

CARPOOLING

Description

Carpooling programs are designed to promote ridesharing by identifying riders with similar origins and destinations. Using a database of interested riders, employers or regional agencies can promote this for an entire region.

Employers and agencies encourage participation through incentives such as discounted/favorable parking, use of managed lanes, flexible work schedules, and guaranteed ride home programs.

Target Market

Carpooling can increase the person-throughput of any roadway, but the biggest impacts can be expected when exercised by people with longer trips. As the trip length increases, so do the positive impacts of maximizing the number of people in a given vehicle.⁸

Congested Corridors during Peak Hours

Freeways and streets can become congested with commuters traveling from suburbs into the city or from one suburb to another. Carpools traveling long distances to the city provide transportation options to the suburban population and remove vehicles from the road. The decrease in vehicles leads to reduced congestion, fuel use, and overall travel time on that road.

Downtown or Other Activity Centers with Limited Parking or Paid Parking

Parking and congestion are major problems in the central city area and other large activity centers. Vanpools reduce the number of automobiles on the roadways, which in turn reduces congestion and parking demand.

Ridesharing also works well for travel patterns without transit service or adequate parking. This service is best paired with managed lanes that



Source: Washington State Department of Transportation

Cost:	●○○○○○
Time:	Short
Impact:	Region
Who:	City/Private
Hurdles:	Personal Habits

offer a price savings for carpools and in areas with park-and-ride lots.

How Will This Help?

- By consolidating more person-trips into fewer vehicles, carpooling offers a range of benefits the community as a whole, and the individual. Community benefits include reduced traffic congestion, vehicle emissions, and parking infrastructure demand.⁹ Carpoolers save cost in terms of fuel and maintenance, reduced commute stress, and may have travel time savings through high occupancy vehicle lane use or preferential parking, if provided.⁹
- The magnitude of carpooling's impact affects various congested corridors differently, but American Community Survey data indicate a modal share of more than 10 percent for Texas as a whole. Since some carpools have three or more participants, most corridors benefit

from a significant proportion of traffic that is not added because of carpooling.

- Reduction in parking costs to employers implementing incentives for transit and carpooling was studied in six employer sites in Minneapolis and St. Paul, Minnesota, finding a reduction in trips ranging 27 percent to 37 percent, and reduced parking demand ranging 11 percent to 21 percent.¹ Employers can leverage the cost savings of reduced vehicle commuters through decreases in employer-paid parking space. Anticipated emissions reductions from commuters are directly proportional to the reduction in vehicle miles traveled.

Incentives for carpooling offered through employers or other organizations are proven to increase participation. Average vehicle ridership increased between 8.5 percent and 16.7 percent in a Los Angeles-area study.¹³ Los Angeles and Sacramento, California, have also implemented regulatory approaches to shifting commute mode, increasing carpooling by 5.9 percent¹⁵ and 3.9 percent,¹⁰ respectively.

The effect of carpooling and related strategies over time was studied in Bellevue, Washington, from 1984 to 2005. The carpool mode share fluctuated from 13 percent in 1984 to 17 percent in 2000, and back down to 10 percent in 2005.¹⁴ During this time several other changes may have affected these results, including changes in transit service and the availability and price of parking, complicating the results.

The benefits of carpooling are often symbiotic with other congestion-reducing strategies. Donald Shoup¹¹ demonstrates the cost savings of carpooling are extended with the use of roadway tolls or congestion pricing for saving travel time (a three-person carpool divides fuel and toll cost by three). Carpoolers then have the added benefit of travel time savings without a significant cost, even if discounts for high-occupancy vehicles are not provided.

Implementation Examples

Carpooling is implemented in different methods across the United States. The most effective examples generally consider both 'soft-skilled' methods of encouragement and incentives along with infrastructure improvements such as park-and-ride facilities and managed lanes.

Houston, Texas: The Houston Downtown Management District works with Central Houston, Inc. to provide carpooling and other trip reduction services to employers and employees in the downtown Houston, Texas, area. In addition to working with the city of Houston, METRO transit, and TxDOT to improve public transit, they partner with NuRide in an innovative ridesharing application. In 2009, 52 percent of workers use some other mode than driving alone.²

Washington, D.C.: The Pool Rewards project by Commuter Connections was developed to encourage drive alone commuters to try carpooling. Eligible participants could earn \$2 per day (\$1 each way) for each day they carpooled to work. The program began as a three month pilot in 2010. The pilot resulted in a decrease in 298 daily auto trips based on logged passenger trips and a daily VMT reduction of over 9,000 miles per day. According to a follow-up survey, 93 percent of participants continued carpooling after the pilot project ended.⁵

Application Techniques and Principles

Carpooling is by itself a simple concept, but several related issues can have significant impact on its effectiveness. Guaranteed ride home programs, priority carpool parking, vanpool vehicles, high-occupancy vehicle lanes, park-and-ride facilities, and real-time ridesharing technology are all important techniques to consider.

Ridematching databases connect potential drivers and riders who would like to share trips, but may not yet know each other. Often funded through federal or local governments, they can

be operated through metropolitan planning organizations, transportation management associations, or government or private organizations. Often at no cost to users, they use Internet mapping, user profiles, and email to coordinate drivers and riders.

In addition to planned databases, real-time ridesharing leverages smartphone technology to allow drivers and riders to coordinate without a pre-planned trip. Since smartphones include location-based technologies, they can coordinate the proximity of carpools dynamically.

Guaranteed ride home programs (employer, local agency, or transit sponsored) offer users the assurance of a ride from work in the event of an emergency (usually through a taxi company contract). Riders use this service rarely and as a last resort, relying more on family, friends, or coworkers if a ride is needed. For sponsors, this is a low-cost and highly effective promotion for carpooling and vanpooling.

Priority carpool parking encourages ridesharing by providing close by and/or discounted parking rates. Convenient and lower-cost parking can increase the percent of people choosing to carpool,⁵ especially in areas of priced or restricted parking.

Park-and-ride facilities provide a designated place for carpoolers to meet. In some cases, informal park-and-ride facilities are utilized, such as underutilized parking in shopping centers. Most formal facilities include free (cost-subsidized) parking and are often co-located



Source: University of Texas Parking and Transportation Services



Source: myCommuteSolutions.com

with transit centers. When developed in conjunction with high-occupancy vehicle lanes, facilities can include 1,000 to 2,000 parking spaces.⁷

High-occupancy vehicle (HOV) lanes may encourage carpooling by allowing use of a dedicated facility to carpoolers, allowing them to bypass congestion. Depending on the context, these facilities can make a significant impact, but their cost can also be very high. The tradeoff on environmental and social impacts needs to be considered in any project.

Issues

There are a number of behavioral, institutional, and infrastructure barriers to the effectiveness of carpooling as a strategy to mitigate congestion. Travel behavior trends and economics, land use, and supportive infrastructure all play a role in the success of carpooling.

Travel behavior is controlled by a number of factors, but overall commuter choice for carpooling has remained flat and fallen somewhat in recent years. Census journey-to-work and American Community Survey commute data show trends in carpooling have fallen from a high in 1980 near 20 percent, to under 13 percent since 2005. Since 1980, census statistics show national average household car

For more information, please refer to: <http://mobility.tamu.edu/mip/strategies.php>.

ownership has increased from 34 percent of households owning two cars, to nearly 38 percent in 2008. The number of vehicles per household has increased, while the average household size has generally held constant. Meanwhile, the cost of fuel has increased, but impacts have been minimal considering inflation.⁸

Studies reviewing attitudes related to carpooling share light on how people choose (or not) to carpool. In practice, carpooling trades time for money, since drivers have to take some extra time to pick up and drop off one or more riders, sometimes in exchange for associated costs, such as gas or tolls. However, the constraints on independence and social requirements can be more important to individuals than cost or convenience.³

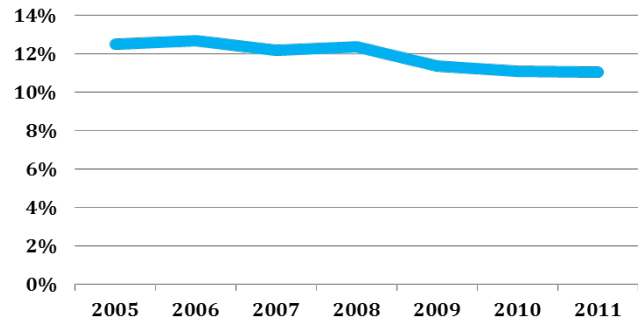
Land use includes the effect of land use densities and mixes through zoning and other measures, and their effect on carpooling behavior. Although carpooling origins (usually residences) can be spread out somewhat, the use of park-and-ride facilities can mitigate this issue. Carpool trips are highly dependent on the proximity of destinations, however. Suburbanization has led to the de-centralization of common work destinations, making the probability of residential neighbors sharing employment destinations less likely.⁸

Infrastructure plays a role in carpooling travel behavior, principally by making some aspects easier to share rides. Managed lanes providing discounted or no tolls for high-occupancy vehicles can encourage carpooling, but the literature shows the effects of high-occupancy vehicle lanes is inconclusive.⁶

Who Is Responsible?

Since carpooling is affected by individual behavior, employer policies, and supportive infrastructure, a variety of organizations can play a positive role in carpooling.

Carpooling to Work in Texas



Source: U.S. Census Bureau, 2005-2011 American Community

Project Timeframe

Timeline depends on the planned project scope. Existing vendors provide ride-matching database services that can be implemented in a matter of weeks or months. Infrastructure improvements, such as dedicated parking, can take months and high-occupancy vehicle lanes several years to implement.

Cost

Costs can vary widely considering whether carpooling is supported by existing ride-matching databases, all the way through dedicated high-occupancy vehicle lanes. Employer carpooling programs involve upfront costs, at least involving program administration costs to employers, and possibly additional time to employees. Administration costs for operating a commuter trip reduction program typically average \$1 to 8 per employee-month, covering program planning, marking, management, and performance evaluation.⁴ Guaranteed ride home programs cost at least \$5 per employee-year.¹ Infrastructure costs for priority carpool parking may be minimal, but high-occupancy vehicle lanes cost ranges in the millions per mile, depending on local factors.

Data Needs

Carpooling data already exists through limited sources, such as annual survey sample data in the American Community Survey. More serious investments in carpooling programs and/or

infrastructure should be supplemented by local surveys that go into some depth of participation rates and opportunities to improve existing programs.

Carpooling Best Practice

- Type of Location: All-congested urban areas or longer rural trips.
- Agency Practices: Carpooling can be supported by implementing ridematching databases, encouragement marketing, priority carpool parking, and partnering with transit agencies for vanpool and supportive programs.
- Frequency of Reanalysis: Annual analysis of both commute statistics and supplemental carpool program surveys are recommended to evaluate progress and improve programs.
- Supporting Policies or Actions Needed: Public and private organizations can set carpooling goals for reducing commute trips, develop or support existing ridesharing programs, and develop supportive infrastructure such as priority carpool parking and managed lanes with carpool discounts.
- Complementary Strategies: Most travel options strategies are complementary, especially vanpooling and real-time ridesharing, transportation management associations, trip reduction ordinances, and parking management.

For More Information

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