Policies Affecting Automobile Use (Click on section to go to article)

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.2

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME: *Zona a circolazione limitada*

LOCATION: Italian cities

Italy has implemented a nationwide policy of limiting car access to city centers. The policy has been introduced in 50 cities, including major cities such as Milan and Turin, medium-size cities such as Bologna, and small tourist towns such as Formia. The measures have been enacted as a reaction to a rapid increase in motorization that saw car registrations soar from two million in 1959 to 23 million in 1985, to over 30 million by 1995. Cities became overwhelmed with traffic, which raised pollution to alarming levels, threatened the integrity of architectural monuments, and caused unacceptable levels of congestion that seriously interfered with the functioning of surface public transit.

Access restrictions were first introduced in the mid-eighties in the cities of North and Central Italy, acting individually. In 1989, a national legislation authorized the creation of urban restricted traffic districts (*"Zona a circolazione limitada")*. Each municipaility could, in turn, promulage its own set of implementing rules and regulations. Most cities chose to confine the boundaries of the zones to the historic city centers, to limit the ban to morning and evening peak periods, and to exclude certain categories of vehicles (such as buses, taxis, emergency and delivery vehicles, and residents' personal autos). However, some cities prohibited weekday car access throughout the day. In the early 1990s, some cities introduced total and permanent exclusion of cars from city centers.

In Bologna, a 1986 referendum led to the creation of a vehicle-restricted zone in the historic city center, from 7 am to 8 pm. The zone covers 4.5 square kilometers and 76 km of streets, houses 67,000 residents and has a daytime population of 75,000 workers. The initiative met with some criticism, and the plan was modified in 1989 to provide for better access and greater mobility (see 1.1.4). In Turin, following a public referendum, a limited vehicle ban was introduced in 1990. The restricted area covers 1.2 km, houses 19,000 residents, and has a daytime population of 44,000 workers. Initially limited only to the morning peak period (7:30-10 am), the ban was extended eight months later through 1 pm.

Source: Patrick Bonnel, "Policies Restricting Access to Town Centers in Italy," Laboratoire d'Economie des Transports, Lyons

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.3

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME:

LOCATION: Bangkok

Since 1990 the Thai automobile market has grown an average of 20 percent a year. It was close to 572,000 units in 1995 and is expected to top 800,000 units a year by year 2000. Bangkok accounts for 50 percent of this total. With narrow streets and inadequate road infrastructure, the city has a reputation for being one of the most gridlocked cities in the world. Bangkok's traffic jams are legendary. Trips of only a few miles can often take four or five hours.

Reacting to this crisis, Thailand's traffic authorities have come up with a radical idea. The proposal would ban new vehicles from Bangkok streets from 6 a.m. to 8:30 a.m. and from 3:30 p.m. to 6:30 p.m. on weekdays, starting on January 1, 1997. The ban would not be lifted until major highway and mass transit improvements (which include construction of a rapid transit line) are completed in 2001.

Under the plan, new vehicles would carry distinctive license plates for enforcement purposes. But current owners would be allowed to switch their old license plates to new vehicles if they could prove that they had sold the older vehicles and people would still be able to buy and drive used vehicles. In other words, the ban on peak-period driving would apply only to first-time new vehicle buyers.

The proposal still has many hurdles to clear before taking effect. Opponents of the proposed ban contend that the proposed ban, while reducing the growth of congestion somewhat, could actually worsen air quality by keeping older, dirtier vehicles on the road longer. Many observers think no matter how gridlocked the city gets, the demand for personal transportation at all levels of Thai society will make driving limitations a difficult proposition for the government to sell.

Source: Automotive News, July 29, 1996

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

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CONCEPT: Limiting Car Access to City Centers

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.4

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME: *Zona a circolazione limitada*

LOCATION: Bologna, Italy

To combat growing air pollution and congestion, Bologna's authorities instituted a traffic restraint system that allowed non-residents automobile access to the historic town center on alternate weekdays, depending on whether their license plates ended in an even or odd number. When this approach failed to reduce atmospheric pollution and congestion, city authorities created a Limited Traffic Zone (LTZ) in the inner city to which car access is limited to residents of the LTZ and a select group of nonresident cars (e.g. those driven by disabled persons) and delivery vehicles.

To enforce this prohibition, an electronic sentry system was installed at each entry point into the controlled area. Special video cameras read the license plates of each entering vehicle. The registration number is electronically transmitted to a central computer data bank which contains vehicle registration numbers of all the authorized vehicles. If the license plate number does not appear in the data bank, the system transmits the offending vehicle's registration number to a central violation center for appropriate notification and fine by mail. The entire process takes but a few seconds.

The system is claimed to be violation proof and has proved to be so effective that the number of violations has dropped precipitously since the system was installed in 1996.

Source: Pietro Caselli, Elettronica Santerno, "Limiting Traffic Automatically," Traffic Technology International, 1997.

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.4 Rev

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.5

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME: Retractable Bollards

LOCATION: Athens, Greece

Serious air quality problems, combined with gridlock conditions due to narrow streets and lack of parking space, have obliged the city of Athens to ban vehicles from its historic center (Trigono) during the busiest hours of the day. Early attempts to enforce a vehicle ban by allowing cars entry into the control zone on odd or even days according to their license plate number failed for lack of cooperation. A system was needed that would physically bar cars from entering the control zone yet allow residents, taxis, emergency vehicles and delivery trucks free entry. The solution adopted by city authorities involves a system of remotely controlled retractable bollards, installed at 20 entry points into the Trigono district. Authorized vehicles can gain entry through a programmed Asmart card@ which causes the bollards to retract into the pavement. Cards are programmable for certain periods of time and for access to certain sectors of the controlled area. Exits are free (i.e. do not require a card), and the bollards are retracted automatically when a vehicle passes through a loop detector burried in the pavement.

All entry points are monitored visually through remote video cameras from a central control center which can communicate with cars seeking entry through an intecom and cause the bollards to retract when needed (i.e. to allow a physician without a card to gain entry in case of an emergency).

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.6

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME: Retractable Bollards

LOCATION: Cambridge, U.K.

To reduce congestion in the narrow streets of historic Cambridge, the City Council has contracted for a sophisticated system of road barriers in the form of retractable bollards that prevent unauthorized private vehicles from entering the city center, but allow access to authorized and emergency vehicles, such as transit buses, taxis, ambulances and police cars. The bollards are raised or lowered automatically by digital radio frequency (RF) tags installed on the underside of the authorized vehicles and read by roadside readers next to the bollards. The electronic tags are programmed into distinct eight-digit groups for each category of vehicles, so that if a bus and an ambulance arrive at opposite ends of the street at the same time, the system recognizes the emergency vehicle and gives it priority over the bus. The RF controlled system has been successful in markedly reducing congestion on Bridge Street, one of the city's main thoroughfares, and in the narrow, buse streets of the historic city center.

Source: Public Innovation Abroad, June 1998

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.7

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME: *Journée Sans Voiture*

LOCATION: Paris

Automobile restrictions have come to be accepted as a legitimate instrument of congestion management. They are used extensively in the cities of Europe, North and South America, and Asia. MIT's International Mobility Observatory has documented their use in over 100 cities. Center city restrictions vary in duration, scope and severity, ranging from temporary traffic prohibitions in commercial districts during shopping hours to permanent closure to vehicular traffic of entire historic town centers, as in Munich, Germany, and Bologna and Turin in Italy. In residential areas, a variety of regulatory and physical Atraffic calming measures are used to slow down and discourage through traffic. Traffic calming, which was first introduced in the Netherlands and Germany in the early 1970s, is currently enjoying a wave of popularity in the United States, where it is used as a defensive measure against commuters cutting through residential areas on their way to and from work.

More drastic restrictions, involving outright bans on automobile use in center cities, have been instituted in some cities on special occasions as an emergency measure when pollution reaches unhealthy levels. In Athens, and during a recent pollution inversion in Paris, authorities banned cars from entering the city center on alternate days according to whether their license plate ended with an odd or even number.

Under a government pilot program, private cars were banned for one day in September 1998 from portions of central Paris. About 90 km (35 miles) or 10 percent of the city's streets were closed to traffic. The experiment was greeted "with varying degrees of approval, impatience, cynicism and outrage" according to the French newspaper *Le Monde.* Opponents derided the experiment as a "useless and costly gimmick" while supporters praised the initiative as an essential step in educating the public about alternatives to the private automobile. Even with a superb system of public transportation, 69 percent of Parisians say they prefer commuting in private cars according to a recent poll, as reported in *Le Figaro*. But attitudes are changing. More than 50 percent think permanent restrictions on automobile traffic in city centers are inevitable.

Source: Innovations Briefs, Nov/Dec 1998

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.8

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME: European Car-Free Day 2000

LOCATION:

On February 5, 2000 the European Commission and nine EU member countries launched the European Car-Free Day initiative. The initiative is designed to "raise awareness of the need to change mobility patterns," in the words of the EU announcement.

The Car-Free Day 2000 Initiative follows the success of the "In town without my car" days held in France in 1998 in 35 cities, and in France and Italy in 1999 in a total of 158 cities. In 1999, 22 million people were said to have participated in the campaign, with more than 80 percent wishing to see the experiment repeated regularly in the future.

The Car-Free Day initiative is sponsored and administered by the Car-Free Cities, a network of some 70 European cities which was created in 1994 by EU's Directorate General for the Environment "to develop and exchange good practices in the field of sustainable mobility by local authorities."

Source: European Union press release, 2/5/2000

INTERNATIONAL MOBILITY OBSERVATORY

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.1.9

CONCEPT: Limiting Car Access to City Centers

PROJECT NAME: Access Control

LOCATION: Rome, Italy

As part of its five-year mobility management plan, the city of Rome is introducing a traffic management scheme aimed at restricting automobile access to the historical center. The scheme calls for the creation of an automated access control system for an area of approximately five kilometers square containing some of the most valuable historical heritage. Access control will be exercised through the use of electronically monitored unmanned gates. The gates will be equipped with TV cameras and microwave transponders, enabling remote identification and tarification of vehicles seeking access to the cordoned area.

The entry gate system was completed in early 2000. The exit gate installation will be completed in a second phase in 2001. This will allow the system to differentiate between user categories (residents, deliveries, tradesmen, etc) and to assess fees according to the length of stay within the cordoned area. The entire system is expected to manage approximately 250,000 trips a day.

All access and exit gates will be remotely monitored. Two-way voice communication between the central monitoring center and the drivers seeking access to the cordoned area will be established.

In addition to the access control system, Rome's mobility management plan calls for a traffic monitoring system, a traveler information system involving 36 variable message signs along principal arterials, and a parking management system.

Source: Traffic Technology International, June/July 1999

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.2.1

CONCEPT: Residential Traffic Calming

PROJECT NAME:

LOCATION: Various cities in Europe, North and South America

Sheltering residential neighborhoods from unwanted traffic may be critical to creating a more livable residential environment. This is a conclusion that a growing number of cities have reached over the last 15 years. In Europe, the concept of protected residential neighborhoods C called *woonerf* in Holland and *verkehrsberuhigung* (literally "traffic calming") in Germany C has been incorporated into all community planning. Central to this concept is the notion that neighborhood streets belong to their residents. This notion leads to a reversal of the traditional rules of the road. In protected neighborhoods automobiles are allowed at the residents' sufferance. Pedestrians may walk and children may play anywhere in the street. Drivers must not exceed a pedestrian's pace.

These principles have been given the force of municipal regulations and are strengthened by self-enforcing design features C bumps, humps, dips and rumble strips in the pavement, "neckdowns," "chokers," and sharp switches in the roadway C to discourage driving at high speed. Angled parking is permitted only in designated places, leaving more space for pedestrians. Curbs are eliminated, to convey the feeling that the whole street is available to pedestrians. This ambience is reinforced through generous plantings of trees, shrubs and flowerbeds, provision of benches and other street furniture, and use of decorative paving patterns and materials. Special signs designate the boundaries of a *woonerf,* alerting motorists that they are entering a protected residential area. The overall effect is one of tranquility and intimacy, rarely experienced in ordinary city streets.

Progress along these lines has been made in some U.S. communities. Residential parking permits to discourage commuters from parking in neighborhoods have become widely embraced. Rush-hour restrictions to prevent commuters from cutting through residential areas are also finding growing acceptance. Physical design features to slow down traffic in neighborhoods have been adopted in many urban areas. Street closures to create pedestrian promenades have been introduced in several communities.

Source: "A Toolbox Approach to Residential Traffic Management," ITE Journal, June 1996

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.2.2

CONCEPT: Residential Traffic Calming

PROJECT NAME:

LOCATION: Montgomery County, Maryland, USA

The new generation of traffic calming initiatives in the United States builds upon earlier neighborhood traffic restraint efforts but goes beyond regulations, which often proved to be only partially successful in reducing traffic in neighborhoods. The thrust of the current traffic calming efforts is to employ physical design measures that oblige motorists to change their driving behavior.

The suburban Montgomery County, Maryland, responding to a chorus of complaints from residents and neighborhood groups about growing commuter cut-through traffic, has embarked upon an ambitious program of traffic calming projects. The most prominent feature of these efforts are "speed humps" - raised mounds in the pavement that force drivers to slow down (speed *humps* are not to be confused with speed *bumps* whose purpose is to bring drivers to a near-complete stop. Properly designed speed humps, on the other hand, can be comfortably negotiated at speeds of 15-25 mph, depending on design). Other techniques used by the County include "chokers" and very small traffic circles (also known by their British name as "mini-roundabouts"). The former create an illusion of a narrower street and act as a psychological deterrent to excessive speed. The latter oblige motorists to slow down at each intersection as they negotiate the tight turns of the traffic circles. In the last three years the County has installed about 1,000 speed humps and a few dozen intersection mini-circles in residential neighborhoods.

At the root of the County's aggresssive traffic calming program lie neighborhood groups increasingly aroused about excessive speeds on local streets. The situation in Montgomery County is being replicated throughout the country. In cities large and small, as varied as Orlando Fl, Portland ME, St. Paul MN, Tucson AZ, Milwaukee WI, Veil CO, Providence RI, Middleburg VA, and Birmingham MI, traffic calming has climbed to the top of local neighborhood agendas.

Source: Innovation Briefs, March/April 1997

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.2.3

CONCEPT: Residential Traffic Calming

PROJECT NAME: Vauban auto-free community

LOCATION: Freiburg, Germany

Vauban, a suburb of Freiburg, is the oldest German experiment in car-free urban living. This residential community, a mere 10-minute bike ride from the city center, was intended to reflect the values and lifestyles of this environmentally conscious region. Vauban was conceived as a car-free community where home buyers who pledged allegiance to carless living got priority for the subsidized bargain-priced building lots. Half of the homes in condominium-like clusters have no driveways or parking along their narrow access roads. Parking is officially prohibited everywhere except in private carports attached to the other half of the homes and in a common community garage which costs about $24 a day.

But Germany's most advanced experiment in car-free living has run into some practical problems and has been gradually scaled down to an "auto-reduced" community. Those who want a parking space with their homes – the first compromise retrofitted into the project, ostensibly to accommodate car sharing, have to pay an extra $17,000. Despite the high cost, half of the households in Vauban now have private parking spaces, and many of the other homeowners keep cars hidden in nearby lots or parked on adjacent public streets – much to the dismay of the project's idealistic planners who envisioned Vauban as a completely carless community. "I still like the idea of auto-free living, but in the long run, people just can't get by without some access to a car," one of the originators of Vauban was quoted as saying.

Source: Los Angeles Times, May 9, 2000

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.1

CONCEPT: Car Sharing

PROJECT NAME: Automobile Cooperatives and Car Sharing Organizations (Overview)

LOCATION: Germany, Switzerland, Austria, the Netherlands

Car sharing organizations are one element in a spectrum of arrangements, which give access to cars without requiring people to own one. The concept works because cooperative members, by self-selection, need a car only occasionally and because belonging to a cooperative offers an advantage over renting cars from a commercial car rental agency. Peak demand (e.g. on weekends) is accommodated through a reservation system.

Auto cooperatives have been multiplying rapidly in Switzerland, Germany, Austria and the Netherlands. The Swiss car sharing organization, *Mobility CarSharing Switzerland,* the world's largest, with 12,000 members and a fleet of 700 vehicles, has been growing at an annual rate of 50 percent over the last several years and has extended its presence across the whole country. While early car sharing initiatives had an anti-car bias, most contemporary auto cooperatives have a more pragmatic appeal. Indeed, surveys in Germany and Switzerland show that the main motivation for joining an auto cooperative are personal convenience, freedom from hassle and cost savings rather than ideological convictions. According to a study by the University of Cologne, Germany, car sharing is a cheaper alternative than owning a car if the annual distance driven is below 6,000 miles. Thus, a typical member of an auto cooperative is a young single city dweller who may not yet be able to afford his own car and who only occasionally needs personal transportation.

Car sharing cooperatives have progressed beyond their environmental grass-roots origins and are becoming a recognized service industry with a business-like approach. In the Netherlands, partners include the car rental industry (BOVAG), the Dutch car owners' organization, ANWB (the equivalent of AAA in the United States) and the local car sharing movement. In Switzerland, car dealers and car rental firms are entering the field, as illustrated by the decision of Hertz/Switzerland to cooperate with the ATG.

A somewhat different approach has been introduced in the German town of Celle, where tenants of a housing subdivision have access to a common fleet of cars as part of their rental agreement. The scheme, known as *Wohnmobil* is designed primarily for tenants who do not own cars or do not drive much. The project is co-sponsored by Volkswagen for a test period of three years. Car maintenance and insurance are covered in the rent. Driving charges are added to the tenants' monthly rent.

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.2

CONCEPT: Car Sharing

PROJECT NAME: Station Cars

LOCATION: San Francisco Bay Area, USA

The "Station Car" concept calls for small, battery-operated automobiles that are provided to commuters at suburban rail stations. Making such cars available at both ends of the suburban trip enables commuters who currently require personal automobiles to use public transit instead. The station-to-home scenario envisions a home-bound commuter picking up the car at the station in the evening, placing it on charge at home overnight, and returning it to the station the next morning. The station-to-work scenario starts with office-bound commuter picking up the car upon arrival at a suburban rail station, driving it to work, using it for various errands during the day, and returning it to the station on the way home. Station cars may be reserved in advance or accessed by walk-up travelers. The station car cam alsp be reserved for certain regular trips each day through a long term lease.

To determine consumer acceptance of "station cars," the National Station Car Association conducted a series of limited-scale tests in 1986-7 in Boston, the San Francisco Bay Area, Connecticut, New York, and South Florida. Sponsors of the tests were several electric utility companies (Calstart) and transit authorities. The goal of the Association is to learn enough from the small-scale demonstrations to justify a large-scale national demonstration.

The test cars were converted Geo Prisms and electric cars built by a Norwegian consortium, PIVCO (Personal Independent Vehicle Company). The latter, known in Europe as "City Bee" is a two-passenger vehicle with a range of 145 km. (See also 1.3.10)

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.2 Rev

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The "Station Car" concept calls for small, battery-operated automobiles that are provided to commuters at suburban rail stations. Making such cars available at both ends of the suburban trip enables commuters who currently require personal automobiles to use public transit instead. The station-to-home scenario envisions a home-bound commuter picking up the car at the station in the evening, placing it on charge at home overnight, and returning it to the station the next morning. The station-to-work scenario starts with office-bound commuter picking up the car upon arrival at a suburban rail station, driving it to work, using it for various errands during the day, and returning it to the station on the way home. Station cars may be reserved in advance or accessed by walk-up travelers. The station car can also be reserved for certain regular trips each day through a long term lease.

To determine consumer acceptance of "station cars," the National Station Car Association conducted a series of limited-scale tests in 1986-7 in Boston, the San Francisco Bay Area, Connecticut, New York, and South Florida. Sponsors of the tests were several electric utility companies (Calstart) and transit authorities. The goal of the Association is to learn enough from the small-scale demonstrations to justify a large-scale national demonstration.

The test cars were converted Geo Prisms and electric cars built by a Norwegian consortium, PIVCO (Personal Independent Vehicle Company). The latter, known in Europe as "City Bee," is a two-passenger vehicle with a range of 145 km. (See also 1.3.10)

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.3

CONCEPT: Car Sharing

PROJECT NAME: *Praxitèle*

LOCATION: Saint Quentin-en-Yvelines (Paris Region), France

In France, the concept of the City Car has been married to the technology of the electric car. In April 1996, Renault launched a demonstration of the public automobile using its electric *Clio* vehicles, already in production. The field test, named *Praxitèle*, employs a fleet of 50 *Clios* in Saint Quentin-en-Yvelines, near Paris. The town has a fleet of 50 electric *Clios* stationed at six strategically sited "Praxiparcs." Subscribers employ smart cards with their individual code to gain access to the vehicles. Upon completion of a trip the car is returned to any of the parking facilities where it is automatically connected to a recharging mechanism. The vehicles are equipped with cellular phones linked to the central control facility to facilitate information and assistance. The decision to proceed with the field test followed successful trials in 1993-94 with an earlier version of the *Clio* in La Rochelle in western France.

Source: Innovation Briefs, Nov/Dec 1997

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.3 Rev

CONCEPT: Car Sharing

PROJECT NAME: *Praxitèle*

LOCATION: Saint Quentin-en-Yvelines (Paris Region), France

In France, the concept of the shared car has been married to the technology of the electric car. In October 1997, Renault, in cooperation with the municipality of Saint Quentin-en-Yvelines, EDF and Thomson-CSF, launched a demonstration of a shared-car system, employing its electric *Clio* vehicles, already in production. The field test, named *Praxitèle*, employs a fleet of 50 *Clios* stationed at strategically sited "Praxiparcs." Subscribers can pick up a car at any station and drop it off at any other station, employing smart cards with their individual code to gain access to the vehicle. Upon return to a parking station, the car is automatically connected to a recharging mechanism. The vehicles are equipped with cellular phones linked to the central control facility to facilitate information and assistance.

The decision to proceed with the field demonstration in Saint Quentin-en-Yvelines, 20 km sw of Paris, followed successful trials in 1993-94 with an earlier version of the *Clio* in La Rochelle in western France. In a first phase, from October 1997 to June 1998, the *Praxitèle* demonstration employed 30 cars and 5 parking stations and used a manual access and billing system. Beginning in June 1998, the demonstration employs 50 cars and 14 stations and uses a contactless smart card, which enables customers to use the system 24 hours/day, seven days/week. Five of the parking stations include a charging mechanism. Users pay $9/30 minutes in peak period and $5/30 minutes in off-peak period, plus $0.17/for each additional minute

The demonstration is being monitored closely. Latest surveys (November ‘98) show monthly system usage at 1,300 trips. 72 percent of the users live in Saint Quentin-en-Yvelines, and 54 percent live close to a *Praxitèle* station. The cars are used for shopping (44%), trip to work (26%), and recreational trips (30%). Preliminary conclusion is that the shared car system can serve as an off-peak internal circulation system for low-density urban areas. Based on the results to date, Renault plans to replicate the demonstration in other cities.

Ref: Innovation Briefs, Nov/Dec 1997;

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.4

CONCEPT: Car Sharing

PROJECT NAME: "Weekend Cars"

LOCATION: Singapore

To allow more people to own and use cars without adding appreciably to traffic congestion in one of the most tightly controlled traffic environments in the world, the government of Singapore has introduced a "weekend car" system. Under this scheme, which has been in operation since mid-1991, cars with a special weekend license plate are substantially cheaper to purchase and operate. Weekend cars are allowed on the road from 7 pm to 7 am on weekdays and from 3 pm Saturday to 7 am Monday, plus all public holidays. Use of weekend cars is also permitted during normal traffic-restraint hours with a special daily coupon displayed on the windshield. Five such coupons are given to each weekend car owner annually free of charge, for emergencies. Additional coupons are available for $20 each. All weekend cars have distinct red license plates for easy recognition. Tampering with the red license plate and driving weekend cars during peak hours without displaying the special coupon is severely penalized.

Despite Singapore's draconian financial disincentives to car ownership, amounting to 300 percent of the car purchase price, the desire to own cars remains strong. The weekend car was introduced to make ownership less costly provided the owner agrees not to contribute to weekday daytime congestion. The rebates for weekend cars amount to $15,000 plus a discount of 70% of the standard road tax applied to full-use vehicles. The latter can be converted to weekend cars and vice versa.

The system will remain in place until Singapore converts to a full electronic road pricing system. Once the electronic system becomes fully operational, drivers will be charged according to the level of congestion and the rationale for weekend cars will disappear.

Source: Innovation Briefs, August 1996

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.5

CONCEPT: Car Sharing

PROJECT NAME: Electric "City Car" Rental

LOCATION: Strasbourg, France

The City of Strasbourg, France has taken the initiative, along with a local public utility, to put a rental fleet of electric vehicles at the disposal of the public. Ten of the 20 vehicles are two-seat passenger cars, the rest utility vehicles. They can be rented at a city-operated garage for time increments as short as half a day. Operation of the vehicles is confined to city streets and secondary suburban roads. The vehicles are not allowed on primary routes or autoroutes and may not be taken out of the urban service area.

The demonstration project, which began in May 1994, is subsidized by the national environmental agency. It forms part of the Environment Charter to which the government and a number of French municipalities have subscribed through locally-based action plans that involve the promotion of public transit, the use of alternative sources of energy, development of pedestrian zones and promotion of bicycling. The city has contributed funds to purchase the electric vehicles and the public utility supplies and services the batteries.

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.6 Rev

CONCEPT: Car Sharing

PROJECT NAME: Car Sharing Organizations in Germany

LOCATION: Germany

The oldest car sharing organization in Germany is the *StattAuto Berlin*, founded in 1988. It and its counterpart in Hamburg have joined forces in the summer of 1998 to create *StadtAuto Drive*, which collectively disposes of a fleet of 350 vehicles and has 6,500 members. Another German car cooperative, *StadtAuto Bremen,* has 75 vehicles and 1,700 members. Both organizations, as well as smaller cooperatives in other German cities are experimenting with intelligent transportation system technologies, notably smart cards for making reservations and facilitating billing, automatic vehicle location (AVL) systems to track the vehicles in real time, two-way communication, and remote diagnostics. *StadtAuto Drive* has been experimenting with a variety of innovative marketing schemes, such as *CashCar,* which allows members to make leased vehicles available for shared car use when they are out of town and *MobilCard,* which allows users to charge taxi fares. *StadtAuto Drive,* like its Swiss counterpart, is partnering with major car rental companies to provide vehicles to its members at reduced rate during holidays when carsharing demand is at a peak.

Germany's Federal Transport Ministry commissioned in 1996 a market study to determine the current and potential membership in automobile cooperatives and their impact on total car ownership and usage. According to the study, the 150 existing German auto cooperatives currently have 15,000 members. Collectively, they remove 2,900 vehicles from the road and eliminate 1.7 vehicle kilometers of travel. The analysis estimated a total of 2.45 million of potential cooperative users nationwide. If the full potential of auto cooperatives were to be realized, a total of 1.2 million vehicles would be removed from the road, resulting in a reduction of 3.7 million vehicle kilometers of travel.

Ref.: Susan Shaheen et al, Carsharing: An International Perspective, TRB Record No. 990826, April 1999; Klaus Zellmer, Institut fur Automobilwirtschaft, Geislingen, Germany; Rev. 5/99

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.6

CONCEPT: Car Sharing

PROJECT NAME: Car Sharing Organizations

LOCATION: Germany

The oldest car sharing organization in Germany is the *StattAuto Berlin* , founded in 1988. It and its counterpart in Hamburg have joined forces in the summer of 1998 to create *StadtAuto Drive* which collectively disposes of a fleet of 350 vehicles and has 6,500 members. Another German car cooperative, *StadtAuto Bremen,* has 75 vehicles and 1,700 members. Both organizations, as well as smaller cooperatives in other German cities are experimenting with intelligent transportation system technologies, notably smart cards for making reservations and facilitating billing, automatic vehicle location (AVL) systems to track the vehicles in real time, two-way communication, and remote diagnostics. *StadtAuto Drive* has been experimenting with a variety of innovative marketing schemes, such as *CashCar,* which allows members to make leased vehicles available for shared car use when they are out of town and *MobilCard* which allows users to charge taxi fares. *StadtAuto Drive,* like its Swiss counterpart, is partnering with major car rental companies to provide vehicles to its members at reduced rate during holidays when carsharing demand is at a peak.

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Source: Susan Shaheen et al, Carsharing: An International Perspective, TRB Record No. 990826, April 1999; Klaus Zellmer, Institut fur Automobilwirtschaft, Geislingen, Germany;

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.8

CONCEPT: Car Sharing

PROJECT NAME: City Car Club

LOCATION: Edinburgh, U.K.

Britain's first automobile cooperative has been launched in March 1999 in Edinburgh, Scottland. The "City Car Club" is a joint initiative of the City Council and a local car rental company. The scheme is designed to tie in with Edinburgh's car-free housing subdivisions where residents pledge not to own private cars in return to easy access to low-cost rental vehicles (similar to the German *Wohnmobile*, 1.3.1). Members pay an annual membership fee to join the club and then pay by the hour for access to a car which is parked within the housing subdivision. The car club will offer a range of vehicles to its members, which can be booked in advance. The idea behind the car club is that people who only require occasional use of a car will no longer need to own their own vehicles.

The City of Edinburgh Council has secured a grant from the U.K. government to help implement the scheme. Operating costs are expected to be met through annual membership fees and hourly charges. The City Car Club is one of several initiatives which aim to reduce car traffic, pollution, congestion and accidents.

Source: "Momentum" newsletter, Autumn 1997

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.9

CONCEPT: Car Sharing

PROJECT NAME: *Mobility CarSharing Switzerland*

LOCATION: Switzerland

The Swiss car sharing program, begun in 1987, now operates in 600 locations in 300 communities, with over 20,000 members. *Mobility CarSharing Switzerland* was created in May 1997 as a result of a merger of *Auto Teilet Genossenschaft (ATG)* and *ShareCom.* (see, 1.3.1).

Mobility CarSharing Switzerland launched in 1998 a new mobility service that provides a combination of car sharing, public transit, car rental, and taxi. The program, known as *Zuger Pass Plus (ZPP)*, is a partnership with the regional transit company, Hertz and local taxi companies. ZPP provides discounts on car rentals, taxi services and car sharing coop annual fees, as well as priority service for the car sharing organization's vehicles. In September 1998, another partnership was launched with the Swiss National Rail System, offering a mobility package to all 1.5 million passholders of the Swiss Railway System (SBB)- approximately 30 percent of the country's entire adult population. The arrangement calls for providing SBB passholders with special discounts and easy, smartcard-facilitated access to the car coop's vehicles.

Source: A Car Sharing in Europe and North America: Past, Present and Future, Susan Shaheen, Daniel Speling and Conrad Wagner, Transportation Quarterly, Summer 1998

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.10

CONCEPT: Car Sharing

PROJECT NAME: *Car Link*

LOCATION: San Francisco Bay Area

The San Francisco BART has partnered with the Lawrence Livermore National Laboratory, the University of California at Davis and Honda Motor Company to test the market feasibility of a station car service. Using 12 low-emission Honda Civic dedans powered by compressed natural gas, the program allows several commuters to share fleet cars that use a BART station as their hub. Each car will have the potential for three distinct uses a day: to and from residence to BART station; to and frim BAR station to work site (Livermore Lab); and midday use at the workplace. All refueking will be done at the worksire using Livermore's CNG refueling facilities already in place. On weekends, the cars will be taken home and used for local trips by the participating households.

An electronic vehicle locator system will track the vehicles, and manage the fleet. Access to operating the vehicles will be controlled with a smart card using technology developed in Germany and used extensively in car sharing programs throughout Europe.

CarLink is part of BART's Station Car Program designed to increase use of BART by providing convenient, innovative ways to get people to and from the transit stations. With parking space at BART stations severely limited (only 42,000 parking spaces available throughout the whole system), the station car concept is of interest to the transit agency because it can serve both an inbound and an outbound commuter with a single parking space.

Source: CarLink: A Smart Car Sharing Demonstration in Dublin/Pleasanton, CA, Susan Shaheen, Institute of Transportation Studies, UC Davis

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.10 Rev

CONCEPT: Car Sharing

PROJECT NAME: *Car Link*

LOCATION: San Francisco Bay Area

CarLink is part of Bay Area Rapid Transit's (BART's) Station Car Program designed to increase use of BART by providing convenient, innovative ways to get people to and from the transit stations. With parking space at BART stations severely limited (only 42,000 parking spaces available throughout the whole system), the station car concept is of interest to the transit agency because it can serve both an inbound and an outbound commuter with a single parking space.

Using 12 low-emission Honda Civic sedans powered by compressed natural gas, the program allows participating commuters to share fleet cars that use a BART station as their hub. Each car has a potential for three distinct uses a day: to and from residence to the BART station; to and from the BART station to work site (Livermore Lab); and midday use at the workplace. All refueling is done at the worksite using Livermore's CNG refueling facilities already in place. On weekends, the cars are taken home and used for local trips by the participating households.

An electronic vehicle locator system will track the vehicles, and manage the fleet. Access to operating the vehicles will be controlled with a smart card using technology developed in Germany and used extensively in car sharing programs throughout Europe.

Ref: CarLink: A Smart Car Sharing Demonstration in Dublin/Pleasanton, CA, Susan Shaheen, Institute of Transportation Studies, UC Davis

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.11

CONCEPT: Car Sharing

PROJECT NAME: Intelligent Community Vehicle System (ICVS)
Car Co-op

LOCATION: Japan and Singapore

Since 1997 there have been increasing developments in car-sharing in Asia by two auto manufacturers. In October 1997, Honda Motor Company announced the launching of the *Intelligent Community Vehicle System (ICVS)* at their Montegi site. The system comprises several lots from which users (Honda employees) can select four different types of electric vehicles for short term rental. Smart cards unlock and start the car. User fees are calculated automatically and deducted from the users' stored value cards. The lots and vehicles are instrumented with AVI technology which allows ICVS management center to monitor vehicle location in real time. Vehicles are equipped with an auto-charging system that instructs the vehicles to dock at a charging terminal when batteries are low.

A similar system is being introduced at Toyota headquarters. Six charging stations will be installed to service a fleet of 50 small electric cars, to be used by Toyota employees for home to work commute.

In Singapore, a car cooperative has been launched at a condominium development in August 1997. Residents of the condominium automatically become members of the co-op, which owns passenger cars and several multi-purpose vehicles. The condominium developers have contributed approximately $200,000 toward the operation of the co-op during the first three years. Residents will not pay membership fees during those years but will pay usage charges. Car-sharing lots are located near a public transit station, so users can rent vehicles upon disembarking from the suburban train.

Source: Susan Shaheen, Daniel Sperling, Conrad Wagner, "Carsharing: An International Perspective," TRB Record No. 990826, April 1999

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.12

CONCEPT: Car Sharing

PROJECT NAME: Car Sharing in Europe - An Update

Nonprofit organizations that lease cars on a short-term basis have been in existence in Europe for over 10 years. The European Car Sharing Association estimates a total membership of 50,000, with 2,500 cars at more than 700 locations. The idea behind car sharing clubs is that people who only require occasional use of a car will no longer need to own their own vehicles. Operating costs are met through annual membership fees and hourly charges. Car sharing organizations have progressed beyond their environmental grass-roots origins and are becoming a recognized service industry with a business-like approach.

The oldest car sharing organizations are those of **Switzerland**. The Swiss car sharing program, begun in 1987, now operates in 600 locations in 300 communities, with over 20,000 members. A national umbrella organization, *Mobility CarSharing Switzerland* (MCSS) was created in May 1997 as a result of a merger of *Auto Teilet Genossenschaft (ATG)* and *ShareCom.* In 1998, MCSS launched a new service that provides a combination of car sharing, public transit, car rental, and taxi. The program, known as *Zuger Pass Plus (ZPP)*, is a partnership with the regional transit company, Hertz and local taxi companies. ZPP provides discounts on car rentals, taxi services and car sharing co-op annual fees, as well as priority service for the car sharing organization's vehicles. In September 1998, another partnership was launched with the Swiss National Rail System, offering a mobility package to all 1.5 million pass holders of the Swiss Railway System (SBB). The arrangement provides SBB pass holders with special discounts and smart card-facilitated access to the car co-op's vehicles.

In **Germany**, *StadtAuto Drive* (a merger of Berlin's and Hamburg's car sharing cooperatives) has a fleet of 350 vehicles and has 6,500 members. Another German car cooperative, *StadtAuto Bremen,* has 75 vehicles and 1,700 members. Both organizations, as well as smaller cooperatives in other German cities, are utilizing innovative technologies such as smart cards for making reservations and facilitating billing, automatic vehicle location (AVL) systems to keep track of vehicle fleets in real time, two-way communication systems, and remote diagnostics.

Britain's first automobile cooperative began in March 1999 in Edinburgh, Scotland. The "City Car Club" is a joint initiative of the City Council and a local car rental company. The scheme is designed to tie in with Edinburgh's car-free housing subdivisions where residents pledge not to own private cars in return to easy access to low-cost rental vehicles (similar to the German *Wohnmobile*). Members pay an annual membership fee to join the club and then pay by the hour for access to a car which is parked within the housing subdivision.

In **Italy,** nine cities (including Rome, Milan, Florence, Turin, Bologna and Venice) participate in a government/European Union-sponsored car sharing program. Each participating city has a fleet of 500 electric vehicles and all cities employ uniform fees and interchangeable smart cards

Source: Susan Shaheen, "Pooled Cars," ACCESS, No. 15, Fall 1999

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.13

CONCEPT: Car Sharing

PROJECT NAME: Car Sharing in Japan – An Update

LOCATION:

In October 1997, Honda Motor Company launched the *Intelligent Community Vehicle System (ICVS)* at their Montegi site. The system comprises several lots from which users (Honda employees) can select four different types of electric vehicles for short-term rental. Smart cards unlock and start the car. User fees are calculated automatically and deducted from the users' stored value cards. The lots and vehicles are instrumented with AVI technology, which allows the ICVS management center to monitor vehicle location in real time. Vehicles are equipped with an auto-charging system that instructs the vehicles to dock at a charging terminal when batteries are low.

Toyota is about to start a demonstration project of a shared-use transportation system using its small two-seat *Crayon* electric vehicle. The demonstration will be conducted in Toyota City (Aichi Prefecture), the site of the company's headquarters, using a fleet of 35 *Crayon* cars. The cars, which have a 180 cm wheelbase, will be equipped with GPS and mobile phone. Participants in the experiment will make reservations electronically and pick up the car at one of eight staging locations. A dispatch center will monitor the location, movement and recharging status of each vehicle constantly. If the driver attempts to leave the designated area of use, the Crayon Center will send an automatic warning. Toyota views the Crayon systems as a potential precursor of a self-drive taxi system for business centers, residential housing developments, trips to and from suburban train stations, and tourist use in resort areas.

Source: Innovation Briefs, November/December 1999

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.14

CONCEPT: Car Sharing

PROJECT NAME: Station Car Rental Service

LOCATION: San Francisco Bay Area

A station car rental program designed to increase use of BART by providing a convenient way to get people to and from the transit stations has been launched in cooperation with Hertz. A station car is a car that is shared by several users each day for access between a transit station, homes and work. With parking space at BART stations severely limited (only 42,000 parking spaces available throughout the whole system), the station car concept is of interest to the transit agency because it can serve both an inbound and an outbound commuter with a single parking space.

Using conventional gasoline-powered cars, the program will allow subscribing commuters to share fleet cars that use the BART Fremont station as their hub. Each car has a potential for three distinct uses a day: to and from residence to the BART station; to and from the BART station to work site; and midday use at the workplace. Hertz plans to charge home-end users and corporate work site users $400/month for premium service that includes a guaranteed parking space near the station entrance. The rental program is an outgrowth of the shared-car *CarLink* demonstration project using CNG-fueled cars. (see, 1.3.2 and 1.3. 10)

Source: Innovation Briefs, Nov/Dec 1999

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.3.15

CONCEPT: Car Sharing

PROJECT NAME: *Flexcar*

LOCATION: Seattle WA, Portland OR, California

North America has been slow to recognize carsharing as a legitimate transportation option, but now there are two formal neighborhood-based car sharing programs in the United States and active car sharing groups in five Canadian cities. In Seattle, a privately-sponsored initiative, *Flexcar*, was launched in January 2000 with the backing of the local city and county government. *Flexcar* offers a low cost alternative to owning a car for residents of city neighborhoods who need a vehicle only occasionally. For $3.50 an hour and 90 cents a mile, customers can rent a Honda Civic on a on-demand basis. Or, they have the option of signing up for monthly access by paying a $250 initiation fee and $20 a month. The car sharing system has about 12 to 15 members for each of its cars. As the system grows, *Flexcar's* sponsors hope to make short-term rental cars available at the end of bus and rail lines, making public transit accessible to more suburbanites. To make *Flexcar* easier to use, the company plans to incorporate smart card technology (already used in Europe) to automatically bill members for car usage.

In yet another effort at making the system customer-friendly, an integrated web-based reservation system will be introduced later this year to complement the present telephone reservation system. As of May 1, *Flexcar* reports over 200 members and a fleet of thirteen cars based in two residential neighborhoods. *Flexcar's* goal is to have a fleet of 200+ vehicles and 3000 members in two years.

In Portland, Oregon, a similar cooperative, *CarSharing Portland*, has been in operations since March 1998. The coop has about 240 members sharing 14 vehicles at 12 locations in downtown and close-in city neighborhoods. The fleet consists mostly of Chrysler Neon compact cars. Recently, a Honda *Insight* electric hybrid vehicle has been added. Other specialty vehicles are planned to be added as the cooperative grows. A computerized reservation system (CARS) is used to facilitate fleet management and vehicle reservation. A third project is taking shape in California under the auspices of WestStart-CALSTART, a statewide non-profit consortium dedicated to the promotion of advanced transportation technology and non-polluting forms of propulsion.

In Canada, small car sharing groups exist in Toronto, Montreal, Quebec City, Vancouver and Victoria BC.

Source: private correspondence; press releases

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INTERNATIONAL MOBILITY OBSERVATORY

FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.4.1

CONCEPT: Innovative Marketing

PROJECT NAME: *CarMax*

LOCATION: Various locations in the U.S.

CarMax uses computerized inventory controls, combined with a no-haggle selling approach, as a new way of marketing used cars. CarMax cutomers browse computerized catalogues, consult a salesperson about their choice and buy it if they like what is shown. They can return the vehicle after five days or 250 miles of use and obtain a full refund. The notion behind CarMax is that cars could be sold the same way as TV sets and VCRs. Not coincidentally, CarMax is owned by Circuit City, Inc., which pioneered the discount superstore approach in consumer electronics.

CarMax now operates five superstores, including its original outlet in Richmond Virginia. It had sales of $304 million in the fiscal year ended last February. The company plans to open up to 90 superstores in 45 metropolitan locations by the turn of the century.

The CarMax approach has caught on. A rival Michigan-based chain, known as Driver's Mart, has been formed by a consortium of traditional car dealers. Driver's Mart plans to open 10 used-car superstores nationwide by the end of 1996. An additional 90 stores are planned by the end of 1999.

Source: Innovation Briefs, March/April 1997

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.4.2

CONCEPT: Innovative Marketing

PROJECT NAME: Mercedes' *Smart Car*

LOCATION:

Confronted with increasingly crowded urban roads and responding to mounting pressures to Acivilize the car, European automobile makers are experimenting with a variety of new mobility concepts. One is development of a "City Car" -- designed to appeal to young urban professionals who want a small, fuel-efficient car to get around town, but also desire style, fun and a good driving experience. While the sub-compacts of the 1980s were spartan in appearance and lacked creature comforts, the 1990s have seen a shift toward more upscale, luxury models. The new ultra-compacts are meant to be "fun cars" -- as much a fashion and life style statement as sheer transportation.

The movement toward luxury mini cars has found its ultimate expression in Mercedes' newest entry, "*Smart*", launched in October 1997 by Micro Compact Car (MCC), a joint venture of Daimler-Benz and the Swiss entrepreneur Nicolas Hayek, inventor of the "Swatch" watch. The *Smart* is designed as a purely city car for short urban trips. Mercedes' market research indicates that in Europe more than 80 percent of cars are driven less than 30 km per day. (for a fuller description see 1.7.1)

Selling Mobility Services
MCC stresses that it wants to provide customers with mobility, not just a vehicle. To this end it will lease and sell the car, as well as offer it under flexible "mobility leases." When a customer buys a *Smart* in Switzerland he can also purchase a mobility package that includes free access to all car sharing services within Switzerland- with no membership fee and only at a slightly higher hourly rate than is paid by car sharing coop members.

Source: Innovation Briefs, March/April 1997; Nov/Dec 1997

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.4.3

CONCEPT: Innovative Marketing

PROJECT NAME: Pool Leasing

LOCATION: Germany and United Kingdom

Pool leasing is an innovative leasing technique that allows customers to access a pool of different vehicle types rather than restricting them to a single type of car. The underlying premise is that no single vehicle type can satisfy all of a typical user's requirements. While customers may need a small economical "city car" for every-day commuting to work, they may have an occasional need for a larger sedan for intercity travel, a station wagon for transporting bulky objects, a sport-utility vehicle for a vacation trip, and a sports car for a weekend outing in the country.

Pilot pool leasing programs have been sponsored by Mercedes-Benz in Germany (with Porsche) and in the United Kingdom. In the U.K. scheme, customers enter into a 2-3 year leasing contract, giving them access to different vehicles within a certain price bracket Customers can swap their cars within their price bracket without additional cost (except for a handling fee) but have to pay extra to access bigger models. The cars can be exchanged at any of the company's dealers in the U.K. at any time, with a minimum of five days' notice. The arrangement is dependent on availability. The pool leasing scheme is coupled with a short-term rental business. Thus, any car that is returned by a lessee can be rented out again quickly.

Making the right car available at the right time provides consumers with an element of flexibility and choice that had been previously unavailable. The trials conducted so far suggest that car purchasers respond positively to such offers. The challenge lies in the logistics and fleet management to make the pool leasing schemes work. The emergence of leasing services which provide customers with different cars at different times could also be a boost for small cars, as people no longer feel compelled to buy a single car that fits all their needs-- even the infrequent or occasional trip.

Source: Innovation Briefs, March/April 1997; Jan/Feb 1998; Institut für Automobilwirtschaft, Stuttgart; "Congested Roads, Crowded Markets," FT Automotive, 1997

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.4.4

CONCEPT: Innovative Marketing

PROJECT NAME: AutoNation USA

LOCATION: Various

AutoNation USA is moving rapidly to establish a national chain of automotive superstores. The stores initially will sell used cars and eventually will provide one-stop sales and service centers for new and used cars.

The concept was first developed by CarMax, a subsidiary of Circuit City stores, in the early 1990s. The idea was to free consumers from the hassles of buying used cars by employing the same kind of mass-marketing and inventory management techniques used in the distribution and sale of TVs, computers and refrigerators (*see 1.4.1)*. CarMax's strategy caught on with consumers and began to spawn a host of imitators, of which AutoNation USA is the biggest and potentially most successful. The difference is that AutoNation USA is moving aggressively into the new-vehicle market segment, while CarMax, with its six superstores, has concentrated on the used car market. As a result, AutoNation USA is now the nation's second largest new-vehicle dealer group, with 1995 sales of 92,823 cars and trucks, valued at $1.8 billion, according to Automotive News.

H. Wayne Huizenga, chairman of the parent company, Republic Industries, Inc., and founder of Blockbuster Video, has said he intends to use AutoNation USA to completely change the way cars and trucks are sold in the United States. The changes he proposes include the elimination of haggling and the establishment of full-service auto centers C places where consumers can buy, lease or rent new and used cars, finance their car purchases, buy parts and have their cars serviced.

Source: Innovation Briefs, March/April 1997

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.4.5

CONCEPT: Innovative Marketing

PROJECT NAME: Automakers Embrace the Internet

LOCATION:

Faced with growing competition from online car retailing services, the major U.S. auto makers are changing their traditional marketing strategies by making a more extensive use of the Internet. The move comes at a time when online car sellers, such as *Autobytel.com* and *CarsDirect.com*, are offering consumers a chance to shop for and purchase cars directly online, without having to set foot in an auto showroom and haggle over price. The Internet-based auto retailers are rapidly creating a sort of virtual market for cars, where buyers are able to enter a specific model and options and obtain price quotes from various dealers who have that model in stock. Customers can then choose the best offer and have the car delivered to the front door. This pressures dealers to post more realistic invoice prices – what a car actually sells for – rather than an inflated "manufacturer's suggested retail price." Car manufacturers, in hopes of retaining Web-shopping consumers, are making their own web sites more consumer friendly by disclosing the invoice prices they charge the dealer. Ford's vice president of global marketing, James C. Schroer, speculates that cost-plus pricing may become the accepted practice, replacing the arduous negotiations that now take place in the dealers' showrooms.

General Motors Corporation has announced the formation of an alliance with Edmunds.com a leading internet source of unbiased automotive information, to offer consumers increased ease of obtaining information about GM products on the Internet. The site will allow consumers to custom-build their GM vehicle online and determine its availability at a nearby GM dealer's lot.

Source: Innovation Briefs, March/April 2000; GM Press Release, February 21, 2000

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.4.5

CONCEPT: Innovative Marketing

PROJECT NAME: Automakers Embrace the Internet

LOCATION:

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Source: Innovation Briefs, March/April 2000

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.5.1

CONCEPT: Emission-Reducing Techniques

PROJECT NAME:

LOCATION:

Most mobile source emissions come from only a relatively small proportion of vehicles. These so-called "gross emitters" represent only 10 to 15 percent of the automobile fleet, but are responsible for a vast bulk of smog-causing emissions. In a study done for the California Inspection/Maintenance (I/M) Review Committee, 1,100 vehicles that had previously failed California's I/M test were sent to service stations in the Los Angeles area for inspection and repair. In this sample, 43% of idle hydrocarbon emissions and 33% of idle carbon monoxide emissions were found to be produced by only 10 percent of the vehicles tested (*Motor Vehicle Inspection and Maintenance in California,* California Research Bureau, 1993). Another study estimated that the dirtiest seven percent of all cars emit 50% of all CO emissions from cars, and the cleanest 50 percent emit only 0.3% of CO (G.A. Bishop, D.H. Steadman et al, *A Cost Effectiveness Study of Carbon Monoxide Emissions Reduction Utilizing Remote Sensing, Journal of the Air and Waste Management Association, July 1993).* Douglas R. Lawson, a researcher at the Energy & Environmental Engineering Center in Reno, Nevada, concludes that vehicles fall into three categories: "high emitters" that make up about 10-15% of the fleet; "marginal emitters which constitute another 15-20% of the fleet; and essentially "clean vehicles" that make up the remaining 65-70% of the fleet.

It follows, that an emission-control approach that focused on high-polluting cars would be far more cost-effective than the prevalent approach of treating all cars as equal. Four generic approaches to dealing with the offending vehicles are being considered:

- Identify/Diagnose/Repair Programs
- Vehicle Scrappage Programs
- Exemption of New Cars From an Inspection Requirement
- Low Emission Vehicles

Source: Innovation Briefs, April 1995; February 1995

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.5.2

CONCEPT: Emission Reducing Techniques

PROJECT NAME: Identify/Diagnose/Repair Programs

LOCATION:

The most cost-effective way of reducing in-use mobile source emissions is through a program that quickly and inexpensively identifies high emitters, then properly diagnoses them and provides effective, verifiable and lasting repairs. These are the conclusions of a recent study by Douglas R. Lawson. Drawing on data from the California I/M Review Committee study, Lawson found that most of the HC emission reductions came from high emitters, with little or no reduction from the remaining 80% of the fleet. The dirtiest 10% of the repaired cars accounted for 61% of HC emission reductions and 44% of CO emission reductions. Emission reduction costs for the highest emitting 10% of the fleet averaged $1,100/ton of HC; for the remaining vehicles costs increased exponentially.

Remote Sensing Program in Phoenix.
In January 1995, Phoenix became the first place in the nation to check tailpipe emission with the help of remote sensing technology. Six specially equipped vans roam the area, with each van sampling 12,000 to 15,000 vehicle a day. The inspection teams set up unannouced roadside spot checks using a device that shoots a beam of infrared light across traffic to a sensor on the other side of the road. When a vehicle crosses the beam, the device measures exhaust pollutants by detecting changes in the intensity of light, caused by carbon monoxide and hydrocarbon emissions. A roadside camera takes a video snapshot of the vehicle and its registration plate. Offenders are notified by mail. First comes a warning. The next notice is an order to report to an inspection station or face the loss of car registration.

Remote sensing and repair of gross emitters has also been adopted by the South Coast Air Quality District in Southern California as one of the recommended alternatives to the requirement to reduce the use of single-occupant vehicles.

Source: Innovation Briefs, February 1995; April 1995

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.5.3

CONCEPT: Emission-Reducing Techniques

PROJECT NAME: Vehicle Scrappage Programs

LOCATION: California and Texas, USA

On November 15, 1994, California Air Resources Board (CARB) adopted a large-scale vehicle scrappage program to remove older, higher-polluting cars and trucks from Southern California's roads. The program was developed to replace portions of the state implementation plan (SIP) which had initially included a dramatically increased number of low- and zero-emission vehicles to be offered for sale in California in 2004 and beyond. Auto, trucking and oil industry representatives appealed that decision and succeeded in having it replaced with the scrappage program which is considered as a more cost-effective means of achieving the required emissions reductions.

The program began in 1996 with a scrappage target of 35,000 cars per year from 1996-98 and 75,000 cars in 1999 and beyond. CARB estimates that the program will reduce reactive organic gases (ROG) by 5 tons per day, rising to 14 tons per day in the year 2010. The scrappage program will cost approximately $91 million in the first year of operation. The state will absorb $75 million of that cost, with the rest coming from private industry.

Under the Accelerated Vehicle Retirement Program, industries in the Dallas-Fort Worth, Houston-Galveston and other non-attainment areas can earn stationary source VOC emission reduction credits by removing polluting cars and trucks from the roads. The Texas Natural Resources Conservation Commission, sponsor of the program, estimates that some 2,000 vehicles could be scrapped during the program's first year. The Texas program specifically targets vehicles that emit unusually high levels of pollution, and requires actual measurement of the to-be-scrapped vehicles' emissions. This approach, while more cumbersome, is deemed to ensure maximum credits to industry, while getting rid of the worst polluters rather than merely oldest vehicles. Unlike in California, Texas-based environmental organizations are backing the program.

Source: Innovation Briefs, April 1995

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.5.4

CONCEPT: Emission-Reducing Techniques

PROJECT NAME: Exemption of New Cars from Inspection Requirement

LOCATION: Maryland USA

Because new cars create little pollution they should be exempt from mandatory inspections. This is the philosophy adopted by the State of Maryland in its new enhanced I/M program. Since automobiles less than 2 years old constitute almost 16 percent of all vehicles, exempting them from the requirement will significantly reduce the overall cost of the program and may provide an incentive to auto owners to get rid of older cars (extending the exemption to autos less than 5 years old would exclude 43 percent of all cars from the requirement.)

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.5.5

CONCEPT: Emission-Reducing Techniques

PROJECT NAME: Low-Emission Vehicles

LOCATION:

In late December 1997, the U.S. Environmental Protection Agency approved a petition of the Ozone Transport Commission (OTC) to launch a low emission vehicle (LEV) program in the Northeast region comprising 12 states and the District of Columbia. The program called for the adoption of California standards for clean cars beginning in 1999. These standards (already adopted by New York, Connecticut and Massachussetts) require that two percent of all vehicles offered for sale should be so-called Ultra Low Emission Vehicles (ULEV). ULEV vehicles effectively eliminate more than 90 percent of auto emissions and are seen both by government and industry as the key to meeting air quality standards. California law also requires that another two percent of vehicles offered for sale be zero-emission vehicles; the mandate rises to 5 percent in 2001 and to 10 percent by the year 2003.

Work on zero-emission vehicles has focused on development of a practical and affordable electric car, but progress has been slow. It is commonly agreed that electric vehicles available at the turn of the century will only have a driving range of about 80-100 miles C and even that limited range will be reduced in cold weather and by heater/air conditioning requirements. The market for such low performance, limited-range vehicles is expected to be quite limited. The auto industry further claims that manufacturing costs of electric vehicles could be from $12,000 to $20,000 more than the cost of gasoline-powered vehicles. To get people to buy electric vehicles, auto manufacturers contend, they would have to spread the additional cost over the entire fleet, raising the price of conventional vehicles.

Source: Innovation Briefs, July/August 1997

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.6.1

CONCEPT: Controlling Vehicle Population Growth

PROJECT NAME:

LOCATION: Singapore

Singapore's strategy is to keep the overall size of the vehicle fleet in balance with existing highway capacity. Each year the government sets a quota for the number of new vehicles it will allow to be registered. The quota is determined by the capacity of the existing road network. The public decides, through an open bid process at monthly auctions how much it is willing to pay for the right to own a vehicle. A certificate of entitlement (COE) is needed to purchase a vehicle. Successful bidders obtain a certificate by paying the quota premium, which is the lowest successful bid price. For example, if the quota for the month is 900 vehicles and there are 1500 bids, the lowest successful bid is the 900th bid. The certificate is valid for 10 years from the date of registration of the new vehicle.

Source: Innovation Briefs, August 1996

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.7.1 Rev

CONCEPT: Innovations in Car Design

PROJECT NAME: The *Smart*

LOCATION: Germany

The movement toward luxury mini cars has found its ultimate expression in Mercedes' new entry, "*Smart*", launched in October 1997 by Micro Compact Car (MCC), a joint venture of Daimler-Benz and the Swiss entrepreneur Nicolas Hayek, inventor of the "Swatch" watch. Only 2.5 meters long and 1.5 meters wide (8 ft long, 5 ft wide), and seating two persons, the *Smart* is meant as a maneuverable "city car"–an asset in the crowded centers of European cities where streets are narrow and parking space is at a premium. The car fits comfortably in one half of a conventional parking space. The *Smart* is not intended for intercity trips. However, Mercedes' market research indicates that more than 80 percent of cars in Europe are driven less than 30 km per day. Although the vehicle only weighs 720 kg (1,590 lbs), its rigid unit construction and two air bags make it as safe as a conventional car, according to its manufacturer. At the same time, the *SMART*'s 0.6 liter (55 HP) engine consumes only 4.8 liters/100 km (51.6 mpg), making it the most economical and environmentally-friendly car on the market. Despite its small size, the *Smart* is surprisingly sophisticated technologically. It is equipped with a mobile phone and a GPS-based roadside assistance and navigation system.

The *SMART*, which went on sale in October 1998, is being marketed aggressively as a new "mobility concept." *SMART* owners will have special facilities to rent a *SMART* car at airports and railroad stations when traveling. Other privileges of *SMART* ownership may include specially reserved parking spaces in German city centers and *SMART* shared-car cooperatives for occasional auto users. (*see also, 1.4.2)*

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.7.1

CONCEPT: City Car

PROJECT NAME: The *Smart*

LOCATION: Germany

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INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING THE AUTOMOBILE** NO. 1.7.2

CONCEPT: Innovations in Car Design

PROJECT NAME: The "City Car"

LOCATION:

When Fiat revived its "Fiat 500" (the *Cinquecento*) in 1992, the market share held by the "minis" - defined as cars under 3.5 meters (11.5 ft) in length - had been in continuous decline for over a decade. The launch of a tiny, maneuverable car was not entirely surprising, given the crowded streets of Italian cities. The "500" was designed as a no-frills urban car, aimed at young budget-conscious drivers who needed to get around the city. But it was also meant to appeal to more affluent customers on the grounds of its superior fuel economy, low impact and "green" image.

The market performance of the "500" exceeded expectations. By 1996, 680,000 units had been sold. The success of the car, together with that of its main rival, the Renault *Twingo*, (3.4 meters or 11.1 ft in length) which was launched a year later and which currently sells 230,000 units per year, did not go unnoticed by the rest of the car industry. By 1996, several other manufacturers decided that the ultra-compact car had to be taken seriously. Among them were Ford of Europe, which launched its *Ka* model (3.6 meters or 11.8 ft) in 1996, and Mercedes-Benz which came out with its A-class model (3.5 meters or 11.5 ft) in the summer of 1997. Both auto makers have targeted young urban professionals who want a small, fuel-efficient car to get around town, but also desire style, fun and a good driving experience. While the sub-compacts of the 1980s were spartan in appearance and lacked creature comforts, the 1990s have seen a shift toward more upscale, luxury models. The new ultra-compacts are meant to be "fun cars" - as much a fashion and life style statement as sheer transportation.

Source: "Congested Roads, Crowded Market," by Günter Hörmandinger, FT Automotive

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.7.3

CONCEPT: City Car

PROJECT NAME: The *Smart* (Update)

LOCATION:

Mercedes-Benz's tiny *Smart* car, launched a little more than a year ago (see 1.7.1) is gaining in popularity among European city dwellers. DaimlerChrysler has recently been selling as many as 10,000 *Smart* cars a month, up from about 3,000 a year ago. In fact, the car is proving itself so popular that Mercedes-Benz has decided to expand its marketing efforts beyond the nine European countries where it was first launched. The company will start selling the *Smart* in the United Kingdom and Japan and is planning to enter new markets as distant as Taiwan and Thailand. But the *Smart* is not expected to come to the United States because it is considered far too small for the tastes of American consumers.

What accounts for the *Smart's* growing appeal in the rest of the world? A combination of convenience and "reverse snob appeal," according to European market analysts. The car is so small that it can be parked perpendicular to the curb. That's a real advantage in the crowded cities of Europe and Asia, where downtown parking space is at a premium. Although the vehicle only weighs 720 kg (1,590 lbs), its rigid unit construction and air bags make it as safe as a conventional car, according to its manufacturer. At the same time, the *Smart* consumes only 4.8 liters/100 km (51.6 mpg), making it the most economical and environmentally-friendly car on the market. And, despite its small size, the *Smart* has all the usual creature comforts. It can be equipped with a mobile phone and a GPS-based roadside assistance and navigation system, and will soon be available in a convertible version.

But the *Smart's* appeal goes beyond its utilitarian value. There is a new generation of affluent young urban professionals in Europe and Asia who want a small fuel-efficient car to get around town, but also desire style, fun and a good driving experience. The *Smart* seems to possess these attributes.

Source: Innovation Briefs, May/June 2000

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.8.1

CONCEPT: Underground Roadways

PROJECT NAME: *Metroroutes*

LOCATION: Paris Region, France

With surface rights-of-way through densely populated areas virtually exhausted, the Paris regional transportation authorities are turning their attention to underground routes as the most efficient, and often the only, way to relieve surface traffic congestion. The Paris regional plan for 2015 envisions a 100 km network of high capacity underground highways or *metroroutes*. The concept calls for using a 10 meter (34') diameter tunnel - which normally would accommodate only two lanes - to provide a two-level roadway, each three lanes wide. Lanes are 2.9 meters (9'5") wide and tunnel ceiling 2.55 meters (8'4") high. (By comparison, typical tunnel dimensions in the United States call for 12 ft wide lanes and 14'6" headroom). The overall result is to triple the capacity of a conventional two-lane tunnel of similar diameter.

The first large-scale application of the *metroroute* concept has been a 10 km segment of the A86- West autoroute, which would complete a missing link of an outer beltway in the Versaille area, west of Paris. The sponsor of the privately financed and built project is the French company, *Cofiroute*, one of the largest toll road operating companies in the world. Cofiroute engineers estimate that about 90 percent of traffic in the Paris region can fit in the low-clearance doubledeck tunnels. By excluding heavy vehicles, the design can accommodate steeper entrance/exit ramps and tighter curves. Estimated cost of the project is $2 billion or $320 million/mile.

Work on the A86 West tunnel project started in late 1996 but was halted in February 1998 when the Cofiroute concession was challenged in court on the grounds of an improper bidding process. Work on the project is expected to resume in mid-1999 under a new concession agreement, with the opening of the underground connection set for 2003.

The only U.S. city currently attempting to put this principle into practice is Boston, where a $6 billion 8-lane underground facility will replace the elevated Central Artery expressway. While the Boston project will remove a lot of traffic from the surface and create green space in the downtown, it does not incorporate a key innovation pioneered by the French - that of increasing vehicle carrying capacity of underground roadways by using low-clearance tunnels.

Source: Toll Roads Newsletter, April '99; Innovation Briefs, May/June '99

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.8.2

CONCEPT: Underground Roadways

PROJECT NAME: *Boulevard Peripherique Nord de Lyon (BNPL)*

LOCATION: Lyon, France

Lyon's inner area ring road is being built for the most part underground in order to avoid disturbing the historic old city. The $900 million project is built and operated as a toll concession by a syndicate led by Bouygues SA, France's largest construction company. The first 10 km northern leg of the inner ring, 6.5 km of which is underground, has been completed and is open to traffic. Construction of the western segment, half of which will likewise be underground, is scheduled to begin next year. When completed, the underground highway will provide a direct link between the northern and southern autoroutes which currently stop at the edge of the metropolitan area. The underground roadway will be the last link in what is otherwise a non-stop grade-separated expressway connecting Paris with Cotes d'Azur,

Source: Toll Roads Newsletter, February 1997

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INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.8.3

CONCEPT: Underground Roadways

PROJECT NAME:

LOCATION: San Francisco, California, USA

The latest draft long range transport plan for San Francisco proposes feasibility studies of three underground city toll roads to take heavy traffic off surface streets and manage it more efficiently sub-surface. One of the proposals is a 3-km underground roadway under Van Ness Avenue which carries heavy local traffic around the western fringe of the downtown business district. It is also a major route between the freeways on the west Bay Peninsula and the Golden Gate Bridge with its link to Marin and Sonoma counties. A second underground roadway would be an 8km stretch connecting I-280 near Daly City to the southern approaches to the Golden Gate Bridge.

The underground facilities would be funded by tolls, using electronic toll collection technology. Charges would vary dynamically to prevent congestion. The underground roadways would be built and operated by private companies under franchise to the city. According to the draft plan, the major rationale for the three tunnel supercorridors is to improve neighborhood livability by removing surface traffic and to help speed Muni bus and trolley service on the surface with dedicated lanes. The report envisages the tunnelways as allowing the widening of sidewalks, and more resident curbside parking. The report says it expects the proposal to be "controversial" but says San Francisco "must consider new ideas for solving transportation problems,"

The draft plan notes that similar projects are under way in Paris, Singapore and Norway. Sydney, Melbourne, Tokyo, Stockholm, Berlin, Lyons and Madrid also have somewhat similar projects. The proposal has generated strong interest in San Francisco and opinion for and against.

Source: Toll Roads Newsletter, April 2000

INTERNATIONAL MOBILITY OBSERVATORY

INNOVATION FACT SHEET

STRATEGY: **POLICIES AFFECTING AUTOMOBILE USE** NO. 1.9.1

CONCEPT: Advanced Propulsion Technologies

PROJECT NAME: Hybrid Vehicles

LOCATION:

Hybrid vehicles are attracting serious attention from auto manufacturers for their ability to combine the strengths of multiple energy sources into a single package. Many auto industry analysts see the battery-powered electric car not likely to be a favorite in the marketplace.

Two primary hybrid technologies being pursued by automakers are gasoline/electric and fuel-cell/electric engines. Both hybrid technologies have been around for a long time. Most freight trains are run by diesel/electric locomotives. Hybrid fuel-cell/electric motors have been used in space applications for many years.

The world's first mass-produced hybrid automobile is the Toyota *Prius* which uses a combination gasoline/electric system. Sold in Japan and slated for introduction in USA in 2000, the *Prius'* main power source is a conventional 1.5 liter, 58 HP gasoline engine that runs the car at moderate and higher speeds and recharges the batteries. At low speeds, when gasoline engines do not operate as efficiently, a 40 HP electric motor kicks in. Sophisticated electronic controls and transmission technology optimize the use of the electric motor, the engine or both simultaneously. Unlike battery-only electric vehicles, the *Prius* never needs to be plugged in, as its battery is recharged by rotating power from the gasoline engine to an on-board generator.

While it boasts signifivantly reduced emissions - up to 50 percent reduction in carbon dioxide and 90 percent in CO, hydrocarbons and nitrogen oxide - and is rated at 66 miles per gallon, the *Prius* does not qualify as a Zero Emission Vehicle (ZEV) under current California regulations, as would an entirely electric car.