U.S. POLICY

RIDESHARING: CONTEXT, TRENDS, AND OPPORTUNITIES

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Transportation in the United States faces significant challenges, including uncertain funding, congestion, unsustainable trends in energy consumption and greenhouse gas (GHG) emissions, and high costs to households and government. Ridesharing represents a cost-effective option for addressing many of these concerns. Although ridesharing has declined in recent decades, it continues to play an important role in the transportation system today, and new developments such as social media present opportunities to increase ridesharing nationwide. This paper examines the role and potential of ridesharing, specifically carpooling and vanpooling (C/V), in the U.S. transportation system, and concludes that ridesharing merits greater support from federal, state and local transportation agencies.

CONTEXT

The United States faces substantial and growing challenges in the transportation sector.

CONGESTION

To keep pace in an increasingly global economy, the United States needs an efficient transportation system for both people and goods. Yet congestion significantly erodes transportation reliability, raising costs for businesses, households, and government.[1] While the current economic conditions have depressed travel demand, both congestion and demand will eventually increase in response to population and economic growth.[2] Reliance on traffic operations improvements,[3] selective highway capacity improvements, expansion of transit, and urban planning is unlikely to decrease congestion or even offset expected increase in travel

demand. [4] This judgment is based on the historical failure of these efforts to keep pace with increased travel demand, and also on the budgetary constraints on federal, state and local funding of costly highway and transit improvements.

ENERGY AND GHG EMISSIONS

Transportation's energy consumption and GHG emissions also present major problems. Surface transportation consumed more than 13 million barrels of oil per day in 2010 (70 percent of U.S. oil consumption),[5] contributing to energy security concerns and the transfer of over $300 billion in petroleum payments to other nations.[6] Surface transportation currently generates over 20 percent of U.S. GHG emissions.[7] Many governments in developed countries support the aim of reducing GHG emissions by 80 percent below 2000 levels by 2050 to stabilize atmospheric concentrations of GHGs – a target that requires substantial reductions from transportation.[8]

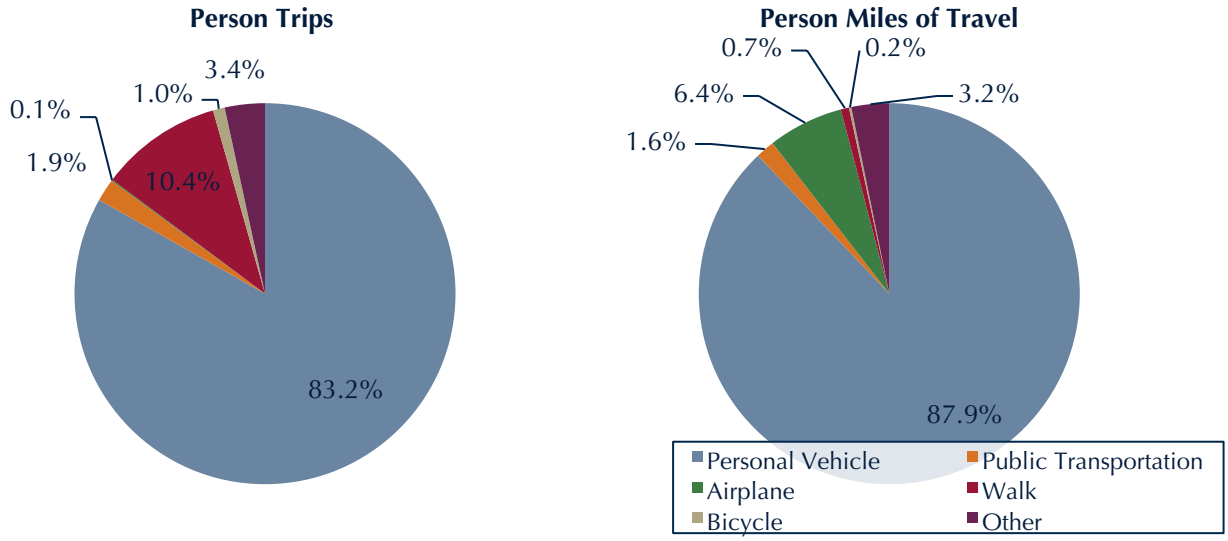
COSTS TO HOUSEHOLDS AND GOVERNMENT

Transportation is a significant cost for both households and governments. Households spent an average of $7,677 per year on transportation (12 percent of before-tax average household income) in 2010.[9] In 2011, Americans spent the greatest proportion of their household income on gasoline in over 30 years.[10] Federal, state, and local spending on highways and transit was over $168 billion in 2007.[11] In view of current economic and budgetary trends, it is unlikely that public spending can be increased. This suggests a need for more economical, if not frugal, transportation options.

C/V FACTS AND RECENT TRENDS

It is evident that the personal vehicle is the dominant mode for all trips and passenger miles traveled in the United States (see Figure 1). This reliance on the personal vehicle, especially when driven alone, is a major contributor to the problems described above. Despite decades of U.S. DOT support for alternative travel modes and travel demand management (TDM) programs, strong air quality and environmental requirements, and billions of dollars in federal, state, and local funding, single occupant vehicle (SOV) travel remains dominant: nationwide, 76 percent of workers commuted by SOV in 2009, up from 63 percent in 1983 (see Figure 2).[12] SOV travel even dominates for workers who live inside a central city, for whom 72 percent of work trips are by SOV.[13]

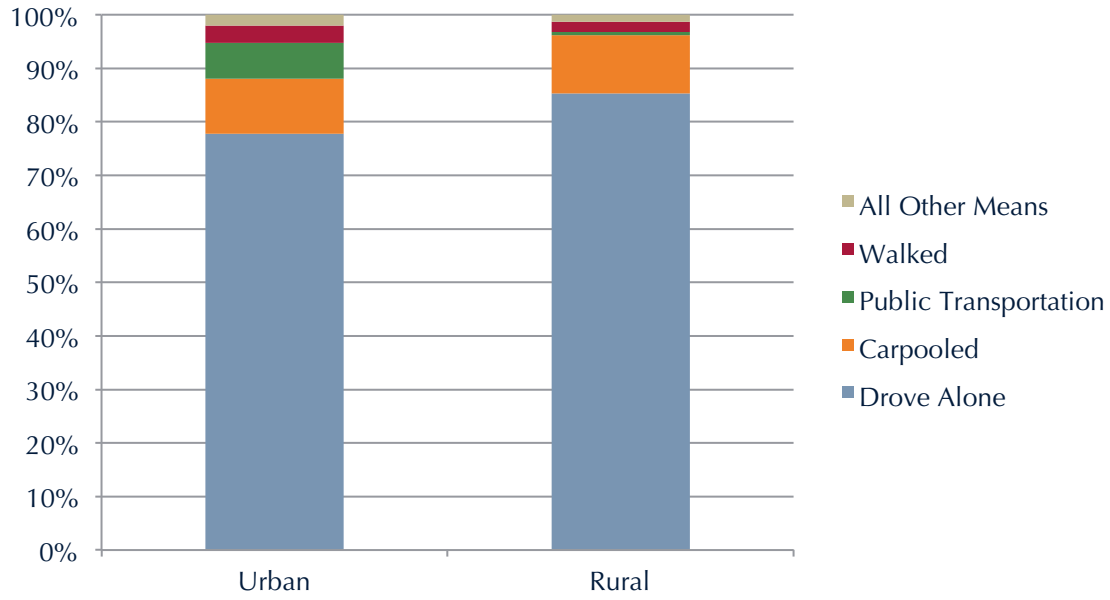
FIGURE 1: Distribution of mode used for all trips and personal miles traveled.[14]



C/V reduces SOV travel, especially for work trips, thereby reducing congestion, GHG emissions, energy consumption, and transportation costs. In 2009, almost 14 million Americans carpooled and represented 10 percent of work trips nationally – more than all other non-SOV work travel modes combined.[15] Carpooling also serves other trip purposes, such as school, recreation, and shopping. This is important because 71 percent of vehicle miles traveled (VMT) occurs for non-work trips, accounting for most of transportation's GHG emissions, energy consumption, and household transportation costs.[16]

While C/V represents 10 percent of work trips, it was much higher in the past – representing 20 percent of work trips nationally in 1980. If that 20 percent mode share had been maintained, the reduction in congestion, household and government costs, fuel use, and GHG emissions would likely be substantial. Unfortunately, little or no research has been done on the impacts of the C/V decline in the past three decades. Importantly, the average occupancy of a passenger vehicle has changed very little since 1990 so the decline in C/V may have leveled off.[17]

FIGURE 2: 2009 work trips distribution by mode as defined by the U.S. Census Bureau.[18]



Research related to C/V has not attempted to explain the mode's decline from 1980 to 2009. Some of the leading possibilities include:

- Factors such as flexible work schedules resulted in work trip travel that is more complex and less amenable to traditional C/V.[19]
- Fuel costs decreased steadily throughout the 1980s and 1990s reaching a low point in 1998 of $1.24 per gallon ($2005).[20] Combined with a moderate rise in the median household income and growing valuation of time during the same period, households bought more vehicles and increased SOV travel.[21]
- Between 1980 and 2011, single-person households increased from 23 to 28 percent of all households, undercutting carpooling among family members, which has historically been a significant share of carpools.[22]
- Institutional support for C/V at the federal, state, and metropolitan levels diminished at the same time as its mode share declined. In the 1970s, the Federal Highway Administration (FHWA) had a Ridesharing Division that promoted ridesharing, supported research, provided technical assistance to state DOTs and Metropolitan Planning Organizations (MPOs), and encouraged its inclusion in transportation plans

and policy. That division eventually disappeared, and today there is no individual at U.S. DOT with clearly defined responsibility for C/V. For at least two decades, public policies have focused more heavily on transit, biking, and walking than C/V. For example, U.S. DOT has a full-time bicycle/pedestrian coordinator and current federal law requires all state DOTS to designate bike/pedestrian coordinators.

- While other modes benefit from significant research efforts, there is a dearth of research on C/V aside from a recent pilot program initiated by Washington State DOT.[23]

C/V POTENTIAL

C/V is a worthy and important complement to other modes like transit, biking, and walking in addressing the problems laid out earlier and providing travel alternatives. To date, the relatively limited attention given to C/V has focused on work trips. To some degree the focus on work trips is appropriate, because SOV work trips contribute significantly to congestion, which entails major economic, environmental, and energy security costs. Congestion is nonlinear: as more vehicles are added to the road, wasted time and fuel increases at a greater rate than the rate of increase in vehicle numbers. This results in the exacerbation of vehicle-related issues such as local air pollution. Thus, removing vehicles from the road at peak travel times can provide very large benefits. In addition, providing more options for the work trip can encourage job growth and improve quality of life, which are priorities of all transportation agencies.

The focus on work-trip related congestion, however, leaves out most of the oil consumed by passenger vehicles since most VMT are for non-work trips. The average occupancy of non-work trips is much higher than work trips regardless of area population, which is probably due to members of the same household traveling together.[24]

Estimating the potential for all trips, however, is challenging. An MIT study on carpooling used spatial analysis and survey data to determine the maximum number of potential rideshares for work trips for its employees. The study found that if MIT employee carpooling increased from 8 to 77 percent (the maximum deemed feasible), overall VMT among MIT employees would decrease by a significant margin, 27 percent.[25] To scale a study to include all trips would require spatial data for individuals over time – data that is rarely collected on a mass scale.

An example of the challenge to understanding C/V's potential, especially as it relates to available data, is revealed in the 2009 NHTS. The survey asks participants to identify their typical means of travel to work along the mode they used "today." Individuals' inconsistent travel patterns are evident as only 54.8 percent of those who say they regularly carpool actually shared a ride to work that day. Meanwhile, 5.6 percent of SOV drivers, 9.2 percent of transit riders, and 9.3 percent of walkers carpooled that day indicating C/V may be a viable option for occasional travel.[26]

FORCES & FACTORS THAT COULD INCREASE C/V

Market forces combined with technological advancements and shifting consumer preferences create opportunities for increasing C/V.

Gasoline cost an average of $3.50 per gallon in 2011, the highest ever in real terms. The U.S. Energy Information Administration anticipates gas prices staying at current levels through at least 2013.[27]

Meanwhile, internet-enabled mobile phones that include location-aware capabilities have sparked the creation of startup companies in many fields, including ridesharing. Features include pre-arranged carpooling and dynamic, real-time ridesharing (i.e., unplanned shared rides among people who may or may not know one another). Low-tech carpooling has also existed in major metropolitan areas like Washington, D.C. for decades. Casual carpooling (or "slugging," as it is referred to in the nation's capital) is anonymous carpooling arranged at defined locations so drivers can access high occupancy vehicle (HOV) lanes.

Changes in consumer preferences could also influence the perception of C/V, vehicle ownership, and multi-modal transportation. In 2008, only half of 17-year-olds owned a vehicle, a drop of 20 percent since 1983.[28] In addition, the availability of bikeshare and carshare programs has changed how a small but growing number of Americans get around in an urban and suburban environment. Lastly, changes in privacy preferences with the mass adoption of social networking websites like Facebook and other internet-induced activities like hospitality exchanges (i.e., couch-surfing) may help remove an oft-cited barrier to C/V – i.e., the aversion to riding with strangers.

CURRENT C/V NEEDS

Given the challenges facing transportation, there appears to be a strong case for leveraging C/V to reduce congestion, GHG emissions, energy use, and transportation costs. U.S. DOT and state/local transportation agencies could play a significant role in this effort, through C/V research, pilot programs, technical assistance, policy, and institutional support. Possibilities for consideration include:

- **Research**: FHWA and Federal Transit Administration (FTA) could fund research to (a) analyze corridors where C/V is highest, to determine factors that contribute to C/V success and its transferability to other corridors; (b) identify how C/V could complement transit service, starting with case studies of those transit systems that currently implement C/V programs and estimating their effect on transit cost-effectiveness; (c) estimate the potential effectiveness and cost-effectiveness of C/V in different settings; (d) estimate how C/V can meet special travel needs, such as in rural areas and areas with aging populations; (e) identify the best ways to market C/V, including exploration of lessons learned from the success of recycling and anti-smoking marketing campaigns and the use of new media such as social networking websites; and (f) identify whether and how C/V has been considered in FHWA and FTA National Environmental Policy Act (NEPA) documents as a NEPA alternative or a complement to NEPA alternatives.
- **Pilot programs**: This could include funding for innovative C/V pilot programs, such as pilots to deploy and test new information technologies designed for dynamic carpooling. In addition, U.S. DOT could provide clarifying guidance on the extent to which state DOTs and MPOs can use their formula funds for innovative C/V pilot programs. Pilot programs could be specially designed for C/V to accommodate work and other trips, for rural areas, and for special population subgroups.
- **Technical assistance**: FHWA and FTA could provide technical assistance to state DOTs, MPOs, and local governments in designing and implementing C/V programs. This could include identifying best practices, providing case studies, conducting peer exchanges and training, and hosting webinars and workshops. This technical assistance could be provided through FHWA/FTA Planning Offices, as well as through FHWA/FTA operational programs.
- **Policy**: U.S. DOT policy documents could highlight C/V as a mode of travel that supports national transportation goals, providing estimates of the current benefits of C/V and estimating the potential for additional benefits if C/V mode share were increased. Further, U.S. DOT could offer heightened consideration of C/V in NEPA documents for major highway and transit investments, emphasizing the importance of C/V as a project alternative or as a supplement to highway and transit alternatives considered in NEPA. Finally, U.S. DOT could look closely at whether and how the emerging emphasis on using performance measures to evaluate transportation program effectiveness should incorporate C/V.
- **Institutional Support**: U.S. DOT could assign staff to focus on providing support and assistance to C/V through the efforts described above. Staff support in FHWA Planning, FHWA Operations,

FTA, and U.S. DOT Office of the Secretary all would be helpful. Besides supporting internal DOT C/V efforts, staff could also serve as a liaison to external national, state, and local organizations interested in C/V.

Ridesharing has been a cost-effective transportation option for millions of Americans for decades. It has reduced congestion, saved money for households and governments, and mitigated the effects of driving on our environment. As transportation costs continue to increase and public and household budgets tighten, governments and individuals will seek out low-cost transportation alternatives. Ridesharing remains an important option that warrants concerted attention from all levels of government.

ENDNOTES

1 Congestion in the United States costs more than $100 billion annually. In 2010, the average delay per commuter was 34 hours, up substantially from 14 hours in 1982. (Schrank, D., Lomax, T., & Eisele, B. (2011). Urban Mobility Report 2011. College Station, Texas: Texas Transportation Institute.)

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The Center for Climate and Energy Solutions (C2ES) is an independent nonprofit organization working to promote practical, effective policies and actions to address the twin challenges of energy and climate change.

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