SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG)

Maximizing Mobility in Los Angeles – First & Last Mile Strategies

FINAL REPORT

Nelson\Nygaard Consulting Associates
in association with
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Southern California Association of Governments

- Jessica Meaney, Project Manager
- Ranjini Zucker
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Los Angeles Department of City Planning

- Jane Choi, Project Manager

Technical Advisory Committee

- Jeff Carpenter, Community Redevelopment Agency of the City of Los Angeles
- Stewart Chesler, Los Angeles County Metropolitan Transportation Authority
- Michael Davies, Los Angeles Department of Transportation
- Helene Bibas, Los Angeles Department of City Planning
- Jane Blumenfeld, Los Angeles Department of City Planning
- Claire Bowin, Los Angeles Department of City Planning
- Miles Mitchell, Los Angeles Department of Transportation
- Matt Gleason, Southern California Association of Governments

Consulting Team

Nelson\Nygaard Consulting Associates

- Linda Rhine, Project Manager
- Jeremy Nelson Deputy Project Manager
- Adina Ringler, Associate Planner
- Anneka Imkamp, GIS Manager

CALSTART

- Fred Silver, Principal
- Whitney Pitkanen, Project Manager
- David Kantor, Project Manager
- Geoff Jennings, Associate Planner

Alta Consulting

- Matt Benjamin, Senior Associate
- Jessica Roberts, Programs Manager
- Hannah Kapell, Planner

Intrago Mobility

- Dan Sturges

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Chapter 1. Executive Summary

Purpose of this Study

The purpose of this study is to identify cost-effective strategies to increase transit use and reduce automobile trips in the City of Los Angeles. *The study focuses on strategies that help to enhance overall mobility and solve what are known as "first mile/last mile" barriers for commuters who could potentially take transit* but whose starting point or final destination cannot be conveniently accessed from the nearest transit stop/station due to distance, terrain (hills, street patterns), or real or perceived safety issues (traffic, crime).

Several strategies discussed in this report are specifically oriented to address first mile/ last mile constraints; this category includes strategies such as bikes on transit and shared taxis. Other strategies are intended to enhance overall mobility for transit passengers by providing flexible commute choices so they don't have to drive when transit isn't a viable option for them (such as days when they need to attend an off-site meeting at a location not well-served by transit); this category includes strategies such as casual carpooling and short-term auto rental. Bridging first/last mile gaps and introducing alternative mobility strategies as a "back-up" option for transit passengers will help to provide safe, convenient, and affordable access to transit stations and encourage commuters who might otherwise drive to work (known as "choice riders") to use transit and other alternative modes.

Practical, user-friendly services are necessary to bridge the "first mile/last mile" gap in order to allow the City of Los Angeles to a) realize the full benefits from the ongoing investment in transit network, b) meet goals for reductions in vehicle trips and greenhouse gas emissions, and c) develop a fully integrated multimodal transportation system. *This report serves as an implementation-focused toolkit of first mile/last mile and alternative mobility strategies that are intended to accomplish these goals by increasing transit ridership.*

The strategies recommended in this study can leverage the tremendous investment that the City of Los Angeles and the Southern California Association of Governments (SCAG) have already made in transit service over the past few decades, as well as the continuing expansions of transit infrastructure that residents have already approved (such as Los Angeles' Measure R that was passed in November 2008). Of particular importance for SCAG, these first mile/last mile strategies can also help the City of Los Angeles and the region as a whole achieve Senate Bill 375 goals for reductions in transportation-related greenhouse gas emissions.

Project Overview

The City of Los Angeles Planning Department and SCAG led the study. The project was also guided by a multi-agency Technical Advisory Committee consisting of representatives from numerous City agencies and Metro. The project was funded by SCAG. The consultant team was led by Nelson\Nygaard and supported by Alta Planning+Design, CALSTART, and Intrago Mobility Services. The key interim work products of the project were:

- **Existing Transportation Alternatives.** The consultant team developed a baseline analysis of existing alternative transportation services provided by the public- and private sectors in the City of Los Angeles. For more information, see Volume II, Appendix 3.

- **Transit-Supportive Strategies.** The consultant team also developed an overview of "transit-supportive" strategies that are important to support transit ridership but were not the focus of this study. For more information, see Volume II, Appendix 4.
- **Preliminary First Mile / Last Mile Strategies.** The consultant team conducted a preliminary evaluation of 13 potential strategies to address first mile/last mile barriers in Los Angeles. The TAC and consultant team then prioritized these 13 strategies to identify the six strategies that were believed to have the greatest relevance and feasibility in Los Angeles. For more information on the evaluation process, see Chapter 2. For more information on the seven strategies that were not advanced for further consideration, see Appendix 1. The remainder of this report focuses on the six strategies that were advanced for further consideration for implementation in Los Angeles.
- **Phased Implementation Plan.** For the six strategies believed to be most applicable for Los Angeles, an analysis of potential marketing and funding opportunities as well as a general implementation timeline. For more information, see Chapter 9.

Summary of Potential Strategies Evaluated

Recommended First/Last Mile Strategies

The six strategies that were found to have the greatest applicability in Los Angeles were:

- **Chapter 3: Casual Carpool -** Casual carpooling refers to the sharing of a ride with a driver and one or more passengers, where the ridesharing between the individuals is not established or prearranged well in advance but coordinated shortly before the trip or even "on the spot." Rides are shared to and from popular origins and destination points, such as from residential neighborhoods with nearby bus stops to downtown business districts. Casual carpooling provides an alternative to traditional ride-matching and formal carpool/vanpool programs. It differs from traditional carpools in that it is designed to provide an instant "real-time" match of potential drivers and passengers traveling to and from the same area. In contrast to formalized carpooling programs, casual carpooling maximizes travel flexibility and better accommodates occasional and/or unscheduled need to share a ride. Casual carpooling also differs from formal carpooling and the commonplace sharing of rides among friends and family members in that drivers and passengers typically don't know each other in advance and may never travel together again. Thus, the major benefits of casual carpooling are that it requires minimal advance planning and accommodates variable travel times, reducing the participation barriers to traditional carpooling.
- **Chapter 4: Taxis -** A taxicab is an automobile with a driver for hire which conveys passengers between locations of their choice. This "vehicle for hire" or expanded taxi service differs from rental car and car-sharing services in that the person making the trip: a) does not drive themselves, b) does not need to reserve in advance, and c) can access the service at many different locations. Taxis can use already existing technology to pick up multiple riders in proximity to one another, provide on-demand door-to-door travel and connect riders from home to transit or from transit to job centers. Taxis are best for short-distance trips. For these reasons, taxis are an excellent first / last mile connector to bridge the gap between a transit station and a person's origin or destination.
- **Chapter 5: Car-Sharing -** Car-sharing programs allow people to have on-demand access to a shared fleet of vehicles on an as-needed basis. Usage charges are assessed at an hourly and/or mileage rate, in addition to a refundable deposit and/or a low annual

membership fee. Car-sharing is similar to conventional car rental programs with a few key differences between most programs: a) system users must be members of a car-sharing organization; b) fee structures typically emphasize short-term rentals rather than daily or weekly rentals; c) vehicle reservations and access is "self-service"; d) vehicle locations are widely distributed rather than concentrated; and e) vehicles must be picked up and dropped off at the same location.[1]

- **Chapter 6: Hourly Car Rental -** As the success of car-sharing programs around the world illustrates, a potential solution to address the first/last mile issue is a related strategy: short-term or hourly car rentals. Since car-sharing services may not be successful in all contexts, this chapter examines how existing for-profit national rental car companies might be able to provide some of the same benefits in Los Angeles (i.e. short-term car rental with convenient pick-up and low rates) in lieu of or in addition to traditional membership-based car-sharing organizations, especially in early implementation stages until an existing or new car-sharing organization was able to expand in the region.
- **Chapter 7: Folding Bikes on Transit -** Transit is most effective for trips of moderate to long distance on busy corridors, and bicycles are effective for trips of shorter distance in low- to medium-density areas. For these reasons, the combination of bicycling and transit can provide a high level of mobility comparable to automobile travel in terms of the overall travel time and distance. Encouraging folding bikes on transit has the advantage of addressing first / last mile barriers on *both* ends of the transit trip. Folding bikes on transit also increases user convenience (compared to leaving a non-folding bike at a transit stop/station all day) without exacerbating peak-hour transit capacity constraints (compared to bringing a non-folding bike on board a transit vehicle).
- **Chapter 8: Bicycle Sharing –** Similar to car-sharing, bike sharing is a form of short-term bicycle rental where people can have access to a shared fleet of bicycles on an as-needed basis. Bicycle sharing programs provide safe and convenient access to bicycles for short trips, such as running errands or transit-work trips. Cities of all sizes from around the world have experimented with bicycle sharing programs for nearly 40 years. Until recently bicycle sharing programs worldwide have experienced low to moderate success, but innovations in technology in the last five years have given rise to a new (third) generation of technology-driven bicycle sharing programs. These new bicycle sharing programs can dramatically increase the visibility of cycling and lower barriers to use by requiring only that the user have the ability to bicycle and some form of electronic payment (smart card, credit card, or cell phone).

Summary of Findings and Conclusions

This section briefly discusses the key strengths and weaknesses of each strategy in the context of potential implementation in Los Angeles. Full analysis and findings are presented in Chapters 3 through 9.

[1] It should be noted that certain aspects of the service models offered by car rental companies and car-sharing organizations can overlap. For example, "Connect by Hertz" is a short-term car rental service that shares many of the same attributes as a carsharing service. A key distinction is that traditional carsharing organizations *only* provide short-term carsharing (rather than both short-term and long-term car rental) and typically have an organizational mission to reduce vehicle trips and vehicle miles traveled (VMT).

- **Casual Carpool**
  - *Strengths:* Provides flexible travel choice for commuters; supports transit ridership; relatively low public-sector implementation costs.
  - *Weaknesses:* Maximum benefits achieved employment centers are centralized; need a strategy to address perceptions of risk of crime in sharing rides with strangers.
- **Taxis**
  - *Strengths:* Underutilized resource in Los Angeles; technology integration to improve system management (dispatch) and user experience (wait times); provides on-demand mobility; supports transit ridership; operated by private-sector on existing roadways under an existing regulatory framework that is structured to balance operators' profit with the public interest.
  - *Weaknesses:* Reforms to benefit drivers and customers are often difficult to implement due to highly competitive and politicized nature of the taxi industry; strategies will need to simultaneously reduce commuters' out-of-pocket costs without reducing driver incomes that could reduce service quality by promoting a "race to the bottom."
- **Car-sharing**
  - *Strengths:* Provides the convenience of occasional vehicle travel without the expense of car ownership; locating cars at transit stations can extend the service area of transit system; allows commuters to take transit to work knowing that a car is available if needed; can help reduce parking demand as part of new development.
  - *Weaknesses:* Because car ownership in Los Angeles is nearly universal among households who can afford a vehicle, car-sharing services will likely require some form of public subsidy for an initial period in order to expand.
- **Hourly Car Rental**
  - *Strengths:* Many of the same benefits of car-sharing, plus: may require reduced direct public subsidy.
  - *Weaknesses:* Many of the same barriers as car-sharing, plus: few car rental companies are offering a service model that would help achieve the core goal of this study to address first/last mile barriers.
- **Folding Bikes on Transit**
  - *Strengths:* Provides on-demand, active (non-sedentary) transportation at a low cost; supports transit ridership without reducing transit vehicle capacity relative to non-folding bikes; if coupled with education/marketing programs, can encourage non-cyclists and/or occasional cyclists to bicycle more often.
  - *Weaknesses:* It is unclear whether the subsidy for folding bikes is justified if the target market is choice commuters who could likely afford a folding bike if they desired one; a robust interconnected on-street bicycle network (lanes, sharrows, bike boulevards, etc.) is necessary to ensure that occasional bicyclists of all ages are comfortable bicycling.

- **Bicycle Sharing**
  - *Strengths:* Many of the same benefits of folding bikes, plus: can be operated as a public-sector program, by a private-sector partner, or as a hybrid public-private partnership.
  - *Weaknesses:* Maximum benefits achieved with implementation of larger multi-site networks (to ensure bicycle availability and provide many pick-up/drop-off points within close proximity to target markets) requiring a larger investment and scale of operations; as with folding bikes, a robust interconnected on-street bicycle network (lanes, sharrows, bike boulevards, etc.) is necessary to ensure that occasional bicyclists of all ages are comfortable bicycling.

Next Steps

This document is the final report for the project. Based on input from the Technical Advisory Committee and consulting team, City of Los Angeles and SCAG staff will begin to pursue implementation of many of the “early action” recommendations in this report in the coming years.

Chapter 2. Overview of Feasibility Evaluation

Preliminary Evaluation Process

After developing a broad list of potential first/last mile strategies, the Technical Advisory Committee (TAC) and consultant team conducted a preliminary evaluation to "screen out" potentially less feasible strategies including those that have already been studied in the City of Los Angeles. The preliminary evaluation was guided by consultant team's collective experience as multi-modal transportation planners and implementers, TAC guidance on the likelihood of success for different strategies, and the evaluative criteria below.

Evaluative Criteria

The primary criteria used to select the most feasible strategies to advance for further consideration were:

- Does the strategy achieve the primary objective of this study of bridging first and last mile barriers to transit?
- Does the strategy provide other "secondary" benefits, such as enhanced mobility, sustainability, and equity?
- Has the strategy proven successful in similar contexts?
- Is the strategy cost-effective in providing the opportunity for public-private partnerships in order to maximize benefits for minimal public-sector costs?
- Does the strategy have policy and political support for implementation in Los Angeles?
- Will the strategy have strong market acceptance among target demographic groups and geographic areas?
- Does the strategy require a "champion" to provide focused implementation guidance and facilitate interagency coordination?
- Would the strategy likely be pursued as part of other public- or private-sector activities?

This preliminary evaluation led to the development of a consensus list of the six strategies that the consultant team evaluated in greater detail. The remainder of this report focuses on the six strategies that were advanced for further consideration.[2]

[2] The preliminary analysis of the seven strategies that were not advanced for further consideration is contained in Volume II, Appendix 1. It should be emphasized that that while these strategies were not carried forward as part of this study, each has strong potential to improve mobility in Los Angeles and can be pursued independently of implementation of the recommendations in this report.

Strategies Advanced for Further Evaluation

Among the large number of potential first/last mile strategies, six strategies were determined to have the greatest applicability in Los Angeles and were advanced for further evaluation. These were:

- Casual Carpooling
- Taxis
- Car Sharing Programs
- Short-term Car Rental
- Folding Bikes on Transit
- Bike Sharing Programs

Chapters 3 through 8 analyze each of these first/last mile strategies in detail. Chapter 9 provides an overview of the comparative feasibility of each strategy.

Chapter 3. Casual Carpooling

Overview

Casual carpooling refers to the sharing of a ride with a driver and one or more passengers, where the ridesharing between the individuals is not established well in advance but coordinated shortly before the trip or even "on the spot." Casual carpooling provides an alternative to traditional ride-matching and formal carpool/vanpool programs. It differs from traditional carpools in that it is designed to provide an instant "real-time" match of potential drivers and passengers traveling to and from the same area. In contrast to formalized carpooling programs, casual carpooling maximizes travel flexibility and better accommodates occasional and/or unscheduled need to share a ride. Casual carpooling differs from formal carpooling – and the commonplace sharing of rides among friends and family members – in that drivers and passengers typically don't know each other in advance and may never travel together again. Thus, the major benefits of casual carpooling are that it requires minimal advance planning and accommodates variable travel times, reducing the participation barriers to traditional carpooling. Examples include the Bay area, where individuals congregate to carpool over the Bay Bridge to Downtown San Francisco, and Arlington, VA where individuals gather to carpool into Washington DC.

While there may be a variety of motives for carpooling, casual carpooling generally thrives in commuting situations when one or more of the following situations occur:

- Single-occupancy vehicle lanes on regional travel corridors (e.g. freeways, bridges) are tolled and/or highly congested and there is an HOV alternative.
- Regional travel corridors are limited and existing forms of transportation (e.g. driving, traditional transit, etc.) do not provide advantages in travel time savings.
- Regional travel corridors provide high-occupancy vehicle (HOV) lanes or high-occupancy tolled (HOT) lanes that provide time savings or money saving (or both) to carpools.
- The region's HOV / HOT network is fairly robust providing a high degree of connectivity between most common origins and destinations.

In these situations, drivers are incentivized to pick up passengers in order to allow for the use of high-occupancy vehicle (HOV) lanes or to avoid tolls on high-occupancy tolled (HOT) lanes – resulting in a savings of both time and money.

Casual carpooling is characterized by informality and lack of stringent regulation, although public agencies can facilitate car-sharing (e.g. providing designated pick-up and drop-off locations and marketing support) and provide oversight (e.g. a website promoting the "rules of the road" and contact for information). Casual carpooling usually falls into two categories, either "self-organizing" programs that evolve organically or "facilitated" programs where private-sector (often social networking or car-sharing companies) are involved. In most "self-organizing" programs, carpoolers do not exchange money (the time or money savings to drivers is the incentive to pick up passengers) but in facilitated programs, passengers may pay drivers to subsidize gas, tolls, or other costs (usually payment is via an online payment service such as PayPal). In self-organizing programs, meeting sites tend to evolve where there is reasonable parking (for passengers who may drive to the site and leave their cars), safe waiting area for queuing cars, proximity to major transportation corridors, and is often near public transportation stops, and public agencies can help designate these areas. In facilitated programs, drivers and passengers may pre-arrange any meeting spot that is mutually agreeable.

Existing Conditions

Description of Historical/Existing Services or Programs

Casual carpooling has existed in the United States for many years and can be traced back to the oil embargo in the 1970s. During this era, gas prices rose and the United States adopted a number of measures to curb gasoline consumption. Speed limits were reduced from 65+ m.p.h. to 55 m.p.h., car manufacturers began to make more efficient cars, and high occupancy vehicle (HOV) lanes were constructed. Los Angeles currently has an HOV system that includes freeway HOV lanes, HOV access ramps, park-and-ride lots and transit stations along HOV corridors. As of January 2000, the State of California had 925 HOV lane miles, with over 40% of these HOV facilities (380 lane miles) can be found in Los Angeles County.[3] In addition, the Southern California region has toll lanes such as SR-91 in Orange County and LA Metro is moving forward with a pilot program to test congestion charging on several congested regional freeways and this pilot may include HOT lane discount for high occupancy carpools. Considering the current and planned HOV / HOT infrastructure and programs conditions, coupled with the worst freeway congestion in the country and the limited number of regional travel corridors, Los Angeles area appears to meet many of the necessary conditions for casual carpooling to thrive.

Demand / Ridership / Usage

While Los Angeles boasts an extensive network of HOV lanes, there is not any documented evidence of casual carpooling occurring in the City of Los Angeles. However, as mentioned above, formal carpooling programs are widespread in Los Angeles. To cite one example, UCLA's carpool/vanpool program has approximately 4,500 participants suggesting demand for carpooling is strong in Los Angeles for certain travel demand markets.[4]

Benefits

Casual carpooling is often considered a win-win mode. Drivers get access to HOV and transit lanes that reduce the length and/or cost of their commute; passengers get a quick, convenient, and free (or low-cost) commute to work. The community benefits by a reduction in vehicles on the road with its array of benefits.

Costs

Capital Costs

Public-sector capital costs associated with existing casual carpooling programs are minimal. Capital costs could include construction of off-street pick-up and drop off areas (if no existing facilities were available) and signage. For facilitated programs, public- or private-sector capital costs could include setting up an internet or phone matching systems if no existing systems exist.

[3] Los Angeles Transportation Metropolitan Transportation Authority. "Los Angeles County HOV System.", http://www.metro.net/projects_studies/hov/hov_system.htm (accessed July 2009).
[4] Fortier, Renee. "UCLA Transportation: An Overview," University of California, Los Angeles, http://www.universityofcalifornia.edu/sustainability/documents/update_la.pdf (accessed July 2009).

Operating Costs

Public- or private-sector operating costs are minimal, but for self-organizing programs there may include maintenance costs for signage and curb markings in pick-up or drop-off areas. For facilitated programs, operating costs could include marketing and administrative expenses and maintenance and updates to the internet or phone matching system. In both types of programs, foregone parking revenue for dedicated pick-up and drop-off areas is an additional operating cost to consider.

Costs to Consumers

Consumer costs breakdown into two categories:

- *Driver costs*: The owner of the vehicle has already made an investment in their privately owned vehicle. Any increased costs to the driver as a result of picking up casual carpooling passengers (e.g. increased fuel costs, vehicle wear and tear from a longer route, etc) are marginal and almost certainly offset through other savings (e.g. splitting tolls and gas costs, value of time savings, etc).
- *Passenger costs*: Casual carpooling is generally free for the user, especially in self-organizing programs. Drivers usually do not ask for money because they benefit financially by avoiding bridge or highway tolls, while also saving time by using HOV lanes. Facilitated programs may charge users a small fee to defray organizers' or drivers' costs.

Best Practices

Casual carpooling is known to occur in three locations in the United States: San Francisco, California, the Washington, D.C. area, and Houston, Texas.

San Francisco

In San Francisco, about 6,000 people a day get carpool rides that were not pre-arranged.[5] Commuters in the Bay Area began to use casual carpooling in order to bypass the heavy congestion on the Bay Bridge during the peak hours. HOV lanes offer significant time savings over the general purpose lanes. Drivers in vehicles with three or more people can use the bridge toll-free. Most casual carpool users travel one-way – from the East Bay to San Francisco in the morning – and then take public transit home in the evening.

There are five conditions that led to casual carpooling's success in the San Francisco Bay Area:[6]

- Sufficient driver time savings to warrant picking up and dropping off passengers.
- Pick-up and drop-off locations are easily accessed by both drivers and passengers, with passengers typically lined up on the sidewalk and drivers queued at the curb.
- Downtown San Francisco is a common destination point due to the concentration of jobs and services,
- Limited number of ways to access downtown San Francisco.
- Good transit service exists for evening return trips, since casual carpooling is primarily a one-way phenomenon.

[5] Flexible Carpooling. "About Flexible Carpooling," http://www.flexiblecarpooling.org (accessed July 2009).
[6] Beraldo, S. "Casual Carpooling in the San Francisco Bay Area," *Transportation Quarterly* 44, no. 1 (1990):133-150.

Casual carpools form at numerous East Bay sites in Alameda, Contra Costa, and Solano Counties. The pick-up locations are all located near transit routes that provide parallel service and also have nearby parking available. The downtown San Francisco area offers a common drop-off point because of the high employment density in the area, which provides a large number of passengers with common destinations. For the most part, casual carpooling is a one-way phenomenon providing passengers a free ride to San Francisco in the morning, and passengers use BART and/or AC Transit for their return trip primarily because end of work time varies and pick up points are more difficult to navigate in downtown San Francisco.[7] A survey conducted in 1998 by RIDES for Bay Area Commuters, revealed that only nine percent of morning casual carpoolers used casual carpooling for the evening trip as well. The survey results also showed that most casual carpool participants in the San Francisco area used the mode four to five times per week and used it for more than one year. Most passengers chose casual carpooling to save money while most drivers chose casual carpooling in order to save time. Secondary reasons casual carpool passengers chose this mode of travel is because it saves time compared to taking transit or driving themselves. The majority of casual carpoolers lived less than five miles from the pick-up location and most either walked or drove alone to the pick-up location.[8]

Washington D.C.

In Northern Virginia, about 6,500 people use casual carpool everyday (also known as "slugging").[9] Slugging is an unofficial way to shares rides, rather like hitchhiking. For many people who don't wish to be involved in formal carpooling or vanpooling they use slugging for sharing rides.

Commuters have been utilizing casual carpooling in the Washington, D.C. area since the early 1970s. It is believed that slugging began with people waiting at bus stops on their way to the Pentagon, which is a major transportation hub. When the HOV lanes on Shirley Highway (I95) opened in 1971, the first slug lines emerged. The Shirley Highway HOV lane is a 28-mile long lane that runs from Virginia Route 234 to Arlington, Virginia, less than two miles from downtown Washington, D.C. Because the new high occupancy lanes were strictly enforced, drivers had to abide by the HOV-4 rule (later changed to HOV-3) or pay high fines. When drivers did not have enough passengers for the HOV, they would pull up to a line of commuters waiting for the bus and offer a ride to anybody in the line. Word spread as drivers found an easy solution to meeting the HOV requirements, and bus riders found a faster, cheaper alternative to the bus. However, the existence of a back-up mode was necessary in case a passenger failed to join a casual carpool. As this mode of travel grew in popularity, lines began to form that were specifically for casual carpooling.[10]

There are now approximately 20 casual carpool formation sites in Northern Virginia for the morning commute period.[11] Casual carpooling in the Washington, D.C./Northern Virginia area is entirely non-regulated. Casual carpool users have created resources to access information, including the website, http://www.slug-lines.com. The website offers information on carpool

[7] RIDES for Bay Area Commuters, Inc. 1999."*Casual Carpooling 1998"*. http://rideshare.511.org/research/pdfs/casualcarpool.99.pdf (accessed July 2009).
[8] Ibid
[9] Flexible Carpooling. "Background: Carpooling without Prearrangement," http://www.flexiblecarpooling.org (accessed July 2009).
[10] Slug-Lines.com, "Slugging and Slug Lines Information for Washington D.C.," Forel Publishing Company, http://www.slug-lines.com (accessed July 2009).
[11] Ibid.

formation locations, general rules of etiquette, the process of carpool formations, and a message board.

In a study of casual carpooling in the Washington D.C. area, survey results indicated that casual carpoolers accounted for approximately 10 percent of the person movement along the HOV lanes during the peak period and between 25 and 50 percent of carpool passengers. The results showed that unlike in San Francisco, many casual carpool passengers also formed casual carpools for the evening commute trip. However, they noted that transit was still frequently used for the return trip. Transit ridership was found to be significantly higher in the evening than in the morning peak periods.[12]

Houston, Texas

Casual carpooling is newer to the Houston Texas area than in San Francisco or Washington D.C. Every day, approximately 900 people use casual carpool in Houston.[13] Casual carpooling in Houston occurs at three locations: Kingsland Park and Ride lot, Addicks Park and Ride lot, and Northwest Station Park and Ride lot. Each park and ride facility is used primarily for transit and offers direct-connect ramps to an HOV lane. If casual carpool passengers are unable to join a carpool, they also have the option of using transit, which runs throughout the day from the park and ride facilities.

The vast majority of casual carpool formation occurs between 6:00 AM and 9:00 AM.[14] Casual carpooling in Houston occurs exclusively on the city's two HOT lanes. The vehicle occupancy requirement on I-10 and US 290 is HOV2+ for most of the day, but as part of the QuickRide program it is raised to HOV3+ from 6:45 AM to 8:00 AM and 5:00 PM to 6:00 PM on I-10 and from 6:45 AM to 8:00 AM on US 290.[15]

Expansion Potential in Los Angeles

There are many commonalities between the three existing US locations of casual carpool formation outlined in this report. The primary commonality is the existence of HOV facilities along heavily congested freeway corridors. The HOV lanes offer time savings incentives for drivers that make casual carpooling attractive. Additionally, the HOV facilities used by casual carpoolers also have vehicle occupancy requirements of 3 or more. The higher occupancy requirements may be desirable as it avoids the perceived risk of getting into a vehicle alone with a stranger.

Casual carpool travelers at the three locations also share a dependence upon transit in some form. In San Francisco, transit is the primary mode used for evening return trips and is a back-up mode for all trips in all three locations. Additionally, most casual carpool formation locations began at or near transit stops. Like other cities, casual carpoolers in Los Angeles may also need to rely on other modes of transportation for their return trip, since the evening commute is relatively dispersed across a longer period of time (e.g. 3 PM to 7 PM) compared to the morning

[12] Spielberg, F. and Shapiro, P. "Mating Habits of Slugs: Dynamic Carpool Formation in the I-95/I-395 Corridor of Northern Virginia," Transportation Research Board 1711 (2000): 31-38.
[13] Flexible Carpooling, "Background: Carpooling without Prearrangement," http://www.flexiblecarpooling.org (accessed July 2009).
[14] Ojah, M. and Burris, M. *Quantification of Casual Carpooling in Houston*, Texas Transportation Institute, College Station, Texas, February 2004.
[15] Winn, Justin R. "An Analysis of Casual Carpool Passenger Behavior in Houston, Texas." Master's thesis, Texas A&M University 2005, http://txspace.tamu.edu/bitstream/handle/1969.1/2319/etd-tamu-2005A-CVEN-Winn.pdf?sequence=1 (accessed July 2009).

commute trip which is usually more concentrated (e.g. 7:30 AM to 8:30 PM). This would mean that many commuters who took casual carpool in the morning would likely use transit or formal carpool for their return trips.

Finally, all three known casual carpool locations in the US also have a common drop-off point: downtown San Francisco, downtown Washington, D.C., and downtown Houston are all areas with high employment densities that provide a large number of passengers with common destinations that make casual carpooling successful. Because downtown Los Angeles has a relatively small share of the regional jobs (but still one of the highest concentrations of employees), employment concentrations exist in multiple locations in Los Angeles, and workers lived in dispersed locations throughout the region, casual carpooling may need to be piloted in Los Angeles at multiple locations (e.g. downtown, UCLA, Century City, Warner Center, etc.) with convenient pick up/drop off locations for waiting passengers. Signage can be used at waiting areas to help match drivers and passengers with similar destinations or travel corridors.

Figure 3-1 Signage at San Francisco's Casual Carpool Waiting Area

Signage at San Francisco's casual carpool waiting area for evening return trips is used to help match drivers and passengers with similar destinations or travel corridors.

Source: Nelson\Nygaard Consulting Associates. Used with permission.

Opportunities

If Los Angeles could structure commuters' incentives to modify only a small change in urban behavior, the City could see enormous gains in efficiency by increasing the throughput of freeways and major roads. HOV lanes are one of the common threads among the three casual carpooling locations described. The existence of HOV lanes provides the necessary travel time savings incentive to encourage casual carpool formation. Los Angeles has an extensive network of HOV lanes, which provide time saving benefits for carpoolers.

New/Pending Policies, Regulations, or Incentives

Converting existing high-occupancy vehicle lanes (HOV) to high-occupancy toll (HOT) lanes and building new toll lanes on freeways that don't have car-pool lanes are new policies which could

encourage carpooling.[16] The US Department of Transportation has awarded a $210 million grant to LA Metro for a one-year demonstration project of converting HOV lanes to HOT lanes. HOT lanes require single-occupant vehicles to pay a toll that varies based on demand; which is also known as congestion pricing. The tolls on HOT lanes change throughout the day according to real-time traffic conditions to manage the number of cars in the lanes and keep them free of congestion.[17] Drivers with three or more passengers are usually not tolled in HOT lanes. The cost savings and time savings benefits could encourage more people to switch from driving alone to carpooling in order to take advantage of the HOT lanes.

Currently LA Metro is investigating converting carpool lanes on 85 miles of freeway to HOT lanes, including the Harbor Freeway, the 210 Freeway from Pasadena to the 605, and on Interstate 10 between downtown and the 605. People who carpool would still be able to use HOT lanes for free. The demonstration project is expected to begin in 2011. HOT lanes exist in Orange County. SR 91 Express Lanes is a four-lane two-directional HOT facility located in the median of SR 91, and was the first HOT facility constructed in the U.S. Tolls on the express lanes are charged based on a fixed toll schedule which changes every hour. All tolls on the express lanes are collected electronically using FasTrak transponders. Drivers in vehicles with three or more occupants can use the lanes for free with the exception of Friday evening when they must pay 50 percent of the toll. The presence of casual carpooling could influence the amount of traffic using the HOT lanes. It is important to consider the impact of casual carpooling on HOT lane implementation.

Joint Partnerships

Casual carpools are generally self-organizing and are not managed by any agency or authority. They have worked well for over 20 years based on a few simple rules that have evolved organically among drivers and passengers. However, LA Metro can help promote casual carpooling by designating appropriate pick-up and drop-off locations for casual carpools. Meeting points for vanpools used in the Metro Vanpool Program (administered by LA Metro) can also be used as meeting points for casual carpooling. Casual carpooling can facilitate transportation to transit sites or central locations in Downtown Los Angeles, which helps to provide alternative transportation choices to commuters, improve air quality, and reduce traffic congestion in Los Angeles County.

Challenges

One of the challenges with casual carpooling is the “first mile” and “last mile”—the connections from home to the casual carpooling collection point and the connections from the drop-off point to work (with the directionality reversed on the way home). It is necessary to identify locations in Downtown Los Angeles where cars can pull over and drop-off passengers. Downtown Los Angeles would clearly be a key initial location for a designated drop-off site because of the density of employment and retail activity.

[16] One of the concerns with implementation of High Occupancy Toll (HOT) lanes is that allowing single-occupant vehicles (SOVs) into carpool lanes will create additional congestion in these lanes that will eliminate the time savings incentive for traditional and casual carpools. However, because SOVs are charged a toll to enter the HOT lanes (while carpools continue to use the HOT lanes for free) and because the tolls can be varied in real-time in order to maintain free-flow conditions at the desired travel speed (i.e. the tolls increase when congestion increases and tolls decrease when congestion decreases), allowing SOVs into HOT lanes need not eliminate the time savings of carpooling. Our understanding of Los Angeles MTA HOT lane pilot projects will utilize mathematical algorithms to monitor travel speeds in the HOT lanes and adjust SOV tolls in real-time in order to maintain free-flow conditions in the HOT lanes.
[17] Wikipedia: The Free Encyclopedia. “High-occupancy toll” webpage, http://en.wikipedia.org/wiki/High-occupancy_toll -cite_note-0 (accessed July 2009).

Park-and-ride lots may be used by casual carpool drivers as a location for picking up passengers in suburban areas because of the ample supply of parking and proximity to transit stations or stops. However, it is important for the pick-up and drop-off locations to have certain amenities so users feel safe and comfortable while waiting for a ride. Amenities such as benches, shade, and lighting can affect behavior and perceptions, and may directly or indirectly affect the success of casual carpooling.

Since Los Angeles' HOV system requires two passengers, people may feel unsafe getting into a car with just one other person, the driver. Casual carpooling in the three locations described in the Best Practices section each require three or more passengers.

Most importantly, in order for casual carpooling to succeed in Los Angeles there has to be substantial time and/or cost saving benefits. Both the driver and the user have to benefit for casual carpooling to be an attractive option for commuters in Los Angeles.

Market Acceptance

Casual carpooling has experienced high market acceptance in areas with: a) available HOV facilities along heavily congested freeway corridors, b) HOV facilities used by casual carpoolers with occupancy requirements of 3 or more, and c) formation locations beginning at or near transit stops and ending at a common drop-off point. Los Angeles has a reputation as being very car-centric, but there is a large network of HOV lanes. Casual carpooling can be used to help link commuters with transit sites in order to reach their final destination especially in the downtown area.

A key barrier will have to be overcome is the fear of the public realm. This can be addressed via marketing programs and social networking. ZimRide, as described in Chapter 6, is a model which provides some sense of pre-screening. Zimride is a social-networking site like Facebook to match drivers and passengers on university campuses or at companies. Programs such as this can help introduce casual carpooling to Los Angeles.

Feasibility Evaluation

Phase I: In order for casual carpooling to gain a presence in Los Angeles, a first step would be to expand instant ride-matching services in order to encourage people to carpool on an occasional basis. This can be accomplished in the short-term through increased marketing of existing ride-matching services and by forming partnerships with the private sector to implement new ride-matching technologies.

Even though in other cities, casual carpooling was initiated by commuters interested in alternative modes of travel, in Los Angeles this organic approach may not be feasible. SCAG or Commuter Choice Rideshare Agency will need to "jump start" casual carpooling through a marketing campaign in conjunction with the City of Los Angeles to identify sites for pick-up and drop-off locations.

Phase II: In the long-term, there is growth potential for casual carpooling following the development of High Occupancy Toll (HOT) lanes in Los Angeles and the dedication of drop-off locations and carpool waiting areas. Another incentive to encourage casual carpooling in the long-term is to increase the vehicle occupancy requirements from two to three for eligible use in the carpool lanes. Higher occupancy requirements may help avoid the perceived risk of getting into a vehicle alone with a stranger.

Benefits

While traditional carpooling is discussed as a separate strategy in this document (see Volume II, Appendix 1), the presence of HOV lanes can make it easier to encourage casual carpooling. Such facilities serve as a time savings incentive, and if HOT lanes are developed in Los Angeles, there will also be a financial incentive not to drive alone. The potential interaction of HOT lanes with casual carpooling depends on the type of HOT lanes implemented and if carpoolers receive a discount on the toll.

Primary Benefit: A major benefit of casual carpooling will be a reduction in VMT and transportation-related emissions during peak hours.

Secondary Benefits: While casual carpooling can help bridge the first mile/last mile gap, it often functions as an entire trip. Casual carpooling may provide a link to or from transit stations and help bridge first/last mile gaps. A casual carpool pick-up or drop-off location can be located near transit to provide an alternative means of transportation to the passenger's final destination.

A mode shift to casual carpooling will also help increase mobility by promoting more-efficient use of existing freeway infrastructure (as filling up empty seats in a car makes use of what would otherwise have been unused capacity in vehicles).

Finally, casual carpooling can increase the equity of the transportation infrastructure by providing an affordable mobility option for non-car owning households for trips that are not well served by other alternative modes.

Costs

Order of Magnitude Pilot Program/Service Costs

Capital Costs: Medium. Capital costs to promote casual carpooling might include new or enhanced software to increase the speed and accuracy of matches, or start-up costs to assist private sector organizations in establishing themselves in the market. Capital costs also include construction of or enhancement of off-street pick-up and drop-off areas (if no existing facilities were available) and signage for facilitated programs.

Operating Costs: Low. Operating costs generally include on-going marketing and potentially administrative expenses. Public- or private-sector operating costs may include maintenance costs for signage and curb markings in pick-up or drop-off areas. For facilitated programs, operating costs could include marketing and administrative expenses and maintenance and updates to the internet or phone matching system. In both types of programs, foregone parking revenue for dedicated pick-up and drop-off areas is an additional factor to consider.

Consumer Costs

Casual carpooling is generally free for the user, especially in self-organizing programs. Drivers usually do not ask for money because they benefit financially by avoiding bridge or highway tolls, while also saving time by using HOV lanes. Facilitated programs may charge users a small fee to defray organizers' or drivers' costs.

Implementation

Regulatory Changes Required

Metro's 2008 Long Range Transportation Plan highlights the expansion of carpool lanes for the 101 and the 10 (west of downtown Los Angeles) freeways, all of which have major implications for traffic conditions in Los Angeles. The completion of the HOV lane network in Los Angeles, coupled with the introduction of HOT lanes, will help provide the incentives needed for casual carpooling. Other supporting polices would be to modify the current prohibition on standing or stopping in LA (as is being done for the downtown Hail-a-Taxi pilot program) and dedication of curb parking for casual carpool pick-up and drop-off, both of which may require changes to Los Angeles' existing municipal code via adopted ordinance.

Figure 3-2 Example of Casual Carpool Signage

San Francisco converts the on-street parking lanes on a few key streets downtown into casual carpool pick-up and drop-off.

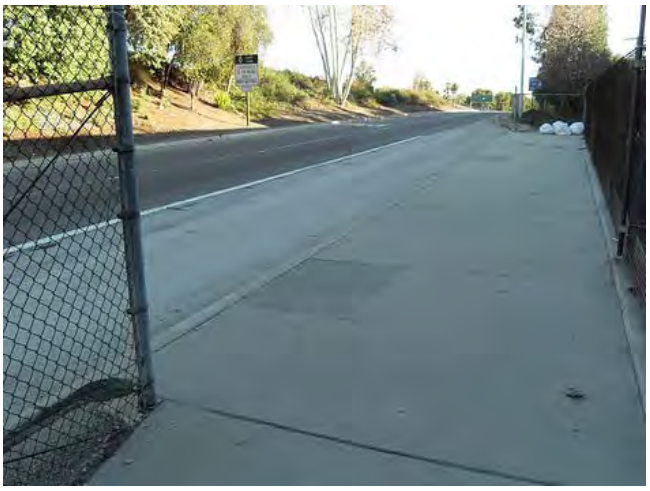
Source: Nelson\Nygaard. Used with permission.

Implementing Entity

Public Sector—The City of Los Angeles could assist in designating and dedicating appropriate locations for carpool waiting areas and drop-off locations. The consultant team is aware of one location in Los Angeles along the 170 freeway that has a carpool waiting area and pedestrian connectivity (see Figure 3-2). The photos were taken in North Hollywood at the southbound 170 entrance at Magnolia Blvd. The carpool waiting area is near the freeway entrance with a carpool lane. Unfortunately, this area is not widely used. Commuters heading downtown could theoretically catch a ride here, but there's no real incentive for solo drivers to pick people up. Adding carpool or toll lanes on the 170 and 101 into downtown LA would provide that incentive. The walkway leading up to the pick-up spot, in Figure 3-3 connects to a residential neighborhood and North Hollywood Park.

Self Organizing—In the examples described under Best Practices, casual carpooling is self-organized (sites have evolved through word of mouth and internet). Casual carpool formation sites are typically located close to an HOV lane entrance or near transit stops. Proximity to public transportation provides an alternative travel mode due to the uncertainty of casual carpooling. If a traveler is unable to join a casual carpool, he or she needs a reliable alternative to ensure that he or she arrives at their destination on time. Los Angeles has numerous park-and-ride lots that are near transit stops and stations, which could serve as casual carpool pick-up and drop-off locations.

Figure 3-3 170 Freeway Carpool Waiting Area



Carpool waiting area near 170 freeway entrance. Area allows passengers to be picked up in order to utilize the carpool lane. Image from Alta Planning taken by Matt Benjamin. Used with permission.

Figure 3-4 170 Freeway Pedestrian Connector

Pedestrian connector to the carpool waiting area near the 170 freeway entrance. Area allows passengers to park their car elsewhere and walk to the carpool waiting area. Image from Alta Planning taken by Matt Benjamin. Used with permission.

Private-sector—Casual carpooling can be initiated through on-line matching sites. People can arrange pick-up and drop-off locations ahead of time, or wait at a pre-determined location. Casual carpooling can be expanded upon through partnerships with the private sector. One private-sector organization, NuRide, currently provides such instant matching, with the goal of allowing people to carpool on an occasional basis. NuRide has established a network in several East Coast and Midwest cities but does not currently operate in Southern California. The company provides incentives to users, in the form of gift certificates from corporate sponsors. NuRide has also partnered with transportation agencies.

Zimride operates in California and has recently partnered with UCSF transportation to facilitate students and staff in ridesharing. Zimride works with social networking sites so people can see who they will be sharing a ride with. Zimride charges universities and companies a fee to use their software so that employees, faculty, or students can arrange a shared ride on an internal Web site integrated with Facebook. Zimride will find users who are hoping to make a similar trip and alert them to the available carpool. The process of instant ride-matching can help casual carpooling grow in Los Angeles.

Market Acceptance

Carpooling has been falling as a share of overall commute trips nationwide, and Southern California is no exception. According to SCAG's 2006 State of the Commute Report, the carpooling share for commuting was 12.2 percent as of 2005; this represents a decrease from a high of 15.6 percent in 1995.[18]

[18] Sorensen, Paul, Martin Wachs, Endy Y. Min, Aaron Kofner, Liisa Ecola, Mark Hanson, Allison Yoh, Thomas Light, James Griffin. Moving Los Angeles: Short-Term Policy Options for Improving Transportation (Rand Publication, 2008).

Compared to other large U.S. metropolitan areas, Los Angeles ranks fifth in daily vehicle miles traveled per capita, fifth in average household automobile ownership, and ninth in single-occupant vehicle (SOV) commute-share (the percent of employees who drive to work alone). Los Angeles' ranking in SOV mode share indicates that carpooling already exists and that there is expansion potential.

Figure 3-5 Automobile Statistics for Large U.S. Metropolitan Areas

Metropolitan Region	Daily VMT Per Capita		Autos per Household		SOV Mode Share	
	N	Rank	N	Rank	N	Rank
Dallas	23.2	1	1.74	4	78.8	2
Houston	22.6	2	1.68	7	77.0	3
Atlanta	22.6	3	1.80	2	77.0	3
Detroit	21.3	4	1.71	5	84.2	1
Los Angeles	21.2	5	1.71	5	72.4	9
San Francisco	19.6	6	1.76	3	68.1	13
Phoenix	19.1	7	1.67	8	74.6	6
Seattle	19.0	8	1.81	1	71.6	10
Boston	18.8	9	1.58	10	73.9	7
Washington D.C.	18.6	10	1.66	9	70.4	12
Miami	17.2	11	1.51	12	76.6	5
Philadelphia	15.8	12	1.51	12	73.3	8
Chicago	13.0	13	1.56	11	70.5	11
New York	12.0	14	1.26	14	56.3	14

Source: RAND Publication: Moving Los Angeles: Short-Term Policy Options for Improving Transportation (MG-748-JAT/Metro/MCLA). 2008

Target Markets

It is difficult to promote casual carpooling in a multi-centric region, such as Los Angeles, since no single area commands the majority of employment centers. However, there are many subcenters with high population or job densities—such areas are downtown Los Angeles, Century City, Westwood, Santa Monica, Long Beach, Glendale, and Pasadena. Casual carpooling is most likely to occur in corridors with HOV lanes and in high-employment areas that attract many commute trips during peak hours. In the Bay Area, many of the pick-up sites are in the neighborhoods where there is nearby bus or rail stop as a back-up.

The target markets for casual carpool could include the following:

- Demographic
  - Proportion of Youth 16-34: High
  - Proportion of High-Income Households: Medium
  - Proportion of Low-Income Households: Medium
  - Proportion of Low Auto Ownership Households: High

- Geographic
  - Residential Density: Medium
  - Employment Density: High
  - Transit Intensity: Medium
  - Proximity to Congested Auto Corridors: High

Technology Integration Opportunities

There is potential to integrate ride-matching technologies with social networking sites, such as Zimride's integration with Facebook (described in Chapter 5). Social-networking sites like Facebook can be used to match drivers and passengers on university campuses or at companies.[19] This model can work well in Los Angeles because it works as a hybrid between "formal carpooling" where you have to arrange everything well in advance and stick to a regular schedule and the "pure casual carpool" where you just show up to the curb roll the dice with the timing of your ride and the driver. The integration of carpooling with social networking sites can help reduce the amount of single occupant vehicles by allowing people to easily match rides.

Additional Resources

Beraldo, S." Casual Carpooling in the San Francisco Bay Area," *Transportation Quarterly* 44, no. 1 (1990):133-150.

Flexible Carpooling. "About Flexible Carpooling", http://www.flexiblecarpooling.org (accessed July 2009).

Fortier, Renee. "UCLA Transportation: An Overview", University of California, Los Angeles, http://www.universityofcalifornia.edu/sustainability/documents/update_la.pdf (accessed July 2009).

Los Angeles Transportation Metropolitan Transportation Authority. "Los Angeles County HOV System", http://www.metro.net/projects_studies/hov/hov_system.htm (accessed July 2009).

Ojah, M. and Burris. M. *Quantification of Casual Carpooling in Houston*, Texas

Transportation Institute, College Station, Texas, February 2004.

RIDES for Bay Area Commuters, Inc. 1999."*Casual Carpooling 1998,"* http://rideshare.511.org/research/pdfs/casualcarpool.99.pdf (accessed July 2009).

Slug-Lines.com, "Slugging and Slug Lines Information for Washington D.C.," Forel Publishing Company, http://www.slug-lines.com (accessed July 2009).

Spielberg, F. and Shapiro, P. "Mating Habits of Slugs: Dynamic Carpool Formation in the I-95/I-395 Corridor of Northern Virginia," Transportation Research Board 1711 (2000): 31-38.

[19] Similar online carpool matching services are offered by Goloco.org and Pickuppal.com.

Winn, Justin R. "An Analysis of Casual Carpool Passenger Behavior in Houston, Texas." Master's thesis, Texas A&M University 2005, http://txspace.tamu.edu/bitstream/handle/1969.1/2319/etd-tamu-2005A-CVEN-Winn.pdf?sequence=1 (accessed July 2009).

Chapter 4. Taxis

Overview

A taxicab is an automobile with a driver for hire which conveys passengers between locations of their choice. This "vehicle for hire" taxi service differs from rental car and car-sharing services in that the person making the trip: a) does not drive themselves, b) does not need to reserve in advance, and c) can access the service at many different locations. Taxis provide on-demand door-to-door travel and are best for short-distance trips. For these reasons, taxis are an excellent first / last mile connector to bridge the gap between a transit station and a person's origin or destination.

Existing Conditions

The Los Angeles taxicab industry is a franchise system regulated by the Los Angeles Department of Transportation (LADOT) Division of Taxi Services, which is responsible for administering the franchise system and provides detailed level of service monitoring of the taxi operators. The Board of Taxi Commissioners, appointed by the Mayor and City Council, provides LADOT with policy direction for the regulation, oversight, and enforcement of taxi services.

In addition to processing license applications and administering taxi driver training examinations, LADOT also ensures compliance with the City's rules and regulations. Among the highest priority enforcement tasks is the elimination of unlicensed "bandit" taxicabs which are sometimes operated by untrained and/or unlicensed drivers. Only taxis that display the official City seal have the legal authority to operate in Los Angeles.

LADOT regulates the internal operation of taxi franchisees that are associations or co-operatives, and the taxi regulations require each company to annually submit a management/business plan. The City of Los Angeles is one of the very few large cities in the U.S. that uses a franchise system for its taxicab service. In contrast, most large cities use other forms of entry control for the taxi industry—operating permits or certificates, taxi medallions, or a combination.

In Los Angeles, the current franchise awards have a 10-year term, at which point they can be extended—for some or all incumbent operators—or allowed to expire and new franchises offered via a competitive award process. The franchise approach provides the public authority with the flexibility to include specific conditions in the taxi operator's franchise agreement, such as the ability to increase or decrease its fleet of authorized vehicles in response to measured changes in customer demand. The franchise approach also assures that taxi service covers in all parts of the city geographically.

Description of Historical/Existing Services or Programs

There are nine franchise licenses and approximately 2,300 authorized cabs operating in Los Angeles.[20] Each of the nine franchises has a direct contract with the City. The franchises are cooperatives made up of "owner-drivers" and "leasehold drivers," with drivers essentially functioning as independent contractors with the cooperatives. The number of individual taxis is

[20] Blasi, William,Jacqueline Leavitt. "Driving Poor: Taxi Drivers and the Regulation of the Taxi Industry in Los Angeles," Institute for Research on Labor and Employment http://www.irle.ucla.edu/research/pdfs/drivingpoor.pdf (accessed July 1, 2009).

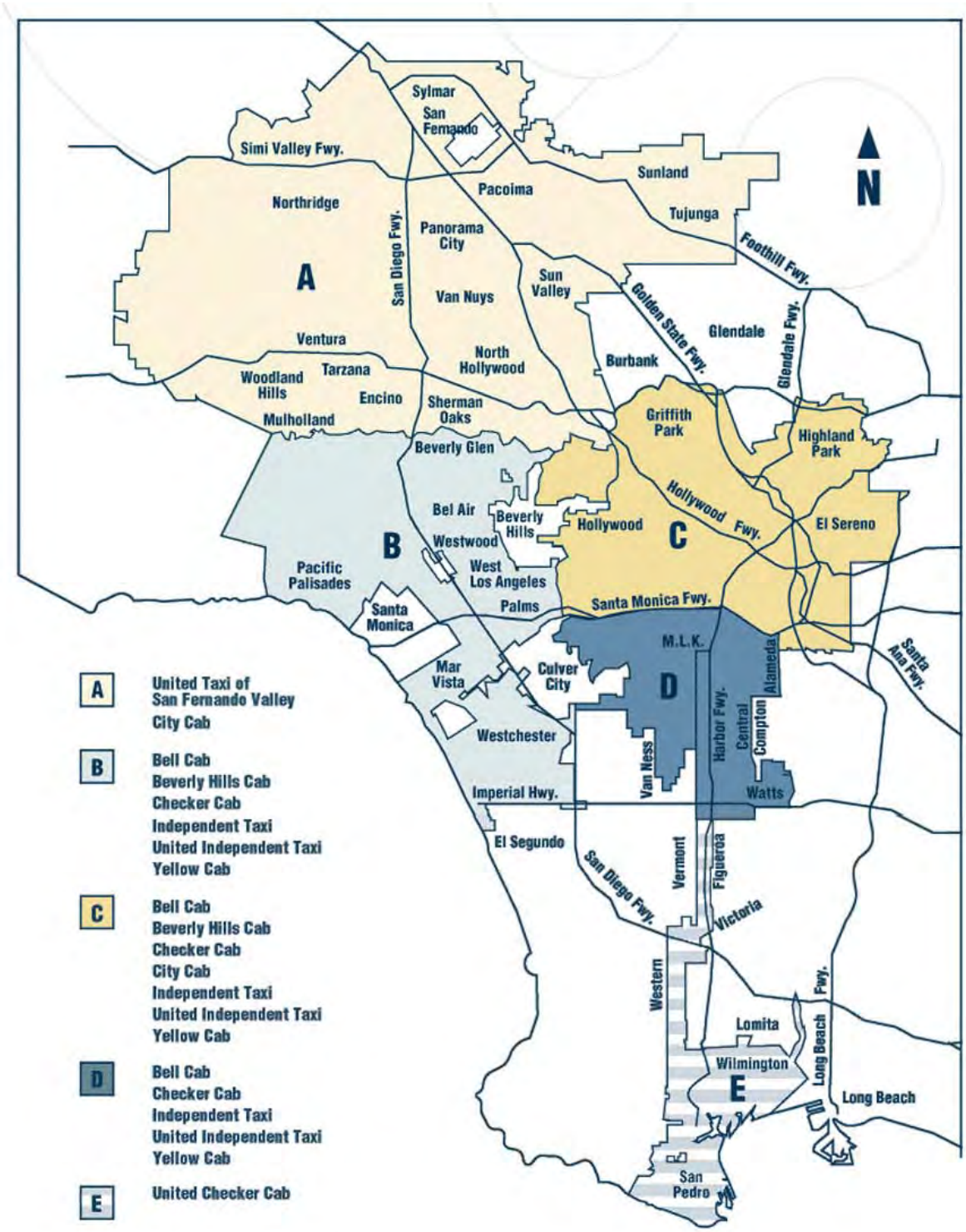
fixed in each franchise agreement so that each cooperative is authorized to operate a specific number of taxis.

The nine cab companies licensed and franchised by the City are:

- United Checker Cab Company
- Bell Cab
- United Independent Taxi
- Beverly Hills Cab Company
- United Taxi of San Fernando Valley
- Checker Cab
- Yellow Cab
- City Cab
- Independent Taxi

As shown in Figure 4-1, Los Angeles is divided into 5 service zones, with each franchisee having a “primary service area” comprised of one or more of these 5 service zones. There are five areas, known as zones A, B, C, D, and E. In addition to setting the number of taxis each franchise is allowed to operate, LADOT also regulates the areas of operation for each franchise. In this system, a taxicab associated with a specific franchisee can serve a trip originating in the franchisee’s primary pick-up area, but not serve a trip originating in other areas.

Figure 4-1 Taxicabs Service Zones



Source: City of Los Angeles' LADOT Division of Taxi Services' website. Accessed at www.taxicabsla.org in March 2009.

Demand / Ridership / Usage

The consultant team is not aware of ridership data for Los Angeles taxi service (e.g. number of taxi trips taken per year). However Figure 4-2 below compares Los Angeles with five peer cities with respect to population, population density, number of taxicab permits, and taxicab companies. Los Angeles has the least taxicabs per capita compared to five peer cities. It should be noted that simply comparing the number of cabs in each city can present a skewed picture of demand, since many cabs are permitted in multiple jurisdictions and do not always operate in a specific city.

Figure 4-2 Taxicabs Per Capita

City	Population[21]	Population per Square Mile	Taxicab Permits	Companies	Cabs per 1,000 Residents
Los Angeles	*3,694,820*	*7,426*	*2,303*	*9*	*0.6*
Beverly Hills	33,784	5,632	120	3	3.6
West Hollywood	35,716	19,228	530	7	14.8
Sacramento	407,018	3,836	371	8	0.9
Arlington, VA	199,776	7,722	666	6	3.3
Santa Monica	84,084	10,507	412	55	4.9

Source: Santa Monica Taxi Study: Technical Memorandum. Nelson\Nygaard Consulting Associates. 5/28/08. Used with permission.

Benefits

The benefits of taxi service include:

- Taxis approximate the convenience and door-to-door flexibility of driving oneself.
- Passenger can do other things while en-route since he or she is being driven.
- Where taxis are readily available and/or can be hailed, passengers do not need to reserve in advance.
- Allows for “front-door” pick-up and drop-off.
- Offers cash or credit card payment options.
- The City of Los Angeles has a well established taxi voucher system to provide subsidized rides to seniors.
- Allows those without vehicles to have access to a vehicle for certain types of trips without the cost of vehicle ownership, and can serve as a “second car” for one-car households.

Costs

Capital Costs

Capital costs are incurred by the taxi companies, and consist primarily of the vehicles themselves.

[21] Population based on 2000 Census data.

Operating Costs

Operating costs for taxis are incurred by the companies and/or drivers. In general, operating costs for taxi companies include vehicle maintenance, insurance, labor, and administrative costs. The operating costs for individual drivers are generally a daily fee for vehicle rental and gas.

As a privately-operated transportation service, operational costs for taxi companies are generally proprietary information. However, taxi companies providing service in the City of Los Angeles are required to include their operating costs in their business/management plans submitted to the City of Los Angeles Division of Taxi Services. Since this information is used to evaluate any requests for increases to the allowable fares, companies may inflate their operating costs in order to justify requested fare increases. For this reason, it is unclear whether such information would be a reliable data source for taxi operating costs specific to the Los Angeles context.

Costs to Consumers

The Los Angeles companies all charge the rates set by LADOT. The first 1/9th of a mile is $2.85 and $0.30 for each additional 1/9th of a mile, which is equivalent to $2.70 per mile. It is possible to have more than one rate structure programmed in a taximeter, but LADOT does not permit any taxi in Los Angeles to have a meter that contains any rates other than those set by LADOT.[22]

Best Practices

Operational

- Dedicated taxi phones at rail stations and major bus stops. Precedent: London Underground.
- Advance taxi dispatch service available from transit vehicles. Precedent: Several German cities.
- Integrated transit-taxi fare payment, potentially using “smart card” technology (e.g. LA Metro’s TAP card). Precedent: Hong Kong’s Oyster Card.
- Streetside taxi stand infrastructure (shelters, lighting, emergency call boxes). Precedent: Outdoor advertising companies often subsidize the capital and maintenance costs of transit shelters and associated infrastructure as part of their franchise agreement.
- Development of enhanced reservation system (online, text messages, etc.). Precedent: Online car-sharing reservation systems and “call-a-bike” text reservation systems.
- Development of a “taxi pool” system to allow passengers with similar origins/destinations to “share the fare.” Precedent: New York City shared taxi pilot programs (see sidebar below); online carpool matching systems.
- Taxi Sharing. Under a taxi sharing program, cab drivers can pick up multiple passengers at the same time, provided each passenger was headed in the same direction. Taxi sharing allows passengers to pay lower fares for door-to-door journeys than they would if travelling alone. A taxi sharing program is especially beneficial when passengers have a common destination, such as from a transit station to downtown. These arrangements not only benefit customers, but the trade and local communities too. Sharing taxis results in

[22] Nelson\Nygaard Consulting Services. “Santa Monica Taxi Study: Technical Memorandum (2008)”.

fewer taxi trips overall, which reduces traffic congestion and pollution. Precedent: New York City Taxi Sharing Pilot Programs (see sidebar below).

- Development of a "flat fare" pricing structure for targeted areas (such as downtown and near transit stations) to simplify customer experience. Precedent: Airport flat fare structures in numerous cities, including Los Angeles.

Taxi Pool / Taxi Share Pilot Programs in New York City

Beginning May 28, 2009, New York taxi passengers were able to share rides under a pilot program approved by the New York City commission that regulates the city's 13,000 yellow cabs. The 12-month program plans to outfit as many as 1,000 taxis with meters to allow for multiple fares and electronic signs showing their neighborhood destination.

A second proposal approved will permit group rides of two to four passengers during the morning rush hour from high- traffic locations such as Grand Central Terminal and Pennsylvania Station to destinations along a designated corridor, with a flat fare of $3 to $4 per person. A third project will set up stands for livery vehicles in areas where demand is high and other forms of transportation are limited.

The average number of passengers per ride in taxis is 1.4, although cabs can hold four riders, and the city is searching for ways to increase capacity without adding more vehicles, especially during rush hour. The commission is also seeking to increase revenue for drivers and reduce fares and waiting times for passengers.

Matthew Daus, the commission's chairman, stated that, "the goal of these proposals is to maximize the existing number of taxicabs, and make livery travel more convenient. For the taxi proposals, using the same number of vehicles to serve more people is good for the environment, and passengers will pay less while drivers will earn more." [23]

Fiscal

As a privately-operated transportation service, the capital and operating costs for taxis generally do not receive public subsidies (with the exception of any public-sector costs for administration/regulation, streetside taxi stand infrastructure, and building and maintaining the roadway network on which taxis operate). However, as presented in the Best Practices section, many public agencies have taken a more active role in supporting the taxi industry in order to achieve broader transportation goals and leverage the potential public benefits of taxi services.

Figure 4-3 Transit-Taxi Integration Signage

A sign on board a transit vehicle in Germany. The sign tells passengers that after 9 PM, they can call the driver when they board if they want a taxi at the stop where they'll be getting off.

Image from Nelson\Nygaard Consulting Associates. Used with permission.

[23] Chris, Dolmetsch, "New York to Allow Shared Taxis Under Pilot Program, "Bloomberg Press [New York] 29 May 2009, http://www.bloomberg.com/apps/news?pid=20601093&sid=amxbdcrsRPkQ&refer=home (accessed July 2009).

Expansion Potential in Los Angeles

Opportunities

New/Pending Policies, Regulations, or Incentives

Franchise System

Perhaps the most distinguishing characteristic of the City of Los Angeles' franchise approach is that it does not confer long-term protected monopoly (or oligopoly) status to the authorized taxicab operators; franchise awards have an expiration date. In Los Angeles, the current franchise awards have a 10-year term, at which point they can be extended or allowed to expire. If the franchise expires, new franchises are offered via a competitive award process. Hence there is neither a public policy nor legal presumption that the public award of operating authority to the taxi company is perpetual. Indeed, franchises also typically include level-of-service criteria which, if not satisfied, provide public authorities with the legal ability to terminate a franchise prior to its scheduled end date as well as provide the opportunity to add or replace a franchisee if service quality targets are not being met. The franchise approach also provides the public authority with the flexibility to include other conditions in the taxi operator's franchise agreement. This regulatory authority, combined with the pending re-franchising process, could be an important tool for utilizing enhanced taxi service to address first/last mile challenges.[24]

Hail-a-Taxi

For many years, taxis were forbidden from standing or stopping on Los Angeles streets due to concerns about traffic congestion and safety. This prohibition limits the usefulness of taxis for unscheduled first/last mile trips. The recent Hail-a-Taxi initiative allows passengers in the downtown to hail a taxi from the street without needing to call ahead or go to a designated taxi stand.

Emerging Political Will / Public Opinion

The recent expansion of LADOT/LAPD staff resources dedicated to taxi enforcement, the introduction of the Hail-a-Taxi program, and the pending evaluation of the current franchising system suggest that the City of Los Angeles is envisioning a larger role for taxi service within the overall transportation system than has been the case historically in Los Angeles.

Challenges

Regulatory

The current regulatory framework for franchising taxis in Los Angeles is complex, but based on our research, some of the potential regulatory challenges to expand taxi service as a first/last mile solution are described below:

- It is widely perceived that enforcement resources are stretched thin and that "bandit" cabs and inflated fares are an ongoing problem.
- With the exception of Hail-a-Taxi Initiative in downtown, taxis are currently forbidden from standing/stopping, which limits their usefulness for unscheduled first/last mile access.

[24] LADOT is currently evaluating consultant proposals for a study to analyze whether to continue the franchise system of taxicab regulation or adopt a different regulatory approach (to be applied when the current franchises expire at the end of 2010).

- The City of Los Angeles' current franchise system evaluates operators' performance primarily based on response times (e.g. number of calls responded to within a certain timeframe). Such a system requires each individual taxi operator to have their own dispatch system, which in turn requires a fairly substantial capital outlay. This requirement precludes a number of small and/or independent operators from entering the market. As discussed below, a centralized dispatch system for all taxis could potentially both improve customer response times (partially by making dispatching more efficient and partially by increasing supply of cabs by inducing more operators to enter the market; these improvements, coupled with marketing and attractive fares, would help "grow the market" of taxi customers.

Financial

Depending on the potential strategies pursued for expanding taxi service in Los Angeles, the financial challenges will vary. They include:

- Measures to enhance the integration of transit and taxi (as discussed in the Best Practices section) will require minor capital investments to pay for installation of telephones and other supporting capital equipment. It is unclear at this time the extent of those costs, or whether they would be borne by the private operators, public agencies, or both.
- Measures to simplify the customer experience for occasional taxi passengers (e.g. a downtown "flat fare," similar to airport flat fares) could be structured to be revenue neutral for operators.
- Measures to simply expand the overall availability of taxis by increasing the number of cabs on the street. This will require public incentives that are perceived by operators to offset the capital and operating costs of increasing the number of taxis in service. Such measures could also have a detrimental effect on driver incomes unless market demand increased in tangent with expanded availability.

Political

Taxi cab franchises are a valuable public asset that can generate significant revenues for operators. As with the allocation of any public resource that creates winners and losers, the awarding of taxi franchises is therefore a high-profile process.[25] For this reason, immediate implementation of all of the best practices discussed above may not be possible.

However, many of the examples from other communities to enhance the integration of transit and taxis (e.g. dedicated taxi phones at transit stations, advance dispatch of taxis while on-board transit vehicles, etc.) represent an opportunity to enhance both customer service and operator revenues through growing the market for taxis and thereby increasing demand. More systematic changes, such as changes to the metrics used to evaluate taxi companies' performance (e.g. prioritizing response times within the catchment areas of major rail transit stations) should be coordinated with the pending re-franchising process.

[25] Blasi, William, Jacqueline Leavitt. "Driving Poor: Taxi Drivers and the Regulation of the Taxi Industry in Los Angeles" Institute for Research on Labor and Employment," http://www.irle.ucla.edu/research/pdfs/drivingpoor.pdf (accessed July 2009).

Feasibility Evaluation

Making taxis more reliable and allowing for more innovative taxi use – such as expanding the Hail-a-Taxi initiative, allowing for shared taxis, and setting a flat fare for downtown – will encourage more people to use taxis. Increased taxi use in downtown Los Angeles would complement Downtown DASH service.

Phase I (separate from refranchising process):

- Dedicated taxi phones at rail stations and major bus stops (minimal capital outlay)
- Advance taxi dispatch service available from transit vehicles.
- Streetside taxi stand infrastructure (shelters, lighting, emergency call boxes).
- Development of enhanced reservation system (online, text messages, etc.).
- Expansion of downtown Hail-a-Taxi pilot program to other areas that have higher densities, mixed uses and are accessible to transit.

Phase II (as part of refranchising):

- Integrated transit-taxi fare payment, potentially using LA Metro TAP "smart card" technology.
- Development of a "taxi pool" system to allow passengers with similar origins/destinations to "share the fare."
- Development of a taxi sharing program for passengers that have a common destination, such as from a transit station to downtown.
- Restructure taxi fares to encourage shared use. This would mean pre-set distance based fares are established so passengers know the fare in advance.
- Plan for and implement a centralized dispatch system.

Benefits

Taxi service is a very important source of demand response transportation and makes a valuable contribution to public transport, enabling short trips to be made efficiently, often when time is at a premium. Usually, it is available 24 hours a day, seven days a week, providing a service to those who may have no other form of transportation.

Primary benefits

- Taxi service supports transit use by bridging first mile/last mile gap by enhancing access to and from transit stations.
- Can reduce VMT by replacing single occupancy vehicle trips with high occupancy vehicle trips.

Secondary benefits

- Reduction in overall reliance on automobiles.
- Improves availability of parking near key destinations.

- Increases ridesharing in shared taxis.
- Flat fare can encourage the use of taxis for short trips.
- Supports the use of alternative modes, including walking, cycling, ridesharing and transit use, by giving people who use those modes a better "fallback option" in emergencies. Especially effective as part of a Guaranteed Ride Home program, as experience with Guaranteed Ride Home programs indicates that improving the availability of fallback options can significantly increase use of alternative modes.
- Increase mobility for those who do not have access to a car, particularly the elderly and disabled, or those who chose not to use their car.

Costs

- Capital costs: Low. Taxi capital costs are largely accounted for by the private sector and are recaptured through fares. The taxi-supportive recommendations in this report are estimated to have incremental capital costs above and beyond existing public-sector expenditures. The public sector may partner with vendors to conduct pilot programs of some of the recommendations in this report, in which case start-up capital costs for a pilot program may be partially subsidized by the public sector. Full-scale implementation could be self-supporting if taxi operators or vendors were allowed to charge a nominal user fee to recoup their costs over a reasonable payback period.
- Operating costs: Low. Taxi operating costs are largely accounted for by the private sector and are recaptured through fares. The taxi-supportive recommendations in this report are estimated to have incremental operating costs above and beyond existing public-sector expenditures. There are several low-cost elements that a municipality can implement to dramatically improve the taxi customers experience, such as providing information about taxis near all transit stations.
- Consumer costs: Low. Figure 4-4 below compares taxicab fares in the central city of 23 major U.S. metro areas, selected based on metro area size and number of licensed taxicabs.[26] Consumer costs in Los Angeles are similar when compared to other large U.S. cities. Measures to simplify the customer experience for occasional taxi passengers (such as a downtown "flat fare") could increase the number of short distance trips taken. Shared taxis can also be used to reduce consumer costs.

[26] Schaller Consulting Archive. "Taxi Fares in Major US Cities," http://www.schallerconsult.com/taxi/fares1.htm (accessed July 2009).

Figure 4-4 Comparison of Taxi Fares by City

Area Costs[27]	City	Fares for typical trips[28]			Components of the fare					
		Average U.S. trip	Short trip	Long trip	Initial charge	Initial distance	Mileage charge	Mileage distance	Wait time per hour[29]	Last Change 2006
**	Honolulu	$18.35	$12.09	$37.95	$2.45	1/8	0.35	1/8	$28.00	5-May
**	San Diego	$16.17	$10.59	$33.67	$2.25	1/10	0.25	1/10	$20.00	
*	Miami	$16.10	$10.73	$32.90	$2.50	1/6	0.4	1/6	$24.00	5-Oct
**	San Francisco	$15.90	$10.85	$31.65	$2.85	1/5	0.45	1/5	$27.00	3-Sep
**	Boston	$15.45	$10.08	$32.25	$1.75	1/8	0.3	1/8	$24.00	2-Sep
**	Los Angeles	$15.00	$10.07	$30.40	$2.85	1/9	0.3	1/9	$29.19	5-Nov[30]
*	Seattle	$14.80	$10.29	$28.80	$2.50	1/10	0.2	1/10	$30.00	5-Apr
	Las Vegas	$14.75	$10.27	$28.75	$3.20	1/8	0.25	1/8	$22.00	5-Apr
	St. Louis	$14.30	$9.81	$28.30	$2.50	1/10	0.2	1/10	$24.00	3-Jul
*	Philadelphia	$14.17	$9.47	$28.87	$2.30	1/7	0.3	1/7	$20.00	5-Jul
	Atlanta	$14.00	$9.52	$28.00	$2.50	1/8	0.25	1/8	$21.00	5-Oct
	Orlando	$13.38	$8.89	$27.38	$2.00	1/4	0.25	1/8	$22.50	
	Minneapolis	$13.37	$9.11	$26.67	$2.50	1/5	0.38	1/5	$21.00	5-Sep
	Denver	$13.23	$8.74	$27.23	$1.60	1/8	0.25	1/8	$22.50	
**	New York	$13.10	$8.65	$27.10	$2.50	1/5	0.4	1/5	$12.00	4-May
	Phoenix	$12.87	$8.83	$27.10	$2.50	1/6	0.3	1/6	$20.00	
	Houston	$12.85	$8.81	$25.45	$2.50	1/6	0.3	1/6	$20.00	5-Aug
**	Chicago	$12.70	$8.66	$25.30	$2.25	1/9	0.2	1/9	$20.00	5-May
**	DC suburbs	$12.08	$8.35	$23.70						
	Dallas	$12.55	$8.52	$25.15	$2.25	1/9	0.2	1/9	$18.00	5-Nov
	New Orleans	$11.80	$8.21	$23.00	$2.50	1/8	0.2	1/8	$18.00	
	Detroit	$11.65	$8.07	$22.85	$2.50	1/8	0.2	1/8	$16.00	1-Aug
	Baltimore	$11.60	$7.99	$22.80	$1.80	1/8	0.2	1/8	$24.00	5-Jul
	Cleveland	$10.78	$7.21	$21.98	$1.80	1/6	0.4	1/4	$15.00	

Source: ACCRA Cost of Living Index (www.coli.org).

[27] "Area costs" reflect cost of living in the metro area. ** indicates costs at least 25% above U.S. average. * indicates living costs are 15-24% above U.S. average.
[28] Average U.S. trip = 5 miles and 5 minutes of wait time. Short trip = 2.8 miles and 4.77 minutes of wait time (New York City average trip). Long trip = 12 miles and 5 minutes of wait time.
[29] Wait time value is based on assumption of the passenger's "value of time" multiplied by average time spent waiting in each market.
[30] Los Angeles' fares are based on current 2009 rates. Rates for all other cities are based on 2006 survey.

Implementation

Regulatory Changes Required

Curbside parking restrictions and the likelihood of being issued parking tickets make many Los Angeles taxi drivers reluctant to stop for street-hails or even take short trips. On-street-parking policies must be changed to address the competing needs of transit, taxis, loading zones, and commercial interests and user groups.

Additionally, based on the current system, there is no incentive to fully utilize a taxi's passenger capacity for different individuals going to similar locations. As an example, the last mile trip for an individual exiting from a transit station may be made easier by taking a taxi to their end destination. If multiple individuals were able to share that taxi fare, there may be more incentive to use a taxi for that last mile service. This is both a fare issue, and a ride matching issue. Yet, under current practice, there is no fare that is setup to allow for this arrangement to occur. The ridematching component will be addressed in the *Technology Integration* section below.

Operational Strategies

- Implementing entity – Taxi Improvements can be implemented in cooperation between local governments, which regulate taxi service, and private companies, which provide taxi service. It sometimes involves transit agencies and other organizations that contract for transportation services.
  - Lead implementer –The City's Department of Transportation (LADOT) is responsible for administering the franchise system and providing detailed level of service monitoring of the taxi operators. LADOT also regulates the internal operation of taxi franchisees that are associations or co-operatives. New regulations can be implemented as LADOT considers whether to continue the franchise system of taxicab regulation or adopt a different regulatory approach when the current franchises expire at the end of 2010.
  - Supporting implementer – LA Metro can support the efforts of LADOT by facilitating the use of taxis from transit stops and stations. Such efforts can vary from providing additional signage and information about taxi use, to designating waiting and pull-out locations for taxi pick-up and drop-off. In the long-term, LA Metro can install public telephones or direct dial phones on trains and at train stations that connect to taxi services.

Joint partnership potential / private-sector role – Because taxi services are operated by private companies and subject to public agency oversight and regulation, almost all of the recommendations contained in this chapter would require public-private partnerships.

Market Acceptance and Target Markets

While it is not as commonplace in Los Angeles to take a taxi compared to other global cities, the consulting team believes that this is largely due to availability, user convenience, and consumer cost issues; we are not aware of any cultural barriers to greater market acceptance of taxis in Los Angeles.

Target markets:

- Demographic
  - Proportion of Youth 16-34 – High
  - Proportion of High-Income Households – Medium
  - Proportion of Low-Income Households – Medium
  - Proportion of Low Auto Ownership Households – High
- Geographic (High, Medium, Low, All, N/A)
  - Residential Density – High
  - Employment Density – High
  - Transit Intensity – High
  - Proximity to Congested Auto Corridors – Low

Technology Integration Opportunities

A number of operating technologies are relevant to taxi service in Los Angeles, including:

- Locational technologies. GPS-based tracking of taxis:
  - Allows customers to see densities/locations of available taxis and reserve via smart phone, etc.[31]
  - Coupled with "closest driver dispatching algorithms," allows dispatchers to more quickly direct cabs to where they are needed.[32]
  - Will allow a customer to estimate approximate wait time for the next taxi.
- Fare payment technologies. Opportunities include:
  - Integration with LA Metro's TAP card systems to allow customers to move seamlessly from taxi to transit with a single fare card.
  - Smart taximeters which allow for taxi sharing by tracking multiple fare amounts.
- Integration with regional 511 system. This system (currently under development) will provide a variety of traveler-information services to the general public and span the counties of Los Angeles, Orange, Riverside, San Bernardino, and Ventura.
- Ridesharing/ridematching services that could connect users from similar locations or neighborhoods for the purpose of sharing taxis for the first or last mile of their trip. This type service would need to be accompanied with changes in fare structure that incentivize taxi-ride sharing.

[31] For more information see Taxi Map UK website, accessed at http://blog.taximap.co.uk in July 2009.
[32] For more information, see GPS World website, accessed at www.gpsworld.com/gpsworld/Integration+Challenge/Call-Me-a-Cab/ArticleStandard/Article/detail/310961 in July 2009.

End-user technologies include:

- Dedicated taxi phones at rail stations and major bus stops that connect directly to a taxi dispatcher.
- Development of enhanced reservation system (online, via phone or text messages, etc.).

Given that LADOT has a wide range of technologies available to assist it in achieving regulatory and consumer protection objectives, a key focus of the ongoing refranchise study will be to assess the benefits of new technologies to regulators, consumers, taxicab owners and management, and taxi drivers. These benefits must then be compared to the cost of the technologies, since ultimately most of the costs are borne by consumers in the form of higher fares to generate the additional revenues needed for taxi operators to purchase any required new equipment.

Additional Resources

AACRA Cost of Living Index, www. coli.org (accessed July 2009).

Blasi, William and Jacqueline Leavitt. ”Driving Poor: Taxi Drivers and the Regulation of the Taxi Industry in Los Angeles” Institute for Research on Labor and Employment, www.irle.ucla.edu/research/pdfs/drivingpoor.pdf (accessed July 2009)

GPS World Website, www.gpsworld.com/gpsworld/Integration+Challenge/Call-Me-a-Cab/ArticleStandard/Article/detail/310961 (accessed July 2009).

Schaller Consulting Archive. “Taxi Fares in Major US Cities,” http://www.schallerconsult.com/taxi/fares1.htm (accessed July 2009).

Taximap Blog. “Taxi Map UK,” http://blog.taximap.co.uk, (accessed July 2009).

Chapter 5. Car-sharing

Overview

Car-sharing programs allow people to have on-demand access to a shared fleet of vehicles on an as-needed basis. Usage charges are assessed at an hourly and/or mileage rate, in addition to a refundable deposit and/or a low annual membership fee. Car-sharing is similar to conventional car rental programs with a few key differences:

- System users must be members of a car-sharing organization.
- Fee structures typically emphasize short-term rentals rather than daily or weekly rentals.
- Vehicle reservations and access is "self-service."
- Vehicle locations are widely distributed rather than concentrated.
- Vehicles must be picked up and dropped off at the same location.

To use a car-sharing vehicle, members typically make a reservation online, then use a wireless security keycard to unlock the door at the beginning of the reservation period, and then simply drive as usual. As the reservation ends, they return the car to its exclusive-use parking space, lock it with their keycard, and walk away. An onboard computer collects and wirelessly transmits trip data (length of trip, mileage, etc.).

Car-sharing programs reduce the need for businesses or households to own their own vehicles, and reduces personal transportation costs and vehicle miles traveled (VMT). Through car-sharing, individuals gain access to vehicles by joining an organization that maintains a fleet of cars and light trucks in a network of locations.

Car-sharing has sometimes been referred to as the "missing link" in the package of alternatives to the private automobile. For example, vehicles available near a person's workplace or school can enable them to commute to work via transit or other means, and use a car during the day only as needed. Car-sharing complements alternative transportation modes and can help address first mile/last mile gaps by facilitating transit access either on the home- or destination-end of a trip.

Existing Conditions

Description of historical/existing services or programs

Car-sharing in its current form began in Switzerland and Germany, where programs date back to the late 1980s. The concept was slower to arrive in North America. The first formal car-sharing program began in Quebec City in 1994, with the launch of Auto-Com. The first large-scale US program, Car-sharing Portland, opened for business in 1998, and the early years saw rapid, almost exponential growth in the number of members, vehicles, and organizations.[33]

Since car-sharing first appeared in North America in 1994, a total of 50 car-sharing operations have been deployed—33 are operational, and 17 are no longer in service. From the late-1990s to 2004, car-sharing grew at a near-exponential trajectory. Non-profit organizations experienced dramatic growth between 2005 and 2008; however, for-profit operators account for the majority of

[33] Bath, Matthew, Susan Shaheen "Shared-Use Vehicle Systems: A Framework for Classifying Car-sharing, Station Cars, and Combined Approaches," Transportation Research Board 1791(2002):105-112.

membership and fleets deployed. Since 2001, there have been a number of program mergers and launches that have occurred among North American operators. Traditional car rental companies such as Enterprise and Hertz have begun to implement hourly pricing options, similar to car-sharing services (see Chapter 6 for more information on Short-term car rental).

The October 2007 merger between FlexCar and Zipcar created the world's largest multi-national car-sharing operator. Prior to the merger, FlexCar operated in Culver City, Downtown, Hollywood, West Hollywood, Pasadena, Santa Monica, Venice, and Wilshire Center and members had access to a large number of vehicles.[34] However, when FlexCar merged with Zipcar, the number of cars available in Los Angeles was drastically reduced and Zipcar currently operates only near college campuses in Southern California.

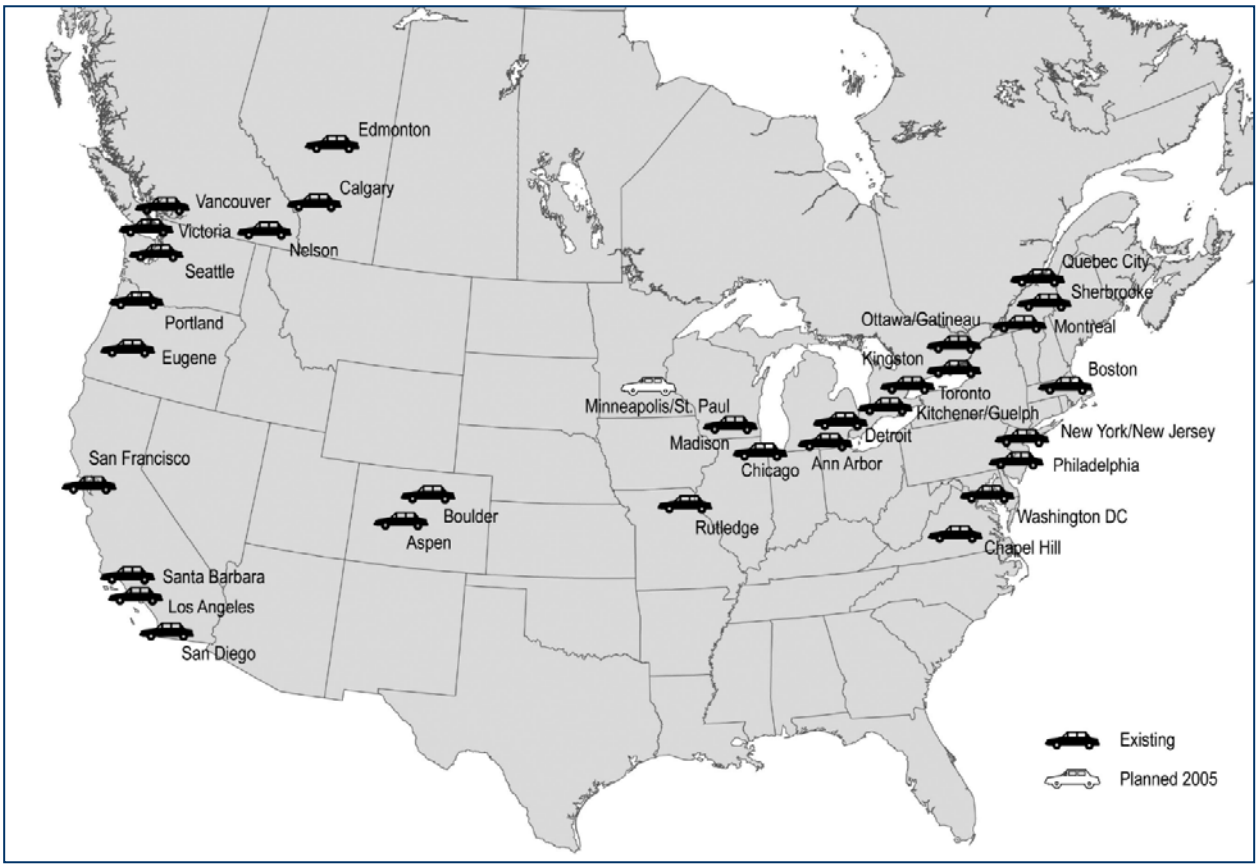
As of March 2009, Zipcar has partnered with the City of Los Angeles to provide access to vehicles by the hour or the day in highly populated areas near UCLA and USC. The Department of Transportation has identified 10 parking spots in each of the neighborhoods for the exclusive use of the car sharing vehicles. The City will allow Zipcar to use the on-street parking spaces free of charge for the one year pilot program to help demonstrate the potential of car sharing in Los Angeles. Spaces without parking meters were selected to avoid any loss of revenue to the City. The City selected neighborhoods near UCLA and USC to build on the successful partnerships that those universities have already developed with Zipcar. Upon the successful completion of the pilot program, City officials have stated that they will consider expanding car sharing to other suitable areas including Venice, Hollywood, Downtown and other neighborhoods.

Demand / ridership / usage

As of 2007, a total of 18 nonprofit and for-profit operators have launched programs in 30 states, serving more than 20 major metropolitan markets and dozens of college campuses (see Figure 5-1). As of January 2008, more than 235,000 members were sharing approximately 5,250 vehicles in the United States.[35] For-profit car-sharing organizations, such as Zipcar, account for 22 percent of car-sharing programs in the United States, but they account for 77 percent of the industry's membership and almost 84 percent of the vehicles deployed. Nonprofit organizations in large cities such as San Francisco, Chicago, and Philadelphia account for almost 23 percent of the industry's membership and 16 percent of the industry's total fleet size. In recent years, both for-profit and nonprofit start-ups have established more modest networks in mid-sized and smaller markets including Madison, Cleveland, Minneapolis, and Austin.[36]

[34] Metro Rider LA. " Zero, Zip, Zilch: Number of Zipcars in Los Angeles," http://metroriderla.com/2008/01/24/zero-zilch-zip-number-of-zipcars-in-los-angeles (accessed March 2009).
[35] Cohen, Adam P., Susan A. "Worldwide Carsharing Growth: An International Comparison" (March 12, 2006), institute of Transportation Studies, Paper UCD-ITS-RR-09-10.
[36] Cohen, Adam P., Susan A. Shaheen, Ryan McKenzie. "Carsharing: A Guide for Local Planners" (2008), Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RP-08-16.

Figure 5-1 North American Car-sharing Regions



Source: Adam Millard-Ball et al. 2005. TCRP Report 108 – Car-Sharing: Where and How it Succeeds. Transit Cooperative Research Program, Transportation Research Board. Washington, DC.[37] *Used with permission.*

North America's car-sharing evolution can be classified into three main phases:

- Initial market entry and experimentation (1994 to mid-2002);
- Growth and market diversification (mid- 2002 to late-2007); and
- Commercial mainstreaming (late-2007 to present).[38]

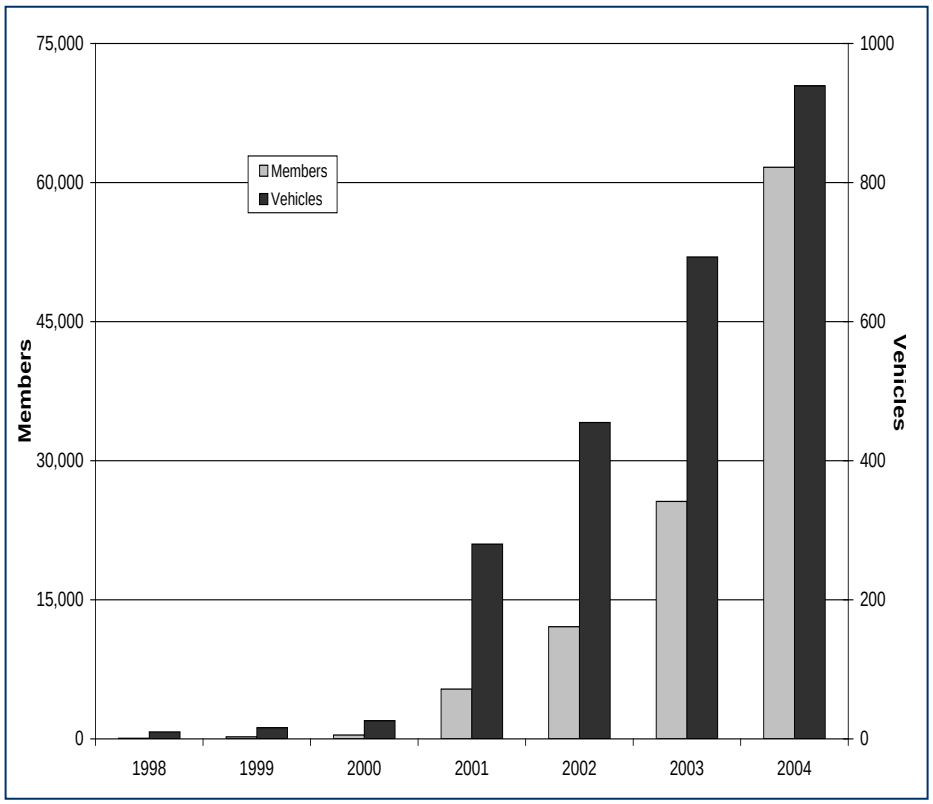
Figure 5-2 illustrates the growth and market diversification phase, which began in 2002. This phase reflects the growing membership rate, capital investment, technological advance, and general expansion of services.

Current usage data for Zipcar car-sharing services in Los Angeles is unknown. In addition, travel behavior for Los Angeles Zipcar members (e.g. is Zipcar being used for first/last mile transit access) is also unknown. Despite consistent growth in demand for car-sharing across the U.S., the Los Angeles market is presumed to have lower-than-average demand due to the recent retrenchment of Zipcar to a university-based service. It is presumed that demand could be

[37] Figure 1 shows car-sharing regions as of 2005.
[38] Chung, Melissa, Adam P. Cohen, Susan Shaheen. "North American Carsharing: A Ten-Year Retrospective," (2008), Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RR-08-38.

increased through public-private partnerships to provide financial subsidy or in-kind support to car-sharing organizations (for more information, see "Expansion Potential in Los Angeles").

Figure 5-2 US Car-sharing Growth



Source: Shaheen, Schwartz & Wipyewski (2004); Susan Shaheen, unpublished data. Note that 2004 data are for December, while 1998-2003 figures reflect June data points, meaning the chart overstates the rate of increase from 2003 to 2004. Used with permission.

Benefits

Car-sharing offers a range of individual and community benefits. Car-sharing can help fill in the occasional service gaps left by other transportation modes such as walking, cycling, and transit. Use of car-sharing encourages more careful consideration of the necessity, duration, and distance of automobile trips, which results in decreased vehicle use and ownership. According to the Transportation Research Board, each car-sharing vehicle takes nearly 15 private cars off the road.

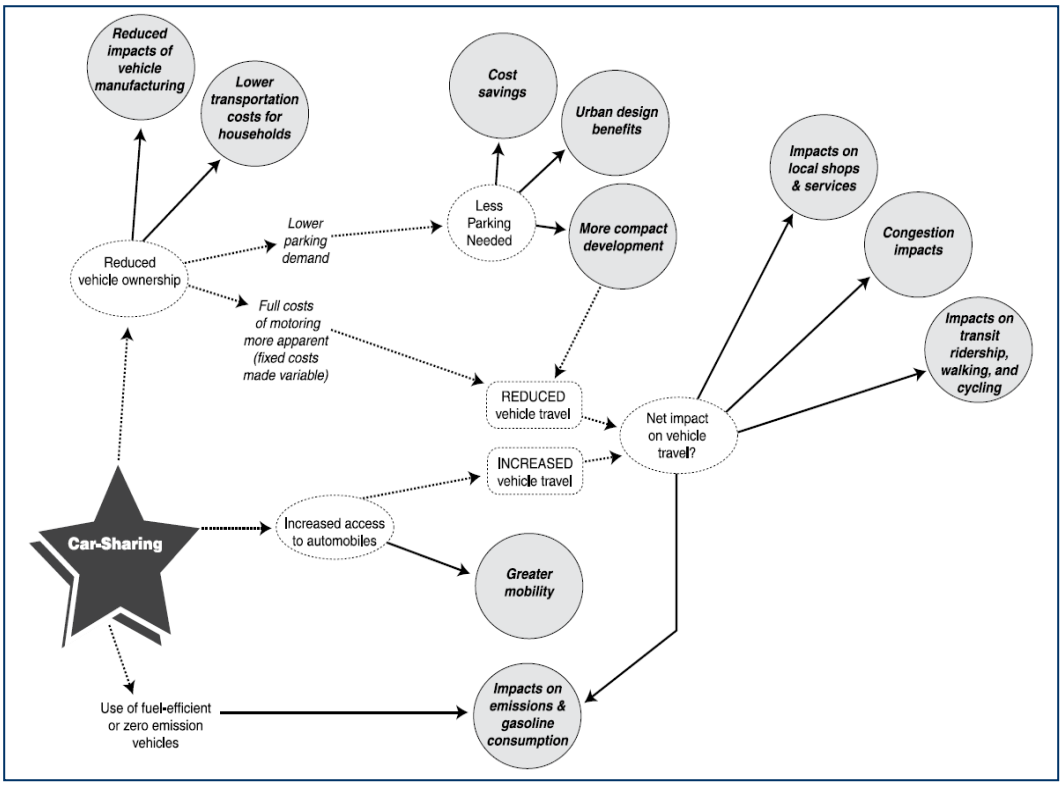
On an individual basis, car-sharing can offer economic savings. The average car costs more than $500 per month to own and operate, which contributes to U.S. households spending nearly 20 percent of their income on transportation — second only to the cost of housing.[39] The increased costs of auto ownership and uncertainty about future gasoline prices encourage people to look for ways to reduce individual transportation costs. Rather than paying for the fixed operating costs associated with a vehicle, including insurance, license, registration, taxes, depreciation, finance charges, and other expenses, car-sharing members pay only for the time and distance they drive.

[39] American Automobile Association (AAA), 2007, http://www.aaa.com (accessed July 2009).

The fixed operating costs are shared among a larger group of users. Use of a car-sharing vehicle, including insurance, and gasoline, is typically offered for less than $11 an hour.

Shared cars also generate social, environmental, and economic development benefits. Car-sharing creates an affordable alternative to ownership for lower-income workers, students, and seniors. With on-demand access to safe and reliable vehicles that include full insurance coverage, those otherwise at risk of being marginalized can affordably maintain their mobility and participate fully in society. According to PhillyCar-share, the combination of driving hybrids, driving less, owning fewer cars, and making fewer cold starts can yield an impressive 95 percent reduction in auto emissions per participant.[40] From an economic development perspective, shared vehicles are an attractive amenity for both residential and commercial customers. By adding an additional transportation alternative, car-sharing can provide urban properties with increased accessibility, making them more attractive sites for tenants who might otherwise look for a suburban location.[41] Car-sharing also helps to reduce parking demand at participating transit stations, employer sites, and residential locations. Figure 5-3 summarizes the potential benefits from car-sharing.

Figure 5-3 Potential Benefits from Car-sharing



Source: Millard-Ball, Adam, et al. 2005. TCRP Report 108 – Car-Sharing: Where and How it Succeeds. Transit Cooperative Research Program, Transportation Research Board. Washington, DC. Used with permission.

[40] PhillyCar-share (PCS), http://www.phillycar-share.org (accessed March 2009).
[41] Cohen, Adam P., Susan A. Shaheen, Ryan McKenzie. "Carsharing: A Guide for Local Planners," (2008), Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RP-08-16.

Costs

Capital Costs

Because the capital cost data for the Zipcar car-sharing service in Los Angeles is proprietary, it is unknown to the consultant team. Costs among operators in other markets vary widely depending on the extent of the service (number of cars and locations), amount of in-kind support received, and other factors. Typical capital costs include purchasing the vehicles themselves and developing the information technology systems to support reservations and billing. Order of magnitude cost estimates for a phased expansion of car-sharing in Los Angeles are provided in the "Feasibility Evaluation" section below.

Operating Costs

As with capital costs, operating cost data for the Zipcar car-sharing service in Los Angeles is proprietary and therefore unknown to the consultant team. Typical operating costs include labor, parking space rental for the car-sharing fleet, insurance, gas, and promotion/marketing. The two most important factors affecting operating costs are a) whether the operator is for-profit or non-profit (in which case they are better positioned to utilize volunteer labor to keep their operating costs low) and b) the monthly cost of securing parking spaces for the car-sharing fleet (in areas with high parking costs, parking space rental can be the largest single cost for small cars-sharing organizations). Order of magnitude cost estimates for a phased expansion of car-sharing in Los Angeles are provided in the "Feasibility Evaluation" section below.

Costs to Consumers

Charges for vehicle usage are usually calculated hourly and are either automatically billed to the member's credit card or deducted from their bank account. Prices typically range from $4 to $11 per hour. Lower hourly rates are frequently accompanied with per mile charges ranging from 9 cents to 40 cents a mile and higher rates are typically bundled with an allotment of "free miles."

In Los Angeles, Zipcar currently charges an application fee of $25, an annual fee of $50. Usage rates start at $9/hour or $66/day (any 24-hour period). Gas, insurance, and 180 free miles are included (thereafter, additional mileage charges start at $0.45/mile).[42] While car-sharing has been cited as a way for household and business to lower their transportation costs, it is difficult to generalize given different expenditure and travel patterns. The out-of-pocket costs of vehicle ownership differ, especially if residents have to pay for parking. However, car-sharing members are much more likely to weigh alternative travel time and modes than other travelers. Overall, persons involved in car-sharing often realize savings in overall transportation expenses due to lower monthly capital costs, lower insurance expenses, lower gasoline and maintenance expenses, and lower parking expenses. Many car-sharing members report that not having "the hassles of car ownership" is an even greater benefit to them than saving money.

Best Practices

Car-sharing is overwhelmingly concentrated in metropolitan cores – around 95% of members are found in these areas. Moderate to high land use densities, a good pedestrian environment, a mix of uses, and parking pressures all help car-sharing to succeed. Most important appears to be the ability to live without a car (or with just one vehicle): lower-than-average vehicle ownership rates

[42] Zipcar, Wheels when you want them, "Occasional driving plan", http://www.zipcar.com/ucla/learn-more?plan_key=odp, (accessed March 2009).

are the best predictor of a strong market for car-sharing. University campuses can also provide an important market niche.[43] Other "success factors" for successful car-sharing pilot programs appear to be community support, a strong champion, and involvement by members (e.g. word of mouth marketing).

According to surveys and focus groups of car-sharing members, car-sharing appears to have the potential to serve a significant market share.[44] The following chart summarizes the key demographic groups that are most likely to join a car-sharing program. Typical trips of car-sharing members include: recreation/social trips, grocery shopping (and other shopping), personal business, work-related, and to and from work.

Characteristics	Typical Car-sharing Member
Age	Mid 30s to mid 40s
Income	Upper middle class (but real variations here)
Education	Upper levels (college degree(s))
Household size	Smaller than average (1-2 persons)
Auto Ownership	Households own one vehicle
Gender	Slightly more males

Chicago, Illinois

I-GO Car Sharing was founded in March of 2002 by the Center for Neighborhood Technology (CNT) – a non-profit organization dedicated to building more livable, sustainable urban communities. Inspired by the success of car sharing in Europe, CNT introduced car-sharing to Chicago to reduce greenhouse gas emissions and air pollution from the transportation sector, urban traffic congestion, and household transportation costs.

The City of Chicago Department of Transportation agreed to apply as the sponsoring government agency for federal Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds after the CNT had been turned down by others. The City of Chicago provided I-GO's initial financing, allowing the organization to begin operations with four cars in two Chicago neighborhoods. With the CMAQ grant, the City was awarded $250,000 to start I-GO by providing CNT with the operating costs for 11 vehicles. In 2005, Chicago was awarded a second CMAQ grant of $419,000 to expand the program with more vehicles, totaling $1 million in federal grant funds for I-GO. The City continues to be involved in monitoring and reporting on the grant to the Federal Transit Administration. Since that time, the organization has grown to serve more than 8,000 members with cars in 32 Chicago neighborhoods, as well as the adjacent suburbs of Oak Park and Evanston.

Every car in I-GO's fleet meets or exceeds the California Air Resources Board LEV II Low Emission Vehicle standards, and nearly one-third of the fleet is hybrid gasoline-electric vehicles. I-GO works closely with city planners, other government entities, and the private sector to maximize the public benefits of car sharing. The city's Department of Planning coordinates with city planners and private developers to incorporate car sharing into planned developments. In

[43] Millard-Ball, Adam. "Car-Sharing: Where and How it Succeeds," (2005) Transit Cooperative Research Program (108).
[44] Ibid

addition, developers throughout the city are incorporating I-GO as a component of achieving LEED certification for their buildings. Car sharing providers rely primarily on surface lots and garages to secure parking for car sharing vehicles. I-GO has taken an approach which integrates car-sharing into the regional transportation network, and emphasizes close collaboration with planners, government agencies, elected officials and the private sector.

Philadelphia, Pennsylvania

PhillyCar-share (PCS) is a nonprofit sharing organization founded in 2002. The organization has introduced innovations such as:

- Free memberships (no application fee or annual membership fee).
- A fleet that is more than 50 percent hybrid vehicles.
- Offering memberships to 18-year-olds.
- Cars on every block.
- Free trips on rail transit to users of PCS vehicles parked at over 40 stations.
- Child car seats in every vehicle.
- Rates from just $3.90 per hour.
- A debit billing system that enables even low-income households to join.

PCS has seen tremendous growth. In 2002 PCS was run by volunteers with nine members and two cars, and since has grown into the largest regional car-sharing organization in the world. PCS's 35,000 local members report owning 13,000 fewer cars and driving 42 percent fewer miles, and those who formerly owned vehicles report choosing to walk more (40 percent), ride public transit more (34 percent), bike more (18 percent) and take taxis more (13 percent). Members have logged 4 million miles in hybrids that pollute 90 percent less than conventional models. 75 percent of members have reported choosing where they live based on the locations of PCS pods, highlighting the impact that PCS has on neighborhood livability and quality of life.[45]

The Philadelphia Parking Authority (PPA) provides space for PCS in about half a dozen different facilities, mainly in residential areas. PPA provides all parking spaces for free, since car-sharing helps to achieve its larger goal of maximizing parking availability. A process has been set up to locate new parking spaces as PCS expands:

- PCS meets with neighborhood community groups, to assess the level of interest in having a car-sharing vehicle in the neighborhood and where it should be located.
- The community groups provide feedback.
- If appropriate, PCS requests parking from the PPA, which evaluates the requests. So far, none have been denied.

Philadelphia is the first large city in the world to partner with a car-sharing organization to replace its vehicle fleet in order to save city resources and support car-sharing (for more information, the "Opportunities for Expansion" section).

[45] Cohen, Adam P., Susan A. Shaheen, Ryan McKenzie. "Carsharing: A Guide for Local Planners," (2008), Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RP-08-16.

Arlington, Virginia

The City of Alexandria helps to subsidize car-sharing membership and offers a promotion to residents and businesses. The incentive reimburses up to $105 of membership and application fees for residents. For business, it funds up to $50 for membership fees plus half of each employee's application fee of up to $20. Low-income households, who are disproportionately transit dependent, have also become a significant target group. Reduced car-sharing membership costs can make it financially possible for them to join, in turn improving mobility by providing access to a vehicle. For higher-income "choice" commuters, a temporary financial subsidy can provide an incentive to try a new "transit + car-sharing" commute option that they might not otherwise consider.

Arlington County also offers generous reductions in parking requirements as part of the overall site plan approval process and for the entire Transportation Demand Management (TDM) package, rather than for car-sharing specifically. The County prefers encouraging car-sharing with memberships and use credits for tenants instead of dedicating a certain number of car-sharing vehicles in the site plan agreement. By doing so, car-sharing parking does not necessarily have to be located in the new development, but can be on-street or in other complexes instead.

Analysis of car-sharing activity in Arlington, Virginia (a suburb of Washington DC) found the following:

- Car-sharing membership in Arlington has been growing rapidly and totaled nearly 3,500 individuals in 2006.
- Five percent of Arlington residents living in the Metrorail (transit-oriented development) corridors are Zipcar members.
- Car-sharing has allowed members to reduce their vehicle ownership rates and overall vehicle-miles traveled while increasing transit use and walking. Members also have generally been able to postpone buying a vehicle.

Expansion Potential in Los Angeles

Opportunities

The most exhaustive analysis of successful car-sharing operations identified five key factors that are critical to support the development of car-sharing.[46] Since many areas in the City of Los Angeles have the density and mixed uses to support car-sharing efforts, the consultant team believes that that there are many opportunities for expansion.

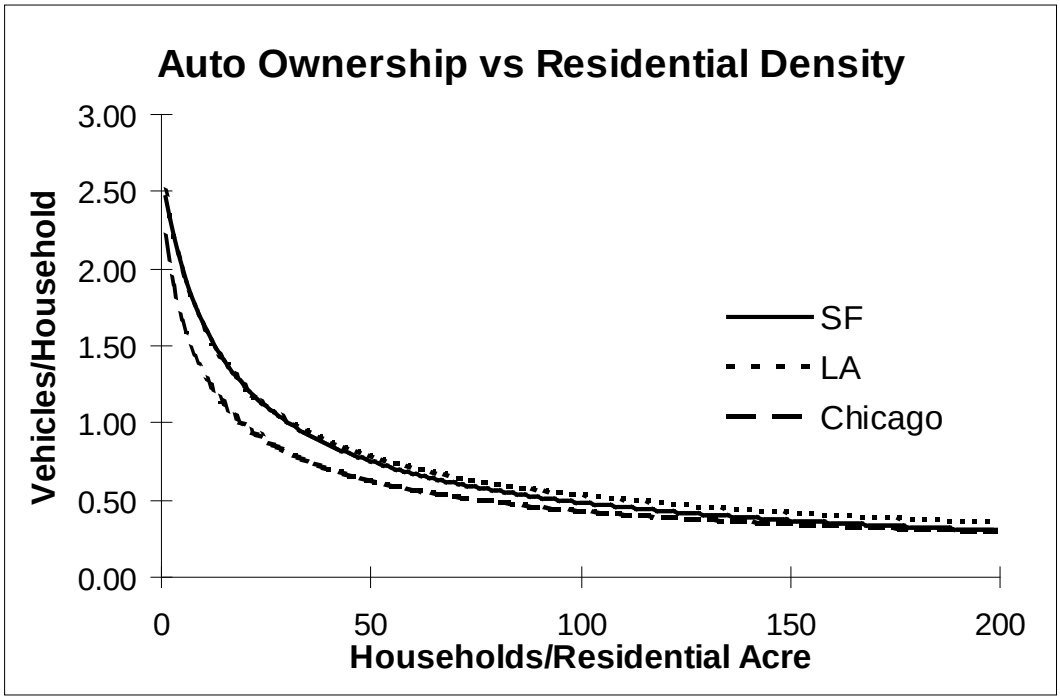
1. Identifying a champion for car-sharing, such as an elected official or high placed city agency staff member who recognizes the benefits of car-sharing and works to promote it.
2. Adopting supportive policies and regulations, such as inclusion of car-sharing in environmental, transportation, and corporate sustainability plans.
3. Providing funds to help car-sharing programs become established.

[46] Millard-Ball, Adam. "Car-Sharing: Where and How it Succeeds,"(2005) Transit Cooperative Research Program (108).

4. Implementing supportive actions such as providing marketing, parking, and integration with transit.
5. Selecting the right neighborhoods that have the density, mixed uses, walkability, and transit service to help car-sharing thrive.

Factors 1 through 4 listed above are related to political considerations, financial resources, and policy choices. The fifth factor is related to the question of whether there are areas in Los Angeles where car-sharing can succeed. Density has two major impacts on the viability of car-sharing. First, it means that there is a large customer base within walking distance of each car-sharing vehicle; for example, doubling the density will double the number of potential customers for a given vehicle. Second, it means that these potential customers will have a higher propensity to join, since dense neighborhoods have lower rates of vehicle ownership and travel (see Figure 5-4).

Figure 5-4 Density's Impact on Auto Ownership



Source: Holtzclaw et al. (2002). A similar curve is found when plotting density against vehicle travel (vehicle miles traveled per capita). Used with permission.[47]

New/pending policies, regulations, or incentives

Finding and financing parking spaces are often the largest barriers to car-sharing expansion. One of the biggest opportunities for Los Angeles to support car-sharing is to allow developers to reduce overall parking requirements if they provide parking spaces for car-sharing vehicles and subsidized memberships for building residents and employees. Currently, Los Angeles allows the use of on-street parking spaces for car-sharing vehicles. Ordinance 180,602 [CF 08-1798],

[47] Holtzclaw, John; Clear, Robert; Dittmar, Hank; Goldstein, David; and Haas, Peter. "Location Efficiency: Neighborhood and Socio-Economic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles and San Francisco*," Transportation Planning and Technology*25 no.1 (2001): 1-27.

effective 04/24/09, enables curb parking to be reserved for car-sharing vehicles through a permit process. The permit process is necessary to ensure enforcement against parking violations.

Variations of this strategy include allowing car-sharing spaces in lieu of general use parking and allowing greater floor-area ratios. By introducing car-sharing, some developers have been able to reduce the number of parking spaces required by parking ordinances. Additionally, if the car-sharing operator is a non-profit organization, the value of the parking space can be tax deductible.

Parking reduction policies are most effectively codified in zoning or building codes, making them easy for developers to use. While they can be managed on a case-by-case basis through the variance process, the bargaining adds difficulty and reduces the likelihood of action. Some examples of where parking policies support car-sharing include:

- Seattle's Municipal Code allows for a reduction of one to three parking space for each parking space leased by a car-sharing program, depending on the size of the development (City of Seattle 2008)
- Parking by-laws in Vancouver, British Columbia, offer to substitute car-sharing vehicles and parking spaces at a 1:3 ratio - one car-sharing vehicle for each 60 dwelling units (City of Vancouver 2005). A Canadian survey respondent noted that the cost savings to developers from reduced parking far outweighs the cost of car-sharing.
- Parking reduction policy in Austin, Texas, allows for minimum off-street parking reductions of 20 spaces for every car-sharing vehicle provided. For multi-family residential uses in the University Neighborhood Overlay District Section, off-street parking requirements are reduced to 40 percent of regular standards with participation in a car-sharing program (City of Austin 2008).[48]

Unbundled parking is another policy incentive that can help car-sharing succeed while promoting transit-focused developments with more affordable housing. Unbundling separates parking costs from housing rents or sale prices, allowing residents to choose how much parking they want to purchase – and ensuring that non-car owners do not pay for parking they may not need. Developers can promote car-sharing by providing spaces in their parking facilities, by providing free memberships to tenants, and by promoting the service to their staff and residents. The service can be reserved exclusively for building occupants or open to any car-sharing member.

Some developers provide car-sharing on a voluntary basis as an amenity to tenants, while others may be required to do so in order to mitigate their transportation and parking impacts. San Francisco now mandates car-sharing in large developments and unbundling of all residential parking in projects larger than 10 units (see Appendix A and B of this volume). Other cities such as Austin, Texas and Vancouver, BC have adopted provisions that allow developers to reduce parking requirements for projects that include car-sharing and many other cities do so on a case-by-case basis.

Numerous evaluations of car-sharing programs from communities of all different sizes suggest that Los Angeles would accrue many of the same benefits with an expanded car-sharing program. The experience of these communities, basic economic theory, and common sense suggest that the benefits of car-sharing are leveraged when coupled with proven parking management techniques to simultaneously provide a high level of mobility within a reduced

[48] Millard-Ball, Adam, "Car-Sharing: Where and How it Succeeds," (2005) Transit Cooperative Research Program (108).

parking footprint. Developers report that unbundling parking has absolutely no impact on a project's feasibility or marketability, and that the savings from building fewer parking spaces (at $30,000 to $50,000 per space for structured parking) as a result of reduced parking requirements can allow for a lower price point to attract a larger market segment and offset any potential concerns from lenders about adequate parking. If Los Angeles were to move forward with an ordinance incentivizing or requiring car-sharing as part of new development, this ordinance would need to be based on an evaluation of unbundling, the appropriate reductions in parking supply, strategies to eliminate parking spillover into adjacent neighborhoods, and the expected impacts on housing affordability and development feasibility.

Joint partnerships

There is a spectrum of business models for car-sharing operations, ranging from for-profit business ventures, public-private partnerships, and non-profit organizations with grassroots volunteers. Car-sharing in many communities usually draw elements from a number of different models. For example, San Francisco's City CarShare combines elements of the strong public-private partnership and non-profit organization with community support. As the only national car-sharing organization, Zipcar is both a for-profit business venture and a public-private partnership; in this model, the public sector provides indirect or in-kind support as a catalyst for car-sharing but does not provide direct financial subsidy.

Local government agencies are the most common partner to car-sharing operators. The explanations for this relationship are: 1) they have multiple goals which car-sharing can help to achieve; 2) they have responsibility for many functions that make them natural partners, particularly parking, transportation and planning; and 3) they may be responsive to public support for car-sharing. For some local authorities, utilizing a car-sharing fleet instead of a municipal fleet for employee travel need can results in significant cost savings (see the sidebar "The Philadelphia Story").

Local governments can also help car-sharing efforts through financial contributions from external grants, which provide seed money for new vehicles, start-up support, or other specific purposes. Cities can apply for federal, state, and local grants to financially support car-sharing. Seed money can finance feasibility studies and help a car-sharing organization get up and running (See Chapter 9 for grant opportunities) Marketing is a simple, low-cost mechanism for local government agencies to assist car-sharing operators, and promote better understanding of car-sharing among the public. Assistance can be of many different types, such as information on websites and in newsletters; distribution of materials at transportation fairs; issuing press releases; and providing on-street parking spaces as a means to promote car-sharing. Some of the most effective marketing partnerships have been part of wider TDM programs, where car-sharing is promoted as one TDM element along with ridesharing, transit and other strategies.

The Philadelphia Story: Converting Fleet Vehicles to Car-sharing Service

As discussed above, Philadelphia was the first large city in the world to replace its vehicle fleet with car-sharing, which it calls "Automated Vehicle Sharing." The motivation was both to support PhillyCar-share (PCS) and to save money through drastically reducing the City's fleet, in the face of a budget crisis. About 310 vehicles had been taken out of the fleet as of March 2005. The City's calculations show savings of more than $9 million over five years. According to Public Financial Management (the City's consultant) "car-sharing helped the Philadelphia to mitigate the impact of this fleet reduction."

Previously, usage of fleet cars was not billed on a per-trip basis and all fleet costs were borne centrally by the Office of Fleet Management. As a result many fleet vehicles were used for non-work purposes. The City found that using car-sharing vehicles and billing departments for usage on a per-trip basis (hourly rate plus a per-mile charge) for its employee travel needs resulted in a major cost savings by reducing capital and maintenance costs and reducing usage costs by making the marginal cost of fleet vehicle trip fully transparent to City employees and department heads. Other cities such as Berkeley, CA have converted a portion of their vehicle fleet to car-sharing vehicles.

Emerging political will / public opinion

Judging by the recent pilot project to provide non-metered on-street parking spaces to Zipcar car-sharing vehicles near USC and UCLA, the consultant team believes that political support for car-sharing is strong among Los Angeles' elected and appointed officials.

Challenges

Car-sharing is a recent phenomenon in the United States. As with any new concept, car-sharing faces challenges in gaining market acceptance as an alternative transportation mode. The public and businesses often fail to appreciate the true costs of automobile ownership and use, and this makes it difficult to sell car-sharing as a cost-saving measure. Other barriers typically include a lack of start-up funding, regulatory obstacles such as zoning and business licensing laws, the need to find visible, well-located parking, and land-use patterns that favor the private automobile. It can also be difficult to serve low-income populations, since this is unlikely to be a profitable market for commercial operators. Carefully distinguishing between a "true" car-sharing service versus short-term car rental – and understanding their respective advantages and disadvantages – is another critical implementation challenge.

The consultant team believes that the most significant challenges to expanding car-sharing in Los Angeles will be, a) providing direct financial subsidy or in-kind support to incentivize expansion, b) creating a high-profile marketing/promotion campaign to create understanding of car-sharing among target populations most likely to use the service, and c) determining the right locations for car-sharing "pods" (e.g. at or near rail stations in neighborhoods that have moderate-to-high densities *and* low vehicle ownership rates).

Regulatory

One of the most fundamental barriers for car-sharing organizations is finding a strong public agency partner because car-sharing does not have a natural "home" in most agencies. Transit operators with a strong "mobility management" function may be best placed to capture its potential. However, most partner organizations do not yet have a good understanding of how car-sharing works, and how it can help them achieve their goals. They may have unrealistic expectations about the types of neighborhoods where car-sharing is economically viable;

alternatively they may be skeptical about whether the benefits of car-sharing justify a public subsidy.

Financial

Car-sharing organizations are rarely sustained entirely through user fees. In order to feasibly expand car-sharing in Los Angeles, public-private partnerships will likely be required, at least during a pilot period where "start-up" support can help the service become established. Such a public-private partnership could take the form of direct financial subsidy (in order to incentivize an existing or new operator to expand into additional locations) or in-kind support (such as marketing/promotion, foregone revenue from providing free parking spaces in public parking facilities, etc.). As discussed elsewhere in this chapter, a potential opportunity for the City to incentivize an expanded car-sharing program that could be cost-neutral (or even result in a savings) is for the City to convert some or all of its current vehicle fleet to a car-sharing operator, while also providing a revenue guarantee based on the historical usage rates of city employees.

Political

Judging by the recent pilot project to provide on-street parking spaces to car-sharing vehicles (discussed previously in this chapter), political support for car-sharing is strong among Los Angeles' elected and appointed officials.

Other political challenges may include a) addressing potential car-sharing operators' perceptions of weak demand in the Los Angeles market and b) justifying the benefits of car-sharing to the general public if City resources are involved in subsidizing or supporting an expanded program.

Market acceptance

The experiences from the car-sharing case studies described in this chapter suggest that demand for car-sharing can be significant in the right context. Typically, the areas in which car-sharing thrives have the following characteristics:

- Mixed land uses providing a market base of both home- and work-based trips.
- Moderate to high densities to increase the overall size of the potential market.
- A higher than average percentage of the population with lower-than-average vehicle ownership.

There are numerous "pockets" within Los Angeles that have mixed uses and moderate-to-high densities; the crucial factor will be determining areas for expanded car-sharing locations that also have lower-than-average car ownership rates.

A critical factor to encourage usage of car-sharing services is to co-locate the vehicles at rail transit stations. Downtown MetroRail stations with surrounding office/residential land uses within walking distance will likely be prime locations for car-sharing "pods."

Another major market acceptance barrier is the need to establish and maintain a critical mass of users (typically 30 members or more) in individual neighborhoods. Car-sharing cannot develop until enough potential users in each area are familiar with the concept, understand how it can benefit them, and are willing to commit themselves to a car-sharing organization. This often requires education and marketing.

Feasibility Evaluation

Car-sharing is generally successful in urban neighborhoods with moderate to high density, mixed uses, lower-than average rates of car ownership and/or scarce parking, and good transit. Without these elements, car-sharing is much more difficult to establish. This is not to say that neighborhoods without these characteristics cannot support car-sharing. For example, car-sharing can succeed in neighborhoods without these "success factors," in such areas where there is a great deal of member involvement, at suburban universities, and/or in "closed" systems where a small group of affiliated individuals (e.g. residents of a planned community, employees of an office park, etc.) shares one vehicle.

Based on the experience of other cities and the unique context in Los Angeles, the consultant team recommends a phased expansion of car-sharing in Los Angeles as follows:

Phase I: A modest Phase I expansion of car-sharing through one or more of the following strategies:[49]

- Continue/expand existing pilot program providing on-street and off-street public parking spaces for car-sharing vehicles.
- Provide in-kind marketing and administrative support to existing or new car-sharing operators.
- Work with car-sharing organizations and private employers/TMAs to expand number of car-share locations at major employment centers and provide subsidized memberships to employees.

Phase II: Prepare for a more robust car-sharing expansion through one or more of the following strategies:

- Work with an existing or new car-share organization to conduct a pilot program in which small NEVs or fuel efficient vehicles are used as the primary fleet vehicle, in order to allow users to return the vehicle to any pod and fleet managers to redistribute vehicles to match demand.
- Issue an RFP to convert all or part of City fleet to car-sharing.
- Develop zoning code language to require new development to provide publicly-accessible car-sharing pods integrated into development and subsidized memberships for residents and employees.
- Work with TMAs to require existing employers that wish to expand to provide on-site car-sharing pods and subsidized car-sharing memberships to employees.

[49] Conversations with staff at car-sharing organizations suggest that a modest Phase I deployment should include 50 to 150 vehicles.

Emeryville TMA

In early 2008, the Emeryville TMA negotiated with Zipcar to initiate and help fund car-sharing services at several locations throughout Emeryville. The TMA is under a license fee agreement with Zipcar to provide free membership and corporate rates to TMA members, and helps advertise the services to employees at commercial properties near the Zipcar Pods. Any business that pays into the TMA (including residential complexes) can join Zipcar for free, and users receive a discount on the standard usage rate (subsidized by the TMA). Other residents of Emeryville can join Zipcar and use the cars at the Emeryville pods at the regular Zipcar rates. All members of Zipcar can also use their services elsewhere at the standard rate.

The TMA is no longer subsidizing car-sharing pods. Zipcar has expressed appreciation for the support the TMA has provided in helping them expand their market.

Benefits

Primary Benefit: Bridging the First/Last Mile Gap

Car-sharing fulfills the primary benefit of helping to bridge the last mile gap between transit and a user's destination, particularly for car-sharing pods located at major transit nodes that allow commuters to take transit for the line-haul segment of the journey, before picking up a car-sharing vehicle at the station to travel the last mile to their final destination. This may be particularly important to reach suburban locations from congested downtown areas. Most car-sharing services require users to return the car to the same location as it was picked, which does limit the utility of car-sharing as a first/last mile solution for commuter trips, but car-sharing is an extremely effective strategy at terminal stations to extend the service area of transit networks and supports transit ridership generally by enabling many households to forgo a second vehicle.

Secondary Benefits

- Reduced vehicle trips and Vehicle Miles Traveled (VMT). Expanding car-sharing in Los Angeles can have a significant impact on the travel behavior of car-sharing members, largely due to changes in vehicle ownership and a reduction in the number and length of trips taken by automobile.

- Increased use of non-auto modes. A decrease in vehicle travel is likely to be realized partly as an increase in transit ridership, along with greater walking and cycling (i.e. all trips net of car-sharing trips).

- Reduced energy consumption and emissions. Hybrids and electric vehicles are often a significant part of car-sharing operators' fleets. Since car-sharing vehicles tend to be newer and more fuel efficient than the average private or rental vehicle, car-sharing can provide a significant reduction in transportation-related emissions and gasoline consumption, even if reductions in vehicle trips and VMT are modest or neutral.

- Enhanced mobility equity and affordability. Car-sharing programs can increase the equity of the transportation system by providing an affordable mobility option for non-car owning households for trips that are not well served by other alternative modes.

- Reduced fleet costs. For public- or private-sector organizations that convert some or all of their fleet to car-sharing operations, corporate fleet costs can be reduced.

- More efficient parking utilization and better urban design. An additional long-term benefit of car-sharing is the potential for reducing the number of parking spaces required for some types of development, which, in turn, can help promote more-compact urban form.

Timeframe – Short-term vs. Long-term Benefits

The personal benefits of car-sharing that accrue to individuals (e.g. enhanced mobility, reduced transportation costs, etc.) are realized in the short-term and are on-going. In addition, for organizations that convert their existing stand-alone fleets to a car-sharing model can realize immediate and on-going cost savings.

The aggregate benefits at the city-wide or regional level (e.g. reduced vehicle travel and congestion, increased use of alternative modes, and environmental benefits, etc.) are realized in the mid- to longer-term once there is a critical mass of car-sharing members in a given market.

Costs

The capital and operating costs of the existing car-sharing operator in Los Angeles are proprietary and unknown to the consultant team. In addition, capital and operating costs are contingent to some degree on the scale of the anticipated car-sharing program (e.g. the larger the program, the higher the total costs but the lower the per-vehicle or per-member costs). Interviews with staff at car-sharing organizations suggested that there won't be any unexpected costs in the Los Angeles market, but that operating subsidies may be required for a longer period of time than is typical for other markets because it will likely take longer to scale up.

- Capital Costs – Not Available (likely High for a new operator or Medium for an existing operator). Interviews with staff at car-sharing operators suggest that capital costs are high enough to preclude a new for-profit company starting up solely to serve the Los Angeles market. Regardless of whether an existing for-profit or a new non-profit operator was selected, public-sector support would be necessary to partially subsidize capital costs.
- Operating costs – Not Available (likely Low after initial start-up). Interviews with staff at car-sharing operators suggest that not-for-profit operators often require ongoing subsidies whereas for-profit operators become self-sustaining over time or abandon the market.
- Consumer costs – Low. As discussed above, Zipcar currently charges an application fee of $25, an annual fee of $50 in Los Angeles. Usage rates start at $9/hour or $66/day (any 24-hour period). Gas, insurance, and 180 free miles are included (thereafter, additional mileage charges start at $0.45/mile).[50] Consumer costs can be lowered if developers or employers offer subsidized memberships or rates. A non-profit might charge a different rate structure depending on organizational mission (e.g. tiered pricing to discourage longer trips) and level of public-sector subsidy (e.g. grants, etc.).
- Private sector vs. public sector costs. The bulk of car-sharing costs are covered by the car-sharing operator via user fees. However, the consultant team believes that some level of public-sector support will be necessary to incentivize further expansion of car-sharing in Los Angeles. Depending on whether the selected operator was a for-profit or non-profit, the level of public subsidy would likely vary. Interviews with staff at for-profit car-sharing organizations suggest that for a publicly-available car-sharing system, public subsidy would involve in-kind support (parking spaces, marketing, etc.) as well as a

[50] Zipcar: Wheels when you want them, "Occasional driving plan," http://www.zipcar.com/ucla/learn-more?plan_key=odp (accessed March 2009).

minimum revenue guarantee for an initial period (e.g. as user fees increase with expanded membership the minimum revenue guarantee is met and public subsidy declines to zero). Other cost models exist based on city needs and could be deployed as a special / pilot program. As discussed below, the City's savings from converting some or all of its municipal fleet to car-sharing operations could be used to fund the minimum revenue guarantee of the publicly-available system.

Implementation

Regulatory Changes Required

The consultant team is not aware of any regulatory changes required for a phased expansion of car-sharing in Los Angeles as recommended in this report. In some cities, zoning and business licensing laws can be regulatory obstacles. For example, high minimum parking requirements for new development can create an environment in which auto ownership is universal (or nearly so) and there is no market for car-sharing service. Approximately 20 years ago Los Angeles relaxed minimum parking requirements in the downtown area, and should consider doing so in any other areas where car-sharing is being considered.

If Los Angeles chooses to provide direct financial subsidy to an existing or new car-sharing operator or certain kinds of car-sharing support (such as low-cost or free use of parking spaces on-street or in public facilities) in order to incentivize cars-sharing expansion, it might be prudent to create a regulatory framework defining what a car-sharing organization is, registering those organizations that meet that criteria, and documenting a transparent process for providing support to these organizations to ensure that public resources are being provided equitably amongst different organizations. San Francisco has created just such a regulatory framework that could provide a model for Los Angeles.

Operational Strategies

Interviews with leaders in the car-sharing industry suggest that FlexCar was successful in Los Angeles and that the trend line was positive as members and numbers of locations was growing. When FlexCar and Zipcar merged, Zipcar reduced service in Los Angeles to a university-based service not because they felt that there wasn't market demand for a publicly-available system, but because of a business decision to prioritize markets based on expansion potential and local financial support. Based on the experience of historical and existing car-sharing organizations operating in the Los Angeles markets, key operational strategies for a phased expansion in Los Angeles will include:

- Full partnership. The City's willingness to participate as a full partner with a vendor chosen through a competitive process and a dedicated staff and/or a champion will be important to the success of expanded car-sharing in Los Angeles. A "car-sharing czar" would be helpful to promote interagency coordination and seek support at the regional and state level (for more information see the "Implementing Entities" section below).
- Focus on proven best practices. Because there are a number of car-sharing models that exist and creating a successful car-sharing operation is a complex endeavor, it is important to identify what the policy goals of an expanded car-sharing operation would be and then focus on the proven best practices to achieve those goals.
- Integrate car-sharing into the transportation system. Car-sharing should be fully integrated into the City's existing TDM and transit programs. The car-sharing operator

should be considered a critical component of the City's transportation system rather than just another City vendor providing services.

- Sustained commitment. Due to the demographics, geography, and characteristics of the regional transportation system, it is expected that it will take a longer period of time to establish critical mass of car-sharing members and locations in Los Angeles.

Different operational strategies for car-sharing organizations are highlighted in Figure 5-5.

Figure 5-5 Car-sharing Business Models and Operational Strategies

Model	Considerations	Initial Markets
1. Business venture	Will primarily depend on operators' business and expansion plans, and their perceptions of the strength of the market. Initiated by a for-profit operator; potentially a car rental firm.	Higher income, well-educated people, dense neighborhoods
2. Strong public-private partnership	Operators' interest will depend on the depth of support that is offered, coupled with the inherent desirability of the market. May be initiated by a public agency or for-profit operator.	Same as (1), but more emphasis on transit riders, wider range of incomes
3. Municipal lead	Requires strong, ongoing commitment from local government, and full operational responsibilities. City takes initiative and may be operated by a non-profit sponsored by city or partnership with for-profit.	Same as (2), but more emphasis on city staff
4. Grassroots, community-based effort	Feasibility depends on interest and organizational capacity of local groups, and the amount of support that can be offered by partners. Initiated by community groups.	Likely to start with people with strong environmental awareness and diversify as the organization matures
5. Special purpose/ research	Limited wider applicability; conditioned by availability of demonstration/ research funds. Usually initiated by University of research institution.	Students, staff and faculty, may diversify as the organization matures
6. Stand alone development or campus	Special niche; can be combined with any of the above scenarios. Can be initiated by a community group, developer, or university.	Residents/staff/faculty or the development/ campus

Source: Millard-Ball, Adam, et al. 2005. TCRP Report 108 – Car-Sharing: Where and How it Succeeds. Transit Cooperative Research Program, Transportation Research Board. Washington, DC. Used with permission.

Implementing Entities

- Lead implementer(s):
  - A new or existing car-sharing organization would be the most feasible lead implementer. Such an organization could be a for-profit or non-profit operator (as discussed above, each model has advantages and disadvantages relative to desired policy outcomes).

  - In addition, a single city staff person (e.g. a "car-sharing czar) should be tasked as the point person for implementing car-sharing's expansion in Los Angeles, including overseeing negotiations, ensuring accountability for any public subsidies, and helping resolve interagency conflicts.

- Supporting implementer(s):
  - City Planning. The City Planning Department's primary implementation role is to a) ensure that development controls are supportive of car-sharing, b) codify regulations to define what organization(s) qualify for car-sharing incentives, and c) require car-sharing as conditions of approval for new development entitlements as a traffic demand management approach.
  - Community Redevelopment Agency (CRA). Similar to the Planning Department, CRA can work to craft development controls in all its redevelopment areas that are supportive of car-sharing expansion. CRA can also strategically require developers in redevelopment areas to integrate car-sharing "pods" into their projects in order to establish a district-wide network so that a car-share vehicle is within walking distance of every employee or resident of the redevelopment area.
  - LADOT. The LADOT can continue and expand its pilot project of providing on-street parking spaces to car-sharing operators. Because transit passengers are a natural target market for car-share members, LADOT can also provide enhanced promotional support of car-sharing on DASH buses and shelters and provide traffic mitigation credit for traffic studies in CEQA reviews.
  - LA Metro. In addition to providing promotional support on Metro transit vehicles, shelters, and stations, Metro can also support car-sharing by participating in conversations of how the TAP card could potentially interface with Radio-Frequency Identification (RFID) readers to allow transit rider to access car-share vehicles.
  - LAGSD Fleet Services. One of the primary strategies for expanded car-sharing in Los Angeles is for the City of Los Angeles to convert some or all of its municipal fleet operations to car-sharing. This transition would require the full buy-in and implementation support of the GSD Division of Fleet Services.
  - Community organizations. Transportation Management Associations, neighborhood associations, business groups, benefit/assessment districts, and other community BIDs organizations have a critical role to play in promoting car-sharing to their networks.

- Interagency coordination. As suggested by the number of supporting implementers listed above, for car-sharing to succeed in Los Angeles, the City would need a truly coordinated effort in order to be able to "speak with one voice" with potential partners. The City would likely need to form an interagency task force (under the direction of the 'car-sharing czar' discussed above) and develop a comprehensive strategy to guide public-sector participation in car-sharing, including reducing barriers to entry and providing cost-effective incentives consisting of either in-kind support or direct financial subsidy during initial phases, or both.

- Joint partnerships. As the experience of other cities has shown, car-sharing requires a strong public-private partnership to succeed; the consultant team believes that this would be especially true for car-sharing to gain an expanded foothold in Los Angeles.

Converting Los Angeles Municipal Fleets to a Car-sharing Operation[51] The City of Los Angeles currently has 1,801 vehicles of all types in its fleet (includes parking enforcement, motor pool, and department-assigned vehicles). Some of these vehicles are assigned to individual departments or even specific individuals but most are used by city staff as pool vehicles. In addition, some departments have their own shared vehicle pools. The City does not utilize a reservation system for motor pool vehicles, they are available on a "first-come, first-serve" basis. Each department is responsible for how the vehicles are utilized, and the Division of Fleet Services is primarily tasked with vehicle maintenance. To assess usage charges, the City uses an interdepartmental Memorandum of Understanding and a "charge back" system so individual users have no incentive to optimize their usage and no funds are transferred between departments. The vehicles are located in various areas throughout the City, usually in proximity to the department in which they are assigned. Fleet Services' only controls those vehicles assigned to its department and the two general motor pools which are used by all departments. Both of these general motor pools are located in the Civic Center area at City Hall East (146 cars) and 12th & Broadway (31 cars).

Benefits of Partial or Full Conversion to Car-sharing. Conversion of some or all of the City's municipal fleet represents a prime opportunity to expand car-sharing in Los Angeles. Such a conversion would both optimize utilization of city vehicles to save taxpayer dollars,[52] while also providing support for a new or existing car-sharing organization to expand in Los Angeles. There are three potential models as discussed below. An option the City might consider after an initial demonstration period would be to allow nearby residents to use the cars for a fee during non business hours. This could generate a small amount of revenue for the program and reduce car ownership for these residents. Three different approaches to fleet conversion are discussed below; all three approaches would require additional conversations with Zipcar and other potential car-sharing providers as well as an independent feasibility evaluation to address any potential unanticipated issues.

1) Closed network. In this model, the city continues to procure and maintain a vehicle fleet, but a car-sharing operator handles all the reservation and usage technology and assists with resource allocation to optimize the size and location of the fleet. In this model, cars are shared on a "closed network" so that vehicles are only accessible to City employees An example of this model is Zipcar's FastFleet program (for more information see the Washington D.C. case study below).

2) Side-by-side networks. A second model is to operate a closed network as described above for a city's primary fleet needs, while providing support to a car-sharing organization to operate a parallel "open system" system that is publicly-available. The savings achieved from downsizing the existing municipal fleet can be reinvested in the publicly-available system (which is effectively providing "peak capacity" when needed to meet city employees' travel needs).

3) Open network. Another model would be a fully "open network" where a city relies entirely on car-sharing vehicles for its fleet needs and these cars are also available to members of the public when not needed by city employees. In such a program, city employees would have priority access to car-sharing vehicles during weekdays, and this would allow them to commute to work via transit or other means and always know that a car was available to them throughout the day for unexpected work or personal errands. When vehicles are not reserved by city employees, the vehicles would be available to members of the public. This model allows for the most efficient utilization of car-sharing vehicles, as most car-sharing operators experience peak demand during evenings and weekends, while municipal usage is likely to be highest during the working day. Due to likely liability concerns for car-sharing operators, this model would only be possible if a city continues to procure and maintain vehicles.

Case Study: Zipcar Manages System for Employee Vehicle Fleet in Washington D.C.[53] District government employees now share more vehicles under a new fleet management system. This system is run by Zipcar and is the first of its kind in the country. Combining car-sharing and fleet management for a city greatly reduces the number of vehicles the city uses. Washington D.C. was able to replace a fleet of 360 vehicles with 58. Mayor Adrian M. Fenty (D) stated that the new system equals a $6.6 million savings over five years. The District is serving as the testing ground for what Zipcar is calling FastFleet, its service for governments. Zipcar allows the city to use its technology, including equipping the cars with Global Positioning System (GPS) devices. Such technology allows the city to better monitor who is driving its cars and where they are going. The city pays Zipcar a one-time fee of $1,200 a car to install the technology and $115 a month per vehicle to maintain it. Unlike its services for private consumers, Zipcar does not own the vehicles; the city does. Since its fleet was reduced, the city has sold more than 100 cars through Liquidation.com; 13 cars went into the new program; and 30 vehicles had leases that were expiring. Based on the success of the pilot program, the city has moved into full-scale implementation of this model.

[51] Walker, Leonard. Phone interview with the Director of the Fleet Services Division, City of Los Angeles. March 2009.
[52] Taxpayer savings based on experience of other cities as documented in this report. Third-party sources suggest that the cost for a fleet vehicle is $800 to $1300 per car per month and that fleet vehicles are only utilized one-third to one-half of the time.
[53] Nikita Stewart. "*Zipcar to Manage System for Employee Vehicle Fleet,"*. Washington Post [Washington] 28 April 2009; accessed 1 July, 2009.

Market Acceptance and Target Markets

Overall Market Acceptance. The current market penetration of car-sharing in Los Angeles is roughly 2,000 members in a population with millions of drivers.[54] Since car-sharing's current market share is so modest, car-sharing availability and usage must be expanded beyond its target population of university students in order to have a significant impact at the regional scale in reducing automotive demand or expanding transportation options.

Based on the phased expansion discussed below, the consultant team estimates that the overall long-term market acceptance for car-sharing in Los Angeles would be moderate, with variable market acceptance in the different target markets discussed below:

- Demographic
  - Proportion of Youth 16-34 – High. Youth populations tend to be "early adopters" who have a desire to reduce their impact on the environment. University campuses also tend to have constrained parking.
  - Proportion of High-Income Households – Medium.
  - Proportion of Low-Income Households – Medium.
  - Proportion of Low Auto Ownership Households – High. Low car ownership and scarce parking make car-sharing an attractive mobility option.
  - Apartment Buildings – High. Developers are able to partner with car-sharing organizations to provide parking management and offer an amenity to tenants.
  - Social Capital/Cohesion – Medium. The initial success of car-sharing often depends on a high degree of personal involvement by members.
- Geographic
  - Residential Density – High. Allows for a large consumer base within walking distance of each car-sharing vehicle.
  - Employment Density – High. Provides opportunities for employers to utilize car-sharing for short day trips.
  - Transit Intensity – High. Car-sharing is designed to work in concert with public transportation and is not designed to meet a household's entire mobility needs. Districts and corridors with good transit access generally have lower-than-average vehicle ownership rates, as households that are predisposed to utilize transit make residential location decisions partially based on the transit service intensity.
  - Mixed Uses – High. Car-sharing in mixed use districts can attract both business and residential trips, which often use the cars at different times of the day.

Marketing and branding. In Los Angeles, a proper marketing campaign for car-sharing will be critical. For example, word of mouth marketing is important because a recommendation from a trusted individual has more credibility than a standard advertisement, and is more likely to persuade travelers to try something new and unfamiliar. In addition, branding car-sharing services with tailored messages (e.g. green, economical, hip, etc.) appropriate to the targeted demographic groups will also be important to increase market acceptance in Los Angeles.

[54] Sorensen, Paul, Martin Wachs, Endy Y. Min, Aaron Kofner, Liisa Ecola, Mark Hanson, Allison Yoh, Thomas Light, James Griffin. Moving Los Angeles: Short-Term Policy Options for Improving Transportation (Rand Publication, 2008).

Technology Integration Opportunities

The major technology opportunities for car-sharing programs include:

- Online/phone reservation system. On-line reservations ensure the vehicle is available when needed. Reservation systems are usually web- and phone-based with some additional cell phone functionality (e.g. receiving a text message to confirm reservation and provide directions to vehicle).
- RFID readers and GPS units. RFID readers allow car-sharing programs to provide vehicle access just to members. GPS units allow for optimized fleet management and accurate billing based on recorded trip time/distance. Smaller car-sharing systems do not necessarily need to incorporate in-vehicle technology (e.g. members can access vehicles using traditional keys and billing can be based on reserved time rather than actual time), but any larger widespread implementation should include these features to maximize member security and convenience.
- Integration with LA Metro's TAP card. Most car-sharing systems used RFID fobs or cards to allow members to unlock and lock the vehicle. This provides opportunities to provide travelers with seamless transfers between transit and car-share vehicles by using the same card to pay transit fares and access car-share vehicles.
- Social networking websites. A recent innovation is for car-sharing organizations to partner with social networking sites to allow members of either to leverage car-sharing benefits. For example, car-sharing members can use social networking sites to form "instant carpools" for their reserved car-sharing trip (for more information see the sidebar "Uniting Car-sharing with Carpooling" below).

Uniting Car-sharing with Carpooling[55]

The for-profit car-sharing company Zipcar recently announced that it is forming a partnership with Zimride, which uses social-networking sites like Facebook to match drivers and passengers on university campuses or at companies.[56] Zimride charges universities and companies a fee to use their software so that employees, faculty, or students can arrange a shared ride on an internal Web site integrated with Facebook.

The new partnership is being piloted initially at Stanford University and will allow people who don't own a car to share a ride by using Zipcar's vehicles in two ways:

- When reserving a car on Zipcar's website, users will also be able to select a "carpool" option and then be able to list the date, time, and destination of their trip. This information will then automatically be fed onto Zimride's web site and Zimride will find users who are hoping to make a similar trip and alert them to the available carpool.
- Zimride's users also will be prompted to consider using a Zipcar for their trip in order to save money on gas and reduce wear and tear on their vehicle.

Zipcar hopes to quickly launch the program at other universities across the country.

[55] Sarah Naussauer. "Zipcar Plans Partnership With Zimride," The Wall Street Journal [New York] 8 April 2009. accessed 8 April 2009, http://online.wsj.com/article/SB123915473346099771.html .
[56] Similar online carpool matching services are offered by Goloco.org and Pickuppal.com.

Additional Resources

American Automobile Association: http://aaa.com

Bath, Matthew, Susan Shaheen. "Shared-Use Vehicle Systems: A Framework for Classifying Car-sharing, Station Cars, and Combined Approaches," Transportation Research Board 1791(2002):105-112.

Cohen, Adam P., Susan A. "Worldwide Carsharing Growth: An International Comparison" (March 12, 2006), institute of Transportation Studies, Paper UCD-ITS-RR-09-10.

Cohen, Adam P., Susan A. Shaheen, Ryan McKenzie. "Carsharing: A Guide for Local Planners," (2008), Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RP-08-16.

Chung, Melissa, Adam P. Cohen, Susan Shaheen. "North American Carsharing: A Ten-Year Retrospective," (2008), Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RR-08-38.

Zipcar, Wheels when you want them. "Occasional driving plan", http://www.zipcar.com/ucla/learn-more?plan_key=odp, (accessed March 2008).

Holtzclaw, John; Clear, Robert; Dittmar, Hank; Goldstein, David; and Haas, Peter. "Location Efficiency: Neighborhood and Socio-Economic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles and San Francisco," Transportation Planning and Technology25 no.1 (2001): 1-27.

Millard-Ball, Adam, "Car-Sharing: Where and How it Succeeds," (2005) Transit Cooperative Research Program (108).

Metro Rider LA. "Zero, Zip, Zilch: Number of Zipcars in Los Angeles," http://metroriderla.com/2008/01/24/zero-zilch-zip-number-of-zipcars-in-los-angeles (accessed March 2009).

Nikita Stewart. "Zipcar to Manage System for Employee Vehicle Fleet." Washington Post [Washington] 28 April 2009; accessed 1 July, 2009.

Sarah Naussauer. "Zipcar Plans Partnership With Zimride," The Wall Street Journal [New York] 8 April 2009. Accessed 8 April 2009, http://online.wsj.com/article/SB123915473346099771.html.

Walker, Leonard. Phone interview with the Director of the Fleet Services Division, City of Los Angeles. March 2009.

Chapter 6. Short-Term Car Rental

Overview

As the success of car-sharing programs around the world illustrates, a potential solution to address the first/last mile issue is a strategy related to carsharing: short-term or hourly car rentals. Since car-sharing services may not be successful in all contexts, this chapter examines how existing for-profit national rental car companies might be able to provide some of the same benefits in Los Angeles (i.e. short-term car rental with convenient pick-up and low rates) in lieu of or in addition to traditional membership-based car-sharing organizations, especially in early implementation stages until an existing or new car-sharing organization was able to expand in the region. (For more information on car-sharing, see Chapter 5).

Existing Conditions

Traditional car rental programs, where users pay a daily or weekly rental fee and no pre-screened membership is required, exist in large numbers in Los Angeles, but are not currently optimized for public transit riders. The historic focus has been on serving business and tourist users, and has been largely centered on and around airports. Non-airport rental locations do exist, but they are typically a smaller part of the car rental service model.[57] Car rental programs characteristically feature a large numbers of cars centered in relatively few high-traffic locations, with rates based on daily usage and significant surcharges for insurance, gas, and the like.

In recent years, several traditional car rental companies have moved into the business of short-term, hourly car rentals. This service model is very similar to car-sharing: for example, “Connect by Hertz” short-term car rental service shares many of the same attributes as a carsharing service model. A key distinction is that traditional carsharing organizations *only* provide short-term carsharing services (rather than both short-term and long-term car rental) and typically have an organizational mission to reduce vehicle trips and vehicle miles traveled (VMT). At this time, U-Haul, Hertz, and Enterprise all offer hourly car rentals in limited markets, though not in Los Angeles. Each of these companies has taken a slightly different approach to short-term car rental service, as discussed below.

Enterprise

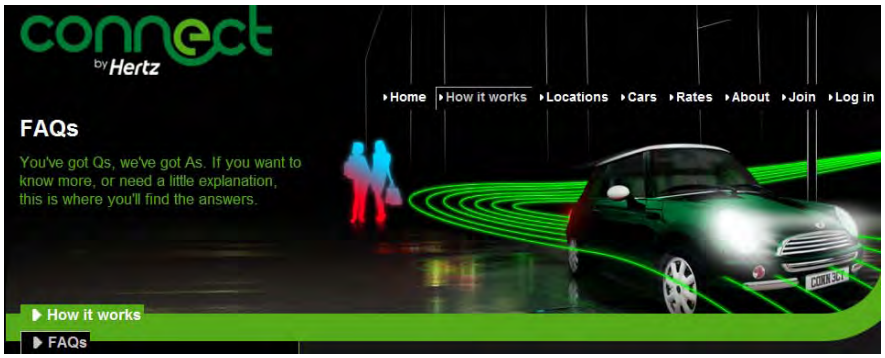
Enterprise has traditionally had a much more distributed neighborhood presence than other large rental companies, and as such, is well poised to move into hourly rentals, although at this time they still require an office visit for each rental and do not include gas and taxes. Their model is the most similar in terms of customer experience to the traditional car rental programs, and importantly, uses the same locations for parking and the same fleet of vehicles. A key strength of Enterprise is more than 6,000 neighborhood locations located within 15 miles of 90 percent of the U.S. population. Pricing for these hourly rentals starts at about $11 an hour (excluding taxes,

[57] Enterprise is an exception and is primarily a neighborhood-based company.

fees, and insurance) in Manhattan, New York, compared to about $80 per day (excluding taxes, fees and insurance) for a similar car.

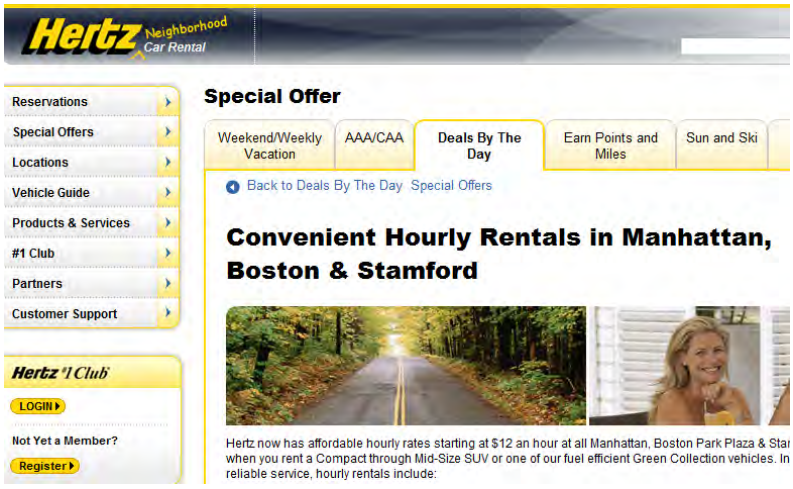
Enterprise is also the parent company for WeCar, another program that is more similar to the car-sharing model pioneered by Zipcar. A membership fee and hourly charge gains access to vehicles left at predetermined locations. At this time, WeCar is available in only three locations in St. Louis, Missouri: one university campus and two corporate campuses.

Hertz



Connect by Hertz is another hourly rental program that has gained significant traction in university settings; it is structured much like Zipcar, with a monthly membership fee and card that allows remote access to vehicles. Even the vehicle fleet is similar Zipcar's fleet with a concentration of Mini Cooper and the Toyota Prius vehicles. Cars are available in small numbers at distributed lots for ease of access, and can be booked online. At this time, Connect by Hertz is only available in 4 locations in the US: New York, New York; Park Ridge, Illinois; Ohio State University, Columbus, Ohio; and Pepperdine University, Malibu, California.

In addition, Hertz offers hourly rates at some of its conventional offices, but only in dense urban areas, with significantly higher rates than the membership program primarily due to increased taxes and fees. The listed hourly rates are similar, between $11-14/hour, but importantly do not include taxes or insurance. Insurance, for liability and collision, is approximately $16.50 per rental.[58] For a one hour rental, this means the price more than doubles, and is twice as much as rates for car-sharing programs. For the very occasional user, this may not be an issue, but for frequent users, the car-sharing programs with fixed and inclusive rates (including the Connect program offered by Hertz) may prove more attractive.



[58] Hertz Car Rental, "Convenient Hourly Rentals in Manhattan, Boston & Stamford,"https://www.hertz.com/rentacar/specialoffers/index.jsp?targetPage=hourly_manhattan_boston.jsp&Category=D&TabLink=tlink3 (accessed July 2009).

U-haul

U Car Share is a program by U-haul that operates a small fleet of PT Cruisers at 4 U.S. locations: Berkeley, California; Madison, Wisconsin; Portland, Maine; and Portland, Oregon. It is structured very similar to the others, with a monthly membership fee and an hourly rental rate. Many reviews have been critical of the program, particularly the locations for the car pick-up which have been predominately at U-haul truck centers. The program initially began with many cars at many locations, but inconvenient locations meant many cars were rarely, if ever, used. This led U-haul to revamp the program and concentrate the cars in the 4 current locations.

Description of Historical/Existing Services or Programs

Short-term car rental and car-sharing programs have many similarities since they both provide access to a fleet of cars at an hourly rate. However, the two programs typically differ because car-sharing is a neighborhood service and insurance and gas are paid for by the organization rather than by usage fees as with short-term car rental. Key characteristics of most, but not all, short-term car rental services are that they: 1) are focused at airport locations and central business districts, 2) do not include gas or full coverage insurance in the rental fee, and 3) do not provide unattended, self-service vehicle access.

As mentioned above, in Los Angeles, FlexCar used to provide a car-sharing rental service, but after being acquired by Zipcar, service was discontinued in January 2008, with the exception of a limited number of vehicles centered on area universities: UCLA and USC. None of the major car rental operations currently offer hourly or short-term car rentals in Los Angeles. The section below discusses what is known about the operations of hourly rental car programs in other cities (for more information on car-sharing, see the chapter 5).

Demand / ridership / usage

Usage information is largely proprietary in the competitive arena of car rentals and thus little public information is available. However, demand for hourly rentals can be presumed from a) the success of car-sharing programs, and b) the movement of for-profit companies into this space. Therefore, car-sharing numbers can be a valuable reference point.

As of July 19, 2008, U.S. car-sharing programs had about 279,000 members, according to the University of California-Berkeley's Innovative Mobility Research. Zipcar offers vehicles at 70 university campuses. Susan Shaheen, who researches transportation trends at the University of California-Berkeley, estimates that there is a market for at least 2 million carsharers in the United States.[59]

[59] Katy, Marquardt. "*Zipcar Redefines the Rental Car. US News and World Report." US News 5 June 2008.* http://www.usnews.com/articles/business/best-in-business/2008/06/05/zipcar-redefines-the-rental-car.html (accessed June 2009).

Benefits

U.S. studies and surveys indicate that 11 percent to 26 percent of car-sharing participants sold a personal vehicle, and 12 percent to 68 percent postponed or avoided a car purchase. U.S. data also reveals that each car-sharing vehicle removes six to 23 cars from the roads.[60] Again, data on hourly rentals (exclusive of membership requirements) is difficult to ascertain due to the relative newness and limited availability of such programs, but can reasonably expected to be similar in car-sharing markets with similar costs.

Best Practices

Most car-sharing and hourly rental programs from the major car rental companies have been focused in two types of markets: universities and corporate campuses where they are used to encourage carpooling and public transit for employees. In addition, the programs are designed to allow access to vehicles for students without cars. For general population use, the programs are nearly exclusively located in dense urban settings, including environments where significant percentages of people live in the urban core, such as New York and San Francisco.

The BART-Hertz program in San Francisco is an interesting practice. Members of the program paid a monthly lease of between $2 to $400 to have the use of a car from a BART station to work, or a BART stop to home. Included in the fee were all costs for insurance, fuel, etc. This cost is lower than the $500/month that AAA estimates for a monthly cost of car ownership. In principal, this program will allow 2 users commuting in opposite directions to share one vehicle. However, this program is not strictly an hourly rental program but is more of a shared lease program, and offers limited advantages over car ownership or conventional leasing.

BART currently co-locates carsharing pods (both Zipcar and the Bay Area non-profit City CarShare) at many of its stations and partners with Hertz on the shared lease program. Based on the small size of the Hertz program, it is likely that a much larger number of BART riders combine their transit trip with car-sharing trip. However, one lesson that could be drawn from BART's experience is that carsharing and short-term car rental can exist side-by-side, and that a program in Los Angeles could offer multiple types of membership or rentals, including hourly, daily, and "shared lease" monthly rates, in order to determine the mix of services that work best for the average consumer. In addition, younger consumers in the Bay Area were shown to be significantly more open to programs that encourage non-ownership. The programs that have had the most success are those that do not penalize younger drivers with higher rates.

New York is perhaps the best U.S. example of car-sharing and hourly rentals. In a city where 77% of the residents do not own a car, and upwards of 40% live in a house with no car, it is no surprise that short-term rentals prove useful for certain types of trips where public transit doesn't fill in the gaps. New York has many car-sharing and car rental service providers. But evidence shows that many people still find the distance to a traditional car rental pickup to be prohibitive. Companies like Hertz and Zipcar have pods every few blocks, with a small number of cars available at each. Although this increases complexity of managing the vehicle fleet and requires the use of automated reservation systems, having the vehicles conveniently close to the user is important to success. Significantly, the initial failure of the U-haul program has largely been attributed to poor location availability. In addition, it has been shown that reserved parking

[60] Green Car Congress. "Zipcar to Double Fleet in San Francisco Area and Expand into Chicago,"http://www.greencarcongress.com/2006/07/zipcar_to_doubl.html (accessed June 2009).

spaces are far preferred to non-reserved locations that users locate with via GPS, as users do not have to search for vehicles with reserved parking spaces.

Another good practice that Hertz and WeCar have demonstrated is to partner with large institutions that have a relatively centralized user base. Google encourages employees to ride transit or carpool to their main campus, and use a carshare program to overcome the "transit isolationism" obstacle of needing a car to run errands during the day. These programs are primarily subsidized by the employer as a means of encouraging public transit and complying with certain air quality regulations or trip reduction ordinances, while users who choose public transit earn credits towards car rentals.

A best practice that can be identified from many programs, both successful and those that failed (such as the first iteration of U-haul's service), is that convenience, cost, and availability trump nearly everything else. People like fun, attractive cars, but will stop using a service if it becomes inconvenient or unavailable.

Building a critical mass to support the program in Los Angeles has proven to be difficult, as it requires a change in behavior on the part of consumers. Requirements for successful implementation will likely be:

- Locations. Cars must be located near the predominant user base, for instance, at public transit, near offices and work locations. Targeting partner companies or institutions for membership can help limit the number of locations needed. In a world of increasingly scarce resources, siting fewer cars at more locations is more likely to be the most successful strategy, but those locations must be chosen carefully. Suggestions would include studying areas where inbound transit use is high. From there, the next step would be to identify large employers in that area, and then site vehicles nearby, preferably even in their parking lots. One can expect that for daily errands and meetings, a roundtrip model where cars are returned to their point of origin could work well, but it is suggested that there may be some advantage to charging a premium for one-way trips as well. Imagine a scenario where a user rides the Metro in from the suburbs, then rents a car to drive to the office, leaving it there. Other users could use it during the day for errands, then the first user drives it back to the Metro for his/her trip home. The difficulty here is that if certain one way trips are more popular than others, there may be an imbalance in vehicle distribution, but car rental companies have sophisticated strategies in place and large vehicle fleets for dealing with this in their long term rental programs that could presumably be modified to meet these new uses.
- Large private employers, universities and government agencies should be encouraged to include use of short-term rentals as part of their existing programs to promote public transit and reduce drive-alone commute trips.
- Pricing should be kept below $15/hour, including all taxes, insurance and fees. With fluctuating fuel prices, this could prove difficult, but the city could help encourage it by waiving the 2.5% rental car tax on short-term car rentals. Government could also help encourage the program by offering free or reduced price parking at city owned lots. Pricing should not discourage younger users, as they have proven to act as early adopters for similar programs. Volume discounts should be available for frequent users.
- Programs must be easy to use, with convenient pick-up, no lengthy forms each visit, and fast turnaround. These programs lend themselves well to internet and automated systems.

- Any program must include significant budgets for maintenance, cleaning, and simple upkeep. Evidence has shown that people will take better care of cars that are found in good condition.

Operational

The traditional car rental companies have significant advantages in implementing new programs in a city such as Los Angeles. They are a huge buyer of automobiles, and can negotiate prices far better than smaller companies like Zipcar. In addition, they have expertise in fleet maintenance, fleet management, and resource allocation. They also have established practices for eliminating cars once they have reached their useful lifespan as rentals. These factors would suggest that they would have no problem being successful in hourly rentals, yet they have struggled in most markets. Their mistakes seem mostly operational in manner. They have (with some exceptions) stuck too closely to their traditional business model. Few users will want to get to an Enterprise location, spend 20 minutes filling out paperwork, wait for a car, and return to the same location and find their way home, all for an hour or two rental. Even car-sharing models find their membership drops off considerably once you exceed a few blocks walking distance from the cars. Hourly car rentals from established rental companies can succeed, but the user experience will need to more closely resemble a car-sharing program than the typical airport rental.

Fiscal

Most programs are financed through traditional loans and or leases. Cities, transit agencies and others often offer incentives, including amenities like free or preferential parking. At this point, profitability data for existing programs is not available.

Expansion Potential in Los Angeles

Opportunities

The hourly car rental market becomes more and more attractive when combined with public transportation. Opportunities to combine the two and across market are significant. Downtown Los Angeles would clearly be a key initial target, perhaps by partnering with major firms downtown or with owners of large buildings. Developing programs that require large employers to subsidize employee hourly rentals in addition to traditional transit or rideshare subsidies has potential.

Emerging political will / public opinion

Favorable public opinion of car-sharing and short-term rentals is growing. Car ownership is slightly less of a status item than in previous decades, particularly among younger, well educated professionals, and alternative transportation is often viewed as attractive or even hip. The popularity of car leasing programs has meant that the general population is less dependent on the idea of vehicle ownership. Many younger generation individuals are more accustomed to paying for services, and programs like Netflix demonstrate a willingness to pay for short-term convenience over ownership. Demographics indicate that most car share users, of all types, skew heavily towards the young and educated.

Challenges

As mentioned above, New York is perhaps the best U.S. example of car-sharing and hourly rentals. However, extrapolating data from New York is problematic since 42% of the population lives in a home without access to a car, while in Los Angeles the number is closer to 11%.[61] In addition, in Los Angeles, the majority of people who live without a car are at the low end of the socio-economic spectrum, while in NY there are significant numbers of middle and upper income residents without a car. Furthermore, cities like New York and San Francisco have significant urban populations who can eat, shop, and do many errands easily by walking and public transit, and truly only have an occasional need for a car. These areas and universities have proven the best market for short-term rentals, and it is difficult to predict the success for Los Angeles due to significantly different demographics and population density.

Regulatory

Regulation favoring hourly rentals and car-sharing has been introduced in California, including items like Assembly Bill 2154, which would allow cities to grant on street parking to carshare programs. These, and similar items in other cities, have been actively and vehemently fought by car rental companies, who see an eroding of their traditional business. In addition, taxes that favor one type of rental (short-term) over another (daily) have been heavily opposed in many areas.

Feasibility Evaluation

Benefits

Benefits of a short-term car rental strategy are extensive and multi-fold. With the primary goal of bridging the first/last mile gap, a strategy in which transit users can pick up a car on their commute in to work, the car can be used by others during the day, and then the car can be used for the return trip at the end of the day would make sense, though the hourly cost may be prohibitive as strictly a “last mile” strategy. The hourly car rental is effective as a strategy to decrease “transit isolationism,” and thus encourage transit use and other last mile strategies.

Short-term car rentals can certainly enable many people to reduce their car ownership levels. Many families may choose to own one car or none, and use the rental cars to “fill in the gaps”. Given that car ownership is estimated to cost between $400-500 per month on average, this can be a very cost effective choice for many. Many studies have shown that once the decision has been made to not own a car (or second car), significant mode shift occurs. The cost of driving becomes nearly 100% variable cost. When an owner is spending hundreds of dollars a month on a car in any case, and the additional cost of driving only being fuel, they will choose to drive a car for nearly every trip. Most costs are fixed, and additional miles driven are inexpensive relative to the total ownership cost. When owners switch to short-term rentals (or car sharing) evidence shows they will be far more likely to walk, bike or use transit. The cost of driving is clearer. This shift has clear benefits in encouraging mode shift and reducing VMT.

Other benefits for developments and the city is a reduced need for parking. Since a single vehicle can serve 20-40 users, reductions in the number of parking spaces needed can be envisioned.

[61] Kathleen Maclay. ” University of California [Berkeley] News Press Release. March 23, 2006, http://www.universityofcalifornia.edu/news/article/7981 (accessed July 2009).

Benefits of a short-term car rental strategy can be seen immediately. Once vehicles are in place, immediate usage begins. Suburban commuters can use transit more frequently. Successful programs (like Google's and Stanford's) typically use short-term car rentals as a means of encouraging carpooling, transit, bike commuting, and other alternatives. Credits towards car rentals are given to alternative method commuters as an incentive and as means to reduce the fear of not having a vehicle readily available when necessary. This has been shown to have near immediate benefits.

Costs

Capital Costs: Medium/Low - Capital costs for car sharing programs are dependent largely on how the program is structured. Hourly rentals from established rental sites like Enterprise and Hertz do, in some locations, have limited additional costs, since they use established fleets. In other programs, capital costs are primarily the vehicle cost, typically $20,000-25,000.[62] Many vehicles are leased, not bought, further reducing initial capital cost. Other capital costs include maintenance facilities and parking facilities, both of which are suggested to be leased for the initial pilot program. The number of vehicles varies depending on location. In addition, for systems using an automatic remote unlocking system, there is an added expense of $1,000-1,500 for that hardware.

Operating Costs: Low - Operating costs are primarily parking, fuel, maintenance, vehicle leasing and insurance. These costs are directly offset by the hourly rental fee. Some municipalities have made special accommodations for parking shared use vehicles, but in most locations parking spots are leased in large parking complexes. Fuel costs are typically built into the hourly pricing, and the vehicles used tend to be small, fuel efficient vehicles. However, the fluctuation of fuel costs is difficult to predict, and can serve as large variable in profitability. There is also a somewhat inverse relationship between fuel costs and hourly car rentals. That is, programs for short-term car rentals are most appealing in places and times when car ownership is expensive, including when fuel prices are high, and that is when the profitability is lowest. However, most short-term rentals are used for low mileage trips, for instance, a short drive to an appointment, combined with waiting time. At least one source suggests average trip distance of five miles.[63] Even assuming 25 miles per hour average fuel economy for the entire time of rental (unlikely in a dense urban environment) and a 25 mpg city fuel economy rating for the typical vehicle would still result in a $2 per hour fluctuation in fuel prices over the last 2-3 years. While this may be significant, it is a worst case scenario and there are financial tools that can be used to hedge against such fluctuations, including pre-purchasing fuel at fixed prices.

Insurance is about $250 per vehicle; per month for $300,000 combined liability, comprehensive and collision coverage.[64] Additional operating costs include staffing and customer care.

[62] Brook, David. " Carsharing- Start up Issues and new Operational Models," Transportation Research Board (January 2004) http://www.carsharing.net/library/StartUp_Issues_TRB04_DBrook.pdf.
[63] Ibid
[64] Ibid

Costs to Consumers

Medium - One of the most attractive features of the car share programs are low hourly costs to consumers. Many programs require a membership, though not all. Membership costs, when applicable, are typically between $50/year and $50/month. Hourly costs range from $8-$15/hour, typically with a daily maximum of $70-80.[65]

- Large variations in pricing are due to taxes and fees. Many cities and counties have car rental taxes that can easily double the price to the consumer. For example, a rental car in Los Angeles is subject to both the 9.75% sales tax, and a 2.5% tourism fee.[66] For frequent users, these taxes could serve as a deterrent. Taxes and fees on rentals at airports are typically even higher. For example, at Los Angeles International Airport (LAX), there is a minimum airport fee of $15 added to the car rental cost. Depending on how a city chooses to classify hourly rentals, and if they are subjected to the same taxes as daily car rentals, this could easily be a significant factor in the ability to implement a program in a region. At this point, Los Angeles membership-based hourly rentals would not be subjected to the tourism fees and taxes, though it would be subjected to the 9.75% sales tax. Hourly car rentals, without a membership, appear to require the 2.5% car rental tax, further disadvantaging them compared to car sharing services.

As mentioned above, the pure hourly rental programs that are not traditional membership-based car sharing programs may also not include insurance.[67] This can easily double or nearly double the price of a short time rental, even before taxes. While $10-15/hour might be a small enough amount to make hourly rentals attractive for infrequent trips, $20-30/hour might prove to be a much more significant barrier. For renters who have credit card or car insurance protection for rentals, these fees may not apply.

In addition, all of the hourly rental companies researched charged additional fees for young drivers under 25, between $5-7 an hour.[68] Thus an hourly rental for a young driver without insurance could easily reach $35/hour for a short rental, and $20/hour for a longer rental.

Short-term car rental programs would best be implemented through a public and private partnership, but given the nature of running the program, the expertise and fleet buying experience combined with vehicle maintenance and management experience needed, it would only make sense that the program be primarily run by private sector businesses. Rental companies like Budget, Hertz, and Enterprise are well positioned to move into this market, and would provide operations, vehicles, and start-up costs, presuming they see opportunity for profit.

The public sector (city, county, transit agencies) can help ensure the success through several avenues, mostly at low cost.

- Reducing or eliminating car rental taxes on short-term car rentals. Car rental taxes on non-membership car rental programs can easily double the cost for short (1-2 hour) rentals.

[65] Survey of Hertz, Enterprise, U-Haul, Zipcar and CityCar Share.
[66] Phone call with Hertz Los Angeles.
[67] Hertz New York location, offering hourly rentals.
[68] Hertz Car Rental, "Convenient Hourly Rentals in Manhattan, Boston & Stamford,"https://www.hertz.com/rentacar/specialoffers/index.jsp?targetPage=hourly_manhattan_boston.jsp&Category=D&TabLink=tlink3 (accessed July 1 2009).

- Free or very low cost parking, along with assistance in identifying location opportunities. Reserved parking is an essential component of the success of hourly car rentals, and studies have shown that a walk of more than 5-10 minutes is considered too long for most consumers. By helping find and secure premium parking spots, public agencies can do much to encourage the hourly car rentals. Most locations will only need 2-6 vehicles. Possible locations include:
  - Train/metro/bus stations
  - Public buildings – Courthouse, DMV, library, government agencies, etc.
  - City owned parking lots.
  - Reserved on-street parking (likely replacing metered spots)
- Programs to encourage their employees to use hourly car rentals. Government and public agencies are a large employer in the region, and encouraging their employees to use hourly car rentals is a potential win-win for both sides. Hourly car rentals could replace some of the government owned fleet vehicles for official business, and be used by employees for personal business. A program modeled after Stanford University's "Commute Club"[69] could be very effective here, where commuters who pledge to use alternative transportation (transit, carpool, etc) receive a monthly credit towards car rentals for the times they need a personal vehicle.
- Government agencies can encourage private companies to offer similar programs to their employees through the use of incentives like tax credits or subsidies.

Implementation

At this time, there are no legal or regulatory changes needed to implement this program. Several changes could be made to make the program easier to implement including:

- Reduce rental car taxation on short-term rentals.
- Provide an easy, low cost system for the rental companies to check driving records. (allowing lower insurance costs for them).

Lead implementers would be Hertz, Enterprise, Budget and other major car rental companies. Supporting implementers would be city government, private companies, and transit agencies. The program should be structured as an incentive based program, with a common structure and guidelines, but allow multiple implementers to encourage competition. Alternatively, it could be granted as a concession, with special privileges, to a single implementer. This reduces competition, but allows greater control for the agency that organizes it.

Advantages of multiple implementers would include:

- Competition leading to lower costs.
- Greater availability of vehicles in more locations.
- Less risk to program due to company-wide financial issues of program implementers.

[69] Stanford University. "Parking & Transportation Services: Commute Club," http://transportation.stanford.edu/alt_transportation/Commute_Club.shtml (accessed June 2009).

Disadvantages of multiple implementers would include:

- Lost economies of scale in purchasing and other aspects.
- Greater cost of management.
- Less appeal to consumers if you have to sign up for 5 different programs to have vehicle availability.
- Risk of consumer confusion.

Interagency coordination could overcome many of these issues. With an overall program management team, many aspects of the program could be optimized, even with multiple implementers. This agency could create a single public face for the program, with a single sign-up, a single access point for reservations, etc. The agency would work with public agencies (transportation and parking, transit, etc.) to find and allocate parking, while working with private companies (Hertz, etc.) to provide vehicles and fleet management services, and working with companies and other government agencies to identify pools of consumers.

Specifically, LA Metro would be optimal as a lead agency, primarily because they have a payment system in place that could be modified to include hourly car rentals (detailed below). By integrating the payment system with a system that is already in use for many commuters, you significantly reduce a barrier to entry. In addition, LA Metro has significant experience in managing resource allocation, fleet management and more. Although their expertise is not in small cars, the experience they have broadly fits, and it aligns well with their public mission of providing affordable, environmentally conscious transportation options. In addition, they are widely recognized in the area, so a program branded “LA Metro – SmartChoices” would have significant customer recognition at the outset.

One possible scenario would even be a system, similar to what Google provides now, where a user goes to the LA Metro site, and plugs in their current location and destination. They are told which busses/trains to take, and asked if they’d like to reserve a car for the “last mile.” Total cost and alternative directions and prices are offered. Preprogrammed directions are sent to the car’s GPS system automatically. Payment is handled through the LA Metro system. Since Google already offers transit options in their mapping system, a “transit” hourly car rental may be posted there as well.

Market Acceptance and Target Markets

These types of programs have experienced high market acceptance in primarily two areas: a) dense urban environments with high rates of people living in the core and with high transit use rates, and b) universities.

We estimate overall market acceptance to be in the medium range. Hourly car rentals are by definition a niche product. If you need a car on a very regular basis, they are not economical. But they do serve an important role in helping people avoid owning multiple cars (with rental car acting as a second car when needed) or avoiding car ownership altogether. A high percentage of car owners drive or own vehicles for occasional uses (like owning a truck for when you have to move furniture) and the need for a car for occasional but recurring trips like grocery shopping are frequently cited as a reason people may continue to own a car even if they commute to work by transit. However, once a household owns one or more cars, average transit usage declines. By providing an alternative to owning a car, hourly car rentals enables transit use. One potential downside from an operational perspective is that people participating in short-term car rental

programs may drive far less frequently than they did when they owned a car (e.g. the marginal cost of driving 15 minutes to go out to lunch is too high, so they walk somewhere instead). Some users may begin to view short-term car rentals as insurance, but don't use them very often. While this is obviously good from an environmental and congestion standpoint, it creates situations where some hourly car rentals may experience reduced usage over time as consumers adjust their travel behavior, making the program difficult to maintain financially unless the user base expands. Careful vehicle allocation for a mixture of users can help overcome much of this.

Los Angeles has relatively high rates of vehicle ownership. Most households without access to a car are relatively impoverished (unlike San Francisco or New York), and therefore the cost of a rental is high. For households that already carry the sunk cost of vehicle ownership, an hourly rental is high relative to their variable costs. As such, market acceptance will be slowed. Efforts should concentrate in areas where people are without vehicles. For example, suburban commuters who work downtown and use transit, or would if they had a car available for occasional use are a prime market. The focus should be on their needs and locations, and business users. Los Angeles has a reputation as being very car-centric, and is not historically perceived to have high transit use, although data shows it is used more frequently than many people realize. In a car-centric world, it might be tough to convince people to give up their car; however, the availability of a car for short trips might help encourage use of public transit for longer trips.

Target markets:

- Demographic
  - Proportion of Youth 16-34: High. Although most hourly rental programs restrict drivers to over 21, and some to over 25, youth have traditionally been high adopters of similar programs. Any agency implementing such a plan should work to ensure that the program is available to younger drivers, potentially even subsidizing insurance costs.
  - Proportion of High-Income Households: Medium. For high income commuters, this program would offer an attractive alternative to driving in on days when a car might be needed. However, most high-income households already own cars, and this is unlikely to displace those vehicles for most non-commuting needs. For some high income households, hourly car rentals may replace the purchase of a second or third vehicle.
  - Proportion of Low-Income Households: Medium. Low-income households have lower rates of vehicle ownership, and are frequently users of public transit, but the hourly rates for renting a vehicle may be high for frequent use.
  - Proportion of Low Auto Ownership Households: High. In Los Angeles there is a strong correlation between low-incomes and low-auto ownership.
- Geographic (High, Medium, Low, All, N/A)
  - Residential Density: High. Areas of high residential density will have much greater adoption than suburban areas. Developers of high density housing may trade free parking for car rentals in exchange for zoning that allows a lower percentage of parking spaces per occupant. In addition, moderate income high density residential customers are more likely than moderate income suburban users to not own a vehicle. In areas of high residential density, a car rental location is more likely to have an adequate pool of potential customers within walking distance.

- Employment Density: High. Programs in areas with high employment density have many of the same advantages as above. Employers may receive incentives for encouraging employees to use these options over driving.
- Transit Intensity: Medium. More transit use equals more people without a vehicle. That said, hourly car rentals work very well for getting to areas without good transit access.
- Proximity to High-Capacity Transit in Dedicated Right-of-Way: N/A
- Proximity to Congested Auto Corridors: Low. Areas with congested auto corridors would make driving an hourly rental less attractive, though these areas also tend to have high rates of transit, keeping the user pool high.

Technology Integration Opportunities

Numerous technology integration opportunities abound. As outlined in the report, different car rental companies have used different approaches, ranging from online exclusively to requiring customers to go into a storefront and fill out paperwork. It is clear from the evidence that the user experience must be very convenient. Given the recommendation that the vehicles be distributed in multiple locations in small quantities, it only makes sense that the entire process will need to be largely automated. There are off the shelf solutions available for unlocking remote key boxes, at a cost of about $1,000/vehicle.

- Reservations. Reservations would best be made through the internet, with telephone assistance if required. In addition, kiosks should be available at transit hubs, possibly integrated with the ticket purchasing machine, such that you buy the whole trip with one purchase, including legs on transit and in an hourly car rental. This integration could occur online, with mapping software, or at the transit station at a kiosk. Tickets and codes could be used to unlock the vehicle, or it could use the LA Metro TAP card. Since TAP card holders already have a payment system in place, this further reduces the complexity of getting new users, and reduces barriers to entry.
- Real-time fleet management. Hourly rental cars would use GPS both as a convenience to the driver and a security program. This GPS system can send information back to a central location, where it can be used to track the fleet, including mileage driven. At given intervals, the vehicles would be brought in for servicing, ranging from cleaning to scheduled and unscheduled maintenance. The GPS systems would also allow large amounts of data to be collected on usage patterns, vehicle availability, and trip lengths. Long trips could be charged a premium, and the fleet could be shifted from one area to another to even out demand. Since GPS is time-aware, pricing could be adjusted based on time of day as well.

Providing real-time information (to maximize user convenience) is essential. Via the internet portal, users would be able to reserve cars in advance, or check the availability of a car for last minute trips. iPhone applications and other mobile phone enabled applications are also essential.

Specific Recommendations for Los Angeles

- Many of the recommendations are outlined in the implementation section. Ideally, the program would be done through a public and private partnership, with LA Metro taking the lead for implementation. By integrating trip planning and payment with the tools LA Metro already has in place, it creates the best opportunities for a seamless user experience.

Users could sign up for the program through the LA Metro, and get a special TAP card that would allow them to use public transportation for most of their journey, then a car for the final leg. Cars would be centered around or at hubs like Union Station, LAX, and other spots. Also, using the same fleets of vehicles to replace or augment city owned vehicles would both reduce costs for the city and provide a larger pool or vehicles and drivers to make the program attractive to the private companies to implement. In addition, advertising through the LA Metro agency, and in their location, would directly reach those users most likely to take advantage of the program. Keys to success will lie in:

- Locating the cars in areas with the highest numbers of folks in the target market, public transit users with an occasional but regular need for a vehicle at their destination.
- Keeping costs low by decreasing insurance and parking costs. This could possibly be done with partnerships with developers in exchange for lower limits on minimum parking spaces.
- Easy access for consumers, using automated lockboxes, no forms at vehicle pickup, and integration with LA Metro Cards.
- Integration into trip planning tools, including the LA Metro website and Google Maps.
- Low hourly fees. May require tax and fee waivers from the city.
- Partnerships with downtown employers to create incentive programs to encourage more of their employees to use public transit and hourly rental cars.

Additional Resources

Brook, David. "Carsharing: Start Up Issues and New Operational Models," Transportation Research Board (January 2004), http://www.carsharing.net/library/StartUp_Issues_TRB04_DBrook.pdf (accessed June 2009).

Hertz Car Rental, "Convenient Hourly Rentals in Manhattan, Boston & Stamford," https://www.hertz.com/rentacar/specialoffers/index.jsp?targetPage=hourly_manhattan_boston.jsp&Category=D&TabLink=tlink3 (accessed July 2009).

Kathleen Maclay. " University of California [Berkeley] News Press Release, March 23 2006, http://www.universityofcalifornia.edu/news/article/7981 (accessed July 2009).

Katy, Marquardt. "*Zipcar Redefines the Rental Car. US News and World Report". US News 5 June 2008,* http://www.usnews.com/articles/business/best-in-business/2008/06/05/zipcar-redefines-the-rental-car.html (accessed June 2009).

Stanford University. "Parking & Transportation Services: Commute Club," http://transportation.stanford.edu/alt_transportation/Commute_Club.shml (accessed June 2009).

Chapter 7. Folding Bikes on Transit

Overview

Transit is most effective for trips of moderate to long distance on busy corridors, and bicycles are effective for trips of shorter distance in low- to medium-density areas. For these reasons, the combination of bicycling and transit can provide a high level of mobility comparable to automobile travel in terms of the overall travel time and distance.

Many steps have been taken in Los Angeles to provide bicycle access to transit by allowing bicycles on rail, installing bicycle parking at transit stations, and providing bike racks on buses. However, during peak hours the ability to combine bicycle with transit diminishes due to a lack of space for expanding the supply of secure bicycle parking, restrictions for taking bikes on urban rail, and limited capacity for carrying bicycles on buses. These issues are discussed in Volume II, Appendix 1 and should be addressed directly. However, expanding the use of folding bikes (see Figure 7-1) can also play an important role in enhancing bicycle access to transit.

Figure 7-1 Modern Folding Bicycle

This photograph shows a modern folding bike in riding and folded positions. Source: CALSTART. Used with permission.

Existing Conditions

Description of Historical/Existing Services or Programs

The Los Angeles County Metropolitan Transportation Authority (Metro) is in the early stages of developing a new folding bike incentive program in partnership with CALSTART. The MyGo-Pasadena program described in Volume II, Appendix 1 is another example of a local subsidized bicycle program, however it focused on electric bicycles and scooters rather than folding bicycles.

Demand/Ridership/Usage

One benchmark for estimating demand comes from Santa Cruz, CA. Ecology Action, a non-profit based in Santa Cruz, has been running its Folding Bikes on Bus incentive program for residents of the County of Santa Cruz. The program originally targeted 140 bikes to be purchased, for an average of 70 bikes per year over the original two year plan. The program is still ongoing, so the

City of Santa Cruz has not yet collected and analyzed its data. However, approximately 90 bicycles have been sold over three years, which amounts to an average of 30 bicycles per year over the approximate timeline thus far (including start-up time). The rebate is $200 on select folding bikes at particular vendors, with a subsidy of up to 70% on two months of transit passes (up to $70). The budget for the program has been approximately $65,000.

Benefits

In addition to a primary benefit of helping bridge first/last mile barriers in order to increase transit ridership, folding bicycles can help address a host of problems that impact both individual commuters and the city as a whole. These secondary benefits include reducing traffic and parking congestion, air pollution, noise pollution; producing better public health outcomes through the promotion of an "active mode" of transportation, and increasing the affordability of personal transportation.

Figure 7-2 Folding Bike in an Office Cubicle

Folding bikes require minimal space and can be easily accommodated in most office environments. Source: CALSTART. Used with permission.

By themselves, folding bicycles can solve two problems that transit agencies face: how to get more commuters to use mass transit; and how to accommodate these additional transit users on board sometimes crowded buses and trains. Metro feels that folding bikes can help them convince more commuters to adopt transit for their daily commute, which would then empower transit administrators to improve infrastructure. As for the benefits to the rider, a folding bike is highly convenient for anyone who lacks the space to safely store their bicycle at any point in their journey or work day. Folding bikes can be easily stored in the office or cubicle and unfolded and ready to ride in seconds.

Folding bicycles occupy a minimum amount of space on the rail/bus system thereby avoiding 'peak period' capacity issues and allowing for more efficient movement of people. For example, many of the higher-ridership bus routes in Los Angeles may regularly exceed the carrying capacity (two bikes total) of the buses' bike racks, thereby forcing bus passengers to leave their bikes behind or stop taking the bus with their bikes. Folding bicycles can also address storage space issues. Having the ability to easily store and retrieve bicycles at home can be a significant factor for everyday bicycle use. This is especially true for older apartments and condominiums which typically don't provide formal, easily-accessible bicycle parking/storage, or for new residential development if the local jurisdiction hasn't adopted strong bike parking requirements.

A subsidized folding bikes program would increase the bike carrying capacity both on buses and on rail without impacting the passenger carrying capacity and without additional expense to LA Metro. Subsidized bicycle programs as a whole have been shown by the MyGo-Pasadena program to be effective in motivating single-occupant vehicle (SOV) drivers to get out of their cars

and free up valuable parking space.[70] Congestion is further reduced by preventing the need of the SOV to circle the parking lot in search of parking spaces, as may often occur during peak hours.

A subsidy program may also motivate cyclists who currently ride conventional bicycles, but can't find bicycle parking at the station, to purchase a folding alternative that they can take on-board the train and/or bus and preclude the need to store at their point of origin. This would concurrently reduce bike parking demand. Surveys of the users of these kinds of programs have shown a willingness not only to use the bicycle for commuting connections but also to use it for point-to-point travel within the community, thus effectively mitigating local congestion and providing collateral environmental and public health benefits.

Savings to the Commuter

One of the most attractive features of a folding bike is the extremely low cost required to operate and maintain one. According to the American Automobile Association (AAA), the average cost of driving and maintaining a motor vehicle in the United States is $0.54 per mile. Thus, when one considers that a given commuter may save as much as $50 to $75 per week in gasoline by simply switching from the use of a car to folding bicycle, the switchover could realistically pay for itself within the first few months.[71]

Costs

Capital Costs

A 2009 model folding bicycle can range in price from about $400 to as much as $1,300.[72] The cost to the implementing agency would depend on the size of the subsidy provided. In Santa Cruz, the subsidy per bike was $200 with a budget target of 140 bikes for the initial phase of the program.

Operating Costs

The total cost of the Santa Cruz folding bicycle project has been approximately $65,000. However, this has been a one-time demonstration, incurring significant one-time start-up costs that would be annualized as part of a longer term program.

Costs to Consumers

Small commuting vehicle subsidy programs like folding bicycle programs can have minimal cost to consumers. The costs incurred by consumers for folding bicycle programs are typically the unsubsidized portion of the folding bicycle purchased. New transit users will also incur the cost of using transit minus any employer or program-related transit subsidies. For example, many of the MyGo program's users found that participation saved them money overall since they were able to decrease the costs of gasoline and parking. While the cost of owning and operating a folding bike is negligible, the total yearly savings of a subsidized folding bike

[70] Whitney, Pitkanen," MYGO-PASADENA: Demonstrating Small Electric Vehicles as Transit Connectors," CALSTART, http://www.calstart.org/Libraries/First_Mile_Documents/MyGo-Pasadena_Summary_of_Conclusions.sflb.ashx (accessed June 2009).
[71] Eco Wheelz," Cost of Operating an Electric Bicycle," http://www.eco-wheelz.com/articles/cost-of-operating-electric-bicycle.php (accessed June 2009).
[72] Transportation Alternatives, "The Folding Bike Solution," http://www.transalt.org/resources/foldingbikes (accessed June 2009)

program must also take into account the cost of a monthly Metro pass at $62/month, or $744 annually. It should be noted, however, that transit pass costs can often be offset by pre-tax commuter benefits which allows employers to offer their employees up to $230 a month ($2,760 a year) in untaxed public transportation benefits, or allows an employee to receive the transit benefit as a pre-tax payroll deduction, or some combination of the two. Alternately, transit pass costs can be offset by "parking cash-out" allowance. Parking cash-out is mandated by California state law and which requires certain employers in California that offer free parking to any of their employees to offer all their employees the option to take a cash allowance equal to the cost of the company-paid parking space in lieu of the parking itself.[73]

Best Practices

Historically, there have been a only handful of commuter incentive programs in the United States that bridge the first mile/last mile transit gap with small commuter vehicles, and only one that has included folding bikes.

Santa Cruz Folding Bicycle Incentive Program

As discussed in the "Benefits" section above, the purpose of the Santa Cruz folding bicycle program was to allow riders greater access to the metropolitan transit system by bicycle. Currently, the fronts of each of the operator's buses are outfitted with bike racks designed to hold three bicycles per vehicle. On the higher-ridership routes, the bicycle racks are often full, which may act as a deterrent for potential bicycle riders from using the transit system. The program requires the applicants to attend a two-hour safety program first before they can qualify for the program. The program offers $200 in rebates on specific vendors' folding bicycles, and also offers the program participant the option of purchasing two months worth of Santa Cruz Metropolitan Transit District bus passes at up to 70% off retail price.

[73] California Health and Safety Code § 43845.

Figure 7-3 Santa Cruz Folding Bike Program Website

A non-profit organization implements the folding bicycle incentive program in Santa Cruz. Source: Ecology Action Website. Used with permission.

Fiscal

Best practices in funding these types of programs suggest that a) many partners must collaborate to provide initial "proof of concept" funding and that b) obtaining on-going funding beyond the pilot phase is a critical challenge for a program that may not be financially self-sustaining.

The Santa Cruz Folding Bikes in Buses Incentive Program was funded by the Santa Cruz County Regional Transportation Commission. The program received funding via Assembly Bill 2766 which provides for the collection of an additional $4 in motor vehicle registration fees to fund various projects that reduce motor vehicle emissions such as zero-emission vehicles, bike lanes, and trip reduction programs.

Expansion Potential in Los Angeles

Opportunities

Full-sized bicycles are currently restricted on Metro Rail during peak hours and in peak directions and are only allowed on Metro buses at the discretion of the driver. At the same time, the available space for vehicle and bicycle parking at transit stations is limited, transit ridership has increased and bicycle use appears to be increasing as well. Folding bikes are currently allowed on Metro Rail, Metro Buses and LADOT buses (Commuter Express and DASH). Promoting the

use of folding bicycles for bike-transit trips is an attractive strategy because it can be implemented without requiring additional space, infrastructure, or policy change.

New/Pending Policies and Funding Opportunities

Metro and CALSTART have received funding from Caltrans for a Folding Bike Implementation Plan which will provide a strategy for implementing folding bike programs in Los Angeles County. Specifically, the project will evaluate the potential for implementing folding bicycle incentive programs targeted around five transit stations in Los Angeles County. Market research will be conducted through surveys and public meetings. The plan will identify potential public and private sector partners and funding sources. If this project determines that there is potential for successful implementation of folding bicycle incentive programs in Los Angeles County, Metro may be interested in providing funding for such programs through their semi-annual Call for Projects.

Emerging Political Will/Public Opinion

Public agencies in Los Angeles are experiencing increased pressure to improve bicycle access to transit. Space constraints associated with vehicular and bicycle parking, as well as capacity constraints on transit vehicles should tend to favor increased support for folding bicycle incentive programs.

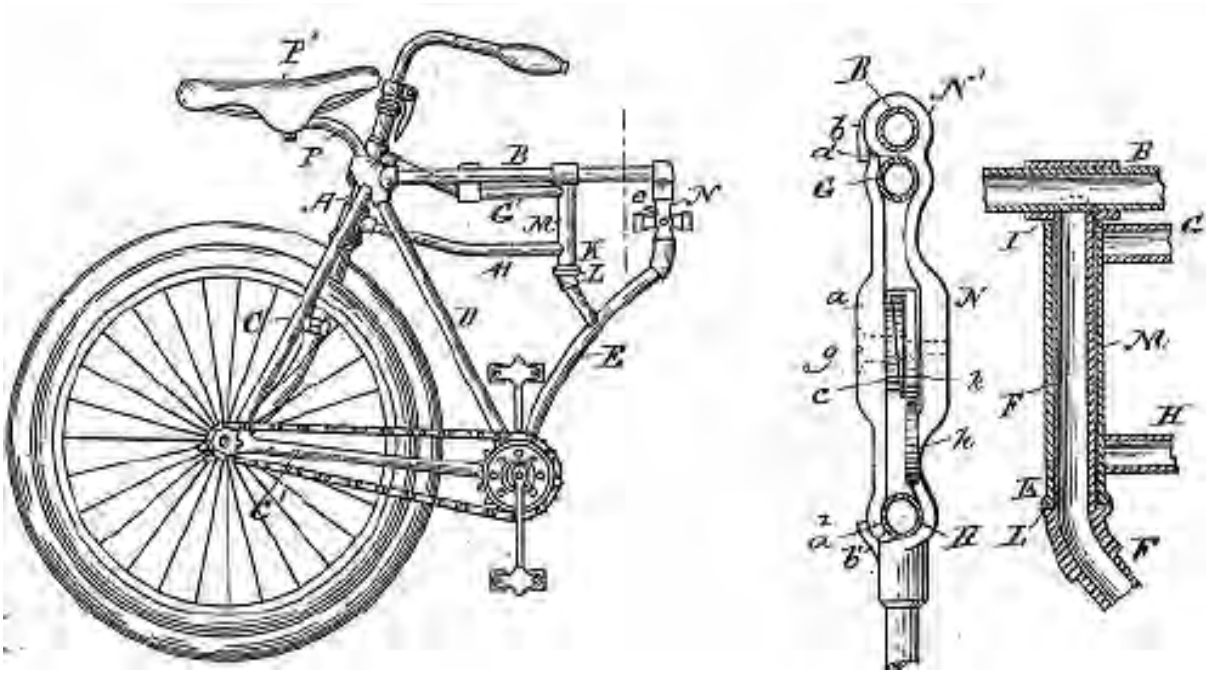
Challenges

Technology

The technological challenges associated with the implementation of a folding bike program are minimal. As Figure 7-4 illustrates, folding bike technology has been evolving for over a century.[74] A key challenge has been the development of a bicycle that possesses the sometimes competing characteristics of safety, portability, comfort, and ease of use. Many modern folding bikes have achieved a high level of functionality while minimizing weight and size. Folding bikes usually have between 20-26 inch wheels and weigh between 22-30 pounds. Through on-going technological advances and manufacturer responses to customer feedback, folding bike technology can be expected to improve in the future.

[74] The Folding Cyclist. "The History of the Folding Bike," http://www.foldingcyclist.com/folding-bike-history.html (accessed June 2009).

Figure 7-4 First Folding Bike Patent (1893)



Folding bicycles are a proven technology that has been evolving for over 100 years, as evidenced by this early patent. Source: The Folding Bicyclist. Public domain.

Regulatory

A folding bicycle incentive program is an attractive mobility strategy because it does not require any regulatory changes. Folding bicycles are currently allowed on-board all rail vehicles and most buses operating within the City of Los Angeles.

Lack of Comprehensive Bikeway Network

The lack of a continuous bikeway network presents a challenge to implementing any bicycle mobility program. People may choose not to bike due to the actual or perceived lack of a complete safe and comfortable network of bikeway facilities that connect to their desired destinations. Targeting areas for adequate bicycle access to transit stops and stations is a potential near-term implementation strategy.

The design and function of streets further influences the demand for travel by bicycle. Streets with designated bikeway facilities are most attractive to occasional or novice riders, providing an increased sense of safety and comfort. Traveling in mixed flow traffic with high volumes of motor vehicles, especially if speeds are high can be a strong deterrent to bicycling, especially by less experienced cyclists.

Financial

Finding the start-up and operating funding for new programs like these can be difficult because there is no established business model that is self-sustaining. (It is worth noting that all modes of publicly-provided transportation are subsidized to some degree, including automobile travel). Thus, these kinds of projects often lack critical start-up funding. However, when the long-term

cost savings to the public are considered (e.g. reduced congestion and air pollution), the cost effectiveness of these programs becomes more apparent.

Political

Due to the current economic crisis, it is reasonable to ask how the public will view new 'non-essential' expenditures in the light of a strong economic downturn, a federal budget deficit, and a state budget deficit. For this reason, mobility programs designed and marketed as contributors to long-term job growth and economic competitiveness will likely garner local and regional political support. Low-cost programs that reduce traffic congestion, provide greater mobility choices, reduce the environmental impacts of the transportation system, and improve public health outcomes fall into this category.

Market Acceptance

For folding bicycles, the Santa Cruz program had some difficulty in getting the vendors to agree to partake in the program and getting them to fill out the paperwork. There was also some difficulty in the bike selection and finding the best target audience to which they could make their marketing appeal. However, the biggest hurdle with folding bikes in the Santa Cruz program was that, although there are 300,000 people in Santa Cruz County, and approximately half that many in the metropolitan area, Santa Cruz lacks the population density that is optimal for a folding bike program. Folding bikes are likely more suitable for high-density areas that are characterized by small living and working spaces.

Feasibility Evaluation

The City of Los Angeles should consider pursuing a folding bicycle pilot program targeted around one or two transit stations within the City of Los Angeles. The program should be developed based on the findings in the Metro Folding Bike Implementation Plan. The City should attempt to identify funding sources for this program that do not compete with funding sources used for the expansion of the citywide bikeway network. The following describes the potential phasing for a folding bicycle incentive program in the City of Los Angeles:

Phase I:

- Partner with local bike vendors and community groups to develop a small pilot program of 500-1,000 bicycles at one to two targeted locations focused on the target markets described below and in the forthcoming Metro Folding Bike Implementation Plan.
- Partner with local bike vendors and community groups to develop a marketing campaign (on-board transit vehicles and at stops, in-store information, and on partner websites) to publicize transit operators' accommodations for folding bikes, cost savings, health benefits, etc.

Phase II:

- Based on evaluation of pilot program, seek funding for an expanded program with the goal of being able to provide a subsidized folding bike to any income-qualified applicant living or working within one mile of a major rail station.
- Incorporate folding bike requirements into local TDM ordinances to require developers to subsidize folding bikes for residents and employees of new transit-oriented development.

Benefits

Primary Benefit: Bridging the First/Last Mile Gap

The benefits of implementing a folding bike program in Los Angeles would include providing an additional mobility option to users who would not normally have reliable bicycle access to the transit system. Because folding bicycles can be taken on board transit vehicles, a folding bicycle program would fulfill the primary benefit of helping to bridge the first and last mile gap between transit and a user's destination. In a dense urban environment where space constraints may prevent people from storing full-sized bicycles in their homes, folding bicycles provide an additional mobility option.

Secondary Benefits: Congestion, Equity, Mobility, Climate Change, VMT Reduction

Increasing the supply of folding bikes in the general population benefits overall mobility by providing a mobility device that can be taken aboard transit vehicles at any time of day. By providing a subsidy or other financial incentive for the purchase of a folding bicycle, this type of program could potentially increase equity by increasing access to folding bikes for those who might not otherwise be able to afford one. The most significant reductions in congestion, greenhouse gas emissions and VMT would result in cases where folding bikes attract new users to transit, who previously used a car for part or all of their commute trip.

Short-Term vs. Long-Term Benefits

Benefits of folding bike programs can be expected in short to medium term, typically as soon as folding bicycles are available for use. It is important to track commuting patterns of users before and after receiving the folding bicycle in order to best quantify the benefits over the short and long term.

Costs

The cost of implementing a folding bicycle program depends on the level of subsidy (cost of incentive), the target number of folding bicycles, the scope of associated educational components, and the timeframe of the program. Planning-level order of magnitude estimates are provided below wherever possible.

Start-Up Costs (non-capital): Low. Non-capital start-up costs include all costs incurred prior to system deployment such as the development of an implementation and marketing strategy. Metro and CALSTART have recently received funding to develop a Folding Bike Implementation Plan which could be used by cities to minimize the start-up costs associated with launching a folding bicycle program.

Capital Costs: Low. The capital cost for a folding bicycle program depends heavily on the level of subsidy (cost of incentive) and the target number of folding bicycles. In Santa Cruz, the subsidy per bike was approximately $200 with a target of 140 bikes for the initial phase of the program, for a total capital cost of around $28,000 or 43% of the total program cost.

Operating Costs: Low. Based on the costs for the Santa Cruz County Folding Bikes in Buses Incentive Program, operating costs were approximately $37,000 for two years and made up approximately 57% of the total program cost. Due to one-time start up costs and the potential for economies of scale in program management, the proportion of program costs spent on operations can be expected to decline as a program matures and expands.

Cost to Consumers. The cost to consumers equals the cost of the folding bicycle minus the value of the subsidy or incentive. There is also a time cost associated with registering for the program and complying with all of the program requirements such as program applications and mandatory safety trainings. Some price-sensitive user groups or demographics may base their decision to participate primarily on the level of subsidy or financial incentive, while others may ultimately decide whether or not to participate based on the time cost of registering and complying with program requirements. Both of these consumer cost elements should be carefully considered in the development of a folding bicycle incentive program.

Private Sector vs. Public Sector Costs. Acquisition of funding from the private sector could be used to off-set the costs to the consumer and/or the costs of operating the program. Folding bicycle manufacturers or dealers may be interested in providing monetary or in-kind contributions to the program as way of marketing their product or business. Sponsors could be provided with advertising space on program websites. Sponsoring bike shops could be listed as eligible dealers. Sponsoring manufacturers could have their folding bicycles listed as eligible products. Health care providers may also have interest in sponsoring folding bicycle programs. In-kind contributions such as manufacturer or bike shop discounts on folding bike models could reduce the costs to consumers, increasing the incentive to join and potentially reaching more price-sensitive participants. Monetary program sponsorships could provide flexible funding which could be used to cover operating expenses or to reduce consumer costs by increasing the incentive or subsidy. Other in-kind contributions from private institutions (e.g. office supplies, coupons, gift cards) could also be used to lower operating costs or as additional incentives for participants, depending on the nature of the contribution.

Implementation

Regulatory Changes Required

As mentioned earlier in the chapter, a folding bicycle incentive program is an attractive mobility strategy because it does not require any regulatory changes. Folding bicycles are currently allowed on-board all rail vehicles and most buses operating within the City of Los Angeles.

Operational Strategies

The Folding Bike Implementation Plan currently being led by Metro and CALSTART will provide strategies that can be used by municipalities in the implementation of folding bicycle incentive programs. It will also identify funding sources that local agencies can use for folding bicycle incentive programs.

The information below is speculative and more definitive information will be produced as part of the Folding Bike Implementation Plan currently being developed by Metro and CALSTART.

- Implementing entity:
  - Lead implementers: City of Los Angeles
  - Supporting implementer: Metro
- Interagency coordination: The City will have to coordinate with Metro and other transit operators serving Los Angeles in order to ensure that program participants have accurate information about the requirements for taking folding bicycle on different transit systems.

- Joint partnership potential / private-sector role: Partnerships with one or more folding bike manufacturer should be pursued in order to reduce the program's capital costs and the cost to the consumer.

Market Acceptance and Target Markets

More study is needed to understand the best target markets for folding bicycle incentive programs in Los Angeles. Target demographics depend heavily on the structure of the program. While bicycle sharing programs are tangible and advertise themselves through conspicuous placement within the community, folding bicycle incentive programs depend heavily on targeted marketing efforts in order to attract participants.

The information below is speculative and more definitive information will be produced as part of the Folding Bike Implementation Plan currently being developed by Metro and CALSTART.

Overall market acceptance: Medium

Target markets:

- Demographic
  - Proportion of Youth 16-34: Medium to High
  - Proportion of High-Income Households: Medium
  - Proportion of Low-Income Households: Medium
  - Proportion of Low Auto Ownership Households: Medium
- Geographic
  - Residential Density: Medium to High
  - Employment Density: Medium to High
  - Transit Intensity: Medium to High
  - Proximity to High-Capacity Transit in Dedicated Right-of-Way: Medium to High
  - Proximity to Congested Auto Corridors : Medium to High

Technology Integration Opportunities

While there is no need to integrate technology into the folding bike program itself in order for it to be successful, transit use by folding bicycle program participants could potentially be tracked through their TAP card. Tracking information would be helpful in evaluating the effectiveness of the program and measuring program benefits. This would require that their TAP cards have unique identifiers and that the program managers have access to that data. Tracking procedures would have to be disclosed as a condition of participation and measures would have to be taken to ensure the privacy of participants.

Additional Resources

Eco Wheelz, "Cost of Operating an Electric Bicycle," http://www.eco-wheelz.com/articles/cost-of-operating-electric-bicycle.php (accessed June 2009).

The Folding Cyclist. "The History of the Folding Bike," http://www.foldingcyclist.com/folding-bike-history.html (accessed June 2009).

Transportation Alternatives, "The Folding Bike Solution," http://www.transalt.org/resources/foldingbikes (accessed June 2009).

Whitney, Pitkanen," MYGO-PASADENA: Demonstrating Small Electric Vehicles as Transit Connectors," CALSTART, http://www.calstart.org/Libraries/First_Mile_Documents/MyGo-Pasadena_Summary_of_Conclusions.sflb.ashx (accessed June 2009).

Chapter 8. Bicycle Sharing Programs

Overview

Bike sharing is a form of bicycle rental where people can have access to a shared fleet of bicycles on an as-needed basis. Bicycle sharing programs provide safe and convenient access to bicycles for short trips, such as running errands or transit-work trips. The international community has experimented with bicycle sharing programs for nearly 40 years. Until recently, bicycle sharing programs worldwide have experienced low to moderate success; in the last five years, innovations in technology have given rise to a new (third) generation of technology-driven bicycle sharing programs. These new bicycle sharing programs can dramatically increase the visibility of cycling and lower barriers to use by requiring only that the user have a desire to bicycle and a smart card, credit card, or cell phone.

Bicycle sharing programs, such as systems in Paris and Lyon, France (see Figure 8-1), have helped to increase bicycling mode share, provide access to the public transit system, reduce a city's travel-related carbon footprint, and provide additional 'green' jobs related to system management and maintenance. In the US, many cities are considering bicycle sharing programs, though they have not yet been widely implemented. These systems are not foolproof: poor design, inadequate supply of bicycles, and lack of maintenance are among the potential pitfalls faced when building and implementing a bicycle sharing system.

Pricing of bicycle sharing programs is often structured to encourage short trips.

Existing Conditions

Description of Historical/Existing Services or Programs

No modern (technology-driven) bicycle sharing programs currently exist in the City of Los Angeles, although some private companies have reportedly maintained bicycle fleets for their employees at one time or another. For example, Paramount Studios and other movie studios reportedly use large numbers of bicycles and tricycles for internal circulation on studio grounds.[75] American Apparel launched an employee bicycle program as a response to a 35-day transit strike in 2003.[76] The Good Samaritan Hospital recently provided a limited number of fleet bicycles for employees.[77] No additional data on these programs is available.

As for publicly-available bicycle sharing programs, none currently exist in Los Angeles, but the City of Los Angeles Department of Transportation recently released a Request for Information (RFI) to assess private sector interest in establishing bicycle sharing services in Los Angeles.

[75] International Bicycle Fund, "Bicycles & Pedal Power in Business & the Work Place," http://www.ibike.org/economics/work-bike.htm (accessed March 2009).
[76] Wearables Business Magazine. "American Apparel bicycle program provides healthy benefits to employees and environment," http://wearablesbusiness.com/wearablesbusiness/mag/apparel_american_apparel_bicycle/index.html, (accessed April 2009).
[77] Urban and Environmental Policy Institute (UEPI), "New Bike Sharing Program at Good Samaritan Hospital," http://uepi.wordpress.com/2008/12/11/ (accessed June 2009).

Demand / Ridership / Usage

No demand or usage data is available for historical/existing bicycle sharing programs in the City of Los Angeles. Demand is typically proportional to population and employment densities, proximity to transit, and socio-spatial characteristics.

Operations

There is currently no information available on the operations of existing bicycle sharing programs in Los Angeles.

Two general operational models exist.

- The first, and most common, model is advertising-based, where large outdoor advertising companies are given exclusive rights to urban advertising space in exchange for installation and maintenance of the bicycle-sharing system. The "Velib" system in Paris is an example of this first model.
- The second is operated by a city or other public agency as part of a larger TDM or parking management strategy. Montreal's "Bixi" and Long Beach's employee-based program are examples of this second model.

Four case studies provided later in this chapter discuss different operational models from Paris, Montreal, Washington D.C., Germany and Long Beach.

Benefits

No data is currently available on the benefits provided by historical or existing bicycle sharing programs in the City of Los Angeles.

In general, bicycle sharing programs improve mobility options, increase cycling and reduce drive-alone trips. Bicycle sharing systems have proven to be particularly effective ways of encouraging bicycle use for short trips. Such systems also clearly demonstrate a city's commitment to investing in non-motorized transportation options. In addition, providing people with a safe and comfortable opportunity to bicycle may also encourage them to consider bicycling as a viable mode of transportation throughout their daily lives.

Employer-based bicycle sharing programs enhance mobility options for employees once they arrive at work and may reduce demand on the motor vehicle fleet. If employees are able to borrow a bicycle for a daytime trip, they may be more willing to take transit to the office.

Costs

Capital Costs

Typical capital costs associated with bicycle sharing programs include the purchase of bicycles, locks, accessories (i.e. helmets, lights), and bicycle racks or any improvements to the area where the bicycles are stored. Lessons learned from the European Union and Canada cite bicycle costs of up to $3,500 USD depending on the type of technology. This price represents the total cost of all bicycles, pods, and installation divided by the number of bicycles. Higher end costs include the purchase and installation of bicycle and all associated infrastructure including terminals, operating software and system cards. Assuming the program operates using mechanical keys and locks with no complex electronic access control or tracking mechanisms, the capital cost would typically

range from $250 - $1,000 per bicycle. The anticipated cost of the Paris program and the Rennes program was estimated at about $1,300 USD per year/per bicycle. This price represents ongoing operating costs including general maintenance, replacement costs, customer service, and redistribution of bicycles.

Operating Costs

While no data currently exists for the historical/existing programs described above, operating costs would typically include the salary and overhead costs of the employee(s) managing the program, the labor cost of maintaining the bicycle fleet (including parts and labor) and the cost of replacing damaged or stolen bicycles. Operating costs will vary greatly depending on the number of bicycles and the level of use.

It is common for a government agency to undertake operation of a bicycle sharing system with an operating partner, as most bicycle sharing systems are not financially self-sustaining. Funding for public bicycle systems typically comes through a combination of advertising revenue, user fees, and public government funds, and operates as a public-private partnership.

One exception to the public/private partnership model is the Bixi system in Montreal. This system, managed by the City's parking department, already has staff and logistics in place for roving city workers to visit bicycle sharing locations and already has billing and revenue collection processes in place.

Costs to Consumers

Bicycle sharing programs can either be available to the general public or a specific group of people associated with the sponsoring organization. Most publicly-available bicycle sharing programs require users to establish a membership prior to use. Membership requirements typically include completion of a form, often available online, providing basic personal information, and either payment of a deposit or registration of a valid credit card as a security deposit against damage, loss or theft. This may also be the case with limited-access programs, though registration may be simplified by use of previously gathered information.

To use a bicycle, someone typically swipes a membership card, credit card, or other identification card to unlock the bicycle. Programs usually charge a time-based usage fee. Some programs offer the first 20-30 minutes for free, then charge a higher fee per hour the longer the bicycle is in use. This encourages shorter trips and allows bicycles to be used for more trips per day, maximizing the social and mobility-related benefits of the program. Most programs have a maximum time period a bicycle may be used, varying from several hours to one day. After this period, the bicycle may be considered stolen, with a significant fee charged to the user.

While no data currently exists for the historical/existing programs in Los Angeles, users of employer-based bicycle sharing programs are typically not charged for using the bicycles from the shared fleet. In some cases, employees may be required to cover a portion of the replacement cost of lost bicycles or keys.

Best Practices

Technology-driven bicycle sharing programs have many common elements including equipment and systems (e.g. bicycle fleets, parking and locking mechanisms, user interface and check-out

protocols, and station networks), as well as maintenance and management requirements (e.g. fleet and station maintenance, status information systems and bicycle redistribution systems).

Public bicycles should be distinctive, designed for easy city use, and be clearly branded to increase their visibility. Bicycles typically come with full fenders, chain guards and, in some cases, locking mechanism attached to the bicycle's frame. In most systems, bicycles come equipped with a Global Position System (GPS) unit, and a Radio Frequency Identification (RFID) tag used to locate the bicycle within the system. This function is typically used in fleet management, utilization analysis, and location of lost or stolen bicycles.

Parking and Locking Mechanisms

Two major types of locking technology, both fully automated, are available. Bicycles lock to either a rack or kiosk where users collect and drop bicycles using a smart card or credit card. Card-access systems are found throughout the world. These systems are generally simple to operate, making them accessible to the general public.

Alternatively, bicycles are secured using an electronic lock mounted on the bicycle. The customer calls the telephone number given on the bicycle which includes the bicycle's ID and receives by voice the four-digit opening code, which she then types onto the bicycle's touch screen to unlock it. This is commonly referred to as a "dial-a-bike" or "call-a-bike" system. These systems are found predominately in Germany.

Call-a-bike check-out requires very little infrastructure as the necessary mechanisms are mounted on the bicycle itself. Stations using card-access systems generally require: a bar, dock, post or other physical structure to lock bicycles between uses; a computerized system to check bicycles in and out; and a power source to control check-in/check-out and track bicycles.

Figure 8-1 Bike Sharing

Bike sharing, like this station in Lyon, France, is a popular method of encouraging bicycling for short trips. Image from Alta Planning and Design. Used with permission.

Station Design, User Interface and Check-in/Check-out Protocols

All bicycle sharing programs require a user interface to collect and retrieve bicycles through a check-in/check-out system. The interface should be simple and easy to understand (e.g., give instructions, diagrams, and multiple languages when necessary). Stations should provide clear directions on how to access and return a bicycle. Other recommended elements and design guidelines include:

- Instructions on where and how to return bicycles
- Cost and pricing information
- Contact information to report damaged bicycles or stations

- Maps of nearby stations and recommended bicycle routes
- Damage-resistant locking mechanisms; and quick access to avoid queues and maximize safety

Both system styles may require the user to register prior to bicycle check-out. The best systems will offer multiple options to register and pay for bicycle check out (e.g., smart card or credit card).

Smart card systems allow quicker, more convenient bicycle access as users are not required to make a phone call in order to check bicycles in or out. Programs using a smart card system generally do not provide users with a lock. If users have prepaid for a smart card, or registered for the service with a credit card, they can simply swipe the appropriate card and go. Many systems also allow the user to register for an account at station locations.

Call-a-bike systems require the user to know and plan for the need to place a phone call in order to unlock the bicycle, but allow increased flexibility in terms of return locations and provide the ability to temporarily secure the bicycle during the rental period. Users can generally register for call-a-bike systems via the internet or a customer service line. After completing the initial set-up, users simply call an automated number and receive the bicycle's unlock code. Time is charged against the credit card registered during the initial call-a-bike account set-up. Users receive a periodic statement detailing each rental change during the previous billing cycle.

Figure 8-2 includes best practices for bicycles, locking technology, and station design.

Figure 8-2 Bike Sharing Best Practices

Equipment	Guidelines
Bicycles	Easy and comfortable to ride with adjustable seats Equipped for utilitarian, city riding (e.g., include chain guard, kick stand, bell, bicycle lights, front and rear wheel fenders, a large basket or bicycle rack) Includes bicycle lock, if full-day rentals are permitted and/or if users may "return" the bicycle by leaving it anywhere Distinctly 'branded' to permit easy recognition and reduce the chance of theft. Some bicycle systems also include non-standard components of bicycle frames to reduce the chance of disassembly and resale.
Parking and Locking Mechanisms	Secure, and easy to use Visible and well-lit, even if hours of use are restricted Denote availability of bicycles through indications of status (typically red or green light). The location of this light will be dependent on the type of system. In the Washington D.C. system availability is denoted on-line, or on the kiosk; in Call-a-Bike systems the status indicator is generally on the bicycle itself. Should provide a map of other nearby stations and directions on how bicycle check-out and return methods Include clear information about bicycle rental costs

Equipment	Guidelines
Station design, check-out method and protocols	Automated, simple and easy to use Resistant to damage and vandalism Accessible to users of casual and regular users Provide a method for initial registration

Station Networks

Station networks should be designed with regard to anticipated users and trip types. For example, some systems in the Netherlands target rail commuters who need a bicycle to get from the rail station to work. In Paris, stations are placed to create a citywide network with stations available about every 300 to 500 meters (900 to 1500 feet). A call-a-bike system may be ideal for casual commuters or tourists who may take advantage of the opportunity to make spontaneous one-way trips and would benefit from the option to leave the bicycle at any street intersection within a predefined service zone. A good station network will:

- Place bicycles at easily-found high-traffic locations.
- Connect to public transit stops and stations.
- Serve the needs of recreation and utilitarian trips.
- Appeal to the targeted population by placing stations near desirable destinations.
- Include sufficient stalls at each station to exceed anticipated demand under normal conditions.
- Take terrain into consideration (most cyclists prefer to avoid hilly terrain when possible).
- Have stations placed within a reasonable travel distance of each other (difficulty created by inconvenient rental/return locations could contribute to underutilization of the system).

Bicycle sharing programs require system management and regular maintenance of the fleet and stations. These systems can help keep the bicycle sharing system in top operating order and provide sufficient bicycles to accommodate normal demand.

System management should include both a status information system and a bicycle redistribution mechanism. A status information system will allow operators to track a bicycle's location and whether it is in or out of service; bicycle and station usage; and each user's usage statistics and billing information. This information allows system operators to develop and refine bicycle redistribution strategies, track maintenance needs, and perform other critical system activities. Some systems may also handle billing and subscription related activities.

A bicycle redistribution mechanism ensures that a bicycle will be available at the station of a user's choice. Information about bicycle demand can be gathered through GPS units, RFID tags and any other means used to track bicycle locations. Redistribution may require attention throughout the day as activity patterns shift.

Bicycle fleet maintenance includes common activities such as filling tires with air and tuning up bicycle gears. Station maintenance may include repairing lock mechanisms, replacing damaged interfaces, and installing new power sources. Bicycles and stations not kept in good repair can create safety and liability issues. System operators should consider requiring users to sign a liability release waiver. Some systems, such as the one in Washington DC, will send messages

about required bicycle and station maintenance. Others systems, such as the Bycyklen stations in Copenhagen, have little to no automation and require regular inspection to ensure that stations and bicycles remain in good repair.

Bicycle fleets and stations will require both scheduled (preventative) maintenance and as-needed maintenance as issues arise. A bicycle sharing program should include a plan for fleet and station maintenance. Suggested plan elements include: a method for users to report bicycle damage or necessary repairs/vandalism, a schedule for regular station inspection and or maintenance, a clearly identified party or group in charge of fleet or system maintenance, and a funding source, or identified method to pay for scheduled and as-needed maintenance required to keep bicycles and stations in working order.

Bicyclist Safety

Rider safety and liability are important issues for bicycle sharing programs. Though there is ongoing debate in Europe, wearing a helmet is considered an important safety measure in the United States, especially for youth. People who use bicycle sharing are often less experienced cyclists without a helmet of their own. Existing bicycle sharing programs do not provide helmets, and to what extent the rider or the bicycle sharing program may be liable for an injury or accident has not been clearly established in the United States or elsewhere. Risk can be significantly reduced through orientation and safety classes for new riders, and providing helmets to members for free or at a discounted price could also reduce both risk of injury and potential liability for sponsors of bicycle sharing programs.

As previously noted, the design of streets and bicycle networks also has a significant impact on bicyclist safety, and can be a primary determinant of demand for bicycle sharing. The successful program in Paris, France has been supported by the development of a comprehensive network of bus and bicycle lanes.

Case Studies

Paris, France

The Vélib program in Paris, France provides rental bicycles that are available day or night throughout the city. The system is designed to reduce barriers to entry: annual membership is not required and stations are placed with a high frequency. A recent study showed cycling has increased in Paris by 70% in the year since the system's implementation.

Advertiser JC Decaux funds the entire system and relies upon revenue from billboard space (1,600 billboards were granted to the company by the city) and bicycle rentals to fund the program. Annual registrations are available annually but not required for 29 Euros (37 USD as of March 2009). The first 30 minutes of each use are free, and then the individual's account is charged. The maximum ride time is three hours. Credit cards may also be used to purchase a short-term pass of one-day or seven-day subscriptions.

The system has 1,450 stations located about 300 to 500 meters apart. Stations consist of terminals and stands for securing the bicycles. Maps of station locations are provided online. Bicycles include baskets, internal hub lights, chain guards and reflective strips on wheels. Helmets and locks are not provided. The Paris system is free for the first half hour, and then charges about $1.30 for the second half hour, $2.60 for the third half hour, and $5.20 for the fourth half hour and each additional half hour. Allowing free rental for the first thirty minutes

encourages users to try the system. In Paris and Lyon, this policy has resulted in about 95% of rides being free.

Bicycles are accessed through Smart Cards that can be swiped at any station. Bicycles can also be returned at any station. Many locations experience peak times of use when a rack will be either completely empty or completely full, making either the check-out or return of bicycles impossible. This operation, while encouraging one-way trips, requires considerable fleet management throughout the day. Bicycle redistribution is handled by maintenance crew when necessary.

> "Bike sharing is an interesting twist on public transit and very much matching the way people want to live today: They want to have their individuality. We see that in the way we consume music and video, and this is the same thing that is happening with public transit."
>
> –Bernard Perisot, president and co-CEO of JC Decaux North America[78]

One challenge the Velib system has encountered is user accountability – 250 to 300 bicycles had been stolen after the first two months of the program. This problem can be mitigated through steep fines for non-returned bicycles.

Figure 8-3 Paris System Bike

The bicycles in Paris' Velib system are sturdily built to minimize maintenance fees. Image from Jane Fabulet. Used with permission.

[78] Hannah Hoag. "Bike-Sharing Services Roll into the US". MSNBC 7 April 2008, http://www.msnbc.msn.com/id/23869261/ (accessed March 2009).

Montreal, Canada[79]

The Bixi (short for 'bike taxi') system in Montreal, Canada is operated by the city's parking department. The system debut was in April 2009. This system, managed by the parking department, has roving workers who visit stops to maintain the system.

The required annual subscription costs $78, while monthly ($28) and daily ($5) plans are also available. Users must register in person. No deposit is required, but two forms of ID and personal information will be recorded. Bixi offers the first half-hour free of charge (with the required subscription), the second half-hour for $1.50, after an hour the cost increases to $3, with $6 for every additional half-hour.

The system includes 3,000 bicycles at 300 stations throughout the City. Bicycles are checked-out from completely modular stations (solar powered), which can be set up throughout the City at will. The bicycles themselves have sealed-in components to lower maintenance costs, as well as RFID tags to minimize theft. Users can deliver bicycles to any station location.

The city estimates that the cost of the program will be up to $1,500 (Canadian) per year/per bicycle to maintain.

Washington D.C.

Called SmartBike DC, the Washington, DC bicycle sharing program is operated by Clear Channel Outdoor in partnership with the District Department of Transportation.

> There's a lot of stress on our transit systems currently... [the D.C. BikeShare Program] will help us reduce congestion and pollution."
>
> – Jim Sebastian, Manager of Bicycle and Pedestrian Programs in Washington, D.C.[80]

Designed for "simplicity, strength and comfort," the fleet consists of about 120 bicycles. The ten stations are located at key places throughout the city. An online and mobile-friendly Google map provides real-time information about the number of bicycles and return slots available at each location. An online map also provides recommended routes between each station. Stations consist of a vertical pillar locating the station and then a horizontal bar that includes locking mechanisms for the bicycles. Each bike station is equipped with electronic communication assemblies that are in permanent contact with the station terminal. Remote processing is used to analyze the number and condition of bicycles at each station. Minor repairs are carried out on site.

Usage of the system requires an annual subscription of $40 for unlimited trips, and users must be at least 18 years of age. Users can register on the internet, and the user card is mailed to the address. A user card allows automated access at any station as long as bicycles are present. A red light denotes a potential error in bicycle return, while a green light indicates successful return. When a red light appears the user is instructed to call a toll-free number to report the error. Bicycles are available from 6 AM to 10 PM daily. Short-term rental is not allowed; bicycles can be borrowed for a maximum of three hours each. A bicycle replacement fee of $550 is charged if the bicycle is not returned to any of the stations within 24 hours of rental.

[79] Montreal Bixi website, http://www.bixi.ca/en/accueil/ (accessed March 2009).
[80] Becker, Bernie, "Bicycle-Sharing Program to be First of its Kind in U.S," The Wall Street Journal [New York] 27 April 2008, http://www.nytimes.com/2008/04/27/us/27bikes.html (accessed March 2009)

Funding for the system comes from outdoor advertising. Redistribution of the bicycle fleet is handled by the service team as a part of remote management.

Figure 8-4 D.C. BikeShare Parking

The D.C. BikeShare Program uses a swipe-card system to rent a bicycle.

Source: Alta Planning and Design. Used with permission.

Germany

The German system of bicycle sharing uses a unique design that allows users to call a phone-based system to determine if a bicycle is available. The Call-a-Bike system began in 2007 and as of 2009 is active in Berlin, Frankfurt, Cologne, Munich, Stuttgart and Karlsruhe. In 2009, the company plans to establish stations at 100 major German bullet train stations, with five to 20 bicycles at each station. Call-a-Bike is a subsidiary for DB Rent, which is a subsidiary of German Railway.

Users register for Call-a-Bike online or via phone and receive a customer number. To borrow a bicycle, the user calls into the system using the telephone number on the cover of the Call-a-Bike lock to receive the code to open the box and access the lock. A red or green light indicates if the bicycle is in use or if it is available, respectively. With this system, it is possible to borrow a bicycle and lock it to another Call-a-Bike area, using the same code to unlock it when finished with the errand. To end the borrowing period in Stuttgart and ICE-Stations, the user calls back into the system and receives another code to lock the bicycle again. To end the borrowing period in the other locations, the user is prompted with the question, “return bike?” to which he or she selects yes.

If the user has a BahnCard, borrowing a bicycle costs six cents/minute, while the standard rate is eight cents/minute. It is also possible to borrow a bicycle for the whole day for nine EUR, or per week at EUR 36. Another option is to pay a yearly flat rate, in which case the first 30 minutes are always free. The standard flat rate is EUR 99/year, which costs eight cents/minute after 31 minutes. A BahnCard 25 costs EUR 75 /year ($99 /year) and the per-minute cost is six cents after the first half-hour.

Long Beach, California

The City Bike Share program in Long Beach, California is a free program targeted toward City employees and managed by the Department of Public Works. The program is a partnership with Bikestation, a company that provides high-quality bicycle parking facilities. The main goals of the program are to: “reduce the number of local trips made by automobile, lessen traffic congestion in the downtown area, and help employees get active and healthy the easy way.”[81]

Employees can easily register for the program online. They receive a key fob, which provides them access to the key to the bicycle lockers. Bicycles must be returned to the same locker they were removed from at City Hall, and cannot be checked out overnight. All bicycles are equipped with front and rear lights, a rear rack and front basket, a kickstand and a warning bell. The first 50 users to register received a helmet.

[81] City Bike Share website [URL pending] (accessed March 2009).

In order to register for the program, participants must sign a release and wavier form. Brochures are available, which outline how to register for the program, as well as rules and regulations about bicycling in Long Beach. These include a warning about bicycling on the sidewalk and usage of bells and horns. The brochure also highlights key safety issues, such as helmet use and avoiding the 'door zone' (the area along the parking lane that a parked car's driver-side door swings into).

Figure 8-5 Long Beach City Bike Share Program

A key fob provides access to locker keys for the Long Beach City Bike Share Program. Source: City of Long Beach. Used with permission.

Bikestation installed the security access control and reporting software system, as well as procuring and assembling the bicycles and accessories. The group also manages registrations, the user database and maintenance, among other day-to-day operational activities. The capital expenses of the Long Beach program were $30,000, and annual administration, operations and maintenance costs were estimated at $10,000 for the first pod and $6,000 thereafter.[82] The program is provided in accordance with Rule 2202 Air Quality Investment Program. It is funded through AQMD AB2766 funds.

Expansion Potential in Los Angeles

Opportunities

While Los Angeles as a whole does not currently have the demand or infrastructure to support a Paris-style bicycle sharing program, the City may be well suited for a more targeted bicycle sharing program focusing on areas with existing bicycle and/or mass transit infrastructure. A year-round bicycling friendly climate, lucrative outdoor advertising market, and the potential for TAP/smart card integration provide supporting elements for a successful bicycle sharing program.

As discussed below, several factors suggest that a bicycle sharing program would likely be successful in parts of Los Angeles. Lessons learned in Europe indicate that bicycle sharing systems are most suitable in moderately sized cities with a population of at least 200,000 people. Areas of Los Angeles are comparable to small cities, with similar densities, job centers, and other destinations with surrounding populations of 200,000 people.

[82] City of Long Beach. "Bikestation: Long Beach Proposal/Scope of Work for the City of Long Beach" (December 17, 2007).

Joint Partnerships

If the decision is made to pursue a successful bicycle sharing program, the City of Los Angeles should consider creating partnerships with major employers, other government agencies, non-profit organizations, and local bike shops as a way of pooling the resources and expertise required to launch and operate a bicycle sharing system. If the city chooses to implement a technology-based system, it should consider a partnership with an organization or firm experienced in modern bicycle sharing program operations.

If advertising rights are included as part of the partnership agreement, the city should consider what type of proposals are acceptable, including limitations on content, ad placement, and duration of advertising rights. Municipal Codes and State laws sometimes place restrictions on where advertising may occur, which could impact the use of this funding mechanism.

Emerging Political Will / Public Opinion

There is a general consensus among City officials that demand for greater bicycle accommodations in all aspects of the transportation system has increased in recent years.

Density and Land Uses

The potential success of a program is influenced by the bicycling environment surrounding each pod, as well as the intensity and types of uses of surrounding development. These factors determine the length and type of trips to be made, and the likelihood that people will consider making trips by bicycle. Partnerships could also be developed based on the targeted population for the program, and stations should be located correspondingly. Good locations for bicycle sharing stations include: downtown, major transit stations, buildings of major employers, and areas with favorable conditions for bicycling. The presence of various amenities such as a market, post office and day-care center close to transit hubs, residential neighborhoods and employment districts increases the ability to walk or ride a bicycle to these destinations.

Characteristics of Successful Technology-Driven Bike Sharing Programs

Based on worldwide experience with bicycle sharing programs, the following is a list of key characteristics of successful programs:

- **Match the Bicycle Sharing System to the Target Group.** Systems experiencing higher levels of success have identified key target groups and tailored their bicycle sharing programs accordingly. For example, call-a-bike systems create highly flexible networks for city centers. Users who enter from areas such as rail stations can use bicycles as their transport while in town but are not required to return the bicycle to a specific location. Smart card systems may be more appropriate in areas where local users will be able to pick up and return bicycles at different location within the city.
- **Match the Program to the Existing Conditions.** Bicycle sharing systems targeted at the general population work best in moderate to large cities with a minimum population of about 200,000 people. Other case studies have shown that smaller cities have achieved success with systems targeted at a specific population demographic, such as rail commuters. Other bicycle sharing programs have targeted university students (e.g., the system being planned for the University of Washington) or employees of one or two large companies.

- **Initial Bicycle Roll-out.** A system must have enough critical mass at roll-out to attract users to the system. For example, the Paris program began operation with nearly half its fleet (10,000 bicycles at 750 stations). Spring or summer is an ideal time to roll-out a bicycle sharing system, as it reduces weather-related barriers to bicycle travel. Starting a bicycle sharing program in conjunction with another transportation-related or environmental event will help draw attention to the program.
- **Provide a Mechanism for Bicycle Redistribution.** It is important for users to be able to rely on the availability of a bicycle to rent and to find space for a return. Bicycle redistribution is likely to be most necessary at particular stations, related to travel patterns. Over time, usage trends can be identified and a bicycle redistribution mechanism developed to help balance the locations of high demand and availability.
- **Price Bicycle Rental Affordably.** Pricing rental on a graduated scale will encourage prompt return of bicycles and reinforce the idea of user accountability. Allowing free rental for the first thirty minutes encourages users to try the system. In Paris and Lyon, this policy has resulted in about 95% of rides being free.
- **Ensure User Accountability.** Most successful systems ensure user accountability by providing an incentive to return the bicycle and treat it well during use. Systems enforce a varying amount of accountability. In systems that require a user to register prior to use, the system operator can bill users for bicycle damages or unreturned bicycles. In some programs rental time is restricted to a timeframe typically ranging from a few hours to a full day. If a bicycle is not returned within the allotted window, the user (identified by their check-out code) is fined a set amount, or simply charged for the cost of the bicycle. This system can be frustrating to users unless stations are frequent and easy to find. The call-a-bike system continues to charge against the credit card provided until the user calls and verifies the return receipt number.
- **Create a System Optimized for the Average Bicycle Trip Length.** Cities such as Paris and Lyon (i.e. cities without call-a-bike technology) have been very successful in creating systems where bicycles serve as a major source of public transportation within the core downtown area, aimed at trips under 5 km (about 3.1 miles). Bicycle trips commonly last under 30 minutes and cover less than 3 miles. As the first half hour of bicycle rental is free in the Paris and Lyon systems, users are provided with an incentive to use the system for short trips. As users become accustomed to using the bicycles, they may begin to use them for longer trips.
- **Extension of Public Transportation System.** To function as an effective part of the public transportation system, bicycle sharing programs should conform to the same standards as other modes for dependability, affordability and convenience. System characteristics that will help to ensure success include: frequently spaced, convenient stations that consider terrain and other environmental factors; bicycles that are consistently and readily available at transit transfer points and at key trip start and end points in the downtown area; a bicycle redistribution system; unlimited hours of service or hours of service that match those of local transit providers; a rental window of a suitable duration to allow bicycle use for utilitarian trips.

Challenges

Theft and poor organization have often resulted in failed bicycle sharing systems. It is crucial to brand the fleet with a recognizable motif to ensure that each vehicle is recognized as part of the bicycle sharing system. User accountability is another important element of a successful bicycle

sharing system; without it users have little or no reason to return bicycles to designated locations, to treat the bicycles well, or to return them into the system at all.

Lack of Comprehensive Bikeway Network

The lack of a continuous bikeway network presents a challenge to implementing a Citywide bicycle sharing system. People may choose not to bicycle due to the actual or perceived lack of a complete safe and comfortable network of bikeway facilities that connect to their desired destinations. Locating bicycle sharing pods in areas with existing bicycle transit infrastructure is a potential near-term implementation strategy.

The design and function of streets further influences the demand for travel by bicycle. Streets with dedicated lanes (referred to as Class II bicycle facilities, in the United States) or better yet, separated paths of travel (Class I) are most attractive, providing an increased sense of safety and comfort. Needing to travel in mixed flow traffic with motor vehicles, especially if volumes and/or speeds are high can be a strong deterrent to use of bicycle sharing, especially by less experienced cyclists. In Paris, France, the dedication of lanes for exclusive use by bicycles (as well as an extensive traffic calming program to slow vehicle speeds on streets where bicycles and autos share the same road space) has supported its bicycle sharing program.

Topography

Bicycle programs are most successful in areas with relatively level topography. In more varied terrain, users will ride bicycles downhill but not uphill, leading to a surplus of bicycles in low-elevation areas and a shortage in higher elevation areas. To mitigate this potential situation, the City of Barcelona, Spain has limited its bicycle sharing program to lower-lying areas closer to the coast. Interestingly, experience has not demonstrated that weather or climate necessarily influence the potential success of bicycle sharing programs, except under extreme conditions.

Safety and Liability

Safety and liability are another consideration of a potential bicycle sharing program in Los Angeles. Even if users are required to sign a liability waver, the system owner/operator will incur some responsibility for the system's safety. As state law does not currently require helmet use by adults, their distribution is not required. However, providing helmets for use could reduce the severity of injury in the event of an accident. Use of proper safety equipment (e.g., helmets) should be included in any liability release waiver required by the system operator.

Financial

No bicycle sharing system is financially self-sustaining at this time. Any money allocated to a bicycle sharing system will likely come from a funding stream that could otherwise be used to construct new bicycle infrastructure and completing a comprehensive bikeway network in Los Angeles.

Bicycle-sharing programs are heavily subsidized to encourage their use, with a small proportion of funding provided by user fees (although some programs are completely free to users). Many European bicycle-sharing programs are funded through public-private partnerships, where the company that operates the bicycle-sharing program receives access to advertising space on bus shelters, billboards and at bicycle station kiosks. These companies, such as Clear Channel Outdoors and JCDecaux, often already have similar agreements for provision and maintenance of bus shelters. This is also how Washington DC is funding and operating their program.

Some publicly-sponsored programs are instead funded and operated by the sponsoring municipality. The City of Montreal program has funding provided by a portion of revenues from on-street and other public parking facilities.

Other bicycle sharing programs designed for a select group of people, such as employees of a company or public agency, or students at a university are typically funded and operated directly by the sponsoring organization.

Market Acceptance

Marketing efforts and improvements to the quality of the bikeway infrastructure will be required to increase cultural acceptance of the use of bicycles for transportation and the viability of bicycle sharing in Los Angeles.

Feasibility Evaluation

Earlier in the chapter we described operational best practices for station networks, station design, user interface (check-in, check-out protocols), parking and locking mechanisms, and bicyclist safety. We also provided case studies describing four distinct programs from Paris, Montreal, Washington D.C. and Long Beach. Based on an analysis of the elements that have led to successful systems, we recommend that the City consider leading the implementation of a program based on the joint public/ private model using 500-1,500 bicycles in a targeted area of the city, such as downtown Los Angeles. If successful, the system could be expanded. Further information about how such a system could be funded can be found below in the Costs section. The costs section also addresses a potential fee structure for this potential system.

Benefits

Primary Benefit

Bicycle sharing fulfills the primary benefit of this study of bridging the last mile gap between transit and a user's destination, particularly for those who may walk or drive on the home end of their transit trip. Due to current time and space restrictions for carrying bicycles on-board transit vehicles, bicycle sharing also bridges the last mile gap for users who may use a bicycle on the home end of their trip. A bicycle sharing or public bike program in Los Angeles would bridge the first/last mile gaps by:

- Extending the service area of transit stations.
- Eliminating transfers between transit lines.
- Attracting and retaining transit customers.

Secondary Benefits

Bicycle sharing provides many secondary benefits, including:

- Providing an additional mobility option to users who would not normally have access to a bicycle. Typical pricing structures which offer bicycles for free for the first 20-30 minutes have the potential of increasing equity by providing low income population with access to bicycles for short trips, if subscription fees for low income users can be subsidized.
- Increasing bicycle use. While bicycle use has been shown to have increased significantly in Paris since the implementation of their large-scale bicycle sharing program, it is still

difficult to determine whether or not these programs can reduce congestion or overall VMT, because latent demand for automobile travel may overwhelm any reductions in congestion or VMT resulting from the bicycle sharing program.

Short-term vs. Long Term Benefits

Benefits of bicycle sharing programs are seen in short to medium term, typically as soon as shared bicycles are available for use. Demand is generally expected to reach its full potential within the first three years. However, external factors such as the expansion of the bikeway network will provide opportunities for ongoing expansion over the long term.

Costs

The cost of implementing a modern bicycle sharing program based on the most recent international best practices is high with about $400,000 in start-up costs, $5 million in capital costs and $1.4 million per year in operating costs.

- Start-Up Costs (non-capital): Low. Non-capital start-up costs include all costs incurred prior to system deployment including administration (labor and overhead), demand analysis and site selection, site plans and permitting, design and production of system maps, and other promotional expenses. These costs would total approximately $300 per bicycle. The City should pursue grant funding to cover start-up costs.
- Capital Costs: High. The capital cost for a modern bicycle sharing program is approximately $3,200 per bicycle deployed. This cost includes the purchase and installation of all associated infrastructure including bicycles, terminals, and system cards. In Los Angeles, a zone-based deployment of 500-1,500 bicycles is recommended.
- Operating Costs: Medium. Operating costs are approximately $750-$1,500 per bicycle per year and include ongoing administration and maintenance of the bicycle sharing program.
- Cost to Consumers (Revenue). Typically the cost to consumers includes a subscription fee (annual, monthly or daily) plus usage fees. The usage fees for bicycle sharing systems should be structured to encourage short trips to ensure that each bicycle is able to serve the greatest number of users, thus providing the greatest social benefit. There should be no usage fee for the first 20-30 minutes. After that fees should increase considerably for each 20-30 minute increment. Figure 8-6 is based on the usage fees of the Bixi Public Bike System in Montreal. The incentive to use public bicycles for short trips is clear in this pricing structure.

- Private Sector vs. Public Sector Costs. Costs for the program should be shared by the public and private sectors. The actual proportion paid by the private sector depends on the structure of the program. Private institutions can be asked to cover the cost of installing a bicycle sharing pod on or adjacent to their property. Public agencies can be asked to pay for the cost of installing bicycle sharing pods on public property. Public and private colleges and universities can be asked to pay for the cost of installing bicycle sharing pods on university campuses. Advertising and user fees can support operating costs of the system. Kiosks can be designed with a two-sided display providing a map on one side and paid advertising on the other. In addition, the bicycles themselves can contain advertising information.

Figure 8-6 Sample Fee Structure

Duration of Rental (hr : min)	Rate (per 30 min)	Cost
0:30	$ -	$ -
1:00	$ 1.50	$ 1.50
1:30	$ 3.00	$ 4.50
2:00	$ 6.00	$ 10.50
2:30	$ 6.00	$ 16.50
3:00	$ 6.00	$ 22.50
3:30	$ 6.00	$ 28.50
4:00	$ 6.00	$ 34.50
4:30	$ 6.00	$ 40.50
5:00	$ 6.00	$ 46.50
5:30	$ 6.00	$ 52.50
6:00	$ 6.00	$ 58.50
6:30	$ 6.00	$ 64.50
7:00	$ 6.00	$ 70.50
7:30	$ 6.00	$ 76.50
8:00	$ 6.00	$ 82.50

The costs incurred by consumers become revenue to partially fund the ongoing operation of the program. Revenues for a successful program are estimated at approximately $1,000 per bicycle per year. The Public Bike System in Montreal has a pricing structure designed to encourage short trips. Source: Bixi and Alta Planning + Design. Used with permission. Note: Fees shown are in Canadian dollars.

The City should pursue various funding sources to cover the start-up and capital costs including:

- Public or Private Grant Funding for Start-Up Costs (8%): A public agency or foundation grant should be pursued to cover non-capital start up costs incurred before the bicycle sharing system is deployed.
- Corporate/Institutional Sponsorship (35%): Includes private businesses or institutions (such as hospitals, colleges or universities) covering the capital costs for bicycle sharing pods installed on or near their property.
- Agency Sponsorship (45%): The City of Los Angeles and partner agencies should pursue and provide funding to cover the capital costs for bicycle sharing pods installed on or near their property. For example, within the targeted area (i.e. downtown CBD) the City of Los Angeles would fund bicycle sharing pods located at City buildings and within the public right-of-way; Metro would fund bicycle sharing pods at or adjacent to transit stations; the County of Los Angeles would fund pods located at County owned facilities; Caltrans or other state agencies would fund pods on their property; etc.
- Financing from Contractor (12%): The selected contractor should be expected to finance a portion of the initial capital cost through a loan. The loan would eventually be repaid through the collection of user fees and advertising revenue. This will help to ensure that the contractor has a stake in the on-going success of the system.

Operational expenses should be covered through user fees and small-scale advertising on bicycles and at kiosks.

Implementation

Regulatory Changes Required

Bicycle sharing infrastructure should fall under the same regulations and permitting processes as the operation of any business within the City. In cases where pods are installed within the public right of way, the regulations pertaining to the provision of street furniture (bus shelters, public toilets) would apply. Installation of bicycle sharing pods at transit stations would require coordination with Metro. Installation of bicycle sharing pods on private property would require coordination with the property owner. The operator of the bicycle sharing system would carry liability insurance covering itself and project partners. The City of Los Angeles may need to modify existing codes or policies in order to allow for bicycle sharing pods to be located on City property. Because of the space requirements for bicycle sharing pods the City will need to consider allowing pods to be located within the portion of the public right-of-way currently used for on-street parking.

Operational Strategies

- Implementing agency:
  - Lead implementer: Private operator under contract with the City of Los Angeles
  - Supporting implementers: Metro, other public agencies, private institutions
- Interagency coordination: the City and the private operator will negotiate agreements with property owners in the targeted area for installation of bicycle sharing pods.
- Joint partnership potential / private-sector role: the City should identify a contractor to provide bicycle sharing equipment and handle the on-going operations of the system.
- Other potential operators: Metro would be another potential lead operator. An advantage would be that transit stations are high value locations for bicycle sharing pods. However, a successful system also requires pods in the public right-of-way and on public and private property surrounding the stations which would typically fall under City jurisdiction.

Market Acceptance and Target Markets

Overall Market Acceptance: The overall market acceptance for bicycle sharing in Los Angeles will be Medium to High if the target area for an initial rollout of a bicycle sharing system is selected based on the following criteria:

- Demographic
  - Youth (ages 16-34): Medium to High
  - High-Income Households: Medium
  - Low-Income Households: Medium
  - Low Auto Ownership Households: Medium
- Geographic
  - Residential Density: High
  - Employment Density: High
  - Transit Intensity: High
  - Proximity to High-Capacity Transit in Dedicated Right-of-Way: Medium

For the system to work, users need to be able to pick up a bicycle near their origin and leave it at another station near their destination so that the bicycle is always either in use or available for use by others. In order to achieve this, stations should be placed a maximum of 900-1,500 feet apart (approximately one bicycle sharing pod for every one to two blocks in the target area).

Technology Integration Opportunities

- Reservations: Public bicycles are typically available on a first-come, first-served basis with redistribution systems in place to balance supply and demand. On-line or telephone reservation systems may be considered, but may not be critical to the success of the program.
- Real-time fleet management: GPS tracking systems provide real time data to inform supply management and redistribution efforts.
- Integration with LA Metro's TAP card: The most modern bicycle sharing terminals are equipped to accept various forms of payment including cash, credit cards, and municipal transit authority passes, student cards, ID cards and so on, subject to reader compatibility and access to card specifications.

Additional Resources

Anderson, Ward John. "Paris Embraces Plan to Become City of Bikes" Washington Post, March 24, 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/03/23/AR2007032301753.html (accessed December 2008).

Becker, Bernie, "Bicycle-Sharing Program to be First of its Kind in U.S," The Wall Street Journal [New York] 27 April 2008, http://www.nytimes.com/2008/04/27/us/27bikes.html (accessed March 2009).

Bycyklen Kobenhaven website, http://www.bycyklen.dk/ (accessed March 2009).

Clear Channel Outdoor "SmartBike Information Document," 2007.

City Bike Share website, http://www.bikestation.org (accessed March 2009).

City of Long Beach. "Bikestation: Long Beach Proposal/Scope of Work for the City of Long Beach," (December 17, 2007).

Cyclicity (Bruxelles) website, http://fr.wikipedia.org/wiki/Cyclocity_(Bruxelles) (accessed March 2009).

Cyclocity website, http://www.cyclocity.be/ (accessed March 2009).

DB - Call a Bike website, http://www.callabike-interaktiv.de/kundenbuchung/process.php?proc=english&f=500&key=3117bbd62380e06e8f67c573d28f07cc...00000 (accessed March 2009).

Gifford, Jonathan, "Will Smart Bikes Succeed as Public Transportation in the United States?" Journal of Public Transportation, Vol 7, No 2, 2004.

Hannah Hoag. “Bike-Sharing Services Roll into the US,” MSNBC 7 April 2008, http://www.msnbc.msn.com/id/23869261/ (accessed 13 March 2009).

International Bicycle Fund, “Bicycles & Pedal Power in Business & the Work Place,” http://www.ibike.org/economics/work-bike.htm (accessed March, 2009).

TIME Magazine,” TIME’s Best Inventions of 2008,” http://www.time.com/time/specials/packages/article/0,28804,1852747_1854195_1854146,00.html (accessed March 2008).

SmartBike DC website, https://www.smartbikedc.com/default.asp (accessed March 2009).

Sebastian Bührmann, Rupprecht Consult Forschung & Beratung GmbH, Cologne (Germany) New Seamless Mobility Services: Public Bicycles, NICHES Policy Note 4, 2007.

The Bike-sharing Blog, “Human’s Freewheelin’ Ridin’ High,” September 8, 2007, http://bike-sharing.blogspot.com/search/label/Humana (accessed December 2008).

Quay Communications Inc. “Vancouver BC PBS Feasibility Study,” March 2008.

Urban and Environmental Policy Institute (UEPI), “ New Bike Sharing Program at Good Samaritan Hospital,” http://uepi.wordpress.com/2008/12/11/ (accessed March 2009).

Vélib’ (Paris, France) website, http://www.en.velib.paris.fr/comment_ca_marche (accessed March 2009).

Wearables Business Magazine. “American Apparel bicycle program provides healthy benefits to employees and environment,” http://wearablesbusiness.com/wearablesbusiness/mag/apparel_american_apparel_bicycle/index.html (accessed April 2009).

Chapter 9. Phased Implementation Plan

Overview

The consultant team's approach to this project – and the reason we assembled team members with direct local and national "hands-on" implementation experience – was to focus on strategies that are realistic and implementable. For this reason, this chapter is intended to function as a phased implementation plan for the six first/last mile strategies believed to be most applicable for Los Angeles. This chapter consists of the following sections:

- Marketing Opportunities. An overview of potential marketing approaches tailored to target markets for each strategy, and including both traditional and non-traditional approaches.
- Funding Opportunities. A discussion of potential funding sources, including the source of the funds, their current uses, and their applicability for each first/last mile strategy.
- General Implementation Considerations. This section presents some of the key implementation considerations, including short- and long-term tasks, likely lead implementer(s), geographic considerations and potential regulatory changes required for implementation.

This chapter is primarily targeted to potential implementing entities, including City of Los Angeles departments, SCAG, and other public-sector, private-sector, and community-based implementation partners.

There are currently several initiatives already underway in Los Angeles to further evaluate and/or pilot test many of the strategies recommended in this report, including an ongoing taxi refranchise study, car-sharing expansion efforts, and a folding bikes on transit program. This chapter is intended to inform those ongoing and initiatives and studies and to provide guidance if and when these strategies are implemented.

For other strategies recommended in this report, there are no known programs operating in Los Angeles or elsewhere in the SCAG region. Examples of these strategies include casual carpool, bike sharing, and short-term car rental. For these strategies, this chapter is intended to help City of Los Angeles staff and commissions move forward with implementation of pilot tests, including forming inter-agency collaborations, seeking out private-sector partners, applying for new funding streams, and revising local regulations as needed.

Marketing Opportunities

Overview

Marketing will be a critically-important component of implementing any of the six recommended first/last mile strategies. From a customer perspective, marketing is important for two reasons: 1) What you don't know can't help you, and some auto commuters may be predisposed to take transit but don't know or understand their options; 2) First impressions really do matter, and no program will succeed if first time users have a negative experience because of technical failure, unclear operating instructions, or even inflated expectations that the service can't meet. In our experience, one of the most effective forms of marketing for choice transit riders can be personalized marketing programs (sometimes called "personal travel encouragement" or "high touch marketing"). Examples of successful personalized marketing programs include the TravelChoice program and RideNOW in the San Francisco Bay Area.

Target Markets

The strategies were analyzed primarily for their relevance to choice commuters who live too far to walk and to close to drive to transit stop/station. However, the potential appeal to the diverse travel markets in Los Angeles was also analyzed. For example, the study recommends several strategies to enhance taxi service in Los Angeles as a way of providing choice commuters with convenient "on demand" access to choice commuters transit stations and reducing reliance on traditional automobile ownership. Traditionally, the cost of taxis puts this service "beyond the reach" of what many commuters can pay for regular commute trips. To address the affordability issue, the study recommends that Los Angeles pursue implementation of a pilot project similar to one that recently launched in Los Angeles which allows taxis to "share the fare" in a manner that reduces costs for commuters, increases income for drivers, and expands taxi availability at peak travel periods.

Figure 9-1 Marketing Opportunities

Strategies	Traditional	Non-Traditional (social network sites, etc.)	Employer-Based	Personalized
Casual Carpool	Paid advertising, integration into 511 site.	Social networking sites (Zimride, Facebook, NuRide) and peer-to-peer (word of mouth).	Outreach to existing carpool user lists via employers.	Outreach to existing carpool user lists via employers.
Taxis	Integration into the region's 511 site; in-vehicle advertising.	N/A	Employer based-promotion of taxi use through guaranteed ride home programs.	Target transit users at transit hubs or vehicles through direct-taxi phones, taxi stands, or other amenities to better connect customers to ride.
Car-Sharing	Information at Transportation Fairs, Direct Mailings, and actual vehicles themselves.	Neighborhood organizations near surrounding car-sharing pods.	Work with employer TDM programs to include car-sharing as a benefit.	University students, employers with TDM programs, areas with low vehicle ownership, residential and commercial developments, transit hubs.
Short-Term Car Rental	Information at Transportation Fairs, Direct Mailings, and actual vehicles.	Neighborhood organizations near surrounding car-sharing pods.	Work with employers to establish corporate accounts with rental companies.	University students, employers with TDM programs, areas with low vehicle ownership, residential and commercial developments, transit hubs.
Folding Bikes on Transit	Information about any potential pilot programs or incentives to purchase bicycles, general in-vehicle information about folding bike policy on transit vehicles.	Working with folding bicycle resellers to promote and educate on benefits. Have trial-ride days of folding bicycles to show their benefits.	Work with employers to describe bicycling benefits and amenities on-site (such as showers or bicycle storage if applicable)	Target transit ridership (on vehicles) and employers near transit.
Bicycle Sharing Programs	General education campaign on potential program through all mediums.	Bike advocacy blogs, affinity groups on social networking sites, and twitter streams.	Work with employers to provide bicycle sharing memberships as part of larger TDM program. Provide exclusive bike-share pods on corporate campuses/office parks.	Target transit ridership (in vehicles and in stations); employers with large campuses or those that would benefit from short trips; populations with short distances between origins and destinations; University students and. areas with low-vehicle ownership or high-transit dependence.

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Funding Opportunities

This section identifies a series of potential funding opportunities to help pay for the recommended six strategies. The purpose is not to identify a specific funding source to fully fund each strategy, but rather to outline revenues that have potential applicability for the recommended strategies. Figure 9-2 reviews Federal, State, Regional, Local and private sector funding sources listing their purpose, how they are currently used, applicability to the First/Last Mile strategies and includes a descriptive comment column. It should be noted that some funds listed in the figure indicate they are highly unlikely to be available because they are currently used for other purposes, fully subscribed or highly competitive in the LA region. Other identified funding sources may provide partial funding for a strategy.

Figure 9-2 Transportation Funding Matrix

Program Fund Source	Funding Purpose	Current Use of Funds	Applicability for FM/LM Strategies	Comments
Federal Fund Sources				
FTA Section 5309 Capital Program (Congressional Earmarks)	Provides Federal funds for bus and bus facilities and New Rail Starts	Transit capital projects	Potential for casual carpooling to fund HOV/HOT lanes and other infrastructure that could incentivize casual carpooling Potential for funding bicycle network infrastructure improvements	Work with Congressional delegation to secure federal funding of high priority large-scale capital projects in the next transportation bill (20010). Large projects and even small scale project may be positioned to receive "earmarks" in the next funding cycle if they have regional support. Projects should be included in the *Regional Transportation Plan*, and have political support to be well positioned for earmark funding.
FTA Section 5307 Urbanized Formula Funds	Provides funds for transit capital projects in urbanized areas over 200,000 in population. , and additionally for transit-related operating costs in small urbanized areas between 50,000-200,000 in population	Capital projects only in large urban areas	Highly unlikely	These funds are used by local and regional transit services and are highly competitive.
Congestion Mitigation/Air Quality (CMAQ)	Federal funding program that is typically limited to purchase of clean fuel buses	Transit capital projects	Highly unlikely	These funds are used by local and regional transit services and are highly competitive.
FTA Section 5316 Job Access and Reverse Commute (JARC) Program	Local programs that offer job access services for low-income individuals.	Capital projects and operations	Potential for taxi sharing program if tested in low income neighborhood	Since these funds are specifically intended for low-income individuals it would be difficult to secure these funds unless a demonstration was tailored to this market.
TIGGER (Recovery Act)	Federal funding program for transit agencies pursuing projects to reduce energy consumption or greenhouse gas emissions.	Capital projects only	Infrastructure could be funded so long that a transit operator is the project sponsor. Could be directed towards station improvements for car sharing or folding bicycles.	This program is part of the 2009 American Recovery and Reinvestment Act. It is unclear if this program will be available again in 2010 or potentially part of a reauthorization of the Federal Transportation Act.
Climate Communities Showcase Grant (EPA)	These funds can be awarded to local governments to implement climate change initiatives that can help reduce greenhouse gas emissions.	Capital projects only	Infrastructure could be funded so long improvements could provide measurable benefits in terms of greenhouse gas emissions	Currently, this is one-time grant. It is unclear if this grant program will continue in future years.
Energy Efficiency and Conservation Block Grant Program (DOE)	Funds are focused on specific energy projects such as solar panels or infrastructure upgrades but also transportation programs that demonstrate energy use reductions. State or local governments are eligible to apply.	Capital project and operations	Unlikely as the grants are focused on infrastructure improvements directly relating to electricity usage	Currently, this is one-time grant. It is unclear if this grant program will continue in future years.

Program Fund Source	Funding Purpose	Current Use of Funds	Applicability for FM/LM Strategies	Comments
State, Regional and Local Fund Sources				
Grant Opportunities – MTA Call for Projects	The SCAG Call for Projects that are includes grant opportunities for transit service, transit service expansion & new service, facility construction and bus replacement.	Transit Capital and/operations	Grants for new service could be used to help pay for taxi and transit demonstrations, bicycle sharing program and amenities to support these new services.	These grant opportunities are generally easier to secure for capital projects (usually with a local match required) than for operations. They are highly-competitive.
Safe Routes to School (SR2S) Grant Funding Program.	National and state grant program to fund projects that increase the number and safety of children reaching school by walking and biking. It funds capital projects such as sidewalk improvements, traffic calming and pedestrian/bicycle crossing improvements, on-street bicycle facilities, off-street bicycle/pedestrian facilities, and traffic diversion improvements.	Capital projects; a portion of funds can be used for other purposes (see comments)	Potential applicability for bicycle infrastructure to support bike sharing especially if emphasizes Increased bicycle, usage and enhanced traffic safety around schools.	LA could apply for a SR2S grant to fund mobility improvements that provide access to schools for school-aged children. Costs for education, enforcement, or incentive programs are also eligible for reimbursement if these costs are related to the construction of the project.
Public Transportation Modernization, Improvement and Service Enhancement Account (PTMISEA)	Advance the State's policy goals of providing mobility choices for all residents, reducing congestion, and protecting the environment	Transit capital projects	Funds could be used to pay for infrastructure improvements for car sharing, taxi dispatch system and other related amenities.	Bond act approved by voters as Proposition 1B on November 7, 2006.
South Coast Air Quality Management District	Funds are typically distributed through grant programs for projects that help improve air quality or reduce greenhouse gas emissions	Capital projects and operations	Funds could be used to pay for infrastructure improvements and operations	Air District funds would most likely be able to be used for seed funds for programs like bike sharing, folding bikes on transit or any program that could quantify its impacts through emissions reduction.
City General Funds	General Funds are generally used for a variety of city services	Capital and operations	Highly unlikely	If General Funds are used for transportation purposes, they are typically limited to ongoing maintenance and improvements.
Proposition A & C (Countywide transportation sales tax)	These funds are used to support transit operations and capital match for transit service in the LA area.	Transit Capital and/operations	Potential for small amount of these funds for any of the strategies.	These funds are used by existing local and regional transit operators.
Transportation Development Act (TDA) Articles 4 and 8 (1/4 cent sales tax)	Transit operating assistance and capital projects, local street and road maintenance and rehabilitation projects, pedestrian/bicycle projects	Capital projects and operations	Potential for small amount of funds to help pay for one-time capital investments –could apply to any of the strategies	Revenues are derived from 1/4 cent of the retail sales tax collected statewide, distributed according to the amount of tax collected in LA County to a Local Transportation Fund in LA County.
In-Kind Services	City, County, transit agencies and other public entities could provide in-kind services in the form of staff time to "jump start" a new service or program. This could include administrative support, marketing services, oversight, evaluation and other related activities.	N/A	City of LA could provide staff support to initiate car sharing, taxi demonstration, bike sharing. Transit agencies could provide staff support for folding bikes on transit demonstration	Local governments could provide parking spaces to house short-term car rentals and/or space for car sharing. Provide initial staff support for any strategy with goal of longer-term sustainability. Currently, CALSTART is developing an implementation plan for the development of a folding bike subsidy program. http://www.calstart.org/Projects/First-Mile/First-Mile-Projects/Folding-Bicycle-Subsidy-Program.aspx

Program Fund Source	Funding Purpose	Current Use of Funds	Applicability for FM/LM Strategies	Comments
Private Sector Sources				
Business Improvement District (BID) or a Property-Based Improvement District	In 1965, the California Legislature passed AB 103 in response to declining economic activity in central business districts. BIDs provide a means for businesses to assess themselves to improve the surrounding area. A property-based improvement district (PBID) collects money from property owners rather than business owners.	Funds collected by BIDs are typically used to fund marketing, streetscape improvements and other transportation improvements	Once established, the District could advance public/private funding for any of the strategies provided they benefit residents or visitors within the District boundaries.	Business owners often initiate the process to establish a BID. However a City Council resolution must establish the intent and activities of the BID and its proposed boundaries.
Transportation Impact Fee	Development impact fees are assessed by city, county, or regional governments on new development in order to pay for the increased services and new infrastructure necessary to serve the residents and/or employees of the new development.	Primarily capital projects; also operations in some situations	Since the fee must demonstrate a "rational nexus" between the impact of the project and the fee charged it is not likely that this is a practical funding source for the strategies.	Revenues collected can be used for multimodal improvements, such as increased transit service, completion of bicycle networks, and better pedestrian infrastructure and amenities.
Car Sharing Companies (Zipcar, Flex car)	Private Sector is currently paying for most infrastructure, signage, and vehicle costs to operate car sharing services.	Private sector non-profit and for profit companies currently pay for all elements of car-sharing services	If demonstration for car sharing near UCLA is successful, the Zipcar and City partnership could expand to other neighborhoods.	City of LA and Zipcar have partnered for car sharing demonstration. The City has donated parking spaces "free of charge." Securing funds to incentivize increased usage of car sharing is critical to support longer term sustainability.
Public/Private Partnerships	Public/private partnerships can increase overall funding by leveraging "outside" dollars and is mutually beneficial to both parties.	N/A	All seven strategies will benefit from cooperative participation between the public and private sector.	Three examples of public/private partnerships are presented below – universities, retailers and employers. Other possibilities include advertisers, hospitals, and other institutions.
Universities (UCLA, USC, etc)	Universities may be interested in providing staff support, and make other contributions to innovative programs and services to discourage students from driving solo to campus and to incentivize alternative modes of travel.	N/A	Provide space for casual carpooling, bike sharing and short-term car rental.	Support operations during demonstration phase, and/or pay for capital improvements. Universities can partner with Zimride and Facebook to promote casual carpooling.
Retail and Merchant Contributions	Retailers may share in the cost of transportation improvements especially if one-time capital improvements or contributions.	Primarily capital projects; also operations in some situations	Potential for contributions for many strategies especially for advertising and donating bicycles and related equipment for start-up phase.	Bike shops may be interested in donating bicycles for folding bikes. Advertisers could provide "free advertising" to market new services. Taxi companies could cooperate with LA Metro and other agencies to "test" dedicated taxi phone lines at rail stations, enhanced reservation system and amenities and shared taxi demonstration. May require agreement between City and private interests - – public/private partnerships.
Employer Contributions	Employers may share in the cost of transportation improvements if beneficial to their employees; typically prefer to fund one-time contributions.	Primarily capital projects; also operations in some situations	Employers could subsidize car sharing membership cost for their employees.	Employers sometimes are willing to underwrite transportation to support their workers getting to/from worksite. May requires agreement between City and employers – public/private partnerships.

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Funding Summary

This section presented several opportunities to provide the financial resources for the recommended six strategies. It identified traditional transportation and innovative funding programs and demonstrated that there is no one funding program that has the ability to *fully fund* a strategy. There are several fund sources that should be pursued to "jump start" a strategy and/or provide support during a demonstration phase. For any of the strategies to be financially feasible in the short-term, it will require a lead agency or champion to cobble together a comprehensive funding strategy that incorporates a variety of funding sources including creative, innovative and bold revenue enhancements. In the longer-term the strategies have the potential to be self-sustaining when minimal or no funds are needed for ongoing operations or there will be an established public/private partnership that largely covers day to day costs.

Implementation Considerations

Overview

For each of the six recommended first/last mile strategies in this report, the consultant team identified likely phasing for implementation, likely implementing entities, geographic considerations and potential regulatory changes that would be required for implementation. This section summarizes that analysis. However, it should be noted that the implementation details will certainly vary if and when a particular strategy is pursued for a number of reasons:

- The type of program implemented. For several strategies, the consultant team has identified a number of potential program models; depending on the specific model implemented, certain implementation specifics could vary.
- Changing funding or regulatory framework. The consultant team has based our recommendations on our understanding of the funding and regulatory framework at this time (or known changes that are pending). Future changes to funding sources and new legislation may alter certain implementation details.
- Geographic considerations. Based on a detailed analysis of the demographic and geographic composition of Los Angeles, research on the best practices for each first/last mile strategy as implemented in other communities (see Chapters 3 through 8), the consultant team's combined expertise in multimodal transportation planning, and input from the Technical Advisory Committee as a "reality check," the consultant team developed maps showing the locations that could be prioritized for implementation of each strategy (see Figures 9-4 though 9-8). It should be noted that these maps are meant to be conceptual and illustrative, showing *potential optimal locations* for implementing each strategy with the Los Angeles context. The consultant team assumes that further analysis would be done to refine and confirm these geographic locations before proceeding with pilot implementation. The maps include Metro rail and transitway facilities that were completed as of November 2009.
- Information not known at this time. For strategies that may involve private-sector partners (such as car-sharing, short-term car rental, and bikesharing programs), certain information is proprietary and not available to the consultant team. Such information would only become available once an implementing agency entered into discussions and negotiations with the private-sector partner.

For this reason, the consultant team has tried to highlight the key "implementation considerations" (including short- and long-term next steps, lead implementer(s), geographic considerations and potential regulatory changes required for implementation) in order to provide a "blueprint" for future implementation.

A Note on the Role of Technology

The analysis of each of these strategies in this report identifies a wide spectrum of innovative approaches to bridge the "first mile/last mile" gap. The study found that new, innovative solutions are available that provide increased access to the city's transit system as well as provide viable options to car ownership and reduce single occupancy vehicle trips. This is partially due to the fact that technologies developed in other industries are successfully being deployed in the transportation sector, making new solutions available to address old problems. For example, car-sharing and bike-sharing programs have taken off in recent years in many urban areas in Europe

and North America utilizing "smart card" payment systems, GPS vehicle tracking and fleet management, online or cell phone reservations and billing systems. At the same time, the project team tried not to focus exclusively on "high-tech" solutions when other, simpler approaches would provide the same benefit.

Figure 9-3 Implementation Considerations

	Timeframe				
Strategies	Short-Term Tasks	Longer-Term Tasks	Lead Agency/ Champions	Geographic Considerations	Regulatory Requirements/ Changes
Casual Carpool	Expand ridematching services. Designate High Priority Meeting Locations/Points. Explore software options for ride matches. Define and implement amenities to enhance casual carpooling (Signage, curb space, etc). Form partnerships with private to sector. Develop Marketing Campaign.	Plan for toll discounts to encourage casual carpooling. Begin in 2012 with implementation of HOT lanes	City of LA could assume lead role in "jump starting" casual carpooling and in evaluating effectiveness. Needs support from local and regional transit and transportation agencies Support from major employers (especially UCLA) with instant ridematching services can help jump start casual carpooling.	Large youth population (ages 16-34); areas with low auto-ownership; medium residential density; high employment density; proximity to high-capacity transit; proximity to congested auto corridors (see Figure 9-4).	Allow standing or stopping in downtown LA for carpool pick-up/drop-off.
Taxis	Enable GPS-tracking of taxis for customers (to provide wait time, see densities and locations of nearby taxis). Installation of dedicated taxi phones at major transit hubs.	Integrate fare payment technologies with LA Metro/smart taxi-meters. Development of enhanced reservation system.	The LADOT is responsible for administering the franchise system and providing detailed level of service monitoring for taxi operators.	Area with high employment density, high transit intensity; age youth population (ages 16-34); and areas with low auto-ownership (see Figure 9-5).	Reform regulatory environment to incentivize street hails (geared towards shorter trips) and ride sharing in taxis.

	Timeframe				
Strategies	Short-Term Tasks	Longer-Term Tasks	Lead Agency/ Champions	Geographic Considerations	Regulatory Requirements/ Changes
Car-Sharing	Creation of a city-level position to help coordinate car sharing with other city organizations and ease implementation.	Further integrate car-sharing into the larger city transportation system, TDM, and transit programs.	At this stage, the lead implementer would be a new or existing car-sharing organization. However, numerous city agencies would play critical supporting roles.	Large youth population (ages 16-34); areas with low auto-ownership; high residential density, high employment density, high concentration of mixed use and multi-family housing; parking constraints (see Figure 9-6).	Continuing to ease current regulations for on-street parking of car-sharing vehicles.
Short-Term Car Rental	Further investigate all technology integration options including easing fare payment for the customer and fleet management for the provider.	Creating of a unified organization that would manage different rental companies under one unified umbrella.	Major car rental companies would be the lead implementers with support from city government, transit agencies, and related private entities. However, a future lead could be LA Metro if the program were to be coordinated under one umbrella.	Large youth population (ages 16-34); areas with low auto-ownership; high residential and employment density (see Figure 9-6).	Reducing taxes on short term rentals and providing rental companies an easier means of checking driving records would both ease implementation.

	Timeframe				
Strategies	Short-Term Tasks	Longer-Term Tasks	Lead Agency/ Champions	Geographic Considerations	Regulatory Requirements/ Changes
Folding Bikes on Transit	Continued efforts to determine target markets and further promote usage.	Determine means to track/capture user data, perhaps by using current LA Metro TAP card users.	Currently, the folding bike implementation plan is being led by the City of Los Angeles and is being supported by LA Metro.	Areas with low auto-ownership, proximity to high-capacity transit; large youth population (ages 16-34); medium residential and employment density; good bicycle infrastructure (bike lanes); proximity to congested auto corridors (see Figure 9-7).	None
Bicycle Sharing Programs	Evaluation of current bike-share system options suitable for Los Angeles environment.	Expansion of suitable city-wide bicycle network. Determination of financial mechanism to fund program in Los Angeles. Integration of technology to assist with reservations, fleeting management and customer payment	It is likely the bike-share program would be run by a private entity working directly with the City of Los Angeles. LA Metro and numerous other agencies would likely be involved in a supporting role.	Large youth population (ages 16-34); areas with low auto-ownership; high residential and employment density, proximity to high-capacity transit and good bicycle infrastructure such as bike lanes (see Figure 9-8).	Regulation in regard to usage of sidewalk space and public right-of-way would need to be modified to allow for bike sharing infrastructure. Similarly, arrangements would need to be made with private entities for property usage for the same reasons.

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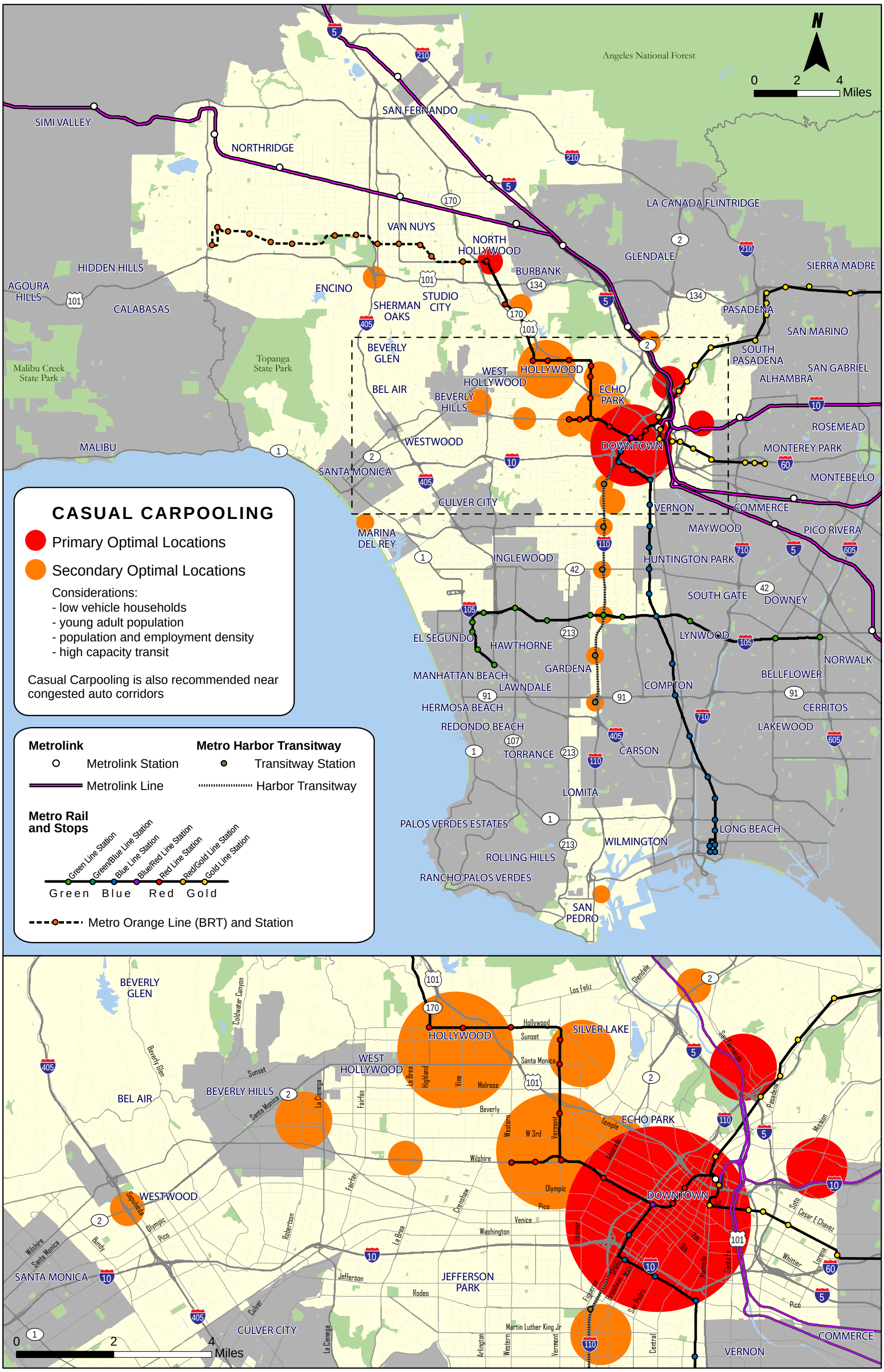
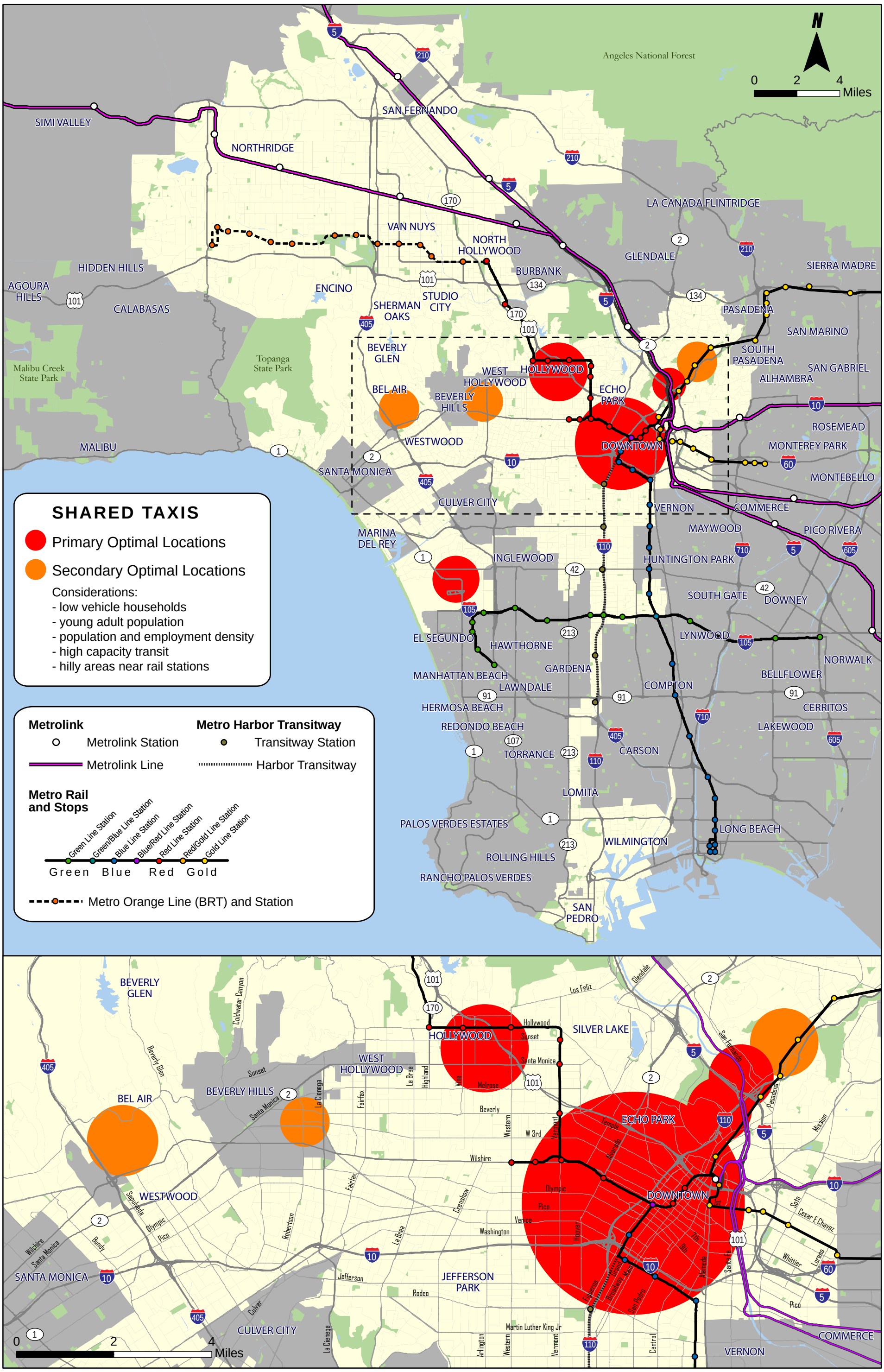
Figure 9-4: Optimal Casual Carpool Locations



Nelson | Nygaard
consulting associates

GIS Data Source: SCAG, ESRI, LA County Planning

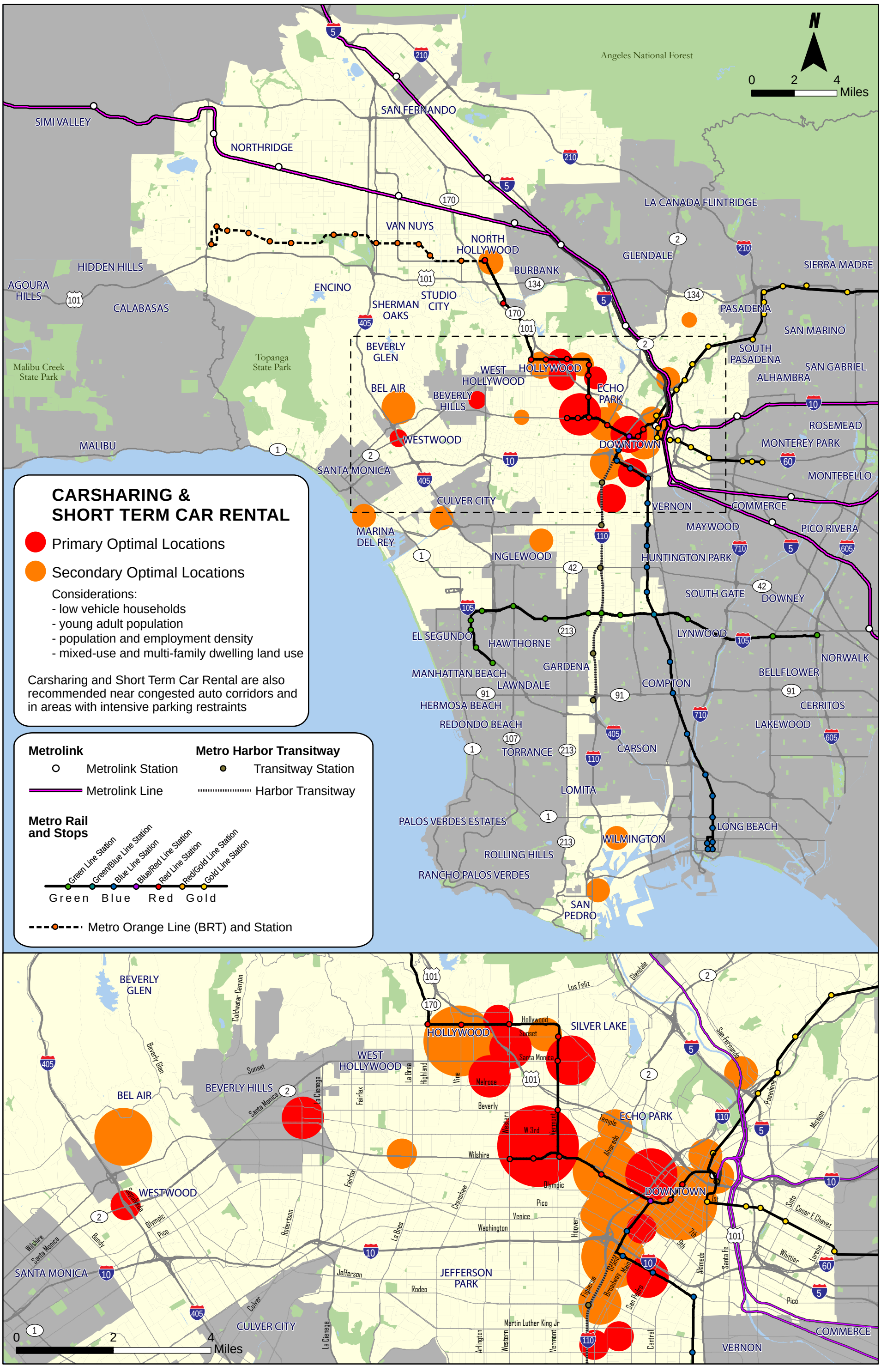
Figure 9-5: Optimal Shared Taxi Locations



Nelson | Nygaard consulting associates

GIS Data Source: SCAG, ESRI, LA County Planning

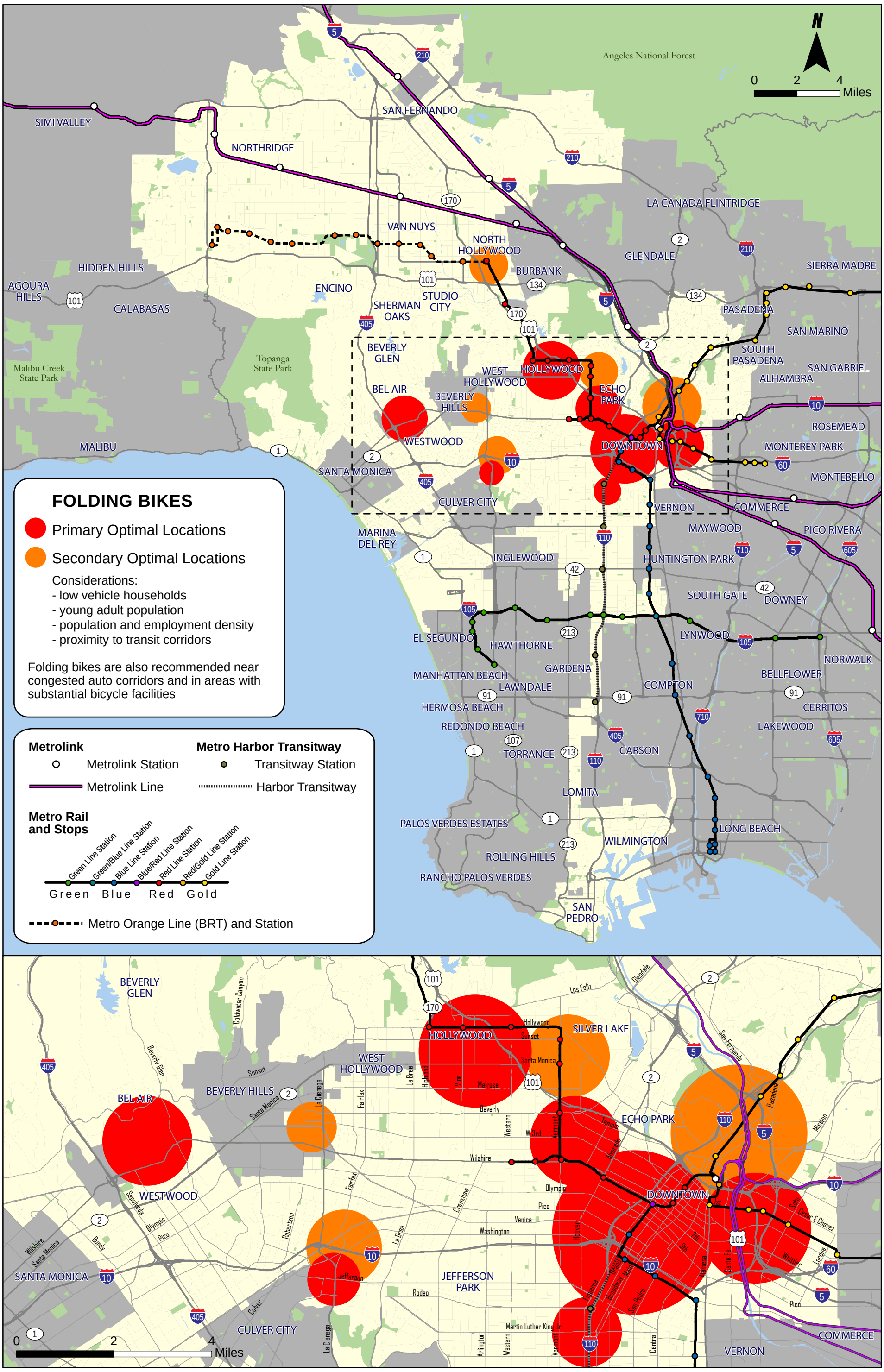
Figure 9-6: Optimal Carsharing and Short Term Car Rental Locations



Nelson | Nygaard consulting associates

GIS Data Source: SCAG, ESRI, LA County Planning

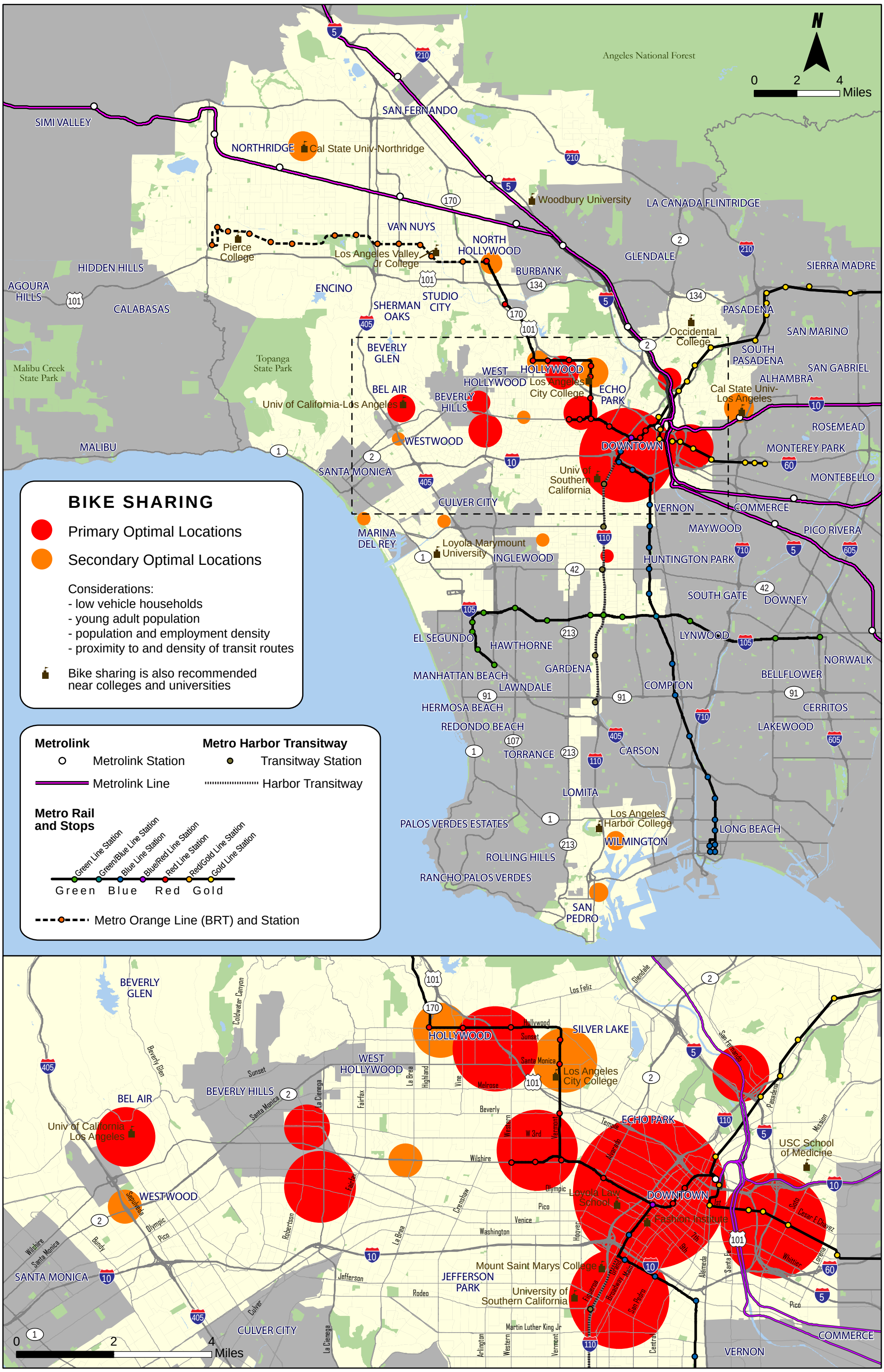
Figure 9-7: Optimal Folding Bike Locations



Nelson | Nygaard consulting associates

GIS Data Source: SCAG, ESRI, LA County Planning

Figure 9-8: Optimal Bike Sharing Locations



Nelson | Nygaard consulting associates

GIS Data Source: SCAG, ESRI, LA County Planning

Appendix A. City of San Francisco Car Sharing Code

SEC. 166. CAR SHARING.

(a) Findings. The Board hereby finds and declares as follows: One of the challenges posed by new development is the increased number of privately-owned automobiles it brings to San Francisco's congested neighborhoods. Growth in the number of privately-owned automobiles increases demands on the City's limited parking supply and often contributes to increased traffic congestion, transit delays, pollution and noise. Car-sharing can mitigate the negative impacts of new development by reducing the rate of individual car-ownership per household, the average number of vehicle miles driven per household and the total amount of automobile-generated pollution per household. Accordingly, car-sharing services should be supported through the Planning Code when a car-sharing organization can demonstrate that it reduces: (i) the number of individually-owned automobiles per household; (ii) vehicle miles traveled per household; and (iii) vehicle emissions generated per household.

(b) Definitions. For purposes of this Code, the following definitions shall apply:

(1) A "car-share service" is a mobility enhancement service that provides an integrated citywide network of neighborhood-based motor vehicles available only to members by reservation on an hourly basis, or in smaller intervals, and at variable rates. Car-sharing is designed to complement existing transit and bicycle transportation systems by providing a practical alternative to private motor vehicle ownership, with the goal of reducing over-dependency on individually owned motor vehicles. Car share vehicles must be located at unstaffed, self-service locations (other than any incidental garage valet service), and generally be available for pick-up by members 24 hours per day. A car share service shall provide automobile insurance for its members when using car share vehicles and shall assume responsibility for maintaining car share vehicles.

(2) A "certified car-share organization" is any public or private entity that provides a membership-based car-share service to the public and manages, maintains and insures motor vehicles for shared use by individual and group members. To qualify as a certified car-share organization, a car-share organization shall submit a written report prepared by an independent third party academic institution or transportation consulting firm that clearly demonstrates, based on a statistically significant analysis of quantitative data, that such car-sharing service has achieved two or more of the following environmental performance goals in any market where they have operated for at least two years: (i) lower household automobile ownership among members than the market area's general population; (ii) lower annual vehicle miles traveled per member household than the market area's general population; (iii) lower annual vehicle emissions per member household than the market area's general population; and (iv) higher rates of transit usage, walking, bicycling and other non-automobile modes of transportation usage for commute trips among members than the market area's general population. This report shall be called a Car-sharing Certification Study and shall be reviewed by Planning Department staff for accuracy and made available to the public upon request. The Zoning Administrator shall only approve certification of a car-share organization if the Planning Department concludes that the Certification Study is technically accurate and clearly demonstrates that the car-share organization has achieved two or more of the above environmental

performance goals during a two-year period of operation. The Zoning Administrator shall establish specific quantifiable performance thresholds, as appropriate, for each of the three environmental performance goals set forth in this subsection.

(3) The Planning Department shall maintain a list of certified car-share organizations that the Zoning Administrator has determined satisfy the minimum environmental performance criteria set forth in subsection 166(b)(2) above. Any car-share organization seeking to benefit from any of the provisions of this Code must be listed as a certified car-share organization.

(4) An "off-street car-share parking space" is any parking space generally complying with the standards set forth for the district in which it is located and dedicated for current or future use by any car share organization through a deed restriction, condition of approval or license agreement. Such deed restriction, condition of approval or license agreement must grant priority use to any certified car-share organization that can make use of the space, although such spaces may be occupied by other vehicles so long as no certified car-share organization can make use of the dedicated car-share spaces. Any off-street car-share parking space provided under this Section must be provided as an independently accessible parking space. In new parking facilities that do not provide any independently accessible spaces other than those spaces required for disabled parking, off-street car-share parking may be provided on vehicle lifts so long as the parking space is easily accessible on a self-service basis 24 hours per day to members of the certified car-share organization. Property owners may enact reasonable security measures to ensure such 24-hour access does not jeopardize the safety and security of the larger parking facility where the car-share parking space is located so long as such security measures do not prevent practical and ready access to the off-street car-share parking spaces.

(5) A "car-share vehicle" is a vehicle provided by a certified car share organization for the purpose of providing a car share-service.

(6) A "property owner" refers to the owner of a property at the time of project approval and its successors and assigns.

(b) Requirements for Provision of Car-Share Parking Spaces.

(1) In newly constructed buildings containing residential uses or existing buildings being converted to residential uses, if parking is provided, car-share parking spaces shall be provided in the amount specified in Table 166. In newly constructed buildings in NCT Districts or the Van Ness and Market Downtown Residential Special Use District containing parking for non-residential uses, including non-accessory parking in a garage or lot, car-share parking spaces shall be provided in the amount specified in Table 166.

Table 166

REQUIRED CAR SHARE PARKING SPACES

TABLE INSET:

Number of Residential Units	Number of Required Car Share Parking Spaces
0--49	0
50--200	1
201 or more	1, plus 1 for every 200 dwelling units over 200
Number of Parking Spaces Provided for Non-Residential Uses or in a Non-Accessory Parking Facility	Number of Required Car Share Parking Spaces
0--24	0
25--49	1
50 or more	1, plus 1 for every 50 parking spaces over 50

(2) The required car-share spaces shall be made available, at no cost, to a certified car-share organization for purposes of providing car-share services for its car-share service subscribers. At the election of the property owner, the car-share spaces may be provided (i) on the building site, (ii) on another off-street site within 800 feet of the building site.

(3) Off-Street Spaces. If the car-share space or spaces are located on the building site or another off-street site:

(A) The parking areas of the building shall be designed in a manner that will make the car-share parking spaces accessible to non-resident subscribers from outside the building as well as building residents;

(B) Prior to Planning Department approval of the first building or site permit for a building subject to the car share requirement, a Notice of Special Restriction on the property shall be recorded indicating the nature of requirements of this Section and identifying the minimum number and location of the required car-share parking spaces. The form of the notice and the location or locations of the car-share parking spaces shall be approved by the Planning Department;

(C) All car-share parking spaces shall be constructed and provided at no cost concurrently with the construction and sale of units; and

(D) if it is demonstrated to the satisfaction of the Planning Department that no certified car-share organization can make use of the dedicated car-share parking spaces, the spaces may be occupied by non-car-share vehicles; provided, however, that upon ninety (90) days of advance written notice to the property owner from a certified car-sharing organization, the property owner shall terminate any non car-sharing leases for such spaces and shall make the spaces available to the car-share organization for its use of such spaces.

(c) Provision of a required car-share parking space shall not be counted against the number of parking spaces allowed by this Code as a principal use, an accessory use, or a conditional use.

(d) The Planning Department shall maintain a publicly-accessible list, updated quarterly, of all projects approved with required off-street car share parking spaces. The list shall contain the Assessor's Block and Lot number, address, number of required off-street car share parking spaces, project sponsor or property owner contact information and other pertinent information as determined by the Zoning Administrator.

(Added by Ord. 217-05, File No. 050865, App. 8/19/2005; Ord. 129-06, File No, 060372, App. 6/22/2006; Ord. 72-08, File No. 071157, App. 4/3/2008)

Appendix B. City of San Francisco Municipal Code Unbundled Parking Requirements Adopted 2008

SEC. 167. PARKING COSTS SEPARATED FROM HOUSING COSTS IN NEW RESIDENTIAL BUILDINGS.

(a) In DTR, C-3, RTO, and NCT Districts, all off-street parking spaces accessory to residential uses in new structures of 10 dwelling units or more, or in new conversions of non-residential buildings to residential use of 10 dwelling units or more, shall be leased or sold separately from the rental or purchase fees for dwelling units for the life of the dwelling units, such that potential renters or buyers have the option of renting or buying a residential unit at a price lower than would be the case if there were a single price for both the residential unit and the parking space. In cases where there are fewer parking spaces than dwelling units, the parking spaces shall be offered first to the potential owners or renters of three-bedroom or more units, second to the owners or renters of two bedroom units, and then to the owners or renters of other units. Renters or buyers of on-site inclusionary affordable units provided pursuant to Section 315 shall have an equal opportunity to rent or buy a parking space on the same terms and conditions as offered to renters or buyers of other dwelling units, and at a price determined by the Mayor's Office of Housing, subject to procedures adopted by the Planning Commission notwithstanding any other provision of Section 315 et seq.

(b) Exception. The Planning Commission may grant an exception from this requirement for projects which include financing for affordable housing that requires that costs for parking and housing be bundled together.

(Added by Ord. 217-05, File No. 050865, App. 8/19/2005; Ord. 129-06, File No, 060372, App. 6/22/2006; Ord. 72-08, File No. 071157, App. 4/3/2008)