

For an integrated policy of urban mobility

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Abstract

In recent decades, urban and suburban travel has undergone major changes in terms of both quality and quantity due to several factors. The urban sprawl led to sharp rise in trips from outskirts to suburbs and long trips from outskirts to the centre. The growth in household purchasing power and the democratisation of the private car led to a rapid rise in car ownership levels. The creation of road systems to respond to the dispersion caused by town planning less suited to the radial structure of heavy public transport networks has encouraged private car use. The changes in people's lifestyles led to an increasing amount of travel for leisure and shopping purposes, trips which do not lend themselves as readily to public transport. This evolution of urban mobility has in most cases resulted in worsening traffic conditions, leading to a growing number of traffic jams which cause polluting emissions to go up in urban areas.

Given these observations, it appears beyond dispute that public transport is the answer to the problems of urban congestion. It also contributes to the quality of urban life and the environment, and makes it possible to free up scarce urban space. Figures on public transport energy efficiency support this line of reasoning.

In this context, an integrated policy of urban mobility is the result of a global approach to travel problems in a context of urban development. It should foster a model of a "compact" city, one which requires less transport and promotes solidarity. Experience and calculations show that as urban density rises, energy use for travel per inhabitant declines and the share of GDP devoted to urban transport spending falls. To prevent housing and businesses from spreading out and to enable dense areas to keep their inhabitants and jobs, it is necessary to draw up town planning schemes which strictly limit construction on vacant land on the outskirts of cities and promote greater density, particularly near stations and railway stations served by efficient public transport; lower the minimum "number of parking spots per residence" standard and set strict maximum standards for office and commercial buildings; encourage experiments in car-free residential zones; and apply a policy of financing housing which encourages the building of new multiple-occupancy buildings rather than single-family homes and proper upkeep of the existing housing stock in downtown areas.

Excessive use of the car is encouraged by underpricing its use for urban travel: parking is almost always free at the destination (parking offered by the employer or shopping centre or free parking on the street), and the external costs (pollutant emissions, noise, accidents, congestion) are not "internalised" since the car driver bears only a minimal share of the cost

he incurs to the community. The priority is therefore to make car use in the city more costly. The goal is not to raise taxes imposed on the car, but to use well-chosen taxes or charges to steer car owners' behaviour in a direction that promotes economic efficiency and the public good.

Developing public transport must go hand in hand with any measure aimed at restricting car use to provide an alternative to the private vehicle. There are a large number of successful experiments throughout the world in developing public transport. According to the existing experiments, the paper presents the outlines of a policy which gives priority to public transport.

Speech

Before defining what an effective public transport system should look like, we first need to put public transport in context: it is an essential element of an integrated policy of urban mobility. Indeed, there is no point in one-sidedly designing and creating an energy-efficient and nonpolluting public transport system if measures are not carried out in tandem to encourage people to use public transport rather than their private motor car. In the long run, the goal is not simply to replace all diesel buses with natural-gas, hybrid, electric or fuel-cell buses. A measure like this will not by itself be enough to solve the problems of urban highway congestion and the impact this has on excessive energy consumption and pollution. It is thus vital that a global approach be taken by asking the following questions:

What strategy should be adopted and what actions taken to organize travel effectively as part of a policy of sustainable development? What role should public transport play in this approach?

To attempt to answer these questions, I suggest using a three-stage approach:

1. **The recognition** or examination of the current context in which urban travel takes place: the features of demographic and urban development and their effects on mobility.
2. **The answer** to the problems of mobility, which are reflected in traffic congestion, excessive consumption of energy, pollution and a growing number of road accidents, can only be provided by public transport and non-motorized modes (walking and cycling).
3. However, public transport has to be developed as part of **an integrated policy of urban mobility**, in a context of sustainable development.

1. Recognition

In recent decades, urban and suburban travel has undergone major changes in terms of both quality and quantity due to several factors:

- ◆ urban sprawl, which has created a larger number of more widely spread cities with large populations. In the year 2000, about 2200 cities will have more than 100,000 inhabitants while this number was 114 in the beginning of the twentieth century. Half of the world's population now lives in urban areas, and estimates are that by 2010 there will be some 50 megacities of over 10 million people. As housing has moved out of the city centre, so places of employment, leisure and shopping have all grown less concentrated;
- ◆ the sharp rise in trips from outskirts to suburbs and long trips from outskirts to the centre, a direct result of the spread of the urban area. This has caused travel distances to

increase: in France, in terms of local mobility the average distance travelled per week rose by 30% between 1982 and 1994, to 23 km;

- ◆ the growth in household purchasing power and the democratization of the private car have led to a rapid rise in car ownership levels, and in some countries to multiple-car families. There is also a noticeable trend for car owners to buy ever-more powerful cars with more features, especially air conditioning, which are therefore more energy-consuming;
- ◆ the creation of road systems to respond to the dispersion caused by town planning less suited to the radial structure of heavy public transport networks has encouraged private car use, which has also been at the expense of walking and cycling. Over the last 25 years, the motorway network of the European Union has more than tripled in size (+208%), whereas the rail network has shrunk by 8%. Between 1980 and 1995, the number of vehicles per kilometre travelled by cars grew by 50% in the OECD countries even though the population growth was only 13%;
- ◆ changes in people's lifestyles have affected their mobility: they are doing an increasing amount of travel for leisure and shopping purposes, trips which do not lend themselves as readily to public transport;
- ◆ a look at patterns of behaviour related to vehicle use shows that car drivers do not always think logically. A study performed by INRETS (France), TÜV (Germany) and TRL (UK) shows that half the time Europeans use their car to go less than three kilometres, a quarter of the time to go less than 1 kilometre, and one time out of eight to go less than 500 m.

This evolution of urban mobility has in most cases resulted in worsening traffic conditions, leading to a growing number of traffic jams which cause polluting emissions to go up in urban areas. According to ADEME (France), individual urban travel represents 24% of the energy consumption of land transport. The private car accounts for 87% of the energy balance of urban mobility, whereas public transport consumes barely 7%. In Brussels, vehicles of the STIB/MIVB (buses, trams and metros) consume only 8% of the energy balance of urban mobility yet account for 30% of total urban travel.

2. The answer

Given these observations, it appears beyond dispute that public transport is the answer to the problems of urban congestion. It also contributes to the quality of urban life and the environment, and makes it possible to free up scarce urban space. The following figures support this line of reasoning:

- ◆ in the Paris region, for example, an RATP bus which is 25% full consumes 25 goe/passenger-km whereas a car carrying 1.25 people consumes 60 goe/passenger-km;
- ◆ in terms of greenhouse gases, a bus emits about a third as much CO₂ per passenger per kilometre carried than a private car;
- ◆ as to other pollutants, in terms of passengers per kilometre the same bus will emit 25 times less CO than a petrol-powered car and a fourth as many particles as a diesel-powered vehicle.

Obviously, these ratios would be even more unfavourable to the private car during rush hour, since the bus would be close to 100% full.

These findings are not unique to the Paris region. They can be extended to almost all European urban areas having a dense public transport network. This is not the case with North American cities (except New York), where public transport does not compare well because it is less used than in Europe. In certain Japanese cities, on the other hand, the metro and railway networks carry a substantial number of passengers and therefore have better energy and environmental performance in terms of passengers per kilometre carried. Generally speaking, the higher the occupancy rate of public transport vehicles, the lower the relative energy efficiency of the private car.

Lastly, as regards the use of space, calculations reveal that for a trip between home and work the private car takes up between 10 and 30 times more space than public transport, and five times more than the bicycle. (This estimate was based on a home-to-work route of 10 km, with nine hours of parking at the workplace.)

This comparison could be carried further, in particular as regards road accidents, jobs created or costs to society, but I have limited myself to subjects being dealt with by this conference.

Consequently, the superiority of public transport is proven and recognized. The debate is no longer about the energy and environmental efficiency of public transport, but about defining the elements of an integrated policy of urban mobility in which public transport, including walking and bicycling, is the priority component.

3. Principles of an integrated policy of urban mobility

An integrated policy of urban mobility is the result of a global approach to travel problems in a context of urban development. Planners and decision-makers can choose between two options in pursuing this goal:

- ◆ Option 1: promote urban sprawl, the consequences being dependence on the car, rising transport costs, and the exclusion of those who do not own cars.
- ◆ Option 2: foster a model of a "compact" city, one which requires less transport and promotes solidarity.

Doing nothing would amount to picking the first option.

A "compact" city requires less transport and is less energy-intensive

Why a compact city? Because experience and calculations show that as urban density rises, energy use for travel per inhabitant declines and the share of GDP devoted to urban transport spending falls, only if an efficient public transport system is provided. A city like Vienna has a density of 75 inhabitants/hectare. Each inhabitant consumes an average of 12,000 Mj per year for urban travel, and spending devoted to urban transport accounts for 6% of the urban area's GDP. In Vienna, 47% of urban travels are covered by public transport. Hong Kong is a city four times as dense where public transport ensures 72% of urban travels, with energy consumption per inhabitant half that of Vienna and slightly lower spending in percentage terms. Melbourne is a fifth as dense as Vienna, which causes energy consumption per inhabitant to be 2.6 times higher. In Melbourne, only 8.5% of urban trips are done by public transport.

***Density, modal choice, energy consumption by urban transport,
urban transport spending in % of GDP***

Cities	Population (million of inhabitants)	Density of urbanized area (inhabitants/ hectare)	Share of mechanized trips by public transport (%)	Energy consumption for annual urban travel (Mjoule/ inhabitant)	Urban transport spending (private and public modes) in % of GDP
Paris	9.4	60	30%	13,000	9%
London	7.0	75	38%	12,500	9%
Vienna	1.7	75	47%	12,000	6%
Budapest	1.9	55	66%	7,000	11%
Melbourne	3.1	14	8,5%	32,000	14.5%
Denver	2.0	14	1,5%	60,000	12%
Bangkok	6.6	140	43%	13,000	13.5%
Hong Kong	6.3	300	72%	6,500	5%

Source: Millennium Cities Database (preliminary data)

To prevent housing and businesses from spreading out and to enable dense areas to keep their inhabitants and jobs, it is necessary to:

- ◆ draw up town planning schemes which strictly limit construction on vacant land on the outskirts of cities and promote greater density, particularly near stations and railway stations served by efficient public transport;

This is the situation in the United Kingdom, where the government has announced that 60% of new construction projects should be done within existing urban areas and not in outlying regions. The British government has also decided to review its main road projects following the SACTRA (Standing Committee on Trunk Road Assessment) report, which concluded that the traffic created by building new roads exceeds the additional capacity the roads provide.

- ◆ lower the minimum "number of parking spots per residence" standard and set strict maximum standards for office and commercial buildings;

The city of Nuremberg allows only one parking spot per 12 employees, the downtown areas of Geneva and Lucerne allow one per 10 employees, and French cities offer between one per 1.3 employees (Toulouse, Strasbourg) and one per four employees (Lyons, Marseilles).

- ◆ encourage experiments in car-free residential zones; and
- ◆ apply a policy of financing housing which encourages the building of new multiple-occupancy buildings rather than single-family homes and proper upkeep of the existing housing stock in downtown areas.

Set a price on car use

Excessive use of the car is encouraged by underpricing its use for urban travel: parking is almost always free at the destination (parking offered by the employer or shopping centre or free parking on the street), and the external costs (pollutant emissions, noise, accidents, congestion) are not "internalized" since the car driver bears only a minimal share of the cost he incurs to the community.

The priority is therefore to make car use in the city more costly. The goal is not to raise taxes imposed on the car, but to use well-chosen taxes or charges to steer car owners' behaviour in a direction that promotes economic efficiency and the public good.

Achieving this goal would require:

- ◆ raising the nonresidential rate for on-street parking and in off-street car parks;
- ◆ encouraging employers to offer less free parking at the workplace;

Modal practices depending on parking conditions at the workplace

City	Automobile	Public Transport	Other Mode	Total
Besançon				
Guaranteed parking	90%	6%	4%	100%
No guaranteed parking	46%	29%	25%	100%
Grenoble				
Guaranteed parking	94%	3%	3%	100%
No guaranteed parking	53%	29%	18%	100%
Toulouse				
Guaranteed parking	99%	1%	0%	100%
No guaranteed parking	41%	24%	35%	100%
Bern				
Guaranteed parking	95%	3%	2%	100%
No guaranteed parking	13%	55%	32%	100%
Geneva				
Guaranteed parking	93%	3%	4%	100%
No guaranteed parking	36%	25%	39%	100%
Lausanne				
Guaranteed parking	94%	3%	3%	100%
No guaranteed parking	35%	35%	30%	100%

Source: *Les citoyens face à l'automobilité; les déterminants du choix modal (City dwellers and driving; the factors determining modal choice)* (UTP, ADEME, CERTU, CTB, SEMITAG, SEMVAT).

The United Kingdom is working on a project to tax parking at the workplace (the annual tax could reach £150/parking space). In Switzerland, companies rent out parking spaces to employees who drive to work and redistribute the rental revenue to employees who use public transport by subsidizing their season ticket.

Studies done in France on the effect of company car parks on greenhouse gases show that for a company of 100 employees which provides parking spots for its employees the annual CO₂ emissions are 144 tonnes, whereas they would be 96 tonnes if there were no parking.

- ◆ developing urban road charges: for access to the centre, for access to congested expressways, and so forth.

Realizing these measures requires carrying out a clear communication policy on the aims pursued, as well as a policy for promoting projects based on the benefits to the community. To guarantee the public success of taxing nonresidential parking and urban charges, it is recommended that the income generated in this way should be allocated to funding upgrades in public transport and environmental quality. Moreover, it is essential to implement

measures which improve city centre attractiveness in order to retain the population from moving to the outskirts.

Make public transport the priority

Developing public transport logically follows from the above comments. It must go hand in hand with any measure aimed at restricting car use to provide an alternative to the private vehicle.

A survey conducted by Eurobarometer for the UITP shows that the European public supports measures promoting public transport: 84% of those questioned believe that public transport, not the motor car, should be given priority in urban areas. The same survey reveals that elected representatives believe this rate to be only 49%. This discrepancy indicates that public opinion is more aware of the problems posed by car traffic than are the public authorities, who lack the courage needed to direct decisions in such a way as to make public transport a priority.

There are a large number of successful experiments throughout the world in developing public transport. It is not possible to present all of them here, but it is important to note the outlines of a policy which gives priority to public transport:

- ◆ The sustainable development model assumes that public transport is a genuine alternative to the car. The segregated right of way for public transport provides this alternative. In Rouen, implementation of two light rail lines led to an increase of 35.7% in travels done by the whole public transport system, between 1993 and 1998. Even in the case of metros, in urban areas the construction costs are lower than those of new road infrastructure for a higher transport capacity. For example, the Parisian RER has a flow of 60,000 passengers/hour which is equivalent to the capacity of 30 car traffic lanes (each lane has an average flow of 1,500 to 2,000 cars per hour with an average occupancy rate of 1.2 persons per car).
- ◆ The effectiveness of the public transport network depends on how easy it is to use. To achieve this, modal integration of networks and services is an essential element enhancing the attractiveness of public transport:
 - * interoperability of networks and cooperation between operators (*cf.* Tram-train in Karlsruhe and Saarbrücken);
 - * tariff integration through an effective automatic fare collection system (*cf.* Octopus in Hong Kong);
 - * door-to-door information in real time by telephone and on the Internet (*cf.* OVR in the Netherlands, DELFI in Germany);
 - * optimization of interchange and transfer points between modes to make them functional and pleasant (La Défense in Paris); and
 - * construction of park-and-ride schemes (Park and Ride in Oxford).
- ◆ The flexibility of public transport comes from the development of new products such as:
 - * high-frequency express bus services enjoying priority over other vehicles and serving the densest areas (*cf.* Jönköping);
 - * transport-on-demand services for low-density areas or special categories of customers (*cf.* PersonalBus in Florence); and

- * partnership with taxis or car rental firms to offer comprehensive mobility services (*cf.* TreinTaxi in the Netherlands).

These are a few measures which would help promote public transport if implemented. There are obviously others.

To come back to my introductory comments, I would say that an effective public transport system is not possible without an integrated policy which treats urban travel as a whole. Public transport operators owe it to themselves to enhance and diversify the services they offer to attract new customers and retain the loyalty of existing ones. The public authorities, in turn, must provide the conditions required to make public transport a clear priority. Without this cooperation, sustainable mobility is not possible.