

# The implementation of mobility management strategies: A comparison of recent experiences in Latin America and the United States

## La réalisation des stratégies pour la gérance de la mobilité: Une comparaison des expériences dans l'Amérique Latine et les États-Unis

C.R. Rivasplata

*Transportation Technology and Policy Program, University of California at Davis, United States  
Planning Department, San Francisco, United States*

M.A. Guilarte

*Programa de Engenharia de Transportes, Universidade Federal do Rio de Janeiro, Brazil  
Instituto Autónomo del Sistema de Transporte Masivo de Mérida (Trolmerida), Venezuela*

**ABSTRACT:** In response to chronic congestion and air quality problems, local governments in a number of countries have attempted to slow the pace of motorisation, seeking practical, low-cost transport alternatives. In designing new systems, planners have discovered that it is prudent to not only consider constructing new facilities, but also, also consider making better use of existing infrastructure. Many have concluded that for strategies to be cost-effective, Mobility Management should form part of a larger, urban transport plan. This paper discusses some of the similarities and differences in the application of MM strategies in Latin America and the United States, exploring practices in Mérida and San Francisco. Both of these cities have pioneered Mobility Management in their respective regions, providing innovative examples for other cities.

**RÉSUMÉ:** Pour répondre aux problèmes chroniques de la congestion et la pollution de l'air, les gouvernements municipaux de plusieurs pays cherchent à ralentir l'augmentation de motorisation par l'emploi de transport collectif pratique et économique. Pour la planification des nouveaux systèmes, les urbanistes ont découvert qu'il est prudent à considérer la construction de la nouvelle infrastructure ainsi que rendre plus efficace l'utilisation du système existant. On est connaissant que l'aménagement de la mobilité doit faire grande partie d'un plan de transport compréhensif, urbain et stratégique. Ce papier analyse les différences et les similarités entre les applications de l'aménagement de la mobilité à l'Amérique Latine et aux États-Unis, explorant les pratiques installées à Mérida et à San Francisco. Les deux villes ont initié les applications innovatrices dans leurs propres régions qui servent comme modèles instructifs pour des autres villes.

### 1 INTRODUCTION

In recent decades, transport planners have become increasingly aware of the need to promote Mobility Management strategies, particularly in light of the decentralisation of activities away from urban centres. The negative impacts of increasing private vehicle use (e.g., rising traffic congestion, deteriorating air quality conditions) on cities and suburban areas are well documented, causing a great deal of concern among local residents. As a result, many local governments have sought to curb private vehicle use, employing practical, low-cost solutions. They have found that whilst it is necessary to provide some urban infrastructure for the movement of goods and services, it is equally as important to make efficient use of existing infrastructure when designing mobility programmes and promoting alternative modes to the private vehicle, especially in low density communities where public transport is limited. In order to be effective, this "soft path" approach (in favour of demand management) should form part of a com-

prehensive urban transport plan. In turn, a coherent set of mobility strategies should be carefully designed to achieve the policies and objectives set forth in the transport plan.

This paper proposes to explore the development of Mobility Management strategies in both Latin America and the U.S., taking note of their similarities and differences. It will seek to define the mobility programme policies that have been successfully implemented, and where appropriate, will discuss their potential applications to other cities. In many cities throughout the Americas, there have been serious efforts to introduce Mobility Management plans aimed at providing accessible alternatives to the private vehicle. Despite their similarities, programmes in Latin America and the U.S. differ in some respects, in large part as a result of inherent differences in urban structure and employment patterns.

In particular, this paper explores innovative practices in two regional centres of Mobility Management, namely Mérida in Venezuela, and San Fran-

cisco in the United States. Whilst both cities have pioneered MM strategies, providing examples for other cities in their respective regions, they have employed very different approaches.

In San Francisco and its surrounding metropolitan area, a number of MM strategies were implemented in the 1970s and 1980s, when there was a boom in office growth both downtown and in suburban centres on the urban periphery. As in other areas of the U.S., San Francisco's efforts have often developed in response to congestion management and air quality concerns. As a result, over the past few decades a disproportionate number of MM strategies have been employer or building-based in nature (e.g., the Downtown Transport Management Programme), largely focusing resources on commute trips. Only relatively recently have local transport planners concentrated on developing MM programmes for other sorts of trips.

In contrast, in Mérida and a number of other Latin American cities, Mobility Management strategies have largely been developed in the past decade, in response to declining traffic and air quality conditions in many of the region's cities. These efforts have tended to focus on improving the areawide management of public transport and non-motorised transport, as well as better provision of basic information. For example, in 2005, Mérida introduced a number of MM measures as part of its Mobility Week activities (e.g., Car Free Day).

Later sections will review local strategies in each of these cities. How do these approaches compare and what lessons can be learned from past successes/failures in each of these regions? A review of recent practices will contribute to a useful exchange of experiences, and perhaps, serve to broaden the set of programme alternatives available to cities in both of these regions.

## 2 MOBILITY MANAGEMENT

Mobility Management (MM), otherwise referred to as Travel Demand Management (TDM) in the United States, encompasses a diverse set of transport strategies that promote the effective and efficient use of existing and renewable resources in urban areas. Increasingly, planners and politicians have embraced Mobility Management as a link through which to strengthen and coordinate the various components comprising regional transport systems.

Rather than accept the status quo position of merely increasing the supply of road space for private vehicles, Mobility Management strategies advocate increased use of alternative options, such as public transport, bicycling or walking. This demand-side focus responds to documented evidence showing that in most cases, increases in road capacity do not provide long-term solutions to traffic con-

gestion. In fact, the widening of roads and highways tends to encourage private vehicle use, leading to further increases in traffic levels and congestion. Clearly, these demand-side options normally require far less space and are more energy efficient than private vehicle-oriented supply-side options are. In addition, they are far cheaper to use for the user, i.e., when gas, maintenance, insurance and other costs are taken into consideration.

In general, MM strategies normally focus on increasing the proportion of travellers to private vehicles, utilising existing facilities (e.g., public transport infrastructure), and often, placing restrictions and/or fees on the use of the automobile, except in special cases. In essence, MM can be divided into three principal areas of emphasis: alternative means of transport; incentives and disincentives; and the reorganisation of work schedules.

In practice, MM strategies have been developed to address all kinds of trips, such as those based on geographic location, trip purpose, route, mode and time-of-day. The development and implementation of these strategies normally entail a good deal of planning and negotiation with authorities and businesses. Often, they are closely linked to wider government policies and actions advocating low cost solutions to many of the urban mobility issues encountered by large and medium-size cities.

Whilst Mobility Management has seen wide application in Europe and North America since the 1970s, it has only recently been introduced to middle-income countries in Latin America. In retrospect, many of the concepts central to Mobility Management evolved from programs implemented during World War II, when residents of the United States were asked to reduce their consumption of energy, in support of the war effort. For example, residents were encouraged to take public transport or rideshare to work.

Although use of the private vehicle skyrocketed following the war (after 1945), these strategies were adjusted to respond to the oil and congestion crises of the 1970s. Similarly, in the 1990s, Latin America became acutely aware of the need to seek low-cost solutions to explosive growth in motorisation.

## 3 LATIN AMERICA

### 3.1 *Background: recent experiences with MM*

In Latin America, as in many other regions of the Developing World, Mobility Management provides an opportunity to develop transport options, tailoring strategies to local conditions. Certainly, many countries in this region are economically constrained and cannot easily finance high capital investments in transport without assuming a significant level of debt, effectively preventing investments in other critical sectors (e.g., housing). In contrast, Mobility

Management offers localities a framework through which to wisely make use of existing resources and low-cost investments, providing residents and other travellers with a diverse set of mobility options.

Recently, many transport policies in Latin America have been linked to investments in infrastructure, road management and technology, commonly regarded as supply-side measures. However, in some countries, these measures have been complemented by demand-side measures linked to improvements in transport organisation, information and awareness campaigns. In addition, demand-side measures have included successful marketing efforts, such as the promotion of public transport, bicycling and walking. These alternative modes have been found to stimulate urban development and sustainable transport, i.e., in response to problems related to social exclusion and economic hardship, factors that are always on the rise in large cities.

In Latin America, it is important to highlight the example of Brazil, a country that took the initiative to create MM-related legislation, providing a political response to perceived mobility problems. In November 2004, the National Policy on Sustainable Mobility entered into practice. This policy is considered innovative for Brazil and Latin America, and its introduction is considered to be a first step toward successfully implementing Mobility Management measures in Brazil. It embodies the federal government's stance on Mobility Management in Brazil and has received the support of state and municipal governments there. It focuses on people and not vehicles, attempting to develop and articulate individual policy components for transport, accessibility, circulation and urban space; stimulate the use of nonmotorised modes of transport; reduce spatial exclusion and improve urban environments.

This policy could contribute to resolving many of the conflicts facing Brazilian cities, since it appears to transcend the existing barriers that have limited policymaking and transport planning in Brazil. National transport policies in Brazil have traditionally been automobile-oriented, targeted at residents that can afford the costs of owning a private vehicle (Vasconcellos, 1996), to the detriment of those that cannot, i.e., a majority of the population. It is interesting to note that in the case of Brazil, 45 percent of the urban population makes less than three minimum wage salaries, clearly limiting this sector's access to transport (Ministério das Cidades, 2003).

Another country that has advanced in the development of infrastructure investment programs is Colombia (CAF 2004). Based on a wider vision to improve quality of life in Bogotá, the municipal government implemented a plan for urban reform that supported the Kyoto Protocols in the reduction of vehicle emissions, effectively paving the way for worldwide support and funding for the Transmilenio Project. At the same time, the City of Bogotá devel-

oped the "Ciudad Humana" Project, which has focused on more efficient use of public spaces. This project was implemented in tandem with a set of informational, educational and awareness campaigns promoting the benefits of sustainable mobility.

Collectively, these efforts played a key role in the advancement of Mobility Management. A general referendum was placed before the voters to gauge the level of support for MM measures, such as Car Free Day campaigns in Bogotá. This referendum, the first of its kind in Latin America to be passed by a majority of the voters, lends widespread support to the Transmilenio and Ciudad Humana Projects. In Colombia, this result reflected a significant change in the attitudes of users, operators and the community in general.

Whilst Chile has yet to identify a focused Mobility Management policy at the national level, the Transantiago Plan has employed MM principles in the development and reorganisation of transport in Santiago. For example, the Plan promotes the use of public transport and nonmotorised modes through improved facilities and the implementation of a road charging scheme. One of the principal objectives of the Plan is to make public transport a better choice for travellers through the establishment of higher standards of planning and investment, i.e., contributing to the development of an environmentally sustainable system.

The Plan proposes to create ten public transport zones, providing local services to key destinations, as well as feeder services to trunk routes. Besides restructuring the bus system and significantly expanding the Metro, Transantiago will theoretically provide for the physical, fare and informational integration of bus and rail modes in Santiago (MOPT 2004). More importantly, under a single operating agency, the Transantiago Plan will introduce institutional integration to the system.

Venezuela has also made very important advances in the development and dissemination of MM strategies, with clear plans for involving the general public in future campaigns. However, whilst the National Assembly approved legislation in support of the Kyoto Protocols, there is not yet a clear policy direction stemming from this action, nor is there widespread understanding of the potential benefits of Mobility Management.

Nevertheless, a number of presentations have been made on the subject and a detailed process of consultation has been initiated with the three principal levels of government: federal, state and municipal. As a result, in recent years, a small number of cities and states in Venezuela have come to appreciate and even embrace many of the key principles of Mobility Management, in many instances, adjusting traditional MM programmes and campaigns to better suit the needs of local users and transport suppliers.

The next subsection provides a description of Mérida and its efforts to implement MM.

### 3.2 Case study: Mérida

One of the most recent cities to develop a comprehensive set of activities in support of the local transport system and MM in particular, is Mérida, in Venezuela. As the city develops its new trolley bus system, a visionary team of planners (e.g., from local government and the local university) has developed a comprehensive transport plan to integrate the city's public transport modes and together with non-motorised modes, provide local residents with a viable set of mobility options.

This city, located at 1,600 metres above sea level in the Andes Mountains of Western Venezuela, currently has a population of about 300,000 inhabitants. It is a regional centre serving a vast hinterland, and is capital of the State of Mérida. Apart from its key role as an administrative centre, Mérida is also home to the Universidad de Los Andes, a well-respected institution that has historically played a key role in local politics and development.

An increasing number of private, single-occupant vehicles contribute to the growing deterioration in the quality of life of the residents of Mérida, a city that faces the geographic limitations of being located on a narrow plateau in an environmentally sensitive area. The supply of public transport is limited and of poor quality, factors that further complicate travel patterns and efforts toward making mobility sustainable, especially in light of the fact that petrol is cheap and automobiles are generally affordable in Venezuela. In addition, Mérida is monocentric in form, a factor explaining why traffic congestion in the historic centre is so bad.

Similarly, there is a lack of informed decision-making on the part of the university students in their choices of travel. Some of these students possess a low level of environmental awareness, leading to a low level of appreciation for the local surroundings.

In synthesis, the following problems have plagued Mérida in the past:

- Environmental degradation;
- High travel costs and social exclusion;
- Low quality public transport;
- Congestion and stress;
- Lack of alternatives to the car;
- Decreasing quality of life for residents; and
- Lack of reliable information

Due in large part to the increasing mobility demands placed on the system by local residents, local authorities decided to integrate public transport modes in the city – a project initiated in 1997, and initially implemented in 2000. There have been three separate local government efforts that have raised expectations among the populace. Unfortunately, a number of administrative difficulties and

delays generated widespread discontent and impatience among residents.

For this reason, it is necessary to develop an MM programme that will inform, educate and raise awareness so that residents are prepared for upcoming changes in the transport system. It is also important to gain the confidence and patience of local residents in the coming years. In this sense, an attempt is being made to initiate the process of preparing residents one year in advance of the official opening of the trolley bus and the integration of services, in order to create a new “mobility culture” in the city.

In 2005, the first Sustainable Mobility Week in Venezuela was held in Mérida. The initiative was developed by the Autonomous Institute of the Mérida Transport System (TRÓLMERIDA), in response to a perceived need to not only build a trolley bus system, but also develop an integrated network of transport options in the city. Subsequently, the proposal was submitted to all three levels of government listed above.

Once the proposal was accepted and assessed, a series of working meetings was initiated, consistent with the aforementioned objective to incorporate all key sectors of society into the planning process. Later, information was provided through diverse means of communication, beginning with a public outreach effort. The campaign organisers developed a campaign to familiarise individuals with the concepts associated with an integrated transport network and sustainable urban mobility.

The Sustainable Mobility Week effort had a number of aims. First it was designed to inform, educate and make citizens aware of the program, creating a new culture of mobility and a new awareness in the city, whilst encouraging active public participation in key events (Car Free Day, International Mobility Seminar, and Closing Ceremonies). It was important to document these activities in order to assess the results and plan for future educational and institutional campaigns.

It was also important to continue promoting activities related to sustainable mobility, with the intent to inform people of the benefits generated by these activities and their effects on the investment of alternative means of transport. For instance, Trolmerida and other agencies have initiated an effort each month to provide information on public transport (e.g., the trolleybus, upcoming modal integration) at two community centres.

Finally, the principal aim of this effort was to promote a set of alternative means of transport (to the private vehicle) that effectively provides the citizen with sustainable mobility, and at the same time, encourages the responsible and rational use of the automobile, informing the citizen of the impacts of this mode on environmental quality. In addition, it is intended to serve as an exemplary experience for other Venezuelan cities.

In the Mérida case, Mobility Management measures focused on demand management strategies for passengers and goods, including new associations and a set of tools to promote changes in attitude and behaviour concerning sustainable transport. These tools have largely been based on informational programs, as well as sound organisation, coordination and concept promotion, where necessary.

Thus, through these activities, the principal objective for Mérida has been to familiarise residents with the key concepts of Mobility Management. These activities have sought to make public transport trips more accessible; help remove personal biases, inhibitions and worries; stimulate the generation of independent trips; and improve the image of public transport, especially with relation to the trolleybus. These actions are being taken in response to the proliferation of the private vehicle and the negative effects that this has produced in the city.

### 3.3 Possible applications of MM in Latin America

In view of the local circumstances affecting Latin America, for the effective implementation of MM strategies there are a number of conditions that must be satisfied. First, it is important to have a local or regional authority with the necessary power to make changes that will stimulate an increase in mobility. In addition, it is important to keep staff and overhead costs low relative to capital costs.

Likewise, it is necessary to make sure that the institutional and legal barriers confronting a city are indeed, conquerable. If possible, transport policies and direction should be oriented such that local authorities are in a position to bring changes that will help solve key transport problems. In addition, these authorities should recognise that in the process of seeking solutions, some risks will clearly need to be taken. There are also risks in dealing with high profile problems: these are often of greater importance to the public (Gakenheimer 1999).

In addition, there are factors that can potentially guarantee the successful introduction of Mobility Management. For example, in Venezuela, there are a number of factors affecting urban access to activities, including levels in the quality of life, the relative costs of petrol, the social costs of congestion and air pollution, as well as such factors as household incomes and travel distance and ease of access to travel modes.

With the effective planning and implementation of the First Mobility Week in Mérida, the first steps were taken to create a “sustainable mobility” culture in the city, and to encourage the active participation of Venezuela in the efficient use of carbon and fulfillment of its commitment to international efforts to promote sustainable development.

Clearly, many of the aforementioned activities facilitate the application of MM measures, at the

same time resolving local issues that often, transcend the institutional barriers that limit the long-term effectiveness of transport policy and planning (Guilarte et al 2005).

Finally, in some countries, there currently exist favourable conditions for creating a new direction for urban mobility, especially in such places as Mérida, where many of the MM activities have recently been well received, reflecting a change in consumer attitude toward local transport. As a result, public opinion in Mérida is generally positive with respect to the implementation of a new public transport system.

## 4 UNITED STATES

### 4.1 Background: a car-dominated Society

For the past 50 years, the private automobile has clearly been the dominant mode of transport in the US. Up until the 1940s, public transport was the principal means of travel for work trips, and the automobile was primarily used for recreational travel. However, as early as the 1920s, public transport experienced the first signs of gradual decline, a phenomenon postponed in part by the Great Depression and World War II.

Nevertheless, after 15 years of economic depression and war, in the late 1940s, the country experienced growth and urban expansion. The automobile soon became a necessity for commuting and shopping as average travel distances further increased. By the 1950's the automobile industry was thriving as Americans began buying new vehicles at alarming rates. In addition, the 1956 Interstate Highway Act, which financed the eventual construction of a massive national freeway network, further promoted private vehicle travel.

Presently, Americans are probably one of the most mobile populations in the world. In 2000, they logged a total of 7.6 trillion passenger kilometres on all motorised modes, an increase of 24 percent over 1990, when they accounted for more than 6.1 trillion passenger kilometres. In 2000, automobiles and trucks accounted for approximately, 85 percent of those kilometres, aircraft about 11 percent and public transport close to 4 percent (USDOT 2003). On average, this amounts to more than 25,000 passenger kilometres per person per year.

The number of vehicle kilometres travelled (VKT) has increased despite occasional threats of fuel shortages and environmental degradation, especially in major metropolitan areas of the U.S. Between 1991 and 2001, VKT per capita increased in almost every year. For instance, per capita highway VKT increased by about 1 percent per year during that period, whilst per capita large aircraft VKT increased by 3 percent per year. These and previous increases reflected not only rises in population, but

also increases in the number of trips made per person and the per capita trip length travelled (Pisarski 1992, USDOT 2001). Changes in propensity to travel can be attributed in part to a higher proportion of licenced drivers, particularly women, and a higher number of vehicles on the nation's roads.

The trend toward higher person trip rates and a greater tendency to travel by private vehicle has resulted in a corresponding increase in the total VKT, and a minor shift in modes from public transport and walking to private vehicles, at least up until the mid-1990s. For example, whilst average vehicle occupancy levels for all trips decreased, from 1.9 in 1977 to 1.6 in 1990 (Pisarski, 1992), it did not continue decreasing in the 1990s, and in fact, is reported to have been just above 1.6 in 2001 (USDOT 2001).

Bus patronage has grown in some urban markets over the past few decades, most notably New York and Los Angeles, however, public transport has lost mode share, especially for trips outside of the commute. According to National Personal Transport Survey (NPTS) statistics, in 1969, public transport carried almost three percent of all trips; but in 1995, it carried less than two percent (FHWA, 1995). The most recent data show that in the U.S., public transport still carries fewer than two percent of all trips (USDOT 2001).

In the U.S., many government authorities and private employers have advocated the implementation of MM for the past 30 years. In some areas it has been an instrumental tool in the management of growth, especially in new areas of development. In other areas, local governments have been less willing to require that employers or building owners pressure their employees or tenants to alter their travel behaviour.

#### 4.2 *Federal legislation*

In 2005, the United States Congress approved legislation authorising the new TEA-3 Transport Bill. This recent legislation builds on the initiatives established in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and the Transportation Equity Act for the 21st Century of 1998 (TEA-21). TEA-3 combines the continuation and improvement of current programmes with new initiatives to meet the challenges of improving safety as auto traffic increases to record levels. It seeks to protect and enhance communities and the natural environment, advancing U.S. economic growth and competitiveness domestically and internationally through efficient and flexible transport.

Whilst the reauthorisation of this transport legislation was essential, most of the key provisions in support of MM were introduced by TEA-21 in the late 1990s. For example, it was TEA-21 that initially amended the federal tax code to allow employers to offer their workers public transport subsidies, sig-

nificantly improving the environment for employer-sponsored commute incentive programmes. As a result, under TEA-3, employers can continue to offer employees flexible MM programmes.

The TEA-21 bill also modified provisions in the U.S. Internal Revenue Code concerning the tax treatment of employer-sponsored programmes that encourage the use of public transport through fringe benefits. Now, more employers are able to provide subsidies to their employees through public transport cheque voucher systems, available in numerous U.S. cities. The TEA-21 legislation was the first of its kind to allow employers to substitute public transport benefits for parking benefits.

Before the passage of TEA-21, employers were permitted to give employees public transport and vanpool fringe benefits that were excludable from gross income "only if they were provided in addition to or in lieu of, any compensation otherwise payable to the employee" as part of a MM programme (USDOT 1998). As such, employee parking benefits were already excludable from income tax under the 1997 Taxpayer Relief Act. With passage of the TEA-21 bill, employers can now offer public transport and vanpool fringe benefits to employees in lieu of compensation. This provision effectively gives public transport and vanpool benefits the same tax treatment as parking benefits (USDOT 1998).

Thus, under TEA-21, employers are allowed to deduct up to US\$65 a month from an employee's pretax salary and return it in the form of a public transport or vanpool pass/voucher. Beginning in 2002, the nontaxable limit for employer-based public transport and rideshare benefits increased from \$65 to \$105 per month. However, all employer benefits were indexed for inflation, so monthly public transport benefits and monthly parking requirements changed gradually over the first few years (Camara and Rivasplata 1999).

Importantly, TEA-21 began to reward the employer for passing on a form of public transport or vanpool subsidy to the employee. Employers are now able to offer employees options for transport fringe benefits, in addition to, or in lieu of present compensation. In addition, whilst employers are not required to participate in "cash-out" programmes, i.e., whereby employees may choose to cash-out the value of employer-provided parking and receive the cash value of parking or public transport/vanpool benefits, many employers now charge for single-occupant parking, effectively discouraging employees from driving to work.

Despite the overall improvement in transport incentives benefits to a large number of employees, for a variety of reasons, many employers still do not take advantage of these provisions in the Federal Tax Code. Whilst more and more employers are finding it advantageous to offer their employees public transport cheques that they can later claim,

other employers feel that they do not benefit monetarily from offering public transport subsidies, or feel that they do not have enough employees to make it a worthwhile venture in the long-term (Camarra and Rivasplata 1999).

In addition, many public sector agencies do not offer public transport subsidies because of the fact that these Tax Code incentives primarily apply to private employers and the public expense of providing an employee allowance programme is too great. Indeed, some city agencies offer minor pre-tax savings for employees to purchase tickets, however, these programmes attract relatively few employees. Similarly, some state and local agencies have relaxed congestion management or air quality requirements, effectively allowing employers to forego past responsibilities. This has primarily been a concern in large cities, such as Los Angeles.

#### 4.3 Case study: San Francisco

The City of San Francisco has historically been the principal hub of the Greater San Francisco Bay Area, a metropolitan region consisting of nine counties and encompassing more than 18,000 square kilometres. Currently, the Bay Area has well over six million inhabitants, making it the fourth most populous urban area in the United States. San Francisco's population totals over 750,000, or 12 percent of the regional total. Whilst the City of San Francisco has seen a decline in its overall proportion of Bay Area residents and employment, it has maintained its role as the primary financial, cultural and administrative centre for the region (Rivasplata, 1997). Despite the growth of the Silicon Valley and other suburban office areas, Downtown San Francisco remains one of the most highly concentrated centres of office and retail activities in the U.S.

One important tool that has allowed the city to further concentrate development in its downtown core has been the comprehensive provision of public transport. In contrast to many other cities west of the Mississippi River, by the early 1900s San Francisco already had a compact and well-developed business district, a citywide street grid designed for walking and a network of street railways. In some respects, geography gave the impetus for the development of transport options in the region, as evidenced through the introduction of the cable car in 1873. Located on a narrow peninsula between the Bay and the Pacific Ocean, San Francisco remained both isolated (accessible mostly by ferry and railroad) and insulated from many of the impacts of the post-World War II automobile era. Residential districts fanned outward from downtown along the streetcar lines, and by the 1920s and 1930, most of the vacant buildable land in the city was already developed. Even after its principal bridges were built in the 1930, access to the city remained limited. In

this high-density urban environment, public transport is still the most efficient mode.

Importantly, in a city where the architectural and physical allure has helped build a thriving tourist industry, the freeway-building programmes of the 1950's and their resulting destruction of city neighbourhoods and landscapes quickly ran afoul of local sentiment and politics. The city's Freeway Revolt of the 1960's brought an end to the local freeway building boom, halting viaducts in mid-construction, and provided the impetus to build the nation's first post-WW II rapid transport system, Bay Area Rapid Transit (BART), which opened in 1972 (Rivasplata and Albert 1998). In addition, the environmental movement and the energy crisis encouraged regional investment in public transport, including a new light rail subway in downtown San Francisco and revival of the ferry system, abandoned when the bridges were built. San Francisco was able to maintain its position as a regional public transport hub.

In 1973, the city's Board of Supervisors passed the "Transit First Policy" resolution, formally establishing public transport as the primary mode of travel to, from and within the City of San Francisco. This policy effectively gave public transport priority over private vehicles, both in terms of planning and funding. One key piece of legislation passed in support of this policy was the Transit Impact Development Fee (TIDF) Ordinance, which required that sponsors of new office buildings downtown pay a one-time fee per square metre of building area to cover the public transport costs of serving an increasing number of employees. This fee was restructured in 2004 to encompass all non-residential uses throughout the city, providing the local transport operator with additional revenue.

Similarly, a principal tool in the implementation of the Transit First policy was the development of a Transit Preferential Streets (TPS) network that enhanced services on key routes. The city's Planning Department, Municipal Railway, and Department of Parking and Traffic worked together to identify street segments where public transport patronage, frequency and transfer activity was high and overall service was negatively affected by vehicle traffic.

Subsequently, modifications were recommended for segments of the TPS network to improve the flow and operation of public transport systems, enabling them to be more attractive to riders and competitive with the private vehicle. These modifications included the designation of exclusive bus and light rail lanes, traffic signal modifications, public transport stop relocations and consolidations, streetcar boarding islands, and sidewalk extensions at intersections. In addition, this network established a series of "transit centers" located at major points of interchange (e.g., at BART and key bus nodes).

The TPS programme was formally initiated in the late 1970s, and for the first ten years relied on federal funding, however, a ½-cent sales tax package (Prop. B), approved by San Francisco voters in 1989, provided funding to the new San Francisco County Transportation Authority (SFCTA). Similarly, in 2003, voters approved Prop. K, reauthorising the use of these ½-cent sales tax funds for the further development of TPS and the introduction of Bus Rapid Transit (BRT) along a few of the high-volume TPS corridors of the city.

Since the Transit First policy was approved, San Francisco has enjoyed general success in the implementation of related policies. Whilst much of this success is attributed to the TPS programme and its improvement of key “transitways” throughout the city, citywide MM policies and programmes have complemented these changes with the widespread provision of informational services that facilitate the use of public transport and non-motorised modes and the improvement of intermodal facilities (e.g., bus-bus interchange, the accommodation of bicycles on certain public transport modes).

One area where MM has helped reduce dependence on the automobile is in parking. Whilst the city does not have a firm cap on parking in the downtown, its policies call for discouraging new long-term parking facilities in a downtown parking area and encouraging the transition of long-term parking to short-term use to meet business needs (Kohlstrand, 1991). With the exception of residential uses, off-street parking is not required in the downtown. Parking rates are also controlled to ensure that new parking is governed by a rate structure that favours short-term users and discourages long-term users with regressive rates. Between 1965 and 1987, the supply of off-street parking spaces in the downtown actually decreased slightly, even as job growth increased dramatically. In the 1990s, however, there was some growth in parking supply.

In terms of employer-based Mobility Management is concerned, since 1979 San Francisco has required that building sponsors and managers implement programmes for their tenants as part of the building approval process. In the 1970s, increases in downtown employment prompted concern that the existing infrastructure would not be able to handle more commuters unless MM measures were implemented. The original intent of the downtown MM programme requirement was primarily to manage growth and co-ordinate future transport improvements with land use.

As regulator of the Planning Code, the Planning Department monitors these buildings on a regular basis, blocking permits where programme efforts have not been satisfactory. In essence, all new downtown office buildings of more than 9,300 square metres are required to provide on-site transport brokerage programmes. These normally pro-

vide rideshare and public transport information, identify public transport ticket and pass locations, conduct periodic surveys and manage on-site parking (Kohlstrand, 1991).

At the regional level, the Metropolitan Transportation Commission (MTC), the planning organisation for the Bay Area, has helped co-ordinate the schedules, fare structures and service areas of at least 28 public transport operators. Interoperator passes, stored-value tickets, expanded interline transfers and extensive marketing efforts have helped improve travel times, fare savings and user access to public transport throughout the region. With San Francisco's daytime employment population so dependent on regional public transport services, these co-ordination efforts have helped keep downtown San Francisco in the top tier of Bay Area employment centres and the region's primary cultural centre, despite the growth of jobs and housing in Silicon Valley and the East Bay (Rivasplata and Albert 1998).

Recently, local and regional efforts to encourage the use of public transport and other alternatives through MM measures have begun to pay off in the form of significant economic advantages. Based on its involvement in Mobility Management efforts and a relatively high public transport mode share, San Francisco was given an exemption from having to prepare a Trip Reduction Ordinance, a requirement imposed on employers with work sites of more than 100 employees. Results of the Citywide Travel Behavior Survey confirmed that San Francisco had already exceeded the targets for vehicle occupancy for 1999, and was therefore in compliance. Large employers in San Francisco were spared the administrative burden of preparing trip reduction plans.

Another benefit of the reduction in vehicle emissions generated by the Transit First Policy and complementary MM programmes was the 1995 designation of the Bay Area as a Clean Air Attainment Region by the Environmental Protection Agency (EPA). The Bay Area, the largest metropolitan region to attain this status, was exempt from relevant sanctions and further administrative burdens that apply to non-attainment regions.

Accordingly, one measure of the success of MM has been the high level of support San Franciscans have had for investment in significant public transport projects, often at the expense of private vehicle-oriented facilities. Nevertheless, gaps remain between the areas of intensive public transport service and high-density activity in downtown San Francisco, particularly where regional services are not well connected to local service, and where local public transport operations are hindered by street congestion. The effectiveness of MM and the TPS network has been demonstrated in several areas however, many thoroughfares are critical to both public transport and private vehicle traffic. Often, there is li-



limited flexibility (e.g., road space) to make further substantial public transport improvements on key surface streets.

The growing reverse commute pattern further challenges the effectiveness of MM and the Transit First Policy. Each year, more city residents are commuting to outlying areas, particularly employment centres in the Silicon Valley, where the local public transport service is not as well developed as in most areas of San Francisco. As a result, in some respects, public transport service to these outlying areas is more important to San Franciscans, who boast the lowest rates of vehicle ownership in the Bay Area.

At the same time, the San Francisco real estate market for both commercial and residential development is very strong. Despite the existence of the city's Transit Development Impact Fee, improvements in public transport infrastructure often lag behind demand. Significant improvements are currently underway, however, the immediate demand for access and mobility often overwhelms the existing system and deters new riders.

In turn, this increases the political pressure to provide additional street capacity and off-street parking, in defiance of the wisdom and success San Francisco has demonstrated in constraining both over the last two decades. Many Transportation Management Associations rely on voluntary participation, and some building owners are abandoning TMAs, citing the effort, cost and lack of interest.

Thus, whilst a number of funding and institutional issues still confront local implementing agencies in San Francisco, MM programs have been maintained and improved, largely due to existing legislation and the establishment of building-related requirements downtown and in a small set of suburban locations.

## 5 CONCLUDING REMARKS

Whilst there are numerous differences in transport infrastructures and travel behaviour patterns not only between the U.S. and Latin America, but also, within each of these regions, there are valuable lessons to be learned when developing objectives and policies for Mobility Management.

For instance, by modifying long-term travel behaviour through incentives, emphasising choice, flexibility and convenience, MM helps users of the transport system accept and appreciate the benefits of alternative modes. Nevertheless, these benefits are seldom self-evident. Comprehensive education and awareness remain the critical link between the will to implement MM programmes and to maintain them, both on the part of the public and private sectors. In addition to clean air and reduced congestion, emphasis must be given to the considerable

cost-efficiencies of doing business in cities that MM and local policy have helped create, especially as other metropolitan areas continue to struggle.

In effect, Mobility Management attempts to respond to travel demand, maximising the benefits offered by investments in transport supply. It has often been shown that a sensible way to respond to mobility problems is to search for balance between actions taken by the diverse set of actors involved, as well as to encourage the use of alternative modes of transport (in place of private vehicles). Together, transport planning and Mobility Management provide many of the tools necessary for this collaboration between stakeholders.

Nevertheless, Mobility Management is certainly much more than the mere substitution of private vehicle trips with alternative mode trips. It can also inform and educate the traveller so that he/she makes a responsible decision regarding mode choice. This is why it is so important to have a strong authority in place to provide institutional support. In addition, it is helpful to have an influential political figure (e.g., mayor or council member) that will champion the effort. In this sense, informational, educational and awareness campaigns are key to the larger process of urban change. For positive changes to occur, there has to be a change in the way the public sees mobility issues and strategies to solve them.

The greatest challenge for technicians, politicians, academics and the community in general is to view sustainable mobility as an agent for restructuring the city. The three principal levels of government (federal, state and municipal) must be made aware of the need to pay particular attention to MM and its potential for addressing some of the critical mobility issues facing cities throughout the region.

However, planners must tailor MM strategies to local mobility needs. For instance, some of the Mobility Management measures most easily applicable in the Venezuelan case include informational, educational and awareness campaigns; public-private partnerships; before and after studies; alternative modes promotions; new transport technologies; high-speed rail privatisation; public transport route and corridor concessions. In contrast, in the United States, employer-based tax incentives and local public transport pass sales have played a larger role in the commuter-based MM strategies there, in large part due to the relatively high level of automobile ownership. In both cases, there is a need for greater integration of services.

Once it has been determined which Mobility Management measures are most applicable to a specific situation, it is necessary to consult the specialists in the field, as a diverse set of MM programmes have already been designed and implemented in a number of cities. This consultation should encompass the sharing of information with MM specialists throughout the world: Europe (Netherlands, United

Kingdom), North America (United States and Canada), Latin America (Brazil, Venezuela, Colombia, Chile), and Africa (South Africa). The principal objective of this consultation and exchange should be to identify the factors and conditions necessary for implementing Mobility Management in a specific city.

Ideally, MM plays a critical role in whetting the traveller's appetite for public transport. For example, it has the potential to generate the higher public transport patronage necessary to justify investments in new, cost-effective transport systems. This fact underlines the importance of periodically monitoring MM programmes: they must continue to be relevant to receive continued support from the local public.

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Retour Session

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