Inter-Agency Transportation Demand Management Strategy

SF Environment

SFMTA
Municipal Transportation Agency

SAN FRANCISCO
PLANNING
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Contents

Executive Summary

Many of the City of San Francisco's guiding documents recognize that infrastructure investments alone cannot create the transportation conditions that provide for a vibrant and environmentally sustainable city. Transportation demand management (TDM) measures, including transportation system pricing, incentives, marketing and regulatory policy are also necessary to ensure that all transportation choices and trade-offs are clear to San Francisco's residents, employees, and visitors. This layer of policies, programs, and communications should elevate those options that optimize access while minimizing transportation network congestion and environmental impacts.

Despite the importance of TDM, city agencies generally lack a coordinated approach for developing and improving TDM programs. To address this gap, four city agencies formed a partnership to develop this TDM Strategy Document.

- The San Francisco County Transportation Authority (SFCTA).
- The San Francisco Department of Environment (SFE).
- The San Francisco Municipal Transportation Agency (SFMTA).
- The San Francisco Planning Department (DCP).

Funded by a Bay Area Climate Initiatives grant from the Metropolitan Transportation Commission, the partnership seeks to improve how San Francisco delivers TDM to reduce single occupancy vehicle trips and decrease transportation-related greenhouse gas emissions.

This strategy aims to answer the following questions:

1. What is the city's overall goal for its transportation demand management program?
2. Which projects and programs do all city agencies agree should be shared priorities over the coming years?
3. How will agencies prioritize new ideas for projects and programs in the future?
4. How will San Francisco deliver a coordinated TDM program?

Methods

Development of the TDM strategy incorporated multiple evaluation efforts, including:

- A consultant review of current agency TDM practices.
- Interviews with twelve expert TDM practitioners.
- An analysis of commute, resident, visitor, and school trip-making trends.
- An analysis of the effectiveness and potential impact of a wide range of agency-proposed TDM activities, including those already in practice.

The priority of each activity was determined by analyzing its effectiveness in supporting the strategy's primary TDM goal of reducing single-occupancy vehicle trips and its potential for broad impact.

Results

The top recommendations emerging from the review include the following:

Transportation demand management program goals:

- **Pursue programs, services and policies that support the city's TDM goals of reducing single occupant vehicles.** Top priority activities are listed in Table ES-1, at right.
- **Speak in a unified voice.** San Francisco's TDM program has historically been made up of offerings created in insolation from one another. Agencies should coordinate their programs to present a unified face to the city. A measure of success is for users to take advantage of the programs without knowing that multiple departments are involved.

Shared program priorities

- **Programs should be comprehensive.** TDM experts emphasized that TDM strategies should reinforce desired travel behavior changes through multiple channels, such as through policies and outreach aimed at employers, employees, residents, visitors, schools, and other audiences. Strategies should aim to be high impact but ensure multiple contacts across a variety of audience.
- **Provide high-quality, user-friendly transportation options.** TDM experts interviewed for the development of the strategy noted that the most effective method of attracting people to modes other than single occupancy vehicles is to make those modes more competitive (faster, cheaper, more reliable, pleasant), than single-occupant vehicle driving. These efforts are not considered part of the city's TDM strategy because they are addressed in other planning documents. In particular, transit capacity issues should be considered a priority in achieving high-quality options.
- **TDM programs and services should be supported by strong, enforceable policies.** The analysis found that the strategies most likely

Table ES-1. Five year recommendations

CORE PROGRAM
TDM Program coordination
Citywide TDM program branding, communications and marketing
TDM evaluation program, report biennially on citywide program's achievements
Congestion pricing: complete follow-on study and define next steps
Parking management and pricing policy and implementation
Modeshare targets for employers—exploratory study
Create program to monitor, evaluate, and enforce developer TDM commitments
Explore a mode split commitment program for new developments/major changes of use
PRIORITY ACTIVITIES
Create comprehensive employer outreach program
Special event TDM programs
Residential TDM pilot program and expansion
Develop proposal for HOV lanes on highways and bridges into/out of SF
SUPPORTIVE ACTIVITIES
Commuter benefits ordinance enforcement*
Implement bicycle, pedestrian outreach through safety programs
Expand SFMTA's on-street carsharing pilot program
Implement shuttle pilot program
Expansion of bicycle share
Design and implement a pilot multimodal wayfinding program

* CBO enforcement may be prioritized in the first two years to ensure continuity of effort while new methods of enforcement are pursued.

to be effective in reducing SOV trips involve strong policies such as congestion pricing; single-occupancy vehicle modeshare targets for employer or worksites; or parking pricing and management. Agencies should use studies and pilots to investigate and test strategies that have a high likelihood of being effective and impactful, and to establish whether support exists, or what it would take for there to be support for large-scale implementation.

- **Enforce existing and future regulation.** Enforcing existing development agreements was found to be among the highest performing TDM activities. Historically, the city has not systematically enforced developer agreements on an ongoing basis with regard to TDM commitments due to limited staff resources and lack of enforcement protocol. Enforcing existing developer TDM commitments is critical to limiting the transportation impact of developments and to ensuring that residents, tenants and employees have access to the transportation choices that were outlined in project agreements. Funding for enforcement must be identified and enforcement protocols developed. The City should also investigate whether systematic enforcement may be funded through development fees.
- **Pursue comprehensive, systematic evaluation and reporting on the effectiveness of city TDM programs.** Best practice requires continuous monitoring and evaluation that ensures TDM goals are met. This further allows for the fine-tuning of TDM programs to further support these goals. Agencies should begin a bi-annual, outcomes-based evaluation that outlines the work performed, as well as assesses how the program as a whole, as well as individual programs, is performing in support of the TDM metrics and objectives.

Prioritize new ideas for projects and programs

- The team developed a replicable process to prioritize TDM activities by evaluating their potential effectiveness in reducing single occupant vehicle trips. The process was applied to a variety of ideas proposed by the team and generated from expert interviews, and was also applied to ongoing agency activities. Transit, bicycle, and pedestrian infrastructure improvements were not included in the definition of TDM and were not evaluated. This resulted in a list of shared inter-agency priorities for TDM activities over the next five years Table ES-1 (previous page) summarizes the priorities grouped into three categories, including:
- **Core SF TDM Program:** Activities necessary to manage and coordinate a city-wide TDM program along with the most effective strategies that would support progress towards reduction in single-occupant vehicle driving.
- **Priority activities:** The individual programs, pilots and policy development work recommended to receive funding and implementation priority.
- **Supportive activities:** Programs, pilots and policy development that support the program, but are lower priority for competitive funding sources.

Delivering a coordinated TDM program

- San Francisco agencies will be working closely together on coordinating delivery of the recommended five year program. Specific agency roles for each of the recommended activities will be determined as a next step.

Introduction

Many guiding city of San Francisco documents recognize that creating a vibrant and environmentally sustainable city requires diverse and high-quality transportation options, especially bicycling, walking, and mass transit. The same documents also recognize that infrastructure alone (bicycle lanes, sidewalks, and transit) is not sufficient to achieve the city's goals for increasing the share of trips made by these modes of travel. Transportation demand management (TDM) measures, including transportation system pricing, incentives, marketing and regulatory policy will also be necessary to ensure San Francisco's residents and employees understand their travel choices and are encouraged to select those with the least transportation network congestion and environmental impacts. These measures are recommended in:

- The San Francisco Municipal Transportation Agency (SFMTA's) Strategic Plan and draft 2011 Climate Action Strategy for the Transportation System.
- The 2013 San Francisco Transportation Plan and Congestion Management Program.
- The General Plan Transportation Element.
- The City of San Francisco Climate Action Strategy.

Despite the importance of transportation demand management, city agencies lack a coordinated approach for developing and improving TDM programs. Agency plans share common recommendations for TDM, but none answer the following questions:

1. What is the city's overall goal for its travel demand management program?
2. Which projects and programs do all city agencies agree should be shared priorities over the coming years?
3. How will agencies prioritize new ideas for projects and programs in the future?
4. How will San Francisco deliver a coordinated TDM program?

What Is Transportation Demand Management?

Transportation Demand Management (TDM) refers broadly to tools and strategies that reduce the amount of single-occupancy trips in personal automobiles. TDM constitutes a layer of information, programs, and policies that facilitate the use of sustainable transportation options and reinforces the transportation goals of San Francisco and the Bay Area.

This document answers these questions by providing the following content:

- Section 1: Needs Analysis summarizes findings from research conducted to inform recommendations for improving and expanding agency TDM programs. It is supported by Appendix A: Current Travel Demand Management Framework, which provides a detailed description of current activities, policies and opportunities for improvement; Appendix B: Summary of TDM Expert Interviews, and Appendix C: Analysis of Trip Making Trends.
- Section 2: Goals and Evaluation Findings presents a shared inter-agency TDM goal statement and the results of a consultant evaluation of the impact and effectiveness of TDM measures. Appendix D contains the consultant literature review.
- Section 3: Summary Recommendations and Next Steps informs funding and staffing decisions and identifies activities needed to implement the strategy's recommendations.

This document results from a collaboration of the four agencies currently implementing TDM activities, and was undertaken as part of the TDM Partnership project. Funded by a Bay Area Climate Initiatives grant, the project seeks to improve TDM programs in San Francisco to support progress towards reducing transportation-related greenhouse gas emissions.

Section 1: Needs Analysis

Introduction

This section summarizes current TDM activities and describes opportunities for improvement based on a consultant review (Appendix A) and interviews agency staff conducted with TDM experts from around the country (Appendix B). It also describes findings from an analysis of trip making trends and implications for strategy development.

San Francisco Transportation Demand Management Programs: Current Practice

Four key San Francisco agencies are involved in delivering the majority of the city's TDM programs and are mandated through the City Charter and city ordinances to provide specific TDM related activities:

- The San Francisco County Transportation Authority (SFCTA) administers various funding pots (such as Prop K, Prop AA, and Transportation Fund for Clean Air) that support TDM programs and serves as the county Congestion Management Agency.
- The San Francisco Department of Environment (SFE) manages compliance with the sustainable commute ordinances, is San Francisco's designated 511 rideshare agency, and administers a number of grant-funded outreach programs.
- The San Francisco Municipal Transportation Authority (SFMTA) is responsible for overall management of San Francisco's transportation systems.
- The San Francisco Planning Department (DCP) sets requirements for new development in the city, including TDM.

The table on pages 6 and 7 describes current agency roles in more detail. Other TDM programs not shown in the table are the San Francisco Unified School District and San Francisco Department of Public Health (DPH) Safe Routes to Schools Program, which involves encouraging biking and walking among school children, and in which both SFE and SFMTA play roles.

Key findings from Consultant Review of Current City TDM Activities and Associated Recommendations

To support development of the TDM Strategy, Nelson\Nygaard consultants provided a review (completed in 2011) of current TDM activities and suggested opportunities for improvement. Key consultant findings are presented below.

UNCLEAR AGENCY ROLES AND COORDINATION MECHANISMS

Four agencies are involved in delivering TDM programs (see Table 1, next page, for detail), and roles are not always clear. Additionally, the consultant found that there had been little coordination between public agencies and private entities leading to a need for a more integrated program approach and an increased level of coordinated engagement with the private sector. Staff identified examples of this:

- Both SFE and SFMTA conduct outreach to employers to promote separate programs, resulting in materials and outreach strategies that are not always coordinated.
- TDM measures implemented at new development sites are the responsibility of the developer/project sponsor. DCP has the authority to monitor and enforce these measures, but does not have the capacity to do so. Implementation of these measures is important to maintain the transportation system's functions.
- All four agencies develop strategy documents relevant to TDM, including the SFMTA Strategic Plan; the SFCTA Countywide Transportation Plan, Congestion Management Program, and Prop K 5-Year Program; the DCP General Plan Transportation Element; and the SFE's Climate Action Strategy.

As part of the TDM Partners project, agencies have begun a regular coordination process, but it

Table 1: Summary of Agency TDM Activities and Source of TDM Direction

DCP	SFMTA	SFCTA	SFE
SOURCE OF TDM DIRECTION			
General Plan Planning Code Development approvals	Voter mandated oversight of multi-modal transportation policy and provision (Prop E, Prop A) Transportation Code	Designated Congestion Management Agency Voter mandated funding of TDM (Prop K and Prop AA) Treasure Island Transportation Demand Management Agency	Environment Code Designated county agency for rideshare

(table continues next page)

has not been institutionalized. Additionally, improved coordination of some private TDM offerings is starting to occur.

INCONSISTENT ENFORCEMENT AND PERFORMANCE TRACKING

The review identified that the city does not routinely enforce TDM measures, for example:

- The Planning Department does not routinely monitor or enforce TDM-related development conditions of approval. This is because of a lack of (1) a comprehensive system that tracks conditions of approval, developer agreements, and CEQA mitigations for projects (2) lack of clear enforcement protocols, and (3) staff capacity.
- The SFE has monitored compliance with the Commute Benefit Ordinance (CBO) since 2009, but has not historically enforced it. Additionally, Nelson\Nygaard identified needed process adjustments and policy clarifications to more effectively enforce the program. Since the Nelson\Nygaard report, SFE has begun enforcement efforts on the ordinance.
- Although some agencies report progress on TDM programs (for example, the SFE reports the number of employers in compliance with the CBO on its web site), currently agencies do not systematically report the impact of efforts on transportation demand, which would allow for an evaluation of the efficacy of individual programs or the combined TDM program.

Since the 2011 Nelson\Nygaard memo, some of these enforcement and performance tracking items have begun to be addressed. Outstanding issues are included in the recommendations section.

DEDICATED LOCAL FUNDING FOR TDM IS LIMITED

The consultant review highlighted the fact that dedicated local funding for TDM programs is limited, amounting to about $1.5 million on average per year from Proposition K (the city's half-cent sales tax) and the Transportation Fund for Clean Air (TFCA). Prop AA, San Francisco's vehicle registration fee, also includes TDM activities as an eligible category for up to 25% of revenues, but most of the funds have so far been dedicated to other activities. Table 2 (page 8) summarizes the amounts available under these programs.

TRANSIT SYSTEM LACKS CAPACITY TO ABSORB MORE RIDERS

At present, many MUNI peak period, peak direction transit services are at capacity and in need of service expansion. TDM efforts that are based on shifting trips to these impacted segments will have a low effectiveness until these capacity issues are addressed.

Table 1, continued: Summary of Agency TDM Activities and Source of TDM Direction

DCP	SFMTA	SFCTA	SFE
TDM ACTIVITIES			
Development focused programs: Codification and enforcement of building/development requirements Requiring developers to include TDM measures in new projects (including developing TDM Toolkit for new development with SFMTA) Creating thresholds of significance for transportation projects Area plan development	**Employer focused programs:** TDM coordination with large employers; Commute by Bike pilot program **Modal marketing and management:** Auto parking management and pricing, SFpark Bicycle parking Customer outreach and information Fare programs: Fast Pass, Class Pass, Passport Shared ride sector (taxi, shuttle, car-share, bike-share, etc.) TDM inputs for development **Development-focused programs:** Waterfront Transportation Assessment, Transit Significance Standards, TDM Toolkit, TDM programs for major developments, monitoring existing TDM commitments **Visitor TDM:** for special events	**Funding:** Prop K and Measure AA expenditure plans; management of TFCA County Share **Research and pilot projects:** Mobility, Access, and Pricing Study (Congestion Pricing) and FHWA-funded parking pricing study; TDM Partners Project Management **Technical support to other agencies** (e.g. Waterfront Transportation Assessment and TSP)	**Outreach and Education programs:** Municipal employee benefits program, CityCycle Emergency Ride Home program Rideshare matching Business consulting Commuter education at events **School Programs:** School transportation education and outreach **Ordinance Enforcement:** Commuter Benefits Ordinance; Tenant Bike Parking in Existing Commercial Buildings Ordinance The Healthy Air and Clean Transportation Ordinance

Key findings from the Best Practices Review

The best practices review involved interviews with twelve TDM experts from around the country (see sidebar). Interview questions focused on defining the characteristics of effective city TDM programs, the best ways to offer programs, and identification of best practice leaders. A summary of these interviews is found in Appendix B. Interviewees highlighted the following ten characteristics of effective programs:

1. **Provide competitive alternatives to driving:** Interviewees emphasized that the most effective method of attracting people to non-single occupancy vehicle use is to make those modes more competitive (faster, cheaper, more reliable, more pleasant), than driving. Marketing uncompetitive services is an uphill battle.
2. **Include evaluation and monitoring.** Most felt that program evaluation and monitoring are critical to making the necessary program adjustments to ensure long-term success.
3. **Address regional travel.** Several noted that since travel is regional, TDM programs must include a regional component. The cities of Boulder and Arlington work with regional players to address travel originating outside their respective counties.
4. **Strong supportive policies (e.g. subsidies, pricing, parking controls) are needed to ensure measurable change.** Interviewees noted that outreach and marketing alone can only produce limited results; the support of strong policies are needed for more meaningful change. Almost half of the experts highlighted strong parking management and pricing as an important aspect of the program, run in conjunction with other programs and services.
5. **Coordinated programs:** Agency staff and private entities with clearly defined roles and well-coordinated programs were reported to be requisites for success.
6. **Provide a balanced, multi-touch program:** Interviewees noted the importance of having

Table 2: Local Sources of TDM Funding and Available Amounts

	TYPICAL MAXIMUM AMOUNT AVAILABLE FOR TDM (ANNUAL)	TYPICAL ANNUAL AMOUNT ALLOCATED FOR TDM
Prop K	$500,000-$1,100,000 [1]	$300,000 [2]
TFCA [3]	$800,000	$800,000
Prop AA	$1,250,000 [4]	$50,000 [5]
TOTAL	Approximately $2.5 million/yr.	Approximately $1.1 million/yr.

[1] The maximum amount available for TDM reflects the estimated total amount available in the next five years in the Prop K EP 43 category, which includes TDM and other activities including development of modal plans. The low end of the range reflects the past five years of programming; the high end reflects the potential programming in the next five years if funds are advanced (this would result in no funding remaining in the category after 23/24).

[2] The typical amount allocated in the past reflects average allocations to TDM activities in the last five years (FY 2009/10-13/14).

[3] Based on 2013. Funds allocated included about $300,000 in bicycle parking projects.

[4] Prop AA is expected to bring in approximately $5 million annually, of which 25 percent is available for transit reliability and mobility activities, including TDM.

[5] The most recent strategic plan programming document, which covers FY12/13 to 16/17 indicates one TDM-related project (a $250,000 bicycle parking station) expected in the next five years, or an average of $50k/year.

a comprehensive program that contains both broad outreach components and targeted programs. Cities with effective programs had a variety of structures, but many experts highlighted that in their experience, combining programs and marketing in a collective effort increased the effectiveness of individual programs.

7. **Focus on specific, reachable geographic or customer markets.** Interviewees suggested focusing efforts on specific populations (e.g. geographic areas or customer types) for maximum impact, and avoiding a modal focus.
8. **Additional concepts:** Multiple experts identified Transportation Management Associations (TMAs), geographic and group-specific campaigns, and clear/simple programs as key elements for success.
9. **Address barriers to behavior change and create targeted education campaigns:** Education and outreach are important components to an effective TDM program. Communications messaging and campaigns need to address key barriers and provide motivation. Communication strategies should incorporate a personalized approach, goal setting and motivation and support from city staff.
10. **Build a coalition to increase TDM program use and knowledge:** build a network of agencies, non-profits, businesses and other stakeholders to build and maintain support for TDM programs.

Key Findings from Trip Market Analysis

For programs that focus on specific audiences (employers, neighborhoods, etc.), TDM activities should be focused on trip types and geographies that generate the most single-occupancy vehicle driving. To define these focus areas, staff analyzed the volume of single-occupant vehicle travel (including all travel to, from, and within San Francisco) associated with four major potential TDM target markets, including: employees (e.g. commute travel); residents (e.g. all travel by San Francisco residents, including commute travel); school-related travel; and, visitor travel. Figures 1, 2, and 3 illustrate the results, namely that:

- **Commute trips generate most vehicle travel.** Figures 1 (page 10) and 2 (page 11) show that San Francisco residents generate the most single-occupant vehicle (SOV) travel, but nearly 60% of residential single occupant vehicle trips are commute-related (Figure 3, page 11); commute travel by those employed in San Francisco generates the second highest amount of single occupant vehicle travel.
- **Schools generate much less single occupant vehicle travel.** This is because the number

EXPERT INTERVIEWEES

Expert interviewees included:

Lori Diggins, Principal, LDA Consulting

Marcus Enoch, Senior Lecturer, Transport Studies Group, University of Loughborough, United Kingdom

Stephanie Groll, City of Cambridge, Massachusetts Parking and TDM Officer

Chris Hagelin, Senior Planner, city of Boulder

Todd Litman, Victoria Transportation Policy Institute;

Kim Martinson, Executive Director, TMASF Connects

Colleen Miller, Regional TDM Program Marketing Manager, Denver Reg. Council of Governments

Matt Nichols, Senior Planner, City of Berkeley

Jessica ter Shure, Principal, Nelson Nygaard Consulting

Ryan Thompson, Senior Associate, ICF International

Phil Winters, Director of TDM Programs, Center for Urban Transportation Research, University of South Florida

Helen Whitkin, board member, Australia's Living Smart program

of elementary and middle schoolchildren in San Francisco (about 55,000 including public and private) is far lower than the number of residents (825,000) and employees (nearly 500,000) within San Francisco. However, the mode choice for a home to school trip may impact the commute mode choice of the parent or guardian, and school travel can cause localized neighborhood congestion, as well as safety concerns.

- **Data on visitor travel is limited, but suggests lower levels of driving.** Data on visitor travel is limited. One source estimates the number of visitors per day in San Francisco to be 131,000 per day and the approximate share of visitor trips made by vehicle (30%) [6]. This suggests that the amount of driving generated by visitors is significantly below that generated by commuters or residents. However, visitor travel, especially travel associated with special events or top tourist attractions, can cause localized congestion if not managed appropriately.

These findings suggest that TDM programs should primarily emphasize reducing single occupancy vehicle travel associated with commuting. Not only does regional commuting generate the most vehicle travel, it occurs within congested periods and locations, e.g. SoMa, which compounds its environmental impact (slow-moving vehicles generate more pollution and greenhouse gases), and also impacts the most congested transit routes. Commute travel needs to be addressed both through employer programs and those that address commute travel by San Francisco residents who work outside the city. Visitor and school travel should be addressed, but given lower priority.

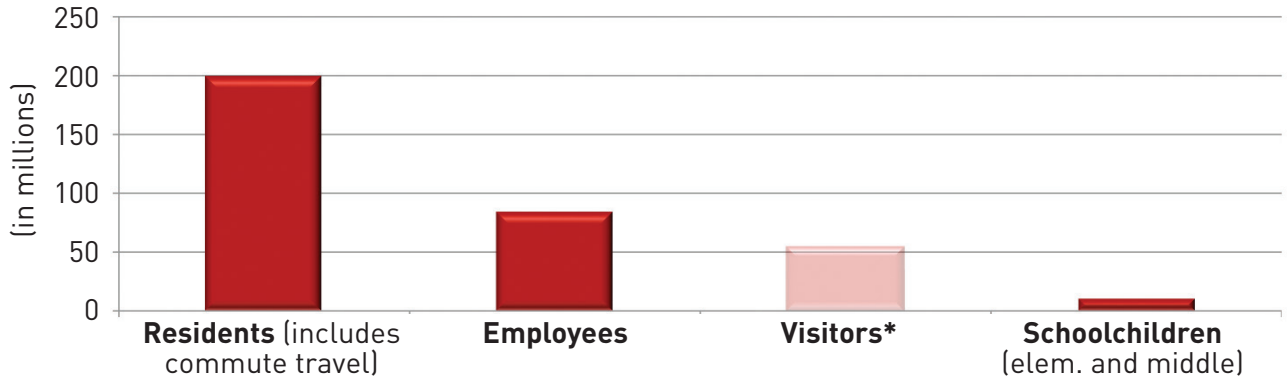
Figure 4 (page 12) illustrates where vehicle travel is concentrated within the city, including total VMT (all VMT to, from, and within the district) generated by households and workplaces, as well as the VMT per household and worker. Appendix C contains the full graphics with legends and sources.

Districts with the highest total amounts of workplace VMT are in the downtown/ SoMa, Mission, Potrero, and Bayshore/Hunter's Point. However, the downtown and Mission appear to have already relatively low levels of VMT per worker, suggesting less opportunity for TDM programs to encourage additional modal shift. By contrast, the SoMa, Potrero, and Bayshore/Hunter's point neighborhoods have high VMT per worker, suggesting higher potential for TDM programs to encourage modeshift in these areas.

Total household VMT is highest in the more residential western and southern quadrants of the

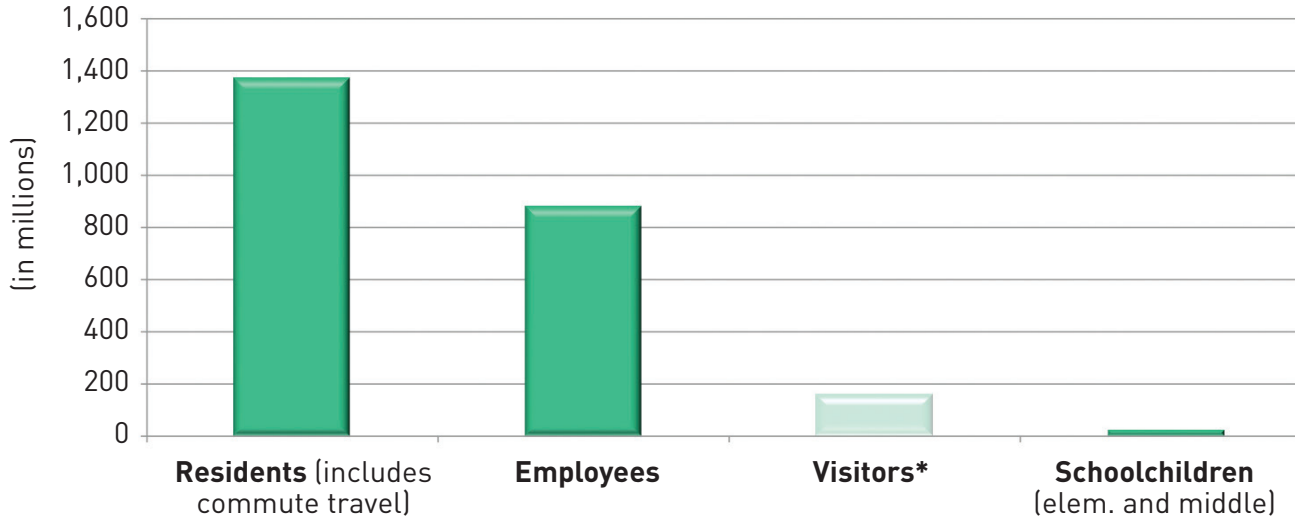
[6] Source: Appendix C (data primarily from the San Francisco Travel Association).

Figure 1. Estimated Annual Single Occupant Vehicle Trips



* The estimate for SOV travel for visitors is shaded because it is based on an assumed number of trips per day (4) and an assumed trip length (3 miles); Appendix C includes a sensitivity test using different assumptions. Employees include anyone who works in San Francisco (including both residents and non-residents). Source: Appendix C.

Figure 2. Estimated Annual Vehicle Miles of Travel in Single Occupant Vehicles



* The estimate for SOV travel for visitors is shaded because it is based on an assumed number of trips per day (4) and an assumed trip length (3 miles); Appendix C includes a sensitivity test using different assumptions. Source: Appendix C.

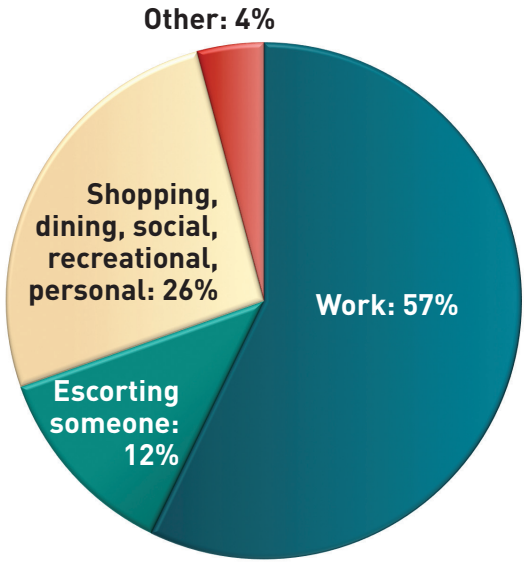
city. VMT generated per household appears highest in portions of the Sunset, Ingleside, Excelsior and Hunter's Point, suggesting these areas would be an appropriate focus for TDM programs aimed at reducing household VMT.

Section 2: Goals And Evaluation Findings

Partner agencies each have unique TDM goals and objectives, but agree that over the next five years, shared goals for the coordinated TDM program are to:

- Reduce single occupancy vehicle use.
- Encourage a culture in San Francisco in which there is increased awareness of, support for, and identification of transportation options and their benefits as a core community value of San Francisco.
- Increase the economic and environmental sustainability of the transportation system.
- Provide high quality TDM service to San Francisco residents, employees, businesses and visitors.

Figure 3. Person Miles of Single Occupant Vehicle Travel Made by SF Residents, by Trip Purpose



Source: California Household Travel Survey 2010–2012. Excludes trip purpose associated with returning home.

- Prioritize effective programs through monitoring and evaluation.

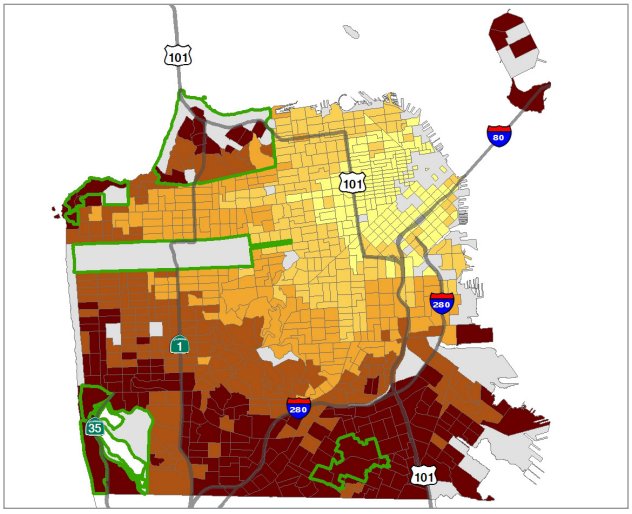
Agency partners also agreed on a process for prioritizing potential programs and policies that would best meet these goals, using an evaluation process described below to compare policy and program ideas submitted by team members in fall 2013. TDM measures were evaluated by Nelson\Nygaard and agency staff alongside existing programs to determine their relative effectiveness, cost and impact determine priority for further funding. Programs and policies were evaluated according to the following criteria:

- **Criteria 1: Effectiveness in reducing single occupancy vehicle trips.** Ideas were scored for the degree to which they would reduce single occupant vehicle trips among program participants (e.g. among all those affected by the program), based on a literature review of the effectiveness of similar programs. This reflects the shared TDM goal of reducing single occupancy vehicle use.
- **Criteria 2: Potential size of affected trip market.** City staff provided estimates of the expected order-of-magnitude costs and potential annual trip market that programs could theoretically affect. This was translated into a score. For example, a multi-modal marketing campaign could be heard by thousands of travelers, and therefore receives a high score.
- **Criteria 3: Readiness.** Some project ideas were screened out if they were not ready to be implemented within the next 5 years.

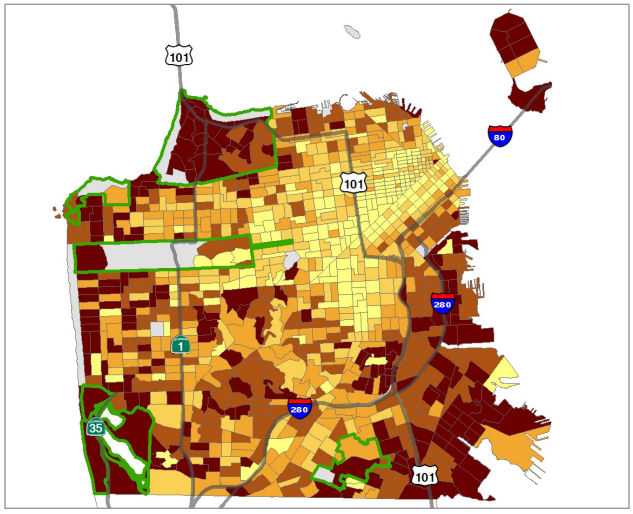
Appendix D provides more detail on the evaluation process and Figure 5 (next page) presents the results of the evaluation findings in graphic format. Each circle represents a proposed project, program, or policy. The x-axis represents the effectiveness score; the y-axis represents the potential annual number of trips impacted, and the size of the circle corresponds to the approximate annual cost of the program if it were fully implemented.

Note that while employer outreach is presented as a distinct program, it is represents a strategy for marketing a series of co-supportive programs (these were evaluated separately) such as ride-

Figure 4. 2012 VMT per household (left) and per worker (right)

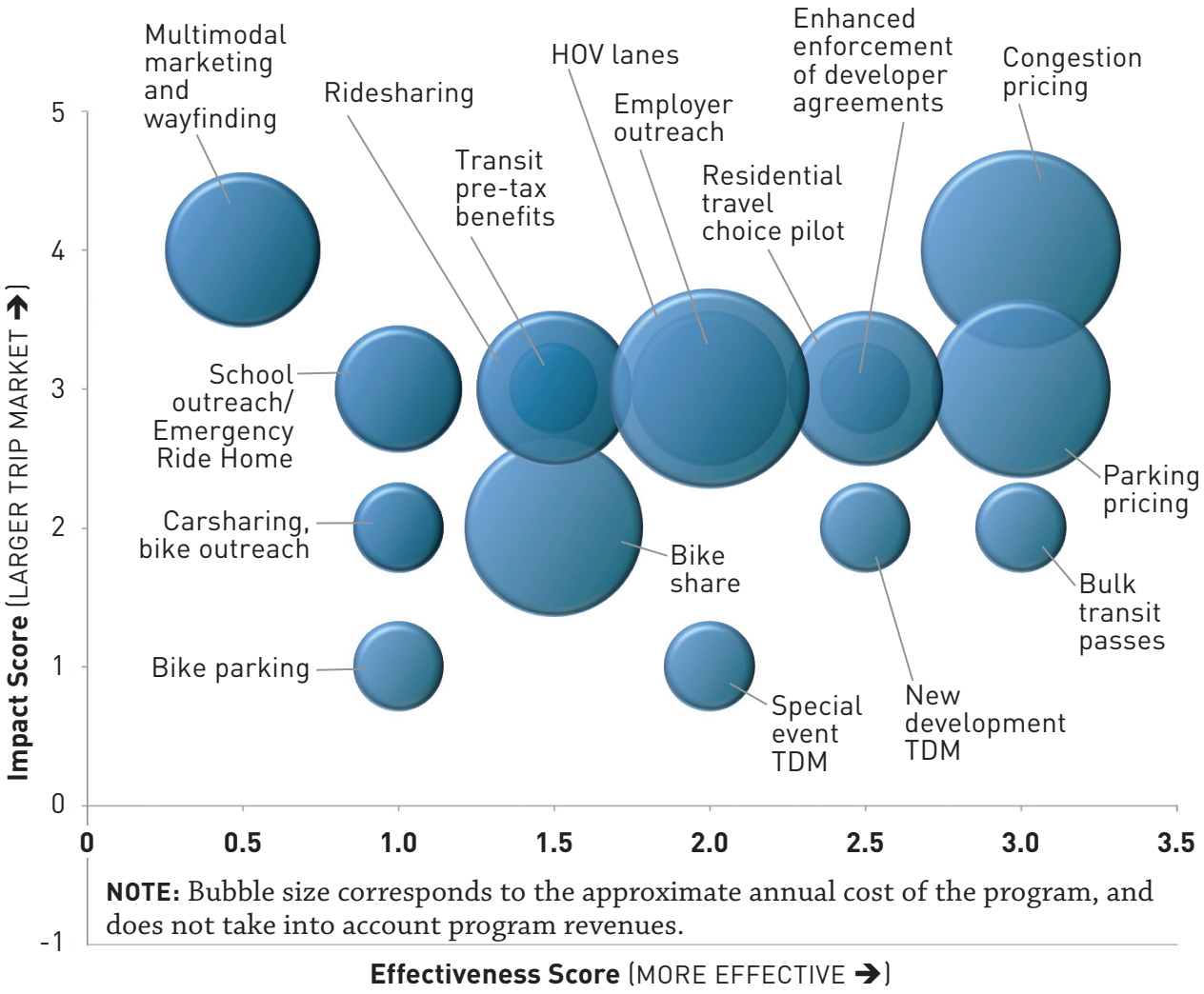


0.01–8 (lowest 20% of zones
9–17
18–31
32–42
43–147 (highest 20% of zones)



1–8 (lowest 20% of zones
9–10
11
12–14
15–47 (highest 20% of zones)

Figure 5. Effectiveness, Impact, and Cost of Scored Projects



NOTE: Bubble size corresponds to the approximate annual cost of the program, and does not take into account program revenues.

matching services, guaranteed ride home programs, and facilitation of shared transportation services. All programs that would be bundled under employer outreach were assigned the same impact and cost scores since the programs could be presented together as a package.

Evaluation Results

The Effectiveness/Impact/Cost (EIC) evaluation results represent a look at each proposed program or policy as a stand-alone item, but they confirm much of the input from expert interviews, namely that the most effective TDM programs involve pricing or strong, enforceable regulations. The following section briefly summarizes the evaluation results; Appendix D provides more detail.

POLICIES

Consistent with the expert interviews, the EIC evaluation found that policies are likely to be the most effective in reducing single occupant vehicle trips.

Downtown congestion pricing, which would involve charging a fee to vehicles entering or exiting downtown San Francisco, was projected to be the most likely policy providing the greatest impact out of all the ideas analyzed. It also has significant up-front costs, though according to the SFCTA's Mobility, Access, and Pricing Study, fees from the program might generate $60-$80 million in net annual revenue for mobility improvements.

The next two policies most likely to be effective were parking pricing and a policy to set and en-

force modeshare targets for employers or worksites. These programs could also involve relatively high startup costs and in the case of parking pricing, the program could also capture revenue to offset its initial costs.

Lower impact or effectiveness policies that still outperform most programs include mode split commitment programs for new development and major changes of use; systematically requiring TDM measures in new developments; and implementing high occupancy vehicle lanes on regional freeways.

ENFORCEMENT

Nelson\Nygaard's evaluation also confirmed the information provided in the best practices research, that evaluation and enforcement of TDM policies and programs is essential to the success of the program.

Enforcement of developer agreements: Enforcing existing development agreements was found to be among the highest performing TDM activities. Historically, the city has not systematically enforced developer agreements due to staff resources and lack of enforcement protocol, although as of 2013, the SFMTA has launched a Development Monitoring program within its Urban Planning Initiatives subdivision to manage agreement tracking and enforcement. This effort has already inventoried development agreements that were created to address transportation concerns as part of project approvals for an expanding base of large and mid-sized, recently approved (post-2000) projects in San Francisco. The SFMTA partners closely with such key agencies in this effort as City Planning, the Office of Community Investment and Infrastructure and the Office of Economic and Workforce Development. The TDM team within the Urban Planning Initiatives subdivision has partnered with the Development Monitoring manager to ensure approved TDM measures are implemented and evaluated.

Enforcing existing agreements is critical to limiting the transportation impact of developments and to ensuring that residents and tenants have access to the transportation choices that were outlined in project agreements. Enforcement of existing agreements is also critical to demonstrating that that new developments will be required to implement agreed-upon TDM programs and services.

Commuter Benefits Ordinance: San Francisco's Commuter Benefit Ordinance (CBO) requires employers to provide pre-tax transit benefits to their employees. Nelson\Nygaard's research shows that a fully enforced CBO is likely to have a small impact on travel behavior.

PROGRAMS AND SERVICES

Nelson\Nygaard's evaluation found that many programs have low direct impacts when considered individually, especially compared to citywide policies; however in our interviews with TDM experts, many reported that in their experience, combining multiple programs into multi-pronged, multi-touch campaigns with a unified identity can multiply the mode-shift changes associated with individual programs.

Employer outreach: Employer outreach would involve reaching out to employers to provide information support and incentives to encourage employees to shift their travel modes. The relatively high effectiveness rating for this program is based on research indicating outreach to be effective when backed by a policy or ordinance requiring employers to change behavior (i.e. programs such as trip cap or other). However, some jurisdictions (such as Arlington, Virginia) have had moderate but measurable success with voluntary programs. Additionally, one study from New South Wales, Australia, showed that significant mode shift (up to 17% decrease in auto use) can occur when offices are opening or relocating. Our best practice research suggests that outreach efforts should focus on connecting employees to transportation services and programs and cover all modes, not just specific ones. Many of the experts interviewed recommended the creation of Transportation Management Associations (TMAs)to help facilitate this outreach and coordination. Finally, although the evaluation did not specifically consider regional versus SF-based em-

ployer outreach, the trip analysis results suggest that much of commute travel is regional and work is needed to integrate marketing, outreach, and trip planning of regional transit services into employer outreach.

Special event TDM: Evidence from TDM programs at sports arenas, at major events such as the Olympics, and San Francisco's own experience with TDM for the 34th America's Cup indicate that there is significant potential to shape trip choice with multi-pronged media and communications campaigns that work in concert with sustainable mode choices. Although the annual number of trips generated by major events is small relative to the commuter market, the impact on traffic and transit can be large. Evidence from the research literature suggests good potential for shifting demand through outreach and incentives around major events. Visitor TDM (separate from special event TDM) was not evaluated due to lack of multiple relevant research sources or best practices on the effectiveness of visitor TDM activities.

Shuttles: Literature on the effectiveness of shuttles shows that depending on their design and location, some shuttle programs can be effective in reducing vehicle trips; data from shuttles in San Francisco has shown that about half of shuttle riders would drive alone if shuttles were not available.

Residential TDM Program: Residential TDM would involve providing tailored outreach and incentives to residents to reduce drive alone travel. The review indicated that tailored, person-to-person outreach efforts to neighborhoods could be an effective method of reducing single occupancy vehicle trips, based on the success of such programs in Portland, OR; Alameda, CA; and cities in Australia and London. The size of the potential population impacted by such a program could also be large, though costs can be high. Nelson\Nygaard's research identified these types of programs as one of the most effective programs.

Bike Sharing: Evidence suggests bicycle sharing programs have low to medium effectiveness in reducing single occupancy vehicle trips. These programs may be more effective at shifting some peak-period demand out of transit vehicles reducing overcrowding and making space available for others to shift from driving alone to transit.

Emergency Ride Home: Emergency ride home programs provide free emergency ride homes to those who took transit or carpooled to work. Much of the evaluation research into Emergency/Guaranteed Ride Home programs focuses on the people who enroll in the program. Among this population, evaluations vary widely on the impact of the program in impacting mode-choice. Nelson\Nygaard's evaluation found that the program has a low effectiveness rate, but the potential pool of participants is relatively high.

Bicycle and pedestrian encouragement (including bicycling and school outreach): Bicycling and walking are critical priority modes of travel in San Francisco but programs to encourage bicycling and walking do not appear very effective in reducing single occupancy vehicle trips. However, bicycling and walking offer low-cost attractive options for shifting peak capacity transit trips.

Bicycle parking: In San Francisco, many employees report that a lack of secure bicycle parking at work is a major hurdle to riding a bicycle to work. Nelson\Nygaard's evaluation found that there was a moderate increase in biking to work when secure parking was available. They also found that bicycle parking at rail stations and bus stops results in significant increases in both transit and bicycle trips. The evaluation further found that on-site bicycle facilities should be coupled with other TDM strategies to optimize effectiveness. The impact on SOV trips is unclear.

Car sharing Support: Available research suggests that at this time, carsharing is on the low end of effectiveness in reducing single occupant vehicle trips. All literature found focuses on traditional carsharing where vehicles are picked up and dropped-off at the same location. It does not include findings of newer one- way carshare models where users can pick up a vehicle in one location and drop it off in another. Carsharing's effect

on automobile ownership was not included in the evaluation.

Ridesharing: 511's Regional Rideshare program evaluation finds that very few of the programs enrollees are carpooling because of the program. At this time, it appears to be self-selecting group of participants who are already aiming to carpool. More than three-quarters of the trips taken by program participants are non-carpooling. In 2010, 19% of carpoolers participating in the program indicated that they had shifted from SOV to carpool. The 2013 evaluation does not look at mode-shift related to the program. The impact on SOV trips is likely low.

Transportation program branding and marketing: Nelson\Nygaard's review found limited effectiveness of mass media transit marketing and did not find good information on the comprehensive branding approach envisioned by the city. Discussions with experts indicate that integrated, comprehensive marketing is an important aspect of successful TDM.

Trip-supportive tools: A class of trip-making tools supports sustainable trip choices: quality information at bus stops such as real-time transit arrival times, legible maps and signage, pedestrian and bicycle wayfinding, and trip-planning applications. Little information exists on the extent to which these individual tools shift modes on their own, however, results from user surveys indicate that they lead to increased comfort in walking, biking, taking transit, and greater likelihood to make an unfamiliar trip via these modes.

Section 3: Summary Recommendations and Next Steps

The best practices interviews, EIC evaluation, and trip market analysis should inform the adoption of a short to medium term TDM program. The following recommendations may be used to inform funding and staffing decisions.

The primary recommendation is to implement a comprehensive TDM program for San Francisco that addresses all audiences (businesses, commuters, residents, families, visitors and developers) and integrates programs and services. Providing TDM programs on a piecemeal basis will not be effective, as the best practices research found. Additionally, programs that are implemented at a neighborhood level should focus their efforts on areas of the city where there is an opportunity to meet the program's goal of reducing single occupancy vehicle trips and programs that target audiences with large potential for mode-shift should be prioritized for greater funding support.

As this program focuses on the reduction of single-occupancy vehicle trips, equity goals will be successfully achieved through the strategy's focus reducing regional commute trips, which rely on freeways and major commute corridors that typically traverse communities of concern, while ensuring that mobility and access within the city. TDM programs will also help reduce air pollution which will have city-wide benefits. Additionally, TDM activities should leverage community based organizations and include culturally-appropriate materials in multiple languages.

To this end, the following policies and programs will work together to equitably reduce the drive-alone mode share for all trips.

Policy

Congestion pricing: has been extensively studied in San Francisco. A follow-on study (the San Francisco Parking Supply and Utilization Study) looking at the potential for managing travel de-

mand through parking policy is underway. At the conclusion of this study, next steps for pursuing a pricing policy will be evaluated and defined.

Parking pricing: Finalize the evaluation of the SFPark program and complete the congestion-pricing follow-on study. Based on the results of these two documents, develop strategies to reduce vehicle trips through parking. Additionally, the Department of City Planning (DCP) should continue to require that parking be unbundled from residential or commercial space, and should consider expanding the provisions that require hourly parking charges and prohibiting discounts such as monthly/daily use in garages beyond the downtown area, SoMa, and Eastern Neighborhoods.

New development mode split commitments: Explore establishing mode split commitments for new developments and major changes of use, accounting for vehicle occupancy. Quantify the impact of specific TDM measures that developers may use to meet their mode split commitments. Identify evaluation and compliance framework and implement a program to begin requiring these commitments in new developments.

New development TDM: Create a consistent set of TDM requirements for new development and major changes of use (referred to as the TDM toolkit). Explore strategies to encourage existing development to adopt robust TDM programs.

Employer Modeshare Targets Program: This is a new concept for San Francisco that could ensure that San Francisco can accommodate its projected growth, and would also address trips from existing businesses. A stakeholders working group should be established to study the concept, generate input on what approach to take to implementing such a program, and define the technical and legal issues associated with implementation.

HOV policy/Freeway Performance Initiative: Develop policy positions to support regional and state legislative advocacy for better managed highway capacity focused further encouraging carpooling, such as by extending carpool lanes across the Bay Bridge or Golden Gate Bridge, or by providing high-occupancy vehicle (HOV) lanes from San Mateo into San Francisco. Research suggests these kinds of changes would be very effective in reducing SOV trips.

ENFORCEMENT

Enforcement of developer agreements: Ensuring that developments follow through with their TDM commitments requires monitoring and enforcement. Continue to support and expand efforts to enforce existing development-related TDM agreements; link future TDM program monitoring to mode split commitments.

Commuter Benefits Ordinance: Identify less time intensive methods of enforcing the Ordinance, conduct additional outcome-related research into the program's effectiveness and adjust program as required.

PROGRAMS AND SERVICES

Employer outreach and education: Develop and implement an employer outreach program that connects employers with programs and services that enable them to support their employees in reducing SOV trips. Offer a range of services, prioritizing the most effective ones, especially the provision of discount transit passes in areas of the city with sufficient transit capacity. A comprehensive TDM program for employees should provide information on local and regional transportation options along with incentives to try/use them. A successful program will provide an unified outreach program that includes providing low cost programs, such as 511 rideshare, emergency ride home, education about pre-tax benefits, and connecting employees with bicycling, car sharing, bike sharing and transit options. Additionally, a separate program that provides outreach to new and relocating businesses with a goal of instilling employees with new travel behavior habits are set should be pursued.

Residential TDM Program: Develop a residential outreach pilot program and report results to inform further investment in additional neighbor-

hoods. Focus on neighborhoods with high rates of driving, adequate transit service with available capacity, but lower than expected transit usage.

Bicycle and pedestrian encouragement (including bicycling and school outreach): Safety has been identified as a key barrier to expansion of non-motorized mode share. Bicycling and walking can be most directly encouraged through coordinated safety infrastructure investment, education, and enforcement.

Special event TDM: Continue existing efforts to manage demand associated with major events. Use the SFMTA Special Events Team to plan for, shape, and manage transportation demand associated with special events. Work with the region and the visitor industry to develop tools and resources that support sustainable trip making for special events. Consider including requirements for TDM for all events and venues.

TMAs: Expert interviews identified transportation management associations (TMAs) as useful partners in delivering effective TDM programs. Develop a fuller understanding of how TMAs might be created in existing neighborhoods and developing areas, what their scopes should include to optimize their impact, and look for opportunities to support and encourage the creation of new TMAs within San Francisco.

Shuttles: Private employer shuttles currently reduce significant vehicle miles of travel at minimal cost to the city's transportation program. Support the SFMTA's commuter shuttles pilot program (implementation expected summer 2014) and evaluate how well it minimizes impacts on Muni and other users while supporting commuter shuttle programs. Based on the results, SFMTA should identify policies for where, how, and when commuter shuttles may use curb space. Additionally, the results of ongoing shuttle pilot programs will be informative for future policy.

Carsharing: The City plays an important role in providing on-street and off-street parking spaces for carshare vehicles and by requiring private developments to provide free parking spaces to carshare vehicles. Maintain the current focus on car-share supportive policies, and partner with private carshare companies to include car sharing information about in outreach efforts to potential users. SFMTA should continue providing on-street parking spaces for carshare vehicles through a permit process and off-street parking to carshare vehicles in SFMTA garages.

Bike sharing: Support expansion of bicycle sharing in San Francisco; seek private funding sources and sponsorships to cover costs. Use the evaluation of the pilot to inform pricing, location of pods, and other elements for a future expanded program.

Transportation program branding and marketing: Develop a brand for the TDM program offerings and develop marketing for the program. Develop a set of messages and techniques that can be used by all participating agencies to promote programs. Incorporate community based social marketing techniques that target audiences and address barriers to behavior change.

Trip-supportive tools: San Francisco should continue to feed real time data to the 511 trip-planning program. Further, the City should continue to make data publicly available about bicycle routes, transit routes and operations, and parking and taxis. Third parties have demonstrated the ability to take this data and produce useful tools and applications. To support increased bicycling and walking in San Francisco, the city should design and implement a targeted wayfinding program.

Programs and policies for further study: a number of concepts and issues were identified as potential sources for trip reduction but did not have enough data to determine whether they should be pursued. The following concepts should be considered for future study to determine how they might be implemented and whether they should be considered for funding.

- TDM for goods movement: determine if there are effective ways for the city to reduce the number of delivery vehicles that use the city during peak hours and impact congestion.
- Visitor oriented TDM: Continue to support

the SFTravel visitor transportation working group and study the needs of visitors to identify strategies that would reduce the impact of visitor travel.

- Other TDM concepts not evaluated but which could be subject to further study include use of HOV lanes on local streets and roads and regional tolling.

Table 3 (right) summarizes recommendations for each of the activities listed above. Activities are grouped into three categories:

- Core SF TDM Program: Activities necessary to manage and coordinate a city-wide TDM program along with the most effective strategies that would support progress towards reduction in single-occupant vehicle driving.
- Priority Activities: The individual programs, pilots and policy development work recommended to receive funding and implementation priority.
- Supportive Activities: Programs, pilots and policy development that support TDM goals but are lower priority for competitive funding sources.

These groupings were based on the effectiveness evaluation results and the expert interviews.

INSTITUTIONAL

The consultant and best practices review suggest that the following institutional changes would strengthen the city's TDM program:

- Establish a coordination framework and agency roles/ responsibilities to ensure the TDM strategy is delivered effectively.
- Evaluate programs and report regularly on collective progress towards achieving goals.

FUNDING NEEDS

Current investment in San Francisco's TDM programs amounts to approximately 14.5 full-time equivalent staff positions per year or approximately $3.6 million.[7] Table 4, below, provides

[7] Assuming one full-time-equivalent staff per-

Table 3. Five year recommendations

CORE PROGRAM
TDM Program coordination
Citywide TDM program branding, communications and marketing
TDM evaluation program, report biennially on citywide program's achievements
Congestion pricing: complete follow-on study and define next steps
Parking management and pricing policy and implementation
Modeshare targets for employers—exploratory study
Create program to monitor, evaluate, and enforce developer TDM commitments
Explore a mode split commitment program for new developments/major changes of use
PRIORITY ACTIVITIES
Create comprehensive employer outreach program
Special event TDM programs
Residential TDM pilot program and expansion
Develop proposal for HOV lanes on highways and bridges into/out of SF
SUPPORTIVE ACTIVITIES
Commuter benefits ordinance enforcement*
Implement bicycle, pedestrian outreach through safety programs
Expand SFMTA's on-street carsharing pilot program
Implement shuttle pilot program
Expansion of bicycle share
Design and implement a pilot multimodal wayfinding program

* CBO enforcement may be prioritized in the first two years to ensure continuity of effort while new methods of enforcement are pursued.

staffing estimates. Only about a third of the funding provided (or about $1 million annually) comes from dedicated local sources of funding (including Proposition K and the Transportation Fund for Cleaner air). The remainder comes from agencies general funds as well as regional and federal funding sources.

Table 5 (next page) provides estimates of the approximate five year cost for each of the recommended activities, which total $46 million or about $9 million per year (compared to the approximately $3.6 million invested currently). Current or likely future funding sources for each of the items are listed in the table notes, including Proposition K, the Transportation Fund for Clean Air, parking and shuttle pilot program fee revenues; and general fund revenues.

Table 5 also lists the estimated order-of-magnitude funding gaps for each of the programs. The funding gap estimates assume application of local Prop K and TFCA sources over the next five years but not general funds.

- **Core program activities:** the largest funding need is for monitoring and enforcement of developer commitments and for implementation of a mode split commitment program for new development.
- **Priority activities:** the largest funding needs are for additional employer and residential travel choice outreach. Although Prop K and the Transportation Fund for Clean Air are expected to provide some funding for these programs, the current funding level will allow outreach only to a small number of neighborhoods.
- **Supportive activities:** the largest funding needs are for expansion of the bicycle share program and expanded wayfinding; needs for these programs total $28 million.

Possible funding sources to address these gaps may include:

- Caltrans planning grants.
- Metropolitan Transportation Commission's Bay Area Climate Initiatives Program.
- Regional cap and trade revenues. The Metropolitan Transportation Commission has indicated that if revenues are received by the region, a substantial share would be dedicated to expand the current Bay Area Climate Initia-

son costs $250,000 per year including fringe benefits and overhead.

Table 4: Current TDM staffing by department/agency

DEDICATED STAFF	CURRENT STAFFING	SOURCE OF MAJORITY FUNDING
SFMTA	4.5 FTE [8] (specific TDM team) 2 FTE TDM related Additional communications, outreach etc.	All TDM FTE's are funded via SFMTA's general fund, some grants fund portions of the work
SFE	4 FTEs 2 FTEs TDM-related	Grant funded (primarily Prop K and TFCA)
SFCTA	1 FTE [9]	Grant funded, primarily regional and federal
DCP	1 FTE	DCP general fund
TOTAL	~14.5 FTEs	

[8] One Full Time Equivalent (FTE) represents a single worker working full-time for a full year.

[9] Temporarily grant funded through the TDM partners project and the FHWA value pricing program.

Table 5: Cost Estimates and Funding Gaps for Recommended Five-Year Program

	5-YEAR COST ESTIMATE	ESTIMATED 5-YEAR FUNDING GAP (RANGE)			
CORE PROGRAM ACTIVITIES	**TOTAL COST**	**$0–$50K**	**$50K–$500K**	**$500K–$1M**	**› $1M**
City TDM Program Coordination [A,D]	$350,000	✔			
Branding, communications and marketing [A]	$300,000		✔		
TDM Program evaluation [A]	$200,000	✔			
Congestion pricing studies [A]	$1,000,000	✔			
Parking management and pricing policy and implementation [B,E]	$900,000	✔			
Employer mode split commitment (study/process) [A]	$200,000	✔			
Developer commitment monitoring and enforcement [D]	$2,000,000				✔
Mode split commitment program—new developments/major changes of used [D]	$900,000			✔	
PRIORITY ACTIVITIES					
Employer and employee outreach [A,C,D]	$1,500,000			✔	
Special event TDM programs [D]	$225,000	✔			
Residential TDM pilot program and expansion [A,C]	$1,500,000			✔	
Develop proposal for HOV lanes on highways and bridges into/out of SF [A,E]	$500,000		✔		
SUPPORTIVE ACTIVITIES					
Commuter benefits outreach enforcement [A]	$225,000			✔	
Bicycle, pedestrian safety outreach [D,E]	$5,000,000				✔
Expand on-street carsharing pilot program [B]	$225,000	✔			
Implement shuttle pilot program [B]	$1,600,000	✔			
Expansion of bicycle share [E]	$23,000,000				✔
Multimodal wayfinding pilot program [D]	$6,000,000				✔
TOTAL	**$45,625,000**	PLEASE SEE EXPLANATORY NOTES [A]–[E] ON FOLLOWING PAGE			
Funding Gap (Range)	$34–39,000,000				

tives Program.

- Regional or state Active Transportation Program.

NEXT STEPS

The next steps are to:

- Identify roles and responsibilities among agencies.
- Develop performance measures that can be monitored, evaluated, reported upon and used to adjust the city's TDM program over time to ensure it is meeting its objectives.
- Develop a funding proposal that outlines the top priorities for competitive Prop K funding for the coming five years.
- Develop an agreed-upon TDM evaluation framework.

Once a comprehensive program is developed, agencies will publish a biennial report that estimates vehicle trips reduced (and other performance measures). This will require identification of performance measures and an evaluation strategy for major TDM program investments.

Explanatory notes for Table 5 (previous page)

[A]: Proposed for funding in the Proposition K Five Year Plan (Fiscal Year 2014/15-2019/20).

[B]: Primarily or wholly funded through a dedicated fee revenue source (e.g. carsharing permit fees; shuttle fees; parking fees).

[C]: Proposed for funding through the Transportation Fund for Cleaner Air in Fiscal Year 2014/15.

[D]: Currently receiving support from general funds / SFMTA budget but future funding may not be secured.

[E]: Regional, state, or federal grant funding for this activity has either already been secured or an application is expected in the near future.

Source: Staff estimates of five year program costs and expected funding gaps.