Policy Brief on the Impacts of Employer-Based Trip Reduction Based on a Review of the Empirical Literature

Marlon G. Boarnet and Hsin-Ping Hsu, UC Irvine
Susan Handy, UC Davis

Policy Description

Employer-based trip reduction programs use various approaches to reduce single occupant car travel to work and the associated greenhouse gas (GHG) emissions. These programs are sometimes encouraged or required by state or local governments, and sometimes are pursued voluntarily by firms.

Employer-based trip reduction programs typically include some combination of the following elements, usually chosen by firms to suit their specific context:

- Employer-provided alternative mode services, such as carpool facilitation (e.g. a carpool matching service), preferential parking for carpoolers, vanpool service, carsharing programs, or a guaranteed ride home for employees who commute by transit;
- Financial incentives for carpoolers, vanpool users, cyclists, or pedestrian commuters, free or reduced public transit fares (often subsidized by the employer), or a cash transportation allowance combined with a parking fee, also called a parking cash-out;
- Worksite facilities for physically active commuting, such as showers, lockers, or bicycle racks;
- Alternative work schedules that include flexible work hours and/or a compressed work week; and
- Information and marketing, such as a commuter information center or a transit promotion campaign.

Some evidence suggests that the more effective programs offer a broader array of elements and include financial incentives for employees (e.g. Dill and Wardell, 2007; Herzog et al., 2006).

Impacts of Employer-based Trip Reduction

Effect Size

While there have been several studies of the effectiveness of employer-based trip reduction programs, only a few have estimated reductions in vehicle miles travelled (VMT) or GHG emissions, either for employees in the program or, even less commonly, for a region or metropolitan area. Most studies examine state mandated employer commute trip reduction programs, which typically apply to large firms in highly populated urban regions. Washington State passed a commute trip reduction law in 1991, which requires firms with work sites of more than 100 employees to implement employer-

based trip reduction programs. The evidence suggests that in Washington State commute VMT is reduced by 6 percent on average for employees at the work sites in the commute trip reduction program (see, e.g., CTR Task Force 2005 Report and Lagerberg, 1997).

A study of voluntary employer-based trip reduction, which includes San Francisco, (Herzog et al., 2006) found similar VMT reductions (4.16 to 4.79 percent) among employees offered an array of trip reduction benefits when comparing employees who participated in trip reduction programs with a reference group of employees at the same work site who did not participate. Most of the studies in Table 1 estimated commute reduction by examining changes in commute mode share combined with survey data on commute distance.

Table 1: Summary of Employer-Based Trip Reduction Studies

Study	Study Location	Study Year(s)	Results	
			Effect Type	*Effect Size*
Giuliano et al., (1993)	Los Angeles metropolitan area	1988-1991	Average vehicle ridership (ratio of employees divided by private vehicles arriving at work site)	Increased 2.7%
			Carpooling	Increased 33.3% from 13.8% initial mode share
Lagerberg (1997)	9 most populous counties in Washington State	1993-1995	VMT from commute trips at participating work sites	6% reduction
Hillsman et al., (2001)	Seattle metropolitan area	1999	Total VMT, a.m. peak	1.33% reduction
			Freeway VMT, a.m. peak	1.07% reduction
CTR Task Force 2005 Report	9 most populous counties in Washington State	2005	VMT from commute trips at participating worksites	5.9% reduction
Herzog et al. (2006)	Denver, Houston, San Francisco, and Washington, D.C. metropolitan areas	2004	Commute VMT, participants compared to reference group at same work site	4.16% to 4.79% reduction

Only two studies estimated VMT reduction for the entire region or metropolitan area. Hillsman, et al. (2001) used survey data from firms on the number of commute trips eliminated by Washington State's commute trip reduction (CTR) program to estimate the declines in total VMT (1.33 percent) and freeway VMT (1.07 percent) for the four central counties in metropolitan Seattle. That is a smaller impact than other studies because the authors examined all travel during the morning peak, not just commute trips. The CTR Task Force 2005 Report, using different years in the same data set analyzed by Hillsman et al (2001), estimated a 1.6 percent reduction in total VMT.

Overall, employer-based trip reduction programs can potentially reduce commute VMT for employees at participating work sites by 4 percent to 6 percent. Studies of individual employers have sometimes given larger impacts. Genentech, in South San Francisco, has commuter drive alone rates that are 21 percent below standard suburban, likely due to the company's broad menu of trip reduction incentives, some of which date to at least the early 1990s (Nelson\Nygaard, 2008). An impact of that magnitude likely represents a high end or upper bound of what could be expected from an individual work site. On a regional basis, the best available study (Hillsman et al, 2001) inferred a regional VMT reduction of about 1 percent. Programs that span many work places across one or several metropolitan areas would perform at different levels, and it would be unreasonable to expect the results at Genentech to reflect an average for a metropolitan area. For metropolitan-scale implementation, the evidence in Table 1 and the range of 4 to 6 percent reduction in employee commute VMT is reasonable.

Evidence Quality

The trip reduction programs that were mandated by state governments (Washington State since 1991 and California pre-1996 in the studies reviewed here) required employers to collect data on employee commute patterns, providing opportunities for before-and-after analyses, either for individual employees or more commonly for firms or work sites (e.g. Giuliano, Hwang, and Wachs, 1991; Lagerberg, 1997; and CTR Task Force 2005 Report). With the exception of Herzog et al. (2006), the studies did not use control groups. As Higgens (1996) discusses, control groups are preferable to simple before-and-after comparisons of program participants because before-after comparisons cannot control for changes in the overall environment (e.g. gas prices or transit fares) that might influence commuting behavior during the study period.

The evidence from both mandated trip reduction programs (e.g. Lagerberg, 1997; CTR Task Force 2005 Report; Hillsman, Reeves, and Blaine, 2001) and voluntary programs (Herzog et al. 2006) gives consistent estimates. As seen in Table 1, the difference between before-after and control group studies is not large, and the most evident difference is the impact on commute VMT at participating work sites (4 to 6 percent reduction) versus metropolitan peak period VMT (about a 1 percent reduction.)

Caveats

With the exception of the most recent evaluation of Washington State's program in 2005, there is little evidence on the effectiveness of mandated trip reduction programs in an era of high gasoline costs, such as the $3 to $4 per gallon prices of the past few years. There is no evidence on the effect of mandated employee trip reduction for work sites smaller than 100 employees. There is however some evidence showing that employees at smaller worksites are less likely to use vanpools, presumably because vanpooling and other shared rides are easier to implement when the program can draw from a large employee pool (Concas et al., 2005). More generally, Dill and Wardell (2007) found that firm characteristics, including access to transit and bicycle/pedestrian amenities, influenced the employee response to employer-based trip reduction

programs.

Another complicating factor is induced travel (Lagerberg, 1997). As some commute trips are removed from the street and highway network, the associated reduction in traffic congestion might encourage other persons to take trips during peak hours that would have otherwise been shifted to different times of day, non-car modes, and alternate routes. Therefore, VMT reduction for a region overall might be lower than the reduction in commuting VMT at participating work sites.

Greenhouse Gas Emissions

The CTR Task Force 2005 Report estimated that Washington State's employer-based trip reduction (ETR) program reduced statewide carbon dioxide equivalent emissions from motor vehicles by 0.2 percent to 0.6 percent – an effect that would likely be larger if one focused only on the nine Washington counties where the ETR program is required. Using a simulation model, Herzog et al. (2006) found there was a reduction of carbon dioxide emissions by 4.11 percent to 4.74 percent comparing participants of employer-based trip reduction programs to a reference group at same work site.

Co-Benefits

The purpose of employer-based trip reduction programs is to provide incentives for employees to switch from solo driving to other commuting modes. Co-benefits of this switch typically include reduced parking requirements and cost, increased use of transit, bicycle, and walking commuting, and (due to reductions in solo driving) reductions in traffic congestion, automobile emissions, and air pollution. Mode shifts and reductions in commute vehicles arriving at the work site have been documented by many studies, e.g. Dill and Wardell (2007) in Portland, Oregon as of 2006, Concas et al. (2005) for Seattle, Washington, and the studies cited in Table 1. When employees shift to non-motorized commute modes, co-benefits could also include improvements in health resulting from increases in physical activity. Co-benefits can also include reductions in criteria pollutants, as documented by Georggi et al. (2007).

Examples

In California, the South Coast Air Quality Management District (AQMD) implemented a commute trip reduction program, Regulation XV, in 1988 requiring employers with work sites of more than 100 employees to develop employee trip reduction plans. Firms could choose elements of the plans, but were required to file reports detailing the plan and, after the initial reporting period, to report on employee commuting patterns annually. In 1995, state legislation prohibited air districts or other public agencies from mandating employer trip reduction programs unless such mandates are required by federal law. In 2008, Assembly Bill 2522 passed allowing the San Joaquin Valley Air District to develop a commute trip reduction program, implemented in late 2009 as Rule 9410. This program is similar to other employee based trip reduction efforts: Firms design their own programs which are intended to provide alternatives to solo

commuting, and employees are not required to choose any particular commute mode but instead have the option of whether or not to use alternatives to solo driving. See http://www.valleyair.org/Programs/Rule9410TripReduction/eTRIP_main.htm.

Suggested Further Reading

CTR Task Force 2005 Report to the Washington State Legislature, available at http://www.wsdot.wa.gov/NR/rdonlyres/172087A9-85D1-416B-86C4-33281C7BDE68/0/CTR_Report_05.pdf, accessed Apr. 18, 2010.

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Giuliano, Genevieve, Keith Hwang, and Martin Wachs. 1993. Employee Trip Reduction in Southern California: First Year Results. *Transportation Research A* 27 (2), 125-137.

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Hillsman, Edward L., Paula Reeves, and Larry Blain. 2001. Estimation of Effects of Washington State's Trip-Reduction Program on Traffic Volumes and Delays: Central Puget Sound Region. *Transportation Research Record* 1765, 16-19.

Lagerberg, Brian. 1997. Washington State's Commute Trip Reduction Program: Phase 1: Assessment and Implications for Program Design. *Transportation Research Record* 1598, 36-42.

Nelson\Nygaard. 2008. *South San Francisco Mode Share and Parking Report for Genentech, Inc*.