CITY OF BOULDER
TRANSPORTATION ADVISORY BOARD AGENDA ITEM

MEETING DATE: December 9, 2019

INFORMATION ITEM:
Staff briefing and TAB feedback regarding the proposed Shared Micromobility Program and Use of Private and/or Shared Lightweight Electric Vehicles

STAFF:
Bill Cowern, Interim Director of Public Works for Transportation, Principal Traffic Engineer
Chris Hagelin, Interim GO Boulder Manager
Dave "DK" Kemp, Senior Transportation Planner
Reese Shaw, Planning Specialist
Will Shepherd, GO Boulder Program Coordinator

EXECUTIVE SUMMARY

The purpose of this memo is to provide an informational update and staff recommendations regarding the proposed Shared Micromobility Program and on which facilities private and/or shared lightweight electric vehicles should be allowed to operate.

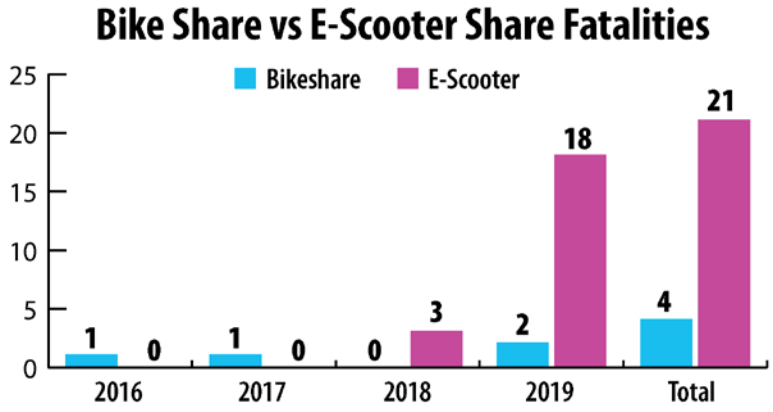
Following City Council's approval of a study period from May 2019 to February 2020, staff conducted a robust community engagement process focused primarily on the use of electric scooters (e-scooters) and whether businesses that provide shared, short-term rental e-scooters should be allowed to operate in Boulder as part of the city's shared micromobility program. Input from stakeholders, including boards and commissions, community organizations and individuals is mixed. Community members generally desire increased mobility options to decrease motor vehicle trips but are very concerned for the safety of users on streets. Specifically, there is concern for people with disabilities and other pedestrians within crosswalks and on sidewalks, particularly in downtown and other areas with high volumes of pedestrian activity.

Contained within this memorandum are two sets of staff recommendations for TAB and City Council consideration. The first set of recommendations address the types of vehicles that could be included in the city's Shared Micromobility Program and regulates the businesses who provide these shared electric vehicles for short-term rental. The second set of recommendations addresses where both private and/or shared lightweight electric vehicles could be allowed to operate within the City of Boulder. Electric-assist bikes (e-bikes) are precluded from these options as they have been previously regulated.

To complete Boulder's Shared Micromobility Program, staff recommends allowing only commercial, shared electric-assist bicycle providers to operate in the city. Staff does not recommend allowing commercial shared e-scooter providers to operate in the city.

For the shared micromobility program, staff recommends continuing and potentially increasing the investment in Boulder Bike Sharing/B-Cycle in order to continue the dock-based bike share system and to assist the with the evolution of B-cycle's equipment, funding model and operational practices in order to grow ridership and add electric-assist bicycles to the current fleet. Staff believes public funding for bike share is necessary for long-term success in addition to support from the private sector.

As staff's analysis suggests, bike share is significantly safer than e-scooter share and poses a much lower risk to users, people with disabilities and other pedestrians. There have been 21 e-scooter share related traffic deaths since 2018 (18 deaths in 2019, as of December 2). Since 2010, there have been 4 bike share related traffic deaths.



Data Source: NACTO Dec. 2, 2019

User compliance to regulations governing where e-scooters may be used and stored is of great concern. Other concerns include the displacement of walking, bicycling and transit trips which contradicts Boulder's Transportation Master Plan's active transportation mode share goals and the healthy way of life attributed to active forms of transportation.

Bicycles, including electric-assist or e-bikes, are a long-standing and proven form of active transportation. The electric-assist option offers more people of varying abilities the advantage to take on hilly terrain and travel longer distances without overexertion while still getting exercise. E-bikes also provide the ability to transport goods and are generally better at handling rougher pavement conditions. People riding bicycles can ride more predictably, including the use of hand signals when making turns. These tasks are much more difficult to do when riding an e-scooter.

While the concern for riding on sidewalks exists for both bikes and e-scooters, staff believes there will be significantly more regulation compliance on the part of bike riders. Staff's proposed regulation for bikes to be locked to a bike rack before and after each use ensures to a greater

degree that bicycles will be parked in an organized fashion and not create hazards for people with disabilities and other pedestrians. Most of the companies offering commercial shared e-scooters do not want e-scooters relegated to "mobility hubs" and most e-scooters do not have "lock to" technology. Currently, most of the companies offering commercial shared e-bikes now include "lock to" technology on their e-bikes.

Whichever direction City Council would like staff to take, the draft Shared Micromobility Program regulations addresses both shared commercial e-bike and e-scooter operations. The draft regulations are based on national best practices and input from stakeholder input and may be additionally tailored based on input from TAB and City Council.

For privately-owned lightweight electric vehicles, including e-scooters, staff recommends allowing their use only on residential streets and within the bike lane on streets that have a posted speed limit of 25mph or less. Staff also recommends that all privately-owned lightweight electric vehicles be allowed to operate on all, or, specified multi-use paths.

When Colorado House Bill 19-1221 became effective in June 2019, e-scooters became legal for use on public streets statewide. Other lightweight electric vehicles, such as one-wheels, unicycles and both human powered and electric skateboards are currently prohibited from operating on public streets and are considered a "toy vehicle" by Colorado's state statutes. Electric vehicles are also currently considered motorized vehicles and are prohibited from operating on sidewalks and multi-use paths per BRC 7-4-50.

The city's extensive network of on-street bike lanes and multi-use paths will provide a high level of mobility and access for private use of lightweight electric vehicles. Staff believes it may be reasonable to allow electric vehicles to operate on sidewalks rather in the bike lane on streets with higher vehicle volumes and speeds; and in areas with lower pedestrian activity. In contrast, areas unfit for the use of lightweight electric vehicles on sidewalks include areas with high pedestrian volume and with businesses adjacent to the sidewalk with zero set-back, such as Downtown, University Hill, and North Broadway.

Staff recognizes that the current distinction of where bikes and skateboards can and cannot be ridden on sidewalks is confusing and difficult to understand. Staff will conduct a community engagement process regarding where human powered bikes and skateboards are currently allowed to operate on sidewalks and if the inclusion of electric vehicles should also be allowed to operate on sidewalk when appropriate. Staff will bring forward the results of the community engagement process and potential recommendations for changes to ordinances B.R.C. 7-5-10 and B.R.C. 7-4-50 in 2nd quarter 2020.

Staff was originally scheduled to return to TAB in November and to City Council on December 3, 2019 to provide an update. Due to other council priorities, this update was rescheduled to January 7, 2020, leaving insufficient time to seek TAB feedback and to conduct a public hearing with TAB prior to bringing any new ordinance(s) to council before the expiration of the current moratorium on February 4, 2020. Therefore, an extension of the moratorium to April 21, 2020 is under consideration by City Council for this reason, as well as, to allow for the mandatory 30-day period to transpire before any new ordinance(s) can go into effect. The ordinance extending

the moratorium is scheduled for first reading on December 3, 2019 and second reading on December 17, 2019.

Following the input from TAB and City Council, staff recommends initiating a Request for Proposal (RFP) process in March 2020 to select 1-2 shared commercial micromobility providers. Following the RFP review, selection and contractual process, staff anticipates program commencement summer 2020.

TAB INPUT

1. What questions and/or suggestions does TAB have regarding the Shared Micromobility Program analysis, community engagement results, program options or staff recommendation?
2. What questions and/or suggestions does TAB have regarding where shared and/or private electric vehicles may be used in Boulder?

BACKGROUND

"Shared Micromobility" refers to any small, human or electric powered mode of transportation or recreation such as bikes, electric assist bikes, electric scooters or any other small, lightweight human powered or electric vehicle that is being used as a shared resource between multiple users.

Systems usually allow point-to-point trips and most companies provide a similar service model to the customer. Vehicles are distributed across a community and typically customers can use a smartphone to find access and unlock a device, and pay for the trip using a mobile app. Business operational models between companies vary greatly and affect the type of operations and maintenance provided.

There are two primary types of operational models: Docked and dockless. The docked model, also known as "docking stations," consists of vehicles (bikes, e-bikes and e-scooters) that can be borrowed or rented from an automated docking stations and can be returned only to another docking station belonging to the same system.

The dockless model does not require a docking station. With dockless systems, bicycles can be parked within a defined district at or to a bike rack or along the sidewalk. Dockless vehicles are typically located and unlocked using a smartphone app and do not require a kiosk to rent a bike.

The City of Boulder's current Shared Micromobility Program consists of a docked-based bike share system called "Boulder B-Cycle," and has been operated by the non-profit organization, "Boulder Bike Sharing." Through a Request for Proposal process in 2010, Boulder Bike Sharing won the contract to provide the Boulder community with a dock-based bike share program and now shares a master agreement with the City of Boulder to work toward achieving key quarterly metrics. Launched in 2011, Boulder B-Cycle has grown in both size and use every year. Today,

its 300 red bikes provide more than 100,000 rides annually to approximately 15,000 community members. Boulder B-Cycle's operations, maintenance and expansion is currently funded through a combination of sponsorship opportunities, fair box recovery through four different pass options and an annual subsidy provided by the City of Boulder *(more information regarding potential impact to Boulder B-Cycle provided in analysis section).*

In 2017, commercial dockless bike share companies approached staff and community leaders seeking the permission to initiate dockless bike share operations within the City of Boulder. The community had numerous concerns regarding the operational model of allowing "free-floating, self-locking" bikes in Boulder. Staff drafted an ordinance stipulating operational regulations including the requirement for the dockless bikes to have a "lock to" capability and that the bicycles be locked to a bike rack when not in use. Another requirement for each company was a rather modest initial fleet cap size of one hundred human-powered bicycles, plus an additional fifty bicycles if they were electric-assist or adaptive (for people with disabilities).

The companies were also provided the option to grow their fleets if key performance indicators were accomplished on a quarterly basis. On June 18, 2018, City Council adopted the Dockless Bike Share Licensing Program ordinance. Soon after, many of the companies who sought initial interest in Boulder either went out of business, left the U.S. market or switched from the self-locking, dockless bike share model to the shared e-scooter model. This was an early example of the rapidly changing landscape of the micromobility industry. Today, the shared micromobility companies currently operating in U.S., primarily offer either both shared e-bikes and e-scooters or only e-scooters, although additional styles of lightweight electric vehicle have recently entered the "mobility as a service" market. While these devices are somewhat different than traditional e-scooters, they generally fall into the e-scooter category as they are entirely dependent upon an electric motor for propulsion but may offer larger wheels and a sit-down option.

In late 2017, commercial shared e-scooter companies began deploying hundreds of e-scooters in numerous cities throughout the country, including Denver, without gaining the consent and/or formal approval from local municipalities to do so. This was a cause of much concern to numerous communities who were forced to react to the large number of e-scooters that were deployed without notice. Many communities reacted by removing the vehicles from the sidewalks and streets, filing lawsuits, or were forced to create regulations after the fact.

In order to avoid the same problems as experienced in other cities, staff's best defense was to watch for commercial e-scooter companies seeking a business license to operate in Boulder. The fine associated with operating a business without a license is considerable when considering the number of rentable vehicles that could be potentially deployed. While staff never rejected a business license, commercial operators were not able to explain how they would be able to effectively operate a business model that discouraged the illegal use of the e-scooters on sidewalks, streets, and multi-use paths.

When Colorado House Bill 19-1221 became effective in June 2019, e-scooters became legal for use on public streets statewide, with the provision that local communities can adopt licensing programs to regulate shared commercial e-scooter operations. City Council enacted a temporary moratorium to allow for a study period on new commercial e-scooter businesses within Boulder,

with the plan for staff to return with a regulatory framework to govern the private sector of micromobility by February of 2020. This study period has allowed staff the time to engage with the community, seek input from the appropriate boards and commissions, research best practices and draft micromobility regulations (e-bikes and e-scooters) for council consideration.

It's important to provide clarity on the types of electric vehicles and the laws that pertain to their use within the City of Boulder. E-bikes have been legal to operate on city streets statewide since the early 2000's, and more recently, also allowed to operate on multi-use paths. This law does not apply to the city's Open Space and Mountain Park (OSMP) trails. OSMP staff, however, will be conducting a community engagement process in 2020 to re-evaluate if e-bikes should be allowed on OSMP trails.

The controlling statute in Colorado for most of the bike laws is C.R.S. Section 42-4-1412 and for electric bikes as defined in C.R.S. Section 42-1-102. This statute was expanded to add the three categories or classes of E-bikes. E-bike Class I is for a pedal assist and provides electrical assistance up to 20 mph. E-bike Class II provides electrical power when the rider is pedaling or not and stops giving power when the e-bike reaches the speed of 20 mph. E-bike Class III provides electrical power up to 28 mph. In Colorado, Category I and II can be ridden on a bike, pedestrian or multi-use paths. Class III can only be ridden on street. When we refer to e-bikes as part of a shared micromobility program, staff is referring to Class I bikes.

When Colorado House Bill 19-1221 became effective, e-scooters became legal for use on public streets statewide. Other lightweight electric vehicles, such as one-wheels, unicycles and both human powered and electric skateboards are currently prohibited from operating on public streets and are considered a "toy vehicle" by Colorado's state statutes.

Furthermore, and except for e-bikes, all other electric vehicles are prohibited from operating on sidewalks and multi-use paths per BRC 7-4-50. Both human powered scooters and skateboards may be operated on sidewalks and multi-use paths, except in designated dismount zones.

COMMUNITY ENGAGEMENT SUMMARY

Staff has engaged numerous community stakeholders, including city boards and commissions, to understand their concerns and interests regarding a Shared Micromobility Program. The stakeholders listed below are very familiar with forms of micromobility, whether they consist of dock-based or dockless bikes, e-bikes or e-scooters. There is a general community interest in e-bikes and people see a benefit for shared e-bikes given Boulder's hilly terrain and need for longer trips across Boulder and to neighboring communities within the region.

For shared commercial e-scooter programs, there is some interest, but also a tremendous amount of concern. Many people are very familiar with the concerns around shared e-scooters due to the extensive social media coverage or personal experiences from other cities, including Denver.

Opponents of shared e-scooters programs express concern for the safety of users and others indirectly impacted. They state concerns of e-scooters parked in the public right-of-way,

blocking sidewalks and creating clutter. The environmental sustainability of the programs also comes into question due to the vehicles' relatively short lifespan.

Proponents of shared e-scooters programs see a transportation benefit as a viable alternative to single occupancy vehicle trips and when safety concerns arise, point to the fact that all modes have safety implications and that e-scooters are being unfairly singled out. Proponents are encouraged by the potential reduction of vehicle miles traveled and point to e-scooters as another way to decrease overall greenhouse gas emissions.

The following section is a summary of community stakeholder input. Since June 2019, staff has coordinated with and presented and listened to several community stakeholders, city boards and commissions. Below is a summary of their position on micromobility:

- **University of Colorado Boulder (CU)** – City staff have been working closely with CU and the Boulder Chamber since June 2019 as part of a micromobility subcommittee of a larger city and CU transportation coordination committee. While there is agreement between the city and CU in terms of developing micromobility regulations, there are specific regulations respective to each agency. CU is a state agency and can operate and regulate micromobility independent of what the city chooses to do, although there is agreement that the regulations governing micromobility for each entity should be seamless. Important to note that CU is conducting an independent process to examine and determine if micromobility operations (primarily e-scooters) will be allowed on CU's campus. At this point, the timeframe unclear when this decision will be made.

- **Boulder Chamber** - The Boulder Chamber has a keen interest in expanding mobility options for Boulder's workforce. Major employment centers, such as, Flatirons Business Park, East Walnut Street, Gunbarrel and many other areas throughout Boulder experience a lack of mobility options to either arrive to, or depart from, an employment center, particularly if they are accessing those centers through from regional transit stops. The Boulder Chamber recognizes the impact of regional transportation trips on Boulder and is working to identify first and final mile solutions for these employment centers. For this reason, the Boulder Chamber advocates for full exploration of all possible opportunities to improve mobility for Boulder's workforce and residents, including extended pilot demonstrations, and see docked bikes and dockless e-scooters and e-bikes as a comprehensive set of innovative transportation choices that should be utilized in Boulder in a regulatory and responsible manner.

- **Downtown Boulder Partnership (DBP)** – DBP's most important concern is the ability to at least maintain the level of pedestrian safety that exists in the downtown core area. Though bikes and scooters are prohibited on the Pearl Street Mall, their presence is an ongoing safety hazard for pedestrians. They believe that enforcement of the prohibition is rare, for many reasons, including the temporal and transitory nature of the offence and the realistic capacity and priority of our enforcement partners. Their recommendation is to disallow, through geofencing, all micromobility vehicles on the sidewalks of Pearl Street between 9th and 15th, Walnut Street between 11th and 15th and Spruce Street between 11th and 15th. DBP is also concerned about the accumulation of vehicles (parking) in an unsafe and disorganized array on the perimeter of the core area, and request that

micromobility parking be limited to designated docks, keeping the sidewalks safe, and accessible for all. Additionally, DBP is concerned about an additional loss of on-street parking that might be determined necessary in the implementation of this program and would like to be involved in decisions regarding such displacement. Lastly, DBP supports staff's recommendation to the program time restriction of 6:00am – 9:00pm.

- **Boulder County Local Coordinating Council (LCC)** - The Boulder County Local Coordinating Council is an alliance of government and nonprofit organizations collaborating for accessible, affordable, and equitable transportation for people with mobility challenges, including older adults, people with disabilities, and low-income families. LLC expressed concerns that e-scooters could easily be moved or placed in the public right of way, which could impede the mobility of people with disabilities and older adults. E-bikes and e-scooter parking placement should meet the minimum accessibility requirements according the Americans with Disabilities Act. LCC has previously expressed support for shared bikes to have a "lock to" capability.

- **Downtown Management Commission (DMC) and Boulder Junction Access District Commission (BJAD)–** Staff presented to the DMC and BJAD at a joint meeting in September. Both commissions shared many of the same concerns as Downtown Boulder Partners in terms of safety of pedestrians and the organized storage of the vehicles. Both commissions seemed generally in favor of moving forward with a shared micromobility program that includes docked bikes and dockless e-scooters and e-bikes with the goal of decreasing motor vehicle trips in both improvement districts.

- **Parks and Recreation Advisory Board (PRAB) –** Parks and Recreation Advisory Board (PRAB) – PRAB members generally expressed concern regarding the inclusion of e-scooters in a shared micromobility program. They are concerned for the safety of users, pedestrians and people with disabilities, particularly when e-scooters are being ridden on sidewalks, multi-use paths and parks. Many people, including senior citizens already feel intimidated and concerned when walking sections of the multi-use path network and an influx of hundreds of e-scooters will not have a positive impact on community member's multi-use path experience. Further, they are concerned that vehicles parked (when not in use) along the multi-use paths and in city parks will have an impact on maintenance operations, such as sweeping and snow removal.

- **Community Cycles –** Staff shared the proposed regulations with Community Cycles at their monthly Advocacy Committee on November 4. Staff shared some of the background on the overall program- challenges and opportunities. Community Cycles supports Micromobility in Boulder as a non-motor vehicle transportation alternative with appropriate regulations and enforcement. The current rules for E-bike share are stringent and have prevented vendors from entering the market and hope that flexibility is provided to ensure companies want to operate in Boulder. In addition to downtown, we also recommend the 55th/Central area as a good place for micromobility which is not well served by public transit. More micromobility options help get people decrease vehicle trips and will show an increased need for bike lanes and parking hubs.

Demonstration Events - In coordination with CU and the Boulder Chamber, staff held five e-scooter demonstration (demo) events in September. Staff greatly appreciates the time and energy the micromobility companies put forth to help community members experience firsthand e-scooters. While the technology of the e-scooters is similar between the various companies, they are slight nuances with how each of the machines handle, including breaking functions, solid vs. pneumatic tires, displays, battery accessibility, lights, shock absorbers and size of vehicles. Community participation in of the demo events was good, particularly at the event in Flatirons Business Park. Altogether, staff estimates that a couple hundred people participated in the events. Participants who did demo the e-scooters typically returned with a favorable impression. Participants were directed to an online mobile Be Heard Boulder questionnaire following their test ride. The demo events were held at the following locations:

- September 10 – 11-5pm - (CU Bike Fest) Farrand Field
- September 16 – 4-6pm – Farmer's Market Atrium
- September 17 – 4-6pm – Farmer's Market Atrium
- September 18 – 11-1pm – Flatirons Business Park
- September 19 – 11-1pm – CU's Center for Community

Questionnaire Results - Staff gathered community perceptions about e-scooters in a questionnaire distributed through Be Heard Boulder and received almost 700 responses between Sept. 9 – Oct. 5.

Approximately 37% of respondents answered in favor of allowing e-scooter companies to operate in Boulder while 49% were not in favor and 13% said they were not sure. However, CU Boulder also conducted their own questionnaire and when both questionnaires were combined 48% of people answered that they are in favor of allowing e-scooter companies to operate in Boulder, 39% were not in favor, 12% were unsure, and 1% had no opinion. This shows that there is more support for e-scooters among CU Boulder students and less support among residents and employees working in Boulder. However, in the CU specific survey, students were supportive of e-scooters compared to CU faculty who was not supportive of e-scooters.

Staff also conducted a cross tab analysis between people who have ridden an e-scooter before vs people's support for e-scooters coming to Boulder and found that 53% of people who have ridden an e-scooter are in favor of e-scooters coming to Boulder and only 22% of people who have not ridden an e-scooter are in favor of e-scooters coming to Boulder.

The city's questionnaire also showed that people less than 35 years old are more supportive of e-scooters than people aged 35 and greater. It is also evident that people making less than $25,000 a year are more supportive of e-scooters compared to people making above $25,000 a year. Respondents making $100,000-150,000 were the least supportive with 52% not in favor.

In addition to data collected via the Be Heard Boulder questionnaire, staff also worked with the city's community engagement specialists to gain a broader range of input from traditionally underserved communities. The questionnaire and a general description of the e-scooter rental process was translated into Spanish and distributed via mobile phone messaging to "City Text" program recipients and via email through Boulder Housing Partners. Initial data showed a 10%

response rate with 57% positive interest in allowing shared e-scooter rental to be available in Boulder.

ANALYSIS

The following analysis addresses the shared e-scooter industry and provides comparison and contrast to both the dockless and docked-based bike share systems operating in other cities today.

Staff's analysis includes references from evaluation reports from several communities and both scientific and non-scientific journals and articles. Staff has attempted to assemble information using limited resources of information to arrive at an informed understanding as it pertains to shared e-scooter operations in each the following areas: **Safety, Mode Shift, Sustainability, Equity and Demographics.**

SAFETY - Although there have been few studies investigating the rise in scooter-related injuries, a study released study from Austin, TX was the first study to be overseen by federal epidemiologists at the Center for Disease Control (CDC). This article provides a concise summary of the report's findings including a short, informative video about e-scooter operations in general. Injuries resulting from e-scooter use are prevalent. Importantly, many of these crashes result in head injuries.

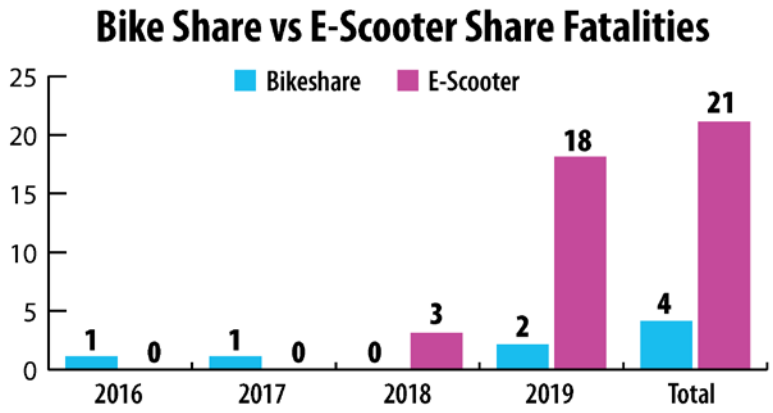
According to a study from Austin, TX, helmet use while e-scooting is rare ranging from 1 - 4% in all medical studies. This results in many head injuries (40 - 67%) and a significant portion (29%) of injuries occur on a person's first e-scooter trip. The percentage of injuries begins to decline following subsequent trips, that is, e-scooters users tend to get better at e-scooting with more trips. Another study showed that of the 79% of the e-scooter injury patients tested for alcohol, 48% of patients during the study period had a blood alcohol content of greater than the legal limit of 08%. Although many of the e-scooter companies are working hard to promote helmet use through incentives and free helmet giveaways, user compliance is still very low.

Injuries per miles traveled - Overall, e-scooter users suffer more injuries per miles traveled than personal bikes and shared bikes. Our research shows there was 1 shared e-scooter injury per 5,604 miles traveled. This is based on a averaging data from the aforementioned CDC study and the evaluation reports from the cities of Portland, OR and San Francisco, CA. A study from the Mineta Transportation Institute (averaging regional data from Washington DC and the San Francisco Bay Area) showed personal bike injuries at 1 per 235,000 miles traveled and roughly 1 bike share injury per 473,000 miles traveled.

It's important to set the context regarding percentage of e-scooter injuries relative to all types of injuries, for example, e-scooter injuries make up a small portion of total emergency room visits across cities (5% of all visits in Portland during their pilot period). Additionally, there were almost 23 times more car injuries than e-scooter injuries in Baltimore during their pilot: 2881 vs 126.

Fatalities per number of trips - In 2018, e-scooter share fatalities were 1 fatality per 12,833,000 trips, and 1 bike share fatality per 52,000,000 trips.

In 2019, there was a sharp increase in shared e-scooter fatalities from 2018. Given the 18 shared e-scooter fatalities (U.S. only) that have occurred in 2019 (as of Dec. 2) and if we apply the assumption that e-scooter trips doubled from 38,500,000 in 2018 to 77,000,000 trips in 2019, this equates to approximately 1 shared e-scooter fatality for every 4,277,778 trips. Bike share fatalities, when averaged over four years between 2016-2019, shows a rate of 1 bike share fatality per 52,000,000 trips.



Data Source: NACTO Dec. 2, 2019

Fatalities per mile traveled (mode comparison) - Last year, 36,560 Americans died in car crashes, not including 6,283 pedestrians killed by cars. This translates to 1.13 fatalities per 100,000,000 vehicle miles traveled.

An average trip length for a shared e-scooter is approximately one mile according to a recent City of Denver, CO e-scooter evaluation report and a 2018 NACTO report. According to the same NACTO report, the average trip length for a shared bike (docked and dockless combined) is approximately 1.75 miles.

If the average e-scooter trip distance was approximately one mile and there was 1 fatality per 4,277,778 trips, or 4,277,778 miles traveled, this equates to a rate of 23 e-scooter fatalities per 100,000,000 miles traveled (under the assumption that e-scooter trips doubled from 2018 to 2019).

If we assume e-scooter trips tripled from 2018 to 2019, then the e-scooter fatality rate goes down to 15.6 fatalities per 100,000,000 miles traveled. Further, if we assume e-scooter trips quadrupled, then the rate becomes 11.7 fatalities per 100,000,000 miles traveled.

When compared to bike share, the average trip distance in 2018 was approximately 1.75 miles which equates to 1.1 fatalities per 100,000,000 miles traveled.

Obviously, there are by far hundreds of thousands of more private motor vehicles than shared bikes, e-bikes and e-scooters on the road today and most of the bike and e-scooters injuries and fatalities are result of crashes with motor vehicles.

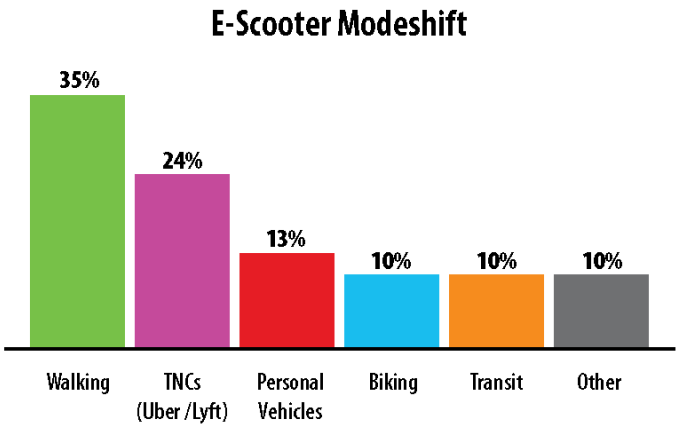
Nonetheless, it is reasonable to state that bike share is significantly safer than e-scooter share and there is generally a higher risk when operating an e-scooter. That said, the safest form of mobility today is public transit. It is ten times safer per mile than traveling by car because it has less than a tenth the per-mile traffic casualty (injury or death) rate as motor vehicle travel.

Multi-use Path Safety - Today, people with disabilities, pedestrians and dog walkers, cyclists (human powered and electric-assist) and users of other lightweight electric vehicles, including e-scooters, sit-down scooters, one-wheels and electric skateboards, all utilize the multi-use path system. Along some sections of the path network at peak times, path congestion is evident and close calls have been reported among bikes, e-bikes and pedestrians. Crashes (some severe) between multi-use path users have been reported at or near underpasses and typically involve bike vs. bike and bike vs. pedestrian conflicts.

MODE SHIFT - A common question that arises when evaluating the effect of commercial e-scooters is if they are, in fact, displacing automobile trips. Shared e-scooters operators tout first and final mile solutions for transit and that e-scooters replace personal automobile trips. This is true; however, they have also an effect on other modes too. Staff examined the evaluation reports from six cities (Arlington, VA; Denver, CO; Oakland, CA; Portland, OR; Minneapolis, MN; and San Francisco, CA) and looked specifically at the responses to the following survey question:

- **If an e-scooter had not been available for your last trip, how would you have made the trip?**

Staff averaged the responses from each of the cities and found e-scooter trips are replacing more low-emission transportation modes than high-emission transportation modes. Results vary from city to city, but trends are showing that walking is being displaced the most by e-scooter trips and is most evident in Denver and Oakland where almost half of all survey respondents said that if an e-scooter had not been available they would have walked instead.



E-scooters are also replacing many Transportation Network Companies (TNC) trips, which could lead to a reduction in vehicle miles traveled in cities that heavily rely on TNCs such as San Francisco where over a third of respondents would have called an Uber or Lyft had an e-scooter not been available.

First and Final Mile Transit Solutions - Some cities are seeing that e-scooters are being used successfully as a first and final mile connection. A survey conducted by SFMTA in San

Francisco showed that about 27.5% of e-scooter survey respondents would not have otherwise taken transit but used the service to connect to transit (induced transit trips). This analysis shows that the availability of shared e-scooters induced around four times as many transit trips as were replaced by these services, indicating that shared e-scooters facilitated a net increase in transit trips by serving as a last-mile solution. Other cities such as Denver and Portland are seeing some people use e-scooters to access transit at least once a week (19% of Denver respondents and 11% of Portland respondents) although more people are not using scooters to access transit at all (44% of Denver respondents and 61% of Portland respondents).

Staff recognizes that the size and density of the cities evaluated is very different than the size and density of Boulder and not a fully applicable comparison; however, this is the only data available for this aspect of our analysis. Furthermore, the survey responses are not statistically valid and should be treated as opinions vs. responses that are representative of an entire community. Nonetheless, staff did observe some trends across all participant responses. According to our analysis, it is safe to say that e-scooter could replace vehicle trips (TNC and personal trips at 37%), but they would also have a negative impact on forms of active transportation including, walking, bicycling and transit at 55%

EQUITY - Efforts to address equity and service to underserved communities have been successful to varying degrees within different cities. All cities with e-scooter programs have identified underserved communities where e-scooter companies need to take extra steps to ensure inclusion. Companies are required to deploy a certain percentage of their fleet within these communities, as well as offer and promote low-income payment plans. Fleet deployment efforts have been successful in cities such as San Francisco where over half of all rides began or ended in a "community of concern." Other cities have seen less success, such as Portland, OR, where only 6% of all trips took place in East Portland, which is recognized as a community of concern.

Staff has also observed that low-income payment plans and cash-based programs are not being utilized in some communities because they are not being promoted very well by the companies. The City of Baltimore, however, views e-scooters as a low-cost mode of transportation that can help serve low-income residents who do not have access to a motor vehicle. There may be other reasons why underserved communities do not utilize e-scooters for transportation purposes, such as trip distance to places of employment, jobs that require carrying tools or equipment, or the need to shuttle family members for both recreation and transportation purposes. Regardless of participation, the shared e-bike and e-scooter providers are ready and willing to provide services at a reduced cost to community members of underserved neighborhoods and that a strategic partnership with the municipality and community champions will elevate the success of these programs.

USER DEMOGRAPHIC- Most surveys conducted by cities are not statistically valid but still offer insights into the demographics of e-scooter users based upon those whose chose to respond to questionnaires. Surveys show that most people using e-scooters are white (80%) men (70%) that earn more money than the median income in their respective cities. Surveys also show that people younger than 35 years old tend to use scooters more than those in older age ranges.

SUSTAINABILITY- According to a study released by IOP Publishing, shared, dockless e-scooters are currently not a sustainable mode of transportation due to their low life cycle. Half of emissions attributed to e-scooters come from the materials and manufacturing processes used to build them. Another 43% of e-scooter related emissions result from the vehicles used to rebalance them throughout the city daily. The electricity used to charge and power e-scooters only accounts for about 5% of their environmental impact. Cities can drastically reduce the environmental impact of e-scooters by requiring zero emission rebalancing fleets and reducing the distances that rebalancing fleets need to travel in order to rebalance e-scooters; however, this requirement is not looked favorably upon by the operators.

Shared e-scooters have a greater carbon footprint per miles traveled than transit, bikes, and walking, but have a lower carbon footprint than personal cars and TNCs. If e-scooter trips replaced more motor vehicle trips than what staff's analysis currently anticipates they can be more environmentally sustainable.

Shared e-scooter companies are working on improving the durability of e-scooters; however, an open data report from Louisville, KY from 2018, showed that e-scooters have a life span of 28.8 days. Since then, companies have made vehicle identification private to protect user privacy, so we do not know 2019 average lifespans. It is also important to note that the IOP publishing study assumed that e-scooters had a lifespan of six months to two years, which is very liberal when compared with available data. Even so, the study concluded that e-scooters resulted in a net increase in global warming in 65% of their simulations, thus questioning the overall environmental sustainability of the programs. E-scooters have also been subject to vandalism by third parties (not necessarily by the customer) and there have been numerous reports of people discarding e-scooters in public waterways, including lakes and rivers causing adverse effect on riparian ecosystems.

IMPACT TO BOULDER B-CYCLE - Decisions on how and whether to allow commercial shared micromobility operators will affect Boulder's current docked-based bike share program, Boulder B-Cycle. It's evident from other cities, that commercial, shared e-scooters rentals will compete with Boulder B-Cycle's current pass options, whereby reducing the number of Boulder B-Cycle trips and its fair box revenue stream. While B-Cycle is an older model of bike share system, it is safe, reliable and predictable.

Between 2011-2015, the City of Boulder contributed $375,000 through direct purchase or as local grant match to acquire capital equipment in the form of bikes and docking stations. Through the local matches, City of Boulder leveraged an additional $773,000 through state and federal grant programs to purchase additional capital equipment between 2011-2013.

Since 2011, the City of Boulder has contributed $466,500 toward B-Cycle's operations and maintenance expenditures. In fall 2019, The City of Boulder contributed an additional $80,000 due to Boulder B-Cycle's loss of a presenting sponsor this year. Without this contribution, Boulder B-Cycle would have ceased operations in November 2019.

Boulder B-Cycle's current funding model is unsustainable, although their staff have done a tremendous job at acquiring sponsorship funds for over eight years. Relying on annual

sponsorships to fund operations and maintenance is not a best practice as we've seen from the latest withdrawal of their presenting sponsor and leaves the organization in an on-going vulnerable position. This winter, staff from the city and Boulder Bike Sharing will engage in a strategic planning workshop to determine the best long-term direction for Boulder B-Cycle in terms of funding models, sources of funding, refinement to existing stations and bikes and how the organization might evolve its current system to also include dockless e-bikes.

Due to the unpredictable nature of the private "mobility as a service" industry, it's imperative Boulder continues to maintain and grow its investment strategy in Boulder Bike Sharing to continue and evolve the current system. While shared micromobility companies offer seemingly free, new technology and transportation accessibility benefits, the industry continues to rapidly change. These companies can and do arbitrarily choose to raise prices and start and cease operations in various cities. Boulder's least desirable result would to be without any form of shared micromobility. Staff believes public funding for bike share is critical for long-term success, as it is for every type of mobility option. There is a role for the private sector to augment the current reach of B-Cycle's service with dockless e-bikes, as well as, its continued support for bike share through sponsorship and corporate membership investments.

DRAFT REGULATIONS - Staff has drafted a robust set of Shared Micromobility Program regulations based on peer city programs, community stakeholder feedback, National Association for City Transportation Officials (NACTO) best practices and feedback from several shared micromobility companies. The regulations currently address both shared e-bikes and e-scooters. Essential and refined regulations from the existing Dockless Bike Share Licensing program have been included to create a universal set of regulations.

To develop the draft regulations, staff performed an alternative analysis of high, medium and low levels of regulation based upon other communities and NACTO guidance. Staff preliminarily selected which tier of regulation would be most appropriate for the City of Boulder and then shared the initial set of the draft regulations with city departments, key community stakeholders and shared micromobility companies. Using their input, staff crafted the final set of draft regulations, which we are sharing with TAB and City Council for consideration.

The regulation framework address five primary categories including, General Terms and Conditions (insurance, contracts and fees), Scope and Operations (safety, equipment, fleet size, rebalancing), Public Engagement (safety outreach, affordability, customer service), Mobility Data and Privacy, and Infrastructure (riding locations, parking, restricted areas).

Following input from TAB and City Council regarding the scope of Boulder's Shared Micromobility Program, staff will refine the regulations and will include associated metrics to measure program efficacy during implementation. These measurable objectives will include the areas of Safety, Access, Equity, Environment, Economic, Operations and Maintenance and Geographic Coverage.

OPTIONS AND STAFF RECOMMENDATIONS

The following section offers for consideration two sets of options and respective staff recommendations. The first set of options addresses the preferred vehicle types to be included in a Shared Micromobility Program. The second set of options addresses where both shared and/or private lightweight electric vehicles should be operated within the City of Boulder. E-bikes are precluded from these options as they have been recently regulated locally and statewide.

SHARED MICROMOBILITY PROGRAM

Options: Each of the following program options includes supporting the on-going dock-based bike share services provided by Boulder B-Cycle. Boulder's Shared Micromobility Program should include:

1. Both commercial shared e-scooter and e-bike operations
2. Only commercial shared e-bike operations
3. Only commercial shared e-scooter operations
4. No commercial shared operations

Staff Recommendation: Option #2 (only commercial shared e-bike providers should be allowed to operate in the city)

Of paramount concern is safety. As staff's analysis suggests, there's a demonstrated higher risk of using e-scooter share over bike share. From a Vision Zero perspective, all crashes resulting in serious injury or fatality are not acceptable and must be eliminated. And while it's entirely appropriate to point to other transportation modes that can also lead to personal injury or death, it's not appropriate to introduce another form of mobility that has far greater safety implications from a shared micromobility perspective.

Staff is also concerned with regulation compliance on the part of the user. In all other cities staff has researched, people continue riding e-scooters on sidewalks and pedestrian zones despite local regulations prohibiting them from doing so. Cities also continue to struggle with how e-scooters are parked and deployed. E-scooters have been found to create sidewalk and crosswalk obstructions and are often cited as creating clutter and causing impediments to people with disabilities or blocking pedestrian thoroughfares. All of which, could place the City of Boulder at risk from a legal perspective.

Achieving regulation compliance through enforcement is not a realistic expectation. The Boulder Police Department prioritizes their time enforcing traffic laws where there is greater consequence and impact to life, such as, speeding enforcement on arterial roadways, responding to traffic crashes, school zone enforcement and neighborhood traffic complaints. Geofencing, a global position system (GPS) technology to control where shared vehicles may be operated and stored is still not entirely accurate and should not be considered a reliable method to regulate proper operation and storage.

Analysis also suggests a large displacement large of walking trips. Boulder's TMP calls for an increase in walking trips to not only off-set motor vehicle miles traveled and reduce emissions,

but to also encourage active, healthy lifestyles. Active transportation options are key to a healthy community and walking, bicycling (including e-bikes) and transit use are integral components, whereas, e-scooters are not.

The sustainability of the shared e-scooter industry also comes into question. Shared e-scooters have a greater carbon footprint per miles traveled than transit, bikes, and walking, but have a lower carbon footprint than personal cars and TNCs. If e-scooter trips replaced more motor vehicle trips than what staff's analysis currently suggests, they can be more environmentally sustainable. E-scooters, while demonstrating some potential benefit of reducing motor vehicle emissions, do not outweigh the safety, mode shift, right of way and sustainability concerns as staff's analysis suggests.

Bicycles, including e-bikes are a long-standing, proven form of transportation. The electric assist option offers more people of varying abilities the advantage to take on hilly terrain and travel longer distances without overexertion, while still getting exercise. E-bikes also provide the ability to transport goods and are generally better at handling rough pavement conditions. Riders of bicycles can ride more predictably and can use hand signals when making turns. These tasks are much more difficult to do when riding an e-scooter. E-scooters also have a higher center of gravity when compared to riding a bike making them more difficult to operate.

While the same concern for riding on sidewalks exist for bikes, as they do for e-scooters, staff believes there will be significantly more regulation compliance on the part of the bike rider. Staff's recommended regulation for bikes to be locked to a bike rack (when available) before and after each use ensures to a greater degree that bicycles will be parked in an organized fashion and not present compromising situations for people with disabilities and other pedestrians.

By not recommending e-scooters as part of a Shared Micromobility Program, staff understands the potential perception of appearing noninnovative or being weary of experimentation. Staff, however, is a proponent for taking risks- albeit calculated ones. Per staff's calculations and analysis, including e-scooters in a shared micromobility program is not a risk worth taking due to the tradeoffs and potentially low return on investment. E-scooter transportation technology is still new and appears to be maturing, or at least moving through its adolescence phase, but has not worked out many of the details needed to be a safe form of shared mobility. Staff recommends allowing the industry to further evolve and to continue monitoring the industry to determine if e-scooters would be appropriate for Boulder at some time in the future.

SHARED and/or PRIVATE USE OF LIGHTWEIGHT ELECTRIC VEHICLES

Options: The following options address the use of all lightweight electric vehicles, except e-bikes, on streets and multi-use paths. Types of electric vehicles include stand-up and sit-down e-scooters, e-skateboards, e-one-wheels and e-unicycles. The options are organized for the application for both on-street and off-street (multi-use path) use.

On-Street:

1. Allow all lightweight electric vehicles to operate on <u>all</u> streets (e-scooters are currently allowed on all streets by state law)

2. Allow all lightweight electric vehicles to operate only on residential streets and within the bike lane on other streets that have a posted speed limit of 40mph or less.
3. Allow all lightweight electric vehicles to operate only on residential streets and within the bike lane on other streets that have a posted speed limit of 30mph or less.
4. Allow all lightweight electric vehicles to operate only on residential streets and within the bike lane on other streets that have a posted speed limit of 25mph or less.

Off-Street (Multi-use Paths)

1. Allow both the shared and private use of lightweight electric vehicles to operate on all or specified multi-use paths
2. Allow only the private use of lightweight electric vehicles to on all or specific multi-use paths
3. Do not allow shared and private lightweight electric vehicles to operate on multi-use paths

Staff recommendation: On-street: Option #4 - Allow all lightweight electric vehicles to operate only on residential streets and within the bike lane on other streets that have a posted speed limit of 25mph or less.

Staff recommendation: Off-street: Option #2 – Allow only the private use of lightweight electric vehicles to operate on all or specific multi-use paths.

Due to the design of the equipment, most electric vehicles have an increased susceptibility to rough pavement conditions due to smaller wheels and high center of gravity, staff recommends requiring all lightweight electric vehicles be operated on residential streets and within the bike lane on other streets with a posted speed limit of 25 mph or less. Unlike e-bikes, smaller electric vehicles may be more prone to crashes because of the smaller design of the vehicle(s) and ability to travel at a higher constant rate of speed (15-20mph). Injuries resulting from a crash with a motor vehicle on streets with higher speed limits leads to increased severity of injury.

Although it is currently illegal, community members utilize a wide variety of lightweight electric vehicles on both sidewalks and multi-use paths likely because they do not feel safe operating these vehicles on streets, including some streets with bike lanes. As stated earlier, relying on enforcement to regulate where electric vehicles may be operated is not a realistic expectation as Boulder police and code enforcement officers have numerous responsibilities and limited resources. There are many streets with bike lanes with a posted speed limit of greater than 25mph and where the pedestrian volume is relatively low. Staff believes it may be reasonable to allow electric vehicles to operate on sidewalks in those scenarios. In contrast, areas unfit for the use of lightweight electric vehicles on sidewalks include areas with high pedestrian volume and adjacent businesses with zero set-back, such as Downtown, University Hill, and North Broadway.

Staff recognizes that the current distinction of where bikes and skateboards can and cannot be ridden on sidewalks is confusing and difficult to understand. Staff will conduct a community engagement process regarding where human powered bikes and skateboards are currently

allowed to operate on sidewalks and if the inclusion of electric vehicles should also be allowed to operate on sidewalk where appropriate. Staff will bring forward the results of the community engagement process and recommendations for potential changes to ordinances B.R.C. 7-5-10 and B.R.C. 7-4-50 in 2nd quarter 2020.

Staff also recommends the private use of electric vehicles on multi-use paths. The potential for conflicts between users of electric vehicles and other multi-use path users may be lower due to a lower number of privately-owned vehicles as compared with a higher number of vehicles deployed within a shared program. Additionally, the individuals of privately-owned vehicles are likely better skilled at handling and maneuvering the vehicles when compared with first time and less frequent riders, such as, students and tourists. Regardless, it's imperative that we continue working to instill a culture of safety on Boulder's multi-use path system whether private and/or shared use of electric vehicles are allowed to operate on multi-use paths. Staff, through the city's Vision Zero Action Plan and Way of the Path program, is expanding the safety campaign to install safety signing along the multi-use path system in 2020.

NEXT STEPS

Staff was originally scheduled to return to TAB in November and to City Council on December 3, 2019, to provide an update. Due to other council priorities, this update was rescheduled to January 7, 2020, leaving insufficient time to seek TAB feedback and to conduct a public hearing prior to bringing any new ordinance(s) before council before the expiration of the current moratorium on February 4, 2020.

Therefore, an extension of the moratorium to April 21, 2020, is currently before City Council for this reason, as well as to allow for the mandatory 30-day period to transpire before any new ordinance(s) can go into effect.

Below is the revised TAB/CC schedule for the overall Shared Micromobility Program:

- 12/9 – TAB - share analysis, options and staff recommendation
- 1/7 – City Council - share analysis, options and staff recommendation
- 1/17 – City Council Retreat – to discuss Shared Micromobility Program options
- 2/10 – TAB – Review new Shared Micromobility Program ordinance (public hearing)
- 2/18 – City Council –1st reading of ordinance (consent)
- 3/3 – City Council – 2nd reading of ordinance (public hearing)

Staff recommends conducting a request for proposal process (RFP) to select 1-2 providers to provide micromobility options for the City of Boulder and CU Boulder, if applicable.

If approved by TAB and City Council, staff will initiate the Request for Proposal (RFP) process in March 2020. Following the RFP review, selection and contractual process, staff anticipates program commencement summer 2020.

Staff also recommends a one-year pilot program to effectively gauge the impact of a Shared Micromobility Program and to perform subsequent changes to the program, if needed.

For more information, please visit the project website:
https://bouldercolorado.gov/transportation/micromobility-in-boulder-2

TAB INPUT

3. What questions and/or suggestions does TAB have regarding the Shared Micromobility Program analysis, community engagement results, program options or staff recommendation?
4. What questions and/or suggestions does TAB have regarding where shared and/or private electric vehicles may be operated in Boulder?

ATTACHMENT LINKS

A. Be Heard Boulder E-Scooter Questionnaire
B. Final Proposed Micromobility Regulations, Micromobility Company Feedback, NACTO Micromobility KSI