

CARSHARING PARKING POLICY: A REVIEW OF NORTH AMERICAN PRACTICES AND SAN FRANCISCO BAY AREA CASE STUDY

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ABSTRACT

Carsharing provides users access to a shared vehicle fleet for short-term use throughout the day, reducing the need for private vehicles. The provision of on-street and public off-street parking dedicated to carsharing is an important policy area confronting public agencies. As of July 2009, approximately 377,600 individuals were carsharing members in North America in about 57 metropolitan areas. A total of 17 jurisdictions, one state (California), and eight public transit operators in North America have formal and informal carsharing parking policies, pilot projects, and proposed legislation. Additionally, the authors examine carsharing parking policies in three jurisdictions in the San Francisco Bay Area, which accounts for an estimated 50,000 carsharing members and 1,100 shared-use vehicles. Supporting this examination is an intercept survey on carsharing parking (n=425) conducted in the Bay Area. Results show that most people supported the conversion of some type of spaces for carsharing use, and 48% thought that carsharing organizations should compensate the city for on-street spaces. At the same time, converting most types of spaces was opposed by at least 20% of respondents. Neighborhood residents were generally more in favor of parking conversion for carsharing than people visiting the area for work or errands. Finally, a majority (61%) felt that non-profits should have priority over for-profit organizations for carsharing spaces and should pay less than for-profit organizations.

INTRODUCTION

In recent years, public policy has increasingly focused upon improving vehicle fleet efficiency and reducing energy consumption and carbon emissions. Public agencies have aggressively pursued climate action planning and carbon reduction strategies. This has coincided with a number of recent policy proposals including “cap-and-trade” and a plan to implement enhanced corporate average fuel economy standards of 35.5 miles per gallon by 2016 (1-2).

Over the last decade, the transportation sector has been the largest end-use contributor of carbon dioxide (CO₂) emissions (3). According to the Department of Energy, petrol-based transportation CO₂ emissions generally coincide with vehicle miles or kilometers traveled (VMT or VKT). Public policies that support the reduction of VMT/VKT are one way that public agencies can achieve carbon reduction goals. Short-term auto use or carsharing is a strategy that local governments and public agencies can employ to lower VMT/VKT and support carbon mitigation efforts. Many public agencies (local governments, public transit operators, and parking authorities) allocate parking to carsharing organizations due to its positive transportation, environmental, land use, and social impacts (4).

The concept of carsharing is simple: individuals and businesses gain access to private vehicle use without the expense and responsibilities of auto ownership. Carsharing members have access to a fleet of vehicles in a network of locations and typically pay per use.

One major impact of carsharing on the transportation system is reduced vehicle ownership. According to North American studies, a carsharing vehicle reduces the need for 4.6 to 20 privately owned cars (4,5). They also suggest that 15 to 32% of carsharing participants sold a vehicle after joining a carsharing program, and 25 to 71% had delayed or foregone a vehicle purchase (4,5). These studies also indicate an average reduction in VMT/VKT of 44% (4,5). In addition to reduced vehicle ownership and VMT/VKT, carsharing is associated with lower greenhouse gases and CO₂ emissions, as members typically shift trips to public transit, bicycling, and walking. Many carsharing organizations also include low-emission vehicles in their fleets,

such as gasoline-electric hybrid and plug-in hybrid cars. Finally, carsharing demonstrates beneficial social impacts (e.g., increased mobility for lower-income segments).

Carsharing can be more affordable than private vehicle ownership as it enables households to gain or maintain vehicle access without bearing the full costs of ownership. Carsharing members report an estimated monthly savings of \$154 to \$600 in the U.S. and a savings of \$392 to \$583 in Canada (4, 6, 7). Furthermore, municipalities and public agencies are employing carsharing to reduce fleet management costs (8, 9). In 2004, Berkeley, California and Philadelphia, Pennsylvania were the first local governments to replace their municipal fleets with carsharing, saving taxpayers an estimated \$400,000 and \$5 million, respectively (10, 11).

This paper has five main sections. First, the authors provide a methodological discussion of the approaches employed in this study. Next, a carsharing parking overview is presented. Third, the authors present a San Francisco Bay Area case study, which highlights the policies and approaches of three jurisdictions: 1) San Francisco, 2) Berkeley, and 3) the Bay Area Rapid Transit (BART) District. Fourth, results of the authors' San Francisco Bay Area 2008 public perception survey on carsharing parking are presented. Finally, the authors provide a conclusion.

METHODOLOGICAL APPROACH

From January to May 2008, the authors surveyed 28 North American carsharing operators about parking. Sixteen of 18 U.S. operators and all 13 Canadian operators participated. Respondents provided quantitative data on parking metrics including the number and composition of on- and off-street parking spaces and qualitative data on how carsharing parking works in their service areas.

Additionally, the authors conducted 34 expert interviews with public officials and governmental agencies with experience in the development, implementation, and administration of carsharing parking policies in North America. Operator survey data, expert interviews, and intercept survey results were supplemented with a literature and Internet review. The authors draw upon these data to provide a review of carsharing parking policies in North America, as well as to develop the San Francisco Bay Area case study in this paper.

In September 2008, researchers also administered a public intercept survey at four locations in the San Francisco Bay Area to gain insights into perceptions and opinions regarding on- and off-street carsharing parking provision. A total of 425 clipboard surveys were collected in San Francisco, Oakland, and Berkeley.

Key Parking Policy Elements

Based upon our literature and Internet review and expert interviews in North America, the authors found that a number of agencies either have or are developing a combination of formal and informal carsharing parking policies. Many of these policies cover: 1) how carsharing is defined; 2) if and how carsharing parking should be allocated; 3) whether there should be a policy differentiation between for-profit and non-profit carsharing providers; 4) how to manage demand for parking among multiple carsharing operators; 5) determining the monetary value of parking spaces; and 6) how to address administrative issues such as permits, street cleaning, parking enforcement, and carsharing vehicle signage.

Some of the municipal parking policies include: 1) provisions for on-street parking; 2) parking time limit exemptions; 3) creation of carsharing parking zones; 4) free or reduced cost parking spaces and/or parking permits; 5) universal parking permits (i.e., carsharing vehicles can be returned to any on-street location); and 6) formalized processes for assigning on-street

parking spaces. Based on our research, the authors identified seven key elements among North American carsharing parking policies, summarized in Table 1.

TABLE 1 Key Elements of North American Carsharing Parking Policies

Parking Policy Element	Description
Parking Allocation	<p>The allocation of carsharing parking is typically implemented through a combination of formal and informal processes. Some municipalities have established “option zones” that designate on-street carsharing parking. Other cities have allocated parking stalls for carsharing as a “vehicle-class” rather than dedicating parking spaces to specific carsharing operators. Other local agencies allocate parking through the use of parking permits, which allow “exclusive-use” of parking within a specific parking zone or district or the use of a particular parking spot.</p> <p><i>Formal Processes:</i> Formal processes include established policies that are either written, codified by local ordinances and zoning provisions, or negotiated through a formal request for proposal (RFP) process.</p> <p><i>Informal Processes:</i> An informal allocation process includes approving on-street and off-street carsharing parking through variances, special permits, and case-by-case approvals either from administrative staff or an elected council.</p>
Parking Caps	<p>Caps limit the number or locations of on-street parking spaces used for carsharing. A public agency may limit the number of carsharing parking spaces in a category (e.g., on- or off-street), the number of parking spaces per operator, the number of parking spaces in a particular location, or parking stalls per given membership level (e.g., one parking stall per 100 members served).</p>
Fees and Permits	<p>Some public agencies charge carsharing operators for parking to recover lost parking revenue from the conversion of parking from general-use to carsharing-only spaces. Methods for determining the amount an operator may be assessed for a parking space include: 1) residential parking permit cost; 2) foregone meter revenue; 3) cost of providing parking (e.g., operations, administrative costs, overhead, and maintenance); or 4) the market cost for private or public off-street parking in a given parking district or municipal jurisdiction. Other public agencies have opted to allow “free-parking” for carsharing operators.</p>
Signage, Installation, and Maintenance	<p>Almost all public agencies allocating on-street and off-street parking to carsharing operators allow special signage to denote carsharing spaces. Some public agencies regulate signage so they conform to local requirements. Many public agencies formally negotiate requirements for maintenance either through real estate lease agreements or informally with an operator on an as-needed basis.</p>
Parking Enforcement	<p>Parking enforcement includes ensuring that carsharing vehicles are parked in their designated locations and that non-carsharing vehicles do not occupy a carsharing “only” parking space. Some public agencies have created provisions for unique license plates and ticketing/towing authority.</p>
Impact Studies	<p>A few public agencies have required carsharing operators to implement impact studies documenting the transportation, social, and environmental impacts of carsharing. At present, most public agencies requiring impact studies do not release the results and rarely link policy decisions to the outcome of such studies.</p>
Public Involvement	<p>Some public agencies require that carsharing operators work with local neighborhoods and community groups to gain approval on the location of carsharing parking spaces prior to their installation.</p>

Carsharing Parking Supply in North America

Between January to May 2008, the authors conducted a survey of 28 North American carsharing operators, including 16 (of the 18 operators) in the U.S. and all 13 Canadian operators.

Zipcar—with service in both the U.S. and Canada—completed survey responses for each

country. This study found that more than two-thirds of U.S. carsharing operators (69%) and 62% of Canadian carsharing operators had access to on-street parking. U.S. and Canadian carsharing providers claimed a total of 415 and 27 on-street parking spaces, respectively, in Spring 2008. At this time, on-street parking accounted for an estimated 8% and 2% of carsharing parking in the U.S. and Canada, respectively.

Carsharing operators indicated that the remainder of their parking included a combination of public and private off-street parking lots and garages. Although North American carsharing operators were unable to provide the exact number of public and private off-street parking, 11 North American operators (seven in the U.S. and four in Canada), all indicated a 2:1 ratio between private sector and public off-street parking when estimating their off-street parking supply.

North American Carsharing Parking Policy Status

In addition to the operator survey and our literature review/Internet search, researchers conducted 34 expert interviews with public officials in governmental agencies involved in developing and administering carsharing and parking policies in the U.S. In Canada, several carsharing organizations provided information based upon their interactions with governmental agencies. Based upon this research, the authors identified 17 local jurisdictions out of 56 (four cities in Canada and 13 cities in the U.S.) and one state (California) with formal and informal policies, pilot projects, and proposed legislation focused on on-street and public off-street carsharing parking. Eight North American public transit operators provide carsharing parking at their facilities (one in Canada and seven in the U.S.). Of the 17 North American cities with carsharing parking policies, Salt Lake City and Los Angeles have adopted carsharing parking policies as part of pilot programs scheduled to launch in Summer 2009. Two other U.S. jurisdictions (Arlington County, Virginia and Austin, Texas) have allocated carsharing parking through pilot programs as well. Finally, California has ratified a bill amending the state's vehicle code that enables city and county governments to designate areas for exclusive-use carsharing parking (18).

In some areas, these policies are formalized through written regulations, local ordinances, or user agreements or contracts that provide special parking use to carsharing organizations. In other areas, the policies are more informal and are typically determined by agency staff and/or on a case-by-case approval basis. The policy provisions and fees associated with these on-street and public off-street parking spaces vary by location. Some of the municipal parking policies include: 1) provisions for on-street parking; 2) exemption from parking time limits; 3) creation of carsharing parking zones; 4) free or reduced cost parking spaces and/or parking permits; 5) universal parking permits (i.e., carsharing vehicles can be returned to any on-street location); and 6) formalized processes for assigning on-street parking spaces. A summary of the North American policies is provided in Table 2. This table is divided into on-street carsharing parking (denoted in gray) and off-street carsharing parking denoted in white, highlighting the seven key elements of carsharing parking policy.

TABLE 2 Overview of North American Carsharing Parking Policies

	ON-STREET PARKING										PUBLIC OFF-STREET PARKING			
	On-Street Parking Allocation	Parking Cap	Fees & P ermits	On-Street Signage	On-Street Parking Enforcement	Impact Studies	Public Involvement	Off-Street Parking Allocation	Parking Cap	Fees & P ermits	Off-Street Parking Enforcement	Impact Studies	Public Involvement	
LOCAL GOVERNMENT														
Arlington County, VA	X	X		X			X	X	X				X	
Austin, TX	X			X										
Baltimore, MD	X			X				X						
Bellingham, WA	X			X										
Brookline, MA	X		X	X										
Cambridge, MA	X			X				X						
Duncan, BC								X						
Los Angeles, CA	X			X										
Montreal, QC	X		X	X										
Philadelphia, PA	X		X	X	X	X	X							
Portland, OR	X	X	X	X	X	X	X							
Salt Lake City, UT	X			X										
San Francisco, CA	X			X				X		X				
Seattle, WA	X			X										
Toronto, ON	X			X										
Vancouver, BC	X			X										
Washington, DC	X	X		X	X	X	X							
PUBLIC TRANSIT OPERATOR														
Bay Area Rapid Transit District														
San Francisco, CA								X	X	X	X	X		
Chicago Transit Authority														
Chicago, IL								X	X	X				
Metropolitan Atlanta Rapid Transit Authority														
Atlanta, GA								X						
Metropolitan Transportation Authority														
New York, NY								X		X				
New Jersey Transit														
Newark, NJ								X						
Translink														
Vancouver, BC								X						
TriMet														
Portland, OR								X		X				
Washington Metropolitan Area Transit Authority (WMATA)														
Washington, DC								X	X					
STATE GOVERNMENT														
California	X													

CARSHARING PARKING IN THE SAN FRANCISCO BAY AREA: A CASE STUDY

The authors examined three jurisdictions as part of their San Francisco Bay Area carsharing case study: 1) San Francisco, 2) Berkeley, and 3) the BART District. The authors chose to highlight this region as it has a long carsharing history; it illustrates the carsharing parking policy approaches of two cities and a public transit operator; and our public perception survey (described in the following section) on carsharing parking was conducted there.

In the San Francisco metropolitan area, private vehicles account for the greatest weekday modal share (80%), followed by walking (10.2%), public transit (6.2%) and bicycling (1.5%) (19). The remaining trips are made by other alternative modes. Some trends affecting carsharing services in the San Francisco Bay Area include: 1) a relatively higher affluence and cost of living and 2) a greater percentage of individuals with a college degree or other advanced degree.

Additionally, many areas in the region have limited on-street parking and expensive off-street parking. Interestingly, San Francisco has the least amount of on-street carsharing parking of all North American cities. At present, three carsharing operators provide service in the Peninsula and East Bay. There is limited service at universities in the South Bay.

Carsharing first appeared in San Francisco from 1983 to 1985 with the Short-Term Auto Rental (STAR) demonstration project. In 2001, carsharing services re-emerged in San Francisco with the launch of City CarShare, a non-profit carsharing provider. In August and October 2005, two for-profit operators—Flexcar and Zipcar—also launched their services. Later, they merged under the name Zipcar in October 2007. In 2007, for-profit U-Haul launched its U-CarShare service in the region. At present, most of U-CarShare's fleet of PT Cruiser vehicles is parked at U-Haul locations within Berkeley. As of July 2009, City CarShare, Zipcar, and U-CarShare served San Francisco, Oakland, and Berkeley with limited service at colleges and universities in the Peninsula and South Bay.

In July 2009, there were an estimated 50,000 carsharing members and 1,100 carsharing vehicles in the San Francisco metropolitan area. The Bay Area represents an estimated 16% of the U.S. carsharing market measured by membership, and it accounts for approximately 18% of the U.S. carsharing vehicle fleet deployed. To date, the BART District has developed a carsharing parking policy, and two additional jurisdictions (San Francisco and Berkeley) are in the process of formulating their carsharing parking policies.

Both San Francisco and Berkeley provide parking spaces for plug-in hybrid electric vehicles (PHEV) carsharing vehicles at no charge and are in the process of developing their respective carsharing parking policies. City CarShare receives a reduced rate for off-street parking in San Francisco, as well as six free spaces as part of their role in the City of Berkeley's fleet reduction program. BART has conducted a carsharing parking pilot program and adopted more formal policies regarding the number of carsharing parking spaces allocated per station and operator, as well as monthly permit fees, which do not reflect operator discounts. In the next section, the authors provide results from their Bay Area carsharing parking public perception survey.

CARSHARING PARKING IN THE SAN FRANCISCO BAY AREA: PUBLIC PERCEPTION SURVEY

In September 2008, the authors administered an intercept survey in the San Francisco Bay Area to understand the public's perceptions and opinions about the provision of on-street carsharing parking. Not surprisingly, it is important to gauge the public's reaction to the reassignment of public spaces to carsharing operators.

Researchers collected a total of 425 clipboard surveys at four locations: 1) Downtown San Francisco near City Hall/Civic Center (19%); 2) the Rockridge neighborhood and nearby the Rockridge BART station in Oakland (39%); 3) Downtown Oakland near the Convention Center (28%); and 4) Downtown Berkeley between the Downtown Berkeley BART station and Berkeley City Hall (28%). Researchers selected intercept locations in urban areas with rail and bus transit, carsharing service, and on- or off-street carsharing parking. These areas are typical of those where carsharing parking is or might be located, and respondents in these areas were more likely to have exposure and knowledge of carsharing and public parking availability. The results are applicable to the neighborhoods in the Bay Area in which they were implemented and are not generalizable to the entire region.

Carsharing Parking Public Perception Survey Results

Approximately half of respondents were male, and half were female. Most were between the ages of 18 to 45 (66%), and respondents were most frequently in the 26 to 35-age category (27%). Most identified themselves as Caucasian (59%), followed by Asian (10%), and African American (9%).

Respondents were asked whether they were familiar with carsharing prior to the survey. Eighty-six percent indicated that they were familiar with carsharing, and only 14% stated that they were unfamiliar with it. Those familiar with carsharing had known about it for approximately 24 months (median timeframe). Most indicated that they became aware of carsharing by word-of-mouth from friends and family, advertisements, media stories, and observing carsharing vehicles and parking spaces. Ten percent stated that they were members of a carsharing organization, 88% were not, and 2% did not respond.

Sixty-four percent worked or lived near the area in which they were surveyed, and most of those who did not were shopping, dining, or engaging in recreational activities in the neighborhood (26%). Fifty percent of participants from the San Francisco, Berkeley, and Oakland sites worked in the neighborhood, and 32% of Rockridge respondents lived in the neighborhood. The majority arrived to the surveyed areas by public transit (51%), followed by private auto (22%), walking (18%), bicycling (6%), and other modes (3%).

Just under half of the respondents (49%) indicated that they had experience parking in the neighborhood, and 51% had not parked there. In general, those that parked in the surveyed locations did so approximately five times per week. Among those who had an opinion (n=333), 65% indicated that the neighborhood needed more on-street parking, and 35% stated that it did not. Responses were mixed about the effect that on-street parking had on the quality of the neighborhood. Among those who had an opinion (n=345), 36% felt that it detracted, 30% thought it made no difference, and 35% stated that it improved the neighborhood.

Next, respondents were asked their opinion regarding carsharing and related parking policies. First, they were queried on whether they would support or oppose converting different types of parking spaces to “exclusive” carsharing use. Across all types of existing on-street uses, a higher percentage of respondents (50%) were willing to convert existing curbside parking to “carsharing only” than opposed it. Only 21% opposed converting any type of space to “carsharing only” parking. Among the different types of curbside carsharing conversions, respondents were most willing to give up metered parking and least likely to give up truck loading zones. Additionally, respondents were most protective of metered parking and least protective of restriping existing parking spaces. The types of parking that had both the greatest support and least opposition to carsharing parking conversion were taxi zones, no parking/no stopping zones, and the restriping of existing parking spaces.

Respondents were then asked whether they thought carsharing organizations should compensate the city for on-street spaces. About half thought that they should (48%), approximately one third thought they should not (33%), 17% were unsure, and 2% did not respond.

Among those that thought that carsharing organizations should compensate the city for on-street spaces, most indicated that the operator should pay a reduced cost (52%), the parking permit cost (19%), or lost meter revenue (21%). The primary reasons respondents offered for supporting free or a reduced cost parking spaces to carsharing organizations was the need to increase carsharing to reduce auto travel and improve the environment. Those who supported

higher charges generally felt that the city needed to be fairly compensated for any lost revenue. When respondents were asked whether they felt that there should be a different policy for granting on-street parking to for-profit carsharing providers versus non-profit carsharing providers, most thought there should be a difference (61%); some thought there should be no difference (23%); and the rest were unsure. The majority (61%) felt that non-profits should have priority over for-profit organizations for carsharing spaces and should pay less than for-profit organizations.

Finally, respondents were asked who they thought should be required to approve the conversion of on-street parking spaces to reserved carsharing parking. Most indicated that approval should be obtained from governmental agencies with jurisdiction over the converted parking (57%), as well as the majority of residents or businesses on the block (53%). Many also thought that elected officials representing the area (34%), relevant community or business associations (33%), and adjacent property or business owners (30%) should be involved in the approval process.

CONCLUSION

This paper examines North American carsharing parking policies, highlights three jurisdictions' carsharing parking policies/approaches in the San Francisco Bay Area, and analyzes public reaction to carsharing parking policies in the Bay Area to help inform future carsharing parking development.

In North America, 17 local jurisdictions out of over 57 localities have a combination of formal and informal policies, pilot projects, and proposed legislation focused on carsharing parking. Eight North American public transit operators provide carsharing parking in their facilities. Finally, California has ratified a bill amending the state's vehicle code allowing local governments to allocate "exclusive-use" on-street carsharing parking.

The San Francisco Bay Area carsharing parking case study features some of the policy approaches undertaken by public entities to allocate on-street, off-street, and transit-based carsharing parking. The authors' intercept survey in the Bay Area revealed that residents of a neighborhood are more inclined to support the conversion of spaces for carsharing use than opposed it. But no type of space was widely unopposed for the conversion to carsharing use. Each space had at least 20% opposing conversion. The fact that residents and not visitors were more supportive of carsharing parking is important, as it is typically residents who have the greatest influence on local parking policies. Furthermore, general support for allocating some parking to carsharing exists in an environment where a large portion of the sample felt that parking was in undersupply.

As carsharing continues to expand, public entities may find it beneficial to develop formal policies to equitably allocate carsharing parking among operators (both the number and space location). Additionally, they should incorporate public involvement into the process to ensure that stakeholder concerns are considered. In the future, supportive parking policy approaches will likely play a critical role in fostering any expansion of carsharing and could aid local jurisdictions in achieving their congestion mitigation and environmental goals.

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REFERENCES

- (1) Obama Announces New Fuel Economy Standards. *Fox News*, May 19, 2009. <http://www.foxnews.com/story/0,2933,520680,00.html>. Accessed June 24, 2009.
- (2) Tankersley, J. Obama sets strict rules on carbon emissions. *Chicago Tribune*, February 27, 2009. <http://www.chicagotribune.com/news/nationworld/chi-cap-and-tradefeb27,0,5872133.story>. Accessed June 24, 2009.
- (3) *Emissions of Greenhouse Gasses in the United States 2007*. Report DOE/EIA-0573(2007). EIA, U.S. Department of Energy, 2008. [http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573\(2007\).pdf](http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573(2007).pdf). Accessed June 24, 2009.
- (4) Shaheen, S., A. Cohen, and M. Chung. American Carsharing: A Ten-Year Retrospective. In *Transportation Research Record: Journal of the Transportation Research Board*, Transportation Research Board of the National Academies, Washington, D.C., 2009, forthcoming.
- (5) Shaheen, S., A. Cohen, J. D. Roberts. Carsharing in North America: Market Growth, Current Developments, and Future Potential. In *Transportation Research Record: Journal of the Transportation Research Board*, No. 1986, Transportation Research Board of the National Academies, Washington, D.C., 2006, pp 116-124.
- (6) Come to College – But Leave Your Car At Home. *Automotive.com*, August 28, 2008. <http://www.automotive.com/auto-news/02/38388/index.html>. Accessed July 30, 2009.
- (7) Victoria Carshare. Membership and Usage Costs. <http://victoriacarshare.ca/drupal-6.2/node/9>. Accessed July 12, 2009.
- (8) City of Philadelphia Selects Zipcar to Provide Car-Sharing Services. June 11, 2008. <http://zipcar.mediaroom.com/index.php?s=43&item=28>. Accessed July 6, 2009.

- (9) Philadelphia's Carsharing Benefits Drivers, City Governments. October 30, 2007. <http://postcarboncities.net/philadelphias-carsharing-benefits-drivers-city-government>. Accessed July 6, 2009.
- (10) Philadelphia Sustainability Awards. Nominees. www.philadelphiasustainabilityawards.org/nominees/philly_carshare/. Accessed July 6, 2009.
- (11) Bates, T. Berkeley is Once Again A Progressive Leader. *Berkeley Daily Planet*. July 12, 2005. www.berkeleydailyplanet.com/issue/2005-07-12/article/21834?headline=Commentary-Berkeley-is-Once-Again-a-Progressive-Leader-By-Tom-Bates&status=301. Accessed July 6, 2009.
- (12) Shaheen, S.A., A.P. Cohen. Growth in Worldwide Carsharing: An International Comparison. In *Transportation Research Record: Journal of the Transportation Research Board*, No. 1992, Transportation Research Board of the National Academies, Washington, D.C., 2007, pp 81-89.
- (13) California Assembly Bill 2154. May 8, 2006. http://info.sen.ca.gov/pub/05-06/bill/asm/ab_2151-2200/ab_2154_cfa_20060616_155424_sen_comm.html. Accessed July 30, 2009.
- (14) Metropolitan Transportation Commission. Maps & Data. http://www.mtc.ca.gov/maps_and_data/datamart/survey/. Accessed July 30, 2009.
- (15) Moyer, M. Parking Bid Resolution Memorandum. *City and County of San Francisco Port Commission*, March 5, 2009. <http://www.sfgov.org/site/uploadedfiles/port/meetings/supporting/2009/Item%209a%20Parking%20Bid%20Agenda%202009.pdf>. Accessed June 24, 2009.
- (16) Mayor Newsom Unveils Electric Vehicle (EV) Charging Stations for San Francisco. City and County of San Francisco, Office of the Mayor, Press Release, February 18, 2009. http://www.sfgov.org/site/mayor_index.asp?id=99135. Accessed June 24, 2009.
- (17) Howland, L. Bay Area Leading Way in Green Automotive Trends. *PublicCEO*, June 9, 2009. http://www.publicceo.com/index.php?option=com_content&view=article&id=288:berkeley-leading-way-in-green-automotive-trends&catid=156:information-technologies-publicceo-exclusive&Itemid=39. Accessed June 24, 2009.
- (18) Kamlarz, P. Contract No. 6475 Amendment: City CarShare for Fleet Vehicle Program. City of Berkeley, Office of the City Manager, June 9, 2009. http://www.ci.berkeley.ca.us/uploadedFiles/Clerk/Level_3_-_City_Council/2009/06Jun/2009-06-09_Item_20_Contract_No._6475_Amendment_City_CarShare_for_Fleet_Vehicle_Program.pdf. Accessed June 24, 2009.
- (19) Parking. *San Francisco Bay Area Rapid Transit District*. <http://www.bart.gov/guide/parking/>. Accessed June 25, 2009.