Employer-Based Transportation Management Programs

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■ Introduction

Employers play a critical role in many of the most effective TCMs. In order to reduce peak period trips for purposes of improving both air quality and traffic congestion, the most logical place to affect behavior and group trips is at the work site. While residential dispersion discourages many public transportation strategies, large numbers of employees traveling to urban cores or large suburban activity centers deem work-end trip reduction strategies worthy of considerable attention. Employers have a great deal of influence over employee travel behavior due to their location, work schedule, parking, compensation and benefits policies and practices. In order to influence commuter travel behavior, experience indicates that working through employers, and developers to a certain extent, is an effective means to reduce trips. The success of these programs over the long term hinges on the ability of the employer to package a mix of attractive options and to sustain commitment over time. Benefits to employers that should be recognized include increased productivity, reduced absenteeism, and reduced parking costs.

A number of well-known employer programs have been in existence for a relatively long time. One of the earliest employer programs was initiated by Reader's Digest. A move from Manhattan to Westchester County, NY in the 1920's prompted the publisher to form and subsidize a private bus system to transport relocated workers. Other well-known examples include the Tennessee Valley Authority program to reduce parking demand and the 3-M Company in the Twin Cities, founder of employer-sponsored vanpooling. The energy crises of the mid- and late-1970's also prompted a significant number of new programs as public efforts to promote ridesharing began to focus on employers.

In the 1980's, trip reduction ordinances to combat growth, traffic congestion and air quality problems resulted in new employer programs. Trip reduction ordinances, or TROs, are **government** requirements designed to encourage the use of transportation alternatives such as ridesharing, transit, bicycling, walking, and even telecommunications as a substitute for single occupant vehicle travel. Typically, these ordinances require employers to implement programs or developers to work with tenants to implement programs.

This chapter on Employer-Based Transportation Management Programs provides guidance to **employers** that is useful in developing, implementing and operating a transportation management program, whether such a program is being undertaken in response to requirements of a TRO or on their own initiative.

The Federal Clean Air Act of 1990 requires the implementation of employer-based trip reduction programs in severe and extreme ozone non-attainment areas. This general guidance on Employer-Based Transportation Management Programs is developed and issued in response to Section 108(f) which, in subpart (iii), mandates the preparation of such information. The information contained in this chapter dose not address Environmental Protection Agency requirements regarding section 182(d)(1)(B) which requires severe/extreme ozone areas to implement employer trip reduction programs. EPA's requirements on section 182(d) employer trip reduction programs should be obtained from the EPA Regional Office for your area.

The key to having a widespread and significant impact on commute trips is to get a large proportion of all employers in a region to implement effective programs. Even with all the programs started in the last two decades, these employers still represent a small percentage of all the employers in the U.S. Additionally, the vast majority are large businesses only. To maximize impacts of employer-based trip reduction efforts, mandatory participation via ordinances can be coupled with public sector improvements such as new, targeted transit service and high occupancy vehicle lanes on regional highways, park-and-ride programs and parking fees.

Finally, it is important to understand that the trip reduction measures that comprise employer programs need to be evaluated as packages of strategies. Employers rarely implement a single measure, such as preferential parking, without complementary and additional alternatives and incentives such as an in-house carpool matching system. The idea behind trip reduction programs is to offer or prompt employees to use a variety of alternatives to driving alone. This results in a variety of activities being undertaken. It is also important to note that it is difficult, if not impossible, to separate out the impacts of any one trip reduction measure, and the techniques are not strictly additive due to the complementary nature of many strategies. This chapter describes the range of incentives and alternatives offered by employers, and evaluates potential trip and emission reductions by looking at the employers' complete program as a package of several individual measures.

■ Description of Measures

The following descriptions enumerate the various strategies available to employers with which to develop and implement transportation management programs for their employees. The strategies or trip-reduction measures available to employers tend to fall within four categories: 1) improved commute alternatives, 2) facility improvements, 3) financial incentives, and 4) on-site support services. Additionally, as mentioned above, it is very important to assess employer programs as packages of strategies aimed at reducing trips to the work site.

Options that allow employees to work at home or a satellite work center or report to work outside the peak commute periods, such as telecommuting and alternative work

schedules, are discussed in the "Work Schedule Changes" Information Document. As this chapter emphasizes, the ability for employees to use alternative arrangements is largely a function of employer policies and decisions governing work practices and much as a decision to allow for commute alternatives. Therefore, the role of the employer is absolutely critical.

Improved Alternatives

Ridesharing has been proven to be an effective way to reduce the number of cars on the road. Whether it is by carpooling, vanpooling, or transit, congestion and pollutants can be lowered. Employer-based promotion of transit and ridesharing has long been recognized as an effective general marketing strategy, and has been developed to a greater or lesser extent in virtually every major U.S. city. Some alternatives which can easily be offered or promoted by an employer are:

- **Carpooling** – a ride shared in an employee's private vehicle. Carpools carry 1 to 5 passengers to and from work, either using one car and sharing expenses or rotating the vehicle used so that no money changes hands.

- **Vanpooling** – more complicated to organize and maintain than carpools, vans hold 8 to 15 passengers per van. It is best if this is organized at the place of work. There is a need for one driver and a back-up driver. The driver usually rides for free while the others split the cost of the gas, insurance, maintenance and the price of the van. An employer can help alleviate matching problems by having a central data base which matches riders. The employer can take the payments directly out of the payroll. In many cases the employer will lease the van to the vanpool group or promote owner-operated or third-party leasing arrangements.

- **Subscription Buses or Buspooling** – an express bus service, usually administered by an employer, with limited pickup stops, such as park-and-ride lots. Passengers have guaranteed seats and advanced ticket purchases. Businesses can set up the ticket purchasing through payroll deductions. Club buses are buspools administered by the riders themselves.

- **Transit** – bus, rail or other forms of public transportation offer a reasonably priced alternative mode of transportation. Transit is most often available in urban areas, and includes several modes such as light rail, commuter rail, subway, bus, ferry, and jitney services. Reinvestment in transit systems in large and older urban areas and investment in new transit systems in newer urban areas has been very substantial in the past twenty years. Transit may be more attractive than ridesharing to some commuters because of the increased flexibility for the commuter and not having to rely on other people. While rail transit may be faster than driving for trips destined to a large central business district, bus transit is often slower because of frequent stops. Exclusive bus rights-of-way and express services have become more popular because they offer advantages that are comparable to those provided by rail service.

- **Midday and Park-and-Ride Shuttles** – offer a mode of transportation to employees who work in business parks during the middle of the day to run errands or go away for lunch without having to use their own automobile. Some shuttles are operated for business associations, while others may be operated for public organizations. The shuttle also may be used to pick up and drop off commuters at local park-and-ride locations which may lie outside of the activity center. This system helps to reduce traffic in and out of developed centers during peak hours while encouraging those who like the freedom of mid-day local traveling. Employers sometimes subsidize shuttle services and/or influence the routing and other service attributes. The midday shuttle is used in Towson, Maryland for local senior citizens to shop, while the business districts in Tysons Corner, Virginia offer the shuttle to transport employees to local shopping and restaurants. This type of shuttle may also boost retail sales in an area.

- **Guaranteed Ride Home** – offers employees who use a commute alternative a means to return home or to their car in the event of a personal emergency or unplanned overtime. Often referred to as an insurance policy for carpoolers, Guaranteed Ride Home (GRH) programs offer reliable back-up transportation, at minimal or no cost to employees. GRH programs were conceived out of a realization that many commuters are reluctant to rideshare for fear of being stranded and unable to get home or to a child care center, for example. In some cases, GRH can be as informal as allowing a co-worker to provide an emergency ride or using a company vehicle to make the trip. More formalized GRH programs involve the employer entering into an agreement with a taxi provider or car rental agency for the provision of trips and requires employees pay to a nominal portion of the fare. In many areas, groups of employers, banded into Transportation Management Associations, provide a GRH program for all member employers and their employees (Reference chapter on Area-Wide Rideshare Programs).

- **Bicycling and Walking** – to work, as discussed in the chapter on Bicycle and Pedestrian Programs, are two inexpensive forms of transportation which have similar results with the participants. Both walking and bicycling to work offer a great form of exercise while reducing the number of cars on the roads. To facilitate the walker/biker, specially designated routes, lanes, or paths should be provided, along with a secure mechanism for storing bicycles. In addition, biking and walking are facilitated if housing is located in the vicinity of the work place. The average bicycle commute is 4-6 miles, and the average walk commute is up to one mile. Employers, as well as building owners, influence these modes by providing shower and changing facilities and bicycle storage facilities.

Facility Improvements

To receive the optimum result in reducing single occupancy vehicles (SOV); the following improvements can be used to help encourage people to use an alternative method:

- Bus shelters and turn-outs;
- Adequate clearance for vans at parking structures;
- Carpool drop off zones;
- Special bicycle facilities and secure bicycle parking/storage;
- Showers and changing facilities; and
- Pedestrian accessible retail services.

The arrangements listed above could be used to facilitate a higher degree of participation. The bus shelters would help protect the passenger from bad weather while the turn-outs would enable a bus to pull safely off the road to access the passengers without stopping traffic. Preferential parking rewards those who vanpool and carpool with close-by parking which also may be reserved. The carpool drop-off zone appeals to large complexes which may have many people from the same origin commute together but have various destinations in an area. The drop off zones allow for the vehicle to safely pull off the street and drop off commuters. On-site or nearby retail and food services reduce the need for an automobile for midday travel.

To support biking and walking as two inexpensive healthy ways to commute, bike lockers might be supplied by the building owner or company as well as being provided at transit terminals. With this availability, a commuter is more apt to bike to work. Many employers offer showers and lockers for their employees, which would also make walking or biking more appealing. Many buildings already contain health clubs, which also can be used for this purpose. Pedestrian friendly design and retail as well as other amenities also facilitate ridesharing.

Financial Incentives/Disincentives

While opportunities exist to provide commute alternatives to the drive-alone auto, even the best designs may have difficulty achieving a perceived level of competition equal to the automobile. This is particularly true in the suburban environment where employment destinations are widely scattered and parking on-site is generally provided free by the employer. Incentives are necessary to overcome these cost advantages of the single occupant vehicles (SOV) and equalize the economic competition between the auto and the other modes. These incentives can include travel time savings, such as are afforded by high occupancy vehicle (HOV) lanes, priority treatment at ramps and entrance-ways, and preferential parking at the destination. Financial incentives are also important, and can consist of direct subsidies to non-single occupancy vehicle users, in-kind subsidies such as discounted transit fares or "inverted" parking rates which favor HOVs. The following are additional examples of employer-provided financial incentives:

- Transit pass subsidies;
- Vanpool provisions;
- Commute alternative subsidies; and
- Transportation allowances.

This last strategy deserves some additional explanation because it combines several very effective incentives and disincentives. Transportation allowances involve employers establishing parking charges for employees and then offering employees the equivalent value of that parking in cash. The employee can then purchase a parking place, or use the money to buy a transit pass or to carpool. Since these alternatives generally cost less per month than the new rate charged for parking, employees can save money, which translates into a raise. Likewise, the employer can use the fees collected from parking to subsidize the balance of the program. The key is allowing employees to make rational economic decisions on a monthly basis. Transportation allowances are becoming a more common element of some firms' cafeteria-style benefits program. Flexible programs like New York City's Transit Check Program make using transit easier and provide financial incentives to employees for choosing transit.

Financial incentives seem to be growing in applications as employers realize the effectiveness of offering an economic incentive for using an alternative. A major obstacle to more widespread implementation of economic incentives is the federal personal tax income regulations. Transit subsidies above $21 are treated as 100% taxable income for the employee and any carpool subsidy is treated as all taxable income. Employers are reluctant to impose such a taxable benefit on their employees and resist the administrative burden of reporting such income.

On-Site Support

Distributing information about ridesharing and transit services is a key to increasing their use. General-oriented transit advertising tends to be less effective and more costly than employer-based marketing for a number of reasons: the ability to target appropriate information at the work-site, the value of complementary and in-kind marketing services that employers can offer, and the importance of gaining employer endorsements and other support for transit use.

Information dissemination programs, using ridesharing agencies or transportation providers, can reach large numbers of employers and employees. More sustained and effective approaches to employer-based information services can be accomplished with the help of on-site Employee Transportation Coordinators, trained individuals who provide personalized service to employees to encourage and facilitate ridesharing and transit use. Wide distribution of supplies of transit maps and posters creates the opportunity to secure corporate endorsement of transit/ridesharing use. The following are some important on-site characteristics to help insure a smoother operating program:

- On-site sales of transit passes;
- On-site ride-matching capability;
- Including information on available transportation services as part of the orientation of new employees;
- Employee transportation coordinators and commuter assistance offices;
- Management support for the program;
- Information dissemination; and
- Rideshare events (fairs).

Another work-based strategy is using telecommunications to reduce the need for travel. Work-based telecommunication strategies at a minimum involve use of the telephone and facsimile technology, but largely involves the use of teleconferencing to reduce face-to-face meetings. Very little empirical evidence exists on the travel implications of teleconferencing. While the potential for substituting technology for trips seems real, the interactions between travel and telecommunications are quite complex and additional research is required to quantify the relationship of telecommunications to air quality. Telecommuting represents one very specific telecommunications strategy where some data are available, and this option is described as part of the chapter on Work Schedule Changes.

Combination of Strategies

Most transportation programs are a package of the strategies listed above. To get the best results, it is crucial to have a program that each employee can choose what best suits their particular lifestyle and needs. A successful program will take into consideration the local programs and incentives offered in the area, the amount of public transportation available and the flexibility of management to support various measures.

The most popular set of strategies, at least among the most effective employer programs, seems to be the promotion of a variety of commute alternatives (such as transit and carpooling) and incentives to induce their use (such as transit subsidies or travel allowances). The promotion element often requires a dedicated staff, marketing effort and management commitment.

■ Case Study Examples

Travel Demand Management (TDM) has become the popular terminology to describe a system of actions whose purpose is to alleviate traffic problems through improved management of vehicle trip demand. Based on the FHWA study, "Evaluation of Travel Demand Management Measures to Relieve Congestion," this section describes three companies that have reduced SOV trips by implementing various alternatives to driving alone.

US WEST Communications, UCLA, and the Nuclear Regulatory Commission have been chosen as case examples for several reasons. First, these examples represent different geographic locations around the U.S., in Seattle, Los Angeles, and Washington, D.C., respectively. Second, each case study employer has implemented a comprehensive program for managing the commutes of its employees. Finally, the case studies represent a range of impacts and cost effectiveness.

US WEST

Bellevue, Washington is a suburban community located in eastern King County, about 5 miles east of downtown Seattle. The City of Bellevue is the fourth largest city in the State of Washington, with a population of about 83,000. Employment in the CBD is almost exclusively white-collar professional, with supporting retail and service industries. It is estimated that there are more than 300 different employers in downtown Bellevue. There are a few large employers, but most are small, located in large, multi-tenant buildings. The larger employers include US WEST Communications, Inc. (formerly Pacific Northwest Bell, with approximately 1,200 employees), Puget Power (approximately 840 employees), and PACCAR (about 450 employees).

Bellevue's rapid growth and potential for serious traffic problems were recognized by area planners by the late 1970's. Significant capital improvements have been and will continue to be a vital part of efforts to accommodate the growing demand for travel in eastern King County. The proposed Eastside Transportation Program, which if built, would cost over $1 billion, would not be completed until well after 2000. A more immediate program that is currently underway involves numerous improvements directed specifically at Bellevue, consisting of extensive improvements to the downtown street network in the CBD, as well as the installation of HOV facilities on I-405, complete with special access ramps into the downtown. This near term program is projected to cost $188 million.

Despite these significant capital projects, it has become clear to local officials that infrastructure enhancements alone will not satisfy the projected increase in traffic that will parallel the City's growth. Therefore, efforts also have been initiated to try to curb or manage the growing demand for travel, linked to an employment base that is expected to double by the year 2000.

US WEST, formerly Pacific Northwest Bell, has the most impressive program of the three largest employers. It has achieved a 26 percent drive alone rate among its employees, attained largely through parking management techniques. This level of trip reduction is unmatched in the Bellevue area. US WEST's rate of high occupancy vehicle use is 30 percent higher than the second ranking program in the Bellevue CBD, and 40 percent higher than the average of downtown businesses.

In 1981, developers of the company's new Bellevue office opted for the minimum parking capacity for employee parking. Their primary motivation in taking this action was minimizing their costs, but they also took steps to ensure that complementary actions were developed in terms of options and incentives to ensure that the parking would be adequate.

Only 408 parking spaces are provided at the company's downtown Bellevue site for its 1,150 employees. With the advice of a transportation consultant, the company established a pricing schedule for parking with inverted rates: single-occupant vehicles (SOV's) are charged $60/month for parking, 2-person carpools are charged $45/month, and parking for vehicles with 3 or more occupants is free. Beyond the pricing factor, further restrictions apply to use of the parking. The parking facility is a four-level garage, with two floors providing reserved spaces for HOVs. A third floor provides spaces for vendors, fleet operators, and short-term occasional users, and only one floor is available for SOV parking. This means that SOV spaces are on a first-come/first-served basis, so that availability of the space, even at a $60/month rate (paid daily) is not reliable. Space is available at other off-site locations at market rates.

The company took an aggressive stance in selling its limited parking program to the city and its employees. The city, which itself advocates reduced parking, was nevertheless concerned that the limited capacity proposed by US WEST would produce spillover problems unless adequate efforts were made to provide alternatives. The company took the lead in selling the program, promising carpool incentives, flexible work hours programs, and a full-time transportation coordinator. Thus, the city eventually agreed to the limited parking proposal.

Many employees were initially somewhat bitter about the need to find alternative commuting arrangements at the new location, but soon adapted to the new environment. The situation was helped by the fact that many of the employees, having been transferred in a consolidation from Seattle, were already conditioned to using carpools and transit to get to work.

Most employees rideshare as their alternative to the limited parking situation. Survey data for June 1988 indicate that only 25.7 percent of US WEST's employees drive alone, 12.8 percent ride transit, 44.7 percent ride in carpools, 1.8 percent in vanpools, 2.0 percent other, and 13.0 percent in multi-modal arrangements typically driving to access some HOV mode. It should be noted that many employees who carpool with co-workers drive to meet their carpools at a park-and-ride lot within a short distance of downtown (1 mile or so), and then form carpools to reach work.

Among the many options available to US WEST employees, and to all downtown Bellevue employees is Seattle Metro's Guaranteed Ride Home program. It is available to carpoolers who use this option three days a week. Registered carpoolers can be reimbursed for up to 90% of up to six taxi trips per year. Finally, one specific finding of interest concerns the degree to which Guaranteed Ride Home programs are actually used. Seattle Metro found that less than one percent of eligible ridesharers in Bellevue used the service. Of 4,300 ridesharers and 466 registrants, only 70 trips were needed by 41 people over a 22-month period.

The FHWA analysis estimated that US WEST generates 45.2 vehicle trips per 100 employees. Thus, 1,150 employees generate only 520 vehicle trips. Comparing this to the regional control sites, US WEST's employees generate 41.2 vehicle trips per 100 less than conceivably would be made at typical regional rates in the absence of a TDM program. Stated another way, if US WEST's employees travel at regional rates, they would generate 47 additional daily one-way vehicle trips. This difference credits US WEST with a trip restriction rate of 47.6 percent over and above ambient conditions.

Another impressive comparison is to relate US WEST to the rest of downtown Bellevue without US WEST. Downtown Bellevue without US WEST is estimated to have a trip production rate of 83.1 vehicle trips per 100 employees. The effectiveness of US WEST's program is so great that, without its inclusion, downtown Bellevue is only 86.4-83.1 = 3.3 vehicle trips/100 better than the rest of the region.

U.C.L.A.

The University of California, Los Angeles (UCLA) campus is located immediately adjacent to Westwood Village, a densely developed urban area in West Los Angeles approximately 10 miles west of downtown Los Angeles. It is considered a major Southern California activity center. In addition to UCLA, Westwood houses several 20-story office towers, numerous high rise residential complexes, and a growing retail/entertainment center which continues to make the area a popular place to live, shop, work and play.

Westwood's population is approximately 37,000. Based on a 1987 environmental impact report for the Westwood Community Plan update, over 21,000 work in Westwood, exclusive of UCLA. Another 18,000 work as faculty and staff at UCLA. Since the Community Plan was updated, two new high-rise office buildings have been completed and another is under construction.

UCLA is the largest campus in the University of California system and the largest university in Los Angeles County. Some 34,000 students attend UCLA and over 18,000 people work on campus. It should be noted that this case study focuses on the UCLA faculty and staff, and not on the students. Approximately 20,000 university-controlled parking spaces exist on and near the campus to serve the total daytime population of over 50,000. UCLA's employment consists of some 4,000 faculty and 14,000 staff and employees of the Center for Health Sciences (Med Center). This number is not expected

to grow significantly in the near term, but even so UCLA is the major employer and influence in Westwood.

Transit service to UCLA is among the best in southern California, with 12 lines from three public operators serving Westwood. In fact, UCLA is a major destination for the Southern California Rapid Transit District and a terminus for the Culver City and Santa Monica municipal systems. In addition, UCLA also operates its own internal shuttle system (throughout Westwood) and commuter bus service to two areas. Traffic in and around Westwood is severely congested. Westwood streets are overburdened and are expected to worsen.

Traffic entering the UCLA campus has grown considerably. Based on cordon counts, total daily vehicle volumes increased by 17 percent from 1980 to 1985 (95,000 to 111,000). Vehicles entering at the three major entrances increased by 1.5 times more than at other access points. This increase and concentration underscores the traffic congestion situation facing UCLA.

Parking fees are charged to all students, staff, faculty and visitors. The monthly/daily fee is $30/$4, respectively, which is well below the market rate in Westwood of $80-$120/$6-$10. Employees are virtually guaranteed a space, and are generally assigned to a lot near their building. Students also pay $30 per month ($90 per quarter) to park, but compete for a limited number of spaces. A need-based point system is used and student parking is determined by various factors including commute distance, tenure, availability of near-by transit, etc. A waiting list several thousand names long exists each quarter. Student carpool permits are provided for carpools of three or more, at a cost of $22, and these commuters are assigned parking first.

In 1985, there were 19,600 available parking spaces on campus, for a combined student and employee population of some 50,000. The maximum accumulation occurs at 11:00 a.m. when 86 percent of the spaces are filled. The rate of increase in accumulated vehicles is less than a third of the increase in traffic volumes.

Prior to 1984, commuter assistance services were provided through the University's Transportation Services office. These services were mainly comprised of annual registration drives, in conjunction with the regional commute management organization, Commuter Transportation Services (CTS). In 1984, in conjunction with UCLA's role in the Los Angeles Olympics, UCLA committed to developing a comprehensive commute management program for UCLA students, staff and faculty. The Commuter Assistance-Ridesharing Office (CAR) was established as a department within the Business and Transportation Services Administration. Vanpooling has become the focus of the CAR program. The variety of services and alternatives that CAR promotes are as follows:

- **Vanpools.** Currently, 65 UCLA vans serve Westwood and the campus, primarily with 15-passenger deluxe vans and some 6-passenger mini-vans. Seventy percent of the riders are staff, 20 percent students and 10 percent faculty and non-UCLA commuters. The vans are owned and maintained by UCLA. The round trip distances that vans travel range from 25 to 200 miles. Fares are based on mileage and average $60-120 per month for full-time riders. Use also is allowed on an occasional,

space-available basis. Demand is growing for vanpools, and the use of starter vans is an attempt to capture the latent demand for vanpooling without waiting for enough passengers to make a 15-person van viable.

- **Carpools.** The CAR program maintains a service contract with Commuter Transportation Services for Remote On-Line Access (ROLA) to the regional ridesharing data base. This allows for on-line matching of interested individuals with others in the system. Interested individuals can also fill out registration forms and receive matchlists in the mail. Three or more students are eligible for a Special Student Carpool Parking Permit which entitles groups to reduced rates and a priority on parking waiting lists.

- **Buspools and Transit Services.** UCLA operates two commuter bus routes: from the Westchester/LAX area south of Westwood and from Sherman Oaks/Studio City north of campus. Hourly service (three runs) during the peak morning and afternoon periods is provided. The routes were determined by identifying employee/student concentrations that were approximately 8-15 miles from campus and thus not well served by vanpools. The fare is $1.50 each way or $55 for a monthly pass. The runs are currently operating at 50 percent load factors.

- **Motorcycles, Mopeds, and Bicycles.** There are 43 parking areas offering 2,300 spaces for motorcycles and mopeds. In addition, 57 areas on campus provide over 2,300 bicycle parking spaces. Given the significant number of students and staff that commute to UCLA and travel within the campus by bicycle, motorcycle and moped, the CAR program has developed an aggressive educational campaign on parking, safety and use of these modes.

- **Shuttle Service.** A broad range of UCLA-operated shuttle services are provided: the Campus Express services, shuttles to off-campus housing areas, an Evening Van service linking housing areas to other key locations, and the Medical Center shuttle. The shuttle is free and well utilized by both students and employees. It operates on 5-10 minute headways, serving ten stops through the campus.

- **Guaranteed Ride Home Program.** UCLA's unique GRH program subsidizes rides at varying rates depending on the provider used. Faculty and staff that rideshare can use UCLA's "night rider" van service once a year for free and for a fee thereafter. Participants get four free rental car uses per year plus additional discounted trips. Finally, taxi use is reimbursed up to $15 per year.

The results of the program seems to be the attraction of vanpool riders, and solidified existing, informal carpools, but at the expense of transit and walk/cycle utilization. Thus, between 1980 and 1985, considerable movement occurred between several alternative modes (e.g. from transit to carpooling), while at the same time traffic volumes increased by 17 percent and the drive alone rate remained the same. This situation meant that the trip reduction potential of the program was minimized as ridesharers were largely drawn from other alternative modes rather than from solo drivers.

Based on the analysis from the FHWA study, it can be shown that in 1980, before the program was initiated in earnest, UCLA was generating 10,951 daily vehicle trips from among its approximately 14,000 employees. This translates to 78.2 trips per 100 employees. In 1985, after initiation of the program and its vanpool component, the rate increased to 86.7 trips per 100, translating to 13,867 vehicle trips from a population of then 16,000 employees. The rise in vehicle trip generation was primarily due to a 5 percent shift away from transit to carpooling (and only 1.7 percent vanpooling). However, in 1988, when the vanpool program was accounting for a full 5 percent, 14,231 vehicle trips were generated, translating to 79 trips per 100. Therefore, the vanpool program was able to recapture the trips that were lost in the general shift away from transit.

Nuclear Regulatory Commission

The Nuclear Regulatory Commission (NRC) is an agency of the Federal Government that has been involved in the consolidation of its staff and operations into Montgomery County, a fast growing suburb of Washington, D.C. Growth management controls applied to the consolidation under Montgomery County law have produced some very interesting results regarding the potential of travel demand management.

This 500-square mile county was largely a residential bedroom community for Washington, D.C. commuters prior to 1980. However, since that time, Montgomery County has followed the trend of most "first-ring" suburban counties in the nation's capital area in becoming a major employment center. In 1985, the county was the home for 236,000 households and 371, 000 jobs. Comparing these totals with 191,000 households and 247,000 jobs in 1975 indicates the substantial growth that has occurred in the county, particularly as an employment center.

NRC's new headquarters is located in North Bethesda, one of 15 planning subareas in the county. The location of North Bethesda is midway between two existing suburban centers, downtown Bethesda and the City of Rockville. This location relative to the transportation system and other activity centers has helped fuel North Bethesda's growth as a job center, producing traffic levels that have brought the area into conflict with the county's growth policy. As of 1987, employment in North Bethesda had reached 55,000, over 80 percent of which is office employment centered in four primary locations, one of which is the area along Rockville Pike where NRC is located.

Much of what has made North Bethesda such an attractive growth location is its excellent location in the region's transportation system. With all of this major traffic, the congestion spilling into North Bethesda has made public transportation appealing. The public transportation in the area is provided by the county and the regional transit authority. One of the regional Metrorail system's runs north-south through the center of the area, with three stations serving North Bethesda. Both the Washington Metropolitan Area Transit Authority and Montgomery County (Ride-On) provide fixed route bus service through the area, largely oriented as feeder operations to the Metrorail system.

The Nuclear Regulatory Commission employs about 2,450 people, which prior to its move to North Bethesda, was headquartered in eight different locations throughout the Metropolitan area. When looking for a consolidation site for the NRC, the General Services Administration (GSA) was attracted to a site at White Flint North, an area of mixed retail and office development. The reasons for the attraction were twofold: more than 60 percent of NRC's staff already lived in Montgomery County, and the site itself adjoined a Metrorail station, which was also a transfer point for feeder buses.

NRC decided to purchase the building from the developer with additional rights to a second building which was planned as a hotel. The facility had to comply with the county's Adequate Public Facilities Ordinance. Heavy commuter traffic along Rockville Pike caused the county to establish strict trip generation limits for the White Flint North site. NRC's plans were dealt a further blow when a 1986 survey of employee commuting patterns revealed that most staff members intended to drive to the new complex. Based on these reported travel preferences, estimates of the probable trip generation from the first building alone far exceeded the county's limit of 465 trips for the building.

Faced with the certainty that under these circumstances Montgomery County would not approve the revised development plan, it became a critical objective for both NRC and the developer to find a way to improve the employee travel situation and satisfy the county's regulation. NRC and GSA launched a major effort to develop a transportation management plan (TMP). The TMP considered the widest possible range of options, including specialized transit services, ridesharing programs, flexible work hours, and a variety of financial incentives and disincentives, featuring parking management strategies. Options were tested on the employees through another survey, which indicated concern that travel to the new site would be restricted, but also acknowledged that alternatives to driving alone might be more attractive.

With the help of the Montgomery County Department of Transportation, a TMP was established and put into effect in early 1988 with the beginning of occupancy of the first building. The plan contained the following elements:

- **Fee Parking.** Parking spaces available to NRC staff were charged at a rate of $60 per month in the garage and $30 per month at a surface lot some blocks away.

- **Transit Discounts.** NRC received a 20-25 percent discount through the county because as a federal agency they were unable to participate in a county matching discount program. NRC purchases fare cards, passes and bus tokens from the county and sells them to staff at a central building location, along with schedule information.

- **Carpools.** A guaranteed parking space in the building garage is offered to carpools of two or more. NRC offers a carpool matching service.

- **Early Work Hours.** Flexible arrangements were offered to allow employees to start and leave earlier.

- **Nearby Parking Restrictions.** NRC informed employees that cars violating parking restrictions in posted areas near the building would be ticketed and towed.

- **Transit Shuttle.** The developer has also made an offer to subsidize a commuter shuttle that would supply a link currently missing in the public transportation system. The shuttle would carry employees from a new county park-and-ride lot to North Bethesda.

As a part of the County DOT's North Bethesda Traffic Mitigation Study in 1987, an employee travel survey was conducted in North Bethesda that revealed the modal split. Using the profile as a more relevant base of comparison, NRC's employee travel patterns are radically different form the heavily auto-oriented North Bethesda environment; almost 90 percent of all commuters to North Bethesda regularly drive alone. Against this base, NRC can claim a vehicle trip reduction of 41.6 percent. Applied to NRC's employee population of 1400, this implies 582 daily one-way trips averted, a very significant reduction. It should be noted that very high trip reduction rates have frequently been achieved in relocation situations. Such dramatic reductions, however, are harder to maintain in stable work settings.

Although successful, the NRC program is not without problems. The parking fees are not a complete deterrent to solo drivers. Many will pay the price, and other options exist for those willing to accept some inconvenience. Less than 40 percent of the employees who drive alone to NRC park in the assigned market-rate spaces. Some use the substantial amount of free legal on-street parking in the general vicinity, and others take advantage of a free State of Maryland commuter lot a quarter of a mile away. In contrast, almost 70 percent of those who carpool park in the building's garage, taking advantage of the cost savings and space incentive. Investigations have shown that the carpool matching services have to be improved, with most current pools having been established through informal arrangements. Survey returns indicate that many auto drivers will not switch modes under any circumstances, based on work hour problems, locational difficulties, or other needs for their vehicle. The NRC program has emerged as an important model of the potential trip reduction effectiveness of a well-designed and supported transportation management program.

■ Program Impacts

Transportation Impacts

The 1990 Federal Highway Administration travel demand management study provides the most recent data on the trip reduction potential of employer-based transportation management programs. This information, and some related follow-up research, is summarized below.

Trip Reduction Effectiveness

The FHWA study assessed the trip reduction effectiveness of 11 employer programs throughout the U.S. The results of this evaluation, presented in Table 1, reveal that these employer programs reduced daily vehicle trips by a low of 5.5 percent at U.C.L.A. to a high of 47.6 percent at US WEST in Bellevue. In fact, six out of the 11 reduced trips by 25-45 percent. The weighted average of the proportion of trips reduced across all sites was over 20 percent. Two key points should be kept in mind when interpreting the results. First, the programs are not "typical" of all employers and were selected because of their widespread reputation as "success stories." Therefore, these programs represent a range of effectiveness for top performing employers. On the other hand, the results are quite impressive when it is considered that the reductions calculated are above and beyond that level of non-solo commuting that is occurring naturally. In other words, these programs are having a direct impact beyond the level of ridesharing that occurs naturally based on family and neighborhood arrangements and the public programs, such as transit service, that are already in place.

Several critical factors contribute to the success of these programs, from the strategic management of parking, to commuter subsidies, to employer requirements. In other words, these employers are using the right incentives and strategies to affect employee travel behavior. The findings that trip reductions of over 20 percent can be achieved is corroborated by a 1983 study of suburban employers in Seattle, which concluded that employers with organized ridesharing programs could reduce trips by 22 percent when compared to similar firms without programs.

VMT Impacts

Translating the trip reduction impacts into VMT impacts is necessary to assess the air quality benefits derived from employer programs. The FHWA study, geared toward traffic mitigation, focused on the removal of vehicle trips, but did not calculate VMT. Regional trip distance statistics were assembled for each of the regions that were included in the case study examples: Los Angeles, Bellevue/Seattle, and Montgomery County, MD. Results showing the daily vehicle trips reduced and daily VMT reduction are shown in Table 2. The average annual VMT reduction was 3.3 to 6.8 million miles of travel. If employers are able to maintain the use of commute alternatives, acknowledging that considerable movement occurs within carpools, etc., the annual VMT reduction can be substantial.

Air Quality Impacts and Considerations

Reduction in vehicle miles of travel (VMT) has been the primary measure used by transportation and air quality planners in determining the effectiveness of employer-based TCMs. Such VMT reductions can be converted to emission reductions. For example, the South Coast Air Quality Management District's Regulation XV (Reference chapter on Trip Reduction Ordinances) estimates that if the program is successful in reducing VMT by 25% (14.8 million miles per day) in the a.m. peak period, CO can be reduced by 100-216 tons per day, NOx reduced by 16-34 tons and ROG reduced by 11-24 tons.

Table 1. Trip Reduction Impacts of 11 Employer Programs

EMPLOYER	LOCATION	EMPLOYEES	TRIPS REDUCED	% REDUCED
CASE STUDY EXAMPLES				
US WEST	Bellevue, WA	1,150	474	47.6%
UCLA	Los Angeles, CA	18,000	828	5.5%
NRC	Montgomery County, MD	1,400	582	41.6%
OTHER EXAMPLES				
Travelers	Hartford, CT	10,000	3,930	25.4%
Hartford Steam Boiler	Hartford, CT	1,100	86	13.6%
3M Company	St. Paul, MN	12,700	1,124	9.7%
CH_2M HILL	Bellevue, WA	400	108	31.2%
Pacific Bell	San Ramon, CA	6,900	1,394	27.8%
AT&T	Pleasanton, CA	3,890	486	13.4%
ARCO	Los Angeles, CA	2,000	261	19.1%
State Farm	Costa Mesa, CA	980	276	30.4%

Source: COMSIS Corporation, "Evaluation of Travel Demand Management Measures to Relieve Congestion," FHWA, February 1990.

Table 2. VMT Reduction From Employer Programs

EMPLOYER	VEHICLE TRIPS (WITHOUT PROGRAM)	VEHICLE TRIPS (WITH PROGRAM)	DAILY VEHICLE TRIPS REDUCED (%)	DAILY VMT REDUCED*	ANNUAL VMT REDUCED**	% REDUCTION OF TRIPS & VMT
US WEST	994	520	474	18,012	4,683,120	47 %
UCLA	15,048	14,220	828	26,496	6,888,960	5 %
NRC	1,334	752	582	12,571	3,268,512	43 %

* Calculated by multiplying trips reduced by average round-trip distance for work trips in region.

** Daily VMT reduction multiplied by 260 work days per year.

While emissions from mobile sources are a considerable problem throughout the day for all vehicular travel, the commute or peak period and the role of employers in the morning peak commute period is crucial for several reasons:

- The work trip still accounts for the greatest proportion of trips. between 30-40% of all trips in an urban area.
- Work trips are the easiest to serve by alternative modes, given common destinations, travel periods and the regularity of trip-making patterns.
- Air pollution is often created in the a.m. period, by both mobile and stationary sources, and thus becomes the most critical period to affect.
- Much of the concern with mobile sources lies with "cold starts" in the morning and "hot soaks" as cars sit after the commute trip. Additionally, emissions worsen at lower speeds, common during commute periods. One study shows that ROG emissions (in grams per mile) are 2-3 times as great at 15 m.p.h. than at 55 m.p.h.
- Travel is a derived demand, linked to trip purpose. Since commute trips are linked to employment, employers have a tremendous influence on how, when and where employees commute.

Program Costs and Other Considerations

Program Costs

As a follow-up to the FHWA study, each of the 11 employers was recontacted to assess the costs of providing their programs. The annual cost to each employer to operate the program and fund the incentives and subsidies offered ranged from a low of $21,250 at AT&T in Pleasanton to a high of $1.1 million at Travelers Insurance in Hartford. The average program cost per employee ranged from a low of $5.46 at AT&T to a high of $181.65 at ARCO.

As can be seen in Table 3, annual costs vary considerably. Some of the variation is clearly due to the size of the employer, but much of the variation is caused by the types of programs offered. Some of the variation also may be caused by the employer's method of determining costs. Programs that contribute staff time and marketing dollars tend to be less costly than those programs that also subsidize transit passes or carpools and vanpools. A point worth noting in the table relates to UCLA and CH2M Hill. UCLA costs are quite high, but the costs of maintaining a very large van fleet and commuter bus routes add considerably. For this reason, UCLA's costs are reported but not included in comparisons. Second, CH2M Hill reports zero costs for operating their program. The firm's transportation management program consists largely of financial incentives and disincentives. However, the offering of a transportation allowance and

Table 3. Employer Program Costs and Cost Effectiveness

EMPLOYER	ANNUAL COSTS	ANNUAL COST PER EMPLOYEE	COST/TRIP*	ANNUAL SAVINGS	NET COST PER TRIP*
CASE STUDY EXAMPLES					
US WEST	$ 27,625	$ 24.02	$ 0.24	$ 113,044	$ -0.75
UCLA	$ 2,428,689	$134.93	$ 11.24	$1,349,640	$ 4.99
NRC	$ 35,506	$ 25.36	$ 0.25	$ 772,200	$ -5.28
OTHER EXAMPLES					
Travelers	$ 1,124,400	$112.44	$ 1.10	$8,253,000	$ -6.95
Hartford Steam Boiler	$ 163,296	$148.45	$ 3.18	$ 0	$ 3.18
3M Company	N/A	N/A	N/A	N/A	N/A
CH_2M HILL	$ 0	$ 0	$ 0	$ 31,680	$ -0.66
Pacific Bell	N/A	N/A	N/A	N/A	N/A
AT&T	$ 21,250	$ 5.46	$ 0.17	$ 327,520	$ -2.41
ARCO	$ 363,300	$181.65	$ 4.08	$ 175,956	$ 2.11
State Farm	$ 107,181	$109.37	$ 1.49	N/A	N/A

* Daily vehicle trips.

other program components still requires administrative staff time that would be in addition to the duties of the personnel responsible. This points up an overall problem with cost data on employer programs. Employers generally do not separate out the cost of operating their programs, and when asked to account for their program, report costs using varying assumptions.

Cost Effectiveness

Perhaps a greater cost indicator than annual program costs or the unit cost per employee is the cost per trip reduced. This is derived by dividing the annual program costs by the number of trips reduced, on an annual basis. If the UCLA and CH2M Hill programs are removed from considerations for the reasons stated above, the employer cost per daily trip reduced ranges from $0.17 to $4.08, with an average unit cost of $1.31 for the eight employer programs reporting detailed cost information. These results are compelling. The daily cost to an employer of reducing a trip averages about $1.30, and many programs spent as little as 20 cents daily. When compared to the cost of providing parking to employees, even just considering the debt service on surface parking, trip reduction seems to be an effective means to not only address traffic and air quality problems, but to benefit the employer directly.

Along these lines, it is interesting to assess the **net cost per trip reduced**. By this we mean the cost of operating the program minus any saving or revenue accrued by the effort. For example, if vanpool fares are recouped by the employer, this is credited toward the net cost. More importantly, many of these programs either allowed the employer to build less parking or save monthly parking lease costs by reducing the number of employee needed parking. These savings can be quite substantial. The annual cost savings ranged from zero to over $8 million at Travelers Insurance (assuming Traveler's leased parking spaces for employees at market rates – even at Traveler's low lease costs, the savings is over $1 million). Therefore, the cost savings are subtracted from the cost of operating the program. The results are quite often a net saving to the firm, saving the company more than the cost of the program. The range of net cost per daily trip reduced is -$6.95 to $3.18. In other words, these programs either cost up to $3 per daily trip reduced or save up to $7 per trip reduced, with the majority of employer programs studied here providing substantial cost savings.

Markets Served

Employer-based transportation management programs largely impact home-to-work trips. While this represents only about a third of all travel in an urban area, it is the easiest to affect with shared ride and alternative commute arrangements. The morning commute also tends to be the period when air pollution is created in many areas, by both mobile and stationary sources. This may differ, though, from efforts to combat traffic congestion. For example, air quality regulations on mobile sources may target the a.m. period when pollution is created, but traffic congestion is often worse in the p.m. peak period when work trips are mixed with shopping, school and other trips.

Areas of Uncertainty

Ability to Sustain Program Effectiveness

Potential concern regards the ability to sustain program impacts. If management support, financial commitment, employee turn-over, or other factors wane, the program's effectiveness can diminish. Several of the programs examined as part of the FHWA study exhibited diminishing results from their efforts as the company changed management or management placed less emphasis on the program's administration. On the other hand, the study also showed that those programs that included financial incentives (commute subsidies) or disincentives (parking changes) were more likely to have sustainable results.

Diffusion and Dissipation

Another area of uncertainty has to do with the number of employers and the total employee population in an area that is affected by transportation management programs. Diffusion and dissipation effects relate to the fact that one employer's effective program can be negated by a neighboring firm with no program. The localized impacts of the successful program can be subsumed by additional through traffic and the ability of neighboring employees to access their site more easily. It also refers to the fact that employer programs are most often operated by a small proportion of firms and, therefore, their area-wide or regional impacts are lost by the great numbers of commuters unaffected by transportation management efforts. The ability to get a significant proportion of an area's employers involved and to coordinate programs in adjacent areas so as to realize maximum results is key to assuring that significant VMT reductions can be realized.

■ Implementation Considerations

Factors Determining Program Success

Examining the factors that contributed to the more successful employer programs assessed as part of the FHWA study provides some interesting information on what works and why. The employer programs evaluated were divided into having a less than 15 percent trip reduction, 15-30 percent reduction, or over a 30 percent reduction. Those with a greater than 30 percent reduction were termed "top performers." The results of this examination are presented below for both counter-intuitive and positive findings.

- **Employer Size.** Even though the 11 programs evaluated were of employers ranging from 400 to 18,000 employees, the size of the employer did not seem to dictate program effectiveness. Two of the five top performers had less than 1,000 employees and two of the three lowest performers had greater than 2,000 employees.

- **Density.** The employer's site did not seem to affect program success. One might speculate that programs in downtown settings would be more effective given the range of commute alternatives available. However, four of the five top performers were in suburban settings. In fact, most of the successful programs were located in large suburban activity centers. This may be because less ridesharing occurs naturally in these areas, and thus the ability to shift a greater proportion of commuters as a result of the program was possible.

- **Subsidies.** One of the most powerful indicators of program success was the offering of commute subsidies. All five top performing employers offered their employees commute subsidies or offered lower parking fees to those ridesharing. All three of the lowest performers did not offer any subsidies.

- **Constrained Parking.** Parking plays a critical role in influencing commuter behavior. One strategy is to build or offer less parking to employees than would normally be demanded. In fact, four of the five top performers had restricted parking of some type. Charging for parking is widely acknowledged for affecting commuter behavior. Again, the same four of the top performers charged all employees, or at least those who drove alone, to park. The one firm that did not have constrained parking did offer a significant commuter subsidy in the face of a regional trip reduction ordinance requiring participation. Implementing parking strategies which provide a disincentive to solo-driving, however, can be difficult in situations where historically parking has been in plentiful supply. Compounding this difficulty is dealing with conflicting zoning policies which may require a minimum of parking spaces be constructed with new developments.

- **Mandatory Environment.** The existence of a legal requirement mandating employer involvement, or at least requiring developers to establish tenant programs, was also a powerful indicator of program effectiveness. Mandatory participation also is probably the key to assuring widespread participation by enough employers to have an area-wide impact. If left to voluntary participation, the number, comprehensiveness and timing of program implementation could result in disappointing overall results. Mandatory programs, however, need to be supported by adequate technical assistance. A regulation by itself does not ensure employer compliance.

In summary, the programs that had the greatest impact in reducing trips by over 30 percent provided the right incentives and disincentives to affect employee travel behavior. Doing the right things in the right environment can have a significant impact on travel. However, the majority of employers currently do not provide such subsidies or have parking constraints, and most do not operate in mandatory environments.

Employer Self-Interest

Perhaps one of the greatest recommendations that can be made involves the ability to show employers "what's in it for them." While mandatory compliance with trip reduction requirements will get employers involved, some of the most effective

programs are developed when employers see a self-interest and discrete benefit to be derived. A good example of this self-interest is US WEST in Bellevue. US WEST had TDM requirements placed upon them as part of the development approval process. However, they realized cost savings could be accrued from building less parking if indeed trip reduction strategies could be successfully employed and maintained. While it costs US WEST about a quarter a day per trip reduced to operate the program, they save 75 cents a day per trip removed in reduced parking requirements. Likewise, the Nuclear Regulatory Commission spends about a quarter per trip reduced, but saves over $5.00 in reduced parking leases.

Several other more qualitative benefits to employers have been suggested. Commute management programs offer employees an addition to their benefit package. Many employers agree that transportation management programs contribute to employee recruitment and retention, improved morale and productivity, and lessen employee stress and related health problems. Exhibiting to employers the direct benefits of initiating programs will contribute to much more solid and sustainable efforts.

Program Planning and Start-Up Guidelines

In establishing a program within a single employer, it is important to plan the effort as if it were any major corporate decision. The employer needs to collect accurate information of current employee habits and preferences, establish some objectives, develop services and monitor the results of the program. Commuter Transportation Services, the regional ridesharing organization in Los Angeles, suggests the following components to any comprehensive employer program.

(1) An **assessment of the current situation**, in terms of any existing trip reduction activities, such as registering the employee with an on-site ride-matching service or the local rideshare agency, and an inventory of parking availability and usage. The assessment should also examine characteristics of the site, such as near-by bus routes, to determine the ability to employ certain strategies.

(2) A detailed **employee transportation survey** helps to identify target markets for various strategies by determining current behavior, such as commute distance, to attitudes about commute alternative, such as needed incentives to induce use of the program's elements. In addition, this survey serves as the baseline for performance measurement and should achieve a high employee response rate.

(3) The **setting of goals and objectives** is vital to meeting corporate or mandated targets. The objectives might be in terms of employees shifted to alternatives, trips reduced, or average vehicle occupancy.

(4) **Selecting strategies** involves developing specific program elements, such as various subsidy mechanisms or vanpool leasing arrangements. These strategies should be developed so as to provide flexibility to accommodate a range of employee needs.

(5) The administration of the program should be detailed in a set of **implementation** steps.

(6) **Management commitment** including appointment on on on-site coordinator trained in transportation demand management technique and methods to facilitate ridesharing.

Monitoring

Monitoring is an important and integral part of an employer trip reduction program to track the results of the organization's efforts. Unfortunately, most employers do not track their programs due to time, resource and technical expertise constraints. Monitoring is becoming more important as trip reduction ordinances often require annual reporting on program progress.

Monitoring can involve one or more of the following techniques:

- Annual employee surveys;
- Employee focus groups;
- Vehicle counts (parking lot or drive way counts);
- Program usage data on carpools formed, vanpoolers placed, transit passes sold, etc.; and
- Ride matching information on the number of employees receiving information.

The key to monitoring is to tie the tracking element to the program's goals and objectives. Monitoring should evaluate progress toward fulfillment of program objectives.

Role of Other Organizations

Perhaps the greatest recommendation to employers seeking to implement an in-house transportation management program is to seek the expertise and advice of organizations such as transportation management associations (TMAs) or the regional ridesharing agency. Not only can these organizations provide advice and assistance on developing the program, but often offer services that help in the operation of the program. This might include carpool matching, vanpool formation, or surveying assistance, among others. The chapter on Area-Wide Rideshare Incentives provides a more detailed discussion of these area-wide services.

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