VMT
2	**TRAFFIC SPEEDS** Net change in vehicle and transit speeds due to this emerging mobility service, OR net change in vehicle and transit delay due to this emerging mobility service
POLICY AND DESIGN FEATURES	
3	**CURB CONGESTION** The service provider rather than individual users, in coordination with the city, designates access points
4	**PEAK SPREADING** Service incentivizes travel outside of commute hours

5	**SHARED TRIPS** Shared fare price per passenger is discounted from average solo trip price

Accountability

Emerging Mobility Services and Technologies providers must share relevant data so that the city and the public can effectively evaluate the services' benefits to and impacts on the transportation system, and determine whether the services reflect the goals of San Francisco.

OUTCOME METRIC	
No outcome metrics were identified for the Accountability Principle	
POLICY AND DESIGN FEATURES	
1	**TRIP DATA** Provide extensive trip data on a recurring basis to help support public agencies transportation network management efforts
2	**USER DATA** Provides anonymized and aggregated user data to local planning agencies

Labor

Emerging Mobility Services and Technologies must ensure fairness in pay and labor policies and practices. Emerging Mobility Services and Technologies should support San Francisco's local hire principles, promote equitable job training opportunities, and maximize procurement of goods and services from disadvantaged business enterprises.

OUTCOME METRIC	
1	**EMPLOYEE/CONTRACTOR EARNINGS** Mobility service operator net hourly median earnings minus job-related expenses
2	**EMPLOYEE/CONTRACTOR BENEFITS** Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits
POLICY AND DESIGN FEATURES	
3	**FAIR PAY** Level of transparency to service operator (employee/contractor) in hourly rate, net of job-related expenses
4	**OPPORTUNITY FOR ENTRY** Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors)
5	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)
6	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company prioritizes contracting with DBEs and LBEs
7	**OPPORTUNITIES FOR ENTRY** Hiring process does not use educational attainment as a barrier to employment

Financial Impact

Emerging Mobility Services and Technologies must promote a positive financial impact on the city's infrastructure investments and delivery of publicly-provided transportation services.

OUTCOME METRIC	
1	**TRANSIT COMPETITION** Net change in transit revenue due to the emerging mobility service
2	**STATE OF GOOD REPAIR** Service's total vehicular VMT on San Francisco roadways
3	**FISCAL IMPACT** Net marginal roadway maintenance cost due to the emerging mobility service
POLICY AND DESIGN FEATURES	
4	**PERMIT FEES** Service pays permit fee to a local regulatory agency that recovers enforcement, maintenance, and other program costs

Collaboration

Emerging Mobility Services and Technology providers and the city must engage and collaborate with each other and the community to improve the city and its transportation system.

OUTCOME METRIC	
No outcome metrics were identified for the Collaboration Principle	
POLICY AND DESIGN FEATURES	
1	**POINT OF CONTACT** Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures
2	**COMMUNITY ENDORSEMENTS** Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders
3	**COMMUNITY OUTREACH** Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders
4	**SERVICE PILOT** Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions
5	**SERVICE PERMIT** Service receives a permit from a San Francisco Public Agency
6	**PROACTIVE PARTNERSHIP** Company has reached out to the San Francisco public agencies and resolved service misalignments, prior to initiating service in San Francisco

4. EVALUATION RESULTS: BY GUIDING PRINCIPLE

The following chapter provides a summary for how all of the emerging mobility services as a whole are aligned with each Guiding Principle and how the policies and design features implemented by this sector may contribute to or detract from ideal outcomes specified in the Guiding Principles. The evaluation does not include emerging mobility technologies such as autonomous vehicles or robots/drones. The chapter is organized with a section for each Guiding Principle. Each section contains the following components:

- Definition of the Guiding Principle;
- Quantitative outcome metrics and policy indicators for that Guiding Principle;
- Summary of the results for that Guiding Principle, describing the nuances in how the emerging mobility sector aligns with the Guiding Principle and how implemented policies and design features may also contribute to or detract from the Guiding Principles ideal outcomes;
- Trends and other considerations related to that Guiding Principle; and
- Outstanding Policy Questions, to identify broader policy areas city leaders and agencies should consider related to that Guiding Principle.

Each Guiding Principle section also includes a table that provides (1) data values associated with outcome metrics related to that Guiding Principle and (2) policy and design features that emerging mobility service companies have implemented and that relate to that Guiding Principle. The table has the following legend:

Evaluation Results Summary Table Legend	
	All evaluated companies have implemented this policy or design feature
	Some companies have implemented this policy or design feature
	No company has implemented this policy or design feature
	There is insufficient data
	Question does not apply to a particular type of emerging mobility service

Safety

Emerging Mobility Services and Technologies must be consistent with the City and County of San Francisco's goal for achieving Vision Zero, reducing conflicts, and ensuring public safety and security.

How do Emerging Mobility Services align with the Safety principle?

Most emerging mobility service providers have not provided sufficient data to evaluate whether, and to what extent, they align with the Safety principle. Bay Area Bike Share (the predecessor to Ford GoBike) provided operational safety data for 2013 and 2014 to the Mineta Transportation Institute, which analyzed them and published their results in a report.[1] Chariot provided the operational safety metric, but not the underlying data to verify it. Relative to the collision rate for driving in San Francisco, 46 per 100,000 miles, bikeshare and microtransit collision rates are lower.[2] Operational safety for other emerging mobility services is unknown.

Vision Zero San Francisco

The City and County of San Francisco adopted Vision Zero in 2014. The policy challenges the city to eliminate traffic fatalities by 2024 by improving street safety, educating the public, enforcing traffic laws, and adopting new policies.

For additional information, visit www.visionzerosf.org.

What policies and design features have emerging mobility services implemented to contribute to the Safety principle?

This study found that all emerging mobility services, except ride sharing, have policies that contribute to the Safety principle. With the exception of ride-hailing and ride sharing, all other emerging mobility services avoid in-app messaging during operation. Ride-hailing relies on in-app messaging for navigation and interacting with prospective fares, which may lead to distracted driving. Ridesharing relies on in-app messaging for navigation and occasional interaction with the matched carpoolers. With the exception of courier services, emerging mobility services often provide safety trainings for their operators (whether customers, contractors, or employees). However, only scooter share and microtransit *require* driver training before operation, and only microtransit *tests* their operators after training. All emerging mobility services penalize unsafe driving, to varying degrees. Compliance with drive-time regulations, among emerging mobility service companies, is mixed. Ridesharing and microtransit have policies that contribute to the Safety principle's goals for drive-time. But ride hailing and courier network services' policies detract from Safety principle goals and do not enforce compliance with Article 2, section 21702, of the California Vehicle Code. This is a major concern. Ride share, ride hailing, microtransit, and courier network service companies, which rely on a driver to transport passengers or cargo, review driving history and background checks are common, though fingerprint checks are rare. Background checks for bike share, scooter share, and car share services, where the consumer is also the operator, are not applicable. Except for ride sharing, all other emerging mobility services provide 24-hour customer service with human response.

Trends and other considerations

- 90 percent of all motor vehicle collisions are caused by human error and approximately 80 percent of vehicle collisions involve some sort of inattention.[3] Emerging mobility service and technology providers are working toward the automation of their services, which many assert may drastically reduce or eliminate issues of distracted driving, while others assert significant risks will remain, particularly during a lengthy period with a mixed fleet of autonomous and human-operated vehicles.
- Data privacy and security may become a greater safety risk as these services increase in automation.[4]

Outstanding policy questions

- **Criminal background check requirements:** Background check requirements vary widely by emerging mobility type. What is the appropriate level of background checks for each type of emerging mobility service?
- **Distracted driving**: Many new mobility services rely on cell phones for navigation, alerts, and notifications. How

1 Elliot Martin, Adam Cohen, Jan Botha, and Susan Shaheen, "Bike Sharing and Bicycle Safety," (Ph.D diss., Mineta Transportation Institute, 2016), Report No CA-MTI-15-2104, http://transweb.sjsu.edu/PDFs/research/1204-bike sharing-and-bicycle-safety.pdf.

2 "2015 OTS Rankings," California Office of Traffic and Safety, https://www.ots.ca.gov/Media_and_Research/Rankings/default.asp.

3 "Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey," U.S. Department of Transportation, National Highway Traffic Safety Administration, 2015: DOT HS 812 115, https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115.

4 Andy Greenberg, "Securing Driverless Cars from Hackers is Hard. Just Ask The Ex-Uber Guy Who Protects Them," Wired, April 12, 2017, https://www.wired.com/2017/04/ubers-former-top-hacker-securing-autonomous-cars-really-hard-problem/.

do these features contribute to distracted driving collisions?

- **Drive time and hours of operation**: It is common for an individual to work as a contract driver for multiple emerging mobility services. What are the roles and responsibilities of the DMV, emerging mobility companies, or other entities in monitoring and enforcing drive-time requirements?
- **Vision Zero:** Are emerging mobility services reducing collisions, particularly for vulnerable roadway users, including people walking and bicycling? Are emerging mobility services reducing drunk driving occurrences?
- **Training standards where the customer is also the operator/driver**: Should safety and operator educational programs and resources be regulated and/or standardized?
- **Autonomous vehicles, VMT, and safety:** What are the implications of autonomous vehicles on collisions, collision severity, and safety? What regulations and policies are appropriate to achieve the best safety outcomes?

Table 2: Safety Principle Evaluation Results

	EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
	OUTCOME METRIC							
1	**OPERATIONAL SAFETY** Number of collisions per 100,000 service miles	0.8*	?	?	?	?	2.2	?
	POLICY AND DESIGN FEATURES							
2	**OPERATIONAL SAFETY** Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)	🟢	🟢	🟢	🔴	🔴	🟢	🟡
3	**OPERATIONAL SAFETY** Safety training is required and tested	🔴	🟢	🔴	🔴	🔴	🟢	🔴
4	**OPERATIONAL SAFETY** Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log	⊘	⊘	⊘	⊘	🔴	🟢	🔴
5	**UNSAFE DRIVING PENALTIES** Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action	🔴	?	🟢	🔴	🟢	🟢	🔴
6	**PERSONAL SECURITY** Service requires background checks of operators	⊘	⊘	⊘	🔴	🟢	🟢	🔴
7	**PERSONAL SECURITY** Service provides 24-hour service with a human response in a timely manner	🟡	🟢	🟢	🔴	🟢	🔴	🟢

*This operational safety estimate used data from Ford GoBike's predecessor, Bay Area Bike Share, from 2013 and 2014. Other bike share operators did not provide data, and more recent GoBike data were not available.

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Transit

Emerging Mobility Services and Technologies must support and account for, rather than compete with public transit and encourage use of high-occupancy modes.

How do emerging mobility services align with the Transit principle?

Emerging Mobility companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned or misaligned with the Transit principle.

Ride Hailing and Transit Ridership

A recent study from the UC Davis Institute of Transportation Studies found that ride hailing services decreased transit ridership by 6 percent on average, across seven US cities and that 15 percent of ride hail trips would have used transit had ride hail not been available.[5] In 2011, a UC Berkeley Transportation Sustainability Research Center study found that people who used car sharing increased and decreased their transit use in roughly equal numbers resulting in net decrease of 1 percent to 2 percent in the number of round-trips takes by transit.[6]

What policy and design features have emerging mobility services implemented to contribute to the Transit principle?

Emerging mobility services do not have policy and design features that support the Transit principle, such as providing discounted fares to transit hubs or providing in-app information on public transit connections or alternatives.

Trends and other considerations

- Cities in the United States and Europe are piloting the integration of public transportation with mobility services to increase access to people with different types of mobility needs.[7] Sometimes referred to as "Mobility as a Service," these efforts combine planning, booking, and payment into a single app that can be used to access multiple services, both public and private. Some mobile applications, such as Transit and Google Maps, aggregate public transit information with emerging mobility services to provide a more seamless navigation experience.
- Transit agencies across the country are exploring partnerships with emerging mobility services and technology companies to supplement service offerings and/or provide first/last mile solutions, with varying degrees of success.

Outstanding policy questions

- **Competition with transit market:** How do emerging mobility services affect transit ridership? What are appropriate strategies and policies to ensure that emerging mobility services support transit? What can transit learn from new mobility services?
- **First and last mile service to transit:** Do emerging mobility providers currently fill a first-mile/last-mile role? What are the effects of a first-mile/last-mile role on transit ridership? What are appropriate strategies and policies to encourage the use of emerging mobility services as a first and last-mile solution?
- **Transit Operation Conflicts:** What percentage of traffic citations, including bus stop violations, are issued to emerging mobility services?

5 Regina Clewlow and Gouri Shankar Mishra, "Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States," (Ph.D diss., University of California Davis, Institute of Transportation Studies 2017).

6 Elliot Martin and Susan Shaheen, "The Impact of Carsharing on Public Transit and Non-Motorized Travel: An Exploration of North American Carsharing Survey Data," (Ph.D diss., University of California, Berkeley, Transportation Sustainability Research Center, 2011).

7 Warwick Goodall, Tiffany Dovey Fishman, Justine Bornstein, and Brett Bonthron, "The rise of mobility as a service: Reshaping how urbanite get around," *Deloitte Insights*, January 23, 2017, https://dupress.deloitte.com/dup-us-en/deloitte-review/issue-20/smart-transportation-technology-mobility-as-a-service.html.

Table 3: Transit Principle Evaluation Results

EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
OUTCOME METRIC							
1 TRANSIT COMPETITION Percentage of trips shifted to and from transit to emerging mobility service	⊘	?	?	?	?	?	?
2 FIRST AND LAST MILE Total trips provided to transit stations, and as a share of all trips	?	?	?	?	?	?	⊘
POLICY AND DESIGN FEATURES							
3 TRANSIT DISCOUNTS Service provides discounted fares to transit hubs	🔴	🔴	🔴	🔴	🔴	🔴	⊘
4 TRANSIT CONNECTIONS Service provides in-app information on public transit connections or alternatives	🔴	🔴	🔴	🔴	🔴	🔴	⊘

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Equitable Access

Emerging Mobility Services and Technologies must promote equitable access to services. All people, regardless of age, race, color, gender, sexual orientation and identity, national origin, religion, or any other protected category, should benefit from Emerging Mobility Services and Technologies, and groups who have historically lacked access to mobility benefits must be prioritized and should benefit most.

How do Emerging Mobility Services align with the Equitable Access principle?

Emerging mobility service providers have made some information publicly available and have shared additional data that allows a partial analysis of each metric. However, with the exception of Ford GoBike which represents the majority of the bike share market, most have not provided sufficient data to evaluate whether, or to what extent, emerging mobility services align with the Equitable Access principle. User statistics are largely unknown, except for bike share; 13 percent of whose users qualify as low-income, and microtransit with 5 percent of their users qualifying as low-income. Access time to bike share is slightly shorter in Communities of Concern than outside of Communities of Concern, but slightly longer for car share and microtransit. Access times to TNCs are equal for trips starting in Communities of Concern, compared to trips that start outside of them. Access time statistics for scooter share, ride share, and courier services are unknown. In 2017, 28% of bike share trips were to or from Communities of Concern, and in Fall of 2016 33% of ride hailing trips were to or from Communities of Concern. Trips to or from Communities of Concern are not known for scooter share, car share, ride share, microtransit, and courier network services.

What policy and design features have emerging mobility services implemented to contribute to the Equitable Access principle?

Most emerging mobility services do not provide low-income fare products, with the exception of some bike share providers. While each bike share company in San Francisco offers low-income fare products, this is not an industry standard. Most do not offer multi-language support, with the exception of some bike share providers and some ride hail services. While each bike share company in San Francisco offers multi-language support, this is not an industry standard. Most services require access to a smartphone or the internet, although some bike share services allow payment at a kiosk, through payment hardware mounted on the bike or by other means. Microtransit also allows their users to call the company to reserve rides and add payment options to their account. Ride hail and microtransit services, along with some bike share providers and some courier network services, allow for payment by means other than debit or credit cards. Bike share, scooter share, car share, ride hail, and some rideshare services are available on weekends, while other rideshare companies and microtransit are not. All emerging mobility services have at least one company that operates south of Cesar Chavez and Taraval neighborhoods Similarly, all services except for microtransit have at least one company that offers service between 9 p.m. and 5 a.m.

Trends and other considerations

- While the digital divide still exists, there is a growing access to the internet in the United States among low-income people. 81 percent of adults making less than $30,000 per year use the internet, which is an increase from 34 percent in the year 2000.[8] However, smartphone access is more limited for low-income people. In 2018, 67 percent of United States adults making less than $30,000 have smartphones, whereas 82 percent people making between $30,000 and $49,999 have a smartphone.[9]
- City governments are beginning to use contracting and procurement processes as mechanisms to set consumer protections, expand payment options, and distribute economic resources to achieve other policy objectives.[10]

Outstanding policy questions

- **Equitable service:** What are appropriate policies to ensure equitable service by emerging mobility services to areas underserved by transit? What policies should be considered to encourage service during times when transit service is limited? What is the appropriate relationship between transit and emerging mobility services at times and in areas that are not well served by transit?

8 "Demographics of Internet and Home Broadband Usage in the United States," Pew Research Center, published February 2, 2018, http://www.pewinternet.org/fact-sheet/internet-broadband/.

9 "Demographics of Mobile Device Ownership and Adoption in the United States," Pew Research Center, published February. 5, 2018, http://www.pewinternet.org/fact-sheet/mobile/.

10 Hester Serebrin, "Improving Unbanked Access to Shared Mobility Services," Seattle Department of Transportation, published 2016, https://www.slideshare.net/HesterSerebrin/serebrincapstonefinal.

- **Discrimination:** What anti-discrimination regulations, policies, and strategies can ensure access and equal service provision to people of color, women, and/or low-income populations?
- **Internet/smartphone access:** What policies should be considered to enable access to emerging mobility services by people without access to a smartphone or the internet?
- **Access for the unbanked:** How many people do not have bank accounts? What payment options are preferred by people who do not have bank accounts? What kinds of policies could enable access to emerging mobility services by the unbanked?
- **Household travel expenses:** What is the effect of emerging mobility services on households' transportation expenses? How do the costs compare between different emerging mobility services, transit ridership, and car ownership?
- **Commuter Benefits:** Which emerging mobility services are eligible for commuter benefits payments, and what is the appropriate benchmark for eligibility?

Table 4: Equitable Access Principle Evaluation Results

	EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
	OUTCOME METRIC							
1	**USER STATISTICS** Percentage of service users who are defined as low-income (compared with general population)	13%	?	?	?	?	?	?
2	**ACCESS TIME** Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)	25 min (28 min)[1]	?	9 min (7 min)[2]	?	9 min (7 min)[3]	30 min (22 min)[4]	?
3	**INCREASING ACCESS AND MOBILITY** Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)	28%[5]	?	?	?	33%[6]	?	?
	POLICY AND DESIGN FEATURES							
4	**FARE PRODUCTS** Availability of low-income fare Products	🟢	🔴	🔴	🔴	🔴	🔴	🔴
5	**MULTI-LANGUAGE SUPPORT** Service offered in multiple languages	🟢	🔴	🔴	🔴	🟡	🔴	🔴
6	**PAYMENT INSTRUMENT** Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)	🟡	🔴	🟡	🔴	🔴	🟢	🔴
7	**PAYMENT METHOD** Service accepts alternative methods to pay besides credit/debit card	🟡	🔴	🔴	🔴	🟢	🟢	🟡
8	**INCREASING ACCESS AND MOBILITY** Availability of service on weekends	🟢	🟢	🟢	🟡	🟢	🔴	🟢
9	**INCREASING ACCESS AND MOBILITY** Availability of Service in underserved areas	🟡	🟢	🟢	🟢	🟢	🟢	🟢
10	**INCREASING ACCESS AND MOBILITY** Availability of service between 9p.m. and 5a.m.	🟢	🟢	🟢	🟡	🟢	🔴	🟡

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

[1] Based on Ford GoBike station locations.
[2] Based on Zipcar vehicle pod locations.
[3] Based on Uber estimated arrival times.
[4] Based on Chariot stop locations. Does not consider wait time.
[5] Based on Ford GoBike 2017 trip data
[6] Based on estimated trip origins and destinations for Uber and Lyft from Fall 2016, limited to trips both starting and ending in San Francisco.

Disabled Access

Emerging Mobility Services and Technologies must be inclusive of persons with disabilities. Those who require accessible vehicles, physical access points, services, and technologies are entitled to receive the same or comparable level of access as persons without disabilities.

How do Emerging Mobility Services align with the Disabled Access principle?

Emerging Mobility service providers have not provided sufficient data to evaluate whether, or to what extent, emerging mobility services align with the Disabled Access principle.

What policy and design features have emerging mobility services implemented to contribute to the Disabled Access principle?

Emerging mobility services have inconsistently implemented policies and features that contribute to the Disabled Access principle, with substantial variation among service sectors. Ride hail, microtransit, and some car share companies provide accessible vehicles. However, bike share, scooter share, and ride share do not. Of the services that do provide accessible services, only microtransit consistently offers their service at the same cost as standard service. Among microtransit and car share companies that provide accessible vehicles, all provide them at the same cost as other vehicles. By contrast, ride hail companies charge more for accessible services. Courier network services provide their service at the same cost regardless of accessibility needs. No emerging mobility services are known to have websites and applications that are accessible to screen readers (508 compliant).

Emerging mobility services also offer mixed levels of information to users with disabilities. Ride hail, microtransit, and some car share companies provide clear information to users with disabilities, but scooter share, ride share, courier network services, and car share companies do not. None of the bike share companies operating in San Francisco provide access information for users with disabilities, although some bike share companies operating in other places do. Only ride hail and microtransit provide their employees and contractors with guidelines for providing accessible services.

Trends and other considerations

- Automated vehicles may dramatically increase mobility access for the nearly 9 percent of U.S. citizens (roughly 3.5 million Californians) who have ambulatory and/or vision impairment.[11] Booking service interfaces and other aspects of emerging mobility services will need to consider the needs of this population.
- Texas A&M is exploring various elements of rider-assistance systems, including better seating arrangements for multiple wheelchair-users and automated vehicles with wheelchair ramps, which the users would summon through a centralized dispatch system.[12]
- Approximately 2.2 million people in the U.S. (approx. 0.6 percent of the U.S. population) depend on a wheelchair for day-to-day tasks and mobility. In San Francisco, 0.6 percent of the population would be equivalent to approximately 5,000 wheelchair users.
- 20 percent of SF Access (pre-schedule individual van service), riders use wheelchairs.[13]
- 53 percent of SF Paratransit customers own a cell phone, but only 50 percent of riders who own a cellphone own a smartphone.
- 77 percent of SF Paratransit customers have never used a smartphone app to schedule a ride[14]

Outstanding policy questions

- **Mobility for those with physical disabilities:** How are emerging mobility services impacting mobility for those in need of wheelchair access? How can the availability of accessible services be most effectively communicated?
- **Accessibility Funds:** Several cities have developed or considered developing Accessibility Funds to collect fees in lieu of services in order to improve mobility for people

11 Lewis Kraus, "2016 Disability Statistics Annual Report: Rehabilitation Research and Training Center on Disability Statistics and Demographics," (MPH, MCP report, University of New Hampshire, Institute on Disability/UCED, 2016),), https://disabilitycompendium.org/annualreport.

12 Saripalli, Srikanth, "Are self-driving cars the future of mobility for disabled people? This advanced technology opens up a new world of possibility," Salon, October 2017, https://www.salon.com/2017/10/08/are-self-driving-cars-the-future-of-mobility-for-disabled-people_partner.

13 San Francisco Municipal Transportation Agency. Paratransit Performance Report. January 2018.

14 "2017 Customer Satisfaction Survey Management Report," San Francisco Paratransit Brokerage.

with mobility needs. What are the roles and responsibilities of government agencies, emerging mobility service providers, or other parties in managing and contributing to such a fund?

- **Comparable Service:** How can city agencies such as the SFMTA and state agencies such as the California PUC ensure that on-demand services are available for disabled consumers that are the same or comparable (i.e. response times, area served) to those provided to the general public?
- **Mobility App Development:** What internal processes should companies have to guarantee accessibility is considered throughout the design and implementation process of mobile applications and mobility services?

Table 5: Disabled Access Principle Evaluation Results

EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
OUTCOME METRIC							
1 **USER STATISTICS** Percentage of service users who identify as people with disabilities	?	?	?	?	?	?	?
2 **ACCESS TIME** Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips	? (28 min)[1]	?	? (7 min)[2]	?	? (3 min)[3]	24 min (22 min)[4]	?
3 **INCREASING ACCESS AND MOBILITY** Total trips provided to people with disabilities	?	?	?	?	?	?	?
POLICY AND DESIGN FEATURES							
4 **FLEET ACCESSIBILITY** Accessible vehicles are provided	🔴	🔴	🟡	🔴	🟢	🟢	⊘
5 **TRIP FARE** Cost of trip for people with disabilities	⊘	⊘	🟡	⊘	🔴	🟢	🟢
6 **508 COMPLIANCE** Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.	?	?	🔴	🔴	🔴	🔴	🔴
7 **ACCESSIBILITY MARKETING** Customers with disabilities are aware that accessible services are available as part of the service provided	🔴	🔴	🟡	🔴	🟢	🟢	🔴
8 **ACCESSIBILITY GUIDELINES** Entity has guidelines for employees/ contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)	⊘	⊘	⊘	🔴	🟢	🟢	?

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

[1] Based on Ford GoBike station locations.
[2] Based on Zipcar vehicle pod locations.
[3] Based on Uber estimated arrival times.
[4] Based on Chariot stop locations. Does not consider wait time.

Sustainability

Emerging Mobility Services and Technologies must support sustainability, including helping to meet the City's greenhouse gas emissions reduction goals, promote use of all non-auto modes, and support efforts to increase the resiliency of the transportation system.

How do emerging mobility services align with the Sustainability principle?

Most emerging mobility service providers have not provided sufficient information to evaluate whether, and to what extent, they are aligned with the Sustainability principle. Microtransit has shared information on fleet emissions and fleet efficiency, and bike share and scooter share have provided fleet mix information. All bike share and scooter share fleets consist of 100 percent zero-emissions vehicles, human-powered, battery-electric, or electric-assist. Microtransit vehicles are fossil fuel-powered, with an average mileage of 18 MPG. However, additional information and analysis is needed to determine effects on average vehicle occupancy and greenhouse gas emissions. The remaining service types have not provided sufficient information to evaluate their alignment with this principle.

Vehicle Miles Traveled

Households that participate in a car sharing service have a net total reduction in greenhouse gas emissions, according to a 2010 study from the Mineta Transportation Institute.[15] By contrast, a 2017 study from the UC Davis Institute of Transportation Studies found that adoption of ride hailing services is likely to result in a net increase in vehicle miles traveled due to competition with public transit. The same study concluded that users who reduce their personal driving replace that driving with increased vehicle miles in a ride hail vehicle, but that the net change based on reduced personal driving could not be determined.[16] The 2017 report TNCs Today by the Transportation Authority found that as of fall 2016, ride hail vehicles traveled more than 550,000 vehicle miles on a typical weekday.[17]

Pending research from UC Berkeley and the National Resources Defense Council (NRDC) on TNC use and climate impacts will provide further conclusions about this area of research.

What policy and design features have emerging mobility services implemented to contribute to the Sustainability principle?

Scooter share, microtransit, and some courier network services prioritize clean and renewable energy vehicles in their fleets. Some car share services also prioritize clean and renewable energy vehicles; however, none of these operate in San Francisco. Microtransit provider Chariot has committed to shifting its fleet to electric in 2019.[18]

Trends and other considerations

- Many previous analyses have used auto ownership as a key metric of sustainability. However, the growing prevalence of many emerging mobility services that allow people to travel in vehicles they do not own means that auto ownership is no longer a valuable indicator of sustainability. That is why this section focuses on vehicle miles traveled and the efficiency and emissions of vehicle fleets.
- Activity-based modeling studies have projected increases of VMT and trip distance,[19] while others show reductions in GHG that stem from increases in efficiency, lowered car ownership, increased low-emission vehicles, and fewer cold-engine starts.[20]

Outstanding policy questions

- **Impacts on PMT, VMT, & GHG:** Do emerging mobility services and technologies reduce or increase people miles traveled and vehicle miles traveled? What is their effect on greenhouse gas emissions and air quality?
- **Impact on current Transportation Demand Management (TDM) and Transportation System Management programs (TSM):** How do emerging mobility service offerings impact current Transportation Demand Management and Transportation System Management programs?

15 Elliot Martin and Susan Shaheen, "Greenhouse Gas Emissions Impacts of Carsharing in North America," (Ph.D diss., Mineta Transportation Institute, June 2010), Report No. CA-MTI-10--2702

16 Regina Clewlow and Gouri Shankar Mishra, "Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States" (Ph.D diss.,, University of California Davis, Institute of Transportation Studies, 2017), NEED PAGE NUMBER(S), http://www.reginaclewlow.com/pubs/2017_UCD-ITS-RR-17-07.pdf.

17 "TNCs Today: A Profile of San Francisco Transportation Network Company Activity," San Francisco County Transportation Authority, published June 2017, http://www.sfcta.org/sites/default/files/content/Planning/TNCs/TNCs_Today_112917.pdf.

18 Monica Nickelsburg, "Chariot wants to launch public mini-bus commuting service in Seattle early next year, with 100K riders and electrification by 2019," Geek Wire, November 21, 2017, https://www.geekwire.com/2017/chariot-wants-launch-public-mini-bus-commuting-service-seattle-early-next-year-100k-riders-electrification-2019/

19 Kyeil Kim, Ph.D., et al., "The Travel Impact of Autonomous Vehicles in Metro Atlanta through Activity-Based Modeling." Atlanta Regional Commission, 2015.

20 D.J. Fagnant and K.M. Kockelman, "The travel and environmental implications of shared autonomous vehicles, using agent-based model scenarios," Transportation Research Part C: Emerging Technologies, no. 40 (2014): 1–13.

Table 6: Sustainability Principle Evaluation Results

	EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
	OUTCOME METRIC							
1	**FLEET EMISSIONS** Percentage of vehicles that are zero emissions vehicles	100%	100%	?	?	?	0%	?
2	**FLEET EFFICIENCY** Average Vehicle fuel efficiency	⊘	?	?	?	?	18 MPG	?
3	**AVERAGE VEHICLE OCCUPANCY** People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type	⊘	⊘	?	?	?	?	⊘
4	**SERVICE EMISSIONS** Net increase/decrease in GHG	?	?	?	?	?	?	?
	POLICY AND DESIGN FEATURES							
5	**FLEET EMISSIONS** Policies prioritize clean/renewable energy vehicles	🟢	🟢	🔴	🔴	🔴	🟢	🟡

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Congestion

Emerging Mobility Services and Technologies must consider the effects on traffic congestion, including the resulting impacts on road safety, modal choices, emergency vehicle response time, transit performance, and reliability.

How do emerging mobility services align with the Congestion principle?

Emerging mobility service providers have not provided sufficient information to evaluate whether, or to what extent, they are aligned with the Congestion principle.

Ride Hailing and Vehicle Miles Traveled

A 2017, UC Davis study found that adoption of ride hailing services is likely to result in a net increase in vehicle miles traveled due to competition with public transit. The same study concluded that users who reduce their personal driving replace that driving with increased vehicle miles in a ride hail vehicle, but that the net change based on reduced personal driving could not be determined.[21]

What policies and design features have emerging mobility services implemented to contribute to the Congestion principle?

Emerging mobility services have mixed levels of implementation of policies and features to contributed to the Congestion principle. Scooter share, car share, and microtransit limit the number of user access points, and have worked with the city to identify appropriate user access points. Bike share companies that are permitted to operate in San Francisco are required to work with the city to designate appropriate user access locations, but not all bike share companies do this in other cities. Conversely, ride sharing, ride hailing, and courier network services do not coordinate with the city and limit the number of user access points. Scooter share and microtransit incentivize off peak travel by charging higher pricing during peak travel periods, while car share, courier network services, and ride hail have fixed rates, or rates that may vary, but not necessarily in alignment with peak travel periods. See Chapter 5 for an explanation of why ride hail's surge pricing does not incentivize off-peak travel. Ride hail services provide lower rates for shared trips, but other emerging mobility services do not.

21 Regina Clewlow and Gouri Shankar Mishra, "Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States," Institute of Transportation Studies, (Ph.D diss., University of California Davis, 2017).

Trends and other considerations

- There is an emerging body of evidence that ride hailing services are increasing VMT and/or congestion. We have estimated that ride hailing services are providing at least 170,000 trips within San Francisco on a typical weekday, generating over a half-million vehicle miles of travel.[22]
- Increasing conflicts between emerging mobility services and public infrastructure have led to a series of new regulations and permit processes in San Francisco (e.g., dockless bike share permits, proposition to restrict and permit sidewalk robots, and increasing recognition of the need for better curb management for ride hailing and microtransit services).
- A survey from Kelley Blue Book found that the majority of those lending cars to peer-to-peer car share networks, or driving for ride hailing companies do so to afford a vehicle[23]
- Emerging mobility services route optimization direct increased vehicle travel onto neighborhood streets.[24]

Outstanding policy questions

- **System Performance:** How do emerging mobility services affect vehicle miles of travel, travel speeds, and travel time reliability in San Francisco?
- **Car Shedding and Emerging Mobility:** What is the relationship between car shedding and VMT in the era of vehicular-based emerging mobility services?
- **Autonomous Vehicle Integration:** What are the implications of the integration of autonomous vehicles into emerging mobility service fleets on congestion? What are the implications of adoption of autonomous vehicles by the general public? How should the city prepare to integrate autonomous vehicles into the existing transportation system and reduce vehicular congestion? What policy or regulatory opportunities related to congestion reduc-

22 "TNCs Today: A Profile of San Francisco Transportation Network Company Activity," San Francisco County Transportation Authority, accessed [year], http://www.sfcta.org/tncstoday.

23 "Car Sharing Trends: Highlights Deck," Kelley Blue Book, March 2016, https://mediaroom.kbb.com/download/2016+Kelley+Blue+Book+Car+Sharing+Study+Highlights++FINAL.pdf.

24 "Car Navigation Tech Brings New Twists and Turns to Driving," Mercury News, 2017, https://www.mercurynews.com/2017/09/05/car-navigation-tech-brings-new-twists-and-turns-to-driving/.

tion could the city take advantage of, with respect to autonomous vehicles?

- **Emerging Mobility and Curb Management:** What are emerging mobility services' impacts on curb management, curb demand, and on- and off-street parking? What policies and strategies are appropriate to manage access to the curb by emerging mobility services and other users?

Table 7: Congestion Principle Evaluation Results

EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
OUTCOME METRIC							
1 **SERVICE VMT** Net change in VMT during am peak, pm peak, and daily VMT.	?	?	?	?	?	?	?
2 **TRAFFIC SPEEDS** Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service	?	?	?	?	?	?	?
POLICY AND DESIGN FEATURES							
3 **CURB CONGESTION** The service provider rather than individual users, in coordination with the City, designates access points.	🟢	🟢	🟢	🔴	🔴	🟢	🔴
4 **PEAK HOUR CONGESTION** Service incentivizes off-peak travel whether by price or by other method.	⊘	🟢	🔴	⊘	🔴	🟢	🔴
5 **SHARED TRIPS** Shared fare price per passenger is discounted from average solo trip price.	⊘	⊘	🔴	⊘	🟢	⊘	⊘

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Accountability

Emerging Mobility Services and Technologies providers must share relevant data so that the City and the public can effectively evaluate the services' benefits to and impacts on the transportation system and determine whether the services reflect the goals of San Francisco.

What policies and design features have emerging mobility services implemented to contribute to the Accountability principle?

Emerging mobility service companies provide widely varying levels of data to support planning and transportation network management. Scooter share and microtransit companies provide both trip data and anonymized and aggregated user data to local planning agencies. All bike share and car share companies that operate in San Francisco are subject to a licensing agreement that requires trip and user data, but companies that operate outside of the city may not. Ride share, ride hail, and courier network services do not provide data.

SFMTA Permit Programs

Over the course of the last five years, the SFMTA has implemented a number of EMST pilot and permit programs such as car share, bike share, and private transit vehicles. As part of these pilot and permit programs, the SFMTA has required that companies share data with their agency. The data collected during the pilots has informed the creation of the permanent permit programs. The SFMTA continues to collect a variety of data from EMST providers as part of administration of the permits. However, given that EMST data collection is relatively nascent, SFMTA needs to continue to work with the private sector to improve data collection and analytics. Specifically, the SFMTA should work towards creating a standard data sharing agreement to ensure that the type of data collected is consistent across providers and types of services. The SFMTA should also work towards making sure that the data points collected inform the assessment of how a service meets the Guiding Principles metrics.

Trends and other considerations

- Some emerging mobility providers have expressed an interest in providing data to neutral third-parties, who could store and analyze the data and provide answers to research questions posed by government entities.
- Some analysts believe vehicle data monetization will be worth over $700 billion by 2030.[25] Absent regulatory mandate, emerging mobility companies are unlikely to share data freely and openly.
- Nationally, there is a large variation in the level of access cities have to data on services using public streets and sidewalks. The cities with greater access to data are either ones where the state has delegated control to cities or, in a few cases, where cities and companies have entered into public/private partnerships.

Outstanding policy questions

- **Data access:** What data should be shared with local planning agencies? How should that data be shared to balance industry business interests?
- **Emergency first responders:** How can emerging mobility companies and autonomous vehicle companies share vehicle collision data with first responders in the case of emergencies and collisions?
- **Privacy:** What restrictions or procedures would need to be in place to ensure the protection of personally identifiable information in the storage and use of trip and user data?
- **Trust and Transparency:** How can public agencies or third parties guide user behavior with indexes or references to each service's policies and attributes, similar to Consumer Reports surveys?

25 "Monetizing car data: New service business opportunities to create new customer benefits," McKinsey & Company, Advanced Industries series, September 2016, https://www.mckinsey.com/~/media/McKinsey/Industries/Automotive%20and%20Assembly/Our%20Insights/Monetizing%20car%20data/Monetizing-car-data.ashx

Table 8: Accountability Principle Evaluation Results

EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
OUTCOME METRIC							
No outcome metrics were identified for the Accountability Principle							
POLICY AND DESIGN FEATURES							
1 TRIP DATA Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."							
2 USER DATA Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.							

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- All evaluated companies have implemented this policy or design feature
- Some companies have implemented this policy or design feature
- No company has implemented this policy or design feature
- There is insufficient data
- Question does not apply to a particular type of emerging mobility service

Labor

Emerging Mobility Services and Technologies must ensure fairness in pay and labor policies and practices. Emerging Mobility Services and Technologies should support San Francisco's local hire principles, promote equitable job training opportunities, and maximize procurement of goods and services from disadvantaged business enterprises.

How do emerging mobility services align with the Labor principle?

Emerging mobility services have not provided sufficient data to evaluate whether, or to what extent, they align with the Labor principle.

What policies and design features have emerging mobility services implemented to contribute to the Labor principle?

Emerging mobility services have implemented a widely varying level of policies and design features that contribute to the Labor principle. Car share and microtransit provide summaries of hourly rates to their vehicle operators, non-office employees, and contractors. One bike share company also provides transparent hourly rates, while the others are unknown. Rideshare providers notify drivers of their potential fare prior to matching the rider. Similarly, it is unknown whether scooter share provides transparent hourly rates. Ride hail companies do not provide summaries of hourly rates, and no courier network services are known to, either. Car share, rideshare, and courier network companies have a hiring policy statement encouraging women, people of color, and people with disabilities to apply, but it is unknown whether other companies within those sectors do. Bike share companies in San Francisco have inclusive hiring policies, but some bike share companies operating elsewhere do not. Ride hail and microtransit companies feature similar hiring policy statements, but scooter share does not. No emerging mobility service companies are registered Disadvantaged Business Enterprises or Local Business Enterprises; and only two companies-- one bike share and one car share-- are known to prioritize contracting with registered Disadvantaged Business Enterprises or Local Business Enterprises. Finally, most emerging mobility service companies require specific educational attainment levels in their hiring process, with the exception of some bike share, some car share, some ride hail, and some courier network service companies.

Emerging Mobility Wage Transparency

Some emerging mobility services use algorithms to create innovative pricing schemes for users. As a result, contractor earnings may be very dynamic, making it challenging for them to have a clear understanding of their earning potential.[26] Several fair pay-related class action lawsuits have been filed against some emerging mobility service companies. Examples include Cobarruviaz v. Maplebear, Inc. and Sophano Van v. Rasier, LLC et al.

Trends and other considerations

- The employment classification of emerging mobility service employees is not standard across services. Some use contract employees to operate vehicles while others use employees.
- Some companies have a mix of employees and contractors with different hiring methods, wage transparency, and benefits.
- While emerging mobility services currently employ thousands of contractors and employees in San Francisco, many companies are transparent in their intent to automate their contractors' labor as early as 2019.[27]
- The U.S. Department of Commerce Economics and Statistics reports that older and/or less educated drivers (such as those used by ride hailing and courier network services) will have a challenging time retooling once these jobs are automated.[28]

Outstanding policy questions

- **Fare structure and transparency**: What are prevailing wages for emerging mobility service operators?
- **Employment Hiring, Status, and Employee Benefits**: Are emerging mobility service operators considered em-

26 The CPUC's rulemaking for TNCs involved approving fare-splitting, and microtransit's fare structure is dictated by the CPUC's permit class; however Chariot's pricing does not adhere to the requirements outlined in their permit.

27 Peter Holly,"GM could launch its own autonomous ride hailing service as early as 2019," The Washington Post, December 1, 2017. https://www.washingtonpost.com/news/innovations/wp/2017/12/01/gm-self-driving-fleet-could-be-biggest-business-opportunity-since-the-creation-of-the-internet/?utm_term=.e33101296733.

28 David Beede, Regina Powers, and Cassandra Ingram, "The Employment Impact of Autonomous Vehicles," August 11, 2017, ESA Issue Brief #05-17, U.S. Department of Commerce Economics and Statistics Administration Office of the Chief Economist. http://www.esa.doc.gov/sites/default/files/Employment%20Impact%20Autonomous%20Vehicles_0.pdf.

ployees or contractors, and what implications does that have for benefits and wages? What is the value of benefits provided to emerging mobility service operators? What policies are most effective in ensuring opportunities for entry to all people?

- **Employment Opportunities:** How can the city work with emerging mobility companies to hire employees locally, particularly from Communities of Concern.
- **Automation and Labor:** What are the implications of automation on emerging mobility service employees and contractors? What policies or strategies are appropriate to address potential impacts of automation on labor in the merging mobility services sector?
- **Disadvantaged Business Enterprises and Local Business Enterprises**: What policies are most effective in encouraging DBE and LBE participation in the merging mobility services market?

Table 9: Labor Principle Evaluation Results

EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
OUTCOME METRIC							
1 **EMPLOYEE/CONTRACTOR EARNINGS** Mobility service operator net hourly median earnings minus job-related expenses	?	?	?	?	?	$20	?
2 **EMPLOYEE/CONTRACTOR BENEFITS** Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits	?	?	?	?	?	?	?
POLICY AND DESIGN FEATURES							
3 **FAIR PAY** Level of transparency to service operator (employee/contractor) in hourly rate, net of job-related expenses	🟡	?	🟢	🟢	🔴	🟢	🟡
4 **OPPORTUNITY FOR ENTRY** Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).	🟢	🔴	🟡	🟡	🟢	🟢	🟡
5 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)	🔴	🔴	🔴	🔴	🔴	🔴	🔴
6 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company prioritizes contracting with DBEs and LBEs	🟡	🔴	🟡	🔴	🔴	🔴	🔴
7 **OPPORTUNITIES FOR ENTRY** Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.	🟡	🟢	🟡	🟢	🟡	🟢	🟡

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Financial Impact

Emerging Mobility Services and Technologies must promote a positive financial impact on the City's infrastructure investments and delivery of publicly-provided transportation services.

How do emerging mobility services align with the Financial Impact principle?

Emerging mobility services have not provided sufficient information to evaluate whether, or to what extent, they align with the Financial Impact principle.

What policies and design features have emerging mobility services implemented to contribute to the Financial Impact principle?

Scooter share, car share, microtransit, and some bike share companies pay permit fees to a local regulatory agency to recover enforcement, maintenance, and other program costs, but ride share, ride hail, and courier network services do not.

Ride Hail Ridership to SFO

Ride hail trips have increased dramatically to and from San Francisco International Airport. The Airport tracks total pickups and dropoffs that occur in their geofenced arrival areas. These trips can be measured against the total taxi ridership to and from the Airport and BART ridership to and from the Airport.[29] Between 2015 and 2016 ride hail trips increased 75 percent. During the same period, BART ridership to and from the Airport decreased as well leading to a significant reduction in farebox recovery.[30]

Trends and other considerations

- Level 4 and 5 autonomous vehicles (where no human interaction is needed to operate the vehicle) will rely on well-maintained surface, connectivity, drainage, and signage.[31] Thus, as emerging mobility services move towards greater automation, they will have an even greater need to rely public investments.
- Emerging mobility services not only rely on the current available road and sidewalk infrastructure, but new studies suggest that some services may increase the use of those utilities at new rates by inducing demand and shifting travel modes.[32]
- Over 30 percent of SFMTA's operating budget came from parking fees, traffic fees, and fines. Car-related emerging mobility services generally reduce the need for parking and increase other demands for use of curb. Autonomous vehicles promise to reduce traffic violations, indicating a possible reduction in revenue collected through parking and traffic violations.

Outstanding policy questions

- **Emerging Mobility Permit Program and Regulatory Authority:** What regulatory authority does the city have to implement a permit program, assess permit fees, and/or assess impact fees for the impacts of emerging mobility services? What are the financial impacts of emerging mobility services on public infrastructure? What are the roles and responsibilities of the government, emerging mobility services, and other parties in paying for infrastructure and maintenance?
- **Business Taxes and Impact Fees:** Are the platform/service intermediary companies that enable emerging mobility services being taxed appropriately? Can local jurisdictions impose business taxes on new mobility services to pay for needed mitigations?
- **Fiscal Impact:** What impact do emerging mobility services have on parking and citation revenues?
- **Transit Investment Impacts:** What are the financial impacts of emerging mobility services on public transportation? How can cities protect public transit from competitive impacts of new mobility? Where should transit agencies shift away from traditional service models and toward new mobility approaches?
- **Long term stability and availability of services:** Transit provision requires capital investment in equipment and long-term investment in infrastructure. How should public service and investment decisions be made based on the provision and use of emerging mobility services today and projections for the future?

29 San Francisco International Airport. Transportation Network Companies: Monthly Trip Report, April 2017.

30 Joe Fitzgerald Rodriguez, "Uber and Lyft Use at SFO Increases Six-Fold in Two Years, BART Loses Ridership," The San Francisco Examiner December 5, 2016, http://www.sfexaminer.com/uber-lyft-use-sfo-increases-six-fold-two-years-bart-loses-ridership/

31 Charles Johnson, "Readiness of the road network for connected and autonomous vehicles," *RAC Foundation*, (April 2017), http://www.racfoundation.org/assets/rac_foundation/content/downloadables/CAS_Readiness_of_the_road_network_April_2017.pdf.

32 Regina Clewlow, ??? message to author, [day month, year].

Table 10: Financial Impact Principle Evaluation Results

	EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
	OUTCOME METRIC							
1	**TRANSIT COMPETITION** Net change in transit revenue due to the emerging mobility service	?	?	?	?	?	?	?
2	**STATE OF GOOD REPAIR** Service's total vehicular VMT on San Francisco Roadways	?	?	?	?	?	?	?
3	**STATE OF GOOD REPAIR** Net marginal roadway maintenance cost due to the emerging mobility service	?	?	?	?	?	?	?
	POLICY AND DESIGN FEATURES							
4	**PERMIT FEES** Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.	🟡	🟢	🟢	🔴	🔴	🟢	🔴

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Collaboration

Emerging Mobility Services and Technology providers and the City must engage and collaborate with each other and the community to improve the city and its transportation system.

What policies and design features have emerging mobility services implemented to contribute to the Collaboration principle?

Emerging mobility services have implemented mixed levels of policies and design features to support the Collaboration principle. With the exception of courier network services and some car share services, emerging mobility service companies have identified staff to communicate regularly with the City and County of San Francisco. Microtransit, along with some bike share and some car share companies, have received endorsements from Communities of Concern, neighborhood groups, advocacy groups, or other city stakeholders. Scooter share and courier network services have not received such endorsements, and rideshare and ride hail services have not disclosed whether they have received such endorsements. Some bike share, car share, and microtransit services have conducted outreach to Communities of Concern, advocacy groups and other city stakeholders, but scooter share and courier network services have not; rideshare and ride hail companies have not disclosed whether they have made this effort. The bike share, scooter share, ride hail, and microtransit companies operating in San Francisco have initiated pilot programs with the city, but rideshare and courier network service companies have not. The one-way, non peer-to-peer car share companies in the city have also done pilots. The SFMTA manages a permit program for bike sharing, scooter sharing, car sharing, and microtransit services in San Francisco. However, no permit program is available yet for courier network services or ridesharing. Ride hailing services are permitted by the California Public Utilities Commission. Finally, bike share, car share, and microtransit, along with some rideshare companies have approached the city to resolve outstanding issues prior to launching service, while ride hail, courier network services, and some other ride share companies have not.

Trends and other considerations

- Some emerging mobility service types show community-based engagement improves their ridership.[33]
- Several emerging mobility service providers expressed frustration with the lack of transparency related to permitting emerging mobility services; some asserted that this was a contributing factor to why they launch services without notifying city agencies.

Outstanding policy questions

- **Industry and Community Collaboration:** How can government agencies and emerging mobility services form a more collaborative relationship?
- **Community Outreach:** How can emerging mobility services be more collaborative with the communities they operate in? How can community groups engage more directly with emerging mobility services (e.g., by hiring or partnering through workforce development organizations)?
- **Emerging Mobility Task Force:** What type of forum will allow for constructive dialogue between city agencies, emerging mobility service companies, and community stakeholders?

33 "Bike Share in the US: 2010-2016," *National Association of City Transportation Officials*, https://nacto.org/bike-share-statistics-2016/.

Table 11: Collaboration Principle Evaluation Results

EVALUATION CRITERIA	BIKE SHARE	SCOOTER SHARE	CAR SHARE	RIDE SHARE	RIDE HAIL	MICRO TRANSIT	COURIER NETWORK SERVICES
OUTCOME METRIC							
No outcome metrics were identified for the Collaboration Principle							
POLICY AND DESIGN FEATURES							
1 **POINT OF CONTACT** Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.	🟢	🟢	🟡	🟢	🟢	🟢	🔴
2 **COMMUNITY ENDORSEMENTS** Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.	🟡	🔴	🟡	?	?	🟢	🔴
3 **COMMUNITY OUTREACH** Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.	🟡	🔴	🟡	?	?	?	🔴
4 **SERVICE PILOT** Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions	🟢	🟢	🟡	🔴	🟢	🔴	🔴
5 **SERVICE PERMIT** A San Francisco public agency manages a permit program for this service type	🟢	🟢	🟢	🔴	🔴	🟢	🔴
6 **PROACTIVE PARTNERSHIP** Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.	🟢	🟢	🟢	🟡	🔴	🟢	🔴

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

5. EVALUATION RESULTS: BY SERVICE TYPE

The following section provides an in-depth description for how each emerging mobility service aligns with the 10 Guiding Principles and how these services have implemented policies and practices to contribute to the Guiding Principles. This chapter is based on the same evaluative data as used for Chapter 4, but organized by type of emerging mobility service.

In general, given very limited data related to our evaluation metrics, the results presented in this report focus primarily on how these service policy indicators may contribute to our Guiding Principles. Following the evaluation results descriptions, we identify a series of data gaps we are interested in studying further and next steps for future actions in this arena.

Each emerging mobility service type section includes a table that provides, where available, data values associated with outcome metrics related to each of the 10 Guiding Principles for Emerging Mobility Services and Technologies.

The table also documents policy and design features related to the 10 Guiding Principles that emerging mobility service companies have implemented.

Under the header for each service type, we list examples of companies that provide this type of emerging mobility. **Companies listed in bold** are ones that currently operate in San Francisco.

Evaluation Results Summary Table Legend	
	All evaluated companies have implemented this policy or design feature
	Some companies have implemented this policy or design feature
	No company has implemented this policy or design feature
	There is insufficient data
	Question does not apply to a particular type of emerging mobility service

Bike Sharing

Bike sharing is a system of bicycles that is available to users to access, as needed, for point-to-point or round-trip trips, traditionally as to station kiosks in dense urban areas. **Docked, or station-based, bike share** systems in the United States generally partner with local jurisdictions and mostly offer subscriptions that include unlimited short trips. The Metropolitan Transportation Commission (MTC) and the San Francisco Municipal Transportation Agency (SFMTA) have partnered with Motivate to expand the pilot Bay Area Bike Share system. Now rebranded as "Ford GoBike," the system is privately owned and operated by Motivate with sponsorship from the Ford Motor Company. In 2017, **stationless bike share** came to North America and the Bay Area, employing free-floating bicycles that do not have fixed stations and are accessible via mobile application for a per-trip fee. Dockless systems are proliferating quickly, in part, because of significant venture capital backing and low-cost equipment and operations which allow them to establish service without public subsidy. San Francisco has recently created a permitting program for dockless bike share systems, which has permitted JUMP Bikes to operate under a limited pilot. In some dockless systems (e.g., JUMP Bike), the bikes must be locked to a stationary object, such as a bike rack. In others (e.g., Limebike), the bikes lock to themselves.

Safety

In 2016, The Mineta Transportation Institute released a report titled, "Bike Sharing and Bicycle Safety," using data from Bay Area Bike Share, the predecessor to Ford GoBike, for the years 2013 and 2014. This report revealed a collision rate of 0.8 collisions per 100,000 miles, comparatively lower than the collision rate for driving in San Francisco of 46 per 100,000 miles[34, 35]. Similar statistics are not available for Ford GoBike, since their 2015 expansion. Dockless bike share programs are still in pilot phases and collision statistics are not available.

Bike share services have implemented few policies and design features related to the Safety principle. Bike share requires no in-app communication or navigation, which limits distracted operation of the bicycles. Bike share operators in San Francisco are required to provide quarterly safety trainings to customers; however, there is no requirement that customers attend the trainings. Bike share operators in San Francisco are also required to provide 24-hour customer service.

Transit

The impacts on transit ridership due to bike share systems are unknown. While bike share companies in San Francisco are required to report trip data to the SFMTA, this data is not yet available. Once it becomes available, additional analysis will be needed to determine transit ridership impacts. See "Accountability" section of Chapter 4 for more information.

Bike share providers do not offer discounted fares for trips that begin or end near transit stations nor do they offer in-app information on public transit connections or alternatives.

Equitable Access

According to data provided by Ford GoBike, about 13 percent of annual memberships are for those of low-income.[36] Nascent dockless bike share systems are still in pilot phases, and are required through permitting to provide user demographic summaries; however, their current low-income qualifying memberships are not yet known. On average, a San Francisco resident of a Community of Concern can expect to walk 25 minutes from home to reach the nearest docked bike share station, while someone who is not a resident of a Community of Concern can expect to walk 28 minutes. These stations are concentrated in the northeastern quadrant of the city, which is both a hub of commercial activity and largely qualifies as a Community of Concern. Access times to dockless bike share systems are not known. In 2017 28% of bike share trips were to and from Communities of Concern. 35 percent of Bay Area bike share system stations are located in Communities of Concern.

Bike share companies have implemented a widely varied mix of policies related to the Equitable Access principle. Some, but not all, offer low-income fare products. Within San Francisco, all SFMTA-permitted bike share providers are required to offer low-income fare options. Similarly, bike share companies permitted by the SFMTA are required to provide multilingual service and material; however, bike share companies operating in other jurisdictions may not. Some, but not all, providers also offer payment options that do not require internet or smartphone access. Docked bike share companies allow payment through a kiosk or through a limited number of staffed locations. Some dockless bike share companies allow payment through physically-mounted card readers on bikes. Most, but not all, accept payment alternatives besides debit and credit cards.

Bike share systems are accessible to users 24 hours a day, seven days a week, including weekends and overnight between

34 Elliot Martin, Adam Cohen, Jan Botha, and Susan Shaheen, "Bike Sharing and Bicycle Safety," (Ph.D diss., Mineta Transportation Institute, 2016), Report No CA-MTI-15-2104, http://transweb.sjsu.edu/PDFs/research/1204-bike sharing-and-bicycle-safety.pdf.

35 "2015 OTS Rankings," California Office of Traffic and Safety, https://www.ots.ca.gov/Media_and_Research/Rankings/default.asp.

36 Andrew Small, "When a Neighborhood Says No to Bike Share," *CityLab,* August 4, 2017, https://www.citylab.com/transportation/2017/08/san-francisco-gobike-launch/532083/

the hours of 9 p.m. and 5 a.m. Docked bike share is not currently available south of Cesar Chavez and Taraval neighborhoods, though dockless bike share is available.

Disabled Access

The percentage of bike share users who identify as people with disabilities is not known, nor are the number of trips provided to people with disabilities.

Bike share companies in San Francisco have not implemented any policies or design features that contribute to the Disabled Access principle. Currently, they do not provide an accessible bicycle or tricycle, usable by people with mobility or vision impairments. Of the providers that responded to the Transportation Authority's industry survey, the companies operating in San Francisco have not provided clear information through their mobile applications about how their services are accessible to persons with disabilities.

Bike Sharing and Disabled Access

The City of Portland, Oregon, has experimented with providing accessible bicycles, including hand-powered bikes and tricycles. The program is similar to more traditional bicycle rental programs in that users must return the bicycles to the same location after renting them.[37] The City of Oakland and the Metropolitan Transportation Commission are exploring similar programs to expand bikeshare opportunities to people with mobility disabilities. Staff from the SFMTA is participating on the Technical Advisory Committee for this effort. It is anticipated that a pilot program will be initiated in Oakland, summer 2018, with short term pop-up stations to provide access to a limited number of accessible bicycle options.

Sustainability

All bike share bicycles are either human-powered or battery electric/human-powered, with zero emissions. While the net effect of bike share on system-wide VMT, and GHG, is not known, research and user surveys show that they reduce VMT.[38]

Congestion

While the net effect of bike share on systemwide VMT or traffic speeds is not known, studies on bike share show that 29-55 percent of users chose to drive personal vehicles less frequently.[39]

In San Francisco, docked bike share systems work with the city to integrate with public infrastructure, installing docks at sites approved by the city. Permitted dockless bike share systems also work with the city to define operating zones, but within those zones bikes can be parked anywhere. Companies operating both docked and dockless systems in San Francisco have worked with the city prior to launching service.

Bike Sharing and Sidewalk Congestion

Concern over sidewalk congestion has been reported with some dockless bike share systems. Some systems guide users through their mobile app how to park without blocking pedestrian right-of-way, and some cities (including San Francisco) require the bike share companies to move improperly parked bikes. Nonetheless, recent news reports have documented problems with improper parking.[40]

Accountability

Permitted bike share providers in San Francisco are required to provide trip data and to survey their users related to service usage, travel behavior, and vehicle ownership. Bike share companies outside of San Francisco may not be subject to similar data reporting requirements.

Labor

Bike share providers have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Labor principle. They have not provided data regarding employee/contractor earnings or benefits.

Bike share providers also have varied policies that contribute to the Labor principle. One bike share company provides transparent hourly rates to employees, but it is not clear whether others do as well. Each company in San Francisco

37 Josh Cohen, "Portland Says Adaptive Bike-Share Pilot Was a Win," Next City, Jan. 18, 2018, https://nextcity.org/daily/entry/portland-adaptive-bikeshare.

38 Elliot Fishman, Simon Washington, and Narelle Haworth, "Bike share's impact on car use: Evidence from the United States, Great Britain, and Australia," *Transportation Research, Part D: Transport and Environment*, Volume 31, (August 2014): 13-20, http://www.sciencedirect.com/science/article/pii/S1361920914000480

39 Susan A. Shaheen, Elliot W. Martin, Nelson D. Chan, Adam P. Cohen, and Mike Pogodzinski, "Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts," (Ph.D diss., Mineta Transportation Institute, October 2014), 79, Report No CA-MTI-14-1131.

40 Jamie Stengle, "Bikes everywhere! Dockless bikes up access, sometimes chaos," San Francisco Chronicle, March 3, 2018, https://www.sfchronicle.com/news/texas/article/Bikes-everywhere-Dockless-bikes-up-access-12725133.php

encourages women, people of color, and people with disabilities to apply through a written hiring policy statement, but not all companies operating outside of San Francisco have a similar policy. Some have undertaken outreach efforts in low-income neighborhoods, posted job openings through the Mayor's Office of Economic and Workforce Development (OEWD), and participated in job fairs for low-income communities. Providers are not registered as disadvantaged business enterprises (DBEs) or local business enterprises (LBEs), and only one reports that they currently prioritize using DBEs and LBEs as contractors. Finally, most providers require specific educational attainment criteria in their hiring process.

Financial Impact

The financial impact of bike share to transit revenues and the state of good repair of San Francisco roadways are not known. While bike share companies in San Francisco are required to report trip data to the SFMTA, this data is not yet available and additional analysis is necessary to determine financial impacts.

Bike share providers are required to pay a permit fee to the SFMTA for operations once a year, allowing the SFMTA to recoup costs associated with regulating and planning for bike share operations and impacts.

Collaboration

Bike sharing companies have a mix of policy and design features that contribute to the Collaboration principle. Each bike share company in San Francisco has a responsive person-of-contact designated to work with the city, although it is not clear that all bike share companies outside of San Francisco assign similar roles. One of the companies has received an endorsement from a Community of Concern, neighborhood group, advocacy group, or other city stakeholders, but the others have not. Similarly, one of the companies has done outreach to Communities of Concern, neighborhood groups, advocacy groups, or other city stakeholders, while the others have not. The SFMTA requires outreach, so bike share companies in the city are developing outreach plans in accordance with those requirements. Both companies operating in San Francisco have engaged in pilot programs with the city, but companies that are not operational in San Francisco have not.

Table 12: Bikeshare Evaluation Results

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- All evaluated companies have implemented this policy or design feature
- Some companies have implemented this policy or design feature
- No company has implemented this policy or design feature
- ? There is insufficient data
- Question does not apply to a particular type of emerging mobility service

Safety

OUTCOME METRIC

1	**OPERATIONAL SAFETY** Number of collisions per 100,000 service miles	.08[1]

POLICY AND DESIGN FEATURES

2	**OPERATIONAL SAFETY** Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)	
3	**OPERATIONAL SAFETY** Safety training is required and tested	
4	**OPERATIONAL SAFETY** Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log	
5	**UNSAFE DRIVING PENALTIES** Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action	
6	**PERSONAL SECURITY** Service requires background checks of operators	
7	**PERSONAL SECURITY** Service provides 24-hour service with a human response in a timely manner	

Transit

OUTCOME METRIC

1	**TRANSIT COMPETITION** Percentage of trips shifted to and from transit to emerging mobility service	
2	**FIRST AND LAST MILE** Total trips provided to transit stations, and as a share of all trips	?

POLICY AND DESIGN FEATURES

4	**TRANSIT DISCOUNTS** Service provides discounted fares to transit hubs	
5	**TRANSIT CONNECTIONS** Service provides in-app information on public transit connections or alternatives	

Equitable Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who are defined as low-income (compared with general population)	13%
2	**ACCESS TIME** Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)	25 min (28 min)[2]
3	**INCREASING ACCESS AND MOBILITY** Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)	28%[3]

POLICY AND DESIGN FEATURES

3	**FARE PRODUCTS** Availability of low-income fare Products	
4	**MULTI-LANGUAGE SUPPORT** Service offered in multiple languages	
5	**PAYMENT INSTRUMENT** Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)	
6	**PAYMENT METHOD** Service accepts alternative methods to pay besides credit/debit card	
7	**INCREASING ACCESS AND MOBILITY** Availability of service on weekends	
8	**INCREASING ACCESS AND MOBILITY** Availability of Service in underserved areas	
	INCREASING ACCESS AND MOBILITY Availability of service between 9p.m. and 5a.m.	

Disabled Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who identify as people with disabilities	?
2	**ACCESS TIME** Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips	0 min (28 min)
3	**INCREASING ACCESS AND MOBILITY** Total trips provided to people with disabilities	?

POLICY AND DESIGN FEATURES

4	**FLEET ACCESSIBILITY** Accessible vehicles are provided	
5	**TRIP FARE** Cost of trip for people with disabilities	
6	**508 COMPLIANCE** Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.	?
7	**ACCESSIBILITY MARKETING** Customers with disabilities are aware that accessible services are available as part of the service provided	
8	**ACCESSIBILITY GUIDELINES** Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)	

Sustainability

OUTCOME METRIC

1	**FLEET EMISSIONS** Percentage of vehicles that are zero emissions vehicles	100%
2	**FLEET EFFICIENCY** Average Vehicle fuel efficiency	
3	**AVERAGE VEHICLE OCCUPANCY** People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type	
4	**SERVICE EMISSIONS** Net increase/decrease in GHG	?

POLICY AND DESIGN FEATURES

5	**FLEET EMISSIONS** Policies prioritize clean/ renewable energy vehicles	

Congestion

OUTCOME METRIC

1	**SERVICE VMT** Net change in VMT during am peak, pm peak, and daily VMT.	?
2	**TRAFFIC SPEEDS** Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service	?

POLICY AND DESIGN FEATURES

3	**CURB CONGESTION** The service provider rather than individual users, in coordination with the City, designates access points.	
4	**PEAK HOUR CONGESTION** Service incentivizes off-peak travel whether by price or by other method.	
5	**SHARED TRIPS** Shared fare price per passenger is discounted from average solo trip price.	

Accountability

OUTCOME METRIC

No outcome metrics were identified for the Accountability principle

POLICY AND DESIGN FEATURES

1	**TRIP DATA** Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."	
2	**USER DATA** Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.	

Financial Impact

OUTCOME METRIC

1	**TRANSIT COMPETITION** Net change in transit revenue due to the emerging mobility service	?
2	**STATE OF GOOD REPAIR** Service's total vehicular VMT on San Francisco Roadways	?
3	**STATE OF GOOD REPAIR** Net marginal roadway maintenance cost due to the emerging mobility service	?

POLICY AND DESIGN FEATURES

4	**PERMIT FEES** Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.	

Labor

OUTCOME METRIC

1	**EMPLOYEE/CONTRACTOR EARNINGS** Mobility service operator net hourly median earnings minus job-related expenses	?
2	**EMPLOYEE/CONTRACTOR BENEFITS** Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits	?

POLICY AND DESIGN FEATURES

3	**FAIR PAY** Level of transparency to service operator (employee/ contractor) in hourly rate, net of job-related expenses	
4	**OPPORTUNITY FOR ENTRY** Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).	
5	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)	
6	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company prioritizes contracting with DBEs and LBEs	
7	**OPPORTUNITIES FOR ENTRY** Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.	

Collaboration

OUTCOME METRIC

No outcome metrics were identified for the collaboration principle

POLICY AND DESIGN FEATURES

1	**POINT OF CONTACT** Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.	
2	**COMMUNITY ENDORSEMENTS** Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.	
3	**COMMUNITY OUTREACH** Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.	
4	**SERVICE PILOT** Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions	
5	**SERVICE PERMIT** A San Francisco public agency manages a permit program for this service type	
6	**PROACTIVE PARTNERSHIP** Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.	

[1] This operational safety estimate used data from Ford GoBike's predecessor, Bay Area Bike Share, from 2013 and 2014. Other bike share operators did not provide data, and more recent GoBike data were not available.
[2] Based on Ford GoBike station locations.
[3] Based on Ford GoBike 2017 trip data

Scooter Sharing

Scooter sharing is the shared use of a fleet of scooters. The scooters are often electric. Systems usually allow for both point-to-point and round trips. Members can rent the scooters by the minute.

Safety

The scooter sharing company in San Francisco has not provided collision rate data to evaluate how it aligns with the Safety principle.

The scooter share service has implemented a few policies and design features related to the Safety principle. They do not send in-app communications or navigation during the ride. They require trainings, which are offered in person and online, and users are tested afterward. They also provide customers access to a 24-hour customer support hotline. Additionally, users must have a valid US driver's license and a clean driving record (no more than one moving violation or accident in the last three years).

Transit

The impacts to transit ridership due to scooter share systems are unknown. While the SFMTA requires permitted scooter share companies in San Francisco to report trip data as part of their permit program, this data is not yet available. Once it is available, additional analysis will be needed to determine transit ridership impacts. See "Accountability" section of Chapter 4 for more information.

San Francisco's scooter share provider has not implemented policies or design features related to the Transit principle. The company's mobile app does not offer discounted fares for trips ending or beginning at transit hubs and the service provides no in-app information on public transit connections or alternatives.

Source: Davis, Dean

Equitable Access

The scooter share company in San Francisco has not provided sufficient data to evaluate whether, or to what extent, they align with the Equitable Access principle.

The scooter share company in San Francisco has few policies or design features related to the Equitable Access principle. They do not offer low-income fare products. Their website and mobile application are only offered in English. They do not offer payment instruments for people without access to the internet or a smartphone, and they only accept payment by debit and credit card. The home zone for scooter share services includes only small areas south of Cesar Chavez, Taraval, and in the Bernal Heights neighborhoods. Lastly, scooter share increases access through availability during late night hours of 9 p.m. to 5 a.m., and on weekends.

Disabled Access

The San Francisco scooter share company has not provided sufficient data to evaluate whether, or to what extent, they align with the Disabled Access principle.

The San Francisco scooter share company does not provide vehicles that are accessible to people with disabilities. Some scooter share services offer "micro cars," such as quads, which could provide mobility opportunities for people with disabilities; however, these are not offered in San Francisco. It is not clear whether their mobile apps and customer interface are 508 compliant. Finally, they do not provide clear information on how to use accessible services and features.

Sustainability

The scooter share fleet in San Francisco includes all zero-emissions vehicles. Similarly, their net effect on system VMT and GHG is not known.

The scooter share company in San Francisco prioritizes clean vehicles.

Congestion

The impact of scooter share on congestion is not known. While scooter share companies in San Francisco are required to report trip data to the SFMTA, this data is not yet available, and additional analysis is necessary to determine congestion impacts.

Scooter share has implemented two policies and design features related to the Congestion principle. Users have some

influence on access points, but at a minimum, scooters must be parked in legal parking spaces per SFMTA guidelines. Scooter share incentivizes off-peak travel by decreasing the base price during off-peak times. On the other hand, scooter share does not discount the price of shared rides.

Accountability

Scooter share provider Scoot, permitted by the SFMTA, is required to provide comprehensive data about their service usage. This includes daily snapshots of scooter locations and dwell times and summaries of trip origin and destinations. Additionally, Scoot is required to survey its members about travel behavior, vehicle ownership, and their scooter share service use.

Labor

Scooter share has not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Labor principle.

San Francisco's scooter share provider has only one known policy or design feature that supports the Labor principle. It is not clear whether they provide employees and contractors transparent information about compensation. They do not have a hiring policy statement that encourages women, people of color, and people with disabilities to apply. They are not a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE), nor do they prioritize contracting with DBEs or LBEs. They do not, however, have specific educational attainment criteria in their hiring process.

Financial Impact

The financial impact of scooter share on transit revenues and the state of good repair of San Francisco roadways are not known. While the SFMTA requires scooter share companies in San Francisco to report trip data, this data is not yet available, and additional analysis is necessary to determine financial impacts.

The scooter share service in San Francisco pays an annual per-vehicle fee to the city.

Collaboration

Scooter share companies have several policies and design features that support the Collaboration principle. The one company has provided a point of contact to the city agencies, participated in a pilot program with the city, receives a permit to operate from the SFMTA, and proactively reached out to the city prior to starting service. On the other hand, they do not have endorsements from Communities of Concern, neighborhood groups, advocacy groups, or other city stakeholders, nor do they conduct community outreach with those groups.

Table 13: Scooter Share Evaluation Results

Evaluation Results Summary Table Legend

- **OUTCOME METRICS:** How do Emerging Mobility Services align with the Guiding Principles?
- **POLICY AND DESIGN FEATURES:** How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?
- All evaluated companies have implemented this policy or design feature
- Some companies have implemented this policy or design feature
- No company has implemented this policy or design feature
- There is insufficient data
- Question does not apply to a particular type of emerging mobility service

Safety

OUTCOME METRIC

1 **OPERATIONAL SAFETY** — Number of collisions per 100,000 service miles

POLICY AND DESIGN FEATURES

2 **OPERATIONAL SAFETY** — Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)

3 **OPERATIONAL SAFETY** — Safety training is required and tested

4 **OPERATIONAL SAFETY** — Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log

5 **UNSAFE DRIVING PENALTIES** — Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action

6 **PERSONAL SECURITY** — Service requires background checks of operators

7 **PERSONAL SECURITY** — Service provides 24-hour service with a human response in a timely manner

Transit

OUTCOME METRIC

1 **TRANSIT COMPETITION** — Percentage of trips shifted to and from transit to emerging mobility service

2 **FIRST AND LAST MILE** — Total trips provided to transit stations, and as a share of all trips

POLICY AND DESIGN FEATURES

4 **TRANSIT DISCOUNTS** — Service provides discounted fares to transit hubs

5 **TRANSIT CONNECTIONS** — Service provides in-app information on public transit connections or alternatives

Equitable Access

OUTCOME METRIC

1 **USER STATISTICS** — Percentage of service users who are defined as low-income (compared with general population)

2 **ACCESS TIME** — Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)

3 **INCREASING ACCESS AND MOBILITY** — Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)

POLICY AND DESIGN FEATURES

3 **FARE PRODUCTS** — Availability of low-income fare Products

4 **MULTI-LANGUAGE SUPPORT** — Service offered in multiple languages

5 **PAYMENT INSTRUMENT** — Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)

6 **PAYMENT METHOD** — Service accepts alternative methods to pay besides credit/debit card

7 **INCREASING ACCESS AND MOBILITY** — Availability of service on weekends

8 **INCREASING ACCESS AND MOBILITY** — Availability of Service in underserved areas

INCREASING ACCESS AND MOBILITY — Availability of service between 9p.m. and 5a.m.

Disabled Access

OUTCOME METRIC

1 **USER STATISTICS** — Percentage of service users who identify as people with disabilities

2 **ACCESS TIME** — Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips

3 **INCREASING ACCESS AND MOBILITY** — Total trips provided to people with disabilities

POLICY AND DESIGN FEATURES

4 **FLEET ACCESSIBILITY** — Accessible vehicles are provided

5 **TRIP FARE** — Cost of trip for people with disabilities

6 **508 COMPLIANCE** — Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.

7 **ACCESSIBILITY MARKETING** — Customers with disabilities are aware that accessible services are available as part of the service provided

8 **ACCESSIBILITY GUIDELINES** — Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)

Sustainability

OUTCOME METRIC

1 **FLEET EMISSIONS** — Percentage of vehicles that are zero emissions vehicles — 100%

2 **FLEET EFFICIENCY** — Average Vehicle fuel efficiency

3 **AVERAGE VEHICLE OCCUPANCY** — People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type

4 **SERVICE EMISSIONS** — Net increase/decrease in GHG

POLICY AND DESIGN FEATURES

5 **FLEET EMISSIONS** — Policies prioritize clean/renewable energy vehicles

Congestion

OUTCOME METRIC

1 **SERVICE VMT** — Net change in VMT during am peak, pm peak, and daily VMT.

2 **TRAFFIC SPEEDS** — Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service

POLICY AND DESIGN FEATURES

3 **CURB CONGESTION** — The service provider rather than individual users, in coordination with the City, designates access points.

4 **PEAK HOUR CONGESTION** — Service incentivizes off-peak travel whether by price or by other method.

5 **SHARED TRIPS** — Shared fare price per passenger is discounted from average solo trip price.

Accountability

OUTCOME METRIC

No outcome metrics were identified for the Accountability principle

POLICY AND DESIGN FEATURES

1 **TRIP DATA** — Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."

2 **USER DATA** — Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.

Financial Impact

OUTCOME METRIC

1 **TRANSIT COMPETITION** — Net change in transit revenue due to the emerging mobility service

2 **STATE OF GOOD REPAIR** — Service's total vehicular VMT on San Francisco Roadways

3 **STATE OF GOOD REPAIR** — Net marginal roadway maintenance cost due to the emerging mobility service

POLICY AND DESIGN FEATURES

4 **PERMIT FEES** — Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.

Labor

OUTCOME METRIC

1 **EMPLOYEE/CONTRACTOR EARNINGS** — Mobility service operator net hourly median earnings minus job-related expenses

2 **EMPLOYEE/CONTRACTOR BENEFITS** — Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits

POLICY AND DESIGN FEATURES

3 **FAIR PAY** — Level of transparency to service operator (employee/contractor) in hourly rate, net of job-related expenses

4 **OPPORTUNITY FOR ENTRY** — Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).

5 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** — Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)

6 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** — Company prioritizes contracting with DBEs and LBEs

7 **OPPORTUNITIES FOR ENTRY** — Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.

Collaboration

OUTCOME METRIC

No outcome metrics were identified for the collaboration principle

POLICY AND DESIGN FEATURES

1 **POINT OF CONTACT** — Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.

2 **COMMUNITY ENDORSEMENTS** — Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.

3 **COMMUNITY OUTREACH** — Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.

4 **SERVICE PILOT** — Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions

5 **SERVICE PERMIT** — A San Francisco public agency manages a permit program for this service type

6 **PROACTIVE PARTNERSHIP** — Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.

Car sharing

Car sharing services provide users access to short-term car rentals. There are multiple models of car share. **Round-trip** car share providers let users reserve a vehicle from the same pick-up spot they return the vehicle to. This model is the most common. Among round-trip car share providers, those with company-owned fleets are sometimes referred to as "traditional" car share providers, as this was the first type of large-scale car sharing in North America. **Peer-to-peer** car share services, which are typically round-trip, enable car owners to rent their cars out as part of car share fleet. **Point-to-point/One-way** car share providers allow users to pick-up and drop off cars anywhere within a defined geographic region. The point-to-point car sharing program allows car sharing organizations to park vehicles in most types of on-street spaces such as defined residential areas and metered spaces. This is the fastest growing model of car sharing, but no point-to-point car share model exists yet in San Francisco. San Francisco currently has round-trip and peer-to-peer car sharing.

Safety

Car share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Safety principle. Car share companies have implemented few policies and design features related to the Safety principle. They do not send in-app messages or navigation during vehicle operation, and they do provide 24-hour customer service. They do not, however, provide or require safety training. Car share providers initially check their members' DMV records to ensure a safe driving record, however they do not regularly monitor driving records.

Transit

The impacts to transit ridership due to car share services are unknown. While the SFMTA requires car share companies in San Francisco to report trip data as part of their permit program, this data is not yet available. Once it is available, additional analysis will be needed to determine transit ridership impacts. See "Accountability" section of Chapter 4 for more information.

Car Sharing and Transit Ridership

In 2011, a UC Berkeley Transportation Sustainability Research Center study found that people who used point-to-point car sharing increased and decreased their transit use in roughly equal numbers, resulting in net decrease of 1 percent to 2 percent in the number of round-trips taken by transit.[41]

Car share providers have not implemented policy or design features related to the Transit principle. Car share providers do not offer discounted fares for trips to or from transit hubs, nor do they provide in-app information on public transit connections or alternatives.

Equitable Access

Some information is available to evaluate Equitable Access outcome metrics, but data are not known for most metrics. Car share companies have not provided user statistics, so the percentage of their users defined as low-income is not known. Based on ZipCar locations, users in a Community of Concern can expect to walk 9 minutes to access a car, compared to 7 minutes for users who do not live in a Community of Concern.

Equitable Access and Car Share

In other car share markets where point-to-point car share services is offered, such as Seattle, Washington DC and Oakland, cities have adopted mandates for service level requirements in Communities of Concern.

Car share services have implemented few policies and design features related to the Equitable Access principle. Car share providers in San Francisco do not offer any dedicated low-income option for those with documentation to verify their status. However, some car share companies have stated that they make special efforts to attract low-income users, such as concentrated outreach or offering free driver credits. Car share companies do not offer multi-language support through their mobile applications and websites. One company offers a payment option for users without access to the internet or a smartphone, but the rest do not. None accept payment other than credit and debit cards. Car share services are available on weekends, which accounts for 26%-40% of their trips according to responses from the Transportation Authority's industry survey. They are also available during late night hours, from 9 p.m. to 5 a.m., which accounts for 10%-22% of their trips, also according to responses from our industry survey. Finally, car share is available south of Cesar Chavez and Taraval neighborhoods.

Disabled Access

Car share companies have not provided sufficient data to evaluate whether, or to what extent, they align with the Disabled Access principle.

Car share providers policies and design features vary regard-

41 Elliot Martin and Susan Shaheen, "The Impact of Carsharing on Public Transit and Non-Motorized Travel: An Exploration of North American Carsharing Survey Data," (Ph. D diss., University of California, Berkeley, Transportation Sustainability Research Center, 2011).

ing the Disabled Access principle. Only one company provides vehicles that are accessible to people with disabilities. Some car share providers offer in-app options to connect users to paratransit services or have trained staff who can deliver a vehicle with hand control devices within 24 hours and there is no extra fee for these services. That company does not charge more for the use of accessible vehicles and they do provide clear information on how to access those vehicles. This company's website also clearly displays information on how users with disabilities can access and use the service. However, no companies offer 508-compliant mobile apps that are accessible to screen readers.

Sustainability

None of the car share companies that operate in San Francisco prioritize clean or renewable energy vehicles, although other several other car share companies, operating nearby, do.

Electric Car Share Fleets

The car share industry has long explored fleet electrification, and this exploration may be picking up momentum. Car2Go brought the first fully-electric fleet to San Diego in 2011, retiring it in 2016, citing a lack of charging stations.[42] BlueIndy introduced an all-electric fleet to Indianapolis in 2014 where it continues to operate today. In 2018, General Motors' car share service for delivery drivers, Maven Gig, is bringing a fully electric fleet of Chevy Bolts to Austin, Texas, and BlueLA, and all electric vehicle car share service launched in Los Angeles, California. Most fleets offer a number of different types of vehicles, including electric and hybrid. The car share service fleets operating in San Francisco currently fit this description.

Car Share VMT

In a 2016 survey of users of point-to-point car share company Car2Go, The University of California, Berkeley found that households across 5 cities reduced their vehicle miles traveled by 6% to 16% annually.[43]

Congestion

While studies have shown reductions in VMT attributed to adoption of carsharing, additional data and analysis are needed to estimate the net change in system VMT and traffic speeds in San Francisco.

Car share services have implemented only one policy related to the Congestion principle. Car share companies coordinated with the City to identify on-street and off-street car share parking spaces. However, none are known to use pricing to incentivize off-peak travel, and none provide discounts for shared trips.

Accountability

Traditional car share providers are permitted by the SFMTA and required to provide comprehensive data about their service utilization. This includes data about the number of reservations per vehicle, number of unique users per vehicle, and length of trip per vehicle. Additionally, car share providers are required to survey their members about travel behavior, vehicle ownership, and their scooter share service use. Peer-to-peer car share providers are not subject to an SFMTA permit program.

Labor

Car share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Labor principle.

Car share providers have also implemented some policies related to the Labor principle. They provide transparent hourly rates to their employees and contractors. Some, but not all, are known to encourage women, people of color, and people with disabilities to apply. Conversely, none are registered Disadvantaged Business Enterprises (DBEs) or Local Business Enterprises (LBEs), and only one prioritizes contracting with DBEs or LBEs. Finally, some use educational attainment criteria for employment in their hiring process.

Financial Impact

Additional data and analysis are needed to determine the financial impact of car sharing on transit and City roads. Academic research demonstrates both a reduction in transit use by car share users as well as a reduction in VMT.

Car share companies pay permitting fees to the SFMTA in San Francisco.

Collaboration

Car share companies have varied policies that support the Collaboration principle. Only one of San Francisco's car share companies is known to have a person of contact assigned to work with City staff. Similarly, only one has received letters of endorsement from, and conducts outreach to Communities of Concern, neighborhood groups, advocacy groups, and other City stakeholders. None are known to have conducted

42 Garrick, David. Car2Go switching electric cars to gas. San Diego Union-Tribune. San Diego, March 2016. http://www.sandiegouniontribune.com/news/politics/sdut-car-share-car2go-fleet-gas-electric-2016mar16-story.html

43 Elliot Martin and Susan Shaheen, "Impacts of car2go on Vehicle Ownership, Modal Shift, Vehicle Miles Traveled, and Greenhouse Gas Emissions: An Analysis of Five North American Cities," (Ph.D diss., University of California Berkeley, Transportation Sustainability Research Center, 2016), http://innovativemobility.org/wp-content/uploads/2016/07/ImpactsofCar2go_FiveCities_2016.pdf.

pilots with the City. Traditional car share providers are permitted through the SFMTA, although peer-to-peer companies do not fall under this permit. Point-to-point carshare services are currently not available in San Francisco.

Table 14: Car Share Evaluation Results

Evaluation Results Summary Table Legend

- **OUTCOME METRICS:** How do Emerging Mobility Services align with the Guiding Principles?
- **POLICY AND DESIGN FEATURES:** How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?
- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Safety

OUTCOME METRIC

1	**OPERATIONAL SAFETY** Number of collisions per 100,000 service miles	?

POLICY AND DESIGN FEATURES

2	**OPERATIONAL SAFETY** Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)	🟢
3	**OPERATIONAL SAFETY** Safety training is required and tested	🔴
4	**OPERATIONAL SAFETY** Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log	⊘
5	**UNSAFE DRIVING PENALTIES** Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action	🟢
6	**PERSONAL SECURITY** Service requires background checks of operators	⊘
7	**PERSONAL SECURITY** Service provides 24-hour service with a human response in a timely manner	🟢

Transit

OUTCOME METRIC

1	**TRANSIT COMPETITION** Percentage of trips shifted to and from transit to emerging mobility service	?
2	**FIRST AND LAST MILE** Total trips provided to transit stations, and as a share of all trips	?

POLICY AND DESIGN FEATURES

4	**TRANSIT DISCOUNTS** Service provides discounted fares to transit hubs	🔴
5	**TRANSIT CONNECTIONS** Service provides in-app information on public transit connections or alternatives	🔴

Equitable Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who are defined as low-income (compared with general population)	?
2	**ACCESS TIME** Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)	9 min (7 min)[1]
3	**INCREASING ACCESS AND MOBILITY** Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)	?

POLICY AND DESIGN FEATURES

3	**FARE PRODUCTS** Availability of low-income fare Products	🔴
4	**MULTI-LANGUAGE SUPPORT** Service offered in multiple languages	🔴
5	**PAYMENT INSTRUMENT** Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)	🟡
6	**PAYMENT METHOD** Service accepts alternative methods to pay besides credit/debit card	🔴
7	**INCREASING ACCESS AND MOBILITY** Availability of service on weekends	🟢
8	**INCREASING ACCESS AND MOBILITY** Availability of Service in underserved areas	🟢
	INCREASING ACCESS AND MOBILITY Availability of service between 9p.m. and 5a.m.	🟢

Disabled Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who identify as people with disabilities	?
2	**ACCESS TIME** Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips	? (7 min)
3	**INCREASING ACCESS AND MOBILITY** Total trips provided to people with disabilities	?

POLICY AND DESIGN FEATURES

4	**FLEET ACCESSIBILITY** Accessible vehicles are provided	🟡
5	**TRIP FARE** Cost of trip for people with disabilities	🟡
6	**508 COMPLIANCE** Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.	🔴
7	**ACCESSIBILITY MARKETING** Customers with disabilities are aware that accessible services are available as part of the service provided	🟡
8	**ACCESSIBILITY GUIDELINES** Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)	⊘

Sustainability

OUTCOME METRIC

1	**FLEET EMISSIONS** Percentage of vehicles that are zero emissions vehicles	?
2	**FLEET EFFICIENCY** Average Vehicle fuel efficiency	?
3	**AVERAGE VEHICLE OCCUPANCY** People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type	?
4	**SERVICE EMISSIONS** Net increase/decrease in GHG	?

POLICY AND DESIGN FEATURES

5	**FLEET EMISSIONS** Policies prioritize clean/ renewable energy vehicles	🔴

Congestion

OUTCOME METRIC

1	**SERVICE VMT** Net change in VMT during am peak, pm peak, and daily VMT.	?
2	**TRAFFIC SPEEDS** Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service	?

POLICY AND DESIGN FEATURES

3	**CURB CONGESTION** The service provider rather than individual users, in coordination with the City, designates access points.	🟢
4	**PEAK HOUR CONGESTION** Service incentivizes off-peak travel whether by price or by other method.	🔴
5	**SHARED TRIPS** Shared fare price per passenger is discounted from average solo trip price.	🔴

Accountability

OUTCOME METRIC

No outcome metrics were identified for the Accountability principle

POLICY AND DESIGN FEATURES

1	**TRIP DATA** Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."	🟡
2	**USER DATA** Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.	🟡

Financial Impact

OUTCOME METRIC

1	**TRANSIT COMPETITION** Net change in transit revenue due to the emerging mobility service	?
2	**STATE OF GOOD REPAIR** Service's total vehicular VMT on San Francisco Roadways	?
3	**STATE OF GOOD REPAIR** Net marginal roadway maintenance cost due to the emerging mobility service	?

POLICY AND DESIGN FEATURES

4	**PERMIT FEES** Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.	🟢

Labor

OUTCOME METRIC

1	**EMPLOYEE/CONTRACTOR EARNINGS** Mobility service operator net hourly median earnings minus job-related expenses	?
2	**EMPLOYEE/CONTRACTOR BENEFITS** Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits	?

POLICY AND DESIGN FEATURES

3	**FAIR PAY** Level of transparency to service operator (employee/ contractor) in hourly rate, net of job-related expenses	🟢
4	**OPPORTUNITY FOR ENTRY** Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).	🟡
5	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)	🔴
6	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company prioritizes contracting with DBEs and LBEs	🟡
7	**OPPORTUNITIES FOR ENTRY** Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.	🟡

Collaboration

OUTCOME METRIC

No outcome metrics were identified for the collaboration principle

POLICY AND DESIGN FEATURES

1	**POINT OF CONTACT** Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.	🟡
2	**COMMUNITY ENDORSEMENTS** Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.	🟡
3	**COMMUNITY OUTREACH** Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.	🟡
4	**SERVICE PILOT** Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions	🟡
5	**SERVICE PERMIT** A San Francisco public agency manages a permit program for this service type	🟢
6	**PROACTIVE PARTNERSHIP** Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.	🟢

[1] Based on Zipcar vehicle pod locations.

Ride sharing

Ride sharing is the third-party service of matching of riders and drivers with similar shared destinations, enabling them to split the cost of the ride. Unlike ride hailing, the driver is not fare-motivated to take the trip. Ride share drivers are neither employees nor independent contractors; they are compensated directly by passengers for only the cost incurred by the driver for providing the service. There are two types of emerging mobility ride sharing services: dynamic matching, which is the matching of riders to drivers on-demand (such as Waze Carpool), and the pre-scheduled matching (such as Scoop), where travelers enter their desired pickup and drop-off schedule and drivers and riders are matched in advance of their trip. .

Safety

Ride sharing companies have not provided sufficient data to evaluate whether, or to what extent, they align with the Safety principle.

Ride share companies have not implemented policies or design features that support the Safety principle. Ride share apps rely on occasional in-app communications and navigation to drop-off and pick-up passengers. No safety training is required. Some providers run driving history background checks while others do not, but none regularly monitor driving records. Penalties for traffic violations are only assessed with a complaint-based system. They do not provide 24-hour customer service. Finally, service hours for operators are not limited, although these platforms only allow two trips a day.

Transit

Ride share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Transit principle.

Ride share providers have none of the identified policies and design features related to the Transit principle. Ride share companies do not provide discounted fares to transit hubs nor do they provide in-app information on public transit connections or alternatives. Ride share company Scoop has partnered with BART for a pilot program to pair riders and drivers traveling to BART stations in exchange for guaranteed parking.

Equitable Access

Ride share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Equitable Access principle.

Ride share companies have implemented few policies related to the Equitable Access principle. They do not offer fare products for low-income customers, although their service is not fare-motivated, and fares are limited to the driver's cost-recovery. Internet and web applications are offered in English only. Ride share services are not available to users without Internet or smartphone access; they must be booked through the mobile application. The companies only accept debit or credit cards, limiting access for people without a bank account. On the other hand, some ride share services are available during late night hours, and some are available on weekends. Ride share services are also available south of Cesar Chavez and Taraval neighborhoods.

Disabled Access

Ride share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Disabled Access principle.

Ride share companies have implemented no known policies related to the Disabled Access principle. They do not provide vehicles accessible to people with disabilities; their mobile applications are not accessible by screen readers (i.e. 508-compliant); their mobile applications and websites do not clearly display information for users with disabilities; and they do not train drivers on how to work with people with disabilities.

Sustainability

Ride share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Sustainability principle.

Ride share companies do not prioritize clean or renewable energy vehicles.

Congestion

Ride share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Congestion principle. As previously stated, industry surveys conducted by the Transportation Authority report that ridesharing users were predominantly single-occupancy drivers during peak travel periods prior to using the ride share service.

Ridesharing services have not implemented any of the identified policies that support the Congestion principle. They do not coordinate with the City to establish appropriate pickup and dropoff locations.

San Mateo Ride Share Pilot

The San Mateo City/County Association of Governments (C/CAG) partnered with rideshare provider Scoop to incentivize carpooling trips for drivers. Pilot trip data demonstrates that 65% of drivers would have driven alone without the rideshare service. However, 20% of pilot users said they would have taken the train or bus without the rideshare service. Caltrain provides transit service along this corridor and is at capacity.

Rideshare trips have grown steadily from 19,840 trips in May 2017 to 40,481 trips in January 2018. Total registered users has also increased during that same period from 13,671 registered users to 22,539 users.[44]

Accountability

Ride share providers have not worked with the SFMTA and the Transportation Authority thus far, though they provide reports to employers, pilot partners such as BART, San Mateo C/CAG and the Metropolitan Transportation Commission.

Labor

Ride share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Labor principle. These services mainly hire professional staff as employees.

Ride share services have implemented some policies that support the Labor principle. Ride share services notify operators of their trip earnings prior to matching them with passengers. Some, but not all, have hiring policy statements that encourage women, people of color, and people with disabilities to apply, and their hiring processes do not require specific educational attainment levels. On the other hand, none are registered as Disadvantaged Business Enterprise or Local Business Enterprise, nor do they prioritize using them as contractors.

Financial Impact

Ride share companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Financial Impact principle.

Ride share companies do not require a permit in San Francisco and do not pay a fee to state and/or local regulatory agency that recovers enforcement, maintenance, and/or other program costs.

Collaboration

Ride share companies policies and design features related to Collaboration are mixed. Each ride share company in San Francisco has designated a person of contact to work with City staff. Whether they have endorsements from, or conduct outreach to Communities of Concern, neighborhood groups, advocacy groups, or other City stakeholders, is unknown. Neither company has conducted a pilot with a San Francisco agency, although one company, Scoop, has entered into pilots with BART, San Mateo C/CAG, the Metropolitan Transportation Commission, and other agencies in the region. Ride share companies have not receive a permit from the City, nor are they required to. One proactively worked with the City prior to launching service, but the other did not.

44 "C/CAG Countywide Carpooling Incentive Pilot Program Update," (presentation, Congestion Management Program Technical Advisory Committee, City/County Association of Governments of San Mateo County, .

Table 15: Ride Share Evaluation Results

Evaluation Results Summary Table Legend

- **OUTCOME METRICS:** How do Emerging Mobility Services align with the Guiding Principles?
- **POLICY AND DESIGN FEATURES:** How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?
- 🟢 All evaluated companies have implemented this policy or design feature
- 🟡 Some companies have implemented this policy or design feature
- 🔴 No company has implemented this policy or design feature
- ? There is insufficient data
- ⊘ Question does not apply to a particular type of emerging mobility service

Safety

OUTCOME METRIC

1 **OPERATIONAL SAFETY** ?
Number of collisions per 100,000 service miles

POLICY AND DESIGN FEATURES

2 **OPERATIONAL SAFETY** 🔴
Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)

3 **OPERATIONAL SAFETY** 🔴
Safety training is required and tested

4 **OPERATIONAL SAFETY** ⊘
Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log

5 **UNSAFE DRIVING PENALTIES** 🔴
Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action

6 **PERSONAL SECURITY** 🔴
Service requires background checks of operators

7 **PERSONAL SECURITY** 🔴
Service provides 24-hour service with a human response in a timely manner

Transit

OUTCOME METRIC

1 **TRANSIT COMPETITION** ?
Percentage of trips shifted to and from transit to emerging mobility service

2 **FIRST AND LAST MILE** ?
Total trips provided to transit stations, and as a share of all trips

POLICY AND DESIGN FEATURES

4 **TRANSIT DISCOUNTS** 🔴
Service provides discounted fares to transit hubs

5 **TRANSIT CONNECTIONS** 🔴
Service provides in-app information on public transit connections or alternatives

Equitable Access

OUTCOME METRIC

1 **USER STATISTICS** ?
Percentage of service users who are defined as low-income (compared with general population)

2 **ACCESS TIME** ?
Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)

3 **INCREASING ACCESS AND MOBILITY** ?
Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)

POLICY AND DESIGN FEATURES

3 **FARE PRODUCTS** 🔴
Availability of low-income fare Products

4 **MULTI-LANGUAGE SUPPORT** 🔴
Service offered in multiple languages

5 **PAYMENT INSTRUMENT** 🔴
Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)

6 **PAYMENT METHOD** 🔴
Service accepts alternative methods to pay besides credit/debit card

7 **INCREASING ACCESS AND MOBILITY** 🟡
Availability of service on weekends

8 **INCREASING ACCESS AND MOBILITY** 🟢
Availability of Service in underserved areas

INCREASING ACCESS AND MOBILITY 🟡
Availability of service between 9p.m. and 5a.m.

Disabled Access

OUTCOME METRIC

1 **USER STATISTICS** ?
Percentage of service users who identify as people with disabilities

2 **ACCESS TIME** ?
Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips

3 **INCREASING ACCESS AND MOBILITY** ?
Total trips provided to people with disabilities

POLICY AND DESIGN FEATURES

4 **FLEET ACCESSIBILITY** 🔴
Accessible vehicles are provided

5 **TRIP FARE** ⊘
Cost of trip for people with disabilities

6 **508 COMPLIANCE** 🔴
Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.

7 **ACCESSIBILITY MARKETING** 🔴
Customers with disabilities are aware that accessible services are available as part of the service provided

8 **ACCESSIBILITY GUIDELINES** 🔴
Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)

Sustainability

OUTCOME METRIC

1 **FLEET EMISSIONS** ?
Percentage of vehicles that are zero emissions vehicles

2 **FLEET EFFICIENCY** ?
Average Vehicle fuel efficiency

3 **AVERAGE VEHICLE OCCUPANCY** ?
People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type

4 **SERVICE EMISSIONS** ?
Net increase/decrease in GHG

POLICY AND DESIGN FEATURES

5 **FLEET EMISSIONS** 🔴
Policies prioritize clean/ renewable energy vehicles

Congestion

OUTCOME METRIC

1 **SERVICE VMT** ?
Net change in VMT during am peak, pm peak, and daily VMT.

2 **TRAFFIC SPEEDS** ?
Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service

POLICY AND DESIGN FEATURES

3 **CURB CONGESTION** 🔴
The service provider rather than individual users, in coordination with the City, designates access points.

4 **PEAK HOUR CONGESTION** ⊘
Service incentivizes off-peak travel whether by price or by other method.

5 **SHARED TRIPS** ⊘
Shared fare price per passenger is discounted from average solo trip price.

Accountability

OUTCOME METRIC

No outcome metrics were identified for the Accountability principle

POLICY AND DESIGN FEATURES

1 **TRIP DATA** 🔴
Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."

2 **USER DATA** 🔴
Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.

Financial Impact

OUTCOME METRIC

1 **TRANSIT COMPETITION** ?
Net change in transit revenue due to the emerging mobility service

2 **STATE OF GOOD REPAIR** ?
Service's total vehicular VMT on San Francisco Roadways

3 **STATE OF GOOD REPAIR** ?
Net marginal roadway maintenance cost due to the emerging mobility service

POLICY AND DESIGN FEATURES

4 **PERMIT FEES** 🔴
Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.

Labor

OUTCOME METRIC

1 **EMPLOYEE/CONTRACTOR EARNINGS** ?
Mobility service operator net hourly median earnings minus job-related expenses

2 **EMPLOYEE/CONTRACTOR BENEFITS** ?
Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits

POLICY AND DESIGN FEATURES

3 **FAIR PAY** 🟢
Level of transparency to service operator (employee/ contractor) in hourly rate, net of job-related expenses

4 **OPPORTUNITY FOR ENTRY** 🟡
Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).

5 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** 🔴
Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)

6 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** 🔴
Company prioritizes contracting with DBEs and LBEs

7 **OPPORTUNITIES FOR ENTRY** 🟢
Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.

Collaboration

OUTCOME METRIC

No outcome metrics were identified for the collaboration principle

POLICY AND DESIGN FEATURES

1 **POINT OF CONTACT** 🟢
Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.

2 **COMMUNITY ENDORSEMENTS** ?
Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.

3 **COMMUNITY OUTREACH** ?
Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.

4 **SERVICE PILOT** 🔴
Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions

5 **SERVICE PERMIT** 🔴
A San Francisco public agency manages a permit program for this service type

6 **PROACTIVE PARTNERSHIP** 🟡
Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.

Ride hailing

Ride hailing services match riders with drivers, on-demand. While often referred to as "ride sharing", we use the term "ride hailing." Unlike ride share drivers, ride hail drivers are fare-motivated, providing transportation to another party to earn a profit, and typically do not share a destination with their passengers. Ride hail companies known in California as Transportation Network Companies (TNCs), are regulated at the state level by the California Public Utilities Commission (CPUC), unlike taxis which are regulated locally. Ride hailing companies are further distinguished from taxis in several key ways: they may not accept street hails, only prearranged rides; there is no regulatory limit on the number of vehicles allowed to operate simultaneously; and fares are not regulated.

Safety

Ride hail companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Safety principle. While ride hailing companies provide collision information to the CPUC, the CPUC does not share that information with other public agencies.

Traffic Violations

In Fall 2017, the San Francisco Police Department (SFPD) presented traffic violation from April 2017 to June 2017 in the South of Market neighborhood data to the Board of Supervisors Land Use and Transportation Committee. The data demonstrated that ride hail drivers disproportionately represent the number of traffic violations in the area: 183 out of 239 citations (77%) were issued for ride hail drivers obstructing a lane of traffic or a bike lane, and 42 out of 57 tickets (74%) were issued to ride hail drivers for illegal U-Turns.[45]

Ride hailing policies and design features related to the Safety principle are mixed. Ride hailing services rely on in-app messaging and navigation during vehicle operation. While they provide driver safety trainings, they do not require it. One company provides "driver hubs" where Vision Zero training videos are played and drivers are able to rest. While companies impose limits on drive time within their own platforms, they do not coordinate with the DMV or other companies to ensure that drive time limits are adhered to. The limits are implemented differently among different companies, too. One warns drivers after exceeding a drive time limit, but allows them to keep driving. The other prevents continued in-service driving, but the time limit it imposes is longer than the time limit specified by the DMV's regulation.[46] Reports have noted the use of multiple ride hail apps by a single driver to circumvent drive time limits.[47] Ride hail companies monitor driver records through the California DMV Driver Pull Program and remove drivers after repeated infractions and based on customer/user feedback and complaints. As required by the CPUC, ride hail companies subject drivers to non-fingerprint-based background checks. Ride hailing services also provide 24-hour customer service.

Transit

Ride hail companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Transit principle.

Ride Hailing and Transit Ridership

In a 2017 study, University of California, Davis found that ride hailing services decreased transit ridership by 6% on average across seven US cities and that 15% of ride hail trips would have use transit had ride hail not been available.[48] Furthermore, data presented to the Board of Supervisors Land Use and Transportation Committee by the SFPD demonstrates that ride hailing drivers commonly use transit-only, lanes which impedes on transit reliability and transit operations. Of 1,715 citations given between April and June in the South of Market neighborhood for driving in a transit-only lane, 1,144 (67%) were to ride hailing drivers.[49]

Ride hailing services do not have policies or design features that support the Transit principle. They do not offer discounted fares to transit, nor do they offer in-app information on public transit.

Equitable Access

Ride hail companies have not provided sufficient data to fully evaluate whether, or to what extent, they are aligned with the Equitable Access principle. The percentage of users who meet the definition of low-income is not known. Using data gathered by Northeastern University from Uber and Lyft, the SFCTA estimates that access times for ride hailing services are roughly equal whether requested from a Com-

45 Joe Fitzgerald Rodriguez, "SFPD: Uber, Lyft account for two-thirds of congestion-related traffic violations downtown," SF Examiner, June 13, 2017, http://www.sfexaminer.com/sfpd-uber-lyft-account-two-thirds-congestion-related-traffic-violations-downtown/.

46 "Taking Breaks and Time Limits in Driver Mode," Lyft, accessed DATE, https://help.lyft.com/hc/en-us/articles/115012926787-Taking-breaks-and-time-limits-in-driver-mode.

47 Carolyn Said, "Long-distance Uber, Lyft drivers' crazy commutes, marathon days, big paychecks," *San Francisco Chronicle*, February 18, 2017, http://www.sfchronicle.com/business/article/Long-distance-Uber-Lyft-drivers-crazy-10942919.php.

48 Regina Clewlow and Gouri Shankar Mishra, "Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States," (Ph.D diss., University of California Davis, Institute of Transportation Studies, 2017).

49 Joe Fitzgerald Rodriguez, "SFPD: Uber, Lyft account for two-thirds of congestion-related traffic violations downtown," SF Examiner, June 13, 2017, http://www.sfexaminer.com/sfpd-uber-lyft-account-two-thirds-congestion-related-traffic-violations-downtown/.

munity of Concern or not, about 3 minutes. Note that this estimate is based on the estimated arrival time displayed to users when they request a ride. 33% of trips are provided to Communities of Concern according to data presented in the Transportation Authority's TNCs Today study.

Ride Hailing and Equitable Access

A study conducted in Seattle Washington and Boston, Massachusetts studied racial and gender discrimination among ride hail users. The study controlled ride requests in both cities and tracked wait times, cancellation rates, and route characteristics. In Seattle, the study found that users with African-American sounding names experienced longer wait times by as much as 35% increase. In Boston, cancellation rates were more twice as common for users with African American sounding names. The study also demonstrated that drivers took female users in Boston for longer, more expensive rides.[50]

The policy and design features that ride hailing services have implemented related to the Equitable Access principle are mixed. Neither company offers low-income fare products. One offers multiple languages on its interface, but the other does not. Neither offers a booking or payment option for those without access to the Internet or a smartphone, although ride hail companies are exploring alternative methods for booking trips by developing dashboards for third-parties to request rides for their customers.[51] Ride hail services are available on weekends, during which 29% of their trips occur. They are also available between 9 p.m. and 5 a.m., during which 23% of their trips occur. Finally, ride hail services are offered across the city including areas south of Cesar Chavez and Taraval neighborhoods.

Disabled Access

Ride hail companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Disabled Access principle.

Ride hail companies have implemented some policies and design features to support the Disabled Access principle. They provide wheelchair accessible vehicles, although a recent lawsuit claims that this service is not sufficient.[52] Ride hail companies do clearly present information for disabled users on their websites. Drivers are notified of policies relating to transporting people with disabilities. However, there are no specific trainings on how to assist people with disabilities. In addition, fares for users requesting wheelchair accessible vehicles are higher than fares for other trips. Their mobile applications and websites are also not compatible with screen readers.

Sustainability

Ride hail companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the sustainability principle.

Ride Hailing and VMT

A 2017 study from the University of California, Davis found that adoption of ride hailing services is likely to result in a net increase in vehicle miles traveled due to competition with public transit. The same study concluded that users who reduce their personal driving replace that driving with increased vehicle miles in a ride hail vehicle, but that the net change based on reduced personal driving could not be determined.[53] The 2017 report *TNCs Today* by the San Francisco County Transportation Authority found that as of fall 2016, ride hail vehicles traveled more than 550,000 vehicle miles on a typical weekday just for trips that both begin and end within San Francisco city limits.[54.]

Ride hail companies do not prioritize clean or renewable energy vehicles.

Congestion

Ride hail companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Congestion principle.

Ride hail policies and design features related to the Congestion principle are mixed. They have not coordinated with the City to establish pickup and dropoff locations, although it is common practice for them to do so at airports, including San Francisco International Airport, where ride hailing customers select a specific door from the arrivals level at which to be picked up or dropped off. Ride hail companies do not use pricing to incentivize travel outside of peak period. Instead, they vary pricing based an imbalance between demand and availability of drivers, which encourages more drivers to provide service. These price variations are not aligned with peak travel periods. Finally, ride hailing services do encourage shared trips through pricing, offering an approximate 30-50% discount on shared fares; and offer multiple shared

50 Zoepf, et al., "Racial and Gender Discrimination in Transportation Network Companies," National Bureau of Economic Research, published October 2016, https://economics.stanford.edu/sites/default/files/zoepf.pdf.

51 Darrell Etherington, "Lyft hits record 13.9M monthly rides, sees 5X quarterly growth in Concierge rides," *Tech Crunch*, August 3, 2016, https://techcrunch.com/2016/08/03/lyft-hits-record-13-9m-monthly-riders-sees-5x-quarterly-growth-in-concierge-rides/. Darrell Etherington, "UberCENTRAL lets businesses request and pay for customer rides," *Tech Crunch*, July 28, 2016, https://techcrunch.com/2016/07/28/ubercentral-lets-businesses-request-and-pay-for-customer-rides/.

52 Adam Brinklow, "Wheelchair users sue Uber", San Francisco Curbed, March 5, 2018, https://sf.curbed.com/2018/3/5/17081538/uber-lawsuit-wheelchairs-health

53 Regina Clewlow and Gouri Shankar Mishra, "Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States," Institute of Transportation Studies, (Ph.D diss., University of California Davis, 2017).

54 "TNCs Today: A Profile of San Francisco Transportation Network Company Activity," San Francisco County Transportation Authority, published June 2017, http://www.sfcta.org/sites/default/files/content/Planning/TNCs/TNCs_Today_112917.pdf.

ride products such as ride splitting, ride-pooling and shuttle services. Ride hail companies have not provided information about what percentage of miles traveled in ride hailing are shared trips.

Accountability

Ride hail companies do not share user or trip data with local planning agencies in San Francisco. While the California Public Utilities Commission (CPUC) requires ride hailing companies to provide extensive data related to trips, labor, and safety issues, the CPUC has declined to share any of this data with local planning agencies.

Uber Movement Platform

Uber recently released a program called Movement. The online portal allows anyone who signs up with an email to track traffic patterns in select cities around the world. The list of cities available includes San Francisco. Traffic patterns are displayed as travel speeds and travel times from one census tract to another. Users may toggle between times periods throughout the day and between different days of the week. The travel time data is provided based on GPS data from Uber's trips. However, Uber Movement does not provide insights into how Uber's ride hail services *impact* travel patterns and travel speeds and travel times, so it is insufficient for our analysis.

Labor

Ride hail companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Labor principle.

Ride hail policies and design features related to the Labor principle are mixed. Ride hail companies do not provide transparent wage rates to their drivers. They do, however, encourage women, people of color, and people with disabilities to apply for jobs. Ride hail companies are not registered as Disadvantaged Business Enterprise or Local Business Enterprise, nor do they prioritize using them as contractors. One company requires specific levels of educational attainment for employment, but the other does not.

Ride Hailing and Wage Transparency

The issue of wage transparency has been raised in lawsuits and through independent research. For example, in early 2017, Uber settled with the Federal Trade Commission on a case alleging the exaggeration of income potential. In March of 2018, Stephen Zoepf, Executive Director of Automotive Research at Stanford, released results of an independent survey implemented on the RideshareGuy blog as part of MIT Center for Energy and Environmental Policy Research working paper series. After the initial release of "The Economics of Ride-Hailing", Uber's Chief Economist critiqued and refuted the initially reported analysis. Zoepf worked with Uber to revise his initial calculations incorporating this feedback. The revised analysis claims that the median profit for driving is between $8.55/hr and $10/hour before taxes. For 41-54% of drivers, their profit per hour was less than the 2016 minimum wage in their state, and 4-8% of drivers lose money.[55]

Financial Impact

Ride hail companies have not provided sufficient data to evaluate whether, or to what extent they are aligned with the Financial Impact principle.

Ride hail companies do not pay permit fees in San Francisco. They do pay the California Public Utilities Commission, the enforcement agency for this permit class, a fee based on 0.25% of gross revenue, as well as an annual registration fee. Neither the CPUC nor the ride hailing companies have disclosed the amounts of these fees paid to the CPUC or how those fees are used. Analysis by the Transportation Authority suggests the amount is likely to be over $2 million in fees per year in San Francisco alone.[56] In early 2018, the CPUC reduced its TNC fees from 0.33% to 0.25% of gross revenues.[57] Separately, ride hailing services pay a $3.80 per trip fee to the San Francisco International Airport for any trips beginning or ending at the Airport. In 2016, the Airport collected $21,817,219 in TNC fee revenue from 5,709,336 trips -- a 75% increase from 2015. Neither the CPUC nor SFO shares any of these revenues with San Francisco public agencies -- or any other city -- to mitigate potential impacts from ride hailing trips.

55 Zoepf, Stephen. The Economics of Ride Hailing, Revisited. March, 2018. http://ceepr.mit.edu/files/papers/2018-005%20Authors%20Statement.pdf

56 The TNC Regulatory Landscape: An Overview of Current TNC Regulation in California and Across the Country. San Francisco County Transportation Authority. Jan. 2018. http://www.sfcta.org/sites/default/files/content/Planning/TNCs/TNC_regulatory_020218.pdf.

57 Joe Fitzgerald Rodriguez, "State Regulators Lower Fees for Uber, Lyft as Ride-hail Business Booms." *San Francisco Examiner*, Feb. 8, 2018, http://www.sfexaminer.com/state-regulators-lower-fees-uber-lyft-ride-hail-business-booms/.

Collaboration

Ride hailing companies in San Francisco have identified points of contact for communications with City staff. It is unknown whether these companies have plans for engaging with San Francisco community stakeholders or have received endorsements from community representatives. In a May 2017 open letter to City agencies and emerging mobility companies, then-Mayor Ed Lee expressed his concerns about the safety and traffic implications of ride hailing on city streets. Lee called on the SFMTA and emerging mobility companies, particularly ride hailing companies Uber and Lyft, to develop a pilot project together. Under that guidance, SFMTA has held several meetings with emerging mobility companies to determine how such a pilot would be developed, implemented, and measured.[58] Ride hail companies do not receive a permit from San Francisco to operate, and ride hail companies did not contact city staff prior to initiating new services on their platforms.

Autonomous Vehicles and Ride hailing

The business of ride hailing is arguably a precursor to autonomous vehicles. Ride hailing platforms, in their current form, act as a communication link between *drivers*, patrons, and the operator. Ride hailing companies are exploring the use of their platform as the communication link between *autonomous vehicles*, patrons and the operator. Many ride hail companies have partnered with autonomous vehicle manufacturers to test autonomous vehicles and autonomous vehicle operation in the State of California. To test autonomous vehicles, companies must obtain a permit through the California Public Utilities Commission and the California DMV. This process requires Autonomous vehicle providers to submit a local law enforcement plan, ostensibly resulting from consultation and coordination with municipal police departments and traffic enforcement officers. As of January 11, 2018, 50 companies have received testing permits.[59] Uber, Lyft, and Cruise Automation are some of the companies currently testing autonomous vehicles on the streets of San Francisco. Mayor Farrell sent an open letter in March asking companies intending to deploy driverless services to attend a safety briefing with city agencies and first responders. In late March, he convened this forum with 6 companies, initiating a dialogue focused on ensuring public safety.[60]

58 Joe Fitzgerald Rodriguez, "Mayor Lee to Tackle Uber, Lyft Traffic Congestion Through Pilot Program," *San Francisco Examiner*, May 15, 2017, http://www.sfexaminer.com/mayor-lee-tackle-uber-lyft-traffic-congestion-pilot-program/.

59 Testing of Autonomous Vehicles with a Driver. State of California Department of Motor Vehicles. https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/testing.

60 "Mayor Mark Farrell Hosts Safety Briefing with Autonomous Vehicle Companies and Law Enforcement to Prepare for Self-Driving Cars in San Francisco." Office of the Mayor. March 22, 2018. http://sfmayor.org/article/mayor-mark-farrell-hosts-safety-briefing-autonomous-vehicle-companies-and-law-enforcement.

Table 16: Ride Hail Evaluation Results

Evaluation Results Summary Table Legend

OUTCOME METRICS:
How do Emerging Mobility Services align with the Guiding Principles?

POLICY AND DESIGN FEATURES:
How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?

- All evaluated companies have implemented this policy or design feature
- Some companies have implemented this policy or design feature
- No company has implemented this policy or design feature
- ? There is insufficient data
- Question does not apply to a particular type of emerging mobility service

Safety

OUTCOME METRIC

1 **OPERATIONAL SAFETY** ?
Number of collisions per 100,000 service miles

POLICY AND DESIGN FEATURES

2 **OPERATIONAL SAFETY**
Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)

3 **OPERATIONAL SAFETY**
Safety training is required and tested

4 **OPERATIONAL SAFETY**
Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log

5 **UNSAFE DRIVING PENALTIES**
Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action

6 **PERSONAL SECURITY**
Service requires background checks of operators

7 **PERSONAL SECURITY**
Service provides 24-hour service with a human response in a timely manner

Transit

OUTCOME METRIC

1 **TRANSIT COMPETITION** ?
Percentage of trips shifted to and from transit to emerging mobility service

2 **FIRST AND LAST MILE** ?
Total trips provided to transit stations, and as a share of all trips

POLICY AND DESIGN FEATURES

4 **TRANSIT DISCOUNTS**
Service provides discounted fares to transit hubs

5 **TRANSIT CONNECTIONS**
Service provides in-app information on public transit connections or alternatives

Equitable Access

OUTCOME METRIC

1 **USER STATISTICS** ?
Percentage of service users who are defined as low-income (compared with general population)

2 **ACCESS TIME** ? (3 min)[1]
Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)

3 **INCREASING ACCESS AND MOBILITY** 33%[2]
Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)

POLICY AND DESIGN FEATURES

3 **FARE PRODUCTS**
Availability of low-income fare Products

4 **MULTI-LANGUAGE SUPPORT**
Service offered in multiple languages

5 **PAYMENT INSTRUMENT**
Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)

6 **PAYMENT METHOD**
Service accepts alternative methods to pay besides credit/debit card

7 **INCREASING ACCESS AND MOBILITY**
Availability of service on weekends

8 **INCREASING ACCESS AND MOBILITY**
Availability of Service in underserved areas

INCREASING ACCESS AND MOBILITY
Availability of service between 9p.m. and 5a.m.

Disabled Access

OUTCOME METRIC

1 **USER STATISTICS** ?
Percentage of service users who identify as people with disabilities

2 **ACCESS TIME** ? (3 min)
Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips

3 **INCREASING ACCESS AND MOBILITY** ?
Total trips provided to people with disabilities

POLICY AND DESIGN FEATURES

4 **FLEET ACCESSIBILITY**
Accessible vehicles are provided

5 **TRIP FARE**
Cost of trip for people with disabilities

6 **508 COMPLIANCE**
Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.

7 **ACCESSIBILITY MARKETING**
Customers with disabilities are aware that accessible services are available as part of the service provided

8 **ACCESSIBILITY GUIDELINES**
Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)

Sustainability

OUTCOME METRIC

1 **FLEET EMISSIONS** ?
Percentage of vehicles that are zero emissions vehicles

2 **FLEET EFFICIENCY** ?
Average Vehicle fuel efficiency

3 **AVERAGE VEHICLE OCCUPANCY** ?
People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type

4 **SERVICE EMISSIONS** ?
Net increase/decrease in GHG

POLICY AND DESIGN FEATURES

5 **FLEET EMISSIONS**
Policies prioritize clean/renewable energy vehicles

Congestion

OUTCOME METRIC

1 **SERVICE VMT** ?
Net change in VMT during am peak, pm peak, and daily VMT.

2 **TRAFFIC SPEEDS** ?
Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service

POLICY AND DESIGN FEATURES

3 **CURB CONGESTION**
The service provider rather than individual users, in coordination with the City, designates access points.

4 **PEAK HOUR CONGESTION**
Service incentivizes off-peak travel whether by price or by other method.

5 **SHARED TRIPS**
Shared fare price per passenger is discounted from average solo trip price.

Accountability

OUTCOME METRIC

No outcome metrics were identified for the Accountability principle

POLICY AND DESIGN FEATURES

1 **TRIP DATA**
Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."

2 **USER DATA**
Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.

Financial Impact

OUTCOME METRIC

1 **TRANSIT COMPETITION** ?
Net change in transit revenue due to the emerging mobility service

2 **STATE OF GOOD REPAIR** ?
Service's total vehicular VMT on San Francisco Roadways

3 **STATE OF GOOD REPAIR** ?
Net marginal roadway maintenance cost due to the emerging mobility service

POLICY AND DESIGN FEATURES

4 **PERMIT FEES**
Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.

Labor

OUTCOME METRIC

1 **EMPLOYEE/CONTRACTOR EARNINGS** ?
Mobility service operator net hourly median earnings minus job-related expenses

2 **EMPLOYEE/CONTRACTOR BENEFITS** ?
Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits

POLICY AND DESIGN FEATURES

3 **FAIR PAY**
Level of transparency to service operator (employee/contractor) in hourly rate, net of job-related expenses

4 **OPPORTUNITY FOR ENTRY**
Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).

5 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES**
Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)

6 **DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES**
Company prioritizes contracting with DBEs and LBEs

7 **OPPORTUNITIES FOR ENTRY**
Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.

Collaboration

OUTCOME METRIC

No outcome metrics were identified for the collaboration principle

POLICY AND DESIGN FEATURES

1 **POINT OF CONTACT**
Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.

2 **COMMUNITY ENDORSEMENTS** ?
Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.

3 **COMMUNITY OUTREACH** ?
Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.

4 **SERVICE PILOT**
Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions

5 **SERVICE PERMIT**
A San Francisco public agency manages a permit program for this service type

6 **PROACTIVE PARTNERSHIP**
Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.

[1] Based on Uber estimated arrival times.
[3] Based on estimated trip origins and destinations for Uber and Lyft from Fall 2016, limited to trips both starting and ending in San Francisco.

Microtransit

Microtransit is a privately-operated transit service, enabled by technology, that usually operates along a dynamically generated route or a fixed route generated from crowd-sourced requests. Microtransit focuses on commuters' experience, emphasizing comfort and convenience, and offering van or shuttle service, typically at a higher price than public transit. Microtransit companies' service delivery can differ in fleet mix (buses or vans), route structure (fixed or dynamic), and, more recently, fleet ownership. Microtransit is distinguished from private shuttles (commonly known in San Francisco as "Tech Shuttles") because microtransit services are open to the public, they charge individuals instead of employers, and automate several characteristics including routing, billing, customer feedback, and reservations. Currently Chariot is the only microtransit service provider in San Francisco. Microtransit providers operating only in San Francisco are subject to SFMTA Private Transit Vehicle permit requirements. Those that operate across city lines are subject only to State regulations. Chariot has applied for a Private Transit Vehicle permit and is working with the SFMTA to conform its operations to SFMTA permit requirements.

Safety

San Francisco's lone Microtransit has reported a collision rate of 2.2 collisions per 100,000 service miles, much lower than the collision rate for all driving in San Francisco: 46 collisions per 100,000 miles.[61]

The microtransit service has implemented several policies and design features that support the Safety principle. While the service avoids in-app messaging, it does require in-app navigation, although the navigation system is touchless, and drivers log in and out while stationary. In San Francisco, all microtransit drivers receive classroom and behind-the-wheel training, and drivers are tested prior to vehicle operation. Drivers undergo Federal Motor Carrier Safety Administration/Department of Transportation-level background checks and are constantly monitored through providers' telematics systems. Drivers are provided retraining/coaching or disciplinary action when safety events are noted. Microtransit services uses the DMV Record of Duty Service log which limits drive time to a maximum of 10 hours a day with 8-hour break in between service periods. Finally, customer service is available during hours of operation, but not 24 hours a day.

Transit

While microtransit companies are permitted by the SFMTA and required to submit trip data and aggregated user statistics, additional analysis of this data is necessary to determine whether, or to what extent, microtransit aligns with the Transit principle. The sole microtransit provider in San Francisco operates crowd-sourced transit routes in the city. Many of these routes overlap with existing Muni bus line service, which is an area of concern.

The San Francisco microtransit provider has not implemented policies or design features that support the Transit principle. There are no discounted fares to transit hubs nor is there in-app information on public transit connections or alternatives.

Equitable Access

The Transportation Authority industry surveys demonstrate that 5% of user signups are from Communities of Concern. Access times from Communities of Concern are typically 36% longer than trips that do not originate in Communities of Concern, with an expected wait time of 30 minutes, compared to 22 minutes. While microtransit companies are required to submit trip data to the SFMTA, this permit was only recently established, so data are not available yet. Once the data becomes available, analysis will be required to calculate the percentage and number of trips provided to or from Communities of Concern.

Microtransit has policies and design features related to the Equitable Access principle that are mixed. Microtransit does not offer low-income fare products, and their smartphone application and website are only offered in English. This service does offer low-tech options for booking through the phone, and callers can also set up recurring service pickups. Microtransit users can pay for rides with credit, debit, or pre-tax commuter benefits. Microtransit does provide routes that serve small areas in Communities of Concern south of Cesar Chavez, Taraval, and in Bernal Heights neighborhoods. However they do not provide service during late night periods between 9 p.m. and 5 a.m. or weekends.

Disabled Access

Microtransit companies have not provided sufficient data to evaluate whether, or to what extent, they align with the Disabled Access principle along all identified metrics. While required to report trip and user data to the SFMTA, this data does not include statistics regarding access by disabled users. The percentage of users with a disability is not known, nor is the number of trips provided to people with disabilities. San Francisco's sole microtransit company has reported an expected wait time of 24 minutes for a user requesting an accessible vehicle, compared to 22 minutes for a non-accessible vehicle.

Microtransit services have implemented all but one of the

61 2015 OTS Rankings. California Office of Traffic and Safety. https://www.ots.ca.gov/Media_and_Research/Rankings/default.asp.

identified policies and design features that support the Disabled Access principle. Wheelchair-accessible vans comprise 5% of the fleet, and rides in these vehicles are priced the same as in non-accessible vehicles. On the other hand, microtransit services do not offer fully accessible, 508-compliant web technologies to persons with disabilities. However, their website does provide clear information on how to use the accessible services and features, and drivers are trained to provide accessible services for passengers with disabilities.

Sustainability

Microtransit operating in San Francisco is comprised of no zero-emissions vehicles; all are gasoline-powered, with an average fuel efficiency of 18 miles per gallon. While any microtransit company in San Francisco is required to provide trip data to the SFMTA, additional analysis is required to evaluate the net effect of these services on average vehicle occupancy and greenhouse gas emissions (GHG).

Microtransit service representatives have committed to having an electric fleet by 2019.[62]

62 Monica Nickelsburg, "Chariot wants to launch public mini-bus commuting service in Seattle early next year, with 100K riders and electrification by 2019," *Geek Wire*, November 21, 2017, *https://www.geekwire.com/2017/chariot-wants-launch-public-mini-bus-commuting-service-seattle-early-next-year-100k-riders-electrification-2019/*

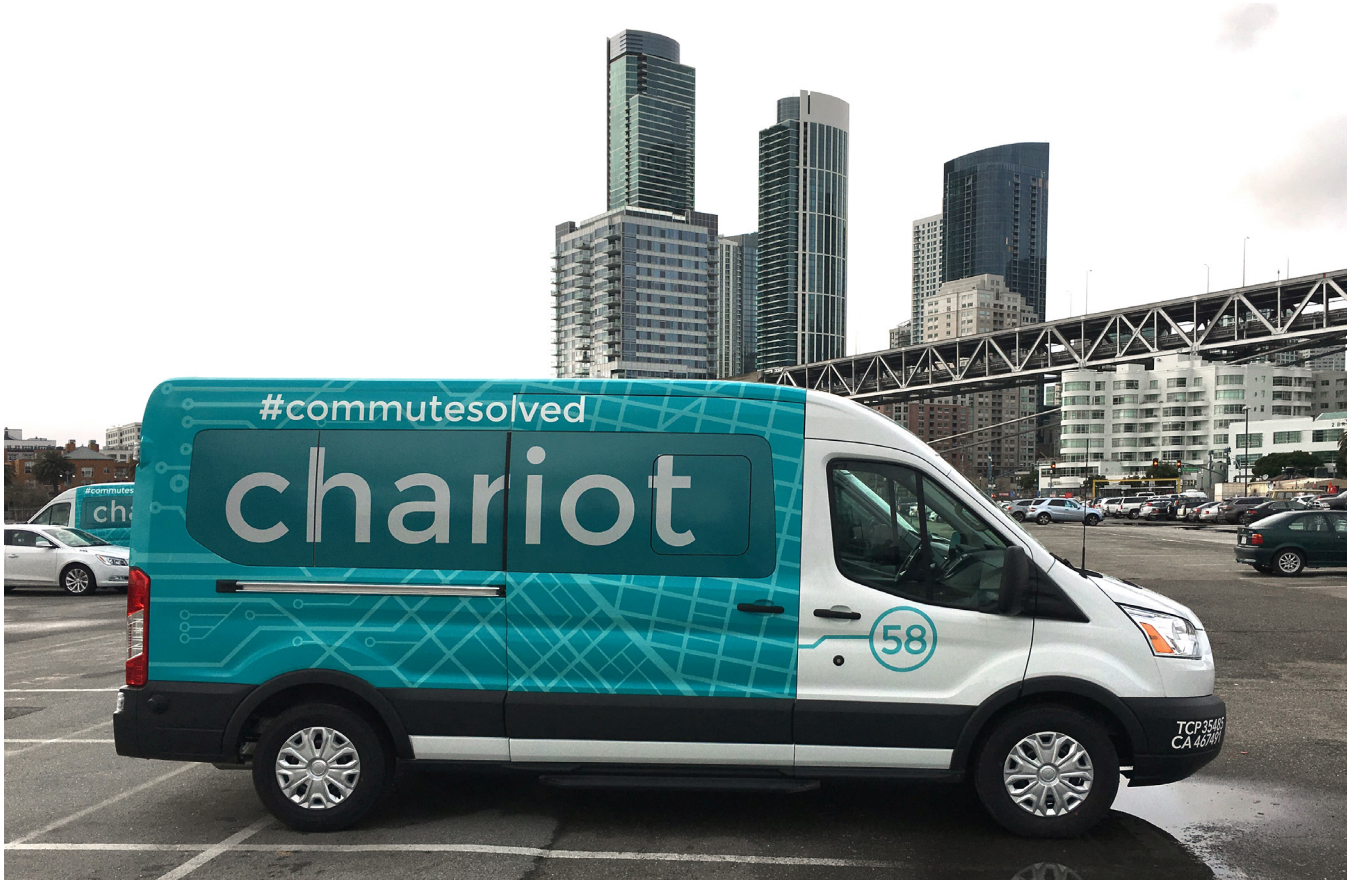
Congestion

While San Francisco's microtransit company is required to provide trip data to the SFMTA, additional analysis is required to evaluate the net effect of microtransit on system VMT and traffic speeds.

Microtransit has policies and design features that are mixed in their support of the Congestion principle. Microtransit obtains white and yellow curb location data from the SFMTA and works with local businesses to determine pickup and drop off locations. According to SFMTA, approximately 20% of microtransit stops are located in unauthorized locations. As part of the permitting process, the SFMTA is working with the operator to relocate those stops and bring them into compliance with parking and traffic laws. Microtransit offers discounted tickets for users using the service during off-peak times.

Accountability

The SFMTA's private transit vehicles permit requires Microtransit providers under the SFMTA's jurisdiction to transmit real-time GPS location data to City servers from all vehicles in service in San Francisco, including data on stop behavior and vehicle characteristics. The data they would provide con-



stitutes trip data for their vehicles only, not individual trip data. Additionally, this does not include user demographic information.

Labor

San Francisco's sole microtransit company reported net earnings of $20 per hour for drivers and covers all job-related expenses. Their drivers are classified as employees and are represented by the Teamsters Union Local 665.[63] While the net value of benefits is not known, the company offers their drivers medical, dental, and commuter benefits.

The microtransit company has implemented some, but not all, of the policies and design features that support the Labor principle. They provide transparent wage rates to their drivers. They actively encourage women, people of color, and people with disabilities to apply for positions. On the other hand, they are not registered as a Disadvantaged Business Enterprises or Local Business Enterprises nor do they prioritize contracting with them. The only microtransit service in San Francisco has, however, applied for certification as a LBE. Finally, microtransit does require specific levels of educational attainment for some, but not all, positions.

Financial Impact

While microtransit companies are required to report trip data to the SFMTA, additional analysis is required to determine whether, or to what extent, microtransit is aligned with the Financial Impact principle.

Microtransit providers under SFMTA jurisdiction must pay a permit fee of up to $250,000 per year depending on the size of the company's fleet, with fee revenues covering administration and enforcement of the program. Additionally, microtransit companies providing private shuttle services in San Francisco must pay fees to the California Public Utilities Commission for Transportation Company Provider (TCP) licensed services.

Collaboration

San Francisco's microtransit provider has implemented all but one of the identified policy and design features that support the Collaboration principle. They have identified a person-of-contact for City staff. They have received endorsements from members of the San Francisco Board of Supervisors, and, although they do not currently conduct outreach to Communities of Concern, neighborhood groups, advocacy groups, or other City stakeholders, they have begun to work directly with San Francisco City Supervisors to create service plans for low-income communities. They have reached out to City staff to resolved potential issues prior to launching service. Lastly, Chariot is working to receive Private Transit Vehicle license and in the process is working with the SFMTA to adjust its routes and stop locations to conform to the SFMTA's permit requirements.

63 International Brotherhood of Teamsters. "San Francisco's Chariot Drivers Join Teamsters Union, May 2, 2017. https://teamster.org/news/2017/05/san-franciscos-chariot-drivers-join-teamsters-union

Table 17: Microtransit Evaluation Results

Evaluation Results Summary Table Legend

- **OUTCOME METRICS:** How do Emerging Mobility Services align with the Guiding Principles?
- **POLICY AND DESIGN FEATURES:** How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?
- All evaluated companies have implemented this policy or design feature
- Some companies have implemented this policy or design feature
- No company has implemented this policy or design feature
- There is insufficient data
- Question does not apply to a particular type of emerging mobility service

Safety

OUTCOME METRIC

1	**OPERATIONAL SAFETY** Number of collisions per 100,000 service miles	2.2

POLICY AND DESIGN FEATURES

2	**OPERATIONAL SAFETY** Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)	🟢
3	**OPERATIONAL SAFETY** Safety training is required and tested	🟢
4	**OPERATIONAL SAFETY** Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log	🟢
5	**UNSAFE DRIVING PENALTIES** Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action	🟢
6	**PERSONAL SECURITY** Service requires background checks of operators	🟢
7	**PERSONAL SECURITY** Service provides 24-hour service with a human response in a timely manner	🔴

Transit

OUTCOME METRIC

1	**TRANSIT COMPETITION** Percentage of trips shifted to and from transit to emerging mobility service	?
2	**FIRST AND LAST MILE** Total trips provided to transit stations, and as a share of all trips	?

POLICY AND DESIGN FEATURES

4	**TRANSIT DISCOUNTS** Service provides discounted fares to transit hubs	🔴
5	**TRANSIT CONNECTIONS** Service provides in-app information on public transit connections or alternatives	🔴

Equitable Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who are defined as low-income (compared with general population)	?
2	**ACCESS TIME** Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)	30 min (22 min)
3	**INCREASING ACCESS AND MOBILITY** Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)	?

POLICY AND DESIGN FEATURES

3	**FARE PRODUCTS** Availability of low-income fare Products	🔴
4	**MULTI-LANGUAGE SUPPORT** Service offered in multiple languages	🔴
5	**PAYMENT INSTRUMENT** Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)	🟢
6	**PAYMENT METHOD** Service accepts alternative methods to pay besides credit/debit card	🟢
7	**INCREASING ACCESS AND MOBILITY** Availability of service on weekends	🔴
8	**INCREASING ACCESS AND MOBILITY** Availability of Service in underserved areas	🟢
	INCREASING ACCESS AND MOBILITY Availability of service between 9p.m. and 5a.m.	🔴

Disabled Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who identify as people with disabilities	?
2	**ACCESS TIME** Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips	24 min (22 min)[1]
3	**INCREASING ACCESS AND MOBILITY** Total trips provided to people with disabilities	?

POLICY AND DESIGN FEATURES

4	**FLEET ACCESSIBILITY** Accessible vehicles are provided	🟢
5	**TRIP FARE** Cost of trip for people with disabilities	🟢
6	**508 COMPLIANCE** Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.	🔴
7	**ACCESSIBILITY MARKETING** Customers with disabilities are aware that accessible services are available as part of the service provided	🟢
8	**ACCESSIBILITY GUIDELINES** Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)	🟢

Sustainability

OUTCOME METRIC

1	**FLEET EMISSIONS** Percentage of vehicles that are zero emissions vehicles	0%
2	**FLEET EFFICIENCY** Average Vehicle fuel efficiency	18 MPG
3	**AVERAGE VEHICLE OCCUPANCY** People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type	?
4	**SERVICE EMISSIONS** Net increase/decrease in GHG	?

POLICY AND DESIGN FEATURES

5	**FLEET EMISSIONS** Policies prioritize clean/ renewable energy vehicles	🟢

Congestion

OUTCOME METRIC

1	**SERVICE VMT** Net change in VMT during am peak, pm peak, and daily VMT.	?
2	**TRAFFIC SPEEDS** Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service	?

POLICY AND DESIGN FEATURES

3	**CURB CONGESTION** The service provider rather than individual users, in coordination with the City, designates access points.	🟢
4	**PEAK HOUR CONGESTION** Service incentivizes off-peak travel whether by price or by other method.	🟢
5	**SHARED TRIPS** Shared fare price per passenger is discounted from average solo trip price.	⊘

Accountability

OUTCOME METRIC

No outcome metrics were identified for the Accountability principle

POLICY AND DESIGN FEATURES

1	**TRIP DATA** Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."	🟢
2	**USER DATA** Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.	🟢

Financial Impact

OUTCOME METRIC

1	**TRANSIT COMPETITION** Net change in transit revenue due to the emerging mobility service	?
2	**STATE OF GOOD REPAIR** Service's total vehicular VMT on San Francisco Roadways	?
3	**STATE OF GOOD REPAIR** Net marginal roadway maintenance cost due to the emerging mobility service	?

POLICY AND DESIGN FEATURES

4	**PERMIT FEES** Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.	🟢

Labor

OUTCOME METRIC

1	**EMPLOYEE/CONTRACTOR EARNINGS** Mobility service operator net hourly median earnings minus job-related expenses	$20
2	**EMPLOYEE/CONTRACTOR BENEFITS** Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits	?

POLICY AND DESIGN FEATURES

3	**FAIR PAY** Level of transparency to service operator (employee/ contractor) in hourly rate, net of job-related expenses	🟢
4	**OPPORTUNITY FOR ENTRY** Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).	🟢
5	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)	🔴
6	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company prioritizes contracting with DBEs and LBEs	🔴
7	**OPPORTUNITIES FOR ENTRY** Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.	🟢

Collaboration

OUTCOME METRIC

No outcome metrics were identified for the collaboration principle

POLICY AND DESIGN FEATURES

1	**POINT OF CONTACT** Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.	🟢
2	**COMMUNITY ENDORSEMENTS** Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.	🟢
3	**COMMUNITY OUTREACH** Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.	?
4	**SERVICE PILOT** Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions	🔴
5	**SERVICE PERMIT** A San Francisco public agency manages a permit program for this service type	🟢
6	**PROACTIVE PARTNERSHIP** Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.	🟢

[1] Based on Chariot stop locations. Does not consider wait time

Courier Network Services

Courier Network Services are companies that operate an application-based platform to provide immediate delivery to customers using couriers who may make deliveries by motor vehicle, bicycle, on foot, or by other mode. These couriers are on-demand local delivery contractors.

Safety

Courier network service have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Safety principle.

Courier network services have implemented few policies and design features to support the Safety. Only one company is known to avoid in-app messaging and navigation. No courier network service company provides or requires safety training. Similarly, none limit hours of service or coordinate service hours with other services or the Department of Motor Vehicles (DMV). None regularly check driving records or penalize traffic citations. Courier network services do not conduct driver background checks. Finally, customers have access to 24-hour customer service lines.

Transit

Courier network service companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Transit principle. Most of the transit metrics and policy and design features are not applicable to courier services, such as providing discounted fares to transit hubs.

Equitable Access

Courier network service companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Equitable Access principle.

Courier network service companies have implemented policies and design features with mixed implications for the Equitable Access principle. None provide discounted products for low-income users. None provide multi-language smartphone applications or websites, nor do any offer payment or ordering alternatives for users without access to a smartphone or the Internet. Only one provider allows cash payment or any other alternative to debit and credit cards. On the other hand, courier network services are available on weekends, during late night hours, and south of Cesar Chavez and Taraval neighborhoods.

Disabled Access

Courier network service companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Disabled Access principle.

Courier network services have implemented policies and design features with mixed implications for Disabled Access. Orders placed by disabled users are priced the same as orders placed by non-disabled users. However, the services' smartphone applications and websites are not 508-compliant or screen-reader compatible, and they do not provide clear information for users with disabilities. Some Courier Network Services are being challenged in court over lack of web and app accessibility for the visually impaired.[64]

Sustainability

Courier network service companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Sustainability principle.

Courier network service provider Postmates has committed to reducing emissions by partnering with electric scooter and e-bike provider GenZe to provide their delivery contractors with E-bikes in San Francisco. No other courier network companies prioritize clean or renewable energy vehicles.[65] Some companies partner with Scoot to provide discounted membership to delivery drivers.

Congestion

Courier network service companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Congestion principle.

Courier network companies have not implemented any policies or design features that support the Congestion principle.

Accountability

Courier network services have not implemented any policies or design features that support the Accountability principle.

Labor

Courier network service companies have not provided sufficient data to evaluate whether, or to what extent, they are ' aligned with the Labor principle. Courier network services classify all drivers as contractors who do not receive benefits. Wage transparency has come under scrutiny for some ser-

64 Jessica Lipscomb, "Disability Advocates Say Postmates, Grubhub Websites Discriminate Against Blind People," *Miami New Times*, August 31, 2017, http://www.miaminewtimes.com/news/postmates-grubhub-sued-for-discriminating-against-blind-people-9632291.

65 Introducing Our First Ever Zero-Emissions Electric Transportation Initiative. Postmates, July 17, 2017. https://blog.postmates.com/introducing-our-first-ever-zero-emissions-electric-transportation-initiative-65f107af32cc

vices, though the average wage of contractors is unknown.[66]

Courier network service companies have widely varied policies and design features related to the Labor principle. None are known to provide transparent wage information to their contractors. Only one is known to actively encourage women, people of color, and people with disabilities to apply for jobs. None are Disadvantaged Business Enterprise or Local Business Enterprises, nor do they prioritize contracting with them. Finally, some set specific educational attainment requirements in their hiring process, but not all do.

Financial Impact

Courier network service companies have not provided sufficient data to evaluate whether, or to what extent, they are aligned with the Financial Impact principle.

Courier Network Services currently pay no permit fee to the City of San Francisco, though most goods purchased on these platforms are subject to San Francisco sales tax.

Collaboration

Courier network service companies have not implemented any policy or design features that support the Collaboration principle

Sidewalk Robot Regulation

Courier Network Service companies have partnered with sidewalk robot technology companies to provide delivery services. However, sidewalk robot technology has drawn concern from the San Francisco Board of Supervisors and San Francisco pedestrian safety advocates. The Board of Supervisors has directed the San Francisco Department of Public Works to develop testing permits for sidewalk robots to determine their impacts on pedestrian safety and congestion. During the testing period, San Francisco's two sidewalk robot companies, Starship and Marble, will be limited to a total of 9 robots to test on San Francisco sidewalks. Those robots will be limited to San Francisco's Production, Distribution and Repair (PDR) areas, located primarily in the eastern area of the city. Following the testing period, the Department of Public Works will determine future regulatory permitting structures. While these testing and operating restrictions apply to rights-of-way governed by DPW and the SFMTA, they do not apply to private roadways and sidewalks such as corporate campuses and educational institutions.

66 Jason Del Rey, "Instacart will pay $4.6 million to settle a class action lawsuit with its workers: The startup also has to change how it describes a controversial service fee," *Recode*, March 23, 2017,

https://www.recode.net/2017/3/23/14804094/instacart-settlement-class-action-lawsuit-workers

Table 18: Courier Network Services Evaluation Results

Evaluation Results Summary Table Legend

- **OUTCOME METRICS:** How do Emerging Mobility Services align with the Guiding Principles?
- **POLICY AND DESIGN FEATURES:** How to Emerging Mobility policies and design features contribute to the outcomes identified in the Guiding Principles?
- All evaluated companies have implemented this policy or design feature
- Some companies have implemented this policy or design feature
- No company has implemented this policy or design feature
- There is insufficient data
- Question does not apply to a particular type of emerging mobility service

Safety

OUTCOME METRIC

1	**OPERATIONAL SAFETY** Number of collisions per 100,000 service miles	?

POLICY AND DESIGN FEATURES

2	**OPERATIONAL SAFETY** Service avoids in-app messaging and navigation during vehicle operation (during revenue and non-revenue hours)	
3	**OPERATIONAL SAFETY** Safety training is required and tested	
4	**OPERATIONAL SAFETY** Service has hours of service program for both revenue and non-revenue hours and/or checks DMV Record Duty of Service log	
5	**UNSAFE DRIVING PENALTIES** Service penalizes user for speeding, traffic tickets, blocking bicycle and pedestrian facilities, DUIs, reckless driver complaints, and leads to corrective action	
6	**PERSONAL SECURITY** Service requires background checks of operators	
7	**PERSONAL SECURITY** Service provides 24-hour service with a human response in a timely manner	

Transit

OUTCOME METRIC

1	**TRANSIT COMPETITION** Percentage of trips shifted to and from transit to emerging mobility service	?
2	**FIRST AND LAST MILE** Total trips provided to transit stations, and as a share of all trips	⊘

POLICY AND DESIGN FEATURES

4	**TRANSIT DISCOUNTS** Service provides discounted fares to transit hubs	⊘
5	**TRANSIT CONNECTIONS** Service provides in-app information on public transit connections or alternatives	⊘

Equitable Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who are defined as low-income (compared with general population)	?
2	**ACCESS TIME** Average access times for trips originating from Communities of Concern (average access time for trips not originating in a Community of Concern)	?
3	**INCREASING ACCESS AND MOBILITY** Percentage of trips provided to and from Communities of Concern (compared with all vehicle trips)	?

POLICY AND DESIGN FEATURES

3	**FARE PRODUCTS** Availability of low-income fare Products	
4	**MULTI-LANGUAGE SUPPORT** Service offered in multiple languages	
5	**PAYMENT INSTRUMENT** Number of alternative payment instruments to pay for service (e.g. via web, mobile application, kiosk etc.)	
6	**PAYMENT METHOD** Service accepts alternative methods to pay besides credit/debit card	
7	**INCREASING ACCESS AND MOBILITY** Availability of service on weekends	
8	**INCREASING ACCESS AND MOBILITY** Availability of Service in underserved areas	
	INCREASING ACCESS AND MOBILITY Availability of service between 9p.m. and 5a.m.	

Disabled Access

OUTCOME METRIC

1	**USER STATISTICS** Percentage of service users who identify as people with disabilities	?
2	**ACCESS TIME** Average access times for trips using accessible vehicles, compared to average access times for all San Francisco trips	?
3	**INCREASING ACCESS AND MOBILITY** Total trips provided to people with disabilities	?

POLICY AND DESIGN FEATURES

4	**FLEET ACCESSIBILITY** Accessible vehicles are provided	⊘
5	**TRIP FARE** Cost of trip for people with disabilities	
6	**508 COMPLIANCE** Mobile apps and other customer interface technology fully accessible to persons with disabilities (508 compliant and accessible to screen readers); mobile app provides clear information on how to use the accessible services and features; have low-tech options for those without access to computer or mobile phone.	
7	**ACCESSIBILITY MARKETING** Customers with disabilities are aware that accessible services are available as part of the service provided	
8	**ACCESSIBILITY GUIDELINES** Entity has guidelines for employees/contractors on procedures for providing accessible services (Standard Operating Procedure for pick up/drop off and securement procedures, accommodating attendants, medical equipment, service animals, employee training, etc.)	?

Sustainability

OUTCOME METRIC

1	**FLEET EMISSIONS** Percentage of vehicles that are zero emissions vehicles	?
2	**FLEET EFFICIENCY** Average Vehicle fuel efficiency	?
3	**AVERAGE VEHICLE OCCUPANCY** People miles traveled (PMT) divided by vehicle miles traveled (VMT) for the service type	⊘
4	**SERVICE EMISSIONS** Net increase/decrease in GHG	?

POLICY AND DESIGN FEATURES

5	**FLEET EMISSIONS** Policies prioritize clean/ renewable energy vehicles	

Accountability

OUTCOME METRIC

No outcome metrics were identified for the Accountability principle

POLICY AND DESIGN FEATURES

1	**TRIP DATA** Provide extensive trip data on a recurring basis to help support public agencies permitting and transportation network management efforts, based on NACTO's definition of "Better Data for Transportation Planning."	
2	**USER DATA** Provide extensive user demographics data on a recurring basis, including age, ethnicity, residential location by zip code, ability, and socioeconomics per SFMTA Travel Decision Survey.	

Labor

OUTCOME METRIC

1	**EMPLOYEE/CONTRACTOR EARNINGS** Mobility service operator net hourly median earnings minus job-related expenses	?
2	**EMPLOYEE/CONTRACTOR BENEFITS** Net value of mobility service operator (whether employees and/or contractors) benefits, including medical, dental, and retirement benefits	?

POLICY AND DESIGN FEATURES

3	**FAIR PAY** Level of transparency to service operator (employee/ contractor) in hourly rate, net of job-related expenses	
4	**OPPORTUNITY FOR ENTRY** Hiring policy statement encourages women, people of color, and people with disabilities to apply (permanent employees and contractors).	
5	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company is a registered Disadvantaged Business Enterprise (DBE) or Local Business Enterprise (LBE)	
6	**DISADVANTAGED BUSINESS ENTERPRISES AND LOCAL BUSINESS ENTERPRISES** Company prioritizes contracting with DBEs and LBEs	
7	**OPPORTUNITIES FOR ENTRY** Hiring process does not use non job-related characteristics, including educational attainment, as a barrier to employment.	

Collaboration

OUTCOME METRIC

No outcome metrics were identified for the collaboration principle

POLICY AND DESIGN FEATURES

1	**POINT OF CONTACT** Identify person of contact for city, work with city before launching service on public right-of-way, respond to city within 1-2 business days, and support city special events by adapting to street closures.	
2	**COMMUNITY ENDORSEMENTS** Has endorsements from Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders. Endorsements should come in form of written letters.	
3	**COMMUNITY OUTREACH** Conduct outreach and marketing to Communities of Concern, neighborhood groups, advocacy groups, and other city stakeholders.	
4	**SERVICE PILOT** Service provider has conducted a pilot project with San Francisco public agencies and provided evaluation data adequate to draw research conclusions	
5	**SERVICE PERMIT** A San Francisco public agency manages a permit program for this service type	
6	**PROACTIVE PARTNERSHIP** Company has reached out to the San Francisco public agencies and resolved service misalignments prior to initiating service in San Francisco.	

Congestion

OUTCOME METRIC

1	**SERVICE VMT** Net change in VMT during am peak, pm peak, and daily VMT.	?
2	**TRAFFIC SPEEDS** Net change in speeds due to this emerging mobility service, OR net change in vehicle delay due to this emerging mobility service	?

POLICY AND DESIGN FEATURES

3	**CURB CONGESTION** The service provider rather than individual users, in coordination with the City, designates access points.	
4	**PEAK HOUR CONGESTION** Service incentivizes off-peak travel whether by price or by other method.	
5	**SHARED TRIPS** Shared fare price per passenger is discounted from average solo trip price.	⊘

Financial Impact

OUTCOME METRIC

1	**TRANSIT COMPETITION** Net change in transit revenue due to the emerging mobility service	?
2	**STATE OF GOOD REPAIR** Service's total vehicular VMT on San Francisco Roadways	?
3	**STATE OF GOOD REPAIR** Net marginal roadway maintenance cost due to the emerging mobility service	?

POLICY AND DESIGN FEATURES

4	**PERMIT FEES** Service pays permit fee to city agency that recovers enforcement, maintenance, and other costs to the city.	

6. RECOMMENDATIONS

Evaluation results summary

1. Pilots and permits lead to better performance

Companies that have performed pilots with San Francisco public agencies have provided data and experience that has informed development of permit systems for those mobility types. The resulting permit systems for bike share, scooter share, and microtransit have guided these mobility types to be more aligned with the Guiding Principles. There are opportunities to strengthen and harmonize the various permit programs. In addition, the City does not yet have a standardized process to proactively conduct pilots and incorporate innovative service types and new companies into the city's permitting and planning systems.

2. Inadequate data

The city does not have adequate data from enough emerging mobility companies to fully evaluate how well emerging mobility services are aligned with our Guiding Principles. Other researchers have produced important studies and findings about some emerging mobility services, but more traveler trip data and surveys are needed to characterize SF travel markets and individual traveler choices.

3. Opportunities for equitable access

Many emerging mobility services are available during late-night hours, on weekends, and/or in areas less well covered by public transit. This may provide opportunities to increase mobility for people with disabilities and increase access for people underserved by public transit.

4. Conflicts with public transit

San Francisco is a Transit-First city, but inadequate data means we do not have comprehensive information on how the emerging mobility sector is impacting transit ridership or our capital investments. While some services play a useful first/last-mile connection role, no emerging mobility companies have implemented design features or policies that our methodology identified as directly supportive of transit.

5. Impacts on safety

With the exception of Microtransit providers, operator training is inconsistent among emerging mobility services; almost no providers test operators following training. As a consequence, many services may exhibit roadway conflicts at curbs, in transit-priority lanes and on sidewalks -- all of which may have significant impacts, particularly on vulnerable roadways users. Additionally, many emerging mobility services may contribute to distracted driving, which also decreases roadway safety.

6. Impacts on congestion

Because we have inadequate data, we do not fully understand how this sector is impacting travel mode choice behavior and congestion. We do know that many emerging mobility services rely on city rights-of-way and curbs. The city and the emerging mobility companies have not consistently coordinated to develop a robust curb management approach. Other researchers have found mixed impacts. For ride-hailing in particular, our TNCs Today study found that ride-hail vehicles in San Francisco are concentrated during times of day and neighborhoods of the city where traffic is most congested. A UC Davis study found that adoption of ride-hailing is likely to result in a net increase in vehicle miles traveled due to competition with public transit. Other studies have found that users of other mobility services chose to drive personal vehicles less frequently.

Recommendations Summary

The Transportation Authority has developed the following recommendations based on the results identified in Chapters 4 and 5. Based on these evaluation results, we believe the greatest priority for the Transportation Authority is to pursue the following:

1. Partner: Proactively Partner

2. Measure: Collect Emerging Mobility Data and Conduct Research

3. Regulate: Regulate and Recover Costs

4. Bridge: Bridge Mobility and Access Gaps

5. Prioritize: Support and Prioritize Public Transit

6. Enforce: Enforce Safe Streets

7. Price: Manage Congestion on City Roadways and at Curbs

The following pages provide detailed policy recommendations, strategies, research and pilots to be coordinated within each of the listed priority recommendations. Appendix 1, 2, and 3 identified additional potential policies, next steps, research and pilots that could be conducted.

RECOMMENDATION 1: PARTNER

Proactively Parter

The SFMTA and the Transportation Authority should develop a framework for emerging mobility pilots that considers this study's evaluation results and encourages the city to proactively partner with companies to develop innovative solutions to address unmet city transportation needs. This framework should consider partnerships with transportation companies, employers, developers, and civic and neighborhood organizations.

Develop a Framework for Emerging Mobility Pilots

The Transportation Authority and the SFMTA in coordination with other San Francisco Public Agencies, could develop an unsolicited request for proposals (RFP) based on this study's evaluation results. The RFP could encourage emerging mobility companies and the city to partner and pilot innovative programs that continue existing success where both the city and the companies align and improve outcomes where there is misalignment. The goal of the RFP would be to develop a list of culled pilot ideas in advance of potential grant opportunities. The RFP would also serve as an opportunity for the emerging mobility companies to approach the city with ideas prior to launching new services.

Establish a Public-Private Emerging Mobility Task Force

These emerging mobility services and technologies studies set a precedent for a collaborative approach between agency partners, city representatives, advocates and emerging mobility companies. The City should create an emerging mobility task force to continue that collaborative spirit. The task force should engage in community outreach on emerging mobility services and technologies. Finally, this task force should develop pilots that test innovative approaches to mitigating impacts from emerging mobility services and technologies.

Pilot Mobility as a Service Application

The Transportation Authority and the SFMTA should pilot opportunities to aggregate transit and emerging mobility service information into a mobile application to provide a more seamless travel experience. This pilot application could coordinate with incentives and discount programs. Results of this pilot should inform future research and transit incentives programs. The SFMTA should also upgrade the Muni Transit Rider mobile application to provide discounts to users who allow mobile tracking and travel diary surveying. The upgraded mobile application should also allow mobile application users to groundtruth bus time arrivals and bus tracking to better inform bus riders of bus schedules.

RECOMMENDATION 2: MEASURE

Collect Emerging Mobility Data and Conduct Research

San Francisco public agencies should develop a data reporting and warehouse strategy to coordinate and consolidate existing data streams. Additionally, the city should employ a travel decision study to understand travel behavior. Such a study could be combined with a mobile application pilot that studies traveler choices and factors that inform them.

Develop a Data Reporting and Data Warehouse Strategy

Emerging mobility companies regularly collect data throughout San Francisco about trip patterns, infrastructure conditions, and travel speeds, among many other issues. San Francisco public agencies are data driven and rely on up to date data to inform policy and planning decisions. San Francisco agencies should coordinate to develop a complete list of data needs and collaborate with emerging mobility companies to share existing data and collect new service data.

Conduct a Travel Decision and Behavior Study

The city should initiate a travel decisions survey that includes emerging mobility services. The survey should prompt users to identify their preferred mobility options based on context areas such as time of day, distance of trip, and purpose of trip. The travel decisions survey should also consider demand for future transportation-related technologies including electrical vehicles, charging infrastructure and autonomous vehicles. Alongside this effort, the Transportation Authority should continue to monitor academic research on autonomous vehicles as it relates to trip decisions, congestion, and projected impacts on vehicle miles traveled. Results from this effort should be coordinated with the San Francisco Planning Department and SFMTA to determine adjustments to land use and development standards, parking policies, and transportation demand management programs. Results of this study may also influence updates to the Transportation Authority's SFCHAMP model.

Pilot Mobility as a Service Application

The Transportation Authority and the SFMTA should pilot opportunities to aggregate transit and emerging mobility service information into a mobile application to provide a more seamless travel experience. This pilot application could coordinate with incentives and discount programs. Results of this pilot could inform future research, transit incentives programs, and updates to the Muni mobile application. The SFMTA should also upgrade the Muni Transit Rider mobile application to provide discounts to users who allow mobile tracking and travel diary surveying. The upgraded mobile application should also allow mobile application users to verify bus time arrivals and bus tracking against estimated data to better inform bus riders of bus schedules.

Pilot a 3rd Party Data Collaborative

MTC, the Transportation Authority and the SFMTA could pilot a third-party data collaborative. Public agencies should identify what research questions they have and should share them with a non-governmental, third-party research institution. Private emerging mobility companies would share data with the third-party researchers. Together, the researchers could answer key questions for San Francisco public agencies without disclosing company-specific information.

RECOMMENDATION 3: REGULATE

Regulate and Recover Costs

The SFMTA should harmonize existing permit programs related to emerging mobility and create a framework for new services. The emerging mobility permit program should administer a permit fee that considers the full cost to plan for and regulate these services. Similarly, the city should seek regulatory and/or impact fees to mitigate effects these services have on safety, city resources and investments, as warranted by research studies. The permit must also require a standard set of data necessary to conduct ongoing evaluation of these services and include standards for equitable provision of services to underserved areas and to people with disabilities.

Harmonize existing permits and develop emerging mobility service permit framework

The SFMTA should harmonize existing mobility service permits that apply to carsharing, bikesharing and microtransit to make them consistent regarding data collection and management strategies. Furthermore, the SFMTA should create a framework for other existing emerging and future mobility services, such as a "Emerging Mobility Service Permit," that considers the Guiding Principles and evaluation results for that service. Where possible, the City should require standardized data reporting across all permit types to enable the city to compare emerging mobility service impacts. This regulatory permitting system should also consider ways to reduce congestion on city curbs and rights-of-way; fleet management and reductions in greenhouse gas emissions; address access for various communities; and mandate data sharing to improve the city's planning efforts.

As part of developing the emerging mobility permit, the SFMTA should conduct a cost recovery study to calculate the true cost of local maintenance, planning and enforcement of the emerging mobility sector. Results of this cost recovery study will inform the permit fee associated with the emerging mobility permit.

Develop and Implement Emerging Mobility Impact Fee

The City could implement an emerging mobility impact fee to mitigate the negative impacts of emerging mobility services and technologies, as identified by the Guiding Principles. The impact fee could be assessed at varying levels and may use different mechanisms depending on the type of service, such as a per-trip, per-mile impact fee or an annual impact fee. A nexus study should examine how various emerging mobility services impact public infrastructure, transit fare revenues, the taxi industry as a paratransit provider, congestion and curb demand, total VMT and greenhouse gas emissions, and any other factors contributing to San Francisco's economic, social, and environmental goals. The impact fee could potentially be structured to include discounts to

On-Street Shared Vehicle Parking Permit Program

The SFMTA's off- and on-street car share parking permit programs have contributed to enhanced access to car sharing in San Francisco. However, the On-Street Shared Vehicle Parking Permit Program has many intrinsic costs and constraints that are becoming increasingly evident. Because it relies on designated restricted-use parking spaces, the on-street (A-to-A car share) program is expensive and cumbersome to operate and difficult to scale and adapt. Permitted parking space proposals take months for review, outreach, hearings and legislative approval; approved spaces take multiple months to mark and sign and activate; event and construction closures take designated parking spaces offline unpredictably (shared vehicles are often towed without warning, at significant expense and loss of reliability to operators and service users); designated spaces are targets for vandalism and require further material and labor costs, along with routine maintenance. When a given on-street shared vehicle is well utilized, its designated parking space is empty much of the time, and unusable for all other purposes (whether general parking or loading or any other use). Permit fees rise to recover increasing administrative costs for fewer parking spaces, presenting further limitations to growth and agility and making the program less productive in providing reliable affordable alternatives to car ownership.

Agency costs to facilitate one-way car share services (such as Gig and car2go) are significantly lower, without most of the expenses required by round-trip, A-to-A services; one-way sharing services are also much more agile and scalable by definition, while providing similar benefits to users and society. If San Francisco intends to remain committed to encouraging and facilitating car sharing, as a tool to reduce VMT and household transportation expenses, it should examine and account for the respective costs and benefits of A-to-A and one-way car sharing.

clean energy fleets, high-occupancy vehicles, vehicles accessible to people with disabilities, or other policy and design features that contribute to meeting the Guiding Principles. Funds levied from the emerging mobility impact fee could be used in several ways, all of which would have a nexus with the impacts of emerging mobility services and technology. Revenues could be directed to an accessibility fund for projects that improve mobility for people with different mobility needs. Funds generated could be used to conduct community outreach and develop emerging mobility pilots. And funds could also be used to make improvements to city infrastructure and public transit to mitigate potential impacts on the city's streets and transit revenues, and improve access for Communities of Concern. For some emerging mobility services, state authorizing legislation would be required before San Francisco could implement this recommendation.

Develop and Implement an Emerging Mobility Business Tax

Emerging mobility companies could be grouped into a new category for gross receipts tax collection purposes, and tax rates could be adjusted to a rate that is commensurate with their overall business activities. For some emerging mobility services, state authorizing legislation would be required before San Francisco could implement this recommendation.

San Francisco Business Taxes

Under existing law, all persons or companies engaging in business activities in San Francisco must pay taxes in the form of a payroll tax and a gross receipts tax. San Francisco is currently in the process of phasing out the payroll tax and phasing in the gross receipts tax as a replacement. The rate of the gross receipts tax is based on the business industry category and the business' gross receipts. Gross receipts tax rates were initially designed to hold business taxes paid by individual businesses steady compared to the payroll taxes they were paying. Many emerging mobility companies utilize technologies to connect independent contractors with customers and users, and so would have had to pay a relatively low amount payroll taxes before this phase in. There are a lot of unknowns about how much these companies are paying in business taxes, particularly when compared to other companies with similar business activity levels but that primarily employ payrolled employees.

RECOMMENDATION 4: BRIDGE

Bridge Mobility and Access Gaps

The cityshould develop a user study to more clearly understand who uses emerging mobility services and for what purposes. This study should focus on equity gaps for low-income users and issues related to disabled access. The SFMTA and the Transportation Authority should also develop pilots to fill mobility and access gaps, such as for paratransit, late night transportation, school-related transportation, and in areas less well-covered by public transit..

Reduce Barriers to Access

The Transportation Authority and SFMTA could incentivize (and when possible, require) emerging mobility service providers to reduce barriers for equitable and disabled access. Strategies could include provisions for low-income fare products, low-tech service availability such as non-web/non-app accessibility and payment, and payment methods that don't require credit and debit cards. The Transportation Authority and SFMTA should also require multi-language support in emerging mobility service platforms including in-app, web and customer support. The Transportation Authority and SFMTA should also encourage emerging mobility services that align with the Guiding Principles to provide service in areas underserved by transit through grant opportunities and assistance. When possible, the SFMTA should require service provision in Communities of Concern and develop other minimum service requirements to ensure more equitable outcomes.

Conduct an Equity and Disabled Access Study

The SFMTA and the Transportation Authority should study the demographics of emerging mobility service users and understand how these services are affecting mobility for people who are often under-served by new services: low-income people, residents of Communities of Concern, and people with disabilities in San Francisco. The study should also determine access times for different emerging mobility services, comparing access times for underserved people compare to the general public. Lastly the study should consider best practices and document the results in other cities that have required payments to Equity Funds and Accessibility Funds in lieu of providing certain services. Results of this study would influence the SFMTA's permitting requirements and incentive programs provided by emerging mobility companies or the City for low-income users, residents of Communities of Concern, and people with disabilities.

Pilot Late Night Transportation Options

The city should develop opportunities for emerging mobility services to provide shared mobility options during late night hours, 9 p.m. to 5 a.m., that complement the regional all-nighter transit network while helping meet the need areas identified in the 2015 report.

Late-Night Transportation

In 2015, the San Francisco Late Night Transportation Working Group released *The Other 9-to-5,* the final report of its first phase of work to evaluate transportation needs during the period from 9 p.m. to 5 a.m.[31] The report identified five need areas to address in the transportation system: availability and coverage; speed and reliability; safety and security; awareness and comfort; and cost and equity, as well as recommendations to begin to address each area. The second phase of the Late Night Transportation Study has implemented the major recommendations from the first phase, including a reevaluation of the regional all-nighter bus network. The final report from this second phase of the study, a draft of which was endorsed by the Working Group on February 6, 2018,[32] identifies the need to "consider whether some form of public-private partnership with taxis, transportation network companies, carpooling systems, shuttle providers or other services might boost access to local transit hubs or better address first or last mile challenges to increase use of the existing AllNighter system."

RECOMMENDATION 5: PRIORITIZE

Support Public Transit and Prioritize Transit

The Transportation Authority and the SFMTA should continue to support the expansion of transit-priority facilities. The Transportation Authority and the SFMTA should collaborate in developing a series of studies related to rights-of-way prioritization, vehicle miles traveled, financial impacts, and cost-recovery. To support these studies, the Transportation Authority and the SFMTA should conduct pilot programs that improve first and last mile connectivity to transit stations.

Continue to Support Expansion of Transit-Priority Treatments

The Transportation Authority and SFMTA should continue to support the expansion and enforcement of transit priority lanes, signals and other transit priority treatments to ensure public transit service is prioritized on city rights-of-way.

Conduct a Customer experience study

The SFMTA and the Transportation Authority should study the customer experience and attractiveness of emerging mobility services and technologies in comparison to public transit service. Topics may include customer service, customer feedback, payment methods/types, vehicle tracking, information sharing, and routing etc. The study would identify lessons learned and opportunities to improve aspects of public transit service and connect results to the SFMTA "Next Generation Customer Information System" development effort.

Conduct a Right-of-Way Prioritization Study

The Transportation Authority and the SFMTA should develop a right-of-way prioritization study. The study could identify methods to reduce modal conflicts, increase transit efficiency and prioritize the efficient movement of people. This plan should consider the City's emerging mobility principles, climate action goals and Transit First policy. The right-of-way study should also identify corridors to prioritize walking, bicycling and transit similar to the Better Market Street Plan and should be coordinated with ConnectSF's Streets and Freeways Study.

Conduct a Financial Impact Study

The SFMTA should conduct a Financial Impact study on emerging mobility services and technologies particularly as they relate to capital improvements. The study should consider city revenue and budget impact implications with respect to emerging mobility services such as parking revenues, transit fare revenues, and business taxes. The study should also consider how short and long-term mode shift statistics to emerging mobility services may impact capital investments and ridership projections. The results of this study will inform potential emerging mobility permit systems, impact fees, and business taxes, as well as any necessary authorizing legislation.

Pilot First and Last Mile Connections to Transit

The Transportation Authority and the SFMTA should explore methods to incentivize traveling to major transit hubs such as BART stations, Caltrain among others. This pilot should consider curb management strategies adjacent to these transit hubs that may facilitate pickups and drop offs. Additionally, this pilot should identify methods of discouraging competition with mass transit within, to and from San Francisco.

School Transportation

The Transportation Authority, San Francisco Department of Rec and Parks, and San Francisco Unified School District should develop opportunities for emerging mobility services to provide shared mobility options for San Francisco youth to travel to and from home, school and after school programs. .

RECOMMENDATION 6: ENFORCE

Enforce Safe Streets

The SFMTA and the Police Department should increase enforcement of known emerging mobility conflict areas throughout the city and consider piloting enforcement blitzes to encourage safe operation. Similarly, they should seek legislative authority and implement a pilot that automates enforcement to promote safety, ensure more systematic adherence to traffic rules, and reduce enforcement costs. The SFMTA should also develop a Vision Zero study that studies collision rate trends and unsafe operations, determines whether there is a correlation with emerging mobility services, and identifies recommendations to reduce traffic fatalities.

Conduct an Emerging Mobility and Vision Zero Study

The SFMTA should study collision rate trends and unsafe operation behavior throughout the city and correlate between emerging mobility service usage in those areas over time. Study findings may influence how collisions and other unsafe behavior in the city is tracked and reported. Study findings may also influence the City's Vision Zero programs to reduce traffic fatalities to zero by identifying additional pedestrian and bicycle safety improvements along high-injury network corridors. Finally, the study findings should influence how and where the SFMTA and the SFPD should increase enforcement, as described below.

Increase enforcement of traffic rules and hours of service

The San Francisco Police Department (SFPD) and SFMTA's parking enforcement officers should increase enforcement in areas or on corridors known for illegal double-parking and parking in bicycle lanes. The California DMV and the CPUC should also increase enforcement of emerging mobility contractor hours of service.

The San Francisco Police Department and SFMTA's parking enforcement officers should also conduct an enforcement blitz during random times of the year to encourage compliance with City traffic rules (e.g., double-parking, transit and bike lane regulations, and other unsafe/illegal maneuvers. The City should work with the emerging mobility service companies to notify their contractors of the heightened enforcement and increase awareness of these regulations. The pilot could identify lessons learned and best practices for enforcing safety and transit conflicts from emerging mobility services and technologies.

Lastly, the SFPD and the SFMTA should identify strategies to automate some enforcement duties. Initial enforcement studies have demonstrated that some emerging mobility services may have common traffic violations. However, given constrained resources for enforcement, the City could consider piloting automated enforcement opportunities. The city could partner with camera and sensor companies to automate enforcement on high-injury corridors and other hotspots to identify best practices for reducing overhead costs as enforcement needs increase.

RECOMMENDATION 7: PRICE

Manage Congestion at Curbs and on City Roadways

The SFMTA and the Transportation Authority should prioritize developing a curb management strategy that allocates and prices curb access appropriately. Such a strategy should be supported by curb management pilots with emerging mobility services and through a curb management prioritization study. The SFMTA should also develop and implement an emerging mobility streets design guide to reduce modal conflicts. Finally, based on current congestion levels on San Francisco roadways, San Francisco should move toward implementing a decongestion pricing and incentives system, whether through cordons or roadway user fees, to manage roadway congestion.

Move towards implementation of a Decongestion Pricing and Incentives Program

The Transportation Authority should move toward implementation of a decongestion pricing and incentives program to prioritize the movement of people and manage congestion. This strategy could be implemented either through a cordon system around the most congested areas of the city or through VMT pricing strategies, paired with improvements to the transit network and incentives to use transit at the places and times when the streets are most congested. State authorizing legislation is required before San Francisco would be able to implement such a program.

Develop a Curb Management Strategy

The SFMTA and the Transportation Authority should develop an inventory of curb space and curb use throughout the city in addition to demand for curb space by user and mode type. The results of this study will inform potential pilot programs to test with emerging mobility companies and ultimately produce a curb management strategy.

The SFMTA could identify locations throughout San Francisco's retail and business districts where innovative curb management strategies may be employed. This curb management pilot could test opportunities during the most congested period of the day (e.g. a.m. and p.m. peaks) during which on-street parking may be restricted to allow for passenger pick-up, loading and goods delivery. The pilot could also consider how to improve safety and access for vulnerable roadway users including people walking and bicycling, as well as access for people with disabilities. The pilot could also measure person throughput gained or lost by increasing loading zones in place of on-street parking. Lastly, the pilot could be used to develop a data driven process for understanding curb space demand in near realtime.

Congestion Pricing and San Francisco

Congestion pricing is a type of demand-based pricing, in which we charge more for a resource during times of peak demand, in order to shift demand and allocate the resource more efficiently. This approach has historically been used for phone service and electricity, among other sectors. In the transportation sector, pricing strategies may be used to manage parking availability, encourage off-peak transit ridership, or reduce peak-period traffic in an area or along a corridor. Here, "congestion pricing" refers to relieving traffic congestion through peak-period road pricing. Under a congestion pricing program, private vehicles are assessed a charge when accessing congested areas (a certain point on the road network or enter a certain area of a city) during the most congested times of day. Pricing can be dynamic or set at a fixed rate.

In 2010, the Transportation Authority completed the Mobility, Access, and Pricing Study (MAPS), an initial study of congestion pricing in San Francisco. While the Transportation Authority Board voted to move forward with the MAPS recommendation of a cordon pricing system for downtown San Francisco, the agency did not move forward. In the years since, some emerging mobility services and technologies have contributed to an increase in congestion during peak travel times in the most congested parts of the city. Additional research and state authorizing legislation would be required before a program could be implemented. Revenues from a congestion pricing program would be used to operate and maintain the program and to fund a package of incentives and improvements to make it easier and cheaper for people to get around without driving. These could include projects to deliver faster and/or more frequent transit services, multimodal improvements, and programmatic/supporting elements such as financial incentives and enforcement efforts.

The results of the curb management study and pilot would shape the final curb management strategy. This strategy should prioritize outcomes identified in the City's Guiding Principles for Emerging Mobility Services and Technologies. Furthermore, the strategy should aim to reduce conflicts between vehicle loading needs behavior and vulnerable roadway users including people walking and bicycling.

Produce a New Mobility Street Design Guide

Current infrastructure design guidelines are not keeping pace with the rapid adoption of new mobility services. The SFMTA should author a guide that prioritizes safe, intuitive and low-conflict pick-up and drop off behaviors. The guide should also identify how sidewalks should be designed an programmed to prioritize walking and reduce conflicts for people with disabilities.

APPENDICES

APPENDIX 1: ADDITIONAL POLICY RECOMMENDATIONS

The following recommendations are organized by Guiding Principle and are provided as additional options for San Francisco public agencies to consider in addition to the priority policies and next steps recommended in the main body of the report.

Safety

The goal of the Safety principle is to achieve Vision Zero, reduce conflicts between modes and ensure public safety and security. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we do not have enough collision data to determine alignment for most of the emerging mobility services. Emerging mobility policy and design features highlighted several issues to address including limited or no driver safety training, distracted driving and a need for enforcement and operational penalties for unsafe behavior. The following safety recommendations are based on these evaluation results:

Increase Enforcement of traffic rules and hours of service

The SFPD and SFMTA's traffic and parking enforcement officers should increase enforcement in areas or on corridors known for illegal double-parking and parking in bicycle lanes. The California DMV and the CPUC should increase enforcement of emerging mobility contractor hours of service.

Require safety training

The California DMV, with support from the SFMTA, or the SFMTA through it's own permitting actions, could require safety training for emerging mobility operators related to loading and unloading best practices, transit-only lanes, bike and pedestrian safety and other issues.

Develop operator training materials

The California DMV, with support from the SFMTA and the SFPD could develop safety materials to educate emerging mobility operators on how to keep themselves, their passengers, pedestrians and cyclists safe during operations. These could be distributed to all emerging mobility service providers.

Encourage and Support a Distracted Driving Awareness Campaign

To protect San Francisco's cyclists, pedestrians and passengers, the San Francisco Department of Public Health (SFDPH) and SFMTA could educate consumers about the consequences of distracted drivers and encourage them to "see something, say something" to preserve their safety.

Develop Emerging Mobility Contractor Training and Safety Program

The City and State agencies could coordinate developing an emerging mobility contractor program responsible for ensuring alignment between emerging mobility contractors and the Guiding Principles. This program could also be coordinated with state efforts such as the DMV Driver Pull Program. This program could monitor drive time of contractors across multiple mobility applications and provide or require a safety training and testing services.

Limit in-app messaging to discourage distracted driving

The California DMV and the CPUC could limit in-app messaging and regulate how emerging mobility service applications require navigation and in-app messaging for service operation.

Require regular checking of driving records

The California DMV and CPUC could require regular checking of driving records for emerging mobility services (both users and contractors). They could also set thresholds for when contractors should be removed from service operation.

Transit

The goal of the Transit principle is to ensure public transit is prioritized on city streets, reduce competition between emerging mobility services and public transit, and increase the use of high occupancy modes. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we lack comprehensive information on transit competition and how these services are used as first and last mile connections to transit. Furthermore, emerging mobility services lack policy and design features that support the Transit principle such as discounts to transit hubs and providing in-app information for public transit connections or alternatives. The following Transit recommendations are based on these evaluation results:

Encourage in-app transit information

The Transportation Authority and SFMTA could encourage emerging mobility service providers to include real-time transit information related to arrival and connection options in their mobile apps to encourage first/last mile connections.

Explore opportunities to develop Mobility as a Service platforms: The Transportation Authority could develop a Mobility as a Service platform that combines public transit options, pricing and incentive strategies, transportation demand management and emerging mobility services.

Equitable Access

The goal of the Equitable Access principle is to promote equity across all emerging mobility services and ensure that all people have access to the benefits of these services. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we do not have enough user statics data to know how many low-income people are served by emerging mobility services and technologies. We also do not know generally what access times exist for Communities of Concern and how many trips are provided to those areas. Emerging mobility policy and design features highlighted several issues to address: nearly no emerging mobility services offer dedicated low-income fare products; very few offer multilingual support; people without smartphones or bank accounts have very limited access; and underserved areas such as Communities of Concern south of Cesar Chavez and Taraval do not have access to these services. Conversely, emerging mobility services are offered on weekends and during late night hours and in underserved areas, which may represent an opportunity to fill transit gaps. The following Equitable Access recommendations are based on these evaluation results:

Support expanded free wifi in public spaces

Access to emerging mobility services requires smartphone data, if not connected to wifi. The City could expand its free wifi network, particularly in areas underserved by transit, to reduce barriers to access.

Develop Community Outreach Standards

The City could develop community outreach standards and best practices for emerging mobility service companies. This outreach plan could include public agencies, advocacy groups and community stakeholders. Moreover, the plan could encourage outreach to Communities of Concern that are underserved.

Disabled Access

The goal of the Disabled Access principle is to promote access across all emerging mobility services for people with disabilities. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we do not have enough user statics data to know how many people with disabilities are served by emerging mobility services and technologies. We also do not know generally what access times exist for people with disabilities and how many trips are provided. Emerging mobility policy and design features highlighted several issues to address: nearly no emerging mobility services provided dedicated accessible fleet vehicles; none discounted the trip for people with disabilities; there is limited compliance with 508 standards for mobile application accessibility; and there is limited marketing of emerging mobility services and technologies to people with disabilities. The following Disabled Access recommendations are based on these evaluation results:

Investigate the possibility of establishing an Accessibility Fund

The SFMTA should investigate establishing an Accessibility Fund to increase service options and mobility for people with disabilities. This could be funded by a fee on emerging mobility services.

Encourage disabled access considerations throughout app and service development

The City should encourage emerging mobility service providers to include Disabled Access experts in their teams during the development of both their mobile application and emerging mobility service to ensure consideration of people with disabilities.

Ensure mobile applications are accessible to the visually impaired (e.g. 508 compliance)

The SFMTA could encourage private mobility providers to update their webpages and applications to be accessible for people who are visually impaired. This could also be included as a requirement prior to partnership or a provision of permit conditions.

Require availability of Accessible Vehicles

The SFMTA could require emerging mobility providers to provide accessible vehicles as a prerequisite for permits and or partnerships.

Sustainability

The goal of the Sustainability principle is to support the City's goals of reducing GHG emissions, promote active transportation and increase the resiliency of the transportation system. Chapter 4 and 5 emerging mobility evaluation results demonstrated that emerging mobility companies that manage their fleet are shifting toward zero emissions vehicles and electric vehicles. However, we do not have enough data about emerging mobility services VMT to determine alignment for the emerging mobility sector. The following sustainability recommendations are based on these evaluation results. Additional recommendations that relate to the Sus-

tainability principle can be found in the Congestion principle recommendations:

Require efficiency standards

The SFMTA could require minimum fleet efficiency standards as a prerequisite for partnerships or conditions for a potential emerging mobility permit.

Expand availability of vehicle charging

SF Environment could identify locations for electric fast-charging stations that may service these fleets and other public users to encourage and hasten this transition to electric vehicles.

Congestion

The goal of the Congestion principle is to reduce emerging mobility's effect on the city's roadway congestion, particularly as it relates to roadway safety, mode choice, emergency response times and transit performance. Chapter 4 and 5 emerging mobility evaluation results demonstrated that some emerging mobility services such as bike sharing and car sharing reduce VMT while ride hailing services increase VMT. We do not have enough data on the majority of these services to determine their effects on traffic speeds in San Francisco. Emerging mobility policy and design features also highlighted significant issues related to curb management and congestion and the curb. The following Congestion recommendations are based on these evaluation results:

Expand availability of vehicle charging

SF Environment could identify locations for electric fast-charging stations that may service these fleets and other public users to encourage and hasten this transition to electric vehicles.

Support shared modes that reduce vehicle miles traveled and increase person throughput

The City could provide more support/privileges to services that demonstrate clear reductions in vehicle miles traveled and increases in person throughput (relative to single-occupancy vehicles).

Accountability

The goal of the Accountability principle is to collect data from emerging mobility service providers to better understand these services and to plan for and mitigate the impacts emerging mobility services and technologies have on our city. Chapter 4 and 5 emerging mobility evaluation results demonstrated that most emerging mobility companies are not providing the data necessary to determine whether they align with our Guiding Principles. While the companies that receive permits from the SFMTA provide data to the SFMTA, that data varies by service type making it difficult to compare services and evaluate their alignment with the Guiding Principles. The following Accountability recommendations are based on these evaluation results.

Use metrics developed in this study to evaluate partnership proposals

Where possible, the Transportation Authority could require data related to the metrics developed in this study for the evaluation of emerging mobility services as a prerequisite to partnership.

Inform consumers about the risks and rewards of emerging mobility services and technologies

When customers buy a car, they have trusted rating systems to determine the safest, most sustainable vehicle, allowing them to make informed choices. The City could develop an easy-to-comprehend guide, based on the research performed in this study, to help consumers understand the risks and rewards related to different emerging mobility service types.

Labor

The goal of the Labor principle is to ensure that emerging mobility companies are providing quality jobs that include fair pay and promote local hiring and equitable job training. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we lack sufficient data related to employee/contractor earnings and benefits to determine alignment with the Labor principle. Most emerging mobility company employees have transparent pay. However, companies that rely heavily on independent contract labor such as ride hailing and courier network services, do not provide benefits to their contractors. The following Labor recommendations are based on these evaluation results.

Encourage emerging mobility industry to develop Emerging Mobility Contractor Benefits Program

Explore how the City or State agencies could encourage or require an industry-led pooled mobile benefits program (such as medical, dental, and retirement) for emerging mobility contractors.

Develop and broker working training programs that create pathways into

emerging mobility industry

The Transportation Authority and San Francisco OEWD could work the emerging mobility industry to develop pathways programs for San Francisco residents to be trained and ultimately employed in the emerging mobility industry. This training program could also identify strategies and incentives to encourage diversity in the emerging mobility industry.

Incentivize contracting with disadvantaged business and local businesses

San Francisco public agencies could incentivize emerging mobility companies to contract with Disadvantaged Business Enterprises and Local Business Enterprises.

Incentivize hiring policies that encourage diversity

The City could incentivize hiring policies in the emerging mobility service companies that encourage diversity.

Collaboration

The goal of the Collaboration principle is to encourage the City and emerging mobility providers to engage and collaborate with each other to improve the city's transportation system together. Chapter 4 and 5 emerging mobility evaluation results demonstrated that most emerging mobility companies have points of contact to interface with city agencies. However, emerging mobility companies have received very few endorsements from community stakeholders and few have conducted outreach to San Francisco communities. While bike share, scooter share and car share companies have conducted pilots in San Francisco (and subsequently have received permits from the SFMTA), other emerging mobility providers have not. Lastly, few emerging mobility providers have reached out to San Francisco public agencies prior to initiating their service in the city. As a caveat, industry interviews suggest this "culture of disruption" is a in part a byproduct of a complicated or uncoordinated public agency system without a framework for collaboration. The following Collaboration recommendations are based on these evaluation results.

Develop a process to prequalify emerging mobility partners

The Transportation Authority and SFMTA could develop a complementary Request for Qualifications (RFQ) process whereby emerging mobility companies could be preselected based on their alignment with the Guiding Principles. The goal of the RFQ would be to develop a pre-screened list of interested partners that could then perform the pilots identified in the aforementioned RFP. This RFQ process could also be coordinated with the emerging mobility permit application described under the Financial Impact principle.

Encourage an industry-led Emerging Mobility Showcase Events

The City could encourage emerging mobility service providers to host an emerging mobility showcase event to introduce city staff, residents and employers to the various emerging mobility services available in San Francisco. These events could focus primarily on Communities of concern to increase access for residents of those communities. These events could also represent an opportunity for people who are less familiar with the services to ask questions directly to staff and service representatives.

Encourage other City agencies to develop an Emerging Mobility Strategy

Encourage San Francisco public agencies including the Planning Department, Department of the Environment and the SFMTA to develop internal emerging mobility strategies. These strategy documents could identify how public agencies plan to address the impacts of emerging mobility services and technologies. These strategies could also include designating specific representatives from each public agency to coordinate policy and pilot development related to emerging mobility.

APPENDIX 2: ADDITIONAL RESEARCH OPPORTUNITIES

The results from Chapter 4 and 5's evaluation identified myriad gaps in our outcome metrics so we were unable to determine how emerging mobility services and technologies align with many of the city's Guiding Principles. Below are a list of potential studies organized by Guiding Principle that work to fill in those gaps in our metrics. These studies are also based on questions and feedback we received during outreach workshops and focus groups. While these studies are described based on a central question, they should be coordinated with other studies listed here, particularly within each Guiding Principle.

Transit

The goal of the Transit principle is to ensure public transit is prioritized on city streets, reduce competition between emerging mobility services and public transit, and increase the use of high occupancy modes. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we lack sufficient data about mode shift and travel behavior. The following Transit research opportunities work to fill gaps identified in our evaluation.

Transit competition Study

How do emerging mobility services and technologies compete with public transit service? Study the effects of emerging mobility services and technologies on public transit ridership to understand mode shifts between emerging mobility services and public transit. Additionally, identify how or whether emerging mobility services serve as first and last mile solutions to and from public transit hubs. Coordinate this study with the Congestion principle travel decision survey. Results of this study may influence how the City permits emerging mobility services and what next steps may exist for fulfilling the City's Transit First goals.

Equitable Access

The goal of the Equitable Access principle is to promote equity across all emerging mobility services and ensure that all people have access to the benefits of these services. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we do not have enough user statics data to know how many low-income people are served by emerging mobility services and technologies. We also do not know generally what access times exist for Communities of Concern and how many trips are provided to those areas. The following Equitable Access research opportunities work to fill gaps identified in our evaluation.

Cost comparison study

Is it cheaper to use emerging mobility services than own a car? Is it cheaper to use emerging mobility service than take transit?: Conduct a cost comparison survey of emerging mobility services and technologies to understand the different user costs associated with each service. This study should compare emerging mobility user costs to transit costs, and the cost of car ownership in San Francisco. Include an equity lens to this study when considering various costs for each service. Results from this cost comparison study may influence SFMTA's Muni fare structure. Results may also help update the California PPIC housing and transportation burden analysis for low-income households.[1]

Sustainability

The goal of the Sustainability principle is to support the City's goals of reducing GHG emissions, promote active transportation and increase the resiliency of the transportation system. Chapter 4 and 5 emerging mobility evaluation results demonstrated that emerging mobility companies that manage their fleet are shifting toward zero emissions vehicles and electric vehicles. However we do not have enough data about emerging mobility services VMT to determine alignment for the emerging mobility sector. The following Sustainability research opportunities work to address gaps identified in our evaluation.

Emerging Mobility and Vehicle Miles Traveled Study

What are the effects of emerging mobility services and technologies on vehicle miles traveled?: Initiate a trip diary study to understand the effects emerging mobility services and technologies have on VMT. While many emerging mobility service companies claim that their users are reducing VMT and car ownership, it remains unclear whether these surveys are double and triple counting the same individuals. This study should also work to understand how emerging mobility users are using these services to connect to transit (as first and last mile solutions) or replacing transit trips with these services altogether. Results from the study may influence the Transportation Authority's travel behavior model and SF Environment's climate action efforts.

Preferred mode type and Sustainable Trip

What is a sustainable emerging mobility trip? Docu-

1 Lorien Rice. Transportation Spending by Low-Income California Households: Lessons for the San Francisco Bay Area. Public Policy Institute of California. http://www.ppic.org/content/pubs/report/R_704LRR.pdf

ment the preferred emerging mobility types by trip type based on findings from emerging mobility VMT study. SF Environment could disseminate information, perhaps as a rating system, relating to the sustainability of each emerging mobility service or technology (see Sustainability principle recommendations and next steps, Chapter 6).

Congestion

The goal of the Congestion principle is to reduce emerging mobility's effect on the city's roadway congestion, particularly as it relates to roadway safety, mode choice, emergency response times and transit performance. Chapter 4 and 5 emerging mobility evaluation results demonstrated that some emerging mobility services such as bike sharing and car sharing reduce VMT while ride hailing services increase VMT. We do not have enough data on the majority of these services to determine their effects on traffic speeds in San Francisco. Emerging mobility policy and design features also highlighted significant issues related to curb management and congestion and the curb. The following Congestion research opportunities work to fill gaps in identified in our evaluation.

Parking demand Study

What are effects of emerging mobility services and technologies on parking demand?: Study the effects of emerging mobility services and technologies on on-street and off-street parking demand. Results of this study may influence the City's Transportation Demand Management Ordinance. Similarly, findings may help adjust off-street parking requirements and loading zones for development standards in San Francisco.

Autonomous Vehicle Integration Study

How can the City prepare for autonomous vehicles?: The city should conduct a study to understand how autonomous vehicles may integrate into existing public infrastructure. Similarly, the Transportation Authority should work to understand how services that leverage autonomous vehicle technology may impact trip decisions and vehicular congestion on San Francisco roadways. This study should also consider autonomous vehicles' impact on on- and off-street parking, and curb management. Finally, this study should consider what types of data may be collected through these services that the city may need and conversely, what types of data autonomous vehicle companies may need from the city. Results from this study may influence the SFMTA's Curb Management Strategy and Data Collection Strategy.

Accountability

The goal of the Accountability principle is to collect data from emerging mobility service providers to better understand these services and to plan for and mitigate the impacts emerging mobility services and technologies have on our city. Chapter 4 and 5 emerging mobility evaluation results demonstrated that most emerging mobility companies are not providing the data necessary to determine whether they align with our Guiding Principles.

Data Sharing Study

What data have emerging mobility companies agreed to share publicly?: What data have emerging mobility companies agreed to share with pilot partners? Study data sharing agreements between existing emerging mobility companies and local government agencies. Results of this study could identify minimum data sharing standards across San Francisco and Bay Area government agencies. Results of this study could also be implemented into future potential pilot projects implemented in San Francisco.

Labor

The goal of the Labor principle is to ensure that emerging mobility companies are providing quality jobs that include fair pay and promote local hiring and equitable job training. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we lack sufficient data related to employee/contractor earnings and benefits to determine alignment with the Labor principle. Most emerging mobility company employees have transparent pay. However, companies that rely heavily on independent contract labor such as ride hailing and courier network services, do not provide benefits to their contractors. The following Labor research opportunities work to fill gaps identified in our evaluation.

Contract Labor Study

What are the effects of emerging mobility services and technologies on labor in San Francisco?: Study labor models used in emerging mobility services to understand the demographics of the contractor labor force employed by these services. The study should investigate how many contractors work for this sector, in which cities they reside, how many contractors work for multiple emerging mobility services, and what their commute patterns are. The study should also work to understand whether or how emerging mobility contractors access medical, dental and other benefits. This study should be coordinated with the Mayor's Office of Workforce and Economic Development to consider standards for training, benefits and other considerations. Results from this study may inform State and local policy related to

contractor benefits requirements.

Automation and Labor Vulnerability Study

Which public agency jobs are vulnerable to emerging mobility market trend forces such as automation?: With the introduction of vehicle automation into the transportation sector, the City should investigate what service jobs exist within public agencies that are vulnerable to automation. This study should work to identify how those jobs can be retains and retooled to maintain the labor force. The study should also collaborate with the unions that represent public agency employees to understand their concerns and develop strategies together.

Financial Impacts

The goal of the Financial Impact principle is to promote a positive financial impact on the city's infrastructure investments and delivery of publicly provided transportation services. Chapter 4 and 5 emerging mobility evaluation results demonstrated that we do not have sufficient data related to transit competition and state of good repair to determine alignment with the Financial Impact principle. However, based on preliminary evidence from SFO and academic studies, some services may be competing with public transit. Separately, bike share, scooter share, car share and microtransit services pay permit fees to the SFMTA to recover costs associated with enforcement and planning. However, no emerging mobility service pays fees related to their impacts on the city. The following Financial Impact research opportunities work to fill gaps identified in our evaluation.

Investment Vulnerability

Which public transit improvements are vulnerable to emerging mobility market trend forces that may reduce ridership?: Emerging mobility services and technologies are constantly evolving. However, based on travel decision data, and future emerging mobility projections, some capital improvements, programs and transit services are more susceptible to disruption than others. This study should identify which of those investments are most vulnerable and provide strategies for protecting against disruption from emerging mobility or for providing that information to decision-makers to allow them to consider making different decisions on future investments.

Collaboration

The goal of the Collaboration principle is encourage the City and emerging mobility providers to engage and collaborate with each other to improve the city's transportation system together. Chapter 4 and 5 emerging mobility evaluation results demonstrated that few emerging mobility providers have reached out to San Francisco public agencies prior to launching services and there have been very few emerging mobility pilots. The following Collaboration research opportunities work to fill gaps identified in our evaluation.

Pilot Evaluation

What pilot programs have been implemented here in the San Francisco Bay Area and select cities across the country? What are lessons learned?: While many emerging mobility pilots have been implemented, there has yet to be a comprehensive document evaluating the impact of these partnerships. Using the metrics developed in this report, the Transportation Authority should commission a study to assess pilots that were established to reach the goals of the guiding principle.

APPENDIX 3: ADDITIONAL PILOT OPPORTUNITIES

In January 2018, the Transportation Authority and the SFMTA facilitated a design-thinking workshop with agency staff. The purpose of the workshop was to gain a greater understanding about the challenges and opportunities related to managing emerging mobility in San Francisco, and to brainstorm pilot project ideas for emerging mobility. The following pilot concepts were developed based on feedback from both the Fall 2017 workshop and Spring 2018 workshop, as well as from ideas staff developed through the course of this project.

Transit Pilots

Autonomous transit service

The SFMTA could support transit line service with autonomous shuttle service along core transit routes to improve transit frequency and reliability. Pilot program could also test what labor implications a blended or completely autonomous transit service may look like. This pilot could also work to understand how to improve mobility in the city's parks, recreation facilities and visitor destinations. Lastly, such a pilot could be implemented as part of a TDM solution for planned unit developments.

Mobility as a Service

The Transportation Authority and the SFMTA could pilot opportunities to aggregate transit and emerging mobility service information into a mobile application to provide a more seamless travel experience. This pilot application could coordinate with incentives and discount programs. Results of this pilot could inform future research, transit incentives programs, and updates to the Muni mobile application.

Equitable Access Pilots

Affordability Pass

The Transportation Authority, the SFMTA and MTC could test a low-income subsidy for emerging mobility services that align with the Guiding Principles. This pilot could also serve as an opportunity to test innovative community outreach that targets specific low-income communities and works to understand how these services may improve mobility for them. Treasure Island is a potential location to pilot an affordable fare or rate for emerging mobility.

Single Payment Platform

There are a couple ways the Transportation Authority could support a single payment platform or the availability of single payment platforms in the marketplace. First, MTC could, as part of C2 or as part of C1 continued development, develop a modern API that allows payment aggregator platforms to integrate Clipper accounts. Second, agencies could work with private organizations such as employers, institutions, etc., to pilot platforms that aggregate payment, transportation choices, and include built in financial incentives to discourage automobile use including car buy-back program, company TDM plans, a point reward system, credit donation and trading, local hire programs/platforms. The public sector's role could be to subsidize an initial launch, provide promotion or incentives such as transit fare value, or marketing and promotion. The public sector could also pilot a TDM program educating employers and institutions about the aggregator platforms available in the marketplace and comparisons of features etc. The Treasure Island Mobility Management Program will include a TDM plan managed by TIMMA, who could perform this role as part of a pilot. TMAs throughout the city could consider including these tools as a feature in their TDM plans.

Smart Mobility Kiosks

The SFMTA and other City agencies could test mobility kiosks similar to those implemented in New York City and Chicago to aggregate transportation options, wayfinding and emerging mobility service. Pilot should evaluate how kiosks increase mobility options for people without smartphones and in areas identified as Communities of Concern.

Sustainability

Sustainable Trip Competition

Similar to BART Perks, the Transportation Authority, the SFMTA, MTC and SF Environment could incentivize travelers during a pilot period to track their mobility habits and gain "points" towards some reward for choosing the most sustainable trip options. This pilot could also provide data insights into how people chain trips, connect to transit using emerging mobility, and other behavior study indicators.

Congestion Pilots

Curb Management and Color Curb Program

The SFMTA's Color Curb Program currently allows adjacent businesses to apply for loading zones outside of their storefronts. The SFMTA could test how emerging mobility companies may apply for loading zones throughout the city through the color curb program. This pilot could encourage emerging mobility companies to work with local business communities to develop curb management strategies that support commercial areas. Similarly, it could allow emerging mobility companies to identify the locations throughout the city where they have the greatest demand for access points/ pickup and drop off needs.

Accountability Pilots

Data Collaborative

MTC, the Transportation Authority and the SFMTA could partner with a non-governmental organization to pilot a third-party data collaborative. San Francisco Public agencies could identify what research questions they have and share them with a third-party research institution. Then, private emerging mobility companies could share data with the third-party researchers. Together, the researchers could answer key questions for San Francisco public agencies without disclosing company-specific information.