

BRIEFING PAPER

TDM Program Impacts and Evaluation

***Chittenden County TDM Education, Outreach, and Support
Program***

February 21, 2005



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INTRODUCTION AND GENERAL FINDINGS

Effective design of Transportation Demand Management (TDM) programs for Chittenden County builds from informed expectations on potential program impacts. Beginning with the end in mind, careful design of evaluation methods and measures ensures the ability to track program results over time. This briefing paper reviews national experience with TDM program effectiveness, documents results achieved in Chittenden County by the Campus Area Transportation Management Association (CATMA) and other worksites, and recommends independent evaluation when the enhanced county TDM program is implemented.

National research suggests TDM impacts are most effectively measured near the worksites where they are implemented. The literature and research results consistently point to financial incentives and disincentives as the most effective measures in motivating use of transit, shared ride, and active modes such as bicycling and walking. TDM support measures and information about travel options, while important components of effective programs, deliver less mode switch in the absence of convenient travel alternatives and incentives for their use.

Chittenden County experience with successful TDM implementation confirms these results. CATMA achieves lower drive alone commuting to its member worksites through the combination of constrained parking in supply and cost, attractive travel alternatives, and mode incentives. CATMA's 21-vehicle free shuttle system, transporting commuters from local and regional park and ride facilities, approaches two million boardings annually. Member institutions underwrite travel on CCTA buses, while CATMA operates an award-winning incentive program successful in encouraging bicycling and walking.

This paper recommends independent third-party evaluation of program impacts to ensure trip reductions and achievement of program objectives. Periodic evaluation measures performance toward goals, monitors program effectiveness, and provides quantifiable results. Research elements, potentially designed in consultation with the University of Vermont, should include surveys of TDM program users, the commuting public, and the business community.

A. TDM PROGRAM IMPACTS – NATIONAL EXPERIENCE

Commuters make rational decisions. Deciding when, on which mode, and even whether to make a trip, travelers weigh cost, time, convenience and other factors to choose the option that best suits their needs. Across the country, use of travel options increases where both attractive alternatives to driving alone exist and incentives encourage their use. More commuters choose transit in urban areas where expensive parking and congestion make solo travel costly and time consuming. Carpool and vanpool travel increases where high occupancy vehicle lanes save commuters time in congested corridors. Bicycling and walking represent more attractive options where sidewalks, bike lanes, bike paths, and other infrastructure make active travel safer and comfortable.

TDM initiatives focus on moving more people, rather than more vehicles, on existing transportation systems. To compete with the convenience of drive alone travel, successful TDM initiatives include incentives and disincentives that shift commuters' evaluation on which mode, travel time, or trip best suits their needs.

Worksite TDM Impacts

In national experience, impacts from worksite-based TDM initiatives are most reliably measured near the worksite, either through employee surveys or driveway/access roadway counts. As the scale perspective zooms out to city- or region-wide perspectives, trips avoided through successful employer initiatives are diluted by continued peak period driving alone to worksites without travel option programs.

The specific TDM program elements implemented by worksites also influence program results. Because employers design travel option programs as business solutions to business problems, only companies experiencing the most serious access problems are likely to choose more robust TDM program elements.

Research into TDM program effectiveness points to a range of impacts and factors for consideration.

- There is no single TDM recipe for success. The same elements implemented at different worksites achieve different results. Variation in worker demographics, convenience of travel alternatives, corporate culture, and the energy with which the program is implemented on a continuing basis all influence outcomes.
- The literature consistently points to financial incentives and disincentives as most effective in causing mode switch. Financial incentives include mode subsidies (i.e. tax-favored transit discounts or vanpool fare subsidies), parking cash-out, discounted parking for alternative mode users, and indirect financial incentives (i.e. programs awarding points toward rewards for trips on alternative modes). Parking fees, particularly those set at market rates, are the primary financial disincentive. Programs employing financial incentives/disincentives exhibit trip reduction rates several times those of programs without these strategies.
- Travelers need to know about alternative modes and incentives in order to use them. Marketing is thus an important component of successful TDM initiatives. However, programs that involve information dissemination (i.e. transit maps or ridematching) and support programs (i.e. guaranteed ride home program) are far less effective in the absence of financial incentive/disincentives.
- Effective TDM programs market specific incentives for attractive travel options (modes), using messages appealing to travelers' self-interest as opposed to general information about mode options.

National Research and Application

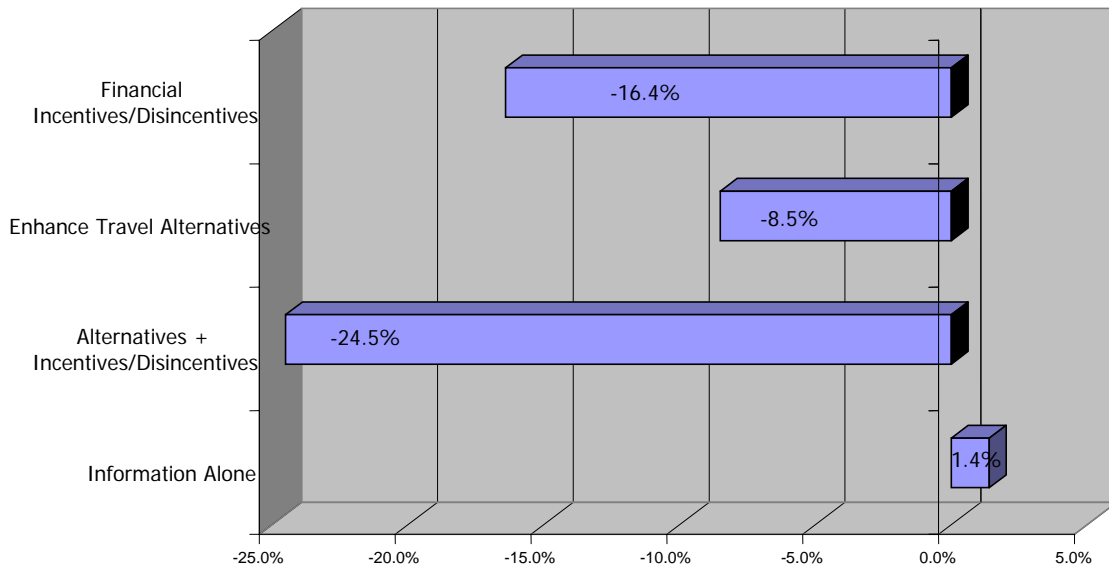
National research conducted for the Transit Cooperative Research Board compared the effectiveness of various worksite TDM measures. Data from nearly 50 employers compared the trip reduction percentages for a variety of worksite-based TDM strategies, implemented across the country. These programs, widely perceived as successful models, achieved average trip reductions of 15.3%, measured at the worksite level. Results, as reported in *Commuter Choice Primer: An Employer's Guide to Implementing Effective Commuter Choice Programs*¹, are as follows. Figure 1 summarizes these impacts.

- TDM programs focusing on financial incentives and disincentives achieved an average 16.4% trip reduction.
- Employer efforts that emphasized the provision of enhanced travel alternatives themselves, such as vanpools, accomplished trip reductions averaging 8.5%.
- Worksites combining enhanced travel alternatives with financial incentives/disincentives averaged trip reductions of 24.5%
- Employer-based programs offering only information on commute alternatives experienced an increase in trip making averaging 1.4%. In other words, initiatives offering information alone were unable to counter the general trend toward increased drive alone travel.

¹ *Commuter Choice Primer: An Employer's Guide to Implementing Effective Commuter Choice Programs*, US Department of Transportation, Federal Transit Administration, Federal Highway Administration, Environmental Protection Agency (FHWA-OP-03-007, EDL# 13669), 2003.

The *Commuter Choice Primer's* authors observe: "These results suggest that information alone is ineffective at changing commuters' travel behavior. However, when commuters are made aware (perhaps most effectively through their employer) of enhanced alternatives and incentives for using them, some commuters will switch from driving alone. It also suggests that financial incentives alone are not as effective as when they are combined with the necessary alternatives to driving alone and a means for employees to learn about the alternatives and incentives to use them."²

Figure 1. Trip Reductions from TDM Measures



Boulder Colorado's recently developed *Transportation Options Toolkit*³ reflects this national experience with TDM program element effectiveness. Developers and business owners proposing transportation option plans choose from a menu of TDM program elements, selecting the strategies most appropriate for their situation. They select plan elements, with effectiveness ratings from one to ten, until the strategies' combined effectiveness ratings total at least 12 points.

- Highest effectiveness ratings (8 to 10) are reserved for strategies involving parking, including parking cash out (offering employees the choice of a parking space or its cash equivalent), charging parking fees, and parking management (balancing the supply or parking spaces in light of available travel alternatives).
- Strategies including both mode incentives (i.e. transit subsidies, vanpool discounts, points redeemable for awards for use of alternative modes) and alternative mode facilities (i.e. protected bicycling/walking corridors, alternative friendly site design) receive moderate effectiveness rankings (4 to 6).
- Measures rating lower in effectiveness (1 to 3) include variable work hour initiatives (i.e. staggered work hours, compressed work weeks), marketing strategies (i.e. transit

² *Commuter Choice Primer*, p. 42.

³ Boulder *Transportation Options Toolkit* available at www.ci.boulder.co.us/publicworks/depts/transportation/master_plan_new/pdfs/TDM_Toolkit.pdf.

guides, travel options information in new hire orientation materials), and support services (i.e. bicycle loan program, carsharing).

B. CATMA, CHITTENDEN COUNTY RESULTS, AND BENCHMARKING

Moving from the national perspective to Chittenden County, Campus Area TMA's (CATMA) success, and that of other county employers, is consistent with the national research and experience on TDM program effectiveness. CATMA's documented success shifting trips to alternative modes and reducing parking demand demonstrates the potential for TDM initiatives in Chittenden County. Understanding the TMA's context, services, and results points to benchmarks for expanded TDM services.

CATMA Organization and Context

CATMA members, the American Red Cross, Champlain College, Fletcher Allen Health Care (FAHC) and the University of Vermont (UVM), partner through the TMA to jointly plan and manage transportation and parking with the goals of improved land use coordination and reduced environmental impacts. Among Vermont's largest employers, these adjacent institutions clustered in less than one square mile, provide travel options to 13,000 students and 9,000 employees through the TMA. Serving the health care needs of northern Vermont and New York, the Hill experiences over 700,000 patient visits annually, an influx of people more than five times the surrounding area's population.

In the late 1980s and early 1990s, the Hill institutions developed consensus that the area's planning and design issues could be better resolved if institutional growth and parking strategies were addressed jointly. Projected parking demand estimated to cost over \$36 million motivated stakeholders to seek alternative solutions, leading to CATMA's formation. The member institutions formalized their collaboration in 1992, establishing CATMA as a private, nonprofit planning and management entity, with private and public sector participation. In December of 2000, CATMA incorporated into a freestanding non-profit 501 (c) (3) organization. CATMA's founding goals are:

- "Establish long-term transportation policies and leadership.
- Provide strategic and long term planning for multimodal transportation and parking development in conjunction with the members' shared land use planning.
- Plan, develop and expand comprehensive multimodal transportation systems management (TSM) programs incorporating transportation demand management (TDM) strategies.
- Plan, develop, own and manage multi-modal transportation systems and parking facilities."⁴

While transportation demand management remains a focus, CATMA activities have expanded to now include air quality permitting, stormwater management, and shared land use planning services for its members. CATMA's founding goals and objectives also include "to develop plans, programs, and projects that fully consider energy conservation and the need to protect and enhance Vermont's resources – environmental, historic and scenic" and "to provide representation for each Member at local, regional and State land use planning forums and regulatory proceedings as required."

The context within which CATMA operates includes several strong predictors for TDM success. Demonstrating strong corporate leadership, its member institutions develop consensus on priorities for shared problems and commitment to shared solutions. Issues around institutional growth, parking, and access represent significant business challenges warranting allocation of resources for business solutions. Managing parking demand, for example, reduces costs for the member institutions. CATMA's service market of 13,000 students and 9,000 employees

⁴ *Campus Area Transportation Management Association*, brochure.

represents the largest employment concentration of the ten TDM target areas reviewed in this project. Employment concentrated in a few large employers facilitates cost-effective program development, implementation, and marketing. The campus district experiences significant congestion and has constrained parking. UVM and Champlain College charge for parking permits for on-site parking. Rates at UVM are based on salary and the zone for which the permit is issued. As an incentive to rideshare, carpools with three or more participants receive a free hangtag for zone one. Carpools with two or more participants receive a free zone two hangtag. Although FAHC does not charge for parking permits, very few employees are given permits to park on-site. Most staff members working at the MCHV, UHC and the Trinity campuses are assigned to off-site parking lots and ride shuttles to their worksite. FAHC does issue on-site parking permits to carpools of three or more participants. The American Red Cross does not charge for parking but not all employees are issued an on-site permit. Both this limited parking and its cost represent significant financial disincentives to drive alone commuting.

CATMA Services and Resources

CATMA works with its members to implement a wide variety of workplace TDM initiatives geared to encouraging alternatives to drive alone travel. These measures include provision of transportation alternatives, incentives for their use, and information about their convenience.

Guaranteed Ride Home (GRH): Over 950 travelers who use transit, carpool, vanpool, bicycle or walk qualify for a free taxi ride home in an emergency (up to \$50) on any day that they use an alternate mode to commute to work. Registered participants may use the service up to twice monthly and eight times a year. Because registrants save the rides home for true emergencies, CATMA staff reports spending less than \$1,400 a year on cab fares. Commuters registered in the GRH program are automatically entered into four monthly drawings for gift certificates to local restaurants.

Ridematching: About 80 travelers are registered in CATMA's free, confidential database for those seeking carpool partners.

Preferential Parking for Carpools: Member institutions provide a variety of carpool incentives including preferred parking locations, parking discounts, and gas coupons

Bicycling/Walking Incentives: CATMA's award-winning incentive program rewards people who bike or walk to and from work at least twice weekly for four consecutive weeks with a \$10 gift certificate redeemable at downtown Burlington businesses. Additionally, all completed Bike/Walk cards are included in a monthly drawing for an extra \$25 gift certificate. Over 450 people participating in the rewards program have received \$65,000+ in gift certificates.

Transit Incentives: The American Red Cross, Champlain College, and FAHC offer employees a 50% discount on transit fares on all regular CCTA routes. Subsidies on the LINK routes vary by institution with the American Red Cross and Champlain College offering a 50% subsidy on all LINK routes and FAHC offering a 25% subsidy on the Montpelier LINK route only. CCTA and CATMA have an unlimited access agreement providing unlimited rides to some or all of the CATMA institutions. Currently, UVM is taking part in the program.

Parking Management and Shuttles: CATMA member institutions charge for on-site parking while offering free shuttle service from satellite parking lots. In 2003, CATMA's 21-vehicle shuttle system approached two million boardings annually.

Variable Work Hours: A large number of FAHC's full-time employees work compressed schedules, where longer hours on fewer days eliminate some commuting trips entirely.

CATMA reports a total budget of \$700,000-\$800,000, with an operating budget of \$220,000. Financed by its member institutions, CATMA employs 2.75 employees to deliver its planning and TDM services. Some TMA costs are apportioned among members based on each institution's share of the projected parking shortfall. For other TMA services, such as the unlimited access

agreement with CCTA, the operational costs of the CATMA PARC Express shuttle, and the Bike/Walk program, CATMA bills usage by employees or students back to the member institution.

CATMA Results

CATMA continuously surveys employees and students to monitor trip and parking demand. This information documents program impacts for CATMA's members, clearly demonstrating the results from investments and policies, while facilitating program refinements. For CATMA's external audiences, survey results confirm ongoing commitment to and impact from transportation demand management initiatives.

As Table 1 summarizes, the proportion of CATMA employees driving alone in 2000 was lower than national, state, and county rates. The percentage of those driving alone without using shuttles is lower than the city of Burlington rate.

Table 1. CATMA 2000 Work Trip Mode Choice Comparison*

	CATMA	Burlington Chittenden County	Vermont	US
Drive Alone	73.8%	62.4%	76.1%	75.7%
With shuttle	17.3%			
Without shuttle	56.5%			
Carpooled	11.5%	12.0%	10.8%	11.9%
Public Transportation	2.2%	3.9%	1.5%	0.7%
Motorcycle		0.2%	0.1%	0.1%
Bicycle	5.2%	1.2%	0.5%	0.4%
Walking		16.8%	6.5%	5.6%
Other	2.8%	0.4%	0.4%	0.9%
Worked at Home		3.1%	4.2%	5.7%

*2000 Census data for Chittenden County, as reported on Vermont Indicators On-line. Data for VT and US from US Census. CATMA data from the TMA's publication *A Joint Institution Parking Plan, 2003-04 Academic Year*, Appendix B. CATMA combines its survey results on bicycling and walking into one category.

Table 2 documents continued positive trends in CATMA employees' choice of alternative modes and shuttle options from 2000 through 2003.

Table 2. CATMA Work Trip Mode Choices 2000 - 2003*

	2000	2001	2002	2003
Drive Alone	73.8%	69.1%	68.0%	64.8%
With shuttle	17.3%	20.5%	20.6%	15.7%
Without shuttle	56.5%	48.6%	47.4%	49.1%
Carpool	11.5%	11.5%	12.2%	11.2%
Bus	2.2%	3.0%	3.9%	4.5%
Train		0.9%	0.8%	
Bike/Walk	5.2%	10.1%	9.5%	13.5%
Other	2.8%	3.8%	4.4%	5.9%

*Source: *A Joint Institution Parking Plan, 2003-04 Academic Year*, Appendix B, prepared by CATMA.

Other Chittenden County Experience

Several large Chittenden County employers shared information on their worksites' TDM initiatives during stakeholder interviews. In addition, CCTA reported usage of its current TDM services.

Chittenden Bank – Downtown bank employees who drive alone to work pay for their own parking at a rate of \$65 monthly. The bank, however, underwrites the \$15 monthly fee for its commuters who choose the PARC shuttle. Currently, about 100 employees, 20% of the bank's downtown workforce, use the shuttle daily.

IBM – To manage peak hour congestion as its 6,000 employees arrive and leave work, IBM provides a 12-hour, three-day/four-day manufacturing schedule and offers two-hour daily schedule flexibility for its administrative staff. About 40 commuters travel by bus to one of two bus stops on the property, including one located near the facility's main lobby. IBM provides preferred parking spaces for 50 carpools and 10 owner-operated vanpools. In warmer weather, about 40 commuters bicycle to the facility.

IDX – This corporate headquarters offers commuters ample free parking, a 100% transit subsidy, and preferential carpool parking. Currently, few commuters use the preferred carpool spaces and none travel on transit.

CCTA – CCTA reports registering 200-300 commuters annually to the state-administered ridematching database, which includes about 1,500 travelers seeking carpool partners. CCTA also administers the region's Guaranteed Ride Home (GRH) program, providing up to eight free rides in emergencies annually (\$50 maximum per ride). The GRH is open to vanpool commuters, Montpelier express bus riders, and registrants in the statewide ridematching database using alternative modes at least twice weekly. CCTA reports financing six to eight rides home in a year, from the 75-100 qualified commuters.

University of Vermont students' survey – In 2004, UVM students surveyed 95 downtown businesses and employers about transportation needs. The 31 responding businesses (32.6% response rate) represented over 1,000 commuters, with the average-sized business employing 18. About half of company respondents reported promoting transportation alternatives, particularly bicycling and walking. Asked if they would consider eliminating payments for employee parking, 50% said no. The students conclude that few businesses surveyed were aware of transportation alternative program benefits⁵.

Benchmarking

CATMA's success reducing trip making to its members' worksites is consistent with national research on where and how TDM programs are most effective. Its member institutions employ larger numbers of commuters traveling to a district experiencing both congestion and constrained parking. Member stakeholders recognize transportation issues as business problems warranting resource allocation and policy-making to encourage travel options. Both the TMA and its members design TDM programs including the financial incentives (i.e. transit discounts and bicycle/walking rewards program) and disincentives (parking charges) most effective in causing mode switch. To these incentives, they add enhanced travel options (i.e. shuttle system). Finally, they market transportation in ongoing campaigns while measuring and documenting results on travel behavior.

CATMA's resulting reductions in drive alone commuting likely represent the best-case scenario in Chittenden County. Results from the enhanced TDM program launched first in downtown Burlington and the Pine Street corridor will be highly dependent on the program's eventual components. National research suggests more robust results where financial incentives are part of the program mix.

⁵ "Burlington Transportation Alternatives," presentation by UVM Service Learners, May 2004.

However, the enhanced TDM program’s operational milieu will also impact results. CATMA serves a district dominated by a handful of large institutions, employing almost 8,500 people at worksites of 50+ employees. Downtown Burlington and the Pine Street corridor house fewer commuters, dispersed among smaller employers, and include many more retailers in the mix. Downtown Burlington/Pine Street’s 5,800+ commuters at 50+ worksites, 70% of those served by CATMA, represent a smaller market for travel options.

In addition, the campus district’s employment is concentrated in only 11 employers. In contrast, Downtown Burlington and Pine Street corridor’s employment is spread among 53 employers, almost five times the number from the Hill. This dispersion represents additional challenges in reaching all the target employers, and building effective TDM programs at their worksites. Continued drive alone commuting to worksites choosing not to institute TDM measures will dilute reduced trip-making to employers with successful TDM programs, especially when viewed on an areawide basis.

A recent FHWA report summarizes the situation this way. “Demand side programs are not a panacea for all social ills or a cure-all for traffic congestion problems. However, they can have a significant impact on travel. If the correct incentives and disincentives are used to facilitate shifts to alternative modes, demand-side strategies can reduce vehicle trips and VMT 10% - 20%. Most decision-makers, however, are reluctant to adopt certain disincentives (such as parking pricing) to change travel behavior in a significant way. In the absence of these strategies, most demand management programs should only be expected to reduce travel by 0% - 5% (COMSIS, 1993). At the same time, it is important to recognize that the goals for demand-side programs often extend beyond reducing VMT to include mobility, accessibility, environmental, and other outcomes.”⁶

C. EVALUATION OF ENHANCED COUNTY TDM INITIATIVES

As Chittenden County moves toward enhanced TDM services, its plans should include an independent third-party evaluation of program impacts to ensure trip reductions and achievement of program objectives. Periodic evaluation measures performance toward goals, monitors program effectiveness, and documents quantifiable results. Stakeholders and program managers use evaluation results to refine service delivery and refocus program activities. Measurable results build credibility with policy makers, funders, business partners, and the traveling public.

Respected academic institutions represent attractive sources for evaluation expertise because of their neutrality, high level of credibility, and reasonable costs. The University of Vermont’s history of working with Chittenden County’s TDM Partners offers significant opportunities for continued collaboration.

Best practices in TDM evaluation often involve the following research:

- Database membership survey - To determine mode shift, miles of travel avoided, and the TDM program’s impact on mode choice. Research with current TDM program customers yields insights on typical commuting behavior, TDM program impacts, user satisfaction, and attitudes about program elements.
- General public survey - To determine awareness of the program, knowledge of travel options, and the impact of the program on travel decisions.
- Business community research - To gauge awareness both of the TDM program and the issues it addresses.

Some of the results anticipated from this evaluation research include:

⁶ *Mitigating Traffic Congestion – The Role of Demand-Side Strategies*, authored by Association for Commuter Transportation with UrbanTrans Consultants, Parsons Brinckerhoff, and ESTC for US Department of Transportation, Federal Highway Administration (FHWA-HOP-05-001), 2005.

- Database survey - Documents aided and unaided awareness of services and marketing messages; identifies sources of awareness (i.e. worksite, word of mouth, or advertising); measures perceived value of TDM services; and quantifies vehicle trips and miles avoided through the program.
- General public survey - Gathers data on mode splits; travel distances; alternative mode use; and employers' commute benefits programs.
- Business community research – Measures awareness of and satisfaction with TDM program services; documents use of TDM program services and marketing materials in developing worksite initiatives; yields insights for future programs and outreach activities.

Professional research expertise is most important during design of the evaluation system and its survey instruments. TDM program managers can conduct the independently designed surveys themselves in alternating years to control costs. Consulting independent evaluators every two to three years ensures that research remains valid, accurately tracking progress over time, while adapting to changes in either the TDM program or its marketplace.