

# 3a.

## SHARED MOBILITY



Shared mobility is arguably the most rapidly growing and evolving sector of the Sharing Economy. One-way and peer-to-peer carsharing, as well as ridesourcing, are amongst the many new entrants in the short-term, as-needed shared transportation milieu. Is shared mobility an opportunity or a distraction on our journey towards more sustainable and equitable transportation systems?

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## Summary

Rather than considering shared mobility options such as carsharing or ridesourcing in isolation, local governments may be better served by cultivating a shift towards integrated mobility planning. Using this approach, a suite of mobility options – with public transit as the foundation – is considered in conjunction with land use patterns. Shared mobility can then be used to fill gaps in the existing public infrastructure and extend its reach.

While there are variations with different models, **carsharing** generally makes a positive contribution to the ability of cities to live within their ecological means by reducing car ownership levels and reducing vehicle miles travelled. The impact on transit requires further exploration, particularly for one-way carsharing. While positive health impacts are assumed, they are not proven. Local governments can leverage carsharing to enhance urban sustainability by: supporting its expansion in suburban municipalities and integration with transit; supporting electric vehicle expansion and carsharing companies that explicitly and consistently advocate for sustainable behaviour change; ensuring that cities have both two-way and one-way carsharing entities to create a more comprehensive mobility mix; and continuing to integrate carsharing into new multi-family developments.

Current usage of carsharing and ridesourcing amongst **low-income communities** is below that of the general population. This can be addressed by continuing to regard shared mobility as a complement to public transit and equitable transit-oriented development. Efforts to increase low-income participation in shared mobility need to address multiple barriers and employ partnerships of public, non-profit and private actors. The equity potential of peer-to-peer carsharing should be explored.

While **ridesourcing** companies including Uber and Lyft may provide a new mobility option – particularly attracting younger, higher educated citizens – they may weaken the capacity of cities to live within ecological limits, particularly in downtown areas. There is early evidence that ridesourcing replaces some public transit, walking and cycling trips; evokes only modest changes in car ownership levels; and has an unknown impact on vehicles miles driven. There are also indications that ridesourcing is inducing entirely new vehicle trips. Health impacts are unknown and there are concerns related to the treatment of workers. Ridesourcing drivers are independent contractors without job security or benefits whose net hourly wage including all costs is above current US and Canadian minimum wages but below minimum wage increases underway, and below the living wage for households with children.

Local governments and transportation agencies may be able to use ridesourcing as a tool to move people out of single occupant vehicles and contribute to more sustainable transportation by:

1. Developing partnerships between ridesourcing companies and suburban municipalities or transportation agencies in order to fill transit gaps and foster first/last mile integration;
2. Exploring the use of ride-splitting services like UberPool, LyftLine and Sidecar Shared Rides to scale carpooling, particularly for commuting to work.

Local governments will want to watch current legal debates happening at state and provincial levels that will determine whether ridesourcing drivers are considered independent contractors or employees in the future. The latter will likely improve labour conditions for ridesourcing drivers.

## 3a.1

### WHAT IS SHARED MOBILITY?

Shared Mobility is the access to transportation services shared amongst users on a short-term, as-needed basis that includes: public transit; bike and scooter sharing; carsharing; ridesharing (vanpooling and carpooling); ridesourcing (e.g. Uber or Lyft); taxis; micro-transit; and commercial delivery services.

The rapid proliferation of smart phones has given rise to an array of transportation apps that make shared mobility possible with demand generated by some major trends:

- Millennials<sup>1</sup> born between 1981 and 2000 who comprise about 30% of North America's population, are moving back into cities and have a much-reduced interest in driving, due to its cost and a desire to stay connected through social media;
- Baby boomers are also increasingly moving back into cities and have less interest or ability in driving and their interest in health is promoting more active transportation;
- A major shift towards a "work anywhere, anytime" mentality, with an increase in people who want to be able to work while getting around; and
- The proliferation of the digital Sharing Economy, which has prompted a broader acceptance of access to goods over ownership and the ability to access commonly held goods through information technologies.<sup>2</sup>

Taken together, these trends have led to a peak in a driving and a proliferation of Shared Mobility options.

### SHARED MOBILITY MODES

#### PUBLIC TRANSIT

Publicly owned transit is the foundation of shared transportation and is increasingly adopting digital technology to enhance the ease and reliability of service. There are two stages of evolution:

- Fixed-schedule and real-time transit apps such as [NextBus](#), [Moovit](#), [TransitApp](#) and [Google Transit](#).
- Multi-modal apps that provide users with real-time trip options with times and pricing for a mix of modes including transit, bikeshare, taxi, carshare, rideshare (carpool), biking, walking and driving. Examples include: [RideScout](#) and [CommunAuto](#).

#### BIKE SHARING

An innovative transportation program, bike sharing is an ideal option for short journeys, as well as first and last mile supplements to regional bus, metro, and train services. Users are able to pick up a bicycle at a self-serve station and return it to another at the end of their journey, or rent a bicycle directly from its owner. Users can pay via mobile app for many forms of bike share, or directly by cash in peer-to-peer transactions. Bike sharing has been growing rapidly in recent years in large part due to the proliferation of information technologies that allow for real time reservation of bicycles, locating docking stations, and payment and account management. There are three main bike sharing models:

- 1. Municipal public bike sharing systems:** This model has cities, counties, etc. engaging in the funding, managing, administering, and permitting of a bike sharing program within their jurisdiction.<sup>3</sup> Municipalities often partner with sponsoring organizations, as with the recently renamed [Santander Cycles](#) in London, UK, and New York City's [Citi Bike](#) system. Mobile apps allow users to find available bicycles and to manage their accounts, and membership is open to the public.<sup>4</sup> Some municipalities are introducing electric bike sharing including [Corner Brook](#), Newfoundland.
- 2. Closed-community bike sharing:** Typically found on college campuses and has a closed membership model available only to students or members of participating organizations. Rentals are typically round-trip. Many college and university campuses in North America have such bike share services available.
- 3. Peer-to-peer bike sharing:** Individuals rent bicycles by the hour directly from other individuals or from bicycle rental shops.<sup>5</sup> The most notable example is [Spinlister](#), which is a peer-to-peer bike share app operating in New York and San Francisco.<sup>6</sup> There are also bikes swaps emerging such as the [Detroit Bicycle Show](#) and [Swap Meet](#).<sup>7</sup>

#### SCOOTER SHARING

An operator-owned fleet of motorized scooters made available to users by the hour or minute (e.g. [ScootNetworks](#) with electric scooters in San Francisco).<sup>8</sup>

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## CARSHARING

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Provides members access to a car for short-term rental - usually on an hourly basis - but some provide daily options or longer. The cars are distributed across a region or city and can be accessed at any time with a reservation. Members are charged on a time or mileage basis. There are three primary carsharing models:

- 1. Two-way or return trip:** the traditional model that involves returning the shared car to the pick-up location. Once reserved, access to the car is restricted to the reserving member. Most trips (80%) are non-work related e.g. [Zipcar](#) and [Modo](#) (Vancouver).
- 2. One-way (aka free-floating or point-to-point):** a newer model where customers pick up and drop off cars in different locations, e.g., [Car2Go](#). Members pay by the mile for leisure and some work trips, but not daily commuting. The latest trend is for two-way companies to add a one-way option. For example, [Communauto](#) in Montreal has added electric and hybrid vehicles for one-way rental and [Zipcar](#) announced a pilot of one-way carsharing in Boston in May of 2014.
- 3. Peer-to-peer:** individuals list their cars on a web platform and renters use an App to reserve and meet the owner to pick up the keys. The company handles the transaction and keeps a percentage, wiring the rest to the car owner's bank account. (e.g. [RelayRides](#) and [GetAround](#)).

## RIDESHARING

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Focused on filling empty seats in vehicles in order to optimize occupancy potential. The passenger has a common destination to the driver who has a non-profit motivation (e.g. to partially cover costs). There are a number of key evolutions:

- Traditional ridesharing includes carpooling (travellers group together in a privately owned vehicle, typically for commuting) and vanpooling (sharing of a van by commuters travelling to and from a job center).
- Since 1994, ridematching platforms have enabled more reliable matching of regular, recurring trips e.g. [eRideshare.com](#) and [boontrek](#) with some using existing platforms such as Newfoundland Rideshare that matches people on Facebook or ride sharing connections made on Kijiji to get to and from Whitehorse in the Yukon.<sup>9</sup>

- Since 2004, real-time ridesharing apps allow drivers and passengers to match up before a trip starts and share costs e.g. [carma](#), [PoolXing](#) (just around Washington DC) and [Enterprise Rideshare](#). For more information see 'Introduction to RideSharing'.<sup>10</sup>

## RIDESOURCING<sup>11</sup>

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On-demand car services where users "source" rides through a mobile app from a pool of private passenger vehicles driven (usually) by a non-professional driver. The apps communicate passenger location to the driver via GPS and charge a distance-based fee, of which about 80% goes to the driver and the remainder to the ridesourcing company. Ridesourcing drivers usually are not already travelling to the same destination as passengers and the driver's motivation is to earn income. This makes ridesourcing more similar to a fee-based taxi service than ridesharing where driver and passengers have a common destination and a non-profit arrangement.

Ridesourcing models are quickly evolving:

- [Uber](#), [Lyft](#) and [Sidecar](#) were the first stage of ride-sourcing that involves a driver using their own car to pick up one passenger or more than one who know each other.
- New business variations [UberTax](#), [UberBlack](#), [Uber SUV](#) and [UberLUX](#) that use dedicated drivers and Uber vehicles on a for-hire basis; the rates vary with how luxurious the vehicle is;<sup>12</sup>
- [UberPool](#) and [LyftLine](#) – an app that allows strangers to share Uber and Lyft rides and split the cost.
- New ridesourcing companies that cater to specific populations e.g. [UberASSIST](#) is aimed at providing services for disabled users,<sup>13</sup> [Lift Hero](#)<sup>14</sup> for seniors is in beta testing in San Francisco and [Shuddle](#)<sup>15</sup> is a start-up ride service for busy families where caregivers take children to school or soccer practice.

## TAXIS

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Taxi companies are also now evolving in various ways in order to compete more effectively with Shared Mobility options, particularly ridesourcing companies:

- Taxi companies are adopting app-based dispatches - e.g. [FlyWheel](#) in New York City is used by 80% of

taxis; others are [Hailo](#) and [Curb](#).

- The Pennsylvania Public Utility Commission (PPUC) approved Yellow Cab Company's application in 2014 to establish a peer-to-peer ridesharing service, known as Yellow X.
- In December, 2014, the cities of Chicago, Washington DC and New York City all announced they would be incubating or developing new e-hailing mobile taxi apps,<sup>16</sup> which hail taxis from any company.

#### MICRO-TRANSIT

Micro-transit is a form of private transit that relies on big data to plan flexible routes with limited stops and no transfers.<sup>17</sup> Users can pay by the ride, buy multi-ride packs or sign up for monthly subscriptions. The buses and vans guarantee every rider a seat and have luxury items like wifi. Examples include: [Leap Transit](#)<sup>18</sup> or [Chariot](#)<sup>19</sup> in San Francisco or [Bridj](#)<sup>20</sup> in Boston (and now Washington). Dynamic vanpools like [Via](#)<sup>21</sup> in New York and the newer carpooling evolutions UberPool and LyftLine are often included in this category.

#### COMMERICAL DELIVERY SERVICES

Uses apps to make commercial deliveries more efficient by pairing up loads in real-time with nearby drivers. The intent is to help truckers make more money by filling unutilized capacity and make goods movement more efficient through shorter routes and loading wait times. Examples include: [Transfix](#),<sup>22</sup> [Cargomatic](#)<sup>23</sup> and [Zipments](#).<sup>24</sup>

Cargomatic appears to be achieving particular success at ports through its "free flow" service. It does this by matching containers to the next available Cargomatic truck versus matching specific trucks to specific containers, an approach often requiring wait times of up to two hours.<sup>25</sup> The Port of LA has very recently decided to do a pilot with Cargomatic to speed up freight movement.<sup>26</sup>

## 3a.2

### DOES CARSHARING ADVANCE LIVING WITHIN ECOLOGICAL MEANS?

In order to consider if carsharing contributes to the ability of cities to live within ecological means, we reviewed the transportation plans of USDN member cities to find those with bold, transformative goals linked to reducing greenhouse gas emissions up to 80 percent by 2050. We also considered the traits of transportation that align with a one-planet ecological footprint by consulting with William E. Rees, Professor Emeritus at the University of British Columbia and Director and Co-founder of One Earth, best known for creating Ecological Footprint analysis alongside Mathis Wackernagel. We also consulted with Dr. Jennie Moore who is a Senior Associate with One Earth and who focused her doctorate on One Planet Cities.

In a paper exploring 'Ecological Footprints and Lifestyle Archetypes',<sup>27</sup> Jennie Moore describes the characteristics of one planet transportation:

*"There is low to no ownership of motorized passenger vehicles. Approximately 19% of the population uses public transit for commuting purposes. Personal motorized vehicle travel averages 582 km/ca per year"*<sup>28</sup>

Moore also provides a range of specific benchmarks for transportation that would ensure that a city's average household aligns with, or exceeds, global per capita ecological carrying capacity.<sup>29</sup>

While strong, one-planet goals for transportation may seem unattainable, phased targets could accompany these goals over time. We use these phased targets in the following table and subsequent analysis in order to consider whether carsharing moves cities in the "right" direction towards living within ecological means. We first consider the impacts of traditional two-way carsharing before considering newer variants of one-way and peer-to-peer carsharing.

**Table 3a.1**

**TRADITIONAL CAR SHARING’S CONTRIBUTION TO “LIVING WITHIN ECOLOGICAL MEANS”**

<b>STRONG, ONE PLANET TRANSPORTATION</b>	<b>MOVES CITIES IN THE RIGHT DIRECTION?<sup>30</sup></b>
<b>Strong increases in non-auto modal share - transit, bike, walk</b> (e.g. 60% in 2030; 86% one planet in 2050)	<b>Mixed impact</b> · <i>cycling &amp; walking</i> – overall increase but individuals both increase and decrease these modes; · <i>transit</i> – see below
<b>Increases in transit ridership</b> (e.g. 9% on average; up to 40%+ in low ridership cities by 2050)	<b>Mixed, neutral, impact</b> · on average slight reduction in transit use · initially carless citizens use transit less; · initially car owning citizens use transit more <sup>31</sup>
<b>Major reductions in Vehicle Kilometres / Miles Traveled (VKT/ VMT)</b> (e.g. 71% by 2030 in Seattle; 78% one planet in 2050)	<b>Yes, but mixed impact</b> · on average, car sharers drive 27% to 43% fewer miles annually · initially carless people drive more <sup>32</sup> · carsharers may drive more in first year and then reduce <sup>33</sup>
<b>Major reduction in private car ownership</b> (e.g. 96% for one planet in 2050)	<b>Yes</b> each shared car replaces 9 to 13 cars; 25% car-sharers shed a car; <sup>34</sup> another 25% postponed purchases
<b>Major increase in electric vehicles</b> (ALL electric for 2050 one planet)	<b>Modest</b> Electric vehicles in carsharing fleets – 5.1% hybrid; >0.1% plug-in hybrid; >0.8% battery electric <sup>35</sup>

**CONCLUSION:**

Aggregate greenhouse gas emissions of traditional car-sharing households are lower because of reduced rates of car ownership and vehicle miles / km travelled.<sup>36</sup>

While the majority of initially carless households increase their emissions, carshare members who owned a car(s) when they joined decreased their emissions significantly by driving much less and selling off a car or two. When members pay for carshare use by the hour or km / mile, they are incented to drive less, take another mode or trip chain (do many stops on one trip, take longer trips as compared with taking lots of separate, little car trips).

**CO<sup>2</sup>**



Majority of initially carless households modestly increase emissions

**CH<sup>4</sup>**



Minority of car-owning households emit significantly less emissions – much lower vehicle miles / km traveled (VMT/ VKT) and shed car(s)

Reductions in carbon emissions may also depend on the nature of the cars being shared. Carsharing services that provide luxury or larger vehicles reduce emissions and ecological footprints less than those offering smaller and/ or electric vehicles.

**DO GREENHOUSE GAS EMISSIONS FROM CARSHARING VARY WITH URBAN FORM?**

As Martin and Shaheen (2010) hypothesize:

*“Carsharing impacts are potentially greater in low-density environments where car ownership is more widespread and driving distances are longer.”*

A study involving Flexcar in Portland in 2003 found that higher percentages of users in neighbourhoods with lower mixed-use values walked more often or much more often.<sup>37</sup> However, Martin and Shaheen (2010) had inconclusive findings:

- Carsharing is effective at lower emissions when urban densities are less than 38,000 / square mile;
- There is a possibility that carsharing in ultra high-density cities is less effective in reducing emissions than mid to lower-densities; and
- The economic barriers to carsharing as the urban environment becomes more auto-dependent reduce the potential for lowering GHG emissions.

## MIXED IMPACT OF TRADITIONAL CARSHARING ON TRANSIT

Cities will not live within their ecological means unless the majority of trips are taken by non-car modes (up to 86%). Carsharing shows mixed evidence here in terms of encouraging non-car travel – the evidence is more modest than often reported. For example, the Spring 2015 report ‘Mobility and the Sharing Economy: Impacts Synopsis’ authored by Dr. Susan Shaheen and Nelson Chan states that:

*“More carsharing users increased their overall public transit and non-motorized modal use (including bus, rail, walking, bicycling and carpooling).<sup>38</sup>”*

Yet the 2011 study upon which this conclusion appears to be founded states that carsharing contributes on average to a slight reduction in transit use overall.<sup>39</sup>

### CONCLUSION:

There are indications that, in the majority of cases, carsharing contributes to a statistically insignificant impact on transit usage, whether a slight increase or decrease. However, a minority of carsharing organizations report a statistically significant reduction in transit usage.

Unfortunately, due to anonymity requirements no details are known about the nature of carsharing organizations that resulted in these reductions in transit usage. We can find some hints, however, by analyzing studies conducted by carsharing organizations themselves. For example, City CarShare based out of San Francisco and the largest non-profit carsharing organization calls itself a transit-oriented carshare which creates many combined trips. For example, nearly 20% of members get to their City CarShare vehicles

by transit – a figure that jumps to 55% when cars are located at transit stations.<sup>40</sup> So, it may very well be that the conscious integration of carsharing and transit is one factor that contributes to the impact of carsharing on transit usage.

## DOES ONE-WAY CARSHARING CONTRIBUTE TO LIVING WITHIN MEANS?

The research about the environmental benefits of one-way carsharing is much less developed. City administration officials in Seattle made the sharing of operational and member survey data by Car2Go a requirement of a pilot launch in 2013 and published their analysis in May, 2014<sup>41</sup> which showed mixed results:

### Positive environmental impacts:

- 39% carshare members gave up a car or are considering it
- 35% traveling fewer miles in personal vehicles
- 39% using personal cars less often since joining

### Negative environmental impacts:

- 47% carshare members ride transit less frequently
- 63% have not changed miles travelled in their personal vehicle

The City of Seattle concluded that it was unclear how free-floating carsharing was affecting boarder transportation choices throughout the city. However, it did lead to the permanent introduction of one-way carsharing with a range of new policies, including a data sharing agreement, that are explained in more detail in Box 5.1: Data Sharing as Part of 120-Day Ridesourcing Pilot Program.

### CONCLUSION:

We can conclude from the initial Seattle data that free-floating carsharing when considered in isolation of other modes:

- has a positive impact on reduced car ownership levels;
- a questionable impact on VMT/VKT;
- and a potentially negative impact on transit ridership.

In a discussion with the LGSE advisory committee, however, it was pointed out that one-way carsharing when combined with two-way creates a comprehensive mobility package that allows car-sharers to reduce or avoid private car ownership and to drive less overall.

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## DOES P2P CARSHARING CONTRIBUTE TO LIVING WITHIN MEANS?

Research on peer-to-peer carsharing is again quite limited. Demailly and Novel (2014) conclude the following:

*“Apart from the sustainability of products, we can expect similar positive conclusions from an environmental point of view due to the transformation of the mobility package.”<sup>42</sup>*

Yet the sustainability impact of P2P carsharing is likely more nuanced, with both positive and negative sustainability points:

### Positive – peer-to-peer carsharing:

- Uses already manufactured cars so reduces embodied energy usage
- Lowers deployment costs so there is more potential in suburban areas

### Negative – peer-to-peer carsharing:

- Has no controls on the nature of the P2P cars – users can rent cars of varying ages and emission profiles e.g. from electric smart cars to Hummers
- Subject to the rebound effect – there is evidence that some people are buying a second car just for P2P car sharing<sup>43</sup>

## CONCLUSION:

Like many areas of the Sharing Economy, the overall impact of peer-to-peer carsharing is uncertain. The most potentially troubling aspect ecologically is that some people are buying a second car to share. On the other hand, P2P carsharing has the potential to expand into less dense, suburban areas and reduce car ownership levels with minimal, if any, impact on transit usage.

### BOX 3A.1 HOW ELECTRIC IS THE CARSHARING INDUSTRY?

Deep carbon and footprint reductions require a transition to electric vehicles. What is the percentage of carsharing fleets that are electric? And what role might local government play in enabling expansion?

A 2014 Report on Electric Vehicles in Carsharing fleets in Canada<sup>44</sup> conducted by the Carsharing Association found that “adoption of EVs in carsharing fleets in Canada is

very, very low, but the interest level from carsharing operators is high.” The penetration of electric fleets in carsharing at the time of the study was: 5.1% hybrid, >0.1% plug-in hybrid and >0.8% battery electric. These numbers are cited by the author as being reasonably accurate of the industry as a whole.

Expanding electric vehicles in carsharing WAS a subject of an Electric Vehicle Carsharing Panel at the 2015 Carsharing Conference held in Vancouver in September 2015.<sup>45</sup>

## DO CARSHARING BENEFITS REBOUND?

Absolute reductions in carbon emissions and footprint also require that carsharing avoids rebound effects in which reduced impact leads to new activities and behaviors that increase impact. Rebound effects in this case might include: 1) members of initially carless households becoming dependent on driving and buying a new car when they can afford to; or 2) savings earned from carsharing being directed into higher levels of consumption in other areas (e.g. flying to Mexico for a winter vacation).

The rebound effect has not been measured in any research known to the authors and warrants further research. Carsharing companies with an explicit emphasis on promoting sustainable lifestyle behaviours may serve to minimize the rebound effect. For example, many carshare co-operatives view carsharing as part of a multi-modal shift away from car usage and focus on this in their marketing efforts. Some, such as Modo in Vancouver, go further to offer their members a variety of sustainable lifestyle perks such as discounts for: cycling gear, education and events; veggie garden installation and seeds; and carpooling to the nearby town of Whistler.

In contrast, for-profit car-sharing entities tend to send more diluted or mixed messages in terms of promoting sustainable lifestyles. For example, DriveNow who have exclusively electric cars offer a Fly and Drive program that makes it easy to drive to and from the airport and pick up a DriveNow car in another global city.

## 3a.3 DOES RIDESOURCING ADVANCE LIVING WITHIN ECOLOGICAL MEANS?

Ridesourcing involves users “sourcing” rides through a mobile app from a pool of private passenger vehicles driven



by a non-professional driver who works (most often) on a part-time basis. As with other areas of the Sharing Economy, ridesourcing impacts are not well documented. Rayle et al with the University of California Transportation Centre released the first peer-reviewed research on ridesourcing as a white paper in November 2014. It involves an intercept survey of ride-sourcing users at three locations in downtown San Francisco,<sup>46</sup> comparing ridesourcing results with taxi trip and user data, and travel times on transit.

We primarily draw from this study, supplemented by additional secondary research, to consider how ridesourcing contributes to strong, one-planet transportation. The San Francisco intercept study focuses primarily on social evening trips and underestimates other trips such as those for commuting, airport travels and errands, so it can only provide an indication of the broader ridesourcing market.

The white paper authors conclude that:

*“Although still exploratory, these findings nevertheless indicate ridesourcing enriches mobility options for city dwellers, particularly in large, dense cities like San Francisco where parking is constrained and public*

*transit incomplete. Thus, outright bans on ridesourcing would negate these mobility gains.”<sup>47</sup>*

The key reasons for enriching mobility cited in the study are that ridesourcing provides:

- *shorter wait times than taxis* – primarily downtown but also some evidence in outer city locations where public transit and traditional taxi service are sparser (other studies have found similar results),<sup>48</sup>
- *a fast point-to-point option for generally younger, higher educated users* for social trips, while avoiding the inconveniences of driving like parking and having to drink and drive;
- *some complementarity with transit* – the majority of ride-sourcing trips saved 10 minutes over public transit; and
- *higher occupancy than taxis* – 1.8 in ridesourced cars vs. 1.1. in taxis.

There is conflicting evidence as to whether ridesourcing is less expensive.<sup>49</sup> Transit service in many cities is often less frequent in the evenings and so ridesourcing may provide a new mobility choice which public authorities cannot provide efficiently. The LGSE Project, however, is concerned not just with enriching mobility options but doing so in strongly sustainable ways that help cities live within their ecological means. Table 3a.2: Ride-Sourcing’s Contribution to Living within Ecological Means, draws from the full range of details in the White Paper.

**Table 3a.2**  
**RIDE-SOURCING’S CONTRIBUTION TO “LIVING WITHIN ECOLOGICAL MEANS”**

2050 ECOLOGICAL SUSTAINABILITY GOALS	TRADITIONAL RIDE-SOURCING <sup>50</sup> (IN DOWNTOWN EVENING CONTEXT FOR PRIMARILY SOCIAL TRIPS)
<b>Strong increases in non-auto modal share – transit, bike, walk</b> (e.g. 60% in 2030; 86% one planet in 2050)	<b>No</b> • Replaces some transit, biking and walking trips (43% in SF study)
<b>Increases in transit ridership</b> (e.g. 9% on average; up to 40%+ in low ridership cities by 2050)	<b>Unclear, mixed impact</b> • Competes with transit (33% would have bused) • Complements transit (66% of ridesource trips would have taken at least twice as long by transit)
<b>Major reductions in Vehicle Kilometre / Miles Traveled (VKT/ VMT)</b> (e.g. 71% 2030 in Seattle; 78% one planet in 2050)	<b>Unclear, mixed impact</b> • 60% of users drive the same amount; 40% drive less • Induces new car trips (8% modest estimate) • Mileage driven between trips not documented
<b>Major reduction in private car ownership</b> (e.g. 96% for one planet in 2050)	<b>No</b> • 90% of users do not change car ownership levels
<b>Major increase in electric vehicles</b> (ALL electric for 2050 one planet)	<b>No</b> No control over the nature of cars driven • Uber in Chicago piloting 25 EVs – rent or lease to own

## CONCLUSION:

When considering the table above, we have some major concerns that ridesourcing, particularly in downtown locations, may weaken the aspirations of cities to live within ecological limits because there is evidence that it:

- moves (non-car) modal split in the wrong direction – 43% would have walked, biked or taken transit instead;
- has an unclear, mixed impact on transit ridership that includes some strong competition – 33% would have taken the bus instead;
- the impact on vehicles kilometres / miles travelled is unknown and there is evidence that it induces new car trips (8% new trips modest estimate); and
- it does not appear to evoke changes in car ownership levels which would suggest weaker support towards more car free or car-reduced lifestyles.

### 3a.4

#### DO CARSHARING AND RIDESOURCING ADVANCE OTHER SUSTAINABILITY DIMENSIONS?

While the LGSE Project is concerned with “living within ecological means” as a primary filter, sustainability is strongest when it’s moved forward in tandem with other goals such as resilience, equity, prosperous and local economies, and quality of life.

#### DO CARSHARING AND RIDESOURCING ADVANCE RESILIENCE AND CLIMATE ADAPTATION?

Some carsharing and ridesourcing platforms are contributing to city emergency preparedness.

In June 2013, [BayShare](#), an organization dedicated to sharing goods and services, announced a partnership with the San Francisco Department of Emergency Management to explore together how the city could become more resilient before, during and after an emergency. BayShare also joined the San Francisco’s Disaster Council<sup>51</sup> – a group chaired by Mayor Lee and has contributed to the city’s new disaster preparedness website, [SF72.org](#).

BayShare includes four carsharing organization and two ridesourcing companies. Padden Murphy, head of public policy for GetAround, explains that being part of disaster response efforts fits with his company’s mission:

*“We are already providing a public good, so the next step of how we can help in times of a crisis was kind of a no-brainer.”<sup>52</sup>*

In the case of an emergency, cars registered on the [GetAround](#) site would still be available for use, but owners could also make them available free of charge to people without transportation. In addition, trucks or other large vehicles (which would not normally be available) could quickly be registered on the site during a disaster, making them available to move materials or get people out of harm’s way. GetAround announced in 2014 that it is planning to launch a disaster assistance policy and Web portal to help educate people about how to find or share a vehicle following a disaster.<sup>53</sup>

#### DO CARSHARING AND RIDESOURCING PROTECT AND RESTORE NATURAL SYSTEMS?

Ridesourcing and carsharing reduce the need for parking spaces – with carsharing contributing the most – possibly reducing demand for new parking space on natural lands.

Ridesourcing cars are not parked, except at the owner’s personal residence, so in theory that means reduced demand for parking. Yet it is not as straightforward as every Uber car resulting in one less parked car. The impact must consider that according to the recent San Francisco intercept study only 7% of ride-sourcing drivers would have driven had they not ride-sourced; the remaining 93% would have taken modes that didn’t lead to a parked car anyway.<sup>54</sup>

Carsharing research shows that a single carshare vehicle can replace between nine and 13 individually owned cars.<sup>55</sup> Fewer cars means less land is needed for parking, potentially preserving more in its natural state and more roadscape for other uses such as sidewalks, parklets and bike. The University of Ottawa, who has partnered with [VRTUCAR](#) to make carsharing available on campus, cites the following potential benefit on their website:

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*“Car sharing helps reduce the amount of space used by vehicles. One car share vehicle can replace up to 20 vehicles! On campus, that’s the size of parking lot A, in front of Tabaret Hall!”<sup>56</sup>*

## DO CARSHARING AND RIDESOURCING ADVANCE EQUITY AND EMBRACE DIVERSITY?

Current usage of carsharing and ridesourcing amongst low-income communities is below that of the general population.

Low-income communities typically face longer commute times and higher fares than their middle and upper income counterparts. While there is a range of anecdotal evidence about whether low-income communities benefit from carsharing and ridesourcing, we highlight a report released in October, 2014, prepared by the Institute for Transportation and Development Policy for Living Cities.<sup>57</sup> This report reviews over 60 professional or peer-reviewed articles, complemented by interviews and with oversight by shared transportation leaders such as Dr. Susan Shaheen. It concludes that:

*“Low-income people usually make up a small proportion of all shared mobility users, and those that do take advantage of the programs are a small share of their overall community.”<sup>58</sup>*

Anecdotal evidence about racial discrimination in the platforms that rely on peer-to-peer interaction, notably ridesourcing and peer-to-peer carsharing, are mixed. Some believe that ridesourcing is less discriminatory than taxi cabs because drivers respond to a request without seeing a photo, which is in stark contrast to hailing a taxi on a street.<sup>59</sup> However, the growth of taxi-hailing apps may erode this difference if it exists. Others believe it’s not so straightforward:

*“Because drivers can reject riders for any reason, you have no way of knowing whether it’s because of your rating, your name (from*

*which race can often be inferred), or the neighborhood you’re in.”<sup>60</sup>*

Some have documented a practice called “redlining” where Uber drivers avoid areas that they consider poor or dangerous. Or, as one Uber driver states:

*“If I have just dropped off in a scary area, I’ll turn off the app, drive back to a better area, then turn it back on.”*

While taxis are required by law to serve all members of our community, Lyft and Uber are not required to operate under the same anti-redlining legislation. Similar challenges are emerging around disabled and elderly passengers with Uber and Lyft both facing lawsuits for failing to accommodate the disabled.<sup>61</sup> Uber is responding with an UberASSIST app option that provides users with an opportunity to call specially trained drivers with cars that can accommodate wheelchairs, walkers and scooters.<sup>62</sup> Supporting the disabled and elderly is part of the training to become a taxi driver in many jurisdictions but is not required by ridesourcing providers.

Ridesourcing usage is higher amongst younger persons, particularly millennials, and this may also be true for carsharing.

Shared mobility experts and studies contend that shared mobility is slanted towards greater participation by millennials.<sup>63</sup> The most recent intercept study of ridesourcing in downtown San Francisco reinforces this conclusion learning that 73% of users were 34 years of age or younger.<sup>64</sup> If carsharing and ridesourcing are to scale effectively they need to go beyond millennials. New ridesourcing start-ups catering to seniors ([Lift Hero](#)) and the children of busy families ([Shuddle](#)) are exploring non-millennial markets.

## DO CARSHARING AND RIDESOURCING ADVANCE A PROSPEROUS, LOCAL ECONOMY?

Car sharing and ridesourcing can help members save money, thus contributing to more affordable living and possibly more local spending.

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## TRADITIONAL CARSHARING

50% of carshare members either shed a car, or do not buy one, contributing to extra household discretionary income which could be allocated to local spending. Carsharers also have lower annual costs for transportation, about 1/10th of the average car owner.<sup>65</sup>

The integration of carshare agreements into new multi-family developments can also reduce living costs.<sup>66</sup> Non-car owners can opt out of paying for a parking space and it provides an option to reduce or eliminate car ownership with associated annual savings.<sup>67</sup> There are some claims that carsharing can bring down the cost of housing by reducing the number of expensive parking spaces built.<sup>68</sup>

## PEER-TO-PEER CARSHARING

The balance of evidence suggests that [RelayRides](#) is cheaper than using a traditional rental company.<sup>69</sup> RelayRides claims that they are 35% cheaper.<sup>70</sup> Again, this can increase household discretionary income.

## RIDESOURCING

A 5 mile, 10 minute traditional ridesourcing trip using Uber is cheaper than taking a taxi in all North American cities barring New York City, except when “surge pricing” comes into effect. How much cheaper varies with each city and driving conditions. Heavy levels of congestion make Uber more costly, which is why taxis are still cheaper in New York.<sup>71</sup> Uber is not cheaper, however, when surge pricing reaches a certain level, ranging from 1.1 to 1.7x regular pricing levels.<sup>72</sup>

Whether these household savings are reinvested locally is difficult to determine. The strongest assertions are found with non-profit and cooperative carshare entities. For example, [City CarShare](#) makes the claim that “since car-sharing members pay for each use, they are more likely to walk to the local store for basic items.”<sup>73</sup> They also provide discounts for local businesses, which may reinforce this statement.

Peer-to-peer carsharing is a way to make extra, casual income that may or may cover your total costs, including the value of your time.

Those who share their car through peer-to-peer carsharing can make money from an otherwise idle asset of their car. RelayRides CEO Andre Haddad claims: “on average they

make around \$200 per active owner per month—more than offsetting the cost of your vehicle.”<sup>74</sup>

According to RelayRides, those who are making more significant money – up to \$1000 a month and some more – are doing high volumes of rentals by making the car available a lot and pricing it on the lower side.<sup>75</sup>

The average net pay of an Uber driver as of March, 2015, is above the national US minimum wage before taxes but less than proposed increases to minimum wage in many states and below living wages for households with children.

There are claims that driving for Uber is more lucrative than working for a taxi company because it has far fewer costs than a regulated taxi company — the cost of medallions, owning and maintaining a fleet of cars and paying for full commercial insurance. However, Uber drivers must shoulder many costs accounting for 20% of gross earnings such as those for car insurance, gas, maintenance and car payments.<sup>76</sup>

Uber has made a series of rate cuts in 2014 that are continuing in some cities in 2015. Rates are down anywhere from 20-70% from two years ago. Uber claims that decreased fares lead eventually to more riders, and therefore more overall earnings; many articles cite it as a competitive strategy against rivals like Lyft and the taxi industry.

Uber doesn't account for drivers having to work harder for their money, nor factor in higher gas costs and greater vehicle wear-and-tear.<sup>77</sup> Uber drivers have said that the rate cuts have reduced their incomes significantly or required them to drive more hours to maintain income levels.<sup>78</sup> Some decided to only drive on weekends when there's surge pricing;<sup>79</sup> others stopped driving entirely.

Emily Guendelsberger, a journalist for Philadelphia CityPaper, worked undercover as an Uber driver starting in January, 2015, after rate cuts of close to half. She calculated her own numbers and interviewed some Uber drivers finding that:

- No Uber drivers said the cuts were beneficial; two who shared their data showed average net income drops from \$15.62 to \$10.53 per hour.
- Her net driving rate after the cuts was \$9.34 before taxes leading her to conclude: “driving for UberX is the worst-paying job I've ever had. If I worked 10 hours a day, six

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days a week with one week off, I'd net almost \$30,000 a year before taxes."<sup>80</sup>

After some email prompting, Guendelsberger was able to learn from Uber that the average net income of Uber drivers in March, 2015, was \$15.41/hour after the company's commission and safety fee. Subtracting 20% for average driver costs (gas, insurance, maintenance etc.) the real, cost-adjusted average wage was \$12.33 an hour.

Others who have written about their Uber driving experiences corroborate Guendelsberger's experience.<sup>81</sup> There are some Uber drivers documenting positive experiences and higher wages, but these tend to be those that work part-time during demand times with surge pricing.<sup>82</sup>

## CONCLUSION:

If we accept Uber's numbers, the average net wage including all costs is \$12.33, which is above the US national minimum wage of \$7.25 but below new minimum wage raises underway, ranging from \$13 in Chicago to \$15 in San Francisco and Seattle.<sup>83</sup> It provides a living wage for one-person, and some two-person households, but not for any households with children in major North American metropolitan areas.<sup>84</sup>

Ridesourcing drivers are independent contractors with no benefits or job security and unclear firing policies; a recent legal ruling in California currently being appealed determined Uber drivers are employees.

Uber drivers are considered independent contractors and so responsible for paying their own taxes as self-employed persons. They have no job security and are subject to rate cuts without notice as ridesourcing rivals compete for market share. Uber may terminate drivers if their 5-star ratings drop below 4.6; the company also has no clear firing policy, which has come under criticism.<sup>85</sup>

Whether Uber drivers should be considered employees, rather than independent contractors is under debate. The California Labour Commission recently ruled that Uber drivers are employees, not contractors citing that the company is involved in every aspect of operation:

*"Uber controls the tools driver use, monitors their approval ratings and terminates their access to the system if their ratings fall below 4.6 stars."*<sup>86</sup>

Uber is appealing the ruling citing driver autonomy. Earlier in 2015 a Florida state agency ruled that Uber drivers are employees, while other states previously have ruled them contractors. Hillary Clinton provided her opinion on the matter of the 'gig economy' and its impact on workers. While Clinton did not directly name Uber or Lyft, she did note that the Sharing Economy is: "raising hard questions about workplace protections and what a good job will look like in the future."<sup>87</sup>

Fleet management savings are generated for local government, businesses, non-profits and other public agencies who may invest the savings back into the local economy.

Some local governments have converted their fleet cars to shared car fleets. For example, the City of Philadelphia recently joined Philly CarShare as an organizational member, allowing City employees to use car-sharing vehicles – and the City to save money by selling 400 municipal fleet cars.<sup>88</sup> The City CarShare report Bringing Car-Sharing to Your Community notes that many other businesses, public agencies and non-profits have realized that carsharing is a more cost-effective and higher quality alternative to managing their own fleets.<sup>89</sup>

Carsharing and ridesourcing contribute most to regional economies and job creation in cities where offices are located; cooperative models may contribute more to prosperous, local economies than corporate models.

Carsharing and ridesourcing companies bring new jobs to many of the cities where they locate. Zipcar and Car2Go, have offices in major cities across North America, employing a range of employees in areas such as management, marketing, fleet technicians, customer service and sales. Likewise, car cooperatives have offices in the cities where they are located. Ridesourcing companies Uber and Lyft have head offices in California, but do not have offices in other North American cities, thus reducing the local economic benefits.

There are significant differences here between corporate,

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and non-profit and co-operative models worth examination in terms of contributing to prosperous, local economies.

- Co-operatives and non-profit carshare companies are rooted in specific places with local employees and management and with profits earned recirculating directly back into the local economy. Some provide discounts with local businesses and organizations reinforcing a commitment to local economies.
- In contrast, entities like ZipCar are multinational corporations with operations in 175 countries listed on the NASDAQ stock market. Any city who has a ZipCar office, with the possible exception of Boston which hosts the head office, is subject to decisions made far away. ZipCar's corporate structure also means that monies earned in one city flow outside the city to executives and shareholders and need to adapt to the vicissitudes of the NASDAQ and global financial flows.

If a local government has the development of a prosperous, local economy as a priority then non-profit and co-operative carshare models may make a greater contribution. It is important to consider, however, that there may be positive synergies between co-operative and for-profit models where the latter help to provide conditions conducive to the scaling of the former. For example, personal correspondence with Modo in the City of Vancouver suggests that individuals may sign up initially with ZipCar and then switch to Modo as they become accustomed to carsharing and seek a local company or a cooperative model.

## DO CARSHARING AND RIDESOURCING ENSURE QUALITY OF LIFE?

Carsharing increases rates of walking and biking for some users, but reduces it for others and keeps it the same it for the majority; overall health benefits are unknown.

Martin and Shaheen (2011) found the following changes in active transportation rates:<sup>90</sup>

### Walking - 2% more people increased walking trips

- 11% increased trips
- 9% decreased trips
- 80% no change

### Cycling - 6% more people increased their biking trips

- 9% increased their cycling trips;
- 3% decreased
- 88% no change

Jennifer Kent analyzed peer-reviewed literature about the health impacts of carsharing from 2005 to March 2013.<sup>91</sup> She found that while carsharing does contribute to reduced vehicle ownership and changed travel behaviour, there are only potential associated health impacts and more rigorous research is needed to determine the actual impacts on health.

The potential health impacts of ridesourcing are minimal, if any, and warrant further study.

The recent study from San Francisco did not focus on health but points to a few results that suggest a limited contribution:

- 90% of ride-source users do not get rid of their car;
- 10% of ride-source users would have biked or walked had they not ride-sourced.<sup>92</sup>

There are some outstanding questions worthy of further exploration: do the 10% that get rid of a car walk or bike more as a result of car reduced lifestyle? And if so, what is the overall impact on health?

Carsharing and ridesourcing likely do not contribute strongly to social connectivity – possibly connectivity increases somewhat more with co-operative carsharing models.

Carsharing where a user accesses a car from a shared fleet using a phone or electronic key does not involve a personal connection. There is no opportunity to enhance social connectivity in this case. The exception is that some users anecdotally note that they use car-sharing services to make social visits, for example, to visit a sick friend – a trip they would not have decided to make on public transit if transit distance and the required time commitment is too long.

Cooperative carshare models such as Modo based out of Vancouver can involve more opportunities for relationship building than in the carsharing interaction itself. While mobility and cost savings motivate many members, some align with Modo's cooperative mission to reduce reliance on fossil fuels and carbon emissions. According to Hilary Henegar, Modo's Marketing Director: "some members volunteer at events and in other ways, thereby forming bonds with each other and Modo's team. Some also attend the AGM every year and have known each other for over a decade now."<sup>93</sup>

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## SHARED MOBILITY SUSTAINABILITY SUMMARY

### LIVING WITHIN ECOLOGICAL MEANS

Traditional carsharing reduces greenhouse gas emissions because of the reduced rates of car ownership and overall reduction in vehicle kilometres / miles traveled (VKT/VMT). One-way carsharing has a similarly positive impact on reduced car ownership levels but has a currently unknown impact on VMT/VKT. The impact on transit usage is less clear for both modes, however. For traditional carsharing, it is usually a statistically insignificant impact, yet there are exceptions with both meaningful increases and decreases. Current evidence about one-way carsharing is that it has potentially negative impact on transit ridership.

While research is scant about peer-to-peer carsharing, we can expect similar positive conclusions from an environmental point of view due to the transformation of the mobility package. The most potentially troubling aspect ecologically is that some people are buying a second car so that others can increase their driving. Lower deployment costs for P2P carsharing, however, may aid its expansion into less dense, suburban areas.

When considering the available evidence, we have some major concerns that traditional ridesourcing – particularly in downtown areas - may weaken the aspirations of cities to live within ecological limits because there is evidence that it moves (non-car) modal share in the wrong direction and has an unclear, mixed impact on transit ridership. The impact on vehicle kilometre / miles driven is unknown and there is evidence that it induces new car trips. Ridesourcing only evokes modest changes in car ownership.

### OTHER SUSTAINABILITY DIMENSIONS

- Carsharing and ridesourcing contribute to a reduced need for parking space – which is greatest for carsharing – possibly reducing demand on paving over natural lands. There is one example where both modes are contributing to city emergency preparedness.
- Current usage of carsharing and ridesourcing amongst low-income communities is below that of the general population and is greatest for those of the millennial generation. The evidence of racial discrimination in ridesourcing is mixed and unclear.
- Carsharing and ridesourcing contribute to more affordable living to varying degrees. Peer-to-peer carsharing is a way to supplement income, which may or may not cover actual costs; high volume rentals are necessary to earn top dollar breaking \$1000.
- Ridesourcing drivers are independent contractors without job security or benefits; their average net wage including all costs is \$12.33, which is above the US minimum wage (\$7.25) but below minimum wage increases underway and below the living wage for households with children.”

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## 3a.5 ENABLING SHARED MOBILITY FOR URBAN SUSTAINABILITY

### PART 1: LEVERAGING CARSHARING FOR LIVING WITHIN ECOLOGICAL MEANS

# Q1.

## What can local governments do to ensure that all forms of carsharing support strong, one-planet transportation?

### RECOMMENDATION:

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Ensure that cities have both one-way and two-way carsharing companies in order to provide a comprehensive mobility package.

This will support the greatest gains in reduced car ownership and vehicle kilometre / miles traveled (VKT/VMT) reduction. One-way and two-way carsharing can be offered by separate companies or integrated into the same company. In the next section, Getting Ahead of the Curve, we make the case for the integration of carsharing together with other shared mobility modes and transit and land use planning in order to be the most effective at supporting car-reduced lifestyles.

One role that local government play in enabling car-sharing is by providing parking spaces allocated to car-sharing vehicles. The City of Toronto and the City of Vancouver developed carsharing allowances and permit systems to support carsharing through parking and residential permits.<sup>94</sup>

### RECOMMENDATION:

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Continue the integration of carsharing into multi-family development with universal access.

Integration of carsharing into multi-family developments with universal access provides an entry point into car-reduced lifestyles. Universal access means that the shared

cars are available to any carshare members and not just residents of the multi-family development; this is critical for viability of the carshare operation.

### RECOMMENDATION:

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Support carsharing entities that explicitly and consistently emphasize reducing car dependence, active transportation and other sustainable lifestyle behaviours.

Non-profit and cooperative models are the strongest and most consistent in emphasizing sustainable lifestyles and reduced car dependence. IGO carshare (subsequently bought out by Enterprise Holdings) is a prime example:

*“Our motto has always been, ‘walk, bike, ride the bus, but when you need us, we’re here.’ That’s why we like to locate our cars next to B-cycle, bus, and light rail stations, and why we keep bike and bus maps in our cars.”<sup>95</sup>*

Modo cooperative carshare in Vancouver also offers their members a variety of perks for more sustainable lifestyles such as discounts for: cycling gear, education and events; veggie garden installation and seeds; and carpooling to the nearby town of Whistler.

Whether this type of messaging and membership perks translates into broader sustainable behaviour change and addresses any rebound effect is not well documented. Local governments should encourage carshare companies and other researchers to explore this further.

### RECOMMENDATION:

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Support carsharing companies to address barriers to electric vehicle adoption.

The top three barriers to carsharing companies adopting more electric vehicles reported in a recent Canadian survey were lack of public charging stations, higher incremental costs for purchasing electric vehicles, and obtaining financing to purchase them.<sup>96</sup> Local governments can help address these barriers by:



- Ramping up efforts to provide public charging stations;
- Preferring electric vehicles in municipal carshare fleet arrangements; and
- Providing grants or incentives to help carshare companies purchase electric vehicles.

### RECOMMENDATION:

Support the integration of traditional two-way carsharing with transit, with an emphasis on targeted expansion into the suburbs.

A key strategy for achieving this is to seek agreements to place traditional, two-way carsharing stations at transit stops and park-and-rides. For example, Zipcar has agreements with many transit organizations across North America to bridge the first/last mile gap by locating at transit stations and park-and-rides. Two-way carsharing supports “re-verse trips” – taking transit to a transit centre, then using carshare for an errand before returning home by transit.

### RECOMMENDATION:

Explore the potential of peer-to-peer carsharing for suburban municipalities.

Despite large service areas, one-way carsharing companies such as Car2Go tend not to provide substantial or any service outside of urban core areas. However, the lower deployment costs of peer-to-peer (P2P) carsharing models like RelayRides and GetAround support broader expansion into suburban municipalities. Scaling up P2P carsharing in suburban areas will require a significant behavioural change to encourage people to share a private asset – in this case, their car – and it will require addressing risks such as insurance coverage.<sup>97</sup> The Shared Use Mobility Centre based out of Chicago is managing a two-year pilot project to explore peer-to-peer carsharing in Chicago in lower density and lower income neighbourhoods in order to allow residents to live well without having to own a vehicle.<sup>98</sup>

## PART 2: LEVERAGING RIDESOURCING FOR LIVING WITHIN ECOLOGICAL MEANS

# Q2.

**Is it possible for local governments to harness ridesourcing in a way that moves substantial numbers of people out of single occupant vehicles into more sustainable travel modes?**

### RECOMMENDATION:

Develop partnerships between ridesourcing companies and suburban municipalities or transportation agencies in order to fill transit gaps and foster first/last mile integration.

Ridesourcing in suburban municipalities has the potential to enhance mobility options for those who don't have licenses or don't want to drive (e.g. seniors, students, and millennials). As Jarrett Walker, transit consultant and blogger recently stated:

*“There is a role for demand responsive service in suburban areas where development patterns preclude efficient transit.”<sup>99</sup>*

Dallas Area Rapid Transit (DART) recently launched a partnership with Uber that allows people to begin or finish their transit trip with Uber using DART's GoPass mobile ticketing app. The partnership was launched with a successful trial during the Dallas St. Patrick's Parade.<sup>100</sup>

### RECOMMENDATION:

Explore the use of ride-splitting services like UberPool, LyftLine and Sidecar.

UberPool, LyftLine and Sidecar Shared Rides allow customers to share a ride and split the cost. The new term ride-splitting is now being used to describe this shared

mobility option. Ridesourcing may be uniquely poised to scale carpooling given their marketing savvy and large pool of drivers.<sup>101</sup> Carpooling peaked in 1980 with about 20 percent of Americans sharing rides to work, a number that's since dropped to below 10 percent.

An article by the Shared Use Mobility Center includes some industry claims that support the scaling up of ride-splitting:<sup>102</sup>

- 50% of rides in San Francisco are via LyftLine;
- There have been millions of uberPool trips, with thousands of users taking trips during commute hours more than five times in a week; in San Francisco, match rates are over 90% during commuting hours;<sup>103</sup>
- Uber claims uberPool has reduced VMTs by nearly 675,000 since its launch in August, 2014.

### BOX 3A.2 PUSHING BACK AGAINST RIDESOURCING

Across North America, a number of cities are pushing back against ridesourcing companies like Uber and Lyft due to a range of concerns over public safety, insurance coverage, labour standards, price surging, and fair business practice. While usually not featured (at least publicly) our analysis points to another concern – questionable environmental benefits. Current evidence suggests that traditional ridesourcing may not move cities in the right direction in terms of reducing vehicle kilometres / miles travelled, enhancing transit usage and active transportation and has only a minimal impact on reducing car ownership levels.

Ridesourcing companies are also taking an assertive approach. They are reluctant to share data to inform civic understanding and argue that as a technology company they should not be subject to many of the rules and demands of cities. Naturally, strong resistance on both sides has led to strained relations and, in some cases, stand-offs.

While pushing back is not without costs in terms of city resources, which could be used elsewhere, it has provided cities with some valuable space to consider effective ridesourcing policies. There is also some evidence too, in Canada in particular, that the collective resistance by local governments may be sending a message to ridesourcing

companies that they need to reevaluate their approach and mend relationships with cities.

In the following section, we provide examples of how North American cities are pushing back against ridesourcing companies.

#### CITIES THAT ARE SAYING “NO”

**CITY OF VANCOUVER:** The City of Vancouver has effectively stalled Uber's attempts to set up shop. Since Uber first entered Vancouver in 2012, it faced a series of regulatory hurdles that to date have prevented it from operating. Vancouver has extended a moratorium on new taxi licences to the end of October 2015 while it reviews the potential impacts of allowing ride-sourcing firms to operate within the municipality.<sup>104</sup> Concurrent with the moratorium, which began in 2014, the Province of British Columbia who has jurisdiction for regulating taxis and ridesourcing companies announced it would launch a system of undercover government checks on the alternative taxi industry to enforce regulatory compliance.<sup>105</sup> In September 2015, Uber Chief Advisor addressed the Vancouver Board of Trade to make the business case for ridesourcing;<sup>106</sup> however, meetings with City Councillors are not leading to a new licensing decision.<sup>107</sup> The Mayor of the City of Vancouver is meeting with other Canadian Mayors to explore regulating Uber.<sup>108</sup> Meanwhile, the Vancouver Taxi Association is launching its own eCab app which guarantees stable rates and avoids the fluctuating prices that ridesourcing companies engage in.<sup>109</sup>

**CITY OF CALGARY:** Since Uber first entered the Calgary market, the City has had deep concerns over the risks associated with the ride hailing company – and with good reason. Uber's Calgary debut took the form of a promotional trial period, during which Uber was found to have unlicensed drivers and vehicles. In theory, the City is not opposed to Uber, but it demands that Uber play by the City's rules, obeying bylaws and adhering to public safety and labour standards.<sup>110</sup> The intense regulatory scrutiny and persistence in enforcement pursued by the City of Calgary has resulted in Uber exiting the Calgary market,<sup>111</sup> other than perhaps operating UberBlack – the luxury service – while allowing the City space to formulate coherent and effective policy frameworks

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for ridesourcing. One potential next step called for by Council members is for the Government of Alberta to develop a ride hailing strategy to deal with app-based ride sourcing in the wake of Uber's illegal operations in Calgary and Edmonton.<sup>112</sup>

**CITY OF SAN ANTONIO:** Uber and Lyft have shut down operations in San Antonio after a year-long struggle with City regulators.<sup>113</sup> The City pushed hard for Uber and Lyft to integrate into the existing regulatory framework, even taking steps designed to help ease the entry to ride-sourcing companies such as reducing fees and excess insurance coverage requirements.<sup>114</sup> However, Uber and Lyft balked at the City's continued requirements for commercial liability insurance and a 10-fingerprint background check,<sup>115</sup> calling them "over-burdensome", and calling San Antonio's request for the companies to share certain data on operations "anti-innovation".<sup>116</sup> The City notes the absolute requirement for all commercial taxi services to be adequately insured and that drivers must have background checks as a matter of course, both in the interest of public safety.<sup>117</sup>

**CITY OF HOUSTON:** Houston has similarly pushed back against Uber and Lyft's efforts to avoid regulations designed to ensure public safety, specifically fingerprinting and background checks on drivers. While existing regulations for ridesourcing require fingerprinting as part of background checks, the City of Houston found adherence to be lacking. When the City asked the FBI to run criminal background checks on a set of Lyft and Uber drivers, they discovered "several drivers with prior criminal histories including indecent exposure, DWI, prostitution, fraud, battery, assault, robbery and aggravated robbery."<sup>118</sup> The City is adamant that if Uber and Lyft drivers apply for permits as required, city oversight would ensure that candidates with criminal records do not get hired.<sup>119</sup> In the most recent development, Uber is suing the City of Houston because they not want to release records that would reveal how many drivers it has licensed in the city, who they are and how the company operates in Texas.<sup>120</sup>

## CITIES THAT ARE INNOVATING

Two cities have recently found innovative ways to address ridesourcing concerns that may hold promise for other places.

**CITY OF EDMONTON AND CITY OF TORONTO:** The two Canadian cities are developing regulations for ridesourcing companies and proposing new licensing agreements for 'transportation network companies'.<sup>121</sup>

**CITY OF PORTLAND:** A city to watch is Portland, Oregon, which first prohibited the entrance of ridesourcing firms but has recently announced a 120-day pilot program that allows legal operation within the City. A unique feature of the pilot is that Portland has negotiated access to user data from ridesourcing companies Uber and Lyft in exchange for a lighter regulatory approach, particularly with regard to insurance and price-surfing.<sup>122</sup> This marks the first time ridesourcing companies have agreed to share such data and it will be used by Portland to shape final recommendations for regulating private for-hire transportation. More detail on this story can be found in Box 5.1 Part of 120-Day Ridesourcing Pilot Program in Section 5 of the LGSE Roadmap.

**WASHINGTON DC, NEW YORK CITY AND CHICAGO:** The cities of Chicago, Washington DC and New York announced in December, 2014, that they would be incubating or developing new universal e-hailing taxi apps for their jurisdictions, prompting some analysts to predict that 2015 will be the year that "the disrupters will be disrupted".<sup>123</sup> These new apps extend ridesourcing style access to the traditional taxi industry, pooling all companies into one universal e-hailing platform. These initiatives foster innovation within the taxi industry to allow it to compete more effectively with ridesourcing companies.

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## PART 3: LEVERAGING CARSHARING AND RIDESOURCING TO ACHIEVE MULTIPLE DIMENSIONS OF SUSTAINABILITY

### Q3.

## How can local governments ensure that carsharing and ridesourcing also enhance other dimensions of sustainability?

### RECOMMENDATION:

View shared mobility as a complement to local mass transit and continue to focus on equitable transit-oriented development.

Shared mobility modes are low-volume systems that should be used to extend the reach of transit systems and provide alternate routes. As a result, as the “Connecting Low-Income People to Opportunities with Shared Mobility” report by Institute for Transportation and Development Policy (ITDP) states:

*“The effective integration of transportation and land use with high quality urban design – including equitable transit-oriented development – will remain a promising area of focus.”<sup>124</sup>*

In other words, the effective integration of affordable housing with land use planning and transportation should remain the foundation of advancing equity. Shared mobility options can build upon this foundation by addressing first and last mile trips to and from transit, or provide connections between less common destinations or bring new mobility options to underserved areas.

### RECOMMENDATION:

Address multiple barriers to the participation of low-income people and explore partnerships of public, non-profit and private actors to advance equity in shared mobility.

There are a range of barriers to the participation of low-income people in shared mobility with research showing that effective policies or programs address at least three of the following:

- Lack of carsharing locations in low-income neighborhoods
- Requirement for a valid driver’s license, internet access or smartphone
- Requirement for a debit or credit card
- Lack of information about the benefits of usage
- Lack of demand in lower-income communities
- Perceptions of higher risk in low-income communities, prompting higher insurance costs for shared mobility companies

The Institute for Transportation and Development Policy recently compiled case studies that show effective approaches for addressing multiple barriers.<sup>125</sup> Non-profit carshare companies like Buffalo CarShare, eGo CarShare (Denver) and CityCareShare (San Francisco) place more emphasis on reaching low-income populations. As a result, business models that favour cross-sector partnerships may be needed in order to determine what subsidy or incentive motivate for-profit shared companies to serve low-income communities. ITDP suggests that:

*“Public and non-profit sectors are important for structuring shared mobility business models since they can increase demand through reducing user barriers, identifying alternative revenue sources, and providing incentives to operators. If the public sector also takes an active role in guiding, requiring, and facilitating low-income shared mobility initiatives, this could help enable the for-profit private sector to scale-up successful programs without losing considerations for low-income individuals.”<sup>126</sup>*

The Shared Use Mobility Center announced a new partnership with the California Air Resources Board (CARB)

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and the City of Los Angeles to launch a first-of-its kind electric vehicle carsharing pilot project focused on serving low-income residents in L.A.<sup>127</sup> Carsharing that not only reduces greenhouse gas emissions but also provides new mobility options for low-income persons is a highly desirable sustainability outcome and so this pilot is worth following.

### RECOMMENDATION:

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Explore the equity potential of peer-to-peer carsharing.

A study by Fraiberger & Sundararajan, 2015, proposes that below median-income persons have the potential to experience greater positive effects from their participation in P2P ridesourcing:

- They are more than twice as likely to switch to renting;
- There is greater rental activity in lower average income neighbourhoods where demand is also higher; and
- There is the potential for higher potential economic gains from switching to renting and new opportunities through enhanced mobility.<sup>128</sup>

The Shared Use Mobility Centre is exploring this potential by focusing on lower-income neighborhoods in their P2P carharing pilot. If people own cars then they can make money when they are idle; if not, it can provide occasional access, which is cheaper than the total costs of car ownership.<sup>129</sup>

### RECOMMENDATION:

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Address data gaps in order to better understand the impacts of shared mobility. The best option is to require that providers share their data.

Many Sharing Economy companies are reluctant to share data and carsharing and ridesourcing companies are no different, citing privacy and competition concerns. While independent research, some of which relies on data scrapping, can provide some necessary information, other options are preferable in terms of time, cost and reliability. Data from multi-modal apps such as Ridescout are noting their willingness to share data with local governments and this is one option that should continue be explored.

Yet these apps may not feature all critical modes; for example, Ridescout currently does not include ridesourcing. Requiring data sharing as part of regulatory agreements is the preferred

option to allow local governments to assess transportation assess and integrate new shared mobility services into transportation plans. More about data sharing, including case studies involving Car2Go and ridesourcing companies, can be found in Chapter 5 on Addressing Data Gaps.

## 3a.6 GETTING AHEAD OF THE CURVE

### SHIFTING TO INTEGRATED MOBILITY SYSTEMS PLANNING

# Q4.

## How can local governments integrate shared mobility systems with transit, active transportation, and land use planning to scale positive benefits?

Rather than considering the merits or disbenefits of each shared mobility option on its own, a better approach may be to view them as an ecosystem of services that can be parallel and complementary to public systems. The City of Victoria in British Columbia, Canada explicitly notes that car-sharing, bike sharing and ride sharing “provide more choices” and that “a healthy and diverse multi-modal transportation system is the best way to deliver affordable, equitable, and environmentally preferable alternatives to the private automobile.”<sup>130</sup> Research shows that shared modes work best when connected and integrated with one another, and with public transit. In a report released by the US PIRG Education Fund, “The Innovative Transportation Index: The Cities Where New Technologies and Tools Can Reduce Your Need to Own a Car” they state:

*“Providing more choices for more people throughout a community means not only offering more options but also making those choices more accessible by increasing both their density*

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*and their geographic spread. In cities with robust transportation offerings, bike, car and ridesharing services help to provide first- and last-mile connections between transit locations and travelers' final destinations, and to increase the reach and interconnectivity of existing transit systems.”<sup>131</sup>*

While investing in mass rapid transit coordinated effectively with land use planning is central to long-term sustainability, shared mobility systems can help fill in the gaps as well as extend the reach of existing public transit networks.<sup>132</sup> Our sustainability analysis of ridesourcing and carsharing found that both geography and integration between modes was important. For example, while ridesourcing in dense, downtown locations may have questionable benefits its targeted expansion in suburban municipalities could fill a mobility gap and reduce single occupant car travel. So too could the integration of traditional two-way carsharing with transit, with targeted expansion into the suburbs.

*Integrated mobility planning considers a suite of shared mobility options, with public transit and active transportation as the foundation, integrated with land use planning in order to foster car reduced and car free lifestyles.*

We provide four recommendations for local governments to help with their adoption of this promising new approach.

### **RECOMMENDATION:**

Learn about integrated mobility planning.

While local governments have many legitimate questions about shared mobility such as whether it reduces transit ridership or only serves a narrow population demographic, the first key step is learn more about it. Fortunately, there are many ways to do this such as:

- Track cities in North America and around the world that are leading the way in embracing integrated mobility planning. The city case study in this Chapter highlights Montreal’s Transport Cocktail as an early example. San Francisco is “cultivating a dynamic transportation strategy that goes from a culture of “no” to a culture of “how”.<sup>134i</sup> Likewise, Chicago has a concerted effort focused on shared mobility.<sup>134ii</sup> In Switzerland, Mobility car-sharing cooperative launched Swiss Pass – a single card that enables multi-modal transport across public and private motorized and non-motorized services, including car sharing, bike sharing and train passes.<sup>134iii</sup>
- Checkout the Shared Use Mobility Center who are dedicated to fostering collaboration in shared use mobility and scaling the benefits for all – as well as providing key information, tools and resources needed by local governments to embrace shared mobility. Sign up to receive their monthly newsletters on shared mobility news, trends, events and policy at <http://sharedusemobilitycenter.org/newsletter/>. Watch for new tools that SUMC is releasing later this year targeted to local governments, including a national use database of policies, regulations and ordinances, and a visual forecasting tool to illustrate the effects of policy changes and program investments on vehicle kilometer / miles travelled reduction, mode shift, auto ownership rates, greenhouse gas emission reductions and more.
- Attend conferences where Shared Use Mobility is featured such as the 2015 National Shared Mobility Summit in Chicago (see <http://sharedusemobilitycenter.org/summits/>) and the 2015 Carsharing Conference held in Vancouver that emphasizes the integration of carsharing with public transit and cycling (see <http://conference.carsharing.org>).
- Join, or follow, organizations dedicated to integrated mobility planning such as International Association of Public Transport ([www.uitp.org](http://www.uitp.org)) or sector specific ones such as the CarSharing Organization which features integration of specific mode with others (see [www.carsharing.org](http://www.carsharing.org)). Many transportation organizations and associations are also now focusing efforts on shared mobility.

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## RECOMMENDATION:

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Take easy, first steps to integrate mobility options.

Shifting towards integrated mobility planning will not happen overnight and requires new policy and planning approaches. While this shift is underway, the following are two easy, first steps that local governments and / or transportation agencies can take to integrate mobility options:

1. Convene public and private mobility providers in order to discuss and explore better connectivity – this requires ensuring that representatives of all relevant local governments departments are in attendance. For example, a meeting might include regulatory, land use and transportation departments.
2. Enhance connectivity through basic means such as schedule coordination and joint signage that directs passengers to a range of mobility options, and potentially encourage joint marketing.

## RECOMMENDATION:

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Undertake integrated mobility mapping that overlays mobility, public transit, land use patterns and demographics in order to identify mobility gaps and the best opportunities to fill them.

In order for shared mobility to fill gaps in the existing public transportation system across the urban landscape requires new mapping tools. Fortunately, the Shared Use Mobility Center (SUMC) is developing software that overlays shared mobility, public transit, land use patterns and demographics in order to identify mobility gaps and consider the best opportunities to fill them.

A February 2015 presentation by Sharon Feigon highlights this emerging tool with a focus on Los Angeles.<sup>135</sup> The preliminary mapping show that while there are many mobility options in LA - ridesharing, all three forms of carsharing, ridesourcing, taxi hailing, bikesharing and corporate shuttles – they could be better connected with each other and with transit. Shared use mobility has the potential to fill transit gaps and extend its reach on weekends and for night service, for first and last mile trips, as well as for transit trips with difficult routes. A variety of proposed policy responses could eliminate 100,000 cars from LA roads through shared mobility, transit and land use planning.

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## RECOMMENDATION:

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Learn about, and consider adopting, best practices for integrated mobility planning such as those outlined in a preliminary framework by the Shared Use Mobility Center

The rapid growth of shared mobility services has spawned innovation in some cities but also chaos. Many cities have had to quickly pass policies, which they must monitor on the go. They are left with many outstanding questions about the effectiveness of their policies to advance urban mobility in a way that is safe, supports public transit and improves first and last mile solutions, reduces congestion, promotes active transportation and health, and serves all communities. Very few cities have developed integrated public and private mobility visions or plans and there is confusion about which city or transit departments should oversee what aspects of shared mobility.

While the specific approach varies from city to city, in April 2015 the Shared Use Mobility Centre (SUMC) released some emerging best practices to serve as the start of a general framework on shared mobility for local governments. This will be expanded into more detailed recommendations together with a policy database in 2015. Best practice highlights include:

- Develop a long-term mobility vision that includes shared mobility and, ideally, mode-split goals;
- Use the mobility vision to decide on the number and types of modes to attract and at what scale, and to guide regulatory and planning efforts;
- Integrate shared-use modes into transportation planning and study the effects of all modes – both individually and in combination – and incorporate into transportation models,
- Encourage integration of public transit, bikesharing, ridesharing and carsharing around transit stops, including electric vehicle infrastructure;
- Support the launch of new modes, including financial support for start-up costs, which has been done already to launch bikesharing;
- Require that providers share their data so that it will be possible to assess impact and integrate new services into transportation plans;
- Provide public access to transit data, including static and real-time information, so that developers can create innovative apps,
- Support creation of universal payment and trip planning mechanisms for multiple modes; and
- Test new approaches to meet the mobility needs of those poorly served by the transportation system, including the young, the elderly, the disabled and those in low-income households.

## CITY CASE MONTREAL'S TRANSPORT COCKTAIL – AN INTEGRATED MOBILITY SYSTEM

*“The future for mobility lies in the transportation cocktail that allows for the use of various modes during the same trip. It’s thus a blend of traditional and new, collective and individual methods of transportation.”*

– Mr. Michel Labrecque, Chairman of the Board of Directors, Société de transport de Montréal

### MONTREAL SHAKES THINGS UP WITH A TRANSPORTATION COCKTAIL

The Société de Transport de Montréal (STM), the authority responsible for managing Montréal's network of bus, metro, heavy rail, and paratransit services, is undertaking an experiment in integrated mobility. Within the Montréal region, the STM is working hard to integrate bus, bicycle, metro, taxi, shared taxibus, carpooling, and car sharing to promote a “smart combination of individual means of transportation”.

Through agreements and partnerships with a variety of alternative transportation service providers, ranging from the Bixi self-serve bicycle system to car sharing firms like Communauto, STM is creating a transportation cocktail to serve a wide array of mobility needs.<sup>136</sup> These partnerships are allowing STM to offer discounted, bundled transportation services, including preferential rates for car and bike-share partner services.<sup>137</sup> Payment is made easy through the full integration of fares across all modes of STM transit, allowing users to begin their trip walking, hop on a Bixi bike and cycle to the metro station and then ride three stops, all on the same ticket and transfer.

### INTEGRATING THE BICYCLE INTO THE TRANSPORTATION MIX

In May of 2013, the STM unveiled a plan designed to enhance the use of bicycles within its jurisdiction. Central to this plan was the roll out of additional buses equipped with bike racks, the testing of bike slides in metro stations, a pilot program for dedicated bicycle parking spaces at metro stations, and a shared bus-bicycle lane on Viau Street – a major transit artery connecting bus and metro systems.<sup>138</sup> For Montréal, embracing the bicycle as a part of the public transportation mixture is a key ingredient that the STM has relied on as a healthy alternative to the car for whole or partial trips.

### TAXIS

As a central part of its expanding integrated mobility program, the STM transformed their relationship with the taxi industry from a rival into a key partner. And rather than viewing the car as the ‘enemy’, the STM is harnessing the taxi industry's unrivaled dominance in the paratransit services market to deliver services in geographic gaps in the fixed-route transit network. Montréal's taxibus service was first developed by the STM in the mid-1990s. ‘Taxibuses’ are shared taxis operating both on a fixed-route and on-demand service. They now serve a vital function providing feeder services to commuter rail stations and other important entry points to the regional transportation network.

The integration of taxis and taxibuses into the transportation network allows STM to expand transit coverage into low-density areas so that fully 99.5% of the Montréal area is now covered by the network. As part of this integration, taxis may use dedicated bus lanes, further reducing trip times. It has also been cost-effective, with the cost of operating taxi service coming in at less than half that of conventional bus service.<sup>139</sup>



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  - 2 [http://www.its.dot.gov/itspac/Dec2014/ITS-PAC\\_MobilitySharingEconomyShaheen.pdf](http://www.its.dot.gov/itspac/Dec2014/ITS-PAC_MobilitySharingEconomyShaheen.pdf); [http://www.uspirg.org/sites/pirg/files/reports/Millennials in Motion USPIRG.pdf](http://www.uspirg.org/sites/pirg/files/reports/Millennials%20in%20Motion%20USPIRG.pdf)
  - 3 [http://www.pedbikeinfo.org/programs/promote\\_bikeshare.cfm](http://www.pedbikeinfo.org/programs/promote_bikeshare.cfm)
  - 4 <http://sharedusemobilitycenter.org/what-is-shared-mobility/>
  - 5 <http://sharedusemobilitycenter.org/what-is-shared-mobility/>
  - 6 <http://www.bikemag.com/pavedmag/spinlister-goes-mobile-with-peer-to-peer-bike-sharing-app/>
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  - 8 <http://www.scootnetworks.com>
  - 9 <https://www.facebook.com/Newfoundland-Rideshare-107147009330661/timeline/>; <http://www.kijiji.ca/b-rideshare-carpool/yukon/c511700101>
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  - 11 In contrast to the recent USDN report *Measuring Sustainable Consumption* we separate out ride-sourcing as distinct from ride-sharing as new, distinct service following the lead of Dr. Susan Shaheen and the Shared Use Mobility Centre based out of Chicago.
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  - 13 <http://www.webpronews.com/uber-has-a-new-option-for-the-elderly-and-disabled-2015-07>
  - 14 <https://www.lifthero.com/about>
  - 15 <https://shuddle.us>
  - 16 <http://sharedusemobilitycenter.org/news/disrupting-the-disrupters-3-cities-work-to-design-universal-taxi-apps/>
  - 17 <http://www.citylab.com/commute/2015/04/how-the-microtransit-movement-is-changing-urban-mobility/391565/>
  - 18 <http://www.citylab.com/commute/2015/03/san-francisco-gets-the-ridiculous-luxury-bus-it-deserves/388090/>
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  - 20 <http://www.citylab.com/commute/2014/07/what-i-learned-riding-one-of-those-new-private-city-buses/375312/>
  - 21 <http://www.citylab.com/tech/2015/04/the-new-york-car-service-that-charges-almost-transit-prices/389985/>
  - 22 <http://www.citylab.com/tech/2015/01/the-trucking-of-tomorrow-is-here-and-its-a-huge-win-for-city-traffic/384672/>
  - 23 <https://www.cargomatic.com>
  - 24 <http://blog.zipments.ca/2013/11/27/our-official-press-release/>
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  - 26 <http://www.ttnews.com/articles/basetemplate.aspx?storyid=38488>
  - 27 Moore, Jennie. *Ecological Footprints and Lifestyle Archetypes: Exploring Dimensions of Consumption and the Transformation Needed to Achieve Urban Sustainability*. Sustainability 7.4 (2015): 4747-4763. <http://www.mdpi.com/2071-1050/7/4/4747/htm>
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  - 29 This is called 'One Planet Living' – a lifestyle that, if adopted by everyone, could be supported indefinitely by the regenerative capacity of Earth's ecosystems (Wackernagel and Rees 1996).
  - 30 We draw primarily here from Dr. Susan Shaheen's research, and primarily from those articles listed as references 31 and 32 below, because this research is peer reviewed. A full list of Shaheen's research can be found at <http://tsrc.berkeley.edu/SusanShaheen/>.
  - 31 <http://tsrc.berkeley.edu/sites/tsrc.berkeley.edu/files/The%20Impact%20of%20Carsharing%20on%20Public%20Transit%20and%20Non-Motorized%20Travel.pdf>
  - 32 Martin and Shaheen (2010) *The Greenhouse Gas Emission Impacts of CarSharing in North America* [http://tsrc.berkeley.edu/sites/tsrc.berkeley.edu/files/Greenhouse Gas Emission Impacts of Carsharing in North America \(final report\).pdf](http://tsrc.berkeley.edu/sites/tsrc.berkeley.edu/files/Greenhouse%20Gas%20Emission%20Impacts%20of%20Carsharing%20in%20North%20America%20(final%20report).pdf)
  - 33 <http://www.sfbg.com/politics/2014/05/23/does-carsharing-really-reduce-overall-driving>
  - 34 Other studies show considerable variability, ranging from 11% to 29% in terms of people who shed a car.
  - 35 <http://carsharing.org/wp-content/uploads/2014/12/Report-out-on-CarSharing-in-Canada.pdf>
  - 36 Martin and Shaheen (2010), state the average change in emissions across all respondents is -0.58 t GHG per household per year for the observed impact, and -0.84 t GHG per household per year for the full impact.
  - 37 Kent, Jennifer L. *Carsharing as active transport: What are the potential health benefits?*. Journal of Transport & Health 1.1 (2014): 54-62.
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  - 43 Slide 43 from a presentation by Tim O'Reilly, CEO of O'Reilly Media at [http://www.slideshare.net/timoreilly/the-clothesline-paradox-and-the-sharing-economy-pdf-with-notes-13685423?from\\_action=save](http://www.slideshare.net/timoreilly/the-clothesline-paradox-and-the-sharing-economy-pdf-with-notes-13685423?from_action=save)
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  - 46 Rayle, Lisa, Susan Shaheen, Nelson Chan, Danielle Dai, and Robert Cervero (2014). *App-Based, On-Demand Ride Services: Comparing Taxi and Ridesourcing Trips and User Characteristics in San Francisco: Working Paper*. University of California Transportation Center (UCTC). [http://76.12.4.249/artman2/uploads/1/RidesourcingWhitePaper\\_Nov2014Update.pdf](http://76.12.4.249/artman2/uploads/1/RidesourcingWhitePaper_Nov2014Update.pdf)
  - 47 Ibid., 18
  - 48 <http://www.forbes.com/sites/ellenhuet/2014/09/08/uber-lyft-cars-arrive-faster-than-taxis/>; <http://www.kgw.com/story/money/business/2015/07/10/report-taxi-have-longer-wait-times-than-uber-lyft/29986679/>
  - 49 <http://qz.com/363759/data-proves-that-often-a-yellow-taxi-is-a-better-deal-than-an-uber/>
  - 50 This means ridesourcing that where an individual or people that already know each other source a ride vs. the newer variants like UberPool, Lyft Line or Shared SideCar where strangers are matched in real-time and can split the cost
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  - 52 <http://www.govtech.com/public-safety/How-the-Sharing-Economy-is-Strengthening-Emergency-Response-and-Recovery.html>
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- 57 <https://www.itdp.org>
- 58 Institute for Transportation & Development Policy, *Connecting Low-Income People to Opportunity with Shared Mobility*, by Michael Kodransky and Gabriel Lewenstein, December (2014): 12. [https://www.itdp.org/wp-content/uploads/2014/10/Shared-Mobility\\_Full-Report.pdf](https://www.itdp.org/wp-content/uploads/2014/10/Shared-Mobility_Full-Report.pdf)
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<http://www.greenbiz.com/blog/2014/10/14/shaheen-how-car-sharing-gets-us-here-sustainability;>
- 63 <http://www.apta.com/resources/reportsandpublications/Documents/APTA-Millennials-and-Mobility.pdf>
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- 65 [https://citycarshare.org/wp-content/uploads/2011/12/CCS\\_BCCTYC\\_Long.pdf](https://citycarshare.org/wp-content/uploads/2011/12/CCS_BCCTYC_Long.pdf) (e.g. CityCarshare members spend \$540 on average compared to \$5000 as estimated annual cost of ownership by AAA. Zipcar makes a similar claim.
- 66 <http://iurd.berkeley.edu/wp/2012-04.pdf>
- 67 <http://www.vancouver.sun.com/Metro+Vancouver+board+with+sharing/10360341/story.html>; [http://citycarshare.org/wp-content/uploads/2012/06/CITY-CARSHARE-best-practices-010212\\_lowres.pdf](http://citycarshare.org/wp-content/uploads/2012/06/CITY-CARSHARE-best-practices-010212_lowres.pdf)
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- 69 <http://frequentflyeruniversity.boardingarea.com/using-relayrides-to-save-money-on-car-rentals/>; <http://www.extremetech.com/extreme/134168-hands-on-relayrides-makes-peer-to-peer-car-rental-cheap-easy>
- 70 <http://blogs.wsj.com/venturecapital/2014/06/24/peer-to-peer-car-rental-startup-relayrides-hopes-to-escape-silicon-valley-bubble/>
- 71 <http://www.businessinsider.com/uber-vs-taxi-pricing-by-city-2014-10>
- 72 Ibid.; The video is worth watching.
- 73 [https://citycarshare.org/wp-content/uploads/2011/12/CCS\\_BCCTYC\\_Long.pdf](https://citycarshare.org/wp-content/uploads/2011/12/CCS_BCCTYC_Long.pdf)
- 74 <http://www.forbes.com/sites/karstenstrauss/2014/12/17/relayrides-wants-you-to-rent-out-your-car-in-2015/>
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- 76 <http://citypaper.net/uberdriver/>
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- 79 <http://citypaper.net/uberdriver/>
- 80 <http://citypaper.net/emilyg/>
- 81 <http://www.laweekly.com/news/confessions-of-an-uber-driver-5173883>
- 82 <http://therideshareguy.com/how-much-did-i-make-driving-for-lyft-uber-on-a-saturday-night-in-the-oc/>
- 83 <http://money.cnn.com/2014/12/02/news/economy/chicago-minimum-wage-hike/>
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