



HEALTH & EQUITY

HEALTH & EQUITY VISION STATEMENT

The transportation system in Fort Collins will foster a community that is healthy, environmentally sustainable and which promotes social equity through an inclusive transportation planning process that seeks to empower vulnerable communities and the equitable implementation of multimodal transportation enhancements.

SUPPORTING PRINCIPLE

PRINCIPLE T9

Utilize the transportation system to support a healthy and equitable community.

Where We Are Today

Promoting community health and equity is a core value for the City, as seen in targeted efforts such as the Climate Action Plan, the Neighborhood Traffic Mitigation Program and the work of the Fort Collins Social Sustainability Department. The transportation system plays a major role in the health of Fort Collins' residents and visitors since it influences activity levels and air pollution emissions.

Opportunities for the Road Ahead

Efforts to reduce greenhouse gas emissions, especially from transportation sources, must be accelerated to meet the City's Climate Action Plan goals. Improving multimodal transportation options and connectivity, particularly in lower-income neighborhoods and areas with poor access, will improve environmental outcomes while better connecting all residents to the City's economic, recreational and social resources. A transportation system with more active travel will also improve the health outcomes of people through greater physical activity.

Introduction

The quality and performance of the transportation system can be measured in many ways—including roadway capacity, travel times and transit ridership—but assessing network impact on quality of life is an equally important consideration. Transportation investments should not be made with the sole objective of moving as many people as possible. Instead, planning efforts unlock opportunities to help people access healthier travel modes, create cleaner air and diminish the negative impacts current transportation infrastructure has on community

life. In addition to outlining strategies for improving public health outcomes through transportation, the Transportation Master Plan has a particular focus on planning with the community instead of for the community. Transportation provides access, which in turn can empower vulnerable populations. Planning in collaboration with all Fort Collins residents will ensure that the resulting layered network represents a transportation system that fosters a healthy and equitable city.

Health Impacts

Lack of Access

Lack of access to transportation options disproportionately affects people with disabilities. Without access to public transit and/or Dial-a-Ride, many people with disabilities have no way to get to work, church, school, shopping, friends, etc. Additionally, a missing sidewalk gap could result in someone with disabilities traveling much farther than necessary to reach a destination that is physically very close. The City is working through the sidewalk-prioritization program to reduce barriers in the pedestrian network and by prioritizing the implementation of bicycle facilities in areas with poor connectivity. The layered network approach to placing appropriate travel facilities to match the community context will ensure that connectivity for all modes is improved.

Air Quality

Vehicle emissions have a direct negative impact on air quality. Low air quality can result in respiratory illnesses, particularly among vulnerable populations such as children and older adults. Air pollutant and GHG emissions are closely related, as reductions in greenhouse gases also result in air pollutants such as ozone-causing emissions and particulate matter. Through the Climate Action Plan (CAP), Fort Collins is committed to reducing GHG:

Fort Collins uses a Transportation Air Quality Impacts Guidance Manual to consistently evaluate, analyze and document the benefits and tradeoffs of transportation investments as they relate to air quality. This was developed to clarify and standardize the process for analyzing air quality impacts of City-initiated transportation planning and construction projects, and to incorporate emissions reductions into the planning process.

Using the manual, Fort Collins can continue to:

- » Differentiate air quality impacts of various alternatives;
- » Determine better and more-consistent information to support triple-bottom-line decision-making;
- » Optimize projects from an air quality perspective and to mitigate air pollution increases from certain projects;
- » Meet requirements for air quality analysis associated with City requests to the Federal Transit Administration (FTA) for funding; and
- » Be more competitive on City grant applications when seeking funding from sources such as the Congestion Management and Air Quality Improvement Program.

Relative to the region, Fort Collins is making active strides in achieving better air quality, but continued efforts to reduce emissions from transportation sources are needed to substantially improve air quality and subsequently reduce rates of chronic obstructive pulmonary disease and asthma.

 **20% BELOW 2005 LEVELS BY 2020**

 **80% BELOW 2005 LEVELS BY 2030**



ACHIEVING CARBON NEUTRALITY BY 2050

Congestion

Vehicle emissions are the primary contributor to PM2.5 levels in the air. A Harvard School of Public Health study found that increased levels of PM2.5 contributed to 4,000 premature deaths in 83 U.S. cities in 2000 alone. In addition, congestion carries high monetary costs through loss of work time and excess fuel consumption.

Perceptions of congestion vary significantly. The ability to easily and reliably move around town is often a significant concern for residents. Congestion also impacts emissions and economic health. There are two basic types of congestion:

- » **Travel Time.** The actual measurement of the amount of time it takes to travel between an origin and a destination, or on a segment of a roadway.
- » **Delay.** Travel time in excess of estimated “free flow” travel time. This is calculated by multiplying the individual travel time by the traffic volume to estimate the total delay of the roadway segment. This measure correlates with fuel consumption, vehicle emissions and greenhouse gases.

It is important to acknowledge, recognize and work toward addressing both types of congestion. Historically, traffic volumes in Fort Collins have increased but at a slower rate than population growth. Impacts of congestion include:

- » **Driver Frustration.** A measure of driver sentiment, as reflected in the City’s annual Citizen Survey.
- » **Vehicle Emissions.** Emissions from vehicles are the largest transportation contributor to the city’s GHG emissions.
- » **Quality of Life.** When arterials are congested, neighborhood cut-through traffic can negatively impact residents’ enjoyment of their neighborhoods.
- » **Economic.** Travel time reliability has a measurable impact on economic health and employee productivity.
- » **Safety.** As traffic congestion increases, the risk of crashes also increases for all modes.

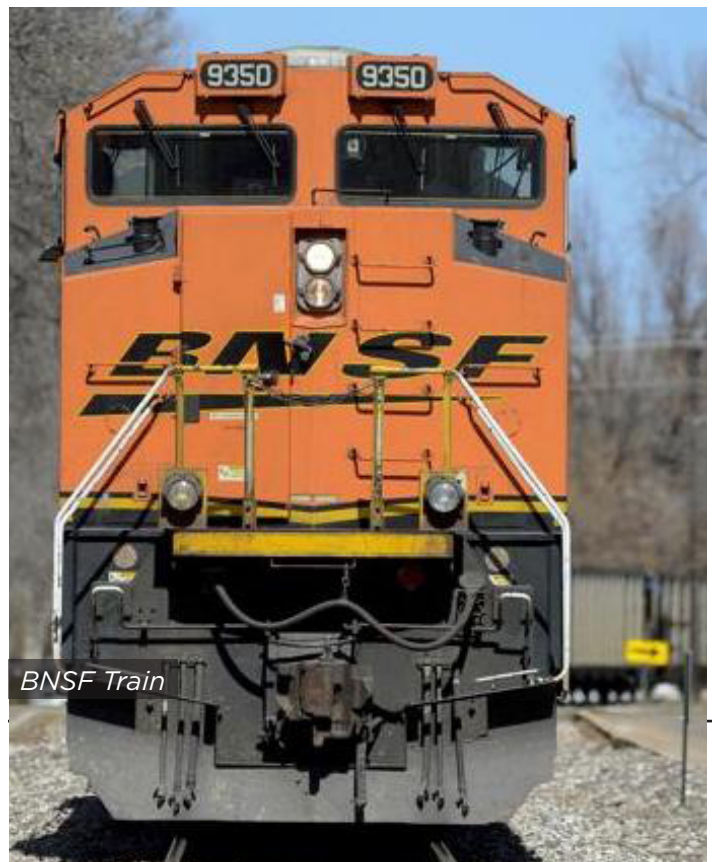
Measuring Congestion

The City utilizes a Bluetooth data system along all major arterials in the city that collects constant, anonymous travel-time data. It is used to provide accurate, comprehensive metrics for congestion, and can be used for real-time travel management and historical evaluation. The system can be used to develop average travel time by corridor, or total delay by corridor (to reflect both types of congestions discussed above).

Noise and Rail Quiet Zones

The connection between noise and human health is not an extensively studied field. However, recent studies suggest transportation noise can negatively impact health by modestly elevating the risk of hypertension and cardiovascular disease. The more-prevalent impact of noise is an increase in annoyance, which can cause stress reactions. In addition, transportation noise exposure can lead to loss of sleep, which in turn can lead to negative health outcomes and have harmful consequences for cognitive development in children, including diminished memory and reading-comprehension skills.

Increased adoption of electric vehicles in Fort Collins can help address noise impacts on local streets. However, freight rail activity still presents a quality-of-life issue due to its high level of sound emissions. The City has worked to address noise from freight rail by studying where quiet zones could be implemented. A rail quiet zone designates sections of track with consecutive crossings where train horns may be sounded only at the beginning of a zone, rather than at each crossing. The quiet zone must comply with the Federal Railroad Administration’s (FRA) Train Horn Rule, which details requirements railroad operators must follow to alert motorists and pedestrians at railroad crossings that a train is



approaching. In order to establish a quiet zone, each crossing in the zone must have a quadrant gate system or gates with raised medians.

The City completed a Quiet Zone Study that took place in two phases. Phase 1 was conducted in 2011 with the support of the Downtown Development Authority. The study identified the necessary improvements to meet federal railroad quiet-zone regulations in the Downtown area. Phase 2 was completed in 2013 and includes the Burlington Northern Santa Fe (BNSF) crossings from south of Laurel Street to Trilby Road. Fort Collins also submitted a request to the FRA in 2015 for a waiver to the train-horn rule for freight crossings near the CSU campus. The waiver included a set of possible improvements the City would make to the proposed zone that would ensure safety in the absence of a train horn. FRA denied the waiver but instead established a working group for Fort Collins representatives to work with the Federal Highway Administration and the Federal Transit Administration to determine strategies for addressing the quality-of-life problems that train horns pose for Fort Collins residents.

Fort Collins should continue to explore opportunities to work with the FRA and other stakeholders to create a healthy community that mitigates the impacts of freight noise as much as possible.

Lack of Exercise

Active transportation fulfills the dual purpose of connecting people with their community via non-driving modes while also increasing physical activity, which leads to positive health outcomes for individuals and the broader community. The 2011 City Plan envisions health and wellness as key aspects of a sustainable community. Transportation has proven central to helping more Fort Collins residents achieve an active lifestyle through biking and walking. Bicycling is a core component of active transportation in Fort Collins, which was designated as a platinum-level bicycle-friendly community by the League of American Bicyclists and ranked as the one of the best cities for riding by People for Bikes.

Organizations such as FC Bikes promote active living through initiatives including Bike to Work Days and bicycle-safety education programs. The local SRTS program also promotes active transportation among Fort Collins youth who live close to their school.

The City encourages active transportation through both programming and policies that promote the development and maintenance of walking and biking facilities to enhance community wellness.

The City should continue to promote active and healthy living through infrastructure, education and encouragement programs and policies that make biking and walking a comfortable, convenient and safe option for all ages and abilities. The modal plan updates described in the Mobility Section of the TMP outline the ways Fort Collins will make the biking and walking layers more user-friendly, and thus present opportunities for more active travel.



People practice yoga at a 2018 Open Streets event.

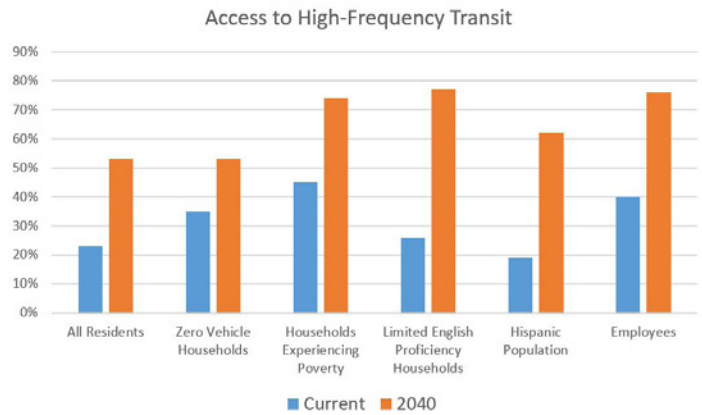
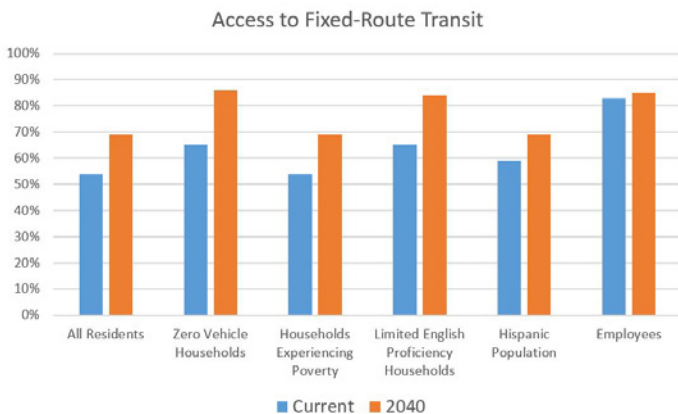
Equity in Transportation

The Planning Process

The location of transportation investments impacts not only the recipients of investments but also the communities that do not receive new infrastructure or service. Communities that experience lower levels of public investment have historically also reported worse air quality, lower access to community resources and less inclusion in the planning process. The impacts of marginalization are compounding, so it is important to bring in all members of the community early in the process. Recognizing the role of transportation in advancing social outcomes, equity must be a core consideration when deciding where to make investments in transportation assets and what form those investments should take.

A 2014 Social Sustainability Gaps Analysis identified the need for more transportation options as a common theme when evaluating the needs of vulnerable populations in Fort Collins. Lack of weekday evening and Sunday transit service was cited as a common barrier to community access. In 2017, City Council expanded Transfort funding for 365-day service to help address this concern.

The following charts from the Transit Master Plan show existing and future access to transit for various populations and demographics in Fort Collins. Access is defined as being within 1/4 of a mile of fixed-route transit and within 1/2 mile of high-frequency transit. Currently a good percentage of the identified populations have access to fixed-route transit, however access to high-frequency transit is much lower for all population groups. The proposed addition of high-frequency transit throughout the City will help address this imbalance.



Additionally, while driving alone is the predominant mode in Fort Collins, nearly 2% of households in the City do not own a vehicle.

With portions of the population living under the poverty line, as well as inequality in wages, affordable and accessible transportation becomes a key resource for accessing employment, education and other resources for economic mobility.

The TMP presents an opportunity to address inequity by incorporating underresourced communities into the planning process, starting with the visioning and prioritization as a part of this Plan. Fort Collins has demonstrated a commitment to advancing social equity and the TMP outlines the role that transportation planning plays in promoting equal access to opportunity in the city. The introduction to City Plan outlines the thorough public outreach process used to develop this Plan. The recommendation and prioritization of transportation investments identified in this Plan considers geographic and social equity.

Unequal access to transportation infrastructure can also translate to inequity in access to educational, professional and social opportunities. Communities that are underserved by transit, sidewalk infrastructure or safe biking facilities have reduced access to employment centers and other tools for economic mobility. Low-income residents may not have access to a private vehicle and rely heavily on reliable transit, biking, and walking services and infrastructure.

Investment Choices

Larimer County and Fort Collins have a growing older adult population that faces additional travel vulnerabilities. Transfort offers discount passes for seniors 60 and older. Senior Alternatives in Transportation (SAINT), a nonprofit human-service provider, administers a volunteer driver program that transports adults 60 and older around the Fort Collins area.

The City could consider investing in a publicly run program for providing older adults with community access through a reliable transportation option that can supplement SAINT. One potential opportunity for targeting the senior population could be through pilot projects and partnerships in the “mobility innovation zones” identified in the Transit Master Plan. These zones have a primary focus on connecting lower-density areas to the core transit network through on-demand, microtransit and micromobility options that could be implemented through public-private partnerships. As these partnerships are tested, they could be expanded to larger geographic areas for seniors in general or for low-income seniors to expand the ability to move across the city. The Larimer County Senior Transportation Needs Assessment (2017) provides additional recommendations for providing transportation options to seniors in the region; these recommendations include shuttles and public-private partnerships, which will require funding from partners such as Larimer County.

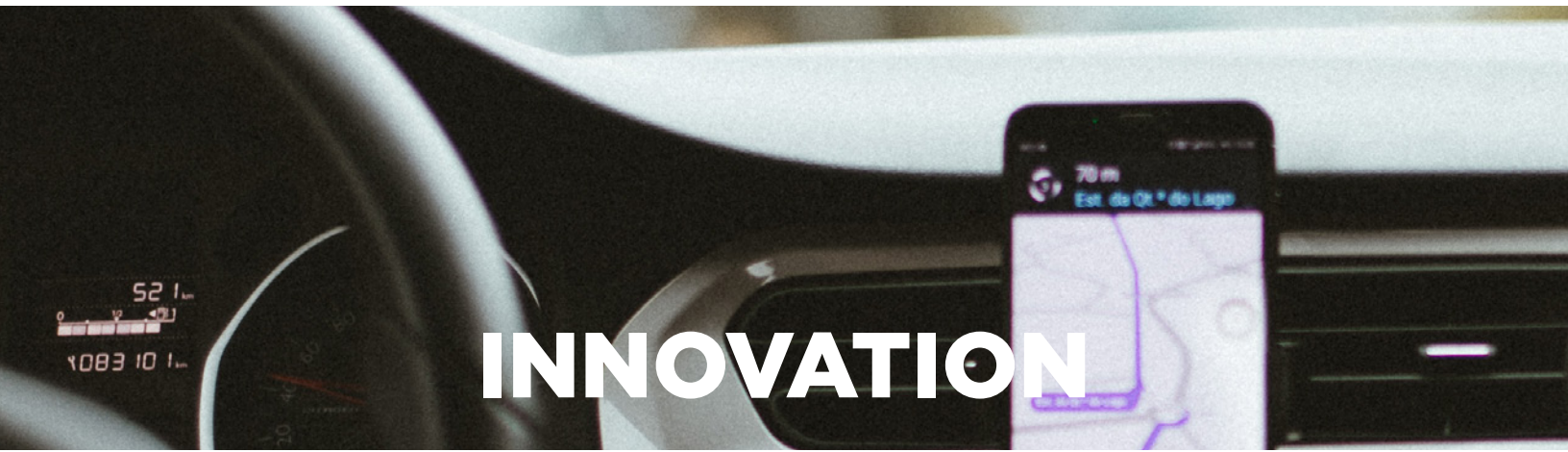
Efforts to improve access to transportation can run in parallel with planning efforts to improve environmental sustainability through transportation.

For example, while planning for electric vehicles, the City can make concurrent plans to site charging stations in lower-income neighborhoods.

To ensure that new transportation investments can further equity outcomes, the City could further develop the Health and Equity index and apply a scoring process that includes criteria such as race, ethnicity, median household income, average percentage of household income spent on housing, percent of the population that is non-ambulatory, and level of educational attainment. When determining where to prioritize investments, the scoring process can guide the City in making more equitable decisions that promote economic well-being within its communities.



Neighborhood Night Out



INNOVATION

INNOVATION VISION STATEMENT

Fort Collins will be proactive in welcoming new travel options that offer the opportunity of traveling more efficiently while reducing negative environmental, infrastructure and social impacts of travel.

SUPPORTING PRINCIPLE

PRINCIPLE T3

Lead transportation innovation by exploring and utilizing emerging and transformative systems and technologies.

Where We Are Today

New technologies are emerging daily that are fundamentally changing the way people think about moving around the community. Some of the emerging technologies can have positive impacts in contributing to meeting Fort Collins' vision and goals: vehicles that are far less likely to crash and injure others; shared mobility options; signal systems that adapt to changing traffic patterns; and transportation modes that are more affordable and accessible to people who can't walk or drive themselves. At the same time, some of these technologies could threaten the quality of life in the city if not managed well, such as congestion from induced demand with driverless cars or drones making same-day deliveries.

Opportunities for the Road Ahead

At this pivotal point in transportation, Fort Collins will be proactive in welcoming new travel options that offer the opportunity of traveling more efficiently while reducing negative environmental, infrastructure and social impacts of travel. At the same time, the City will be vigilant in establishing regulations and incentives to ensure that these new transportation technologies do not degrade the quality of life or erode the City's vision for sustainable and equitable mobility. Fort Collins should use emerging modes to facilitate transit use by encouraging first-last mile solutions through means such as bike-share and scooter parking at Mobility Hubs and right-sizing transit through ride-hailing in mobility innovation zones, as identified in the TMP.

Introduction

The potential impact of evolving technologies on vehicle miles traveled and travel preferences is important to understand. In order to assess the impact such trends may have in Fort Collins, a workshop on the future of transportation was held with City staff in January 2017. **Figure 5-8** shows the results of a polling exercise with workshop attendees on the direction of potential trends and their implication on VMT in 2040. More details on these projections and results are located in Appendix H7.

Based on staff projections on trends, VMT will be about 9,600 VMT per capita, while the Climate Action Plan goal is 6,300 VMT per capita. A significant amount of the growth in VMT can be attributed to increased ride-hailing, increased deliveries of goods/services, and decreases in housing affordability (which pushes some people further from job centers and lengthens their commutes). Results of this Plan support the City's priority to be more proactive in funding transit and regulating/encouraging more sustainable travel behavior in order to meet climate action goals.

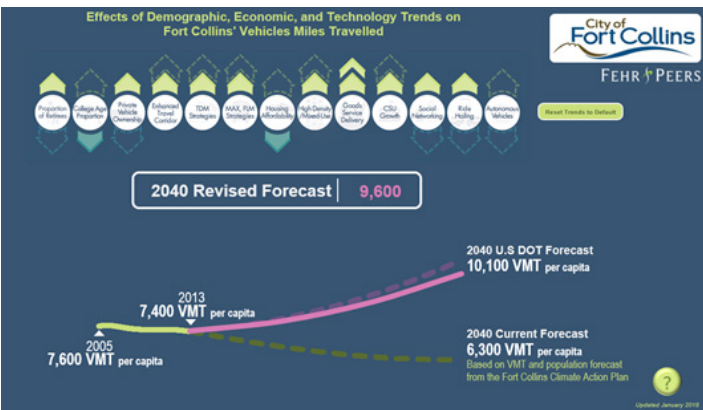


Figure 5-8: Results of Effects of Projected Future Trends on VMT

Shared Mobility

Shared mobility—the shared use of a vehicle, bicycle or other low-speed travel mode—is an innovative transportation strategy that enables users to have short-term access to a mode of transportation on an as-needed basis. It will be important for Fort Collins to prioritize shared mobility through programs and infrastructure in order to optimize the transportation system in consideration of environmental

sustainability and limited space and resources. Shared mobility also provides a broader set of transportation options for users that reduces reliance on the private automobile, therefore mitigating congestion and carbon emissions. Shared mobility is a key component of a future transportation innovation (MaaS) that is beginning to emerge in Europe and that has the potential to fundamentally change how people pay for and access travel. MaaS is described in a later section of this chapter.

Bike-Share

On April 1, 2016, the Fort Collins Bike Library evolved into Fort Collins Bike Share provided by Zagster, a private bike-share operator. This bike-share system is a collaboration of Zagster, the City of Fort Collins and Bike Fort Collins, along with the sponsorship of numerous local businesses.

In June 2018, the Fort Collins Bike Share became Pace Fort Collins. Pace Fort Collins, a product of Zagster, is a modern, dockless bike-share system that allows riders to dock their bikes at any local bike rack to end a ride. The citywide fleet has 250 bicycles, and since debuting two years ago, the program has provided more than 22,000 rides.

This flexibility expands the destinations users can travel to on bike-share. In addition, the system provides equitable access by accepting ride/membership purchases using EBT cards preloaded with public-assistance funds. Further enhancements to the bike-share system could include full integration of the Transfort trip-planning web and smartphone applications, along with Pace. This integration with transit would also be facilitated by incorporating bike-share stations at Mobility Hubs to ensure that bike-share serves as a first-last mile solution for transit users.



Shared E-scooters

Shared e-scooters are a system where scooters with electric motors are available for rental and short transportation trips. They are generally operated and maintained by private providers. They do not require memberships but have a small flat fee and a per-minute rate. This new shared-use mobility option has become popular around the country and is available in cities around the country and in Colorado, including Denver. Shared e-scooters are expected to launch in Fort Collins in mid-2019.

In anticipation of the potential arrival of e-scooters, the City updated local regulations. This includes e-scooter parking and inclusion of e-scooters in Downtown dismount regulations. Additionally the City is preparing a Request for Proposal (RFP) to manage e-scooter activity by selecting a company (or companies) to operate in Fort Collins. This will allow the City to work with e-scooter companies on details of operations and to help mitigate potential issues.

Early anecdotal data suggest that e-scooter sharing gets more usage than similar bike-share systems.



For some people, e-scooters are easier to ride and are less cumbersome to park than bikes. Cities that have planned for e-scooters by updating municipal codes to incorporate e-scooters and coordinating with e-scooter providers to negotiate the number of devices deployed onto city roadways have witnessed less disruption to their transportation networks than cities that had not prepared for the arrival of e-scooters.

Fort Collins is also reviewing its vehicle and bicycle codes, in anticipation of changes at the State level, to make sure it is clear where and how people should ride e-scooters (shared or not).

E-bikes

In addition to electric scooters, the use of electric bikes is also on the rise, in the form of privately owned and shared e-bikes. Fort Collins updated regulations that prohibit riders from using e-bikes on city trails with a one-year pilot to allow Class 1 and 2 e-bikes traveling 20 mph or lower on city paved trails. This pilot project is aligned with new state laws and the popularity of e-bikes.

E-bikes make biking accessible to many who otherwise would not feel comfortable biking while also expanding the range of how far some will bike to reach their destination. In a study at the University of Tennessee at Knoxville of its e-bike-share system data revealed that “with few exceptions, riders of e-bikes behave very similarly to riders of bicycles.” However, it is also important that the City of Fort Collins educates users and collects and analyzes data to protect the real and perceived safety of other trail users.



E-Bike

Car-Share

Car-sharing is a model for car rental that allows users to pay for access to vehicles for limited periods of time. Car sharing can come in many forms such as publicly or privately provided, gig economy based, and app-based. Rental periods for car-share are typically in minute or hour-long increments, filling a temporary need for a vehicle and offering an alternative to the traditional car-rental model, which requires a rental period of at least one day. In addition, car-share systems tend to have vehicles dispersed throughout a service area, making the vehicles easier to access than traditional car-rental companies. Access to a car-share vehicle is also much quicker than a traditional rental: a person either walks up to a car and gets in via an access card or smart phone, or reserves a car with a few clicks on a web page or smartphone app.

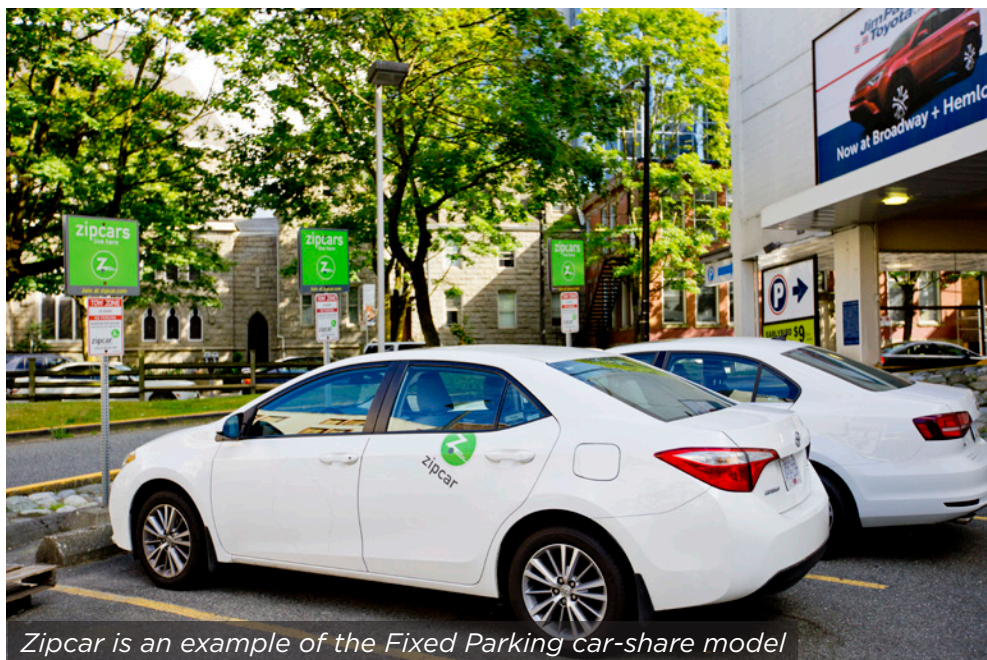
At the time of this update to the TMP, there are three primary models for car sharing:

- » **Point to Point.** This model consists of a fleet of vehicles that can be dropped off at any location within a designated service area. Point-to-point systems are designed for users traveling in one direction, do not require advance registrations and incentivize shorter trips by charging per minute of use.
- » **Fixed Parking.** The most well-known Fixed Parking car-share company is Zipcar. The Fixed Parking model requires an advance registration and the vehicle to be returned to its origin point. Fixed Parking requires coordination with private landowners and municipalities as the vehicles require a permanent location in either a privately owned lot or in the public right-of-way. In Fort Collins, Zipcar has several locations on and near the CSU campus.

- » **Peer to Peer.** The newest entrant in car sharing, peer-to-peer services provide a platform for people to rent their private vehicles out during times they are not in use. Rentals can be by the hour or by the day. Turo is an example of a popular peer-to-peer provider that currently operates in Fort Collins.

Fort Collins may continue to facilitate and support opportunities for car-share. This could be in the form of public-private partnerships, providing parking spaces or EV charging stations, or providing incentives and discounts as a part of Transportation Demand Management strategies. To better prepare for the continued growth of car-share services, the TMP recommends that the City formalize a permitting process that allows car-share operators to apply for a dedicated parking space or vehicle area permit through a streamlined process. The permitting process should clearly define the requirements that all vendors must meet, including required business licenses, insurance and operating permits. Unique permitting requirements should be identified for point-to-point and fixed-parking models.

Car sharing provides opportunities for people without access to a vehicle to enjoy increased connectivity when their travel needs cannot easily be met by walking, biking or riding transit. Car-share also tends to reduce overall vehicle use because the cost of operating a vehicle is no longer a hidden, sunk cost (as is the case with a privately owned car) and overall car ownership tends to decrease with car-share membership, which results in less driving overall. The availability of car-share models creates a more holistic landscape of transportation options and supports residents and employees who are unable or who choose not to own a vehicle.



Zipcar is an example of the Fixed Parking car-share model

Ride-hailing

Ride-hailing, provided primarily by Transportation Network Companies (TNC), is a newer mobility service that has exploded in popularity over the past few years. At its most basic level, ride-hailing is simply the modern version of a taxi using a web-based platform that matches passengers with drivers in a simpler and more intuitive way. Drivers opt in to provide this service, and fees and wait time are determined based on supply and demand, as moderated by the platform owners. Uber and Lyft are currently the TNCs operating within Fort Collins and the surrounding region.



Uber - a popular TNC

Nationally, TNCs/ride-hailing represent the fastest growing transportation mode. Multiple studies have shown that people choose ride-hailing for many reasons, and as a result, ride-hailing has the potential to reduce the mode share for all modes, including walking, driving, biking and transit. Recent data also show that ride-hailing has the potential to increase overall VMT because of mode shifts from walking, biking, and transit and because of the amount of “deadhead travel” (travel with no passengers) required to pick up new passengers. On the other hand, a key market for ride-hailing vehicles is transit hubs—where TNCs serve as a first-last mile connection to transit and have the potential to increase transit ridership by expanding access to stops and stations.

Overall, ride-hailing presents some mixed opportunities for Fort Collins. Ride-hailing provides a niche in the travel market for many trips: late evenings when transit is less frequent; travel with bulky items; social travel; and more. Ride-hailing also can help to reduce the risk of impaired driving by providing an easy way home for people who shouldn't be driving. On the other hand, excessive

use of ride-hailing can lead to increased VMT, energy use/greenhouse gas emissions, traffic congestion, and crowded curb spaces and loading zones.

The TMP recommends that the City work with TNCs to ensure that ride-hailing is part of the mobility environment, while also working to prevent increases in traffic congestion and negative environmental outcomes. Some potential strategies to balance the pros and cons of ride-hailing include:

- » **Open data requirements.** Provide the city with more information to be able to more effectively regulate and create public private partnerships with TNCs; require that TNCs provide open access to real-time travel costs and travel times so that cost/travel time information for multiple modes can be aggregated into a single source.
- » **Fees in highly congested areas and times.** While TNCs incorporate surge pricing to entice more drivers when demand is high, Fort Collins should consider congestion pricing ride-hailing vehicles when congestion threatens the reliability of transit operation.
- » **Explore passenger occupancy levels or taxing low occupancy vehicles or deadhead time.** Particularly during congested times, higher vehicle occupancies may be charged a fee for low occupancies, to help mitigate the curb and roadway congestion caused by ride-hailing vehicles.
- » **Operational improvements that prioritize transit such as transit signal priority or BRT service.** The popularity of ride-hailing has shown that people highly value short travel times and the ability to quickly access a vehicle. Improving the speed and reliability of transit will make this mode more attractive than ride-hailing when considering the cost differential.
- » **Formalizing ride-hailing as a part of the transit system.** The Transit Master Plan has identified areas where ride-hailing can provide transit access in areas with minimal fixed route transit service, identified as mobility innovation zones, or to serve as first-last mile connections at mobility hubs.

Curbside Management

In addition to TNCs' potential impact on congestion and roadways, this type of travel also increases the demand for curbspace through pick-ups and drop-offs. Without designated curbspace and enforcement of pick-up and drop-off zones, TNC vehicles often block travel lanes; conflict with bicyclists and pedestrians; double park; obstruct loading zones; or block bus stops when picking up or dropping off passengers. This can result in safety conflicts and operational inefficiencies for private autos, freight and transit. In order to mitigate these impacts, managing the limited space at the curb becomes a critical piece of the transportation system. The Curbside Management Practitioners Guide describes this process as follows: "Curbside Management seeks to inventory, optimize, allocate, and manage curbspace to maximize mobility and access for the wide variety of curb demands."

In the short term (one to two years), a curbside management study could examine how well locations accommodate moderate- to high-volumes of passenger-loading activity amid other uses. As a part of this study, the City could collect, observe, and analyze video and traffic data, including activity data from TNCs to quantify loading demand. These results will help better understand curbspace demand and the efficiency with which different people use the curb, evaluate interactions between roadway users, and understand other behaviors and trends at and around the curb. In the short and medium term (three to five years), the City could then implement strategies to improve curb productivity based on the results of the curbside management study.

Potential actions could include creating designated pick-up and drop-off zones, especially in mobility innovation zones where ride-hailing is encouraged as a form of public transit. Some of these strategies are already being piloted at certain times in Downtown. Mobility hubs should all contain pick-up and drop-off zones to facilitate multimodal travel and first-last mile connections to high-frequency transit. Three additional strategies that may be implemented include:

- » Relocating curbspace along a block;
- » Converting the amount of curbspace dedicated to various uses; and
- » Implementing flexible curbspace that applies technology and infrastructure to change the curb use as demand for that space fluctuates throughout the course of a day or week.

Electric Vehicles

The City of Fort Collins has an Electric Vehicle Readiness Roadmap that was completed in October 2018 and serves as a strategic plan for supporting the increased use of plug-in electric vehicles (EV) in the city. The Roadmap establishes a vision and a set of goals, and clearly defines roles for City Departments, the private sector and the community. EVs are a cornerstone of the City's Climate Action Plan because CAP assumes that a large proportion of future travel will still be carried out in smaller vehicles (either as privately owned autos or ride-hailing-type services) that are inherently more energy-intensive to operate than public transit, walking or biking. The EV Readiness Roadmap includes short, medium, long-term, and ongoing action items and strategies to achieve these goals **(Figure 5-9)**.

In the short term (one to two years), the Roadmap recommends that the City identify locations for EV charging stations in the public right-of-way, encourage installation of the stations and continue transitioning the City fleet vehicles to electric. In the medium-term (three to five years), the Roadmap includes strategies to revise building codes to incorporate EV charging into new developments, incentivize local residents to purchase EVs, and support EV drivers by adjusting their utility rate structures and increasing their access to renewable electricity for EVs. Over the long-term (within ten years), the Roadmap encourages the use of EVs for ride-hailing and car-sharing, upgrading electricity distribution infrastructure to accommodate increased demand from EVs, and pursuing emerging technologies that will further support the adoption of EVs such as wireless charging and battery recycling. Ongoing strategies include: providing resources for promoting public awareness on EV benefits, incorporating EVs into local planning efforts and advocating for EV adoption regionally.

To build on what is in the EV Readiness Roadmap, the City may work with state and federal legislators on further incentives for EVs or disincentives for traditional internal-combustion engines. These state and federal efforts, in conjunction with the strong local actions outlined in the EV Readiness Roadmap, will help to speed the transition to a more efficient electric-vehicle fleet.

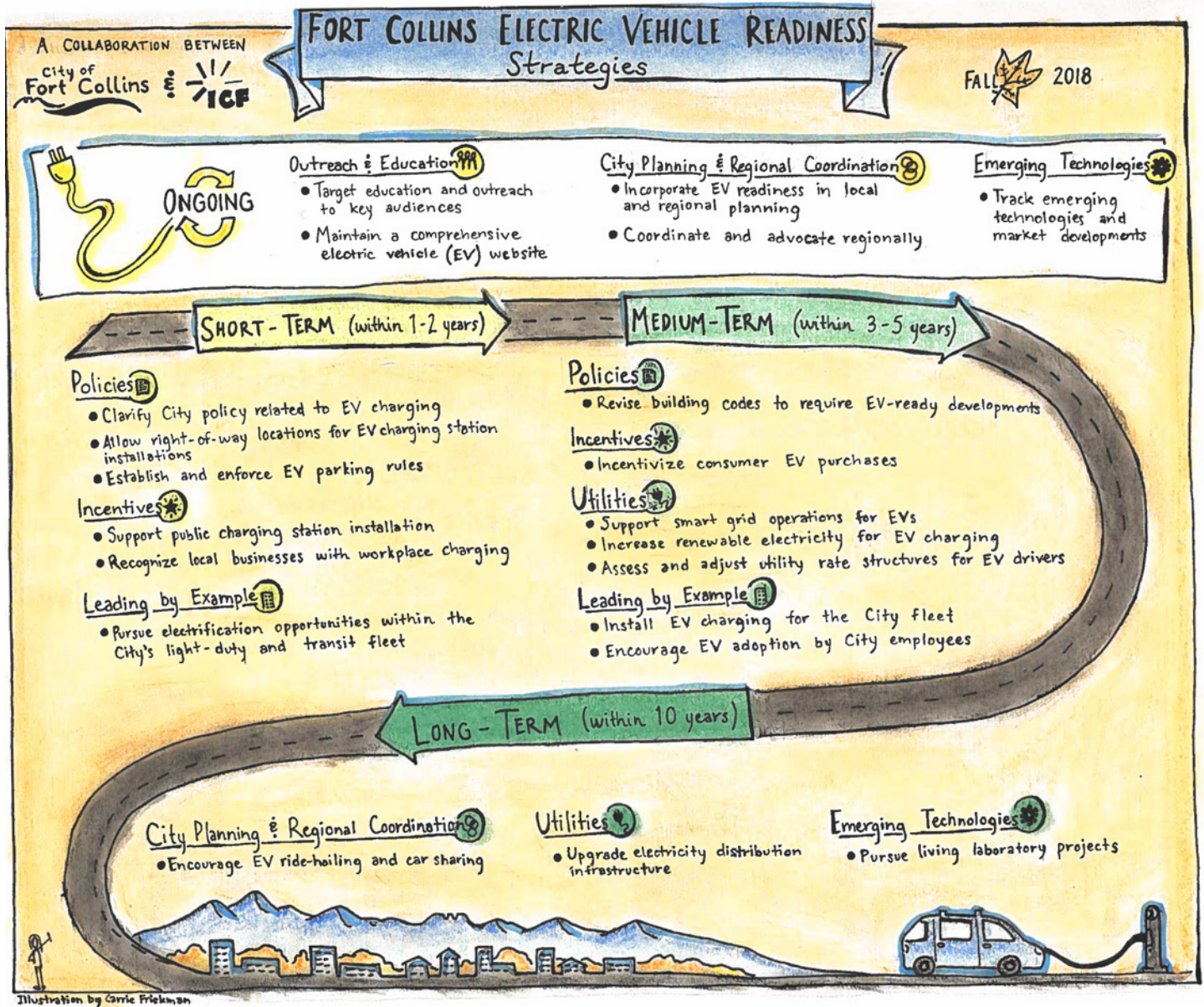


Figure 5-9: Strategies from the Fort Collins Electric Vehicle Readiness Roadmap

Autonomous and Connected Vehicles

Autonomous and Connected Vehicles (AV/CV), are two vehicle technologies that are rapidly evolving with the potential to impact travel patterns and trips choices in the future. AVs are capable of sensing the environment and moving through the street network with little or no human input. CVs are vehicles that communicate with other vehicles on the road, as well as connected infrastructure, to improve roadway use and safety.

AVs may increase the demand for travel due to the decreased opportunity costs for travel and decrease the demand for parking. In addition, research on travel behaviors suggests that AVs may decrease transit usage except for high-frequency transit services that operate in a separate guideway (e.g., BRT and rail). Some travel related to AVs has potential good outcomes by providing elderly and youth populations more mobility options and expected improvements in traffic safety.

Connected vehicles and connected infrastructure are currently in development and include various levels of connectivity, including:

- » Vehicle to Infrastructure;
- » Vehicle to Vehicle;
- » Vehicle to Cloud;
- » Vehicle to Pedestrian; and
- » Vehicle to Everything.

To address the potential impacts of AVs and CVs, strategies include:

- » **Curbside management (as discussed in the TNC section).** AVs could cause curbside congestion that impacts many other users and modes.
- » **Protect pedestrian safety.** The capability of AVs to adequately respond to pedestrian behavior presents a unique concern.
- » **Equity implications.** AVs may be more accessible to people with high incomes and the added congestion could negatively impact lower income populations.
- » **Land use impacts and policies to restrict potential sprawl.** When people don't have to drive, they might be interested in living further away from work.
- » **Opportunities for transit hubs and first-last mile connections.** AVs can serve as great connections to core transit services; Denver is about to get its first autonomous shuttle to connect a light rail station to an employment area.
- » **Transit implications.** Autonomous buses could improve the safety and reliability of the transit system and reduce operating costs.
- » **Support of Complete Streets principles and "Moving Towards Zero Deaths" goals.** AVs should not compete for space devoted to other modes (notably transit), though they can help achieve the "Moving Towards Zero Deaths" goals.
- » **Site planning and parking design that accommodates AVs and changes in demand.** The City could consider reducing minimum parking requirements in anticipation that AVs (and better transit service) will reduce the need for people to park at their final destination.
- » **Investing in smart infrastructure (e.g., dynamic traffic-control signals and multimodal sensor technology).** AVs can operate more efficiently and cities can better manage AV usage (through pricing, metering when trips can occur, etc.) if there is connected vehicle infrastructure. The City should monitor changes in connected vehicle technology.
- » **Developing data-management capabilities.** Fort Collins should work with state and federal legislators to ensure that the City can access relevant and anonymous data from AVs to help in understanding travel patterns and managing the traffic and curb congestion that could be caused by AVs

Drones

Delivery drones are remotely piloted vehicles that can deliver lightweight packages; they are currently in development and testing phases. In several examples across the world, drones are being used for delivering time-sensitive items, such as medicine, or for deliveries that would be difficult with traditional vehicle-based services.

Delivery drones have the potential to change last-mile delivery economics for smaller and lighter packages as they could replace many deliveries made by traditional delivery vehicles. The FAA issued regulations in 2016 that limit but allow the use of commercial aerial drones for deliveries. Current regulations require that a licensed pilot keep the drone within sight, the flight cannot be conducted from a moving vehicle, and the weight of the drone and package must be under 55 pounds.

Potential limitations include limited package weights; constrained operating times due to limited battery capacity; interference with other sidewalk and pathway users (for ground-based drones); difficulty in determining designated drop-off locations in dense urban areas; irregular or unpredictable events such as weather, wildlife or vandalism; and the need for airspace control regulation. In addition, aerial drones are a new source of noise pollution that is currently outside the scope of most city noise ordinances.

The potential limitations and impacts related to drone delivery, including concerns about privacy, noise, safety and vandalism, will need to be evaluated alongside the potential benefits of drone delivery. For example, drones could reduce the impact of "instant delivery" services and traditional vehicle-based delivery services in neighborhoods. Key actions to consider for both aerial and land-based drones include:

- » Size limits for land-based drones to ensure that sidewalk users can navigate around the vehicles;
- » Updates to the vehicle code to accommodate land-based drones;
- » Noise limits for aerial drones;
- » Operating hours to manage noise; and
- » Policies to address privacy concerns.



DHL delivery drone. Photo credit: Sam Churchill (flickr)

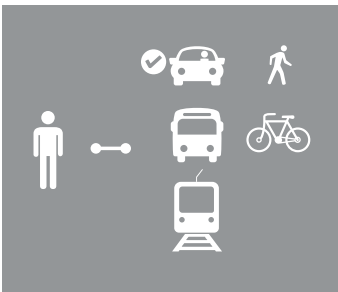
Mobility as a Service

MaaS describes the shift away from privately owned automobiles and toward transportation that is offered as a service. This includes both public and private providers that can work together to provide a holistic landscape of transportation options. MaaS provides reliable and comprehensive transportation options and information that can reduce the reliance on or eliminates the need for private automobiles. The average car costs more than \$8,800 per year to own and operate. By comparison, MaaS reduces costs for the user, decreases congestion, reduces emissions and provides transportation providers with the data they need to be more cost-effective. MaaS can become increasingly appealing and viable through an integration of modes that includes payment integration, a trip-planning app and mobility hubs.

Fort Collins can encourage and facilitate MaaS by:

- » Requiring open data from private providers to facilitate trip planning. This includes providing trip planning information and trip costs in a way that can be easily aggregated by a third party;
- » Creating a platform for integrated payment that starts with Transfort and bike-share and later expands to include private providers. Ultimately, Fort Collins may seek to require that third parties participate in an integrated payment system as a condition of operating in the City; and
- » Creating public-private partnerships that use private providers to complement and supplement public transit, particularly in the mobility innovation zones identified in the Transit Master Plan.

THEN



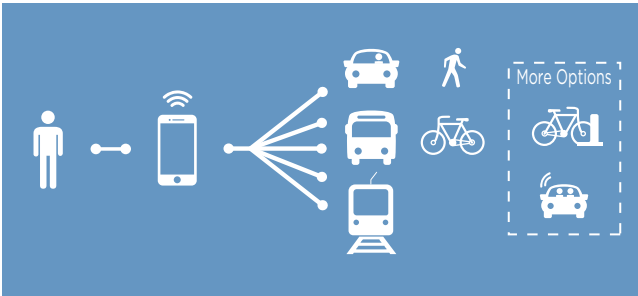
Loyal to Mode

Tend to use just one option and rarely switch

Perception of Limited Options

Personally owned car often the default option

NOW



Mobile Phone

Helps make choices, but each tool has separate app

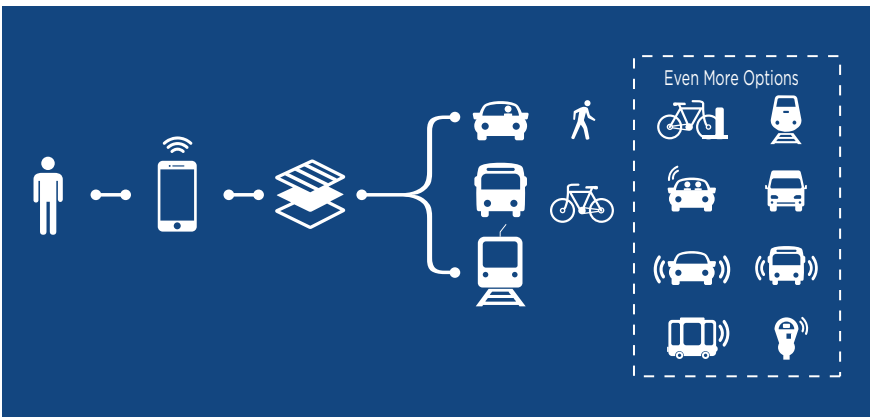
New Options

Many people use just one or two new options (ride-hailing, bike-sharing) in addition to their primary mode

Ride-Hailing

Car ownership separated from car use

FUTURE



Mobility as a Service

Use mobile device to select among many options and seamlessly book and pay for them

More New Options

Including innovative, new, private-sector mobility tools

Choose the Right Tool for the Right Trip

Based on better information about cost, time and comfort



People explore a Transfort bus during an Open Streets event in 2018.