Carsharing

What is it?

Carsharing programs are on-demand automobile rental services that substitute for private vehicle use and ownership. Such programs include commercial car sharing programs and peer-to-peer carsharing programs.

Commercial carsharing, run by private firms, maintain a fleet of vehicles that are deployed regionally (neighborhoods) and are available for short-term rental. Commercial carshare companies typically either offer a fleet of vehicles designed for round-trip rental where vehicles are returned to a designated parking spot or one-way trip rentals where vehicles may be rented and returned anywhere within the company’s designated operating area. Typically, the cost of rental includes fuel, insurance, and parking meter fees.

Personal vehicle carsharing, also known as peer-to-peer car sharing, enables private car owners to make their vehicle available on a temporary basis to a private carsharing company for rental. In return, the vehicle owner gets a substantial portion of the rental revenue from the carsharing company. When not rented out, the vehicle owner can continue to use their car as usual. Program users must typically pass an application process before being allowed to use cars.

Carsharing programs can increase accessibility and equity within a city by increasing the transportation choices available and allowing users to easily access cars for occasional trips without the expense of purchasing and maintaining a private vehicle. Car sharing programs have also been shown to lower vehicle miles traveled (VMT) and increase biking, walking, and the use of public transportation.

What are the benefits?

- **Mobility**: Encourages mode shift to transit, cycling or walking for the majority of trips by allowing individuals to forgo personal vehicle ownership. This helps reduce congestion and VMT.
- **Accessibility**: Increases the types of travel options available and facilitates the use of more sustainable transportation modes by

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2. Photo courtesy of CH2M HILL.
providing a low-cost alternative to personal vehicle ownership.

- **Environmental**: Reduces the emission of criteria air pollutants and greenhouse gases that are harmful to the environment and human health by encouraging shifts to more sustainable transportation modes.

- **Equity**: Provides lower-income populations with access to the convenience of auto travel for occasional trips without the expense of purchasing and maintaining a private vehicle.

- **Quality of Life**: Increases physical activity and quality of life by enabling users to forgo vehicle ownership and adopt more active modes for the majority of trips where a vehicle is not required.

**Where is it being used?**

Carsharing systems are becoming increasingly common in medium-large cities across the world and also in university towns. Modern day carsharing began in North America during the mid-1990s; as of July 2009, carsharing as an industry had more than 378,000 members served by more than 9,800 vehicles throughout the continent. Examples of carsharing programs (both commercial and peer-to-peer) operating in the Pacific Northwest include:

- **Car2Go**, Portland, OR
- **Zipcar**, Portland and Eugene, OR; Puget Sound, Spokane, and Pullman, WA
- **U Car Share**, Portland, Monmouth, and McMinnville, OR
- **Enterprise CarShare**, Corvallis and Eugene, OR
- **Getaround**, Portland, OR (peer-to-peer)

**How effective is it?**

Recent studies have shown carsharing programs to be effective in the following areas:

- A survey of members of 10 carsharing programs operating throughout North America during late 2008 showed that the average number of vehicles per household for carsharing members dropped a statistically significant amount, from 0.47 to 0.24, mostly due to one-car households becoming car-free households. Additionally, the average fuel economy of carsharing vehicles used most often by respondents was 10 miles per gallon (mpg) more efficient than the average vehicle shed by respondents. An aggregate analysis suggested that for every carsharing vehicle, 9 to 13 private vehicles are taken off the road (including shed vehicles and postponed purchases).

- A 2007 study of San Francisco’s **Carma** program found that 4 years after the program was introduced, 29% of members had gotten rid of one or more cars. Additionally, before-and-after comparisons revealed declines in travel among members compared to nonmembers. After controlling for the influences of other predictors, City CarShare membership was found to significantly reduce daily VMT. Specifically, all else being equal, City CarShare membership typically

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5 In this summary, the best available data on program effectiveness is used. Whenever possible, information is provided for the referenced examples; however, that information is not always available.

reduced travel by 7 vehicle miles per day; residing in dense, transit-friendly San Francisco reduced
the figure by another 3 vehicle miles per day; and owning a bicycle cut down on travel by an
additional 4 vehicle miles per day. Overall, carshare members’ average mode-adjusted daily VMT
fell by 67% over the long term (2001 to 2005). This decline was statistically significant and
determined to result from a combination of the program members’ tendencies to walk, bike, take
public transit, and—when they drove—to take shorter trips and have other occupants in the
vehicle. Reduced travel was matched by increased accessibility afforded to those who joined the
City CarShare program. The authors of the study concluded that rising personal benefits matched
by declining social costs (reflected by VMT and fuel consumption) suggested that carsharing was a
“win-win” proposition that benefited both program users and non-users.

- Evidence of the effectiveness of carsharing programs in Europe have produced similar results:
  - In 2003, carsharing programs in Edinburgh (regional population: ~ 780,000) and Bristol (regional
    population: ~ 1,070,000) reduced 2,200 to 2,400 annual vehicle miles per carshare member.
  - A survey of several carsharing programs in the UK (in both urban and rural locations) showed
    that about 30% to 40% of members gave up a privately owned car when they joined the
    program or joined as an alternative to purchasing one. The rest (60% to 70%) either did not
    previously own a car or kept their car after joining the program.
  - In 2004, Carplus in Berlin reported that carshare members increased their walking and cycling
    by 28% and use of public transit by 35%.
  - In 1998, carshare members in Switzerland who gave up their cars were able to reduce annual
car mileage by an average of 72% (from 5,780 miles to 1,620 miles per year).

- According to the OSTI Greenhouse Gas Toolkit, carsharing could result in a 0.05% to 0.2% reduction
  in total transportation sector baseline greenhouse gas (GHG) emissions in 2030. However,
increasing financial support to public, private, and/or nonprofit carsharing organizations could help
increase effectiveness up to 1.7%. Because the reduction in greenhouse gases is calculated
entirely based on a decrease in VMT, a 1:1 ratio of percent GHG reduction to percent VMT
reduction can be assumed.

How much does it cost to implement?

As with any new business, carsharing programs incur startup costs that must be covered before a
revenue stream is developed. Startup costs include the need to purchase vehicles, obtain insurance,
set up a reservation system, hire staff, market to prospective members, and develop a parking scheme.
While costs depend heavily on the size of the carshare program, one carshare operator in the United

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7 Mode-adjusted VMT accounts for occupancy levels of private car trips and nets out transit trips (since no new buses or rail vehicles are
added to accommodate these trips).
8 Cervero, Robert, Aaron Golub, and Brenda Nee. "City CarShare: Longer-Term Travel Demand and Car Ownership Impacts." Transportation
Department for Transport. pp. 196 to 208.
11 While GHG reductions are different than VMT reductions, a 1:1 ratio of percentage of GHG reduction to percentage of VMT reduction
is assumed for the programs that derive GHG reductions entirely from reductions in VMT (such as car sharing). While carsharing can
reduce greenhouse gas through improvements to fuel economy as well, this factor was not included in the GHG reduction estimate for
this program. The 1:1 ratio assumption is consistent with assumptions in the OSTI GHG Toolkit source document, Moving Cooler.
States estimated that it can cost up to $1 million to open a new market. It then takes time to build the business and break even. All of these steps require risk taking, which a partner organization such as a local agency can help to mitigate. The benefit for the partner is a new mobility option for the partners’ constituencies.12

As an alternative to commercial car sharing, peer-to-peer car sharing utilizes members’ privately owned vehicles, which greatly reduces startup costs. According to one study, the peer-to-peer carsharing model maybe able to reduce the cost of operating a carshare service by 50% or more.13 This makes peer-to-peer carsharing a potentially strong option for lower density areas where commercial carsharing programs are less economically viable. Currently, peer-to-peer carsharing is being tested in Portland, Oregon, through a federal grant and in partnership with the City of Portland and Oregon Transportation Research and Education Consortium (OTREC).

In terms of cost-effectiveness, carsharing programs in Edinburgh and Bristol in the United Kingdom resulted in a program cost of 5 pence per kilometer (or $0.13 per vehicle mile) reduction. This estimate is derived from the total program costs and total estimated vehicle miles reduced for the programs at the time of analysis.14

Implementation resources

Carsharing programs are often the result of partnerships between the public sector and private or non-profit carshare companies. While carshare operators are the most common initiators of program launches in a particular community, there are numerous partnership, business, and operating models available to a community that wishes to implement a carshare program. Some common factors for success include:15

- Identifying a champion for car-sharing
- Adopting supportive policies and regulations (e.g., VMT reduction goals, supportive parking policies, etc.)
- Providing financial assistance (e.g., for marketing and/or startup and operating costs, etc.)

The following are additional resources that may aid in the implementation of a carshare program:

- Carsharing.us (a blog) and Carsharing.org (one-stop web resource) by David Brook

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https://www.trb.org/Publications/Blurbs/156496.aspx

