CASE STUDY

FIRST AND LAST MILE CONNECTIONS: NEW MOBILITY

Mile High Connects (MHC) is a partnership of private, philanthropic, and nonprofit organizations committed to developing inclusive, affordable, and livable communities within walking distance of public transit. In 2015 MHC identified and prioritized First and Last Mile Connections (FLMC) as a critical part of study to make sure that every transit rider could easily and safely get to and from their transit connection. As a member of MHC, Natural Resources Defense Council (NRDC) undertook research and developed three case studies that looked at FLMC best practices in the Denver region and nationally. FLMC refers to the facilities, infrastructure, and services that allow people to get from their front door to their final destination via transit without driving a personal vehicle. The comprehensive objective is to provide MHC with useful information, tools and a set of best practices to complement their regional and local work around social and equitable transit solutions. The first two case studies focus on the interface and relationships between the Metropolitan Planning Organizations (MPO), local jurisdictions, and transit agencies progressing FLMC enhancements in the Salt Lake City and Atlanta regions. The third case study focuses on emerging and existing shared mobility models and systems that are striving to provide sustainable transit service to low-income communities and communities of color. Additionally, this case study highlights some of the best practices, tools, and technologies and where they have best worked in more disadvantaged communities.

Innovation, strategic planning, and collaborations are driving creative solutions to the unrelenting need for more transportation choices. New "shared mobility" programs, policies, tools, and techniques are emerging around the country as a result of their wide range of economic and social benefits. Innovative shared mobility programs help to reduce vehicle miles traveled (VMT), auto emissions, car ownership rates, household costs, street space and parking demands, and traffic and congestion.[1] Furthermore, "shared mobility encourages greater use of transit, opens up more land for parks and other public space and can help improve users' health by encouraging biking, walking, and other forms of active transportation."[2]

Shared mobility is comprised of short-term transportation solutions enabling users to access various shared vehicles, bicycles, or other low-speed modes. In North America alone, shared-use mobility transcends the submarkets of car-sharing, bike-sharing, ridesharing, on-demand services, shuttle services, and other emerging industries.[3] Shared mobility methodologies have led to commuting options that are easier, greener, and more economical. Shared mobility programs can also link critical first and last mile connections by extending convenient and cost-effective public transportation options at strategic locations. Although, these new services and tools are flooding the transportation market, communities of color along with low-income and immigrant populations often do not have access to these new mobility solutions. This can be due to language, income, and access to technology. Transportation and funding are connected and incredibly important to developing solutions for low-income communities. However, there is a fine line in balancing public funding and subsidies sustainably without over establishing fiscal commitments. The goal of this case study is to locate and examine best practices for new mobility strategies, programs, and models benefiting vulnerable populations.

AUTHORS
LOGAN SAND, NRDC
SAMANTHA BECKERMAN, NRDC
CATHERINE COX BLAIR, NRDC

NRDC
NATURAL RESOURCES DEFENSE COUNCIL

MileHighConnects
Opportunity for all through transit

In the Denver region, FLMC and shared mobility bicycle enhancements are determined by the prioritization of resources and funding. Currently, Denver is faced with limited funding and resources, and a new need to examine how land use, density, and equity impact FLMC connections and shared mobility tools and operations. FLMC enhancement projects tend to focus around fixed rail transit, but Denver's biggest gap is in funding sidewalks. This is in part because of the aging infrastructure and number of sidewalks to fix is overwhelming and challenging to cost feasibility.[4] Denver Public Works is in the midst of completing a bicycle enhancement project in the neighborhood of Westwood, located in west Denver. However, at the community level, there is more interest in pedestrian realm improvements. As a point of interest, Denver Public Works does not own, operate, or fund shared mobility businesses. This is because shared mobility businesses are outside entities with an independent operational business model. Shared mobility providers do not receive federal subsidies like Denver's Regional Transportation District (RTD) or other city transit agencies. Furthermore, bike-share systems cannot expand too far from reliable urban-centric high-volume ridership areas. This is because peripheral station locations force vendors to maximize operational costs putting them in jeopardy.

BARRIERS TO NEW SHARED MOBILITY

Barriers facing shared mobility providers to reach low-income communities exist in four key issue areas: structure, finance, information and culture, and profitability[5]. Structural issues present physical and logistical access barriers. Financial barriers are reflected in the costs to the user, and "unbanked" populations. Informational and cultural barriers include the lack of mobility information access as well as the cultural stigma behind the populations using—or not using—shared mobility options. Lastly, the profitability barrier on the operational side of shared mobility systems limits the kinds of ridership included. Profitability is impacted by lack of demand and the liability costs incurred by the user. Advancing shared mobility systems into low income and communities of color requires a strategic effort between the community, business, and local jurisdictions. Local government has a powerful and influential role in guiding and shaping shared mobility landscapes of metropolitan areas. Local government regulates, funds, and can incentivize shared mobility operators to provide service in low-income communities. Acting as a third party broker, shared mobility service providers can also help low-income residents overcome a variety of barriers by "conducting outreach and marketing campaigns while also implementing technical fixes to structural barriers (such as providing streamlined alternatives to online-only applications)."[6]

WHAT IS BIKE-SHARING?

Bike-sharing systems are designed to give the user a quick, easy, and accessible mode of transportation via bicycle. Normally a bike is picked up at one docking station and to be returned at the same station or another (point-to-point). Bikes-sharing systems usually require a pre-registration or pre-authorization process using a credit or debit card. The user is then charged for the time the equipment is rented. While these systems are making great progress, the majority of users still tend to be young, wealthy, and male. Bikeshare systems have been established in cities all over the country, extending a presence in over 75+ cities at the beginning of 2015.[7] These formal bike-sharing systems are continuing to evolve and maintain high demand at the national level.

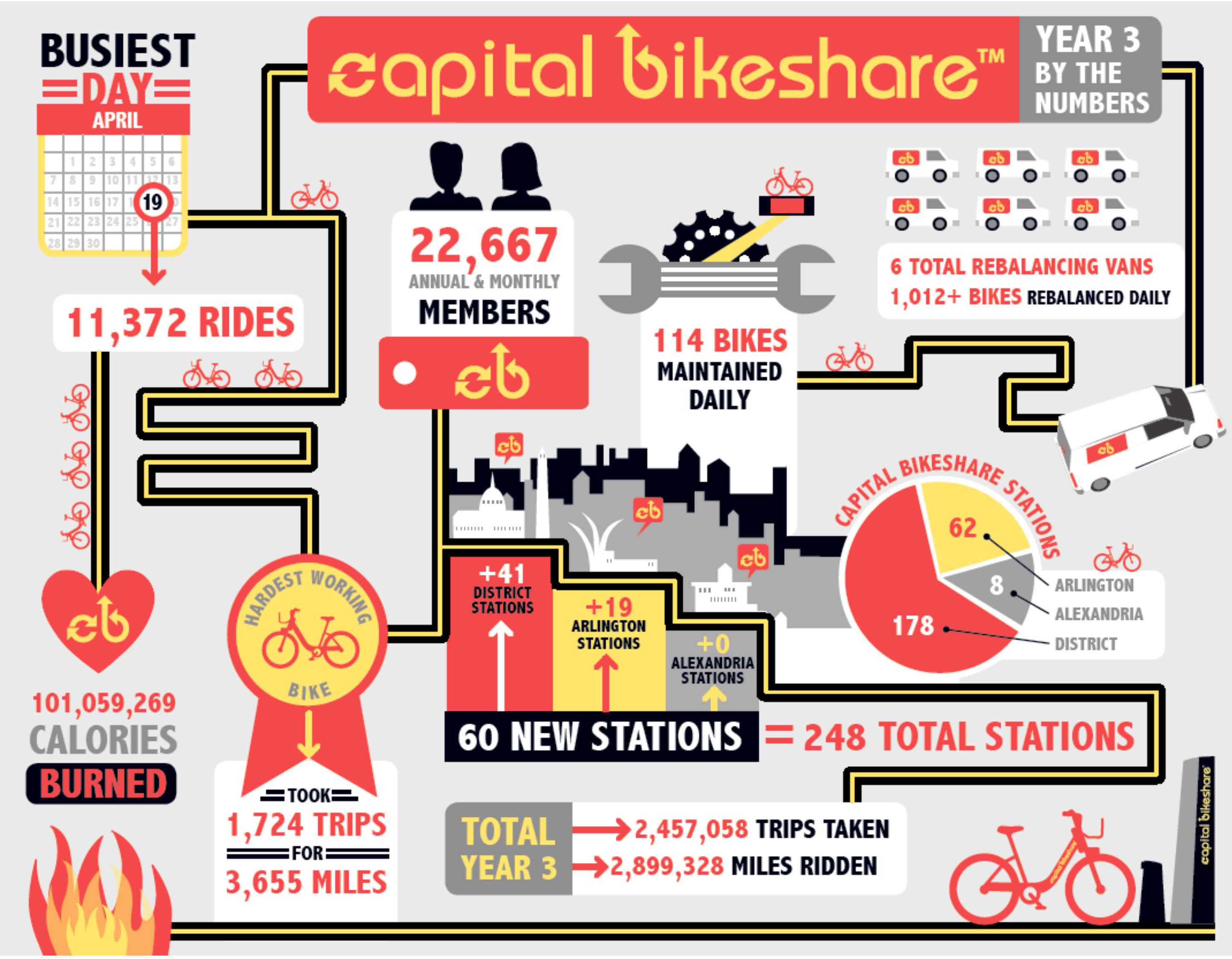
FACTS AROUND BIKE USE

- Children from low-income households and children of color, particularly blacks and Hispanics, are more likely to bike or walk to school than whites or higher-income students.[8]
- Among African Americans and Hispanics, 60 percent cited the costs of purchasing a bike as the main barrier.[9]
- Of African American and Hispanic residents, 35 percent in focus groups said they did not have a place to store a bicycle, citing the fear of theft.[10]
- Of bike-share users, 40 percent report driving less and a reduction of.82 pounds of CO2 kept out of the atmosphere for every mile travelled on bike rather than a car.[11]

CHALLENGES TO BIKE-SHARES

- Bike-share systems are young businesses in an evolving industry. At the moment, this simple concept means stations are strategically located near high ridership, yielding the required payments for business service operation. These areas are usually high-density commercial and residential neighborhoods within the city.
- Low-income populations and communities of color commonly live in the outlying city neighborhoods, and many are "unbanked"—meaning that they do not own a debit or credit card.
- Physical and cultural barriers are the main obstacles. However, there has been little focus on the cultural barriers since these systems are not run by community-based organizations. Cultural barriers target one cultural idea of bicycling (such as the perception that bike-shares are best-suited for the higher-income white demographic).

Figure 1.1: 2013 Capital Bikeshare Numbers



CAPITAL BIKESHARE

Washington D.C.'s Capital BikeShare is one of the largest bike-share programs in the nation with more than 300 stations, providing access to more than 2,500 bicycles. Capital BikeShare is publicly owned and privately operated. After registering with Capital BikeShare online, which requires a credit card, users are mailed a key to unlock any bike at any station across Washington, D.C.; Arlington and Alexandria, Virginia; and Montgomery County, Maryland. The first 30 minutes of bike use are free. Capital BikeShare stations are owned and operated by their respective local governments (Arlington County, City of Alexandria, Montgomery County), in a public-private partnership with Alta Bicycle Share. Each Capital BikeShare member saves approximately $800 on transportation costs annually, while each bike-share trip generates $7 for the local economy.[12]

Capital BikeShare has incorporated several unique incentives and changes to improve accessibility, community outreach, and provide financing mechanisms to low-income communities. Capital BikeShare has partnered with Bank on D.C. to encourage and educate new and existing account holders about the benefits of bike-sharing. New members receive a $50 annual membership as a discount, while existing account holders can receive a $25 coupon from any United Bank or District Government Employees Federal Credit Union. Arlington County Capital BikeShare recently began a one-year cash membership pilot program to provide an additional membership opportunity for residents who may not possess a credit card. Capital BikeShare has a Spanish marketing campaign that aims to educate the metro area's Latino population about the bike-sharing systems and values. The Capital Bikeshare website Spotcycle (its mobile application for bike inventory and station locating), are user-friendly and can be set to a number of different languages. An additional service provided is in the form of a multi-language crowdsourcing map that allows people to suggest station locations.

Five local jurisdictions participate in the Capital BikeShare system. Each jurisdiction buys and sites stations as a geographic control mechanism. Then the jurisdictions jointly contract for operation and maintenance. Participating jurisdictions are responsible for calculating respective operation and maintenance costs using per bike and per physical station budget line items. However, there are also pooled shared costs between jurisdictions for mutual operations needs, such as system call centers. Each jurisdiction can then decide how to fund the totality of operating costs. In D.C.'s Ward 8, CMAQ funding has been used for the first three years allowing for a capture of revenue.[13] The banked revenue was then used as an endowment to pay down the operating gap. The operating gap is not big in Ward 8 (currently $0.5 to $1 million a year), but other jurisdictions are seeing larger gap costs.[14] As a separate jurisdictional technique, Ward 8 will sell advertising on the bike-share stations to address financial gaps.

Capital BikeShare station expansion tends to focus on dense rail station areas toward downtown, some of which are engrained in low-income areas. However, some rail and bike station areas are some of the most gentrified in the city. There remains a Capital BikeShare station coverage shortfall towards the outer boundaries where there are lower-density, low-income, and African-American communities. Due to the challenges of low usage in these neighborhoods, D.C. Department of Transportation is working with an equity coalition. An additional challenge is the potentially prohibitive annual membership costs. Bank on D.C. and Back on My Feet (homeless running club) provides membership access to Capital BikeShare. Regarding annual membership, the Equity Coalition in D.C. is having discussions about flooding the market in low-income communities to create sufficient density of coverage.[15] The flipside to this logic is that it may sacrifice revenue. One idea to link shared mobility to public health programs is to encourage health providers to prescribe biking to combat obesity. This may facilitate the provision of free Capital BikeShare memberships to people in need.

Capital BikeShare will not completely replace transit, but it can reduce transportation costs while improving community health and integrity. The Capital BikeShare highlights interesting best practices as well as challenges. Though most bikers prefer to own their bicycles, bike-shares offer a strong back-up option to actual ownership. The goal of shared mobility is to create an environment of complementary programs. However, there can be a fiscal burden if there are too many mobility practices. Washington, D.C. is beginning to witness this, with its many programs needing public subsidy: ZipCar, Car2Go, bike-shares, etc. The point is that there is not enough structured and steady funding to implement too many different mobility systems.

INDEGO PHILADELPHIA

Indego is Philadelphia's newest and hottest public transportation option. The Indego bike-share system was launched in the spring of 2015, and provides more than 600 self-service bicycles and 60 stations throughout Philadelphia. Indego offers a variety of membership and payment options. Each bike-share station has a multi-language kiosk that accepts credit or debit payments, and several kiosks accept cash. Each new member is given a flex card that easily unlocks bikes once swiped at station kiosks. A popular membership option is the $15 for 30 days of unlimited one-hour trips. This option was generated in response to the short-term needs of the community. Additionally, any individuals without a membership have the option to purchase walk up half-hour rides for 4$, or for 1$ during the first Tuesday of every month.

Indego is planned and managed by the Philadelphia Mayor's Office of Transportation and Utilities (MOTU). Indego is another example of a publicly owned and privately run bike-share system. The City of Philadelphia owns the bicycles and stations, Independence Blue Cross is the title sponsor, Bicycle Transit Systems operates Indego, and B-cycle manufactures the equipment.[16] The City began preparing for a bike-share program in 2009, and after the 2010 Philadelphia Bike Share Concept Study, concluded that Philadelphia's flat geography, relatively regular street grid, and consistent urban scale was ripe for implementation.[17] MOTU received more than 10,500 public comments in an engagement initiative between September and October 2014 around future station placements. In addition to the public comment period, MOTU attended community meetings in proposed station areas, conducted public surveys, and hired consultants to assist in educating the community on the site planning process. The City has also "committed to launching 20 of the initial stations in neighborhoods where, based on Census data, 50+ percent of households live at or below 150 percent of the poverty level and/or median household income is at or below 80 percent of Philadelphia median household income."[18] The program's strategy hopes to capture some of the 27 percent of the 1.6 million City residents living below the poverty line, most of which are people of color (43 percent black, 12 percent Latino, and 6 percent Asian).[19] The phased implementation of all neighborhood stations is scheduled through 2016.

Philadelphia has invested $3 million, and Pennsylvania has invested $1.5 million into the project. The remainder of the total $16 million project will come from Independence Blue Cross (contributing $1.7 million per year), Better Bikeshare Partnership, and the William Penn Foundation.[20] To make sure the program maintains success, the City is hiring 10 "ambassadors" to educate communities about the bike-share, and to work with the Mural Arts Program and youth to draw attention to station accessibility. Lastly, as an effort to examine the long-term impacts and outcomes of the program, Better Bike Share Partnership (funded by the JPB Foundation) recently awarded "$74,986 to Portland State University, to collect and study data about 'perceptions of bike-share, barriers to use, success of specific interventions to increase use, and the impact of station siting decisions' with Philadelphia's Indego bikeshare".[21]

CYCLES FOR CHANGE (C4C) AND THE COMMUNITY PARTNERS BIKE LIBRARY (CPBL) PROGRAM

Cycles for Change (C4C) is a leading 501(c)3 non-profit that effectively engages, empowers, and educates low-income residents and communities of color about bicycling in Saint Paul, Minnesota. C4C uses an equitable, innovative, and collaborative approach to getting bicycles and resources to those most in need. C4C administers a variety of English and Spanish programs, including Open Shop, Earn-a-Bike, youth programs, Women and Transgender Night, and most importantly (as it relates to new shared mobility) Community Partners Bike Library (CPBL). The C4C program is a tool for social and environmental change.

CPBL partners with 20 nonprofit and public organizations in the Twin Cities to create a model bike-lending program that fosters new ridership in low-income and immigrant residents, as well as communities of color. Access, education, and leadership drive the program's success. Once a member attends their safe cycling workshop, CPBL lends bikes free of charge for six months along with a U-lock, light, and free helmet. CPBL provides free learn-to-ride classes in English and Spanish, as well as other customized programs through their partners. Lastly, CPBL provides leadership and civic engagement opportunities for residents and participants in an effort to spread the word and overcome some of the cultural barriers around bicycling. Of particular focus are cultural barriers of gender inequality and race, as immigrants, women and communities of color still remain marginalized in the bicycle community.[22]

CPBL is more than just a bike-lending program for C4C. The CPBL partners with nonprofits and public institutions directly engaged with low-income and immigrant residents and communities of color. CPBL requires that potential partners meet certain criteria. For instance, CPBL examines the candidate's relationship with the focused communities, and requires a staff member liaison involved in outreach, recruitment, and communication.[23]

NICE RIDE NEIGHBORHOOD PROGRAM

Nice Ride Minnesota launched the Nice Ride Neighborhood Program (NRNP) in 2014, with the objective of making traditionally low-income and underserved communities in Frogtown, the East Side of Saint Paul, North Minneapolis and Little Earth of United Tribes more active through bicycling. The participating communities were identified and selected for the initial pilot program with the help of public partnerships and community organizations. Nice Ride Minnesota is the area's dominant bike-share program. Building successful neighborhood and local partnerships with Green Line, Model Cities, and St. Paul Public Housing, allowed the NRNP to offer 145 Frogtown participants a four-month all-inclusive cycling experience.[24]

As a community-building strategy, the NRNP worked with the Major Taylor Bicycling Club of Minnesota, St. Paul Women on Bikes, and Cycles for Change to hold a series of events around riding, food, and family activities. These events allowed participants to connect with other riders and build community. Not only was the program a success from a bicycle education standpoint, also "participants changed their perceptions and individual behavior regarding bicycling as a means of transportation."[25] In 2015, NRNP will expand by 120 bikes and participants, while continuing to collaborate with a diverse set of partners, including: Aurora/St. Anthony Neighborhood Development Corporation, Hmong American Partnership, Model Cities, St. Paul Public Housing, and Vietnamese Social Services.[26]

BICYCLE COLLECTIVE

Table 1.1: 2014 Bicycle Collective Programs

Earn-A-Bike	Earn-A-Bike allows low-income youth to pick a bike that they can keep on the condition they have taken it apart and rebuilt it from scratch. These bikes embody confidence, teamwork, and pride, and may set wheels in motion for future engineers. Last year 414 youth earned bikes over this six-week course.
Bikes for Goodwill Organizations	In 2014 the Bicycle Collective Goodwill program provided 1,029 ready-to-ride bikes through referrals from 45 other local non-profits.
Community Bike Shop	In 2014, Salt Lake City's community bike shop served 6,120 patrons. The shop also hosts empowering Women's Night, weekly free mechanics classes, and our self-directed apprenticeship. Centered on the community bike shop, the Bicycle Collective produced a total of 2,427 refurbished bikes for the community last year.
Trips for Kids	Trips for Kids opens the world of cycling to at-risk youth through mentor-guided mountain bike trips, including lessons in personal responsibility, environmental awareness, practical skills, and the simple act of having fun. Last year they took 730 kids on 57 mountain bike rides along the Wasatch Front.
Bike Valet	The Bicycle Collective Valet service was present at 81 events in Salt Lake City, parking 11,017 bikes and providing a high-profile affirmation of the role of bikes in our community while keeping them safe.

One of the best shared mobility community-based resources similar to Cycles for Change is Utah's own Bicycle Collective. The Salt Lake City-based Bicycle Collective provides refurbished bicycles and educational opportunities to the community, and has an explicit focus on low-income and youth populations. The vision of the Bicycle Collective is to create cleaner, healthier, and safer communities by promoting cycling as an environmentally and economically sustainable form of transportation. The Bicycle Collective hosts a number of community services, including refurbished bicycles for nominal resale and charity purposes; community bike shops in Salt Lake, Ogden, and Provo with full tool sets for bicycle repair; bicycle parking at the Downtown Farmer's Market, Twilight Concert Series, Utah Arts Festival, and other events; Earn-A-Bike program for kids; Bicycle mechanic courses and certifications; frame building courses; and general distribution of free bikes to the neediest community members.[27]

The Bicycle Collective's partnerships are mostly mutually beneficial arrangements, thus the program does not receive government funding. As David Davis, executive director, explained, this "means less overhead due to administration and reporting requirements. It also speaks to our self-sufficiency: all we primarily need to [go to] scale are more donated bikes."[28] As a result of the Bicycle Collective's partnerships, the city councils of Salt Lake, Provo, and Ogden all recommended that non-recovered police evidence bikes be donated to the Bicycle Collective, and the municipal police departments have all complied. Salt Lake County, a larger metropolitan area, requires all registered public events over a certain size to provide bicycle parking accommodations. This requirement allows the Bicycle Collective to provide bike valet for municipal events. At the state level, the Bicycle Collective sits on the Governor's outdoor economic development meetings, Utah Clean Air Partnership, and participates in Utah Department of Transportation (UDOT) and Highway Patrol's Road Respect Tour, a statewide initiative to encourage motorists and cyclists to share the road amicably. These are mainly networking opportunities and rarely result in established partnerships, but in 2007–2008 the Bicycle Collective received UDOT funds to run a Safe Routes to School and a League Cycling Instructor (LCI) certification program.

THE DENVER BICYCLE LANDSCAPE

Figure 1.2: 2014 B-cycle Successes[29]

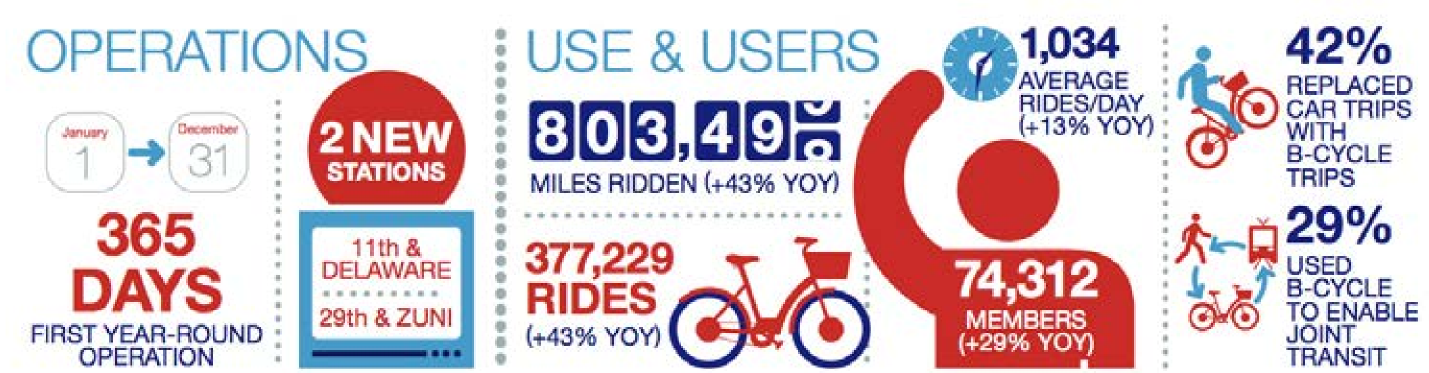


Table I.2: 2015 B-cycle Progress[30]

Memberships Purchased Or Redeemed	2010	2011	2012	2013	2014
Annual	1,784	2,675	2,734	4,023	3,980
30 Day	262	139	242	514	450
7 Day	268	215	281	417	500
24-HR	32,392	41,966	39,183	52,609	69,382
Total Memberships	34,706	44,995	42,440	57,563	74,312
Trips By Membership Type	**2010**	**2011**	**2012**	**2013**	**2014**
Annual	52,829	121,781	131,176	165,897	242,770
30 Day	555	1,314	3,179	5,640	6,094
7 Day	931	1,080	1,938	2,554	3,890
24-HR	47,844	78,556	70,681	89,019	124,475
Total Trips	102,159	202,731	206,974	263,110	377,229
Distance and Health (Estimates)	**2010**	**2011**	**2012**	**2013**	**2014**
Miles Ridden	211,111	431,817	440,855	560,424	803,498
Estimated calories burned	6,333,332	12,954,511	13,225,639	16,812,729	24,104,933
Pounds of body weight equivalent to estimated calories burned	1,810	3,701	3,779	4,804	6,887
System	**2010**	**2011**	**2012**	**2013**	**2014**
Number of Stations	50	52	53	82	84
Number of Bikes	500	520	530	709	709
Operating Days	227	271	278	288	365
Environmental and Economic Benefits (Estimates)	**2010**	**2011**	**2012**	**2013**	**2014**
Pounds of CO2 emissions avoided	311,900	729,783	807,867	1,028,836	1,486,288
Gallons of gasoline not used	15,857	37,101	41,071	52,305	75,561
Gasoline cost savings	$41,227	$120,579	$139,642	$180,452	$238,018
Parking cost savings	$311,126	$506,909	$505,203	$770,412	$1,110,638

The City of Denver alone has a robust and connected bicycle landscape, with more than 100 miles of bike lanes, 100 miles of multi-use trails, 39 miles of sharrows, and approximately 400 miles of signed bike routes.[31] Denver has approximately six lane miles of buffered bike lanes, and 1.1 miles of protected bike lanes. In addition to the physical bicycle landscape, Denver also has B-cycle, a forceful 501(c)3 non-profit that provides a year-round operational bikeshare. B-cycle is expanding its current fleet of over 700 bicycles and 85 stations, in the Denver metro area. In March, 2015, B-cycle opened its first privately funded and largest station to date at 3200 Pecos Street, in Lower Highlands.[32] In the high-density, mixed-use neighborhood, B-cycle partnered with private developer Avanti, to mitigate parking, traffic, and transportation concerns. Integrating with the Denver metropolitan transportation system is a critical component of B-cycle's success, including prioritization of service accessibility to low-income populations and people of color. In B-cycle's sixth year in Denver, it aimed to improve business technology, partnerships with private developers, expanding the Subsidized Annual Access Pass and outreach to people of color. To reach Hispanic communities in Denver, as of 2015, B-cycle has a fully operational Spanish language website and technical products.[33]

The B-cycle Subsidized Annual Access Pass Program targets Denver's low-income populations and communities of color. Supported by Kaiser Permanente, this program follows the Denver Housing Authority template and opened to qualified applicants in 2015. The pass is $10 for qualified applicants, and provides a more inclusive service to low-income residents. Since its inception, B-cycle has compiled some preliminary service use information. This includes 42 riders over all Denver Housing Authority (DHA) properties (public housing residents), 30 of which come from 10th & Osage (Mariposa Development), and there are consistently new profiles being processed for new membership.[34]

Denver has very strong public, private, and nonprofit interagency support for its bike culture. Denver's 2020 Sustainability Goals include improving mobility options to ultimately reduce single-occupancy vehicle mode share by 60 percent by 2020.[35] Similarly, the DenverMoves' city-wide bicycle network plan aims to implement 15 miles of bike infrastructure a year, and to have a high-use facility within a quarter mile of every residence. The Department of Public Works has implemented a Complete Streets Policy that is defined as a "practice to promote safe and convenient access for all users along and across travel ways in the context of the overall transportation network, land use patterns, and community needs."[36] The Department of Public Works incorporates the Complete Streets into any planning, design, implementation, and operation of transportation infrastructure. To echo interagency support, the Denver Regional Council of Governments

(DRCOG) selected 21 percent of bicycle and pedestrian projects from its last four-year funding pool of $260 million[37]—the largest percent funding allocated to bicycle and pedestrian projects ever.

The Bike Depot is another example of a Denver-based grassroots program that successfully gets bicycles into underserved low-income and communities of color. The Bike Depot is a 501(c)(3) nonprofit community bike shop located in Denver's northeast Park Hill neighborhood. The Bike Depot fulfills its vision to "get as many people riding bikes as possible" with a retail shop, mechanic service, and community programs and classes. The Bike Depot provides donated bicycles to low-income residents through Earn-A-Bike (EAB), which requires participants to dismantle and reconstruct a bicycle in order to keep it. To date, more than 3,000 bicycles have been earned through the EAB program. Other Bike Depot programs include: Fix Your Bike, Bike Camp, and Bike Rodeo. The Bike Depot also provides donation-based bicycle mechanics, commuting, and touring classes. Through its retail shop, the Bike Depot molds together a for-profit and nonprofit business model. The business model does not require Bike Depot to be completely reliant on grants and donations, as revenue from the retail shop offsets some operational costs.

Part of the program's success is due to community reaction, as often these "shared modes" enhancements reflect a community aversion to government intervention. A new idea is to find a way to support the grassroots non-profits that have the community connections. The Park Hill Bike Depot is a community-based organization that started from an environmental health grant from the city and has grown into its own organization.

Recommendations for Denver

1. Establish a partnership with a financial institution to help promote bike- and car-share services with "unbanked" community members. The Credit Union of Colorado is a constructive option, with strong Spanish translation and marketing services.
2. Lead an individual communities barriers study of the Denver Metro region. Community barriers to shared mobility vary at the micro level and may be specific to each community. Currently, there is a gap in the comprehensive understanding of low-income urban and suburban community needs and preferences for shared mobility operations. A barriers study will serve as the fundamental research for first and last mile policy and decision-making moving forward.
3. Develop a coalition to rally behind spreading the Bike Depot service. (There is currently only one Bike Depot location at Fairfax and 28th Street.) In addition, work with the Bike Depot to replicate some of the educational classes and approaches used by C4C.
4. Allocate municipal, county, and regional funding to structurally maintain long-term support for grassroots bike programs.
5. B-cycle should create a short-term bike-share rental similar to Indego, which provides customers a $1 half-hour rental that would be enticing and applicable to Denver communities.

CAR-SHARING

Car-sharing provides on-site, on-demand access to a motorized vehicle. Car-share systems are also designed for round-trip and one-way use depending on the service provider and location. Car-shares require individuals over the age of 21 to pre-register with a credit or debit card and a valid driver's license. Users pay an annual membership fee and a fee for the hours rented or distance traveled. Peer-to-peer car-share systems allow private residents to rent their personal vehicles to strangers, through a round-trip mechanism. The coordinating organization facilitates the connections between drivers and car owners.

Nonprofit car-share programs exist solely to support users who do not own a car. These programs serve as a tool for social and environmental change by providing an accessible and affordable transportation option for the public. However, often this model requires public subsidy, donations, or grant assistance from sponsors and partners. For-profit car-share programs—like Car2Go, Enterprise Rent-A-Car and ZipCar—currently capture a larger market share. Under this model, the objective is to meet, or exceed the bottom line for stakeholders. Generally, for-profit car-share models are more organizationally expansive and have the financial backing to be more commercially aggressive.

Facts around Cars and Carshares

- Vehicle ownership increases access to jobs and economic opportunities. A study of participants of HUD's Moving to Opportunity for Fair Housing program found that low-income families with a car were twice as likely to find a job, and four times more likely to stay employed.[38]

- Cars are a more time-efficient mode of transit. "Data from the 2010 Census reveals that people living in central cities with a higher proportion of transit riders experience longer commutes. And since transit riders have more cumbersome commutes, they are much more likely to be tardy or absent from work."[39]
- Car-shares are more cost-effective than ownership. Low-income individuals are more heavily burdened by ownership costs, loan premiums, car insurance, repairs, and variable gas prices. Car-shares package these costs to provide a more manageable financial approach. Some families can save more than $700 a month by sharing, rather than owning, a car.[40]

Challenges to Car-Shares

- Car-share programs, while more cost-effective than car ownership, still have costs that may be prohibitive for some populations.
- Bike-share and car-share operations attempting to extend into low-income neighborhoods experience the same funding challenge. Currently, there is no structural model for publicly funded car-shares to assist low-income neighborhoods. Short-term public subsidies are beneficial, and have provided some of the most equitable car-share programs on the market. But these public subsidies are linked to prosperous economic periods and strong political support allowing for allocation of public dollars to low-income pilot programs.
- There are still cultural stigmas around car-shares, often associated as being modes for affluent millennials with credit cards.

CURRENT BIKE SHARE SYSTEMS AND BEST PRACTICES

Buffalo Car-Share

Buffalo CarShare (BCS) is one of the most equitable car-sharing programs in the nation. In Buffalo, New York, 31 percent of households—and 60 percent in the lowest-income neighborhoods—do not own a car.[41] BCS was created in 2008 by community organizer Michael Galligano with the goal of reducing traffic congestion and pollution while providing a viable and accessible transportation mode to low-income suburban communities. Prior to the launch of BCS, low-income residents without cars remained isolated, unable to afford the expensive minute or hourly charges of Car2Go and Zipcar.[42]

Currently, half of the 900 BCS members earn less than $25,000, with one in four members earning less than $15,000 a year.[43] BCS also has a racially diverse membership with 68 percent White/Caucasian, 22 percent African American, and 8 percent Hispanic. At $5 a month for membership, and $11 per-hour rates, the BCS program remains a promising transportation mode for low-income residents of Buffalo. Operating out of a storefront and promoted at neighborhood meetings and church functions, BCS was so successful that the state government wanted to spread it to other cities upstate. The Department of Transportation and the state Energy and Research Development Authority awarded Buffalo CarShare $280,000 to replicate its model in other cities. Since 2009, BCS has kept 600 cars off the road easing parking needs in busy areas. As the University of Buffalo Medical School constructs a new building over a metro rail station, innovative solutions like BCS are even more critical.

Buffalo CarShare remained an effective and equitable transportation alternative, surviving the cutthroat market in which larger monopolistic companies like ZipCar and Car2Go often absorb smaller entities. However, due to New York state law, BCS members faced a cease of operations that went into effect June 15, 2015. The complicated issue was rooted in New York's state auto insurance regulations and a "no-fault" law that require insurers to cover up to $50,000 in medical costs up in the event of accidents caused by other drivers. On one hand, the law is beneficial to car owners' safety and liability; on the other, it provides a reason for BCS's insurer, Philadelphia Insurance Company, to discontinue coverage. Philadelphia Insurance Company's discontinuance of coverage is tied to a recent BCS accident and significant payout. New York's no-fault law and specific liability provisions (which allow rental car drivers to sue insurers) has driven out many of New York's small car rental businesses and insurers. New York state Senator and Buffalo Democrat Marc Panepinto attempted a legislative fix however, due to political gridlock no compromise or solution for BCS allowed the company to resume operations in the same capacity. As of fall 2015, BCS is set to be acquired by ZipCar to be part of their smaller national fleet.

City CarShare

City CarShare is the only 501(c)3 nonprofit car sharing program in the San Francisco Bay area. With the greenest car-share fleet in the country, City CarShare's mission is "to improve the environment and quality of life in our communities by promoting innovative mobility options."[44] To fulfill their mission, City CarShare has three specific goals: (1) take 20,000 cars off Bay Areas roads by 2020, (2) save Bay Area car ownership costs of over $1 billion by 2020, and (3) offer members a green transportation alternative with a fleet consisting of at least half hybrids and electric vehicles, by 2015.[45] Currently, over 200 fleet vehicles are located within walking distance of major transit lines, and more than 60 percent of the car-share locations are in low-to-moderate income neighborhoods.[46] The CommunityShare program subsidizes membership service fees and driving costs for low-to-moderate income residents referred by any partner organization, including Glide Economic Development Corporation, Mercy Housing, Bridge Housing, Resources for Community Development, San Francisco Working Families Credit, and Redwood Gardens. "City CarShare was the first car-share operator in San Francisco's low-income community of Bayview, and it has continued to expand affordable car-sharing services to other low-income neighborhoods. Members save $8,400 per year in costs associated with car ownership."[47]

In December 2014, City Carshare collaborated with Contra Costa Transportation Authority (CCTA) and the Bay Area Climate Collaborative (BACC) to deploy a new program called CarShare4All into East Bay communities. CarShare4All is partially funded by a $973,864 grant from the Metropolitan Transportation Commission (MTC).[48] This strategic program was designed to support "expand green transportation choices to all constituencies."[49] CarShare4All will include a fleet of plug-in electric vehicles or hybrids, piloted Electric Vehicle (EV) charging infrastructure at a select site, and prototype "innovative "off the grid" technology".[50] Since the program is so new, best practices have not yet been formulated.

The Denver Car-share Landscape

The Denver metro region hosts a number of successful for- and non-profit model car sharing programs, including eGo Car Share, Car2Go, Zipcar, Enterprise CarShare, and Hertz Rental. The service and rates between providers varies, with round-trip, one-way, point-to-point trips charging by the minute, hour, or day. One of the oldest national car-share models, eGo CarShare is now a Denver-based 501(c)(3) nonprofit that strategically partners with community and transportation organizations to expand round-trip service and availability throughout the Denver metro region. eGo has a hybrid and electric fleet, and mission to limit environmental and social impacts from vehicular ownership. eGo has capitalized on members' desire to choose a local option over "another for-profit" model.

The eGo program is not a standard car-share. In 2014, eGo received CMAQ funding from the Denver Regional Council of Governments (DRCOG) to launch the Affordable Housing Multi-modal Toolkit for low-income residents in Boulder and Denver.[51] Mile High Connects and The Denver Foundation provided additional funding. The program partners with Boulder Housing Partners (BHP), Denver Housing Authority (DHA), and Habitat for Humanity of Metro Denver (HFHMD) to provide qualified households with "significantly subsidized monthly transit passes, easy access to car-sharing at discounted rates, free or discounted B-cycle memberships and/or access to pool bikes, and education about the multi-modal transportation options available to them."[52] This program concludes in 2016, and is currently working in the Mariposa and Globeville neighborhoods.

Table I.3: Reasons Members use Car Share Programs in Denver (respondents asked to check all that apply)[53]

Reason	Percent of Respondents
Convenience - Increased Mobility Options	91%
Parking Flexibility	76%
Cost Savings	45%
Variety of Vehicle Choices	36%
Environmental Awareness	35%
Lack of Alternative Transportation	29%

Table I.4: Denver Car Share Members Mode Use After Joining a Car Share Program[54]

Travel Mode	Less	Same	More	Net Change
Walk	7%	71%	22%	+15%
Bicycle	8%	77%	15%	+7%
B-Cycle	9%	83%	7%	-2%
Public Transit	17%	71%	12%	-5%
Motorcycle/Scooter	9%	88%	3%	-6%
Carpool	15%	81%	4%	-11%
Drive Alone	40%	57%	3%	-37%

Denver car-share programs are correlated to healthier transportation mode shifts. While this is a positive sign, the demographics analyzed by Denver Public Works highlight a recurring theme in the City and County of Denver, "the typical car share member is a white, college-educated, middle class, business professional, aged 25 to 44, who lives downtown or in one of the neighborhoods adjacent to downtown, and does not typically drive to work... either single or married without any children...[and] more likely to be male than female and to own their home rather than rent."[55] This pattern is obviously not inclusive of low-income, Hispanic, and communities of color.

The City and County of Denver adopted car-share operation rules and regulations in 2013. The Denver car-share permit program allows qualified car-share operators to purchase permits for a dedicated parking space in the city right of way (ROW). Or the car-share operator can purchase an area permit that allows the vehicle to park at meters without payment and exceed the two hour or greater time limits. The area permit also allows operators to park in Residential Parking Permit areas."[56] These permit fees cover program administration, but are also designed to recoup on-street parking value and the lost meter revenue. This cohesive effort was additionally designed to enhance mobility options, while stimulating a reduction in parking demand and vehicular miles traveled across the city and county. After permitting adoption, car-shares are happily paying the minimum $750 permit, and some $850 for free-floating right (allowing customers to park at any meter and bypass charges), per year at a variety of downtown locations.[57] As an equity inclusion measure, Denver's Department of Public Works passed regulation requiring car-share companies to place vehicles in "opportunity areas," where 30 percent or more of the population lives below the poverty line.[58]

Recommendations for Denver

- Maintain and expand market opportunities for nonprofit car models. Do not allow market over-saturation by for-profit car-shares. This is a reactionary challenge given that large corporate car-shares often absorb and consolidate smaller car-share companies. Non-profit car-share models tend to have more inclusive equity criteria and programs for low-income communities.
- Similar to the bike-share recommendation, a barriers and needs assessment would be beneficial to understanding Denver's car-share potential and applicability in the region.
- Consider requiring for-profit programs who receive any city parking preference or subsidy to service the entire city.

RIDE SOURCING, RIDE SHARING, TECHNOLOGY, AND THE SHARED ECONOMY

Ride-sourcing is a type of on-demand service within the shared economy, and is arguably the hottest and fastest evolving new shared mobility option on the market. Transportation Network Companies (TNC)—like Lyft, Uber, and SideCar—allow users to connect to drivers via smartphone, and request a ride for a fee. These services differ from taxis, as drivers are not commercially licensed. TNCs help conveniently bridge first and last mile inefficiencies or distances for users by providing quick and easy connections to and from public transportation. For some, however, accessing a smart phone can be logistically challenging. Owning a smartphone can also be a heavy monetary commitment for low-income users. TNCs offer service apps that can be set to variety of languages but they lack connection to transit interfaces. The challenge is observable when a non-English-speaking user needs to plan a multi-modal route. RTD currently only uses static data for bus and train services, which does not always allow people to easily and interactively coordinate travel between buses, trains, or a TNC.

Ride-sharing systems are designed to connect a group of people in an origin or destination to share a ride. Ride-sharing services are best utilized where transportation options may be very limited. Ride-sharing utilizes four modes of transportation: vanpool systems, microbus services, demand responsive transit, and carpool programs. While the four modes differ slightly, the objective for each remains the same: to group individuals together in sharing a ride to a specific origin or destination. Ride-sharing differs from ride-sourcing in two main ways: (1) the group route is pre-determined, (2) riders pay a fraction of the cumulative cost.

Uber and Lyft

Ride-sourcing platforms Uber and Lyft are leading the industry's innovative solutions for bridging the gap of first and last mile connections to local transit. Unlike other platforms, Uber and Lyft make an effort to provide service within the critical first and last mile connection gap. Uber and Lyft's affordability and network of service are appealing to transit authorities attempting to solve a number of local transit obstacles. In the Bay area, the Hillsborough Area Regional Transit (HART) authority has created a new First Mile/Last Mile program in response to the limited number of public transit options successfully between first and final destinations. HART is currently hiring a contractor to run a pilot program in Riverview and Apollo Beach, where the first and list mile disconnect is the most acute.[59] Uber and Lyft will most likely be selected as contractor(s) of choice. Recently in Texas, Dallas Area Rapid Transit (DART) partnered with Uber to explicitly bridge first and last mile gaps to local and mass transit. The result was Uber DART's GoPass Mobile Ticketing Application that now allows users to shop for transit needs and subsequent Uber connections in the same place. Many of DART's riders do not live near a transit station, so the app allows a synchronized coordination between the transit agency and the TNC. In this partnership the TNC serves as a complimentary shared mobility option to a mass transit system.

Also recently, Uber and Lyft also transcended the barrier between ridesharing and ride-sourcing with offering UberPool and LyftLine. This new ride-sourcing option is uniquely named ride-splitting, and as of now only applies to TNCs like Uber and Lyft. Ride-splitting allows drivers to pick up multiple riders heading in the same direction. The costs are then split between the riders. These programs have become very popular; in San Francisco 30 percent of all Lyft rides are taken through LyftLine.[60]

Challenges to Ride-sourcing

TNCs have a complex and controversial relationship of benefits and challenges. First, very little research shows that ride-sourcing TNCs are a more environmentally friendly than public transit. The primary environmental impacts of air quality and greenhouse gas emissions are not easily measured per person. Recently, a study by the City of Portland Private For-Hire Transportation Innovation Task Force concluded that "for-hire transportation is more energy intensive per passenger mile than other modes. However, people tend to use it sparingly, so as part of the transportation system, it can have strong positive impacts."[61] The analysis of transportation system effects on whether TNCs and for-hire transportation options reduce the number of trips taken reveals several direct and indirect impacts (i.e., net ridership volume to congestion and parking factors). However, the key question for TNCs is whether they complement or substitute public transit. The study's environmental considerations are a mixed bag: (1) "ride-sourcing both complements and competes with public transit, at least with respect to individual trips;" (2) "ride-sourcing appears to substitute for long transit trips, but otherwise it complements transit;" (3) "the survey provides some evidence that ride-sourcing enables lower levels of driving among vehicle owners" and "so far, ride-sourcing seems to have little impact on auto ownership, which is not surprising given the newness of these services."[62]

We are in the midst of a potential shift in the shared economy. Uber is worth more than $40 billion as a company.[63] However, it operates as a platform and not an employer, connecting drivers and passengers through technology. Uber has long maintained an independent contractor culture. Ride-sourcing and ride-sharing companies like Uber and Lyft are in the business of utilizing freelance labor. A quick skim of the web will show countless personal accounts of Ubers contractors' inflexible hours, sub-par wages, absence of health benefits, and complicated tax obligations. A conversation with a Lyft or Uber driver typically yields praise for the flexible hours and independence.

In June 2015, the California labor commission ruled an Uber driver to be an employee and not a contractor. As the pioneering ride-sourcing business model, if the ruling is upheld in the California State Court it would mark a potential reshaping of the entire shared economy. The commission's ruling is not binding, and currently only applies to the one driver in suit. However, additional drivers may file claims, creating a snowball effect with regulators and trial courts leading to permanent labor laws for Uber. This has the potential to completely alter Uber's operational business model. Currently, there are "11 lawsuits against sharing economy companies made mostly by workers seeking employee benefits. Uber and Lyft are defendants in four of those lawsuits."[64]

Recommendations

- RTD should develop a multi-language geo-location app, en route service Wi-Fi, and mobile fare payment options.
- RTD should cultivate a collaborative partnership with Uber and Lyft to access some of their data to address first and last mile connection challenges.
- DRCOG and RTD should host a convening of regional planning and public works staff to better understand the emerging landscape of share use mobility benefits and challenges.
- The City and County of Denver should explore a shared use mobility plan similar to Seattle and Los Angeles that would identify the range of shared use mobility services, assess issues such as service area coverage, the regulatory framework, right-of-way and parking issues.

CONCLUSION

Shared mobility options are most effective for low-income communities when tied to mass transit. Therefore, shared mobility and mass transit systems need to complement each other. In addition, data transparency across all shared mobility programs should remain a universal priority. The first challenge is finding comparable metrics between systems that are above the basic bike- and car-share usage statistics. B-cycle provides the infographic (Figure 1.2) and set of comparable statistics (Table 1.2) over their years of operation. There are few accessible examples to articulate multi-faceted streamlined data on the benefits, disadvantages, successes, and failures of shared mobility operations. Another challenge of the shared economy is reaching an authentic understanding of grassroots community needs. Equitable shared mobility options are best utilized when combined with advocacy or community-based organizations. Bike-sharing and car-sharing enhancements need to be more intentional with coordinated through advocacy groups and community-based organizations, which can identify low-income community needs and gaps with mass transit systems. In many low-income communities, a majority of ride-sharing happens on buses. As shared mobility options evolve, community-based organizations need to be part of the design and marketing engagement. Funding mechanisms and support for new mobility systems vary on many levels. Operations that have reliable funding structures and strategies are the most successful and sustainable.

Shared mobility operations are becoming more dynamic, innovative, and cost effective. However, they still need to be connected to underrepresented low-income communities across the nation. Simply, the goal of this case study is to highlight best practices in shared mobility concepts, and to identify challenges and constraints. Ultimately, as we begin to examine opportunities and address challenges in the Denver region, this study shall serve as a comprehensive reference point.

ENDNOTES

1 Shared Use Mobility Center, “SUMC Newsletter: Understanding Shared Use Mobility,” Shared Use Mobility Center, May 8, 2015, http://sharedusemobility-center.org/wp-content/uploads/2015/05/SUM-Primer-Installment-Five-05082015.pdf.

2 Ibid.

3 **Shared-Use Mobility Center, 2013 – Shared-Use Mobility Summit, May 2015.**

4 Emily Snyder (Pedestrian/Bicycle Project Manager, Denver Public Works), interview by author, May 14, 2015.

5 Kodransky, M. and Lewenstein, G., “Connecting Low-Income People to Opportunity with Shared Mobility,” Institute for Transportation and Development Policy and Living Cities, December 2014, https://www.itdp.org/wp-content/uploads/2014/10/Shared-Mobility_Full-Report.pdf.

6 Ibid.

7 “Home Page.” Shared Use Mobility Center. Accessed September 18, 2015. http://sharedusemobilitycenter.org/#

8 McDonald, N.C., Critical factors for active transportation to school among low-income and minority students: Evidence from the 2001 National Household Travel Survey, American Journal of Preventive Medicine, 34, pp. 341-3, April 2008.

9 *Community Cycling Center, Understanding Barriers to Bicycling Project: Final Report*, Community Cycling Center, July 2012. http://www.communitycyclingcenter.org/wp-content/uploads/2012/07/Understanding-Barriers-Final-Report.pdf?.

10 Ibid.

11 Bike Share, “The 2014 Bike Share World Fact Sheet,” Bike Share, (accessed September 18, 2015). http://bikeshare.com/wp-content/uploads/2013/02/BikeSharing-Statistic-Infographic.pdf.

12 Ibid.

13 Sam Zimbabwe (Associate Director of Policy, Planning and Sustainability, Washington, D.C. Department of Transportation), interview by author, May 21, 2015.

14 Ibid.

15 Ibid.

16 “Home Page.” Indego. Accessed September 18, 2015. http://www.rideindego.com/.

17 Mayor’s Office of Transportation and Utilities, “Philadelphia Bike Share Station Planning Update,” City of Philadelphia, December 2014, http://www.phila.gov/bikeshare/PDF/BikeShare_StationPlanningUpdate_December2014.pdf.

18 Ibid.

19 Hamilton, A., “Has Philadelphia Made a Bike Share That Can Get the Entire City Biking?” Fast and Company, March 30, 2015, www.fastcoexist.com/3044431/world-changing-ideas/has-philadelphia-made-a-bike-share-that-can-get-the-entire-city-biking.

20 Lobasso, R., “Indego is Philadelphia’s Bike Share System!” Bicycle Coalition of Greater Philadelphia, February 11, 2015, http://bicyclecoalition.org/indego-philadelphias-bike-share-system/#sthash.6sOhrC2U.dpbs.

21 Mondon, M., “Philly is Racking up the Bike-Friendly Points,” Next City, May 8, 2015, https://nextcity.org/daily/entry/philadelphia-new-bike-share-riders-biking-data.

22 http://www.cyclesforchange.org/community-partners-bike-library.

23 *Cycles for Change,* Community Partners Bike Library, 2013 – Best Practices for Bike Libraries, April 2015.

24 Nice Ride Minnesota, “Nice Ride’s Neighborhood Program,” Central Corridor Funders Collaborative, May 28, 2015, www.funderscollaborative.org/CCFC_News/nice-ride%E2%80%99s-neighborhood-program.

25 Ibid.

26 Ibid.

27 “About.” Bicycle Collective. February 10, 2006. http://www.bicyclecollective.org/about.

28 Davey Davis, Bicycle Collective, email communication with author, July 9, 2015.

29 Denver Bike Sharing, 2014 Annual Report, Denver Bike Sharing, https://denver.bcycle.com/docs/librariesprovider34/default-document-library/annual-reports/2014-denver-bike-sharing-annual-report.pdf?sfvrsn=2. (Accessed September 18, 2015.)

30 Ibid.

31 The City of Denver, “Biking on Denver’s Streets and Trails,” The City of Denver, https://www.denvergov.org/bikeprogram/BicyclinginDenver/StreetsandTrails/tabid/438230/Default.aspx. (Accessed September 18, 2015.)

32 Hendee, C., “Denver Welcomes its Largest B-Cycle Share Station Ever,” Denver Business Journal, March 24, 2015, www.bizjournals.com/denver/news/2015/03/24/denver-welcomes-its-largest-b-cycle-bicycle.html.

33 Denver Bike Sharing, 2014 Annual Report.

34 Isabelle Wolfe, email message to author, May 19, 2015.

35 Denver Office of Sustainability, “2020 Sustainability Goals,” Denver Office of Sustainability, https://www.denvergov.org/Portals/779/documents/2020SustainabilityGoals_101514.pdf. (Accessed September 18, 2015.)

36 Public Works Department, “Complete Streets,” 26, Denver, CO, May 17, 2011, 2, https://www.denvergov.org/Portals/708/documents/Signed_CSPolicy.pdf.

37 WalkDenver Focus Group with DRCOG, project notes, May 27, 2015.

38 Badger, E., "Why the Poor Need Better Access to Cars," *Washington Post*, April 1, 2014, www.washingtonpost.com/blogs/wonkblog/wp/2014/04/01/why-the-poor-need-better-access-to-cars/.

39 Khau, J., "Mobility for the Poor: Car-Sharing, Car Loans, and the Limits of Public Transit," *New Geography*, August 22, 2013, www.newgeography.com/content/003888-mobility-poor-car-sharing-car-loans-and-limits-public-transit.

40 City Car Share, "2013 Fact Sheet," City Car Share, December 2012, http://citycarshare.org/wp-content/uploads/2013/04/1071_CCS_Fact_Sheet_v2-1.pdf.

41 Randall, C., "Buffalo CarShare: Two Years in Review," Buffalo CarShare, November 2011, www.buffalocarshare.org/Buffalo%20CarShare%202yr%20report%20-%20print.pdf.

42 Gottlieb, J., "Buffalo, NY, Nonprofit Launches Car Sharing Service for Low Income People," Government Technology, June 8, 2015, www.govtech.com/transportation/Buffalo-NY-Nonprofit-Launches-Car-Sharing-Service-for-Low-Income-Peo.html.

43 Ibid.

44 "Our Mission." City Car Share. Accessed September 18, 2015. https://citycarshare.org/why-city-carshare/our-mission/.

45 City Car Share, Member Handbook, City Car Share, September 2015, https://citycarshare.org/wp-content/uploads/2014/04/City-CarShare-Member-Handbook.pdf.

46 Business Wire, "City CarShare to Expand Carsharing in East Bay Through One Million Dollar Grant Awarded by Metropolitan Transportation Authority," Business Wire, December 18, 2014, www.businesswire.com/news/home/20141218006323/en/City-CarShare-Expand-Carsharing-East-Bay-Million#.VYhr6edkdNJ.

47 Espino, J. and Truong, V., "Electric Carsharing in Underserved Communities" Considerations for Program Success," The Greenlining Institute, January 2015, http://greenlining.org/wp-content/uploads/2015/01/Electric-Carsharing-in-Underserved-Communities-spreads.pdf.

48 Business Wire, "City CarShare to Expand Carsharing in East Bay."

49 Ibid.

50 Ibid.

51 eGo CarShare, "Affordable Housing Multi-modal Toolkit," eGo CarShare, http://carshare.org/affordable-housing-multi-modal-toolkit/. (Accessed September 18, 2015.)

52 Ibid.

53 Apex Design, Denver Car Share Program: 2013–2014 Assessment, Denver Public Works, December 2, 2014, https://www.denvergov.org/Portals/706/documents/CarShare%20Program%20Assessment.pdf.

54 Ibid.

55 Ibid.

56 Ibid.

57 Murray, J., "Attracting Big Players, Car-sharing Takes off on Denver Streets," *Denver Post*, March 24, 2014, www.denverpost.com/news/ci_25411127/attracting-big-players-car-sharing-takes-off-denver.

58 Kodransky, M. and Lewenstein, G., "Connecting Low-Income People to Opportunity with Shared Mobility."

59 Snider, E., "HART Looking into Uber, Lyft to Close Gap in Hillsborough Bus System," *Tampa Bay Business Journal*, April 23, 2015, www.bizjournals.com/tampabay/news/2015/04/23/hart-looking-into-uber-lyft-to-close-gap-in.html.

60 Wagstaff, K., "Riders Look for Love on UberPool and Lyft Line," TODAY Money, March 18, 2015, www.today.com/money/riders-look-love-uberpool-lyft-line-t9586.

61 City of Portland Private For-Hire Transportation Innovation Task Force, "Environmental Considerations," (Presentation, Subcommittee on Market and Program Considerations, Portland, OR, June 9, 2015.) http://www.portlandoregon.gov/transportation/article/533860.

62 Ibid.

63 Zillman, C., "California's Uber Driver Decision Could Throw A Wrench in the Sharing Economy," *Fortune*, June 17, 2015, http://fortune.com/2015/06/17/uber-drivers-are-employees-sharing-economy/.

64 Ibid.