Transportation Demand Management (Click on section to go to article)

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In June 1975, Singapore introduced a cordon road pricing system called the Area Licensing Scheme (ALS). Originally aimed at discouraging commuter traffic from entering the central business district, and applied only to private cars during morning peak hours, its objective was broadened in June 1989 to include the overall management of traffic congestion. Until the ALS was superceded by the current electronic road pricing system, it covered all vehicles (cars, taxis, delivery vehicles) during the afternoon and morning rush hours.

The Singapore concept involved four components: a restricted zone, restricted hours, a restricted class of vehicles and license fees. The restricted zone was defined by an imaginary cordon drawn around the most congested part of the city. During the restricted hours (7:30 am to 10:15 am and 4:30 pm to 6:30 pm) all vehicles except transit buses and emergency vehicles had to display "area licenses" to enter the cordoned area, called the restricted zone. Originally, carpools were given free entry into the zone. The carpool exemption was revoked with the introduction of the broadened ALS in June 1989. A daily license cost $3 Singapore dollars ($1.87 U.S. dollars) for private cars, taxis and delivery vehicles and double that amount for company-owned cars, which are often used to chauffeur senior executives to and from work. Monthly licenses were available for $60 Singapore dollars ($37.50 U.S. dollars).

Enforcement was carried out by policing entrances into the restricted zone. Visual inspection was facilitated by windshield stickers that came in different shapes and colors for different months and types of vehicles. Beginning in May 1998, an Electronic Road Pricing (ERP) system replaced the visual inspection of windshield stickers. The current system involves roadside transponders installed at entry points, that cause on-board units installed in vehicles to deduct the amount of the toll from a stored-value "smart card". With the automation of the system, it is possible to apply variable charges varying with the time of day, thereby endowing the system with a true congestion pricing capability. (see 2.1.7)

A road pricing study was commissioned by the U.K. government in 1991 from a consortium of 15 academic groups and private consulting firms. The study team was asked to examine the feasibility of introducing electronic road pricing in three areas of London: a central zone, roughly the area circumscribed by the Circle Line of the London Underground; a much larger central city area bounded by London's ring roads; and the entire urbanized region within the M-25 beltway (the latter was dismissed by the study team as too large an area for a practical road pricing scheme.)

The team investigated six charging systems, all of them employing some form of wireless communication between the vehicle and roadside receivers. The simplest version would involve "read only" tags (transponders) mounted on vehicles, and roadside monitors. More advanced versions would both "read" the tag and deduct the amount of the toll (which could vary by the time of day) from the driver's pre-paid stored-value tag, thus doing away with the need to collect tolls or bill motorists by mail. The most sophisticated version would employ satellites to track vehicle movement and then charge drivers for the exact distance they traveled in the controlled area.

The study team concluded that road pricing in London would be complicated and difficult but not impossible. The authors warned, however, that "it is not yet clear whether [the necessary] technology could be sufficiently reliable and accurate to implement charging in a city of the size and complexity of London."

The report was formally delivered to the government in December 1994. However, UK transportation officials were reportedly wary both of the politics and the practicality of road pricing in London and would prefer initial trials in smaller cities first. Even these small-scale field tests are unlikely to take place before the end of this decade. As for London, the British government has reportedly ruled out deployment of road pricing deployment for at least a decade.

Ref: Traffic Engineering + Control, March 1996, p.178

(Ed. Note: this described the status of road pricing in the U.K. in early 1996. For the current status of U.K. government position on road pricing, see 2.1.8)
CONCEPT: Congestion Pricing

PROJECT NAME: Cordon Charges

LOCATION: Trondheim, Oslo and Bergen, Norway

Over the past 10 years, three Norwegian cities —Bergen, Oslo and Trondheim— have implemented cordon charges on vehicles entering the city centers by establishing a toll ring around the downtown area. Bergen, Norway's second largest city, pioneered the approach in 1986. Oslo and Trondheim followed, in February 1990 and October 1991 respectively. The toll rings were set up by the Norwegian parliament on an experimental basis, with a sunset provision. The Bergen toll ring is scheduled to expire in 2001, while the Oslo and Trondheim toll rings will terminate in 2007.

Electronic toll collection technology is used to charge motorists a fee for entering the city center between the hours of 6 am and 5 pm. Saturdays and Sundays are free, except in Oslo. Bergen, Oslo and Trondheim have 8, 19 and 13 toll stations respectively. The rates range from 60 cents (in Bergen) to $1.50 (in Oslo). All three cities offer electronic non-stop payment.

The toll ring systems were sold to the public as a revenue raising mechanism, to finance transportation infrastructure improvements. Initially, all of the toll proceeds were dedicated to road construction and congestion relief. Subsequently, 20 percent was set aside for public transportation, as a gesture to gain the support of transit and environmental constituencies. The idea of using variable tolls as a demand management tool was not considered until recently. Now, all three cities are thinking of replacing the current system with a system of variable tolls to control rising levels of traffic congestion in the heart of the city. The new plan calls for dividing the central district into four sectors or "cells" and to levy a rush hour toll on vehicles moving between the cells. The aim is to cover the one-third of commuters who live within the cordon area and thus avoid paying a toll. The second-generation toll system will employ electronic toll collection technology that will do away with the need for toll gates and will make it possible to vary tolls dynamically, in small steps.

The idea of dividing a city center into sectors for purposes of traffic management comes from the Swedish city of Göteborg (Gothenburg), which has had a system of traffic "cells" since 1971. However, Göteborg had to establish physical barriers between its sectors, rendering crosstown vehicle movement impossible. The Norwegian cities, taking advantage of advances in electronic toll collection technology, are able to apply a less drastic and politically more palatable approach.

Ref: Tolltrans Oct/Nov ’98; Toll Roads Newsletter, Dec.’96. 5/99
INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: TRANSPORTATION DEMAND MANAGEMENT

CONCEPT: Congestion Pricing

PROJECT NAME: U.S. Pilot Demonstration Projects

LOCATION: Various

A series of “pre-implementation planning studies” of congestion pricing is underway in five jurisdictions under the aegis of the U.S. DOT-sponsored Congestion Pricing Pilot Program:

- San Francisco: Raising current $1 toll to $3 during peak periods on the Bay Bridge
- Minneapolis/St Paul, MN: Gauging public acceptability of congestion tolls on metropolitan highways
- Los Angeles, CA: Feasibility and public acceptance of congestion pricing and VMT/emissions fee
- Portland OR: Technical and political feasibility of congestion pricing on area freeways
- Boulder CO: Feasibility of using pricing strategies to achieve the goal of no-VMT-increase over 1994 levels
- Houston, TX: Feasibility of a HOT Lane (High Occupancy Toll) strategy that would allow HOV-2 vehicles to use the existing HOV-3 lane upon payment of a fee
- New York Thruway: Application of a differential toll on the Tappen Zee Bridge

Singapore unveiled its new Electronic Road Pricing (ERP) system in May 1998. ERP will progressively automate the current area licensing scheme (ALS), and road pricing scheme (RPS) (see, 2.1.2). The former, in operation since 1975, requires vehicle owners to purchase a special windshield sticker if they wish to enter the central area during peak hours. The latter, introduced several years ago, charges vehicles a fee for the use of certain major roads during the morning peak.

Unlike the old system, which required the purchase of a daily or monthly permit, the ERP system automatically deducts the fee from the motorist's stored-value “CashCard” each time his vehicle passes through an ERP checkpoint. Whereas under the old system motorists were charged a flat daily or monthly fee, the new ERP system imposes a fee that is twice as high at the peak of the morning rush hour (8 to 9 AM) as during “shoulder” periods (7:30-8:00 AM and 9:00-9:30 AM). All vehicles using the ERP roadway system must be equipped with a transponder.

According to an official announcement, traffic volume on the East Coast Parkway, a major commuter road entering the city from the east and the first artery to be converted to ERP, has dropped by 24 percent during the peak period. However, it has risen by about the same amount on a parallel free route, suggesting that road pricing in Singapore is more effective in spatially redistributing traffic than in shifting demand from cars to other modes or times.

A policy-setting White Paper, *A New Deal for Transport: Better for Everyone*, unveiled by Deputy Prime Minister John Prescott on July 20, 1998 set the stage by outlining the government’s new transport policy. Described as a framework for change, the paper proposed a series of measures intended to fight congestion and reduce traffic, including improvements in public transport and a national system of traveler information and dynamic route guidance. The most controversial aspects of the White Paper were proposals to empower local governments to introduce road user charges on local roads and parking levies, as well as tolls on motorways and trunk roads (primary highways). In introducing the government’s proposals, Prescott told the House of Commons, “Radical change is necessary. This White Paper is about that radical change and how to achieve it. No change is, frankly, not an option...” However, in deference to local autonomy, the proposed pricing schemes would first have to be endorsed by local officials “where they feel that charges help to meet their local transport objectives.” The proposals set forth in the White Paper, now awaiting legislative action by the Parliament, are expected to be hotly contested by the Conservative Party opposition. Tory spokesmen have described the proposals as “nothing more than extra taxes for road users, more regulation and no improvements for the traveling public.” A follow-on paper, *Breaking the Logjam*, was unveiled by Prescott in December 1998. The aim of the paper is to provide a more detailed blueprint for local councils interested in implementing pilot pricing projects. The paper stresses once again that participation in the pilot program is purely voluntary and that it will be up to local officials to decide whether road charges are appropriate.

To gain support of local officials the paper proposes full retention of the revenues generated from the road and parking charges by local authorities. In a further effort to overcome local reluctance the proposal would allow local officials to use the revenues for a variety of purposes and not just to improve local transport. In parallel, the government has announced a major program of “congestion-charging research.” The project is aimed at assessing the technical feasibility and user response to a charging system that can operate on both urban and intercity roads. A deadline of February 1, 1999 has been set for local governments to make their interest known. The most likely candidate sites are Leicester, Southampton, Bristol, Leeds and Edinburgh.

*Source: Innovation Briefs, Jan/Feb ‘99*
According to a government proposal, road pricing would be introduced in year 2001 to control peak period traffic congestion in the Ranstaad region of the Netherlands, the densely developed area framed by Amsterdam, Rotterdam, Utrecht, and the Hague. The proposal calls for all entry roads into the four cities (including secondary roads) to be instrumented with electronic toll collection systems. Motorists entering the cities during the morning rush hour (7 to 9 am) would be charged a fee of $3.70. Fees would be collected electronically using on-board transponders and stored value smart cards already in wide use by the Dutch public. Field tests have already been conducted, preliminary to a competitive bidding process. The winning bidder, chosen from among four prequalified consortia, would be responsible for supplying, installing and maintaining the full system for ten years.

Despite considerable opposition, government officials saw few alternatives to tolls in this small, densely settled country, where traffic congestion is worsening despite an efficient and ubiquitous public transit system. Whether the road pricing scheme would result in significant auto use reduction is uncertain. The official forecast of a 13 percent reduction in peak period traffic was questioned by the political opposition as grossly unrealistic.

Shortly before the government proposal on Rekeningrijden was to be considered by the Dutch Parliament, the coalition government fell, and the proposal is now seen as no longer politically viable, especially in view of organized opposition led by the Dutch Automobile Association.

*Source: Toll Roads Newsletter, April ‘99; Traffic Technology International, April/May ‘99*

*Rev. 5/99*
CONCEPT: Variable Tolls

PROJECT NAME: Autoroute du Nord (a-1); Autoroute Paris-Troyes (A-5)

LOCATION: Paris Region, France

**Autoroute du Nord (A-1)**
Variable toll pricing has been in effect on the Autoroute du Nord (A-1) since 1992. Sunday tolls on the Autoroute du Nord (A-1), which connects Paris with Lille and points north, are raised 25 percent between 4:30 pm and 6:30 pm and lowered 25% for two hours immediately preceding and following the peak period. The large differential (26 francs or $5) is intended to encourage returning weekend travelers to shift to the shoulder periods. Traffic has been cut by 5 percent during the peak period, according to French officials, and no diversion to free parallel highways has occurred. The pricing scheme, which has met with public acceptance and has produced significant shifts in demand among weekenders returning to Paris on Sunday night,

**Autoroute Paris-Troyes (A-5)**
This experience has convinced French autoroute operators that variable pricing is an effective instrument of weekend and holiday travel demand management. Variable tolls are now being applied to balance traffic flows on two autoroutes leading into Paris from the south. The autoroutes' operator, Société des Autoroutes Paris-Rhin-Rhône (S.A.P.R.R.), has instituted a system of surcharges and discounts on its newest Paris-Troyes autoroute (A-5) which roughly parallels an older, heavily utilized toll facility. Motorists pay only 65 percent of the normal toll during periods of no congestion, and 85 percent of the normal toll during periods of moderate congestion. During peak congestion, however, they have to pay an extra 25 percent surcharge. Paris-bound motorists can obtain real-time information about current toll rates on the traveler information radio. Differential tolls allow the autoroutes’ operator to shift demand from one facility to another and achieve the most efficient utilization of total available road capacity.

*Ref: Toll Roads Newsletter, October ’96; November’97; Innovation Briefs, July/Aug 1999*
INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: TRANSPORTATION DEMAND MANAGEMENT  No.  2.2.2

CONCEPT: Variable Tolls

PROJECT NAME: I-15 Express Lanes

LOCATION: San Diego CA, USA

The first application of dynamic variable pricing of highway traffic was launched on March 30, 1998 on the I-15 High Occupancy/Toll (HOT) lanes in San Diego, California. The HOT lane facility is an 8-mile stretch of High Occupancy Vehicle (HOV) lanes which are open to single occupant vehicles that pay a toll. (see 2.9.3). Toll rates are set from $0.50 to $4.00 for a one-way trip. Within this range, toll rates fluctuate in real time, depending on the volume of traffic in the high occupancy/toll (HOT) lanes. Traffic volumes are measured in real time and automatically translated into toll rates, which are set so as to maintain free-flow in the HOT lanes at all times. Ordinarily, the $4 rate is charged during the peak of the rush hour and the lowest fees is in effect when the lanes first open around six AM, and just prior to closing, when traffic is light. However, if road sensors detect lighter-than-usual traffic, a lower than maximum toll will be charged even during the peak of the rush hour. In exceptional circumstances, when the parallel free lanes are closed to traffic because of a serious accident, the maximum one-way toll may rise to as high as $8.

Tolls are collected electronically with the help of windshield-mounted transponders. Motorists access the HOT lanes at normal highway speeds through a special entrance lane where overhead antennas scan the motorists' transponder and automatically deduct the posted toll from the motorist's pre-paid account. Electronic signs located prior to the entrance of the HOT lanes give motorists advance notice of the current toll. Future enhancements may also involve signs reporting on the state of congestion in the free lanes, so that commuters can weigh the benefit of using the HOT lane versus staying in the free lanes.

The feasibility of dynamic pricing of road facilities is no longer in doubt. This is a conclusion that can be drawn from recent surveys of San Diego's Interstate-15 Express Lanes carried out by San Diego State University. The world's first dynamically priced facility is working smoothly and has won high praise from its customers. The HOT lanes carry approximately 12,000 vehicles per day, of which about 1,600 are solo drivers paying a toll.


Cooperative Mobility Program
Center for Technology, Policy and Industrial Development
Massachusetts Institute of Technology
Variable charges have been instituted in the Summer of 1998 on two toll bridges in Fort Myers, Florida. Tolls have been reduced by 50 percent during the shoulder periods surrounding the morning and evening rush hours to encourage commuters to shift their time of travel out of the peak. The discounted toll is offered only to those using a newly installed electronic toll collection system with prepaid toll accounts.

The LeeWay project is the only project to have been authorized under the old US DOT's “Congestion Pricing Pilot Program” (now replaced by the “Value Pricing Pilot Program”).

*Ref: Toll Roads Newsletter, January '97*
Value pricing has been defined as “a system of optional fees paid by drivers to gain access to alternative road facilities providing a superior level of service and offering time savings compared to the free facility.” The term was first introduced by the California Private Transportation Company (CPTC), the operator of the SR91 Express Lanes project—a privately built four-lane toll facility located in the median of SR 91 in Orange County, California (see, 2.3.2). While superficially sharing certain common features with road pricing (or “congestion pricing”), value pricing differs fundamentally in its underlying purpose and intent. Traditional road-pricing charges are meant to reduce demand on heavily congested roads by charging every user a fee. The intent of value pricing is not to discourage drivers from using congested facilities but to offer them—for a fee—the option of alternative road facilities that provide a higher level of service.

HOT lanes are one example of value-priced facilities (see, 2.9.3). HOT lane users obtain tangible value for their money (hence, value pricing) in the form of faster, more predictable, and less stressful travel in free-flowing carpool lanes. Unlike traditional toll roads that require every user to pay a fee, HOT lanes offer motorists a choice. They always have the option of staying in the general purpose lanes and traveling free—albeit more slowly. However, drivers who want to reach their destination on time and are willing to pay a fee can enjoy a faster and more predictable trip in the adjoining uncongested carpool lanes. In off-peak periods, when traffic is light, most drivers will likely choose to stay in the general purpose lanes and travel free. Traditional congestion pricing does not allow for this kind of choice: in a classic congestion pricing scheme, everyone who travels on congested roads or during peak periods has to pay a fee.


Rev. 5/99
The 91 Express Lanes project is the nation's first project to implement the concept of value pricing. Opened in December 1995, the project is one of four private toll road ventures authorized by the California legislature in 1989. Two toll lanes in each direction were built in the median of the existing, highly congested eight-lane freeway. Toll rates vary with the time of day to ensure that the toll lanes remain uncongested at all times. Since the Express Lanes entered service, tolls have been raised four times in order to keep traffic flowing smoothly. The latest toll schedule, effective Jan. 31, 1999, provides eight different price levels between $0.75 and $3.50 for traveling the length of the 10-mile facility. All tolls are collected electronically and only vehicles with valid transponders are permitted to enter the Express Lanes. The facility is open to all vehicles carrying transponders issued by CPTC and other toll authorities which use the California AVI (automatic vehicle identification) standard. Approximately 120,000 transponders have been issued, and about an equal number have been issued by other California toll road authorities. Enforcement is done electronically, using photographic license-recording methods as vehicles pass spotter booths located at the midpoint of the facility.

The Express Lanes facility provides average time savings of 12-13 minutes, but time savings are only one of several motivations for using the Express Lanes. Other perceived benefits offered by the Express Lanes include increased reliability, greater safety, and superior predictability of arrival time. An evaluation study carried out by California Polytechnic's Prof. Edward Sullivan has found that a large majority of motorists do not use the Express Lanes regularly: only 23 percent use the facility every weekday, and a third use it less than once a week. Value pricing benefits not only the users of the Express Lanes but also motorists in the general purpose lanes, reports Sullivan. Average peak period speeds in the free lanes have increased from 15 mph to 32 mph, and morning peak period congestion in the general purpose lanes has dropped from four hours to less than three hours.


Rev. 5/99
In 1990, the U.S. Congress enacted, as part of the Clean Air Act Amendments, a provision requiring large employers in "severe" ozone non-attainment areas (totaling 12 metropolitan areas) to implement programs to reduce work-related vehicle travel by employees. The programs were commonly referred to as "Employer Trip Reduction" or "Employee Commute Options" programs. The law required all affected employers to develop plans which will "convincingly demonstrate" compliance with the trip reduction target of a 25 percent increase in the average passenger occupancy (APO) of the commuting employees' vehicles. Roughly speaking, this meant a 25 percent reduction in the number of employee cars arriving at a work site during the morning rush hour. The law did not prescribe any particular measures. Employers could choose from among a variety of measures, such as:

- Promoting and facilitating ridesharing
- Sponsoring company-owned or -leased vanpools
- Introducing flexible work schedules and telecommuting
- Offering financial incentives to employees to use public transit, carpools, or other commute alternatives;
- Charging parking fees or eliminating parking subsidies for those who drive alone to work;

The trip reduction mandate of the Clean Air Act met with widespread opposition in every affected jurisdiction. Employers felt that the requirement would be difficult to enforce and costly to implement. Employees did not like the idea of being told that they cannot drive to work. And many local officials believed that the program was not worth the effort because it would only result in insignificant reductions in trips and vehicle-miles of travel.

Following a sustained lobbying campaign by a coalition of businesses, Congress repealed the law in December 1995. Congressional action has been widely interpreted as a clear signal that the American public will not tolerate coercive measures enacted in the name of congestion relief and air pollution reduction. Henceforth, authorities will need to rely on incentives and persuasion rather than on regulatory commands and sanctions to influence commuters' driving habits.
The Yosemite Area Traveler Information system (YATI) uses advanced communication technologies to provide Yosemite-bound travelers with current information on road and traffic conditions, public transportation alternatives, tourist activities, parking availability, lodging/campground accommodations and other park facilities and services. The system utilizes a variety of communication means, including kiosks with interactive terminals, changeable message signs (CMS), highway advisory radio (HAR), and telephone-accessible database.

YATI is designed to provide travelers both with information and choices. For example, if weather prohibits travelers from taking a certain route (such as Taioga Pass, a major east-west route across the Sierra Nevada Mountains, which can be closed more half the year because of snow), the system will be able to suggest alternative routes. Similarly, when all campgrounds within the Park are fully occupied, tourists will be directed to motels and commercial campgrounds along the route. Park-bound visitors will be able to access this information at kiosks in the surrounding counties and at nearby airport terminals, through changeable message signs and highway advisory radio on approaches to the Park and, eventually, through electronic bulletin boards.

Seasonal travel demand management is also deployed in New Jersey, to manage and control heavy traffic flow along the major recreational corridors leading to the south Jersey Shore; and in Maryland, whose “Reach the Beach” program was designed to serve the specific recreational travel market to the Maryland and Delaware beaches and minimize the monstrous delays encountered in crossing the Chesapeake Bay Bridge.
STRATEGY: TRANSPORTATION DEMAND MANAGEMENT

CONCEPT: Seasonal/Recreational Travel Management

PROJECT NAME: Itineraires Oranges; Migrazur

LOCATION: France

Itineraires Oranges
An elaborate system of "Itineraires Oranges" has been set up throughout France to help ease traffic jams on principal autoroutes during periods of heavy summer travel, especially on weekends of the departure for and return from the traditional French summer holidays (first and last weekends in July and August). Traffic during those periods is often three or four times heavier than during normal periods and overwhelms the French autoroute system. Regional traffic management centers monitor traffic flows on key autoroutes and divert traffic onto pre-designated secondary roads when the autoroutes threaten to become saturated. Motorists are alerted through an elaborate system of variable message signs, physical barriers set up by roving motorcycle patrols, and "radio autoroutiere" which broadcasts on special frequencies utilizing RDS technology (see 3.3.1 and 3.3.12)

Migrazur
Sections of the Esterel-Côte d'Azur autoroute (A8) in southeastern France, which serves as the gateway to the French Riviera, have been instrumented with a sophisticated system of fixed video cameras, automatic incident detection devices, emergency (SOS) call boxes, variable message signs and automatic lane diversion barriers. The system, called Migrazur, is designed to help manage heavy flow of traffic on this key highway which handles up to 140,000 vehicle per day during the peak tourist season.
CONCEPT: Seasonal/Recreational Travel Management

PROJECT NAME: Summer *SmartPass*

LOCATION: Maine Turnpike, USA

From June 28 through September 2, weekend travellers can enjoy free and discounted travel on the Maine Turnpike during designated off-peak hours. By offering a discount pass that can be used all summer long, the program targets regular weekend travelers — the group most likely to be influenced by traffic conditions and changes in toll rates. Tourists from other states who happen simply to be passing through, are thought to be less influenced by discounted toll rates.

The critical question the program seeks to answer is whether toll incentives can persuade regular weekend drivers to adjust their travel times from peak to off-peak. Time-of-day tolling is one of several traffic management strategies the Maine Turnpike Authority is required to test in compliance with the 1991 Sensible Transportation Act. The Act states that certain alternatives must be tried and evaluated before highway expansion projects may be considered to alleviate congestion.
Episodic controls are measures that urban areas put into operation intermittently, when weather conditions threaten to create unhealthy levels of pollution. Often called "Ozone Alert" or "Ozone Action" days, these programs call for voluntary cooperation by the public to reduce driving and take other steps to refrain from other pollution-causing activities. Announcements are disseminated directly to the news rooms of printed and broadcast media and to large employers. Companies are urged to develop internal communication plans for notifying their employees of the advisories and to encourage them to use alternatives to driving alone. Upon receipt of an Ozone Advisory, participating employers are expected to put their contingency plans into effect by notifying employees of the pollution advisory before they leave work, using internal E-mail systems, bulletin boards and public address systems. During pollution alerts employees are urged to eat lunch at work, consolidate trips and errands, limit idling, and carpool or use mass transit to work. Public transit agencies often cooperate in the program by offering free bus rides and shuttle services to anyone wishing to heed appeals not to drive.

Since they were first introduced in San Francisco and Tulsa, Oklahoma in 1984, ozone alert programs have been adopted in at least 20 other jurisdictions. They include: Austin, Baltimore, Chicago, Cincinnati, Dallas, Dayton, Detroit, Kansas City, Philadelphia, Pittsburgh, Richmond, San Antonio, Washington DC and the state of Maine.

Ref: Innovation Briefs, December ‘93
The term telecommuting has come to embrace a variety of working arrangements that allow workers to work at home or closer to home. Early discussions of telecommuting tended to assume that telecommuters would work full time at home. Today, the concept of telecommuting embraces part-time work at home, working in satellite offices or "telebusiness centers" located close to home, and "virtual offices," i.e. transient working arrangements to suit the worker's convenience.

Telecommuting has been made possible by a convergence of three trends: spectacular advances in microelectronics that have placed an ever-growing array of portable computer and communications equipment within the reach of average consumers; the changing nature of work, with more and more workers engaged in development, manipulation and dissemination of data and information; and the desire of modern workers for greater workplace flexibility, to better manage their often competing demands of work, families and other commitments.

The most widely cited estimate, by Link Resources, a New York market research firm, places the total number of telecommuters at between three and five million nationwide. A recent US Department of Transportation report (Transportation Implications of Telecommuting, U.S. DOT, April 1993) estimates that telecommuting is now practiced by about two million workers. The Bureau of Labor Statistics (BLS) estimates that about 20 million people worked at home part- or full-time in 1991, but BLS does not count telecommuters as home-based workers. Coming up with a reliable national estimate is difficult because there is little valid statistical data on which to base such calculations. Most documented cases of telecommuting involve government sponsored pilot projects that offer employees special incentives to participate in the experiments. While there is some evidence of management-inspired telecommuting programs at corporate facilities, the data are anecdotal and sketchy.

_innovation briefs, April '94_
The General Services Administration has established four satellite telecommuting centers in Maryland (Hagerstown and Charles County) and Virginia (Winchester and Fredericksburg) for use by federal employees who live far from their Washington DC offices. Funded by a $5 million appropriation, the project provides alternate work sites nearer the employees' homes. By the end of the two-year demonstration period, between 400 and 600 employees from 15 federal agencies are expected to have used the centers. The Winchester center, which formally opened in October 1993, has 14 work stations, and there are plans to expand to 100 during 1994. Employers pay $100 a month per station, and the employee gets a computer and desk, telephone, fax machine, access to a kitchen and conference room.

The Bay Area Telecommuting Development Program
In the San Francisco Bay Area, two multitenant telecommuting centers have opened for business in Concord and San Jose. The Centers are a demonstration project sponsored by the Bay Area Telecommuting Development Program, a public/private consortium consisting of the Metropolitan Transportation Commission, CALTRANS, Pacific Bell, and the 680/580 Corridor Transportation Management Association. The centers will remain open at least one year. The University of California at Davis will evaluate the transportation and air quality impacts of the demonstration project, while the project sponsors will be assessing its financial feasibility once public funding runs out.

The Los Angeles County Telecommuting Program
Launched in 1989, the LA County program gives some 2,600 employees in 35 different county agencies a means to cut down on their commute. Employees in 230 county job classifications, from clerks to executives, participate in the program, working at home two or three days a week. Another telecommuting experiment, the Riverside Telecommuting Center, financed by the state of California, Riverside County and local businesses, provides office space to interested employers at little or no cost for the first year.

Ref: Innovation Briefs, April 1994
STRATEGY: TRANSPORTATION DEMAND MANAGEMENT

CONCEPT: Ridesharing

PROJECT NAME: Interactive On-Line Ridematching

LOCATION:

Internal computer systems designed to facilitate employee ridesharing enable employees to do their own carpool matching using computer bulletin boards accessible through desktop computers or through touchscreen kiosks located in company cafeterias and public lobbies. Employees can enter their names, telephone numbers and carpool preferences into the data base, confident that this personal information will only be shared with fellow employees. This overcomes one of the drawbacks of regional ridematching systems — people's reluctance to provide personal data to public data banks and to enter into ridesharing arrangements with strangers.

On-line ridematching has been embraced by a growing number of companies and Transportation Management Associations as a byproduct of the expanding use of corporate e-mail systems and computer networks (LAN). One attractive feature of these systems is their versatility. Interested employees can sign up for full-time participation or just for an occasional ride.

One of the largest private ridematching systems of its kind is the University of Washington's SWIFT Smart Traveler (SST) system. The University is Seattle's largest employer, with some 50,000 faculty, staff and students. Most of them commute to and from the campus on a daily basis. The SST will involve an array of communication technologies, including e-mail, computer bulletin boards, touchscreen kiosks and telephones.
CONCEPT: Preferential Treatment of High Occupancy Vehicles

PROJECT NAME: HOV Lanes

LOCATION: Various US locations

There has been a steady growth in the deployment of High Occupancy Vehicle (HOV) Lanes in the United States and, more recently, in Europe, South America and Asia. HOV lanes are viewed as offering multiple benefits. They increase the people-carrying capacity of roadways, encourage carpooling, ease congestion, offer an opportunity for express bus service, and improve air quality.

The idea of treating high occupancy vehicles preferentially by providing exclusive lanes, was born in the United States in the late 1960s, during the energy crisis. Three early examples were bus/carpool lanes on eastern approach to the San Francisco-Oakland Bay Bridge, an exclusive bus ramp leading into the NJ-NY Lincoln Tunnel and dedicated lanes on Shirley Highway (I-395) in Northern Virginia. Initially regarded with skepticism by the traffic engineering establishment, HOV lanes gradually gained acceptance among state and local traffic officials and, over the past ten years, have been introduced in more than 20 metropolitan areas of the United States and Canada. Some exclusive bus lanes on city streets have also been implemented, though primarily in Europe, the Far East and South America.

The growth of HOV lanes in the United States has been nurtured by a supportive federal policy. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 has made consideration of HOV lanes mandatory in the congestion management plans (CMP). The Clean Air Act Amendments of 1990 included HOV lanes among transportation control measures (TCMs) that were to be considered in designing state implementation plans. Partly because of this favorable policy climate, the number of HOV projects has continued to grow. Over the last ten years the number of HOV lane miles has increased from 120 to more than 550 miles. Major expansions of HOV networks are planned in several metropolitan areas, notably New York, California and Texas. (Note: HOV lanes also exist in Canada, the Netherlands, Spain and several South American cities).

STRATEGY: TRANSPORTATION DEMAND MANAGEMENT No. 2.9.2

CONCEPT: Preferential Treatment of High Occupancy Vehicles

PROJECT NAME: BUS-VAO (Vehiculos de Alta Occupation)

LOCATION: Madrid, Spain

US style dedicated High Occupancy Vehicle (HOV) lanes have been introduced in one of Madrid's main commuter corridors in an effort to relieve traffic congestion. Bus-VAO, as its is called, became operational in January 1995 on a 25-km stretch of N-6, feeding the suburbs to the west of the capital. The reversible HOV lane is opened into the city in the morning, Monday through Friday and in the afternoons on weekends, to ease returning weekend traffic. The HOV lane works in the reverse direction on weekday afternoons and on weekend mornings. The lane is open to buses as well as carpools with two or more passengers.

Trip times into and out of the city have been drastically reduced for buses and carpools and the average vehicle occupancy has risen from 1.2 to 1.6 and is still growing, according to Madrid officials.

Ref: Traffic Technology International, Feb/March ’96
Underutilized HOV lanes have come under attack in many jurisdictions in the United States as a wasteful use of scarce road resources. In several celebrated cases irate commuters have succeeded in opening up HOV lanes to general use. High Occupancy/Toll (HOT) lanes is a new concept that allows single-occupant cars to use underutilized high occupancy vehicle (HOV) lanes for a fee. By allowing single-occupant vehicles to fill up the unused capacity, transportation authorities hope to defuse potential public pressure to dismantle “empty” HOV lanes. HOT lanes are felt also to offer other benefits. They provide a premium travel option to solo drivers who want more predictability in reaching their destination on time, they generate revenue for corridor transportation improvements; they keep HOV lanes at their optimum utilization; and they reduce congestion in the parallel free lanes. Unlike toll roads, which require all motorists to pay a toll, HOT lanes offer a choice: solo commuters can stay in the slower moving general purpose lanes and travel free; or they can pay a fee and enjoy a faster, more reliable and less stressful trip in the dedicated HOT lane.

The first application of the HOT lane concept was implemented in December 1996, on an eight-mile stretch of an HOV facility on I-15, north of the City of San Diego. Initially, a monthly permit was used, allowing single-occupant cars with a windshield sticker to enter the HOV lanes. In a second phase, which began in May 1998, an electronic toll collection system has been deployed, with tolls adjusted in real time to reflect changing levels of congestion and to maintain free flowing traffic at all times (see, 2.2.2).


Rev. 5/99
INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: TRANSPORTATION DEMAND MANAGEMENT

CONCEPT: Preferential Treatment of High Occupancy Vehicles

PROJECT NAME: Exclusive Bus Lanes

LOCATION: Paris Region

In the Paris region, RATP, the metropolitan transportation authority, has embarked on the construction of a 170 km network of exclusive busways and bus lanes, covering one-third of the radial and two-thirds of the circumferential bus routes in the suburbs. The first such busway, known as Trans-Val-de-Marne (TVM) opened in 1993 in the southern portion of the Paris region. The new bus network will supplement the already extensive, 300-km network of exclusive bus lanes on city streets in central Paris.

Ref: Innovation Briefs, March/April ’99
Except in the downtown districts and some suburban centers, parking fees are not used to control automobile demand in U.S. metropolitan areas. According to surveys, of the 91 percent of American workers who commute to work by car, 95 percent receive free or subsidized parking from their employers. Parking fees in suburban areas (where ample parking exists) are viewed as politically unacceptable. An alternative policy, of “cashing out” parking subsidies, has been promoted in California as politically more acceptable. Under this policy, employers providing subsidized parking at work must offer their employees the option of a cash allowance equal to the cost the employer pays for the employee's parking space. The choice of travel mode remains with the consumer: commuters themselves decide whether to take the cash-out or to retain a free parking space.

Estimates of the impact of the “cash-out” provision on commuter travel behavior remain highly conjectural. Limited experience from California suggests that 10-15 percent of employees offered the cash-out would choose to give up their parking spaces and switch to public transit or carpools. Since the total affected employee population is estimated to account for about 15-20 percent of total employee trips, the cash-out provision has been estimated at approximately a 1-3 percent reduction in daily work trips.

Although the trip reduction potential of a parking cash-out policy appears modest, the policy provides a model that advocates of market-based approaches have long championed as the right way to manage travel demand -- i.e. without regulating private behavior and restricting individual freedom of choice.

Ref: Innovation Briefs, December ‘93

Cooperative Mobility Program
Center for Technology, Policy and Industrial Development
Massachusetts Institute of Technology
Since 1950, the percentage of working mothers in the United States has grown from one-fifth to two-thirds of all working women. The gains have been especially rapid among married women with preschool children. By the end of this decade it is estimated that 66 percent of married women with young children will be working outside the home. Faced with rising cries for help from harried working parents, and taking their cue from businesses that practice "niche marketing," employers and transportation entrepreneurs are responding to the needs of working parents with a number of innovative, custom-tailored "family-friendly" services:

• Privately-operated transit service for children offer individually customized door-to-door transportation to and from school, after-school activities, orthodontist appointments, music lessons and weekend social and sports events. Because safety and security are uppermost in parents' minds, these services operate under stringent procedures: Drivers are carefully screened, children carry photo identifications, and will not be left unattended unless they are greeted at the door by a parent or other pre-approved person.

• In an attempt to make mass transit commuting more convenient, attractive and "family-friendly," many localities have come up with a creative solution: locating childcare centers at transit terminals. This allows working parents to drive straight to the station, park their car at a park-and-ride lot, drop off their kids at the child care center and hop on the train for the trip to work; picking up the kids at the end of the day is equally easy. Virtually unknown until the 1990s, the idea has caught on, and child care centers at transit facilities are proliferating throughout the United States.

• Surveys indicate that the fear of being stranded at work looms large in the minds of suburban employees, and is particularly prevalent among working parents of young children who must be able to leave on a moment's notice in case a child gets sick, and employees whose elderly parents may requires sudden hospitalization. To allay these fears many companies now offer Guaranteed (or Emergency) Ride Home Programs: reliable back-up transportation, at minimal or no cost to employees, to be used in case of emergencies or unplanned overtime.

Ref: Innovation Briefs, June ‘95