

ADDITIONAL READ-AHEAD MATERIALS FOR RESIDENTIAL PARKING WORKING GROUP MEETING FIVE: CARSHARING STUDIES

In various places, the read-ahead materials for Residential Parking Working Group Meeting Five made reference to carsharing, both as a way to manage demand for private-vehicle travel, and as services that developers can facilitate in association with reduced parking.

Here we present summaries of two studies: one that examines the relationship between “traditional” carsharing services (such as those provided by the Zipcar and Enterprise companies) and private vehicle ownership, and one that examines the relationship between “point-to-point” carsharing (as provided by the car2go company) and private vehicle ownership.

Additional background materials that summarize parking policies in jurisdictions around the United States can be found in the “Additional Readings” section of “Meeting Five” on the [“Documents”](#) page of the project web site.

Report citation

Elliot Martin, PhD, Susan A. Shaheen, PhD, Jeffrey Lidicker, M.A., M.S..2010.CARSHARING'S IMPACT ON HOUSEHOLD VEHICLE HOLDINGS: RESULTS FROM A NORTH AMERICAN SHARED-USE VEHICLE SURVEY.

Editor's Note: This is one of several papers, published in various ways, that describes the results of this 2008 survey effort. This paper is the most directly related to off-street parking impacts through vehicle holdings)

Report abstract

"Carsharing has grown considerably in North America during the past decade and has flourished within metropolitan regions across the United States and Canada. The result has been a new transportation landscape, which offers urban residents an alternative to automobility without car ownership. As carsharing has expanded, there has been a growing demand to understand its environmental impacts. This paper presents the results of a North American carsharing member survey (N = 6,281). The authors establish a "before-and-after" analytical design with a focus on carsharing's impacts on household vehicle holdings and the aggregate vehicle population. The results show that carsharing members reduce their vehicle holdings to a degree that is statistically significant. The average vehicles per household of the sample drops from 0.47 to 0.24. Most of this shift constitutes one-car households becoming carless. The average fuel economy of carsharing vehicles used most often by respondents is 10 miles per gallon (mpg) more efficient than the average vehicle shed by respondents. The median age of vehicles shed by carsharing households is 11 years, but the distribution covers a considerable range. An aggregate analysis suggests that carsharing has taken between 90,000 to 130,000 vehicles off the road. This equates to 9 to 13 vehicles (including shed and postponed auto purchases) for each carsharing vehicle."

Does the report describe best practices in off-street parking policy? If yes, please describe these best practices.

No.

Does the report describe a policy framework for granting reductions in off-street parking ratios? If yes, please describe.

No.

Does the report describe findings about vehicle ownership or off-street garage/lot occupancy? If yes, please describe.

Yes. Select excerpts included below.

"This paper reports on carsharing's impact on vehicle holdings among member households. The study results are based on a survey of carsharing members within organizations operating throughout North America during late-2008. A total of 9,635 carsharing members completed the survey. After researchers

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removed respondents due to confounding circumstances and mis-answered questions, the final dataset contained 6,281 individuals. The participating North American organizations in the survey included: 1) AutoShare, 2) City Carshare, 3) CityWheels, 4) Community Car Share of Bellingham, 4) CommunAuto, 5) Community Car, 6) Co-operative Auto Network, 7) IGo, 8) PhillyCarShare, 9) VrtuCar, and 10) Zipcar (in the U.S. and Canada). Most organizations, which are located in a single city, distributed survey solicitations to all their members. Because of Zipcar's size and geographic distribution, the sample was capped at 30,000 members and targeted at specific markets. This included 5,000 each within New York City; Boston; Washington, D.C.; Portland; and Seattle. An additional 2,500 (each) in Vancouver and Toronto also received survey invitations from Zipcar.

Until now, most North American carsharing studies have focused on one organization within a single city. Many of these evaluations have occurred during periods in which the organization was just starting. Finally, in most studies, vehicle impacts have been just one evaluation component, and few studies have attempted to characterize the vehicles that have been shed by members with respect to fuel economy, age, and annual miles/kilometers driven. This study addresses these gaps by focusing on carsharing's impact on household vehicle holdings.

Respondents were asked key questions about their household's travel lifestyle during the year before they joined carsharing. This included parameters such as annual VMT/VKT made on personal household vehicles (if any) and travel on non-motorized modes and public transit. The respondents were then asked to evaluate the same annual parameters "at present," as this permitted simpler recollection and prevented respondents from self-assessing the "after" timeframe in which they may have shifted to a new set of travel patterns. To evaluate vehicle holdings, the survey collected the make, model, and year of each vehicle within the household both before joining carsharing and at the time of the survey. The make, model, and year of each vehicle were used to determine the vehicle's fuel economy.

Evidence from this North American carsharing member survey demonstrates that carsharing facilitates a substantial reduction in household vehicle holdings, despite the fact that 60% of all households joining carsharing are carless. Households joining carsharing held an average 0.47 vehicles per household. Yet the vehicle holding population exhibited a dramatic shift towards a carless lifestyle. Based on assumptions with respect to the active member population, it is estimated that carsharing has removed between 90,000 to 130,000 vehicles from the road (9 to 13 vehicles per carsharing vehicle, including shed and postponed car purchases) in North America to date. The vehicles shed are often older, and the carsharing fleet average is 10 mpg more efficient than the fuel economy of vehicles shed. Inactive memberships reduce the forecasted aggregate impacts, but it is worth noting that even if every other household of the population were inactive, carsharing would still be effective in reducing the overall number of household vehicle holdings."

Does the report present a predictive model or equation for estimating parking demand at a location or for estimating how much parking should be built?

No.

Report citation

Elliot Martin and Susan Shaheen. July 2016. The Impacts of Car2go on Vehicle Ownership, Modal Shift, Vehicle Miles Traveled, and Greenhouse Gas Emissions: An Analysis of Five North American Cities. Transportation Sustainability Research Center.

Report abstract

"Car2go is currently the largest carsharing operator in the world, with a presence in nine countries and nearly 30 cities. It operates as a one-way instant access carsharing system within a pre-defined urban zone. Members can find an unoccupied parked vehicle, access it immediately, and use it to meet their local travel needs. As long as the vehicle is parked within the operating zone, users only pay for the time that they drive. As a one-way system, car2go provides flexibility to the user. There are questions as to whether one-way carsharing increases overall vehicle miles traveled (VMT), by facilitating easier one-way travel (and automotive commuting) within urban environments. The results of this study suggest that access to ubiquitous shared automobiles allows some residents to get rid of a car or avoid acquiring one altogether. These actions taken by a minority of members have VMT-reducing effects that are estimated to exceed the additional driving that does take place within car2go vehicles."

Does the report describe best practices in off-street parking policy? If yes, please describe these best practices.

No.

Does the report describe a policy framework for granting reductions in off-street parking ratios? If yes, please describe.

No.

Does the report describe findings about vehicle ownership or off-street garage/lot occupancy? If yes, please describe.

"This study surveyed car2go members in five cities to determine the impacts on vehicle ownership, modal shift, VMT, and greenhouse gas (GHG) emissions. The cities surveyed were Calgary, San Diego, Seattle, Vancouver, and Washington, D.C. We asked questions that required respondents to attribute specific changes in their life as caused by the presence of and access to car2go. We also used vehicle activity data to evaluate the total driving that car2go vehicles travel in a city during a year, as well as a profile of the frequency of use by the broader car2go population.

Not surprisingly, we found that car2go has a diverse range of impacts on the member population. Most of the car2go population appears to use it for a small number of trips a year to satisfy incidental mobility needs. This activity generally adds to driving that is additional or would have otherwise occurred with another automobile. The analysis also found that a minority of the population uses car2go as a substitution for personal automobiles as they either sold personal vehicles owned or suppressed the acquisition of a private auto. The impacts of these changes are large relative to the overall increase in driving that is caused by car2go activity. Thus, the results of this analysis suggest that car2go is on net

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reducing vehicles that would be owned by households, reducing driving, and thus lowering GHG emissions."

Does the report present a predictive model or equation for estimating parking demand at a location or for estimating how much parking should be built?

No.

Other relevant information

"car2go also causes substantive change on the vehicle holdings of a minority of members. In this study, we measure the change in the raw sample; however, when we scale the impacts to the broader population, we re-weight the effects to consider the distribution of usage frequency in the activity data. This was done to balance the responses in consideration of the fact that more active users are more likely to respond to the survey and are more likely to report substantive impacts relative to the general population. When considering the re-weighted impacts of active car2go drivers (i.e., those using it more than once a month), the results suggest that between 2% to 5% of the car2go population sold a vehicle due to car2go across the study cities. The average age of vehicles sold ranged between 12 and 15.7 years across the five cities, and the entire sample of sold vehicles had an average age of 14.4 years across all of the cities. Another 7% to 10% of respondents (aggregate results) did not acquire a vehicle due to car2go.

The analysis here finds that car2go would have a net zero impact on VMT if all personal vehicles estimated to be sold and suppressed by active members were driven a little less than just 1000 miles per year. This is far below the reported annual VMT of average sold vehicles and far below the average annual driving of personal vehicles."