

IV. TDM Program Development Guidebook

Need for Guidance

The public agency research that preceded the development of this guidance indicated that few public agencies used a systematic process for selecting TDM strategies for implementation nor felt any pressure to do so. Most public agency representatives interviewed indicated that their selection of TDM strategies was based not on a cost-benefit comparison of various strategies to meet a specific problem, but rather on outside political and financial motivations. Agencies cited four primary factors in their TDM decision-making/measure selection process:

- Direction given by policy-makers
- Availability of a grant for a specific strategy or set of strategies
- Response to the agency's mission to promote certain commute alternatives
- Popularity of the measure in the region or among peer agencies

The fact that the majority of public agency representatives cited one or more of these factors indicates that they have not positioned TDM as a serious measure for consideration compared to other responses to significant transportation and air quality-related problems. TDM seems, for some agencies, to be relegated to the sidelines, an approach that is taken only if a mandate exists or if available outside funding is restricted to TDM applications.

The result of this reliance on outside decision factors, rather than rigorous cost-benefit analysis, is that the strategies ultimately implemented may not be the most effective. Indeed, when asked to list "effective" strategies, few public agency representatives listed strategies they were currently supporting. Recognizing that this might be perceived as illogical, they indicated that many of the strategies they believed to be effective and cost-effective, such as commute subsidies and parking fees, were too costly or unpopular among the public at large and/or political officials to implement.

A three part problem emerges from this research:

- (1) Current policy and funding priorities may hinder the implementation of effective, but controversial strategies in favor of those that are non-controversial but less effective.
- (2) Public agencies recognize this problem, but feel little pressure, for a number of reasons, to engage in formal analysis of the value of TDM strategies.
- (3) This lack of analysis, either before or after strategies are implemented, leads to continuing questions of which TDM strategies can and should be implemented in various situations.

Guidebook Organization

Limited time and resources, and competing agency priorities may make it difficult for agencies to undertake full TDM feasibility studies. In light of these concerns, this guidance offers a four-step process to examine the likely feasibility of TDM program strategies that a public agency might implement. Although the process is intended to be generic, and the general outline is applicable to the evaluation of any TDM measure or program, the focus of this research and guidance is on employer-based TDM efforts. As shown in Figure IV-1, this process, which defines TDM program development, implementation and monitoring consists of the following modules:

- (I) Identify problems/evaluate potential TDM solutions
- (II) Identify/Develop appropriate candidate TDM strategies
- (III) Implement employer-based TDM
- (IV) Monitor and evaluate results

Identify Problems/Evaluate Potential Solutions: Is TDM part of the solution?

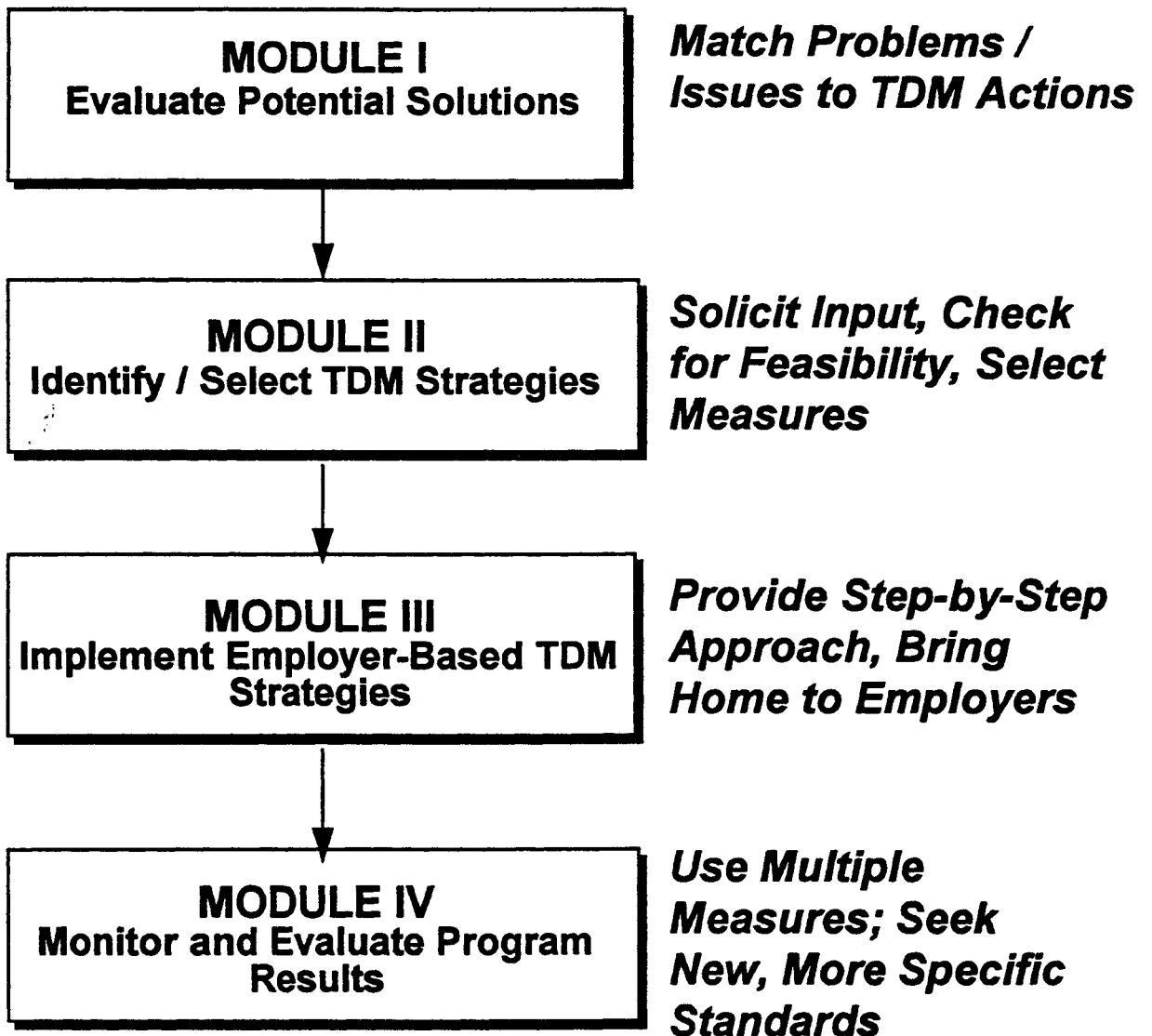
The first part of assessing feasibility is clearly defining those issues or problems TDM will be expected to address, and since TDM success is highly situational, determining if TDM is generally applicable. When evaluating potential solutions TDM approaches should be considered and compared along with non-TDM options, such as TSM, new construction, technological solutions, and land-use planning techniques. This helps to ensure that TDM is being considered from the very beginning of the planning process, and that any comparative assessment of potential tools is a complete one.

Identify/Select Appropriate TDM Strategies: Which TDM strategies will work?

After one decides that TDM may have potential for addressing a problem, the wide range of potential individual TDM strategies must be thoroughly examined. This step requires the agency to explore its needs further and assess the type and level of benefits, such as trip reduction, emissions reductions, and others, that TDM strategies will offer. If the problem demands significant trip reduction, then significant strategies are likely needed. Each candidate strategy must be assessed in terms of the type and magnitude of its effectiveness. If the projected benefits of a potential strategy fall short of the needed objectives, a more aggressive strategy, or combination of strategies, is required.

FIGURE IV-1

ONGOING PROCESS FOR PUBLIC AGENCY TDM PROGRAMS



Implement employer-based TDM Strategies: How and in what context should the selected measures be implemented?

Develop a clear set of implementation steps and schedule, identifying each implementation partner and the roles they have agreed to play. The schedule should include progress milestones and serve as a frequently-consulted guide to implementation. Also examine legal, institutional, funding, and other issues that could impede smooth and effective implementation.

Monitor and evaluate results: Are the selected measures achieving the desired results?

Review TDM goals and objectives (public and private). Do they seem to be met by the measures proposed and implemented? This will require further development of evaluation techniques that can adequately account for the intended goals and objectives. This module can also include, if necessary, surveys and data collection. The entire monitoring and evaluation effort must be geared toward feeding the results back through the entire process, applying the lessons learned to each relevant stage of program development.

Module Organization

Each module of the guidance is organized according to the same format:

- a **module summary figure** showing the key steps within the module and their sequential relationship opens each module.
- the **individual steps** are organized into two basic components:
 - (1) **general descriptions** of the relevant issues and necessary background
 - (2) **checklists** consisting of a series of specific questions and essential actions (**status**) and **examples** highlighting the step, that is followed through each step of each module.

Although presented in a sequential fashion, the modules do not necessarily need to occur in the order shown. Several may be occurring simultaneously, and some steps within each module may occur earlier than indicated. This is especially true of monitoring and evaluation, which may take place at any point throughout the process.

Module I: Identify Problems/Evaluate Potential Solutions

This module begins with a contextual discussion of public issues or problems for which TDM might be a viable solution, and situations in which TDM is most appropriate. It is written in very general terms, because its purpose is not to define appropriate or effective applications of specific strategies, but to guide agencies that are considering TDM, TSM, and other actions to determine if they should explore TDM further. Figure IV-2 graphically illustrates the steps comprising this module.

A Brief History of TDM Application

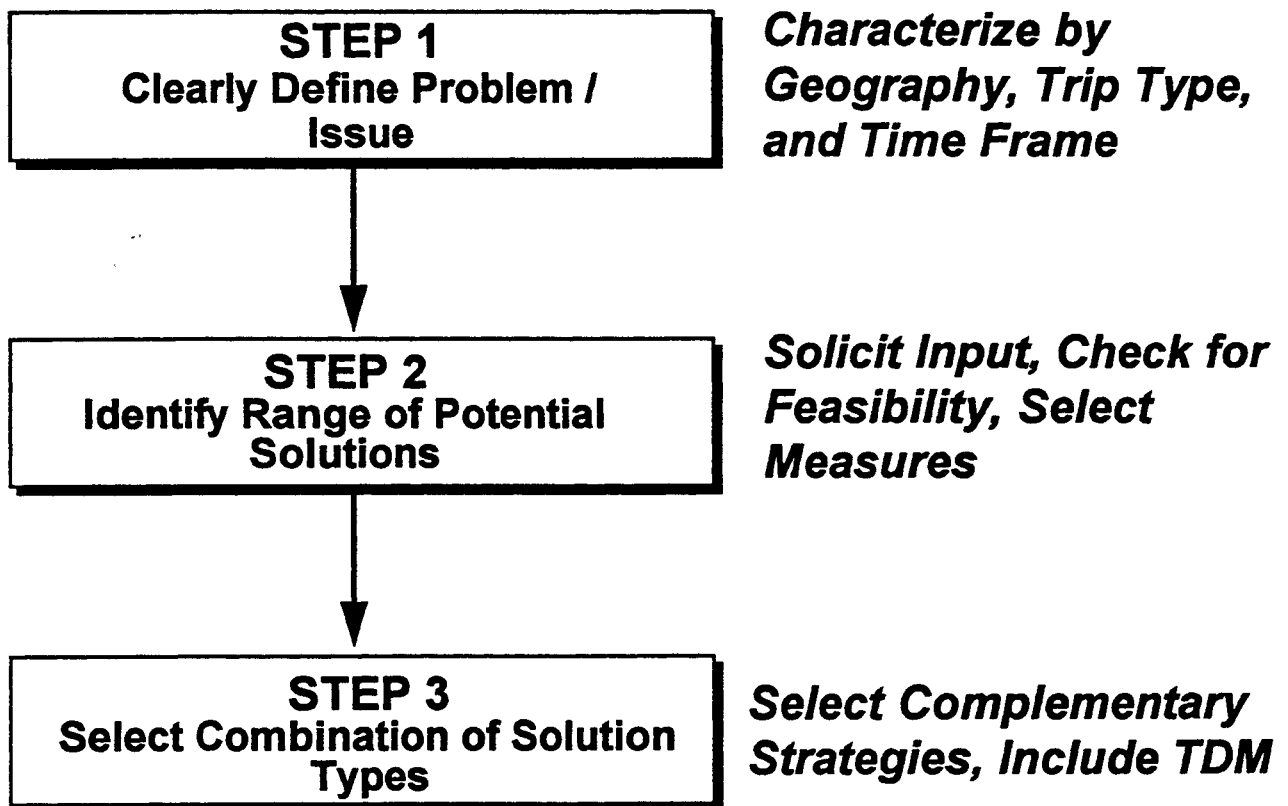
Employer-based TDM programs have been implemented for many years, and for many diverse reasons and situations. When first implemented on a broad scale in the 1970s, their purpose was primarily to reduce energy consumption. In a decade that witnessed two severe energy crises, employers and public agencies started vanpool, ridesharing, and transit programs to reduce the country's consumption of and dependence on fossil fuels and to reduce the need for commuters to wait in long service station lines to buy gasoline. In the early 1980s, when concerns about energy consumption had abated, two new public issues surfaced for which TDM seemed a viable solution, traffic congestion and the need to improve accessibility for communities and businesses. The focus of TDM shifted to improving the operating efficiency of existing roadway networks, especially during peak commuting hours, and avoiding new capital infrastructure investments.

Growing public interest in TDM also stemmed from public agencies' desire to maintain the economic health of their communities, which they believed was threatened by traffic congestion. This decade saw the first local trip reduction ordinances, which required developers and employers to participate in TDM actions, and the introduction of "peak shifting" TDM strategies, such as flextime, which shift the timing of trips from the peak period to other times of the day.

Late in the decade, public agencies added another reason to implement TDM. Growing concern over mobile source air pollution and the realization that growth in vehicle miles traveled was outrunning air quality improvements from technological advances in pollution control equipment prompted public agencies to look at TDM as an air pollution solution. Regional trip reduction ordinances that required employers to reduce vehicle commute trips to reduce auto emissions were passed in California and Arizona in the late 1980s.

FIGURE IV-2

**MODULE I DETAIL:
EVALUATE POTENTIAL SOLUTIONS**



In 1990, the federal Clean Air Act Amendments (CAAA) extended air pollution-related employer trip reduction mandates to ten other states with severe air pollution. In 1991, a second federal law, the Intermodal Surface Transportation Efficiency Act (ISTEA), was passed. This law requires federal, state, and regional/local agencies involved with transportation planning to assess the air quality impacts of proposed transportation projects, develop regional congestion management plans that support air quality goals, and to consider application of TDM strategies in regional transportation planning.

We now have 25 years of TDM experience, with changing goals and changing strategies. **What have we learned and when is TDM part of the solution?**

We have learned that the potential applications of TDM are broad, and that some are more promising than others. We have learned that the potential effectiveness of TDM in any situation is highly dependent on what strategies are chosen, how widely they are applied or adopted, how and by whom the strategies are implemented, and how we measure success. Finally, we have learned that it is important to set realistic TDM goals and not to oversell the potential benefits. It is an important tool in transportation planning, but its impacts are most effective when strategies are integrated with the overall transportation planning process.

Step 1: Define Problems/Issues - What Problem are You Addressing?

TDM is an effective tool when addressing several public transportation and air quality planning issues. Additionally, TDM is appropriate in several geographic areas and for several trip types. The next section reviews the issues and problems followed by the geographic application and the targeted trip types.

Issue/Problem: What is the problem you want to address?

- Traffic congestion
- Roadway reconstruction
- Land use and zoning
- Air pollution
- Congestion management planning
- Economic development and community access
- Parking supply/demand imbalance

Issue/Problem - In the research conducted for this project, public agencies cited many issues or problems they are addressing or hope to address with TDM, including traffic congestion, disruption during roadway reconstruction, land use management and zoning, air quality management, congestion management planning, and economic development and community access.

- **Traffic Congestion:** During the past 25 years, TDM has been charged with solving many different problems, but the TDM role that seems to remain through all policy changes is that of mitigating traffic congestion. Most of the agencies polled for this project noted "reduction of traffic congestion" as a primary reason to implement TDM and consistently cited it as the most promising TDM application. Frequently they coupled traffic congestion with community access, economic vitality of the community, or quality of life, but the root problem was too many vehicle trips in an area at a time.

The most successful applications of TDM to alleviate congestion have occurred where congestion was localized and of short-duration, such as at employment centers or entertainment facilities, where attractive alternatives to driving alone can be efficiently provided, and where travelers can be made aware of the alternatives.

- **Roadway Reconstruction:** A second common and successful TDM application is in conjunction with reconstruction of major roadways to minimize travel disruption. Rehabilitation of major arterials and limited access facilities can cause severe localized congestion on both the reconstruction roadway and other facilities

in the travel corridor. TDM strategies can reduce SOV travel during the critical peak periods. TDM programs for roadway reconstruction might extend only through the completion of the project, but can have long-term benefits if travelers continue with their changed travel patterns and if the program promotion and services continue.

- **Land use and zoning:** Public agencies interviewed indicated that they are increasingly considering the potential impacts of TDM strategies on local land use planning decisions such as development patterns and densities, transit and auto facility access, parking requirements, and site design. A growing number of agencies charged with enforcing zoning requirements are obligated by local ordinance to ensure that all needed public facilities (e.g., sewer, water, and transportation facilities) are or will be in place before a given project can be approved.

To meet these requirements, agencies have developed TDM requirements to mitigate the transportation impacts of new developments. Some have included the existence of TDM-friendly site features as a criterion in their site plan review process. Others have allowed new developments to trade off TDM features, such as a transit transfer center, for other costly requirements such as excess parking. Widespread acceptance of TDM as a land use technique has been hampered, however, by the uncertainty of TDM's results, compared to the long experience of planning agencies with traditional trip generation estimation tools and guides.

- **Air Quality Requirements:** At the broad regional level, public agencies responsible for monitoring and improving air quality must meet TDM requirements from the federal Clean Air Act. For 11 states with areas of severe ozone pollution, the CAAA mandates the implementation of TDM or ECO programs or Employer Trip Reduction (ETR) programs at large employment sites. These states and others with less severe pollution also must assess the emissions reduction potential of other TCMs, including TDM strategies and include them in SIPs if needed to meet air quality standards.

Debate over TDM's potential to solve or even contribute to air pollution reduction has been vigorous, however, and various public agencies differ widely in their assessment of TDM's air quality benefits. Emissions reduction from TDM strategies are generally a small part of the reductions needed to reach air quality standards, because many TDM strategies affect only the largest employers and only peak period work-related travel. But for many areas even these small reductions are important, due to the limited number of emissions reduction options available.

- ***Congestion Management and Conformity Requirements:*** The CAAA and ISTEA also require state, regional, and local transportation planning agencies to consider TDM in the larger context of regional congestion management planning. Together, these acts mandate the evaluation of transportation projects and policies in light of clean air goals and regional mobility concerns. New transportation projects must "conform" to regional and state plans for improving air quality. Projects that produce emissions that conflict with air quality plans for attainment are effectively prohibited (except for a small number of exempt projects, such as those required for safety). Because most large construction projects would create new emissions, agencies are encouraged to explore TDM solutions such as HOV lanes, transit options, telecenters, and other strategies to reduce trips on congested highways and create capacity through non-construction means.

- ***Economic Development and Community Access:*** TDM strategies also have been used to support healthy economic development and easy access in a growing number of communities. Economic development-related TDM strategies often actually target traffic congestion, because congestion causes an area to be difficult for employees and customers to reach and less desirable for new businesses to locate, but TDM services and facilities such as transit centers, pedestrian malls, and ridesharing support services can also act independently as amenities for businesses and customers.

- ***Parking Supply/Demand Imbalance:*** In downtowns and other commercial business districts and institutions there is often more parking demanded than available, primarily during the midday period, when the commuter vehicles are using spaces needed for the retail customers, or when shift changes occur at a hospital or manufacturing facility. TDM applications have the potential to shift the commute mode away from the single occupant vehicle and can also spread the peak and reduce travel through telecommuting and compressed work week programs. Parking pricing programs that discourage single occupant commuting and transit financial incentives can be effective in reducing peak period parking demand. These TDM programs are best applied in downtowns or commercial districts that already have paid parking and transit services.

Geography: Where will the strategy be applied?

Downtown/suburban/rural
Regional/local

Geography. Geographic application of TDM can be divided into two broad categories: the geographic extent of the program: regional or local; and the type of development of the area: primarily urban, suburban, or rural.

- ***Regional vs Local:*** Public agencies generally have implemented TDM for regional benefits, but regional benefits have been generally modest (one to three percent trip reduction). The modest nature stems largely from the limited focus of regional programs - on commute trips made to large employers, which account for only a small number of the daily trips in most urban areas. A regional trip reduction of three percent during peak commute periods might play an important role in congestion relief in a region, however, if the trip reduction is concentrated in areas or along corridors where congestion is most severe. And, as noted above, even small emissions reductions from TDM activities can be important, if few emissions reductions options exist.

TDM programs applied locally, such as at a single employment site or office park, along a roadway corridor, at a few closely-related intersections, or at a major activity center such as a recreational area or sports complex, offer more promise. At the extreme, trip reduction as high as 30 percent to 40 percent has been achieved at individual work locations with aggressive TDM strategies and strong employer support. TDM strategies, such as free or discounted transit service from outlying parking, also have long been used at concerts and recreational venues, where parking typically is limited and unusually high demand occurs over a short time period.

- ***Downtown vs Suburban vs Rural:*** Formal employer-based programs to encourage TDM have most often been initiated in suburban areas, to address congestion, air quality, and land use issues in the absence of readily available drive alone alternatives. TDM programs implemented through employers have been less common in downtown areas, because limitations on parking, access difficulties, and wide availability of drive alone alternatives make use of those alternatives a more obvious choice for downtown travelers. TDM programs are rarely used in rural areas, because traffic volumes in these areas seldom exceed road capacity.

The focus of employer-based TDM programs in suburban areas is a natural response to the need for transportation alternatives created by the low density land use patterns which encourage over-reliance on driving alone. That most of these

programs have been only moderately successful simply reflects the continuing advantage that driving alone enjoys in an environment with abundant free parking, limited and circuitous transit service, and generally tolerable (if not easy) access by car. To reduce this advantage, the most successful TDM programs have offered sizeable incentives, either in reduced cost or time, to induce travelers to shift modes.

Trip type: What types of trips are to be influenced?

Work trips
School trips
Other trip purposes (shopping, recreation)

Type of Trip - The types of trips TDM programs are intended to address also influence their likely success. Trips generally are divided into one of three types or "purposes": work trips; school trips; and shopping, recreation, and other trips.

- **Work Trips:** Public agencies historically have focused TDM programs on commute trips made during peak travel periods. There is logic in focusing TDM on work trips, from perspectives of both marketing success and infrastructure needs. First, because commute trips are repeated, travelers are more willing to spend time exploring alternative routes, times, and modes for work trips, than they are for trips made once or only occasionally. Commute trips also tend to be longer than other-purpose trips, providing a greater incentive to the traveler to explore alternatives that could save them time or money.

Second, most work trips are made during travel periods when demand on the transportation network is at its peak. This offers greater incentives for public agencies to invest resources in influencing commuters' behavior. Finally, employers, who strongly influence how, when, and where work trips are made, can be partners in implementing successful commute trip TDM programs.

Research has shown that TDM programs can reduce vehicle trips to worksites in some cases by 30 percent or more, but program effectiveness varies widely, by the characteristics of the worksite and employees, by the strategies implemented, and by management's support of the program. Strategies must be tailored to worksites and be attractive enough to entice employees to switch modes. Strategies also must be accompanied by supportive local and regional infrastructure, services, and specific internal employer policies.

- **School Trips:** Another potential market for TDM is educational trips. Transit, both public and school-provided, has long been a common transportation mode

for primary and secondary students. Carpooling also is prevalent, as parents drive children to school, or high school students with cars drive each other.

Many universities sponsor commute alternatives programs to address student trips. In general, student use of alternative modes is higher than for employees. For example, a 1982 study at the University of Maryland reported that 30 percent of all students carpoled, while only 10 percent of faculty and staff shared a ride. High alternative mode use by students is largely due to lower auto availability, greater sensitivity to travel cost, and greater parking constraints than is the case with most work trips.

- ***Shopping, Recreation, and Other Trips:*** TDM programs seldom address trips made for shopping, recreation, or other non-work or school purposes, because they are typically made outside the peak period, are more likely than work or school trips to be made by an alternative mode to SOV travel, and are repeated infrequently, if at all. The first two of these characteristics make it less critical for public agencies to address them. The third makes it less likely that travelers will be motivated to seek options to driving alone, unless they do not have access to a car.

Although this guidance divides these applications into *issue/problem, geography, and trip type* categories, they must be examined in combinations. For example, traffic congestion can occur across a region or be concentrated in a smaller local area. It can be present in suburbs and downtowns. It can result from work-related travel, near busy shopping areas, and before and after recreational and cultural events. In other words, it is important to determine if TDM will be appropriate for the three-part *combination* of issue, geography, and trip type.

When considering the combination of aspects that comprise the issue or problem at hand, the analyst is strongly encouraged to gather sufficient data to construct a meaningful baseline of system- or areawide characteristics. These characteristics may include the areawide mode split, levels of traffic congestion at select intersections, average vehicle occupancy, or some other quantitative measure of transportation system use. In addition to quantitative measures, the analyst may want qualitative information on user perceptions or needs. Taken together, the data gathered at this initial stage will provide a ready basis for comparison to post-program results.

CHECKLIST Module I: Step 1: Define Problems/Issues

What is the problems(s) that you want to address?

Guidance:

Objective: Create a profile of the transportation problem/issue for use in the consideration of potential TDM approaches.

- Do you have a list of identified problems and associated causes of congestion, roadway reconstruction, land use /zoning, air quality, economic development/community access, parking imbalance?

If **YES**, please check the list identified **problems/issues** to be addressed.

- Traffic Congestion
- Roadway Construction
- Land Use and Zoning
- Air Pollution
- Congestion Management Planning
- Proposed Project for Conformity (TIP/RTP) Process
- Economic Development and Community Assessment
- Parking Supply/Demand Imbalance

If **NO**, coordinate with others at your agency or with other agencies to identify problems/issues. Consider the congestion management planning, the air quality planning, land use planning, transit planning, and community/economic development planning activities.

- In what **geographic** application will the strategy be applied?
 - Central Business District (Downtown) Urban Development (Outside CBD)
 - Suburban Activity Center Other Suburban Settings Rural
 - Regional Local

- Rank the **problems/issues** based on priority or urgency of solution.

Priority: High - Medium Low

Urgency: Immediate Short Term Forecasted

- For the top ranked **problem/issues** identify the applicable **geographic setting** (urban/suburban/rural) and whether it is regional or local in nature.
- Identify the **trip types** that are expected to be influenced by the top ranked **problems/issues**.

Work Trips School Trips Other Trips (e.g. shopping)

- GO TO STEP 2

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Example:

- **Problem:** A county has a major radial freeway that is scheduled to undergo two years of reconstruction which will add one additional conventional lane and one peak period HOV lane. The construction will slow traffic through the construction zone and significantly add to congestion and travel times throughout the day.
- **Geographic Setting/Nature:** Problem is in a suburban setting with major regional implications. The construction project spans two counties and is being administered by the state DOT.
- **Types of Trips Influenced:** All trips will be effected by the 24 hour a day construction and the lane narrowing and detours. Peak period trips will be mostly effected by the travel delays because of the high traffic volumes. Peak period trips include work trips and school trips.

Step 2: Is TDM Part of the Solution?

As noted earlier, the likely success of a TDM program to address a public agency issue depends not only on the issue, but on how, where, and when it is applied. Tables IV-1 and IV-2 show the relative degree to which TDM is likely to be able to address the six key issues or problems described above in a variety of geographic and trip type situations. Table IV-1 presents a matrix of public agency issues by geographic settings. Table IV-2 presents public agency issues by trip types. In each cell of the matrix, the relative application is listed as:

- "L" - low application potential for TDM,
- "M" - moderate application potential, or
- "H" - high likelihood that TDM is applicable.

**Table IV-1:
Likely Application (Success) of TDM by Public Issue and Geographic Setting**

Problem/Issue	Geographic Setting			
	Local Area			Regional
	Rural	Suburban	Urban	Regional
Traffic Congestion	L	M	H	M
Road Reconstruction	L	M	H	M
Land Use/Zoning	L	M	M	M
Air Quality Management	L	L	M	L
Congestion Management Planning	L	M	H	M
Economic Development	L	M	M	L

The most noticeable tendency in Table IV-1 is the higher likelihood of application of TDM in primarily urban, but also suburban environments. This strongly reflects the compatibility between commute alternatives and the density of development encountered. If origins and destinations are widely scattered, regardless of the immediate problem or its severity, TDM may simply not be workable. This is indicated by the low applicability of TDM strategies in rural settings.

In those cases where activity is clustered, as in suburbs and urban areas, the potential for TDM is greatly increased for all prospective transportation problems/issues.

**Table IV-2:
Likely Application (Success) of TDM by Public Issue and Trip Type**

Problem/ Issue	Trip Type			
	Work	School	Shop	Recreation
Traffic Congestion	H	M	L	M
Road Reconstruction	H	M	L	L
Land Use/Zoning	H	M	M	L
Air Quality Management	M	L	L	L
Congestion Management Planning	H	M	L	L
Economic Development	H	L	M	L

Table IV-2 also reflects a common axiom in TDM: work and school trips are the most likely to be influenced through TDM, while more discretionary activities are less likely to be influenced by TDM measures. Although this general rule is being challenged in some circles of TDM application, it still holds generally true and particularly so, by definition, for employer-based TDM, which has been the focus of this research.

"Immediacy" of the Problem - A final interesting aspect of the application of TDM is how immediate and severe is the problem TDM is proposed to address. Is the problem a current, accepted problem, or is it yet to occur?

- **Current Problem:** Areas with immediate and severe problems have been the traditional market for TDM. They might be expected to have the greatest success in implementing TDM, because travelers should be more likely to be aware of the reasons why TDM programs are needed and have greater motivation to use the strategies implemented. This is generally true, especially when the problem, such as traffic congestion, is visible to travelers. Future or anticipated problems or issues create greater challenges in generating support and resulting in success.

For instance, TDM measures implemented to stave off potential traffic congestion creates the challenge of market identification and acceptance. This is not to infer, however, that TDM strategies cannot successfully be applied in managing anticipated transportation problems.

- *Future, Expected Problem:* Cities, such as Seattle and Portland, successfully implemented TDM programs as preventative measures to avoid future, expected problems. These cities see themselves as "green and clean," and highly "livable" and want to remain that way. Florida, which has experienced phenomenal growth rates in recent years, also has recently encouraged TDM to protect its ability to draw millions of tourists annually. Other areas have implemented TDM to stave off congestion they believe will strangle future economic growth.

In short, TDM can be used by areas that want to be pro-active to maintain the community and/or economic benefits they currently have. Such agencies that participated in this research used key phrases such as "to maintain the beauty of the region" and "to avoid becoming Los Angeles" to explain their reasons for TDM implementation. These agencies were able to build on the willingness of residents to take action now to avoid a problem they anticipate will occur in the future.

Alternative Transportation Solutions

TDM cannot necessarily solve, or even address, all of the issues and situations described above. TDM can be an important component of a set of strategies to alleviate transportation related problems, but many non-TDM strategies also have been employed in the past and will continue to be used in the future. One such strategy is the construction of new transportation capacity to meet increasing or already overwhelming demand. Although TDM often can reduce or delay the need for new capacity or reduce the number of lanes needed on a new road, some situations cannot be addressed without construction.

A second strategy that has been widely used is transportation system management (TSM), the supply-side companion to TDM. TSM uses technological and operational strategies to maximize the efficiency of the transportation supply. TSM elements include computerized signalization to promote better traffic flow and better roadway and intersection geometry to improve safety and reduce accidents. Like TDM, TSM strategies can address multiple problems, such as traffic congestion and roadway reconstruction disruptions. Some TSM solutions, such as freeway ramp metering, can worsen air quality, however, because vehicles actually produce a higher level of emissions when accelerating from a full stop.

A third strategy to emerge in recent years is transit-oriented (or pedestrian-friendly) design (TOD) for new development projects. Although this strategy is still relatively untested, the

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approach has gained conceptual acceptance in many planning circles. TOD reverses the traditional transportation planning approach by fitting land use design to an efficient transportation system. TOD development seeks to reduce emphasis on automobiles and driving convenience by adapting land use to the needs of transit, with more walkable, compact neighborhoods. Although TOD seeks to establish walking and transit as the modes of choice for both work and other purpose trips that are now made primarily by private automobile, its success in these areas is still a matter of debate.

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CHECKLIST Module I: Step 2: Is TDM Part of the Solution?

Is TDM a part of the solution?

Guidance:

- Circle the appropriate box in Table IV-1 (Public Issue and Geographic Setting) and identify the likely application (success) of TDM to be a part of the solution.

Problem/Issue	Geographic Setting			
	Local Area			Regional
	Rural	Suburban	Urban	Regional
Traffic Congestion	L	M	H	M
Road Reconstruction	L	M	H	M
Land Use/Zoning	L	M	M	M
Air Quality Management	L	L	M	L
Congestion Management Planning	L	M	H	M
Economic Development	L	M	M	L

If the likely application is either a medium or high application potential , then continue.

- Refer to Table IV-2 (Public Issue and Trip Type) and identify the likely application (success) of TDM to be a solution by trip type.

Problem/Issue	Trip Type			
	Work	School	Shop	Recreation
Traffic Congestion	H	M	L	M
Road Reconstruction	H	M	L	L
Land Use/Zoning	H	M	M	L
Air Quality Management	M	L	L	L
Congestion Management Planning	H	M	L	L
Economic Development	H	L	M	L

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If the likely application is either "M" or "H" then continue. If the application potential is "L", there may still be a role for TDM in the larger potential solution. TDM actions by themselves will not solve the problem but may improve the effectiveness of other supportive actions.

- Determine if the problem requires immediate action or whether it manifests itself in a longer term strategy.

If the problem requires immediate action, then continue. GO TO STEP 3

If the problem involves processes that require longer term planning then coordinate the TDM planning with others involved in the decision making process. The appropriateness and the potential success of TDM actions may depend upon the public awareness of the problems and the political leadership to address them over the longer term.

Example:

- **Likely Application of TDM by Public Issue and Geographic Setting:** A road (re)construction scores a "medium" for suburban local area setting and a "medium" at the regional setting.
- **Likely Application of TDM by Public Issue and Trip Type:** A road (re)construction scores a "high" for work trips and a "medium" for school trips.
- **Immediacy of the Problem:** The road (re)construction project will begin within one year and last for two years. At the conclusion of the construction, there will be HOV lanes which should support regional TDM programs. Over the long-term, however, these HOV lanes will also need ongoing support from regional TDM program to help ensure full utilization. This requires that regional TDM programs be perceived and developed from the start as a long-term operation and not merely as a short term device for mitigating traffic disruptions caused by road construction.
- **Identify Other Potential Solutions:** There will most likely be TSM solutions as well as TDM solutions being implemented by the state and local highway agencies. These actions will be geared to improve traffic flow by making signalization, geometric, and other on-street improvements. At the same time, the state and local highway agencies may be constructing additional travel lanes on alternative routes to accommodate the diverted traffic from the freeway under construction. TDM actions should be planned cooperatively with the TSM and supply improvements to maximize the effectiveness of the combined effort.

Step 3: Select Combinations of Solution Types

Module I Steps 1 and 2 have identified the **problem/issue**, the **geographic setting**, and **trip types** and scored the likelihood of applying TDM strategies.

A range of TDM and non-TDM solutions may be combined to meet a given transportation **problem/issue**. Although this guidance focuses attention on employer-based TDM, its usefulness for public agencies in meeting these issues, may best be applied in combination with non-TDM solutions.

CHECKLIST Module I: Step 3: Select Combinations of Solution Types

What is the range of TDM and non-TDM measures to be included as part of the solution?

Guidance:

- Evaluate the possible measures and identify the role of TDM in the overall solution. At this point Module I does not identify the final set of TDM measures or strategies. This is done in Module II. TDM is dealt with here at the general level and only in terms of a range of potential strategies.

- GO TO MODULE II

Example:

- Public agencies should include regional and local TDM programs to discourage single occupant vehicle commuting to work and school. Public agencies should coordinate with regional and local transit service providers and employer associations (transportation management associations or chambers of commerce) during the planning and implementation phases.

Module II: Identify/Select Appropriate TDM Strategies.

This module guides the public agency transportation planner through the process of identifying specific employer-based TDM strategies for dealing with particular transportation problem/issues. These selected TDM strategies will ultimately be recommended to employers for implementation. Figure IV-3 graphically illustrates the steps that comprise the module.

Step 1: Review Potential Strategies - Which Could Work?

Tables IV-1 and IV-2 suggested the relative potential success of TDM for a variety of situations, but did not specify which TDM *strategies* could be effective in any particular situation. To address transportation and air quality-related issues, public agencies could themselves implement a wide variety of TDM strategies or encourage their implementation by employers or other organizations. The employer-based TDM strategies include vanpool programs, transit pass discounts, employee marketing campaigns, guaranteed ride home, parking supply and pricing, and many others. TDM strategies that could be implemented by public agencies include HOV lanes, congestion pricing, park-and-ride lots, parking policies, and general public information outreach campaigns, as well as other strategies. But an obvious question follows: Which strategies should be selected? The answer depends on the issue to be addressed, the location of the problem, the availability of commute alternatives, the resources that can be committed, the type and level of benefits needed or desired, the market potential for each strategy, and many other factors.

The attached bibliography lists other documents that describe the full range of TDM strategies and where each is best applied. An example of a recent document is the 1993 FHWA Report, *Implementing Effective Travel Demand Management Measures*.

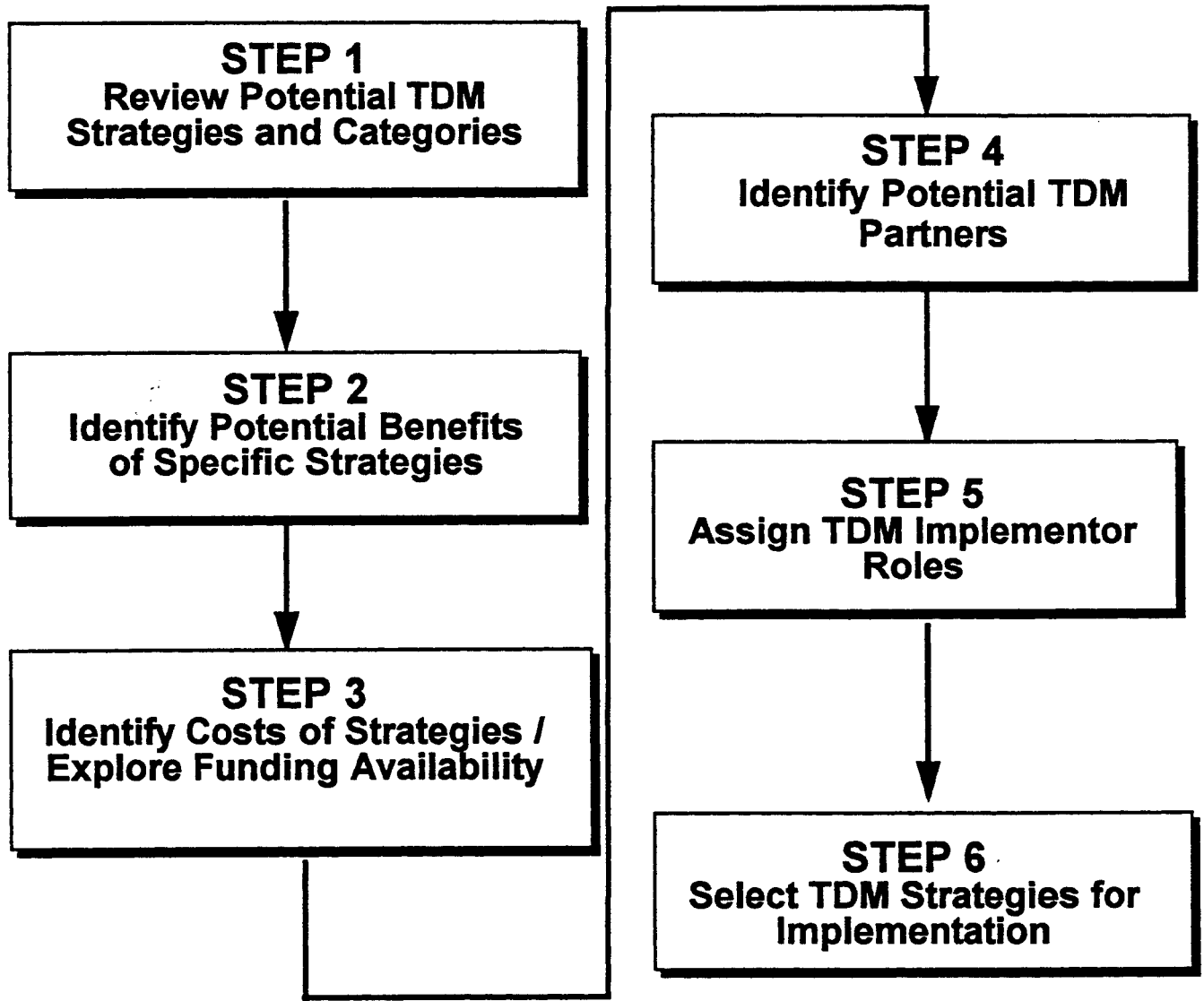
Strategy Groupings

Employer-based TDM strategies are categorized as follows:

- Alternative Work Arrangements
- Transportation Services
- Economic Incentives/Disincentives
- Support Services

FIGURE IV-3

MODULE II DETAIL: IDENTIFY/SELECT TDM STRATEGIES



- **Alternative Work Arrangements:** Measures included in this category do not shift travel mode, but change the time of day a trip is taken, the number of trips made to a worksite, or shift the location of the work site. Strategies under this heading include:
 - Flexible work hours, or "flextime", in which employees or students arrive before or after the peak period;
 - Compressed work weeks, in which employees work a full work week in fewer than the usual number of days (e.g., 40 hours in 4 days or 80 hours in 9 days); and
 - Telecommuting, in which employees work from their homes or other locations near their homes rather than come to the workplace.

Note that the effect of the first strategy is to shift trips rather than to eliminate them -- a result that may relieve congestion during certain time periods, but may have minimal impact on air quality. The latter two strategies have substantial potential for trip reduction and air quality improvement. New non-work related trips may be generated to some extent.

- **Transportation Services:** Employers can provide commute alternatives to their employees by directly operating or contracting with a public or private service provider for dedicated transportation services. Such services include company-sponsored vanpool programs; subscription bus services; shuttle services to transit stations, other worksites, or nearby shopping areas; and circulator shuttles within a multi-building worksite or a multi-employer office or industrial park. Employers can also utilize computer technology to establish satellite work centers for employees.
- **Economic Incentives/Disincentives:** Research has shown that economic incentives are among the most effective TDM strategies. These incentives exploit the importance of cost in the commute decisions made by employees. For most employees, especially those with free parking, the speed and convenience of driving alone outweigh the inherent cost savings of ridesharing. Economic incentives that level the playing field with driving alone include introductory pricing, ongoing transit and carpool subsidies, transportation allowances, and parking charges (disincentive). These strategies also include incentives with an implied monetary value, such as additional time off from work with pay for those who participate in a given program on a regular basis. Fiscal incentives, implemented through tax code or other accounting-related provisions, can also encourage the formulation and implementation of TDM programs by employers and lead to a higher level of employee use of TDM options.

- *Support Services:* Support services include strategies or activities that create a favorable environment for acceptance and use of TDM options by employees (and students), or that remove real or perceived barriers to use of alternatives. These services primarily offer information, promotion and/or other assistance, but stop short of providing physical or financial inducements. The most common examples of support services are rideshare matching, commute information resources such as employee transportation coordinators (ETCs), guaranteed ride home programs, and promotional activities (raffles and prizes for rideshare use). It is important to emphasize that supporting services alone have little impact on commute decisions. Compared to financial incentives and parking management, which can offer trip reduction of 10, 20, or even 30 percent or more, supporting services alone are likely to reduce trips only by a few percent. They are, however, an important part of a successful TDM program, because they remove barriers that make it difficult for employees to choose an alternative.

CHECKLIST Module II: Step 1: *Review Potential Strategies*

Which TDM strategies could work?

Guidance:

- Inventory the TDM strategies currently being supported by *public agencies* in your area. Categorize the available strategies by public agency (regional and local) and by TDM measure group:
 - Alternative Work Schedules
 - Transportation Services
 - Economic Incentives/Disincentives
 - Support Services
- Repeat this inventory process for those TDM strategies currently supported by *employers*.
- Compare the nature and types of programs supported by public agencies and employers to establish a starting point to identify the range of current practice. Note any areas where TDM strategies are not being implemented by either public agencies or employers as this may indicate some important unmet needs.

Example:

- Summary of public agency-supported TDM strategies:
 - Alternative Work Schedules
 - Local government program for own employees that includes flex time and a demonstration program for telecommuting.
 - Transportation Services
 - Employee vanpool program
 - Shuttle bus service to government center from rail line
 - Economic Incentives/Disincentives
 - Not offered
 - Support Services
 - Countywide and regional coordinated rideshare matching
 - Distribution of commute alternatives information
 - Sponsorship of employer ETC training activities
 - Administration of guaranteed ride home (GRH) programs for public employees and residential areas in county
 - Sponsorship of public and private employee promotional activities

Public Agency Guidance

- Summary of employer-supported TDM strategies:
 - Alternative Work Schedules
 - Flex time and telecommuting currently being tested on a trial basis by several employers
 - Transportation Services
 - Shuttle bus service from/to rail line
 - Economic Incentives/Disincentives
 - Limited use of transit passes/discounts
 - Support Services
 - Participation in county and regional information/training programs
 - Three TMAs in county
- Summary of existing public and employer-based strategies:
 - County and regional agencies offer a wide range of support services for both their employees and employers. Public agencies do not offer or sponsor alternative work schedule programs for private employers or legislate employer participation.
 - The majority of employers are located in office parks with ample free parking and limited public transit services. Employers are experimenting with alternative work schedules, particularly telecommuting, and limited shuttle bus service. Some employers participate in the transit subsidy program.

Step 2: Identify Potential Benefits of TDM Strategies

Types of Benefits

The answer to the question "which strategies should be selected?" also depends on the benefits needed or desired from a TDM program. Not all TDM strategies offer the same benefits or the same level of benefit. The extent of benefits depends on the strategy, the level at which it is implemented, and its applicability to the situation.

TDM strategies might be expected to produce any or all of the following benefits:

- *Reduction in the Number of Vehicle Trips* due to a reduction in the total number of trips that are made or shifting of trips from driving alone to higher occupancy (HOV) modes.
- *Reduction in the Number of Vehicle Miles Traveled (VMT)* due to a reduction in the total number of trips made, shifting of trips from driving alone to HOV modes, or reduction in the length of trips.
- *Increase in Alternative Mode Use* due to greater availability of alternatives or greater attractiveness of alternatives compared with driving alone.
- *Reduction in Local Area Congestion* due to reduction in the number of vehicle trips overall or shifting of trips from congested to less congested times.
- *Reduction in Vehicle Emissions* due to a reduction in the total number of trips that are made, shifting of trips from driving alone to higher occupancy modes, or reduction in the length of trips.
- *Expanded Travel Options* due to new or increased availability of alternative modes.
- *Increased Local Accessibility* due to new or enhanced availability of alternative modes, reduction in the number of trips, or shifting of trips from driving alone to higher occupancy modes.

Table IV-3 shows the primary (P) and secondary (S) benefits that might be expected from each of the four categories of strategies. The table also indicates with a (+ or -) those strategies where the benefit may vary depending on the context in which it is applied.

Table IV-3 Benefits of TDM Strategies

Strategy Benefits	TDM Strategy			
	Alternative Work Schedules	Transportation Services	Economic Incentives	Support Services
Reduce trips	P	P	P	S
Reduce VMT	P	P	P	S
Increase use of alternative modes	+ or -	P	P	S
Reduce local congestion	P	P	P	S
Reduce emissions	P	P	P	S
Expand travel options	NA	P	S	P
Increase local accessibility	S	P	S	P

Level of Benefits

The level of benefit arising from a particular measure, whether expressed in terms of employee trips eliminated, roadway level of service improved, or increased transit ridership, will vary considerably based on the context in which that measure is applied. It should be noted that, in some cases, a TDM strategy may actually reduce the potential for providing some benefits, while simultaneously increasing others. For instance, in the table above, increased use of alternative modes (especially ridesharing) may actually be hindered by alternative work schedules, which may reduce the likelihood of finding a suitable match between prospective ridesharers. But this may not always be the case as employees from different companies may be more likely to rideshare with each other when they have the option of adjusting their respective work schedules.

CHECKLIST Module II: Step 2: *Identify Potential Benefits*

What are the potential benefits of each TDM strategy?

Guidance:

- Identify the desired benefits of the TDM program in response to the **problems/issues** identified in Module I.
- Match potential TDM strategies with desired benefits. Refer to Table IV-3.

Example:

- The major freeway reconstruction will create unacceptable levels of peak period congestion that will significantly affect commuters and students. TDM strategies should reduce the number of peak period vehicle trips, increase alternative mode use, reduce congestion on parallel local roads, maintain local accessibility during construction, and reduce vehicle emissions. In the longer term, TDM should support the use of the new HOV lanes.
- **Select Measure Groupings:** Use measures under alternative work schedules, transportation services and economic incentives to attain these benefits. Add support services to expand the availability of alternative modes and increase local accessibility.

Step 3: Define Cost and Funding Issues

Costs

Public agencies implementing employer-based TDM programs will need to look at two types of costs:

- (1) Costs incurred by public agencies to support employer-based TDM
- (2) Costs incurred by employers

Although the first category of costs may be of more immediate concern to public agencies, the second category also will determine the long term sustainability of the employer TDM programs. If employers believe that the costs of implementing these strategies outweigh the benefits, then they are less likely to continue to implement them.

Public Agencies: public agency costs to support employer-based TDM, includes several components:

- Staffing and Administration
 - Marketing
 - Financial Incentives
 - Transportation and Program Services
- *Staffing and Administration:* Public agencies must have the technical expertise to undertake the tasks for which they have assumed responsibility. Training of existing staff, hiring of new staff, or use of outside consultants may be required. Staff time and other resources also could be needed to initiate and administer the strategy or program.
 - *Marketing:* Public agencies need to inform employers, TMAs, employees, citizens, and others in the target markets of the strategy and encourage participation. Such costs could include those for meetings, workshops, and other forums for interested parties to plan, inform and promote. Other costs include electronic and/or printed communications designed to reach a wide audience. This may be a significant element of the total costs.
 - *Financial Incentives:* Public agencies may engage in cost sharing with employers via direct or indirect means. Some public agencies provide subsidies to employees if their employers match the subsidies. This is most common for transit agencies, in pass discount sharing arrangements. Tax credits to employers in support of TDM programs is an example of indirect financial incentives.

- **Direct Transportation and Program Services:** Public agencies may modify existing transportation services or provide new ones in response to employer requests in support of their TDM programs. Examples include demand responsive (paratransit), vanpools, new transit service, or other fixed-route services. Public agency staff also can assist employers with privately-provided transit and vanpool services and offer other program services such as rideshare matching, transit information, and guaranteed ride home. Whether these services are provided by existing or new public agency staff, or contracted out (as with contract transit service or funding of a TMA), the costs must be included.

Employers: Public agencies should also take into account the costs incurred by employers to implement TDM programs. Typical employer cost elements include:

- Staffing and Administration
 - Marketing
 - Financial Incentives
 - Facilities, Vehicles, and Equipment
 - Other Program Services
-
- **Staffing and Administration:** Most employer-based programs require administration, by an employee transportation coordinator (ETC) or other employee designated as an in-house commute contact, or by an outside service organization. Costs associated with in-house administration include: wages/salaries and fringe benefits of the staff, office supplies, and other costs associated with maintaining an office. When the ETC works only part-time on transportation functions, it is important to realize that these costs, although "hidden" in the budget of the ETC's department (e.g., human resources or facilities), do represent real program costs.

This category also would include any fees for regulatory compliance activities, such as TDM plan filing fees, if the program requires employers to document and report their program activities.

- **Marketing Costs:** Employers should expect to incur costs to communicate and promote the commute alternatives to employees. Such cost items could include out-of-pocket costs for design and printing of promotional materials, as well as staff time to prepare and distribute. As with staffing/administration, it is important not to ignore these cost items, even if the materials are to be produced wholly in-house.
- **Financial Incentives:** Some employers now offer commute subsidies to employees. Such incentives include small, indirect incentives, such as free

cafeteria meals, bicycle helmets, oil changes, etc., and larger direct payments, such as monthly subsidies for employees who use public transit, carpools, vanpooling, bicycling, and parking discounts for high occupancy vehicle users.

- **Facilities, Vehicles, and Equipment:** Some employers could incur costs for facility upgrades or additions and equipment. These cost items could include:
 - Information display racks ("take one" displays), special event displays, and information center facilities
 - Bike racks, showers, and personal lockers
 - Transit stop signs and shelters, passenger loading facilities
 - Signs and striping, preferential parking equipment and installation for controlled access parking facilities
 - Telework equipment or fees for use of satellite work centers
 - Other special equipment such as computers for ridematching

Most of these costs are paid once at the beginning of the program, but this category also can include on-going costs, such as those for company-owned or leased carpool or vanpool vehicles, fleet vehicles used for ridesharing, or operation of a shuttle or subscription bus service.

- **Other Program Services:** This category includes supporting services such as employee ridematching and Guaranteed Ride Home programs. These programs generally have staff costs but also could have out-of-pocket costs. For example, some employer ridematching services use computers hooked to an on-line, remote regional database. These programs can have hook-up charges and monthly service charges. GRH programs frequently have taxi or rental car costs.

Funding

Funding for both the public agency and employer-based efforts should be identified as early in the process as possible. For many TDM strategies, the public agency may only be responsible for identifying public funding and providing the seed money needed to leverage private employer contributions.

Traditionally, public funding for TDM has come through a combination of federal, state and local sources. Federal funds may come from flexible funding grants and/or congestion mitigation and air quality (CMAQ) allocations. Planning activities can be funded from the regional planning agencies' work programs, such as the unified planning work program, and implementation funding using state and federal funds that must be programmed in the regional transportation improvement program (TIP).

Public Agency Guidance

State and local agency funding often can provide the most reliable and least constrained sources of resources. Many states have provided TMA seed funding through their departments of transportation, as well as through their various air quality/environmental protection agencies. Local funding is often limited to economic development or other planning assistance grants, although many cities and counties have sought to apply their flexible state funding sources to TDM strategy implementation.

Private funding can come from private employers, developers or transportation management associations (TMAs). It is likely that any measure or group of measures will combine funds from all of the sources mentioned in this section -- federal, state, local and private -- to implement and maintain TDM strategies and actions. In fact, making the shift from start-up to ongoing funding security is often the most crucial element in TDM program survival. Special consideration should be given to the identification of renewable sources of operating funding, whether through a provider/client arrangement or some other source of continuing revenue.

CHECKLIST Module II: Step 3: *Define Cost and Funding Issues*

What is the cost of a given TDM strategy to public agencies and employers?
 What funding sources are available?

Guidance:

- Identify the public costs of the strategy or strategies in terms of the following categories:

- Administration
- Marketing
- Financial Incentives
- Transportation and Program Services

- Within each of these categories, subclassify the costs into one of six groupings

- Direct labor -- hours (full time equivalents) and costs
- Fringe benefits -- as a percentage of direct labor costs
- Materials and supplies
- Office space -- may not apply if housed within already-rented or owned space
- Outside services -- consultants, transit service providers, printing, graphics, etc.
- Equipment -- computers, software, printers, card readers, vans, etc.

Cost Category/ Functions	Administration	Marketing	Financial Incentives	Services	Total
Direct Labor					
Fringe Benefits					
Materials/Supplies					
Office Space					
Outside Services					
Equipment					
Total					

Public Agency Guidance

- Break out employer costs into the same categories. Use the following working tables as a guide to account for these costs.

Cost Category/ Functions	Administration	Marketing	Financial Incentives	Services	Facilities	Total
Direct Labor						
Fringe Benefits						
Materials/ Supplies						
Office Space						
Outside Services						
Equipment						
Total						

- Identify funding sources at all levels cited above: federal, state, local and private employer.

Example:

- One of the selected strategies for consideration to reduce vehicle trips in the corridor combines the provision of free shuttle service with additional transit service. The public costs include financing the tree service and the costs of running the new service. Marketing costs were a part of the larger public relations effort. Outside services constituted the only public cost.
- There were no major private sector costs associated with the program. Employers were asked to permit flexible schedules so employees could accommodate fixed public transportation schedules more easily, and to distribute public information packets.
- Public funding for the TDM strategy planning and implementation came from the federal Interstate Reconstruction program (14R).

Worksheet IV-1: Example Public Agency Cost Worksheet

Cost Category/ Functions	Administration	Marketing	Financial Incentives	Services	Total
Direct Labor		\$250,000			\$250,000
Fringe Benefits		\$30,000			\$30,000
Materials/ Supplies		\$60,000			\$60,000
Office Space					
Outside Services		\$140,000	\$800,000	\$91,000	\$1,031,000
Equipment					
Total		\$480,000	\$800,000	\$91,000	\$1,371,000

Step 4: Identify Potential TDM Partners

As the term "employer-based" TDM suggests, employers play a substantial role in implementing these programs. This does not mean that employers must do so alone, however. Indeed, the premise of this guidance is that employer-based programs will be more successful and more widely implemented if public agencies and other local and regional groups encourage and support employers' efforts.

Employer-based TDM programs can be supported by transportation and air quality planning agencies, transit and vanpool service providers, regional ridesharing groups, transportation management associations (TMAs), or any combination of groups. These possible TDM partners and their typical roles and responsibilities are discussed below.

- *Federal Agencies.* The key agencies at the federal level for TDM are primarily the US Department of Transportation (most particularly the Federal Highway Administration and the Federal Transit Administration) and the US Environmental Protection Agency. Both agencies have been active in funding research and pilot programs, as well as providing the federal regulatory regime under which TDM currently operates.
- *State Departments of Transportation:* State DOTs have been involved with TDM in several capacities, but generally as funding agencies and providers of guidance to local regulating agencies and employers. Examples of such support are found in DOTs in California (Caltrans), Florida, Connecticut, and New Jersey, states which have consistently funded TDM efforts directly to employers, employees, and/or other travelers, or through TMAs and regional ridesharing agencies.
- *State Departments of the Environment:* State environmental agencies (DOEs, but also called Departments of Environmental Protection, Environmental Resources, and Natural Resources) have come to TDM relatively recently, as a result of the 1990 federal Clean Air Act Amendments (CAAA). These organizations are often called upon to administer mandated regional employer trip reduction laws and requirements and other transportation control measures (TCMs) that affect employers. In some states DOEs also administer TDM funds from local transportation taxes (California) and CMAQ funds. These agencies also conduct and/or fund research on TDM programs.
- *Regional Metropolitan Planning Organizations:* Like state DOEs, many MPOs have become involved in TDM through the CAAA and the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). Through these laws, MPOs may be called upon to assist in developing and implementing state mandates for trip reduction programs and to explore TDM efforts to establish conformity between

transportation improvement plans and federal clean air standards. MPOs in states such as California, Washington DC, Illinois, Maryland, and Florida also support regional ridematching and TDM information and outreach activities.

- **Local Governments (Counties and Cities):** Local governments often have taken the lead in local and regional TDM efforts by enacting trip reduction ordinances. While most such ordinances have been applied only to new developments, the ultimate responsibility has fallen on the new employers that locate in the areas. Many of these ordinances have been implemented in California communities, but Bellevue, WA and Portland, OR also have adopted such ordinances. Often these ordinances have been accompanied by significant efforts by the cities or counties to provide TDM services and enhanced commute alternatives, such as new transit services in Bellevue.
- **Transit and Other Transportation Providers:** Regional transit operators are becoming increasingly involved in TDM efforts through cooperative actions with employers and with local governments. Seattle Metro is a prime example of a progressive regional transit agency. In addition to its fixed-route bus system, it has developed a rideshare and vanpool network throughout the Seattle region. Other transit operators, such as WMATA (Washington DC) and BART in San Francisco have become involved in TDM through on-site transit pass sales, fare discounts and other transit-related inducements. Transit agencies are also becoming increasingly responsive to employers' needs for non-traditional transit service, contract service, and early and late hour services.
- **Transportation Management Associations (TMAs):** TMAs play a growing role in supporting TDM, both as a support service to employers and as a connection between employers and public agencies. Effective TMAs can enhance the overall effectiveness of their members by pooling resources and advocating for local and regional services and policies that benefit multiple employers. TMAs also can play a "wholesale" function through which public agencies can funnel employer-support services.
- **Regional Rideshare Agencies:** RRAs, also known as commute management agencies, play much the same role that TMAs play, although their emphasis is generally on a region, rather than a local area level. RRAs also are generally more narrowly focused than TMAs, providing assistance with rideshare matching and other related services, but rarely offering a complete range of TDM strategies.

Employers: Naturally, employers are ultimately the most important implementing partner in any TDM program designed around measures that focus on employers and their employees. It should be noted here that employers may be private or public. Public agencies and federal, state and local governments may want to implement a pilot program among their own employees to test its effectiveness and encourage private employers to join them in their efforts.

CHECKLIST Module II: Step 4: *Identify Potential Partners*

Who will be the public and private partners responsible for sharing in the implementation?

Guidance:

- Identify the public and private partners involved in the TDM strategy planning and implementation.
- Check Partners involved in TDM planning and implementation
 - Federal
 - State DOT
 - State Environmental Agencies
 - Regional MPOs
 - Local Government
 - Transit and Vanpool Operators
 - TMAs
 - Regional Rideshare Agencies
 - Private and Public Sector Employers

Example:

- The road reconstruction required the following agencies to be involved in the planning and implementation. The FHWA, state DOT, state public transportation agency, two counties, three transit operators, and the MPO.

Step 5: Assign TDM Implementor Roles -- by Strategy and by Partner

A partnership among all of the organizations identified in Step 4 should encompass the following seven functional responsibilities.

- **Establishing Policy/Regulations:** Most key implementors should participate in the formulation and establishment of TDM-related policies and regulations. Even when one organization is designated as a lead agency, such as for the development of an employer ordinance, other groups (including employers) also should be encouraged to participate. Input of employers is particularly important. Not only will they bear the greatest responsibility for carrying out the policy, but their understanding of their operations can provide valuable insights for efficient program implementation.
- **Planning/Analysis:** The twin technical functions of planning and analyzing employer-based TDM strategies are primarily the responsibility of employers. Public agencies such as MPOs that are charged with analysis of regional and local transportation issues can provide planning assistance to employers. Many of these agencies have established recommended analysis procedures that can aid employers in selecting TDM strategies appropriate to their needs and goals.
- **Funding:** Nearly every one of the public groups named above could have a funding role in TDM, although many also are experiencing funding cutbacks. Some agencies also have coordinated funding arrangements. For example, a TMA might receive start-up and/or continuing funding from a local transportation agency, or receive a state grant to implement a TDM demonstration project. Funding also can be an area of TDM opportunity for federal and state agencies, which might otherwise have little role in supporting a regional or local TDM effort.
- **Education:** TDM education is another role in which many groups can participate, through the development and implementation of commuter information campaigns to educate employers, employees, and the public. Educational campaigns are an important adjunct to other TDM strategies in increasing awareness, acceptance, and use of employer-based strategies as well as TDM measures with other target audiences.
- **Implementation:** Most public agencies play a fairly small role in the actual implementation of employer-based programs, unless they are supplying economic incentives or support services directly to employers as part of a wider TDM effort. TMAs and RRAs generally play more significant roles, by virtue of their close contact with employers and local orientation. However, public agencies

through other TDM activities can create a regional climate that supports the implementation of employer-based TDM programs.

- **Monitoring/Evaluation:** Evaluation of employer-based TDM programs has been primarily the responsibility of employers themselves, although in areas where employer trip reduction programs have been mandated, public agencies often have established the evaluation criteria and procedures. This is an area that has been generally lacking in the past. Evaluation will continue to be a vital function and one in which several groups may choose or need to become involved as public agencies take a greater role in supporting such programs.

Public agencies and participants in TDM programs must evaluate the relative success of strategies and groups of strategies to improve their programs. From comments of employers that participated in the research, however, it is clear that the monitoring and evaluation function must be revised and expanded to include a wider range of evaluation measures than public agencies have typically used (such as average vehicle ridership (AVR), and trip reduction).

- **Enforcement:** As the emphasis on employer-based TDM programs increasingly shifts toward "flexible" and "voluntary" programs, public agencies could be expected to have less of an enforcement role. Current employer TDM trends are away from command-and-control type regulations. Agencies may need to replace enforcement efforts with education and assistance efforts, however. Increased flexibility could lead to greater confusion among employers unless employers and public agencies work together to produce a viable framework for effective, voluntary TDM efforts.

CHECKLIST Module II: Step 5: *Assign Implementation Roles*

Which public agency is responsible for what function?

Guidance:

- Assign a public agency (ies) responsible for these functions, see Worksheet IV-2.

Develop regulations/establish policy
 Planning and analysis
 Funding
 Education/training
 Implementation
 Monitoring and Evaluation

Example:

- See the worksheet below for a matrix-format display of the assignment of responsibilities in implementing the transit service improvements in response to the road reconstruction project.

Worksheet IV-2: Example Public Agency Role Matrix

<i>Function/ Agency</i>	FHWA	State DOT	State Public Transit	Counties	Transit Agencies	MPO
Policy	X	X	X			
Planning		X	X	X	X	X
Funding	X	X				X
Education		X	X	X		
Implementa- tion		X	X	X	X	X
Monitoring & Evaluation		X	X			

Step 6: Select TDM Strategies For Implementation

The selection of TDM strategies to move forward to implementation will depend on the success of each strategy in terms of the criteria outlined in Steps 1 through 5 in Module II. Is the measure appropriate in scale and direction to meet the issue at hand? Does the measure under consideration have sufficient benefits? Are its costs relatively low? Is funding available? Are partners available to implement the measure?

The weight of each of these criteria will be decided upon by the analyst and decision-maker at the public agency in question, but this guidance would recommend that no single criterion be made overwhelming in its influence. In many instances, the most appropriate measure may prove difficult to fund, or it may require innovative implementation strategies. Whatever the case may be, those measures that have the greatest potential to fulfill a range of criteria should be those moved forward.

CHECKLIST Module II: Step 6: Select Strategies for Implementation

Which strategies should be implemented to solve the problem/issue?

Guidance:

- The following questions should be answered in the TDM strategy selection process:
 - Is the TDM strategy appropriate in scale and direction to meet the issue/problem at hand?
 - Does the TDM measure have sufficient benefits?
 - Are the costs appropriate and in line with the benefits?
 - Is funding available?
 - Are the public partners able to implement the program/strategy?
- If any of the above questions can not be answered satisfactorily, then go back to Module II, Step 1 and reexamine assumptions and conclusions. If there are still issues unresolved, then perhaps TDM is not the appropriate solution at this time.
- GO TO MODULE III.

Public Agency Guidance

Example:

- The transit component of the road reconstruction example was estimated to eliminate 650 daily vehicle trips from the peak periods in the study corridor. This component represented over 75 percent of the required vehicle trip reduction to maintain acceptable levels of congestion during the construction period. The free transit service was budgeted at \$267,000 annually. Funding came from FHWA and the State DOT as part of the construction project. All parties agreed to the program. The TDM measure increased transit ridership in the study corridor by over 70 percent and the use of park and ride facilities by over 40 percent.

Module III: Implement Employer-based TDM Strategies

This module explores issues surrounding the implementation of employer-based TDM strategies and programs. Figure IV-4 graphically illustrates the steps that comprise the module.

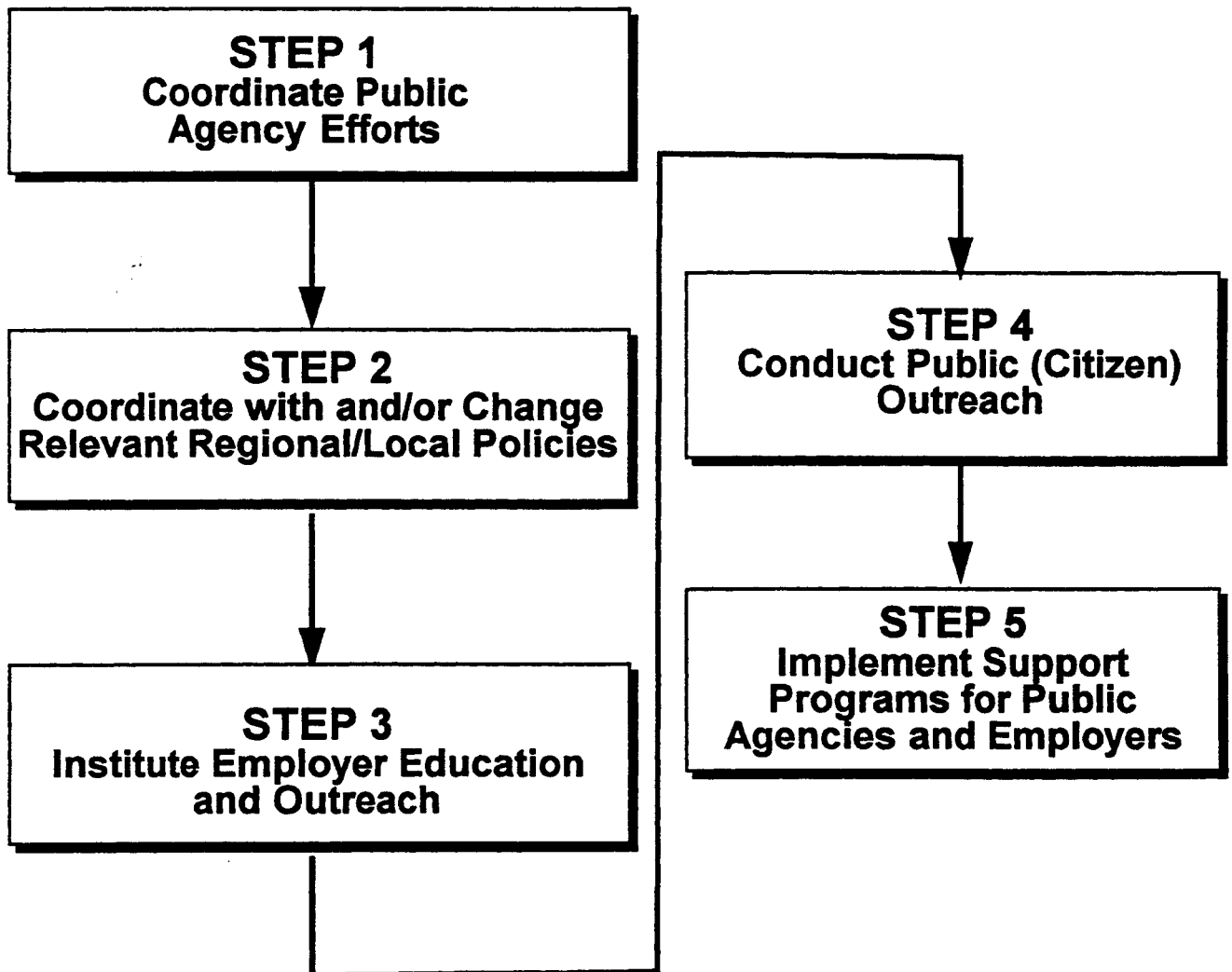
Implementation: Indispensable for Program Success

Modules I and II described a process which public agencies can under take to first assess the general potential of employer based TDM strategies to address local and regional transportation-related problems and to then select the most feasible and effective of those strategies. The process for implementing those strategies is outlined in this module. Program implementation consists of a number of interconnected elements, such as marketing and administration. Implementation activities will vary, depending on the strategy implemented and the area in which it is applied, but several activities and concerns cut across situational boundaries. These include:

- Public agency interaction/coordination
- Coordination of regional/local policies (land use, parking, zoning, fiscal, regulatory, ...)
- Employer education/outreach
- Public education/outreach
- Development of supporting programs

FIGURE IV-4

**MODULE III DETAIL:
IMPLEMENT EMPLOYER-BASED TDM
STRATEGIES**



Step 1: Establish Effective Public Agency Interaction/Coordination

Public agencies involved in TDM can improve their effectiveness by establishing procedures for interagency cooperation and communication. This theme is supported by both the CAAA and ISTEA. These federal legislative acts and their implementing regulations and guidance require better integration of the separate elements making up a given region's transportation system. Such integration requires interagency coordination. Key aspects of interagency coordination are considered in the following questions:

- What agency and interagency roles are mandated by federal or state legislation?
- Which agency activities overlap, compete, or conflict?
- Where has interagency cooperation been strongest and where has it been weakest (types of agencies, regions, functions/programs, organizational levels)?
- What key challenges must be met or obstacles resolved to achieve interagency coordination (politics, turf rivalries, divergent goals, institutional barriers, fiscal constraints, lack of information/education/tools)?
- What agencies/regions/states/programs offer successful models for interagency cooperation?
- What factors support successful interagency cooperation (historic relationships, legislative authority, definition of roles and responsibilities, frequent communication, agreement on and adherence to document review and sign-off procedures)?

Not all these aspects will come into play, but the importance of coordination and cooperation among implementing (and non-implementing) agencies cannot be underestimated. **Employers interviewed for this research project voiced considerable confusion as to which public agencies play which roles.** Some employers suggested that all TDM-related activities be brought under the control of a single agency. Although centralization to this extent is neither likely or preferred, considerable opportunity remains for further integration and coordination of public agency actions.

CHECKLIST Module III: Step 1: *Establish Effective Coordination*

What other public agencies, both implementing and nonimplementing, should become involved in TDM strategy development?

Guidance:

- Identify agency and interagency roles in response to federal, state and local legislation and regulation.
- For each identified agency, list its:
 - role and function, and
 - areas in which roles overlap, compete or conflict.
- Suggest agency roles in the planning and implementation of the TDM strategy. Seek consensus among agencies on their respective roles. The MPO or the state DOT may help facilitate interagency cooperation.

Examples:

- Review Worksheet IV-3 as a starting point for public agency coordination.
- The transit service improvement strategy implementation in the road reconstruction example requires active involvement from all involved state and local agencies.
- The state DOT is the conduit for funding, coordinates the construction schedule, and is the primary source for overall project-related public information. It is also involved in establishing temporary park and ride locations and for the monitoring and evaluation of the entire TDM program.
- The state Public Transportation Department is responsible for planning and coordination among the three transit operators as well as for advancing other directly-related TDM strategies including the guaranteed ride home (GRH) program.
- The two counties have their own transit operations via third party contractors and provide ridesharing matching through the regional system. They also operate and sponsor park and ride facilities and coordinate the public information programs within their jurisdictions.
- The regional transit operator will contract with the state to subsidize the free fare program. Bus routes were modified to serve the new park and ride lots and to allow for timed transfer at the rail station.
- The MPO revised the project description in the TIP and coordinated the regional rideshare matching efforts.

Public Agency Guidance

Worksheet IV-3: Public Agency Role Matrix

<i>Function/ Agency</i>	<i>FHWA</i>	<i>State DOT</i>	<i>State Public Transit</i>	<i>Counties</i>	<i>Transit Agencies</i>	<i>MPO</i>
<i>Policy</i>						
<i>Planning</i>						
<i>Funding</i>						
<i>Education</i>						
<i>Implementation</i>						
<i>Monitoring & Evaluation</i>						

Step 2: Coordinate or Change Regional and Local Policies

Conflicts often arise between local and regional policies where TDM is concerned. Independence in agency decision-making and infrequent information sharing can make it difficult for agencies to coordinate with each other. Sometimes information is effectively disseminated, but divergent goals may lead to conflicts which can hamper implementation efforts.

A wide range of regional and local policies can influence the success of employer-based TDM programs, including policies such as:

- Local land use planning and zoning and local and regional parking policies (including the location and size of parking lots and park-and-ride facilities and what fees, if any, should be charged)
- Fiscal considerations and constraints at all levels (especially regional and local transit and highway funding priorities)
- Regulatory environment at all levels, federal, state and local.

The degree to which these policies reinforce or conflict with each other can affect the overall success of TDM. If, for instance, local zoning encourages low density housing and employment, then land use patterns becomes less supportive of ridesharing and transit, since shared-mode travel is more compatible with a concentration of uses at both ends of the trip.

If, on the other hand, policies and programs at the local and regional levels complement each other, then they can help to foster a more TDM-compatible environment. For instance, regional park-and-ride facilities can be located along newly-developed or expanded transit routes. Local land use policies can foster compact development patterns that allow for more effective use of non-SOV modes, including bicycling and walking, which require much greater proximity of jobs and homes than automobile-oriented development. TDM can help to establish a planning context in which all regional and local agencies and governments can produce policies beneficial for the entire region.

Public agency conflicts can also occur at higher policymaking levels. For example, state transportation and air quality agencies may share a strong interest in TDM, but given different institutional priorities conflict on which TDM strategies to implement. A State DOT will consider TDM strategies which can improve the operational efficiency of the transportation network. For an air quality agency, the overriding goal is cleaner air, but some TDM activities that support efficient transportation systems, such as alternative work schedules, may not also reduce emissions.

CHECKLIST Module III: Step 2: *Coordinate Local Policies*

What local and state policies or regulations may conflict or enhance the TDM program?

Guidance:

- Each jurisdiction affected by the TDM strategy will have its own set of policy and regulatory directives. Identify the areas of policy and regulation that may conflict between and among agencies. These policy areas may include:
 - Established trip reduction ordinances
 - Transportation and land use plans that conflict at boundary areas
 - Labor agreements
 - Jurisdictional issues
 - Public involvement and approval processes
 - Fiscal constraints/budgeting process
 - Procurement processes

- Identify opportunities and possible solutions to conflicts. In some cases, changes in state and local regulations may be required. Regulatory changes take time and may involve other agencies that have not been involved in the TDM strategy development process.

Example:

- In the bus service improvements associated with the road reconstruction, the regional transit agency did not have authority to serve one of the counties because it was outside its service area. This county had its own transit program, which was operated through a third party contract. To resolve the conflict, the state Department of Public Transportation brokered a compromise that allowed the regional transit agency to run its routes through the county in question.

Step 3: Establish an Employer Education/Outreach Program

Effective employer education and outreach are essential to TDM program implementation, but especially so for employer-based TDM programs. When employers remain uninvolved or unconvinced of the efficacy and benefits of TDM, the prospects for successful implementation are greatly diminished. Conversely, when employers see a real benefit and value in TDM, the chances for improved commute alternatives are enhanced.

In both interviews and focus groups, employers which participated in this research expressed a distinct desire for more education and outreach. Employers were often unclear on the justification or rationale for TDM. In their view, TDM programs often were introduced as "mandated programs" with little explanation of the importance of the programs, or where and how they benefited employers, the local community, or the region.

This suggests public agencies should begin the process of education and outreach with the articulation of regional goals and objectives and explain why public agencies believe TDM is important as a potential solution. In what is becoming the post-regulatory era, however, public agencies will need to develop rationales and justifications for TDM that go beyond regional necessities or legal requirements. Voluntary employer involvement will require proof of benefits and an increased level of positive marketing to employers.

One key that has emerged is the need to translate public goals for TDM into meaningful benefits for employers. This requires that public officials concerned with TDM deconstruct what are often areawide goals into local, even individualized goals and benefits. Participating employers consistently indicated that they were unmotivated by regional policy-based rationales for TDM and wanted to be shown how their particular situation could be improved by implementing an employer-based program.

One example of this market-oriented approach would consist of positioning TDM as a product that offers employee benefits that can help businesses reduce the cost of employee recruitment and lower employee turnover costs. Case studies of benefits similar employers achieved in similar settings have been shown to be useful. Although not all employers will find such motivation compelling, it could broaden the range of employers that participate in TDM actions beyond those few that support TDM because it is "right for the region".

Beyond explaining the regional rationale for TDM or positioning it in terms of particular employer benefits, public agencies also need to provide employers with guidance on how to develop, implement, and evaluate TDM programs. This can take the form of educational materials, formal training programs and workshops, and ongoing TDM technical assistance programs.

CHECKLIST Module III: Step 3: *Establish Employer Outreach*

What can be done to encourage active employer participation in the program?

Guidance:

- Do state, regional and local agencies maintain regular communication with employers?
- Do state, regional and local agencies offer basic support services such as ETC training, TMA assistance, and commute option information?
- Are public forums in place to solicit employer input into the TDM process?
- Are employers persuaded that the benefits of TDM programs to themselves will exceed the costs of implementation?

Example:

- The state public transportation agency has contracted with a marketing/communications firm to assist in maintaining employer contacts and overall public communication. As a part of the strategic planning process, the firm conducted a survey of corridor and downtown employers to solicit their concerns about their expectations of the project and commuter conditions overall. The information gained from the survey helped to craft the final TDM implementation strategy.
- One of the counties has a countywide rideshare matching program that allows it to focus its efforts in the reconstruction corridor.
- The state Department of Public Transportation has regular employer events including an executive breakfast to present TDM strategies and solicit employer support for new TDM initiatives.
- Each county has its own formal public information/public hearing process.

Step 4: Establish a Public Education/Outreach Program

Public education and outreach programs are often a question of chicken and egg. Many public agencies adopt the position that while they should try to direct public opinion about a given issue, they must also serve the public will as it exists at that time. This position can lead to conflicting policies and create confuse among both employers and the public, hampering TDM program implementation. Other agencies feel they should seek to mold public opinion. Promoting TDM public education and outreach is crucial for creating a regional climate supportive of TDM, which in turn can greatly enhance efforts to persuade employers to develop demand management programs.

The TDM public outreach activities in Seattle, Washington have often been cited as a positive example of a sustained regional campaign. Through this campaign, public agencies in Seattle have played a significant role in furthering already strong employer-based TDM efforts. Whatever the implementation stage, it is clear that a balanced, realistic education and outreach campaign can complement other TDM efforts and provide a wider base of information and knowledge regarding TDM benefits and services.

Finally, public education and outreach campaigns can help to set the regional framework within which TDM can be effectively implemented at the local and employer levels. Although employers may remain unconvinced of the need for their own firms to become involved, their awareness of regional goals and the general purposes and benefits of TDM can greatly improve the potential for starting programs at all levels.

CHECKLIST Module III: Step 4: *Establish Public Outreach*

What can be done to encourage the public, and particularly commuters, to actively participate in the program?

Guidance:

- Do participating state, regional and local agencies maintain regular contact with the general public? Are these contacts geographic-based, or categorized by socio-economic/demographic characteristics?
- Do participating state, regional and local agencies offer basic support services to the general public, such as informational brochures, newsletters and/or public service announcements?
- Are there any public forums for soliciting general public input into the TDM planning and implementation process?

Example:

- Many MPOs and state DOTs are engaged in the development of congestion management planning processes and/or new/revised long range transportation plans. These regional planning activities provide avenues to solicit public input on TDM strategies and their role in meeting a given region's transportation challenges.
- In the road reconstruction example, the county agencies working with the state DOT and the state Department of Public Transportation sent out direct information mailers on the construction project and associated TDM strategies to community organizations, including homeowner and community associations. The participating public agencies also advertised in the local community newspapers.
- One innovative technique developed by the regional transit operator was the painting of one of its bus transit vehicles as a cartoon character announcing the free bus service to the wider community. Signs were also installed at major park and ride facilities and along parallel routes.
- The TDM strategy communications budget roughly matched the cost for operating the free and expanded bus service. After the first three months of operation, a survey of the general public showed that approximately 25% of all respondents were aware of the bus services offered.

Step 5: Establish TDM Support Programs

A TDM program is most effective when strategies are implemented as part of a complementary group, in which strategies support and reinforce each other. This means strategies designed to encourage the use of commute alternatives can work best when combined with other strategies which remove perceived and actual barriers to use of those same alternatives. This approach is often utilized within employer TDM programs. Providing ridesharing employees with mid-day, lunchtime shuttles or on-site services, such as a dry cleaner and automated teller machine, to minimize the need for a car during the work day is one such example of a support strategy. Eliminating free parking for solo drivers while at the same time providing financial subsidies to ridesharers is another example of a TDM support strategy.

Likewise, public agencies can support TDM strategies implemented by employers by implementing regionwide TDM strategies designed to reinforce and enhance the efforts of employers. This can include TDM strategies which employers may find too costly, or impossible, to implement on their own. This may take the form of regionwide TDM programs or transportation infrastructure enabling employees to use commute alternatives. For instance, publicly-sponsored regional ridematching services increase the capability of employer TDM programs by providing employers with access to a ridematching data base larger than any they could develop on their own, increasing ridesharing opportunities for their employees. Moreover, this support strategy makes it less costly for employers to provide TDM services, who otherwise would expend resources developing a basic TDM service which can be provided more cost-effectively on a region wide basis.

An areawide guaranteed ride home (GRH) program is another example of a TDM supporting strategy which can be provided by a public agency more cost-effectively than by employers acting independently of each other. This strategy responds to the needs of employees who do not have access to an automobile during the day because they are using commute alternatives. Many surveys have shown that commuters are reluctant to rideshare because they fear that they will not be able to respond to a personal emergency, such as picking up a sick child, or they will be stranded without transportation if they work late unexpectedly. GRH addresses this concern by ensuring that employees who rideshare or use public transportation are provided alternate transportation home in the case of an emergency.

Public agencies can also support employer-based TDM programs by providing new, or improving existing, transportation infrastructure with the goal of encouraging the use of commute alternatives. For instance, the development of high-occupancy vehicle (HOV) lanes can make transit and car/vanpooling much more attractive by offering significant travel time reductions. Within congested traffic corridors, these HOV facilities can provide alternative commute modes with a time-based competitive advantage over solo driving. The development of park-and-ride lots is another significant, complementary TDM support strategy which facilitates the work of employer TDM programs and can only be provided by public agencies.

Reconfiguring transit routes and changing transit schedules to better serve employment centers, especially where those changes are requested by employers, are among transit improvements which can support employer TDM programs.

These examples do not fully define the range of public agency TDM strategies which may possibly be developed in the future to support and enhance employer-based TDM programs. Some public agencies, like the Los Angeles County Metropolitan Transportation Authority, have funded TDM demonstration projects to investigate the potential of new, innovative TDM strategies to increase the use of commute alternatives among the general commuting public, while also enhancing employer-based TDM programs. These projects include among others shuttles between transit stations and major employment centers, child care centers at commuter rail stations, and telebusiness centers serving multiple employers.

Just as HOV lanes are developed by public agencies to impact travel time to the advantage of commute alternatives, public agencies may in the future attempt to impact the cost of commuting to the advantage of ridesharing modes. This may take the form of road pricing such as toll roads which offer free or discounted prices to HOV vehicles, or vehicle use fees based upon the miles driven each year. Like other TDM support strategies, these pricing structures would help to create a regional climate more favorable to commute alternatives in general and employer-based TDM programs in particular.

CHECKLIST Module III: Step 5: *Establish Support Programs*

What can the participating public agencies do to improve or help establish programs to support employer TDM efforts?

Guidance:

- Does your agency sponsor programs that other agencies require for their successful TDM implementation? Do other agencies offer programs that you need?

If the answers to these questions are yes, then there is a need to coordinate the communication, public education and availability of these shared resources.

This does not necessarily mean that the financial support or responsibility for implementation must change, rather it means that linkages between the various programs should be established.

- Are the basic TDM components in place to support employer based programs?

Example:

- The road construction example's TDM program requires regional rideshare matching at the county and regional levels. In addition, the development of park and ride facilities, public information and outreach were required and provided by a variety of participating agencies.
- The project includes one new HOV lane that will extend the HOV lane system through three counties and to about 25 miles. It is important to select supportive TDM strategies during the construction phase of the project that can continue after the HOV lanes are open. Focusing on increasing transit use and carpool and vanpool programs is consistent with the longer term HOV goal.
- The region has a sophisticated rideshare matching program in place, and the participating public agencies have well established public information and educational programs.

Module IV: Monitor and Evaluate Program Results

All the public agencies that participated in the research agreed that evaluation is an important part of a TDM project, but evaluation emerged as a difficult guidance issue for several reasons. **First, few of the public agencies involved in this research conducted evaluations of the TDM programs they implemented.** Many cited the dual problems of limited funds for evaluation and little pressure from within or outside the agency to evaluate. There were, therefore, few evaluation studies or models to examine.

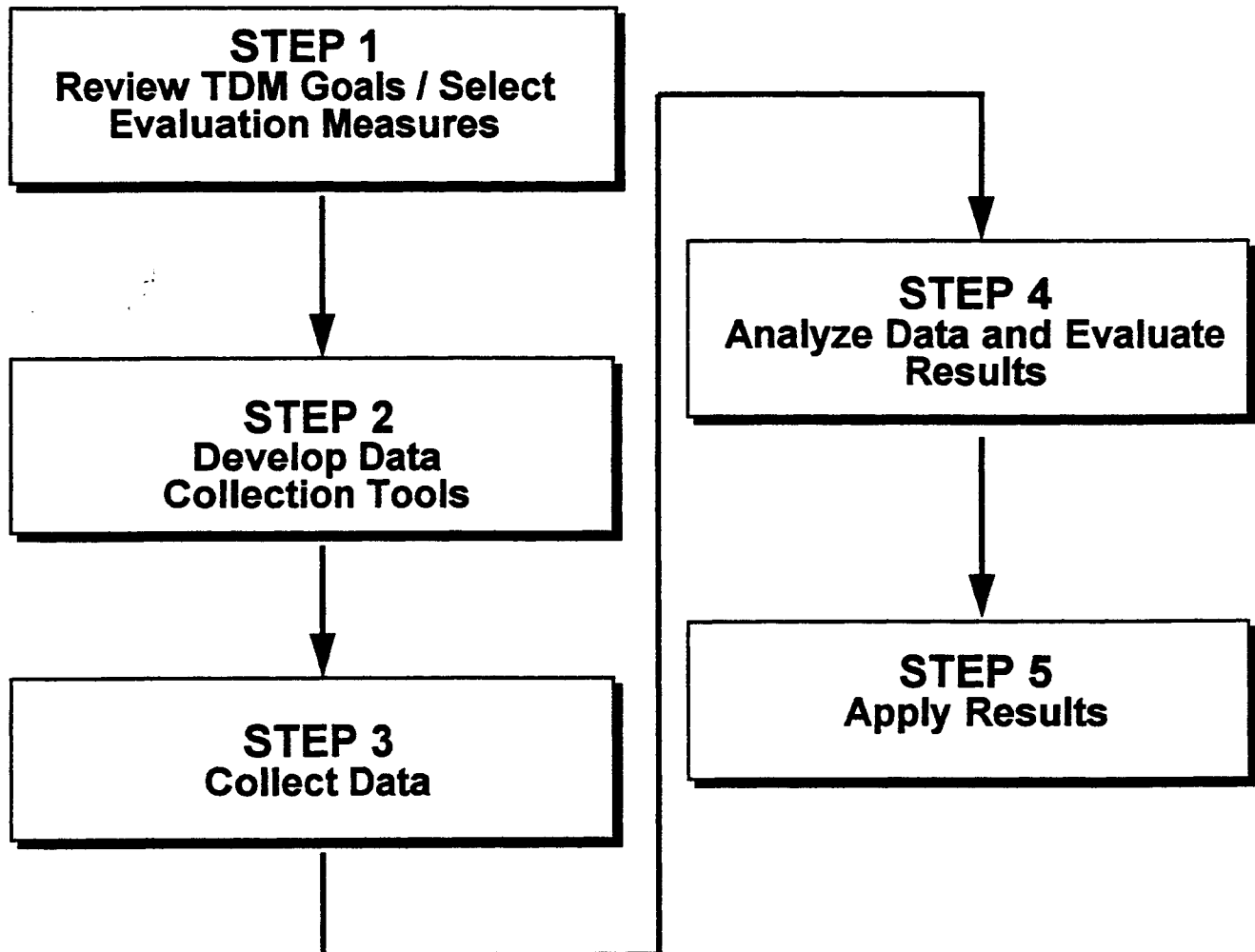
Second, TDM evaluation methodologies are seldom comparable, even when the same TDM strategy is being evaluated. Few conventions have been established for TDM evaluation, unlike other transportation disciplines with longer and more established evaluation histories. Such inconsistencies make it difficult to compare results from the few TDM evaluation studies that have been done. Lack of accepted evaluation procedures also opens agencies to criticism of evaluation results. Many of the agency representatives said that opponents of TDM projects had questioned the assumptions, measures, methods, and conclusions of their TDM forecasts and evaluations.

TDM evaluation is further complicated by the difficulty in isolating the impact of one TDM strategy from that of other strategies, because most successful employer-based TDM programs include multiple strategies. Trip reduction results seldom can be conclusively attributed to one strategy. Unless a rigorous evaluation design incorporating both treatment and control sites is applied, it is also difficult to account for non-strategy influences over which the researchers have no control. For example, is an increase in transit use due to implementation of a transit information program, or due to a combination of other exogenous factors such as a rise in the price of gasoline.

A final evaluation issue concerns the measures to be used to determine program success. Public agencies have commonly used vehicle trip reduction (VTR), average vehicle ridership (AVR), or other quantitative measures as the standards for assessing program effectiveness. But employers that participated in this research questioned the use of quantitative, trip reduction-oriented measures as the exclusive success indicators. Many of the employers had implemented programs for reasons unrelated to trip reduction and felt AVR and trip reduction measures failed to count benefits, such as productivity increases and enhanced employer image, that the employers would include in assessing success.

FIGURE IV-5

**MODULE IV DETAIL:
MONITOR AND EVALUATE PROGRAM
RESULTS**



Public Agency Guidance

These issues make it difficult to provide guidance based on real-world experience, but evaluation remains an important element of a TDM program. As shown in Figure IV-5, this module presents a five-step process for evaluation:

- Review goals and select evaluation measures
- Develop data collection tools
- Collect data
- Analyze data and evaluate results
- Apply the results

Step 1: Review TDM Goals and Select Evaluation Measures

Evaluation, as used in this guidance, means assessment of the success of the TDM program against the goals established for the program. Therefore, a TDM evaluation should start with a review of the program's goals and the selection of evaluation measures associated with those goals.

The question then arises, against whose goals should the program be measured? As mentioned before, the reasons employers implement TDM do not always mirror those of public agencies. The answer is that both public and private goals could, and perhaps should, be considered and that both quantitative and qualitative measures could be appropriate, depending on the components and application of the TDM program. It also is likely that many public agencies will have more than one goal for TDM and might choose several evaluation measures, to be used in combination, to assess the various impacts of the TDM program.

Public Goals

The program goals of public agencies and the evaluation measures they choose to utilize will vary by the issues they expect TDM to address. Modules I and II of this guidance described a range of regional and local issues of potential concern to public agencies and benefits TDM might offer. These issues and benefits are grouped below into three broad categories: mobility and transportation system efficiency, air quality, and economic viability.

Mobility/Transportation Efficiency Goals -- Mobility and transportation system efficiency applications have been shown to be among the most successful for TDM and are likely to continue to be of primary importance to public agencies. For these goals, quantitative measures will continue to be appropriate and reasonably well-accepted among transportation planners and engineers, for whom these goals predominate. Examples of mobility and system efficiency goals and associated evaluation measures could include:

Goals:

- Reduce traffic congestion regionally or in local areas
- Increase the use of alternative modes regionally, within certain corridors, or to activity centers (e.g., shopping centers)
- Increase use of transit for commute trips
- Maintain or improve roadway levels of service (LOS)
- Expand regional travel options
- Increase local or regional mobility or accessibility

Evaluation Measures:

- Number of vehicle trips all day or during peak periods
- Vehicle miles traveled (VMT) all day or during peak periods
- Average vehicle ridership (AVR)
- Percentage use of alternative modes or percentage of SOV commuting
- LOS on certain roadways
- Number of transit miles/hours of service
- Average distance of residents from transit stop or percent of residents within 1/4 mile of transit stop
- Number of miles of bike/pedestrian lanes
- Minutes of travel delay on roadways or at intersections
- Average vehicle speeds (by roadway type)

Air Quality Improvement Goals - Some public agencies, especially environmental agencies and others charged with implementing CAAA and ISTEA requirements, are interested in the potential air quality benefits that can be achieved by TDM programs. Even those agencies for which air quality is not a primary concern may include air quality benefits among their reasons for implementing TDM. Quantitative evaluation measures also will predominate here. Some of the measures, such as total regional VMT, also could be used to assess transportation efficiency, but are listed here because they have a strong emissions component. Examples of air quality goals and associated evaluation measures include:

Goal:

- Reduce vehicular emissions
- Reduce total regional emissions
- Reduce overall VMT in a region
- Reduce "hot spot" congestion (e.g., where idling occurs)

Evaluation Measures:

- Tons of pollutants emitted daily/annually by mobile sources
- Percent of daily regional tons of pollutants from mobile sources
- Cost per ton of pollutants from mobile sources
- Total regional VMT
- Average vehicle speeds (by roadway type)

Economic Vitality Goals - A third category of public TDM goals centers on the impact of TDM on the economic health of a region. This category of goals stems from concerns that traffic congestion and other mobility access problems can act as a drag on economic growth by increasing the time and cost to ship goods, by making it harder to recruit and retain employees, and by affecting the overall quality of life within a commercial area or corridor.

For instance, public officials and planners are often challenged by the need to balance the economic interests of a business/commercial district with the need to improve traffic flow. This can occur where efforts to increase traffic speed and throughput by removing on-street parking during peak travel periods, for example, may severely limit the discretionary shopping trips local merchants and businesses depend upon for their economic health. Similarly, opportunities to expand businesses and commercial developments can conflict with the needs of nearby residents concerned about the possible threat of increased traffic in their neighborhoods and the loss of on-street parking. In situations of this kind, TDM programs can be used as one part of an overall strategy to balance these seemingly conflicting needs. This may include the use of shuttles from parking lots located outside the business district, and employer-based TDM programs which succeed in contributing to a reduction in traffic volumes.

Mobility indicators are most directly pertinent for assessing the economic impact of TDM programs. However, other measures that target the commercial and residential attractiveness of an area also may be useful in assessing TDM's impact on the economic vitality of an area. Examples of such goals and evaluation measures include:

Goals:

- Enhance regional or local economic vitality and desirability
- Support efficient land use planning
- Balance the competing transportation needs existing between land use, corridors and jurisdictions.

Evaluation Measures:

- Commercial occupancy rates
- Number residential units and commercial/industrial square footage.
- Net number of businesses/jobs in the region
- Percent of employees living within 10 miles of their worksite
- Average regional commute distance or distance to major employment centers
- Number of miles of pedestrian and bicycle lanes
- Average distance of residents from transit stop or percent of residents within 1/4 mile of transit stop

Private Goals

Goals that concern the overall jurisdiction or region served by a public agency, such as reducing traffic congestion and improving air quality, will continue to be the primary reason public agencies implement and support employer-based TDM. But to achieve these public interest goals, public agencies will also need to more seriously consider another set of goals. **One of the most important findings that came out of the focus groups was the suggestion from employers that TDM effectiveness be assessed by measures other than trip reduction.** This is especially relevant in light of the current trend toward voluntary employer-based TDM.

Success in achieving public interest goals requires that public agencies be better able to motivate employers by demonstrating a link between successful employer TDM programs and the economic bottom-line of the employer. As a result, efforts to assess the impact of TDM programs in terms of measures relevant to the economic health of employers are becoming increasingly essential. Such goals and evaluation measures could include, among others:

Goals:

- Reduce employee turnover
- Reduce site congestion during morning and evening peak periods
- Increase employee productivity
- Expand access to new labor markets (e.g., transit-dependent populations)
- Expand customer service hours (compressed work schedules)
- Improve relationships with neighbors (e.g., reduce parking spill-over into residential developments)
- Provide new employee benefit (e.g., part of "cafeteria plan")
- Reduce facility costs (e.g., parking lease cost)
- Ease transition to new facility location

Evaluation Measures:

- Employee turnover rate
- Employee productivity
- Parking lease costs
- Sales volume (from longer hours of customer service)
- Overhead costs (equipment set-up time, employee recruitment costs)
- Employee attendance (medical leave, tardiness)
- Employee morale
- Corporate image
- Employee retention during corporate move

Many of these measures are unfamiliar to public agencies. Indeed, many employers have difficulty assessing change in these measures. In particular, measuring changes in employee productivity as a result of TDM programs are especially important, but also very difficult to identify and evaluate. In theory employees who are able to decrease their commute times, reduce their stress, and better balance their work and family lives as a result of using commute alternatives, should be more productive employees. But if efforts to measure this impact are not made, then the potential benefits remain intangible and are unlikely to motivate employers who need quantifiable evidence to justify financial investments in TDM. In effect, managers in both the private and public sectors pay most attention to what can be measured. So, if public agencies want to convey to employers the pro-business impacts of TDM programs, then it will be important for public agencies to find ways, in partnerships with employers, to measure this possibly significant, but previously intangible impact of TDM on employee productivity and other benefits of value to employers.

Benefits such as easier recruitment and retention of employees, cost-effective parking management, and corporate image have long been noted by employers that have implemented TDM without the stick of regulation. Promotion of such benefits also could be used in regulated areas to build positive support for TDM programs and to foster more, and more substantial, TDM programs.

CHECKLIST Module IV: Step 1: *Review Goals/Select Measures*

What were the initial goals of the TDM program and its individual components?
What evaluation measures make sense as barometers of the fulfillment of those goals?

Guidance:

- Review and inventory original goals and the TDM measures selected to fulfill them:

Public Goals

Mobility/Transportation Efficiency
Air Quality Improvement
Economic Vitality

Private Goals

Employer Concerns
Employee Concerns

- Match evaluation measures to appropriate goals and program components.

Example:

- In the reconstruction project example, each TDM measure within the program was paired with a specific evaluation approach:

Transit	Ridership Tracking
	Shuttle Bus Patronage
Ridesharing	Calls for Assistance Received
	Carpool Traffic Counts
	Park and Ride Lot Facility Patronage
GRH	Use of Service
Employer TDM	On-site Presentations
	ETC Training Participation
	On-site Ridematching Success

Step 2: Develop Data Collection Tools

Once evaluation measures have been selected, tools must be developed to collect evaluation data, both quantitative and qualitative. As TDM data researchers are well aware, however, TDM data collection is challenging. The regional impacts of an employer-based TDM program may be small and not easily captured through data such as vehicle counts, level of service (LOS) measures, pollution concentrations from emissions sensors, regional employment records, and other data that could indicate changes in regional mobility, air quality, and economic activity.

Such aggregate measures have value in evaluating TDM programs, but impacts of employer-based TDM probably are best measured at the employer level. The difficulty this presents is that few employers routinely collect TDM evaluation data unless they are required to do so by a trip reduction ordinance or regulation. Even then, the data they collect is limited to travel behavior during the peak period and perhaps a few other quantitative data elements required by the public agency. Surprisingly, considering some employers' assertion that they implement a TDM program for internal, business-related reasons, they rarely collect data for these measures either. Finally, due to inexperience with research design and administration techniques, employers' results are not always reliable or comparable to those of other employers in the same region or across the country.

The tool most often used by public agencies to measure TDM success is a written *AVR or commute mode survey*, in which employees indicate the way in which they commute to work. Other tools that also could be useful to public agencies in assessing success of employer-based TDM programs are *focus groups*, in which transportation-related topics are discussed with small groups of employees, and *employer surveys or interviews*, in which employers are asked about their development and implementation of their programs. Other data also might be needed, such as *the traditional public agency vehicle counts, transit ridership counts, and other traffic data*.

Commute Mode Surveys - Employee surveys can become valuable TDM data collection tools, but only if such surveys utilize a standard methodology. Currently, differences in the number, type, and wording of questions from one survey questionnaire to another makes it difficult to compare the results and findings reported by different survey evaluations. For example, in the interest of keeping questionnaires short and questions simple, some surveys ask employees about their travel on a "typical" day, while others ask about travel on each day of the week. The use of the "typical" day may underreport use of alternative modes by commuters who usually drive alone, but use the bus or carpool one or two days per week.

Surveys also differ in whether and how they capture data on use of multiple modes, such as walking to the bus stop or driving alone to a carpool pick-up point. Some surveys ask about the longest portion of the trip. Others ask respondents to report all trip segments. A third variation is the terminology used to describe TDM programs and activities. For example, "telecommute" and "work-at-home" are sometimes used interchangeably but may be interpreted differently by

employees. Variations in the time when data is collected also causes difficulty in comparative analysis, especially if data is not always collected both before and after a project is implemented.

Another major problem with most commute mode surveys is that they collect information on how employees commute, but not why they change, or don't change, their commute patterns. This makes it difficult to determine the role of the TDM action in observed changes in travel behavior and to identify program modifications that could make the TDM program more effective. Commute surveys used to evaluate TDM programs should collect data not just on employees' travel patterns, but also their:

- Demographic characteristics
- Awareness of commute alternatives and TDM programs (including source of information)
- Opinions and attitudes about alternatives and TDM services
- Use of and satisfaction with the TDM services being evaluated
- Reasons for using or not using a particular travel mode
- Reasons for changing or not changing behavior
- Interest in existing and potential new TDM programs

Because surveys are developed to answer questions in a specific situation, some differences in survey questionnaires and methodologies are inevitable, but standardization of common survey questions would allow for more valid comparison of the survey results from different research studies.

Finally, all survey questionnaires should be pre-tested, through a "dry run" with a small group of respondents, to identify potential problems with the survey form or administration procedures. Surveying conditions should be as near to real conditions as possible. For example, if you intend to survey respondents at home in the evening by telephone, use this method for the pre-test. If responses indicate that employees do not understand questions, these questions should be changed to eliminate ambiguity and confusion.

Employee Focus Groups -- A second TDM data collection method is the group interview, or "focus group," so named because a small group or groups of people are gathered for a detailed, focused discussion on one subject. Group interviews do not produce results that can be generalized, but they can be useful for exploring opinions, brainstorming ideas, assessing satisfaction, and uncovering unconscious fears and motivations. They also can be useful to develop questions for surveys and to pre-test written surveys.

Group interviews are gaining interest among TMAs, employers, transit agencies, and regional ridesharing agencies who recognize the advantages of interactive communication with employees and others involved in TDM programs. For example, a TMA might use a focus group to find out why a new vanpool service that was expected to be popular has had little impact. A transit

agency could use a group interview to evaluate riders' satisfaction with new types of transit passes.

Group interviews can be informal discussions or formal video-taped sessions conducted by a professional market research firm. At their most formal, focus groups are conducted by a trained facilitator who guides the group in a discussion of a series of structured questions. The facilitator does not try to bring the group to a consensus, but explores similarities and differences in the viewpoints of the group members.

Group interviews can provide valuable information, but their results cannot be generalized to non-group members. Additionally, the group interaction that is so useful in generating ideas can become group pressure that sways the opinions voiced by individuals and biases the results. Thus it is important for the facilitator to guard against domination of the discussion by one strong group member.

Employer Surveys and Interviews -- Employees are a primary source of data for TDM evaluation, but employers' input also is important in assessing effectiveness of employer-based TDM programs. A basic tenet of this research is that public agencies will be more successful in promoting effective employer-based TDM programs if they promote the benefits TDM programs can offer to employers, in the form of enhanced productivity, easier recruitment of employees, access to wider labor pool, and other "bottom line" benefits.

This research identified some of the reasons employers have implemented TDM, but few employers had documented the benefits they have received from the program. Further research is needed to determine the benefits that are most likely to motivate employers to participate in TDM programs and typical magnitudes of benefits. Further, techniques must be developed to measure these benefits, in ways that are easy to use, consistent across employer settings, and credible in their results. The availability of such tools could encourage employers to collect TDM data, because the results could document persuasive business benefits.

This guidance document also recommends that agencies conduct research among their own employer populations to identify TDM information and support needs of employers in their own areas and tools these employers would find useful in planning and implementing TDM program. This research could take the form of a simple survey of employers or involve more detailed discussions with employers through interviews and/or focus groups.

Vehicle Counts and Transit Ridership Data -- Existing sources of data may also be tapped in the search for information to provide a basis for understanding the impact of various measures. Vehicle counts on targeted facilities can provide the best means of estimating changes in the level of congestion and delay, one of the most common goals of TDM strategies. Transit ridership data is practically the only way to effectively assess the success or failure of measures aimed at boosting transit use.

CHECKLIST Module IV: Step 2: *Develop Data Collection Tools*

Which data collection tools should be used?

Guidance:

- Choose from a wide range of tools, depending on the evaluation measure, including:

- Written AVR/commute mode surveys
- Focus groups -- employees or employers
- Employer surveys or interviews
- Vehicle counts
- Transit ridership data

Example:

- The example considered in this guidance has not yet reached the post-program data collection and distribution stage. Pre-program surveying did occur during the planning stage of the program, as indicated in the checklist for Module III, Step 3.

Step 3: Collect Data

After the data collection tools have been selected and/or developed, collect the information, that is: distribute and collect survey forms, conduct focus groups, conduct telephone or in-person interviews, conduct vehicle counts and other traffic studies, measure emissions, research regional employment records, and collect any other data dictated by the evaluation measures selected. To accurately measure the impact of the TDM program or strategy being evaluated, it is important to collect information at least two points in time. It is critical that "baseline" data be collected prior to implementing the TDM program, and then "closing" data should be collected after a sufficient period of time has elapsed to allow for the full impact of the program on its target market. At both times, the same data collection instruments and methodologies should be used to avoid any possible variation in results due to methodological differences.

Beyond this important principle, most of the tools and methods for collecting traffic, emissions, and economic data are well-established and do not need further definition here. The wide use of surveys and the great variation in their use suggests some guidance may be needed to improve their consistency and comparability. Presented below is general, basic guidance on data collection techniques. Readers with a great interest in market research techniques should consult one of the many texts available for more information.

Many public agencies have conducted or sponsored TDM research using professional survey researchers, but other TDM studies have relied on internal staff and employers to collect TDM data. Lack of survey research experience by those administering the surveys has often led to inconsistent and unreliable results. Common commute survey problems have been low response rates, poorly selected samples, and lack of respondent tracking, leading to questions of respondent bias and lack of representation of the survey results.

Many of these problems can be eliminated or reduced by clearly thinking through the data collection process. Beyond the important question of what topics or questions will be included in the research, data collection procedure issues for surveys and interviews could include:

- Who will be surveyed or interviewed?
- How will the survey be conducted - telephone, mail-back, or in-person interview?
- What will be included in the survey packet (survey form, mail back envelope, cover letter, etc.)?
- Will financial or other incentives be used to encourage high response rate?
- How will focus group participants be recruited and where will the discussions be held?
- What the data collection will cost?

These and many other questions must be answered prior to beginning the data collection. Ideally, the data collection methodology should be developed before the data collection tools are prepared, because they are closely related. It also is important to think through how data will be analyzed, to ensure data are collected in a useable form.

CHECKLIST Module IV: Step 3: *Collect Data*

What is the best method for collecting the needed data?

Guidance:

- Who will be surveyed or interviewed?
- If a sample will be used, will it be random or stratified by respondent characteristics? If used, how will the sample be selected?
- How will the survey be conducted - telephone, mail-back, or in-person interview?
- Who will distribute and collect the survey or conduct the interviews?
- What will be included in the survey packet (survey form, mail back envelope, cover letter, etc.)?
- Will financial or other incentives be used to encourage a high response rate?
- How will non-respondents be tracked and contacted to remind them to return the survey?
- How will focus group participants be recruited and where will the discussions be held?
- When will data be collected, and what time period(s) will the evaluation cover?

Step 4: Analyze Data and Evaluate Results

The purpose of a TDM evaluation is, of course, the assessment of impact or effect. "Did the program work," and "why or why not?" The analysis step in the evaluation compares the current position or status of an evaluation measure, such as the number of vehicle trips or the employer's parking lease cost, to a baseline position and determines the degree of change between them.

Evaluation Baseline - An important analysis question is: what constitutes an appropriate "baseline?" Ideally, it is the measure at a time before the TDM program was available, but as this research demonstrated, often employers do not collect "before" data. Complicating an evaluation is the fact that some employers will have implemented TDM strategies before a regulation was adopted, so even a "baseline" might not show a true "before" condition.

As an alternative to before and after data, the evaluation can compare data for an employer that offers a particular TDM strategy with data for a similar "control" employer without a program, or to a regional or local average. Control group studies for TDM seldom carry the same credibility as "before and after" studies, however, due to the great difficulty in identifying employers that are similar enough to eliminate the many factors that can muddy TDM control group research.

If control group studies are done, they should limit exploration to one or two well-defined TDM measures that more general research suggests hold substantial promise for TDM benefits. For example, studies of impact of parking management, financial incentives, transportation services, and other strategies, might be conducted on a limited basis. Although these studies might provide only limited information individually, collectively they could provide a new base of valuable results for certain strategies.

Analysis Topics - The evaluation analysis should examine all pertinent evaluation measures. Depending on the strategy or program being evaluated, these could include changes in:

- Employees' travel patterns, and awareness and opinions of commute alternatives and TDM programs
- Reasons for changing or not changing behavior
- Internal environment (employee demographics and employer operation) and external transportation and economic environment
- Program costs and savings (employers and public agencies)
- Employers' motivations for program implementation

A typical TDM analysis will look first for evidence of change in employee' travel behavior and their use of and opinions about different commute modes. Have their travel patterns or opinions changed since the program was implemented? Evaluations, especially for outreach and education

programs, also should explore how much employees know about the TDM program and how they heard of the program to guide future promotional activities.

The analysis also should examine the reasons for any mode or travel pattern changes. If employees have changed their commute modes, was it due to the program or some other reason, such as moving their residence? Which services or incentive in the program encouraged the shift? If employees did not change, were they unaware of the TDM program, unable to take advantage of it, or were the services and incentives not appealing?

A common criticism of TDM evaluations is that they do not account for non-TDM factors that can influence travel decisions. A thorough analysis thus should also examine any changes in the employee or employer populations, transportation infrastructure, economic factors, and other outside factors that might have affected employees' travel patterns.

For example, if the price of gasoline increased by 20 percent, a shift to transit might be more related to the gas price change than to any TDM program activity. If new roads or buildings have been built in the area, the area could be less or more congested than at an earlier time, influencing employees' interest in ridesharing. Do other groups provide TDM incentives that were not provided before? Although it can be difficult to quantify the influences of these external factors, it is important to account for them as much as possible.

Cost of the program overall and for individual strategies is another important area for TDM evaluation. As described in the cost estimation section of Module II, cost components could include subsidies, costs for promotional activities, administration costs, and many others. Savings that resulted from the program, such as reduced cost of leasing parking spaces, reduced public agency costs for road maintenance, and others, also should be included to determine the *net* cost of the program.

As indicated by this research, few public agencies or employers collect comprehensive data on program costs. Even those that had estimated costs did not feel confident that they estimated them accurately and indicated strong interest for a worksheet, spreadsheet, and/or tool with which to determine costs. Public agencies also need a consistent, uniform, and concise cost estimation framework that can be tailored to different strategies and settings.

Finally, as mentioned earlier, the analysis should examine employers' motivations for implementing a TDM program, the strategies they implemented and did not implement by type and location of employer, their reasons for implementing or not implementing strategies, their support needs, and other factors related to employers' selection of and experience with TDM strategies. Public agencies' ability to promote employer-based programs likely will rest on their knowledge of employers' needs and motivations.

CHECKLIST Module IV: Step 4: *Analyze Data/Evaluate Results*

How has the program performed?

Guidance:

- Establish the appropriate baseline or base condition. This is not an academic exercise. The baseline chosen will largely determine the nature and level of the impact estimated.
- Analysis topics to be assessed should include:
 - Employee travel patterns
 - Reasons for changing behavior
 - Internal environment/external transportation and economic environment
 - Program costs and savings (for employers and public agencies)
 - Employer motivation for program implementation

Step 5: Apply Results

The final evaluation step is to identify program modifications that will improve the future effectiveness of the program. If the evaluation shows that the program is effective, producing results in the "right" direction--toward the goal--and at an acceptable rate, continuing the current program may be the conclusion. If program feedback through the evaluation indicates that progress is too slow or in the "wrong" direction, then redirection of resources to different activities might be in order.

Public Agency Efforts to Encourage Employers to Evaluate their Programs

This module focuses on guiding public agencies to more rigorous and defensible evaluations of employer-based TDM actions. Although "third-party" evaluations sponsored by public agencies might be the preferred evaluation methods, budget constraints might force many agencies to continue to rely on employer-collected data for TDM evaluations.

Experience suggests that non-regulated employers are unlikely to collect any TDM data, much less credible data, unless they are supported in data collection activities. Public agencies can encourage additional and better data collection efforts by providing well-tested survey instruments and developing clear guidance on survey and focus group administration.

Assistance with processing and analysis of survey data also can be a substantial incentive for an employer to collect evaluation data. Processing and analysis services are available now from market research firms, TMAs and other, but the cost of conducting surveys and focus groups generally presents a significant problem to employers' data collection. Agencies can reduce employers' costs to collect and process data by providing these services directly or by funding services offered by regional ridesharing agencies and TMAs.

This research also recommends that more research be conducted to examine the benefits most likely to motivate employers to participate in TDM programs and to develop measurement techniques for these benefits that are easy to use, consistent across employer settings, and credible in their results. If such tools were available employers might be more willing to use them, rather than feeling compelled to simply collect trip reduction data, because the results could document persuasive business and/or bottom line benefits.