

# Key Considerations for Developing Local Government Transportation System Management Programs

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**This report is intended to be a reference to clarify the decision making process that leads to selection of (a) an approach for a transportation system management (TSM) program (voluntary or regulatory), (b) whom to include in the program, (c) program goals, (d) mitigation measure requirements, and (e) an administrative structure for the program. TSM programs can be a cost-effective way to increase vehicle occupancy and thus improve efficiency of the street and highway systems. However, in most cases, TSM programs alone will not solve the traffic problems, so they should be considered just one part of a broader strategy. A city should develop its TSM program through a consensus between the public and private sectors. Employers prefer voluntary programs, but they tolerate mandatory programs that are inexpensive, allow flexibility in meeting requirements, and allow private-sector control. The combined voluntary/mandatory TSM approach, a program type that starts as voluntary and becomes mandatory only if and when preselected targets are not reached, appears especially promising. The programs that are most effective at increasing the commute-alternatives-use rate are characterized by a long-term funding source that can maintain sufficient professional staff time for fairly intensive work with targeted employers and developers. Various factors, including the transportation environment, employer characteristics, employee characteristics, and the development environment, should be assessed in developing the TSM program. A program's goal should not be too high; credibility will be enhanced by selecting an ambitious but achievable goal. According to a 1985 Metropolitan Transportation Commission study, a good employer program can result in 5 to 8 percent of employees switching to nonsolo driving. Much higher changes have been achieved, but rarely. Compliance is usually judged based on implementing program requirements rather than meeting specific numerical goals. Implementation of a program's requirements by no means guarantees that the goal will be met.**

Urban and suburban traffic snarls have become pervasive, and local governments have begun to design their own traffic mitigation strategies—some voluntary and some mandatory—to cope with escalating traffic. This paper is intended as a reference to help local governments develop traffic mitigation approaches suitable to their local needs. It does not provide a model ordinance; rather, it provides an inventory of key issues that must be addressed before a specific approach can be recommended. As such, it will be more useful to the

staff person charged with the task of designing an effective program than to the policy maker or general reader.

Questions addressed in this paper include the following:

- How does the commute environment affect program results?
- How do the attitudes of employers, developers, and elected officials affect what is possible to accomplish within these programs?
- What are the major differences between voluntary, mandatory, and other types of transportation system management (TSM) approaches, in terms of effectiveness and acceptability?
- How does the commute environment affect program results?
- Who should be included in a TSM program?
- What types of goals are appropriate and how should they be quantified?
- What kinds of traffic-mitigation activities should be required of employers and developers?
- How can a city TSM program be administered?

## ESTIMATING TSM PROGRAM EFFECTS

City traffic-mitigation programs for employers and developers are designed to shift employees out of single occupant vehicles and into a "commute-alternatives" mode, such as carpools, vanpools, transit, bicycling, and walking. Some programs also encourage employees to travel outside of the peak traffic hour. When employees shift from solo driving to commute-alternatives use or from peak-hour to off-peak-hour driving, peak-hour vehicle trips on the highway and local street systems are reduced. Thus, these programs can affect traffic conditions. This section discusses how to estimate the effect of a traffic-mitigation program on traffic conditions.

To estimate the program's effect on traffic we must know the following information:

- How much the commute-alternatives participation rate increased because of the program;
- How many vehicle trips were eliminated because of the participation rate increase; and
- What percentage of all trips on a roadway the eliminated vehicle trips represent.

Measuring how much the participation rate changed as a result of the program can be accomplished by comparing employee survey results from before and after the start of the program.

### Vehicle Trip Reductions

Estimating the vehicle trip reduction is more involved. It requires data about the particular modes now used by the employees who changed from solo driving. If all of these employees switched to transit or walking to work, all of these employees' vehicle trips would be eliminated. If all of these employees switched to two-person carpools, half of the vehicle trips would be eliminated. In reality, employees will probably switch to several different modes, so somewhere between half and all of the vehicle trips generated by those who previously drove alone to work will be eliminated.

Measuring the vehicle trip reduction for commuters switching to off-peak-hour travel is straightforward. Traffic peak hours are typically defined as 7:30 to 8:30 a.m. and 4:30 to 5:30 p.m., although many freeways are experiencing extended periods of heavy congestion. Each solo driver or carpool moving from the peak hour to the off peak eliminates one peak-hour vehicle trip. The total peak-hour vehicle trip reduction is determined by the number of employees commuting during this period and the commute modes used by these employees.

### Effects of Vehicle Trip Reductions on Traffic Conditions

To estimate the effect of the vehicle trip reduction on traffic conditions, we must know the traffic volumes on the streets and highways of concern. If traffic volumes are close to capacity, even a small percent reduction in vehicles could have a significant effect on traffic conditions. This is because travel delay increases rapidly as volumes approach and then exceed street capacity.

At the same time, if a program results in eliminating a sizeable percentage of peak-hour vehicle trips generated by a city's employers, traffic may not decrease proportionately. Usually, there are many other types of traffic on a city's streets besides work traffic, such as "through" traffic going to and from other cities and the city's own shopping, school, and recreational traffic. The percentage of through traffic, in particular, will be much higher on freeways and major arterials compared to local streets. Therefore, reductions in peak-hour vehicle trips generated by a city's commuters will be far less noticeable on freeways and arterials than on local streets. The combined effort of several adjacent cities is probably necessary to affect traffic significantly on a long stretch of freeway. Also, there can be latent demand for travel during the peak hour—other vehicle trips may switch over to traveling during the peak hour and erode the TSM program's benefits.

This latter phenomenon calls into question the purpose of a TSM program. However, even if traffic conditions are not improved, TSM programs will increase the number of people traveling per vehicle and result in more efficient use of existing capacity.

### Evidence of TSM Programs Affecting Traffic Conditions

Some evidence of TSM program effects on areawide traffic conditions is provided by the Golden Triangle Task Force study that used a traffic model to predict the effects of the task force's proposed program in Santa Clara County (1). The model results showed that if the commute-alternatives participation rate among major employers increased from the current 15 to 17 percent, to 35 percent, traffic on both local streets and freeways would decrease by up to 10 percent—a substantial change. This is an important finding because such large changes in commute-alternatives use areawide have not occurred in the past and, therefore, observation of such traffic condition changes has not been possible. However, it is not yet clear whether all the measures needed to reach this goal can realistically be implemented.

### UNDERSTANDING LOCAL ATTITUDES

To be effective, a TSM program must be understood and supported by all responsible for program implementation. The program development process should entail assessing local expectations and attitudes toward the TSM program, then developing an appropriate approach for reaching a widespread consensus.

#### The Community

Much of the groundwork for setting up a TSM program has been laid if policies and programs that support commute alternatives already exist in the community. As a first step in TSM development, city staff should note if the following programs and policies exist:

- Voluntary employer commute-alternatives programs;
- Good communitywide information programs about the local rideshare agency and transit service;
- Sidewalks and bike paths for walking and bicycling to work;
- Project development standards that include bus turnouts and shelters, sidewalks to transit stops, preferential parking for carpools, bicycle storage, and so on; and
- Transportation planning programs that consider commute alternatives (e.g., high occupancy vehicle (HOV) lanes are supported for freeway widening projects).

#### Employers

Understanding employer attitudes is especially important because employers will be largely responsible for implementing the program. Outlined here are some of the key findings from a 1987 Bay Area Council study that focused on what the region's major employers think of TSM programs and why (2).

The following factors motivate employers to adopt TSM programs:

- Employers are receptive to instituting transportation programs when they are relocating. Easing commutes during the transition is valued as a way to minimize employee disruption and turnover.

- Recruitment, retention, and morale problems have been linked to commuting problems. The commuting problems are seen to stem from the problem that housing is scarce and expensive near many work places, forcing lengthy commutes on already crowded freeways.

- A sense of responsibility for traffic and commuting problems has been a motivating factor among major employers with a long-term stake in their communities.

- Employer location can be a motivating factor, especially for suburban employers. Downtown employers, who are located near good transit service, are less likely than suburban employers to think easing employee commutes is their responsibility.

What do employers think about regulatory TSM programs? Most of the surveyed employers oppose TSM regulations. They think that city programs should be voluntary because employers cannot actually force employees to change their commute behavior. They also think that TSM programs will require money and impose a burdensome reporting requirement without any guarantee that they will actually change commute behavior and relieve traffic.

Some employers think that it is really government's job to control traffic and that government should not pass its responsibilities off onto the private sector. They think that government should shoulder some of the burden by providing other inducements for changing commute behavior, such as convenient transit service and HOV lanes for carpoolers. They also think that government should set a good example by starting TSM programs for its own employees.

Employers are more tolerant of certain types of programs. They are most tolerant of programs that are inexpensive, allow the employer flexibility in meeting requirements, and allow private sector control over citywide program implementation.

### Developers

Developers are generally more amenable to TSM program requirements than employers because they recognize that they are bringing new traffic into an area and should participate in mitigating it. They ask mainly that the requirements be flexible because, at the time of building construction, they may not know who their tenants will be and what the employee commute patterns and needs will be. The ordinance should allow them to develop their program after tenants are known. It should also allow for special cases, such as exemptions for tenants who do not contribute to peak-hour traffic.

### Elected Officials

City officials often have conflicting concerns about TSM programs. They may support TSM programs as an approach to addressing traffic problems but be uncertain about the impact on business development. Some officials are concerned about

stringent voter initiatives to control traffic and development. Because elected officials may have little say over the type of voter initiative developed, a TSM program may appear as the "lesser of two evils" and a step in the right direction to addressing the concerns of their constituency.

## COMPARING PROGRAM APPROACHES

### Types of Approaches

The major TSM program approaches can be described as voluntary, mandatory or regulatory, a combination of voluntary and regulatory, and incentive.

#### *Voluntary*

In the voluntary approach, the employer's or developer's decision to start a program and the level of effort are purely voluntary. An example is the Santa Clara County Manufacturing Group, a business association that allocates one full-time professional to promote TSM programs among member companies and to provide technical assistance. Another example is Berkeley TRiP, which is sponsored by the city of Berkeley and the University of California at Berkeley and provides commute-alternatives assistance to downtown employers.

#### *Mandatory*

There are several kinds of mandatory, or regulatory, programs:

- *Developer conditions.* Local officials specify conditions of approval for development permits. The cities of San Mateo and San Francisco both require TSM programs as conditions of approval for new development.

- *Commute-alternatives ordinances.* Employers are required to meet specified criteria to implement TSM programs to achieve a desired level of commute-alternatives use among employees. Placer County and Contra Costa County have this type of ordinance.

- *Vehicle-trip-reduction ordinances.* TSM programs are required to reduce vehicle trips by a certain percentage as compared to a specified baseline. Both ridesharing and shifting to off-peak commuting are used. The Los Angeles Coastal Corridor ordinance requires these programs of new developers and new employers. The city of Pleasanton requires vehicle trip reductions of all large employers.

- *Incentive ordinances.* Rather than requiring developers or employers to implement TSM programs, these ordinances offer benefits to encourage TSM program implementation. The cities of Palo Alto and Los Angeles allow developers to reduce parking in return for commitments to implement TSM programs.

#### *Voluntary/Mandatory*

A new concept that appears promising is called the voluntary/mandatory approach. The program starts as voluntary and

becomes mandatory if the agreed-upon rate of progress (as measured by specified standards) does not take place. The ordinance is adopted at the start of the voluntary phase and can be triggered into effect by the ordinance's own language about the required progress rate. This approach is being considered by the Marin County TSM Task Force and the Golden Triangle Task Force in Santa Clara County. It could be quite effective because employers will be motivated by both the active involvement of professional staff and the desire to avoid a regulatory program. Because the voluntary program is given time to prove effective, the approach should be acceptable to the business community.

### *Informal Agreement*

Local governments could request major employers to sign letters of agreement outlining local governments' expectations about activities to be conducted and the services local governments will provide to assist employers. The letters could also state that, at certain intervals, transportation audits (survey information) would be solicited from the employer to determine current program implementation status. Like the voluntary/mandatory approach, this approach would be a precursor to a more mandatory approach, in that it relies on good faith commitments.

### **Comparison Criteria**

The program development team should compare the various approaches according to several criteria, including effectiveness, acceptability to the private sector, flexibility, potential for cooperation or compliance, and potential for longevity. They should then decide which approach meets local needs.

### *Effectiveness*

Usually, effectiveness is measured by the size of the increase in commute-alternatives use or the size of the peak-hour vehicle trip reduction achieved by the program. Contrary to the common perception, mandatory programs are not necessarily more effective than voluntary programs. Some voluntary programs by individual employers or developers have been quite effective. However, mandatory programs appear more effective at getting all employers or developers in an area to participate in the program.

The most effective programs of all types have sufficient staff time to work with employers or developers targeted by the program. Staff time is needed mainly for assisting employers to develop programs, monitoring program results, and notifying employers about ways to improve their programs.

The effectiveness of TSM conditions on developers can be improved if TSM program requirements are passed on to tenants (employers) in lease agreements. Thus, employers are also held responsible for meeting conditions once the developer is gone. When the conditions do not have to be specified in lease agreements, it has been found that some developers have not informed tenants about them.

Parking incentive ordinances have not been effective because

they have generated little developer interest. The reason appears to be that investing in ongoing TSM programs is perceived to be risky compared to providing parking. Providing ample parking is a one-time expense and is known to be an attractive feature to prospective tenants.

### *Acceptability to Private Sector*

Voluntary and incentive programs are generally more acceptable to the private sector than mandatory ones.

### *Flexibility*

Because employers within a city have varying constraints and needs depending on their size, sector, and site characteristics, programs must offer employers flexibility in how they meet requirements. Of course, voluntary and incentive programs are completely flexible. The mandatory approaches must balance equity considerations—the need to require the same things of similar developers or employers—against flexibility needs.

### *Potential for Cooperation or Compliance*

Full compliance with a mandatory program appears to result from perceptions that the city is committed to the program and that enforcement penalties are possible. However, imposing enforcement penalties does not appear to be necessary for compliance. Evidence of this exists in Pleasanton, where the city transportation manager and the employer task force are able to bring the rare noncompliance cases around by sending mild letters suggesting action.

### *Program Longevity*

Sustaining the TSM program for the long term is critical to its effectiveness. TSM programs rarely show immediate results nor will they necessarily remain effective over the long term. First, getting commuters to change habits can take time. Second, the commuters who agree to switch to nonsolo driving may switch back again in a year or two unless commute assistance is ongoing. Finally, constant employee turnover means that the program will have to keep active to maintain a certain rideshare level.

Program longevity will depend largely on maintaining stable funding for staff time. Public sources of money, such as municipal general funds, county sales tax revenues, assessments from special districts, and impact fees, are usually more stable than counting on voluntary funding from the private sector. Fees for voluntary private-sector programs generally come from transportation management association dues.

Ensuring that conditions of approval for developers will continue means "tying them to the land" through language in the deed. This allows conditions to be passed on if the property is sold. Otherwise, a second owner will have no obligation to meet the conditions.

Table 1 compares the program approaches using a rating

TABLE 1 COMPARISON OF PROGRAM APPROACHES

Criteria	Program Approach				
	Voluntary	Conditions of Approval	Rideshare and Trip-Reduction Ordinances	Incentive Ordinances	Voluntary/Mandatory
Effectiveness	2	3	3	1	3
Acceptability	3	2	2	3	3
Flexibility	3	2	2	3	2
Potential for compliance	1	3	3	1	3
Potential for longevity	1	3	3	1	3
Total	10	13	13	9	14

NOTE: High = 3, medium = 2, low = 1; maximum points = 15.

scale (3 = high, 1 = low) for each criterion. The scores for each program for each criterion are shown, as well as a total score for each approach. The mandatory program types—the conditions of approval and the rideshare and trip-reduction ordinances—rated higher overall than the voluntary and incentive approaches because of higher ratings on effectiveness, potential to maintain cooperation or compliance, and potential for program longevity. However, the voluntary/mandatory approach rated highest of all—it had the same scores as the regulatory approaches on all criteria, except that it had a higher acceptability rating.

### Choice of Approach

Although the combined voluntary/mandatory TSM program approach is strongest according to the selected criteria, the other approaches may be more suited to local needs and conditions. The choice of approach should be based on both program objectives (traffic problems targeted) and the level of political and financial commitment to the TSM program. Determining which approach to use may be the most difficult and time-consuming task of the program development team.

Conditions of approval should be used if the city is not concerned about areawide traffic conditions but wants to target new development effects at nearby intersections or streets. A voluntary program should be used when the city has areawide traffic problems and wants to explore a TSM program's potential. It is also appropriate if funding is limited and the private sector is opposed to an ordinance and believes it can accomplish a lot on its own. Ordinances should be considered if there appears to be a strong commitment to a TSM program and the city wants to affect areawide traffic conditions through requirements on new and existing employers.

### IDENTIFYING TSM OPPORTUNITIES

Various factors, including employer characteristics, employee characteristics, transportation environment, and the development environment, should be assessed in developing the TSM program. These factors will determine which program measures should be implemented in the particular jurisdiction, and they will influence program results. It is impossible to say how much a factor or unique combination of factors

will affect results. However, the city can probably determine whether results are likely to be moderate or high.

In the following subsections are described some distinct commute environments, program measures that are most appropriate for each, and the effects their characteristics will have on results:

#### New Suburban Office Parks

New suburban office parks generally have ample parking and are most accessible by car. Transit service to office parks is often poor because of the low density. However, the centralized administrative structure can promote ridesharing and match carpools and vanpoolers efficiently. Congested freeways near business parks may lead commuters to avoid the aggravation of driving. If traffic is concentrated over short peaks, flextime should be beneficial. Data for new suburban office parks often show long average commute distances during the first couple of years after they open because employees have not yet moved their residences closer to work or found new jobs closer to their residences. Carpooling and vanpooling are attractive for long-distance commuters. Parking management techniques, such as preferential parking for carpools, may provide an added incentive to use commute alternatives. Without TSM programs, the limited commute-mode options result in low rates of commute-alternatives use and shifts to off-peak travel. However, there is potential for relatively large increases to these rates.

#### Congested Travel Corridors

Transit, flextime, and carpooling are key solutions where capacity is constrained and roadways are crowded. Corridors with preferential bus and carpool treatment will offer incentives to commuters to switch to nonsolo driving. Flextime will improve use of freeways and enlarge the market for transit service and carpool formation. However, flextime may not greatly improve overall traffic conditions if heavy traffic is already spread over long periods of the day.

#### Areas with Large Employers

Like business parks, large employers have the resources to become involved in TSM programs if they so choose. They

can staff transportation coordinator positions, a key ingredient to effective programs, and will have a good sized pool of employees from which to organize carpools and vanpools.

### Areas with Small Employers

TSM programs for areas consisting predominately of small employers are problematic unless some organizational structure can be superimposed to make transit and carpool services available to these employers. Individual companies lack resources to sustain a commitment to TSM programs. Often small employers are geographically dispersed, which creates further problems for transit and carpool initiatives. Counties that have explored TSM ordinances for small employers generally adopt lower expectations concerning possible solutions.

### Downtown Central Business Districts (CBDs)

Downtown areas generally provide factors conducive to transit, such as expensive parking and multiple transit services. However, substantial increases in transit use may be possible only if transit service improvements are implemented, such as improved service coordination, frequency, hours of operation, and ticket availability.

## TARGETING THE PROGRAM

The project development team must decide whether to target the program at new developers, new employers moving into new developments, existing employers, residences, or a combination of these. Sometimes just particular geographic areas are targeted. Equity considerations will figure prominently in deciding whom to include in the program. In addition, program objectives, which identify the desired effects of the program on the transportation system, will determine in part who should be included in the program. If the objective is either to maintain existing traffic conditions or to improve them, the city will have to reduce all vehicle trips sufficiently to more than offset the traffic effects of any new development. Therefore, both new and existing employers should be included. If a city's existing traffic conditions are acceptable, but congestion is expected from new development, only new employers may be targeted.

### Employers and Developers

TSM programs usually target developers and employers because employee commute trips make up the major share of peak-period traffic, and developers and employers have many possible ways of influencing employee commute habits. Developers can install preferential parking for rideshares and provide subsidized shuttle service through financial arrangements that carry over beyond the developers participation in the project. Employers can establish company policies conducive to ride-sharing, appoint a transportation coordinator, institute flex-

time, and provide financial and other incentives to their employees.

### Residences

TSM programs are appropriate for high-density residential development, where efficient carpool matching and transit operations are possible. Complexes with common areas have potential for efficiently reaching all residents with promotional materials and services. Promotional activities can also be conducted by homeowners' associations.

A concern with requirements on residential development is that because there are housing shortages in many areas, especially for low- and moderate-income levels, cities often do not want to place restrictions that may discourage residential development. In fact, encouraging residential development near job sites is a strategy for reducing traffic. Residents who live near work may be able to walk or bicycle to work, or they may be able to commute via arterials rather than the congested freeway system.

### Equity Considerations

The issue of who should be targeted often raises equity concerns. Existing employers may think that new developers and employers should be held more responsible for controlling traffic because the new development has pushed traffic conditions from acceptable to congested levels. At the same time, new employers argue that all employers should be included to the same extent because they are all contributing traffic to the problem areas. The geographic areas targeted for the program may have the most traffic congestion and also the most economic prosperity. The areas not targeted may argue that both development and government resources need to be distributed more evenly.

## SETTING GOALS

Program goals numerically describe the expected program result. A primary purpose of goals is to measure progress. To maintain the program's credibility, the city should measure progress toward achieving the goals. If measurements show that progress is not occurring at the expected rate, this may signal that the program should be adjusted, the timetable should be altered, or the goal itself should be changed.

Goals are also used to budget resources. Realistic goals will help a city decide how much resources to expend on a program. A city that expects only minimal results will want to allocate less money than a city that expects substantial results.

### Types of Goals

Goals are usually expressed in one of the following ways:

- *Percentage of nonsolo drivers.* Sometimes called the participation rate, this goal states the percentage of the employ-

- *Percentage of nonsolo drivers.* Sometimes called the participation rate, this goal states the percentage of the employer's work force that is expected to commute by an alternative to solo driving. It is used when the program is emphasizing mode change rather than a travel-time or peak shift. The advantage of using this goal is that it can be calculated easily from employee surveys. However, it does not relate the program's effects to traffic conditions.

- *Percentage of solo drivers.* This goal is the percentage of an employer's work force expected to drive alone to work. It has the same strengths and weaknesses as the percentage-of-nonsolo-drivers goal.

- *Overall reduction in vehicle trips.* This goal is to reduce vehicle trips by a certain percentage by increasing nonsolo driving. With this goal, the program's results can be easily translated into an effect on traffic conditions. The vehicle trips reduced by the program can be expressed as a percentage change in traffic volumes on streets or freeways. With this goal type, the "baseline"—the number of vehicle trips against which the reduction is measured—must be specified. It is either (a) the number of vehicle trips that would occur if all commuters drove alone or (b) the existing number of vehicle trips that occurred before the program was implemented for a specific employer or geographic area. Some percentage of the work force uses commute alternatives when no TSM program is in effect, so the existing vehicle trip rate is lower than the rate that would exist if all commuters drove alone.

- *Percentage reduction in peak-hour vehicle trips.* This goal is concerned only with the peak hour, so vehicle trips can be eliminated by both increases in commute-alternatives use and shifts to off-peak-hour travel. Therefore, the percentage reduction will be greater than for the overall vehicle trip-reduction goal. Usually, the goal is measured by considering the number of employees who start work between 7:30 and 8:30 a.m. or leave work between 4:30 and 5:30 p.m. The baseline must be specified.

- *Level of Service (LOS).* This goal is a measure of traffic conditions. It should express what the conditions should be and on which road facilities. The LOS usually selected is "D," characterized by a high-traffic-volume-to-road-capacity ratio, but no congestion. Definitions of LOS are found in *TRB Special Report 87: Highway Capacity Manual (3)*. Measuring goal attainment requires a traffic monitoring program.

### Selecting a Goal

The goal should represent a decrease in the solo driving rate or in the p.m. peak-hour vehicle trip rate as compared to the preprogram level and one which the city has a fairly high likelihood of attaining. The preprogram rate should be identified by means of an employee survey. Then, the external factors likely to affect the program's potential should be assessed to decide if the solo commuter decrease is likely to be on the moderate or high side.

Cities should probably select slightly ambitious goals. An ambitious goal may push employers to do all they can, whereas a more conservative one may be too easily reached. However, the city should be wary of overselling the program to the public.

### Using Data To Gauge Results

Recent data on results of various Bay Area TSM programs can be used to gauge expected results. A 1985 Metropolitan Transportation Commission (MTC) assessment of six good employer TSM programs found that about 5 to 8 percent of employees switched from solo to nonsolo driving. A 1986 Santa Clara County Manufacturing Group survey showed that member companies with TSM programs had caused 6 percent of their employees to start using commute alternatives. These rates of switching correspond to about a 3 to 7 percent vehicle trip reduction. Changes much greater than this have been reported, but they are rare. One example is the Bishop Ranch Business Park in San Ramon, which reports (in a 1986 survey provided to MTC as part of the MTC/RIDES funding agreement for FY 1986–1987) a 45 percent nonsolo driver rate (4). This rate probably indicates that approximately 25 percent of the business park's employees have switched to ridesharing as a result of the program.

Less information is available about peak-hour vehicle-trip reductions as a result of shifts to off-peak-hour commuting. The best example is Pleasanton's TSM program, which, as of 1987, had resulted in 10 percent of employees shifting to off-peak-hour commuting. The rate of commute-alternatives use has actually decreased slightly in Pleasanton since the program started, so the net peak-hour trip reduction has resulted from changes in travel time. Bishop Ranch Business Park results also indicate that 5 to 10 percent of employees have shifted to off-peak travel.

Thus, a reasonable goal for a program with moderate potential would be to cause 5 to 8 percent of employees to switch to nonsolo driving. An ambitious program could aim for a change of a few percentage points higher. Changes as high as Bishop Ranch's are unlikely as a citywide average. A moderate peak-hour vehicle-trip-reduction goal would probably be a 13 to 17 percent reduction, as compared to the existing or ambient (areawide) rate. About 3 to 7 percent would be from ridesharing and 10 percent from travel-time shifts. Information is not available to indicate a reasonable goal for a program with high potential.

### Review of Existing Programs' Goals

The 35 percent nonsolo driver goal selected for both the Contra Costa County model ordinance and the Santa Clara County Golden Triangle program, now being developed, shows that the programs are expected to result in 15 to 25 percent of employees switching to nonsolo driving. This goal is ambitious. In comparison, the goals of the proposed San Mateo County model ordinance—15 percent peak-hour trip reduction in 10 years and 25 percent in 20 years, as compared to all commuters driving alone during the peak hour—are probably already being attained.

It is interesting to note that although some goals may appear very different, they may actually be striving for similar changes in commute behavior. The Los Angeles Coastal Corridor ordinance and the Pleasanton ordinance goals are examples of this. The Los Angeles Coastal Corridor ordinance seeks to

achieve a 15 percent reduction in vehicle trips based on trip generation factors (obtained from the Institute of Transportation Engineers) that already include some commute alternatives use. The Pleasanton ordinance's trip reduction goal is 45 percent, as compared to a baseline of all commuters driving alone. Although highly reliable data are not available, indications are that before Pleasanton's ordinance was implemented, there was about a 25 percent reduction in peak-hour vehicle trips through either mode change or shift to off-peak-hour travel, as compared to the number of vehicle trips that would be made if all commuters drove alone during the peak hour. Therefore, Pleasanton's ordinance expects to eliminate an additional 20 percent of peak-hour vehicle trips. This is fairly close to Los Angeles's 15 percent peak-hour vehicle-trip-reduction goal (5).

### Adjustments to Program Goals

A program may have more than one goal. Goals are sometimes varied for geographic areas within a jurisdiction. For example, the Contra Costa County ordinance specifies higher goals for the I-680/CA-24 and I-80 corridor than for the rest of the county.

Goals are also sometimes varied by employer size. Large employers will have higher goals because they have more resources to devote to the TSM program and because a large concentration of employees offers more opportunities for rideshare matching. Although many programs use size cutoffs of 100 employees for setting goals, cutoffs as high as 300 to 500 employees may be necessary to achieve economies of scale in TSM programs. Programs that vary goals by employer size also tend to vary the program requirements (measures to encourage ridesharing or travel-time shift) accordingly.

Finally, goals are often varied over time to account for the fact that programs require start-up time and employees need time to change their commute habits. Also lower goals and "easy" measures such as flextime may need to be replaced by higher goals and tougher measures as traffic increases as a result of new development.

### MEETING PROGRAM REQUIREMENTS

Program requirements are the traffic mitigation activities that employers or developers must undertake according to an ordinance action. Voluntary programs also recommend certain activities sometimes. Requirements ensure some equity—that similar efforts are required of similar employers. They also allow the city to guide employers or developers to undertake measures that are appropriate to local conditions and have proven effective. Compliance is usually judged based on meeting requirements rather than on meeting specific numerical goals, because implementation of a program's requirements does not guarantee certain results. Some employers may implement the program more meticulously than others. In addition, factors external to the program will affect results, as described earlier.

Programs vary in terms of the specificity of their requirements. One approach is for each employer to set annual vehi-

cle-trip-reduction goals for itself and decide how to achieve these goals.

A less flexible approach is exemplified by Pleasanton's ordinance. It requires appointment of a transportation coordinator to implement the program, participation on an employer task force, and implementation of some measures from a particular list. Measures on the list include preferential parking, carpool subsidies, and others. If the employer's program does not meet the city's annual goals, the employer must implement more measures from the list. Another method is to list measures from which the employer must pick and to identify specific vehicle-trip-reduction percentages expected from each. The employer can choose any combination of measures expected to result in the stated vehicle-trip-reduction goal. The weakness of this option is that it is difficult to predict whether measures will reduce vehicle trips by a certain percentage.

Some cities have identified "performance standards" that provide specific guidance about implementing each measure. San Francisco requires new office buildings to promote public transit and sell passes. The performance standards state that buildings with more than 1,000 employees must have tickets and passes for sale on site for 40 hours per month, distribute information for all transit operators in the Bay Area, distribute promotional flyers semiannually to all building tenants describing when and where transit passes and information can be found, and arrange for transit operators to make presentations annually. Performance standards of similar detail are specified for the other measures required of new development.

The less specific program requirement options are more acceptable to the private sector and allow employers to develop programs suited to their own constraints and needs. However, employers may either do less under the more flexible options or need more guidance from the city about how to implement a good program. The specific performance standard approach is probably the best way to ensure that the required measures are implemented to their maximum effectiveness.

### ADMINISTERING THE PROGRAM

This section identifies the main characteristics of a good TSM program's administrative structure and the roles needed in the organization. It also describes some types of administrative structure and the advantages and disadvantages of each.

#### Administrative Structure Characteristics

The following characteristics represent a good administrative structure:

- *Low cost.* The city will want to keep paid staff to a minimum and to maintain a low cost per commuter targeted by the program.
- *Personalized service.* Studies have shown that convincing commuters to change modes or travel times requires personalized service.
- *Centralized program management and service delivery.* Some professional citywide management staff time will be

needed to oversee the program, inform employers about program requirements, and bring problems and recommendations to a policy body. Delivery of some services, such as rideshare matching and transit ticket sales, should also be handled by a centralized professional staff to realize economies of scale.

- *Private-sector control.* Employers and developers will be more willing to support and take active part in the program if they have responsibility for policy direction.

### Organizational Roles

The major tasks in administering a TSM program are program policy direction and management, employer plan preparation, promotion, operations, progress monitoring and reporting, and enforcement if the program is mandatory. Following are the organizational roles needed to carry out these tasks:

- *Policy setting.* This level hires employees, establishes guidelines for employer programs, evaluates program progress, and handles compliance problems if the program is mandatory. Generally a policy-setting body, either city staff or a city and private-sector task force, will make some policy decisions and defer others to the city council.

- *Program management.* Professional staff should oversee the day-to-day operations of informing employers about requirements, helping employers develop TSM plans and implement measures, informing the policy body of employer activities, and managing the data collection and monitoring function. Usually a city staff member will have this job.

- *Promotion and service delivery.* Staff assigned to this role provide carpool and transit information, sell transit passes, and manage preferential parking programs. Responsibility for this role can be handled in a number of ways. The city can provide services, such as accessing a centralized rideshare matching data base, providing promotional literature, and holding media events. Employer staff, through their daily contact with employees, can also perform some of this function. Alternatively, the city or the employer can contract with a professional rideshare agency, such as RIDES for Bay Area Commuters. The advantages of this option are that these agencies offer a high level of expertise and economies of scale in their operations. In addition, the contract can be modified or terminated easily.

- *Employer liaison.* The employer liaison, usually called the transportation coordinator, is the employer's staff person responsible for communications between employer management, employees, and city program management staff. The same staff member generally performs both service delivery and liaison functions. Liaison functions include working with city staff to prepare the employer TSM plan, coordinating company programs and policies with management, overseeing the monitoring and data collection effort, and preparing progress reports.

### Types of Administrative Structures

The following options exist in choosing an administrative structure:

- *Administration by city staff.* A common approach to administering TSM programs is to allocate part of a city staff member's time to the task. Employer transportation coordinators may or may not be required. An advisory committee may help develop the program but does not remain operative after program implementation. Full responsibility for employer plan preparation, technical support, and program monitoring falls on city staff. This structure has not been effective at maintaining a high level of employer activity. Although inexpensive, it does not provide sufficiently for expert, personalized service delivery and employer involvement, usually because of staff resource constraints.

- *Transportation management associations.* These organizations are set up and financed by the private sector to provide ridesharing services. Participating companies usually appoint a transportation coordinator. Participation is voluntary. The advantage of these programs is that they are tailored to employer needs. However, employers may not provide sufficient funding for personalized service and the public sector has no say over program policies. Because they are voluntary, these organizations are sometimes short-lived.

- *Administration by city staff and employer task force.* This administrative structure type includes a city staff member to manage the program and provide some service delivery, an employer task force with some program management and policy making authority, and employer staff to act as transportation coordinators with service delivery and liaison responsibilities. The cities of Pleasanton and Concord both have this type of structure. The strength of this program is that the employer task force maintains a high level of employer involvement. Weaknesses are that the city's full-time staff member, with both management and service delivery responsibilities, may not have sufficient time to offer personalized service. Service delivery may rely heavily on the employer transportation coordinators, who generally have other high priority responsibilities within their companies.

- *Administration of a program oriented to small employers.* In cities with a high percentage of employees working for small employers, TSM programs will require more staff time. It is difficult for small employers to spare the staff time needed for the transportation coordinator role. Therefore, city staff can act as transportation coordinators for the small employers, or they can organize employers into "blocks," each with an appointed coordinator. Blocks can be formed out of existing business associations or based on geographic location.

- *Regional program administration.* Multijurisdictional TSM programs are being planned in various parts of the Bay Area, although none are operational at this time. The administrative structure tentatively planned for Marin County is an example of how regional organizations can be set up. It will include a policy body, with about 10 public- and private-sector representatives. Marin County staff will manage the program—prepare budgets and work programs, administer contracts, and recommend program changes to the advisory board. A centralized staff of professionals will promote the program and provide services. This staff could be provided under contract, at least initially. Service delivery will also be provided by employer and developer transportation coordinators. The advantage of this program structure is that several cities together potentially could have a substantial effect on regional (free-way) traffic conditions. Also, individual cities are prevented

from using a relatively lenient TSM program to gain a competitive advantage in attracting development.

## CONCLUSION

We have found that well-designed TSM programs are a cost-effective way to increase vehicle occupancy and thus increase the efficiency of the street and highway system. They can also reduce traffic on highways by small amounts and on local streets by more significant amounts. Therefore, most cities should consider implementing a TSM program. However, in most cases, TSM programs alone will not solve the traffic problems. Rather, these programs should be considered just one part of a broader strategy that includes widening roads, operational improvements on city streets, and growth management policies. Local and regional TSM efforts are supported by state facilities—HOV lanes and park-and-ride lots. A complete strategy should involve comprehensive long-range planning to ensure that transportation system capacity will meet travel demand.

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