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Road Congestion Charging in London

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1. Introduction: Transport in London

On 17 February 2003, Congestion Charging was introduced into Central London. Any vehicle driven into the Central London area shown on the map between 7am and 6:30pm, Monday to Friday (excluding public holidays), has to pay a fee of £5 per day (London Transport Website 2003). There are very few cities in the world that have applied congestion charging. Why was it thought necessary to introduce such a scheme in London? Will a £5 fee deter sufficient motorists to affect congestion? What are the political implications? What has been the impact on road use, public transport and the general public after three months? These are the questions being investigated in this paper.

Transport in London is under the direction of the Mayor and the Greater London Authority, along with the officials at Transport for London, TfL (Transport for London Website 2003). They manage the road infrastructure, London Buses, Docklands Light Railway and Croydon TramLink. Also from 15 July 2003, London Underground will be managed by TfL, although private companies will be running the underground on 30 year leases, in a Public Private Partnership scheme (PPP). All railways into London and all buses other than London Buses are run by private companies. However, TfL has responsibility for both the planning and the delivery of transport facilities and therefore works closely with both public and private operators. The mayor was able to introduce congestion charging as it comes under his authority.

2. The Congestion Charging Scheme

The congestion charging zone in Central London is 21 square kilometers and there are 174 entry

Boundary of the central zone

London Transport Website 2003

and exit points around the zone (London Transport Website 2003, BBC London Congestion Charging Website 2003). All vehicles are observed from cameras at 230 pole positions, of which 180 are on the edge of the zone. There can be up to 7 cameras on each pole, which means that every single lane of traffic is monitored at both entry and exit points. Therefore no in-vehicle equipment is required to operate the system. Vehicle owners have to pay the £5 fee before or during the day that they enter the zone. The fee can be paid on the web, by telephone or at retail outlets in the zone.

The cameras provide high quality video-stream signals and use X-wave technology to provide good pictures in poor light. The cameras are linked to an Automatic Number Plate Recognition (ANPR) computer system that records the exact date and time of the image. The car registration number is checked against the list of vehicle owners that have paid the £5 charge. Those not yet paid have until midnight to pay the fee, otherwise a penalty notice will be issued to the vehicle owner.

The congestion charging scheme is very simple for the motorist to use. They just pay the £5 fee at sometime during the day that they enter the zone. However, it is a huge technical exercise to organize and TfL have engaged a private company, Capita, to operate the system. TfL spent £200 million developing and implementing the scheme ready for the start in February 2003. In addition to the cameras and computer systems, there were many traffic management schemes undertaken over the year before February 2003. Extra bus lanes, changed vehicle flows, rephasing of traffic lights and road calming measures were undertaken to allow the scheme to run smoothly. It is estimated that the cost of operating the scheme will be £50 million per year. However, TfL estimate that £130 million will be collected from congestion charges each year, giving a profit of £80 million which must be spent on the transport network.

3. Traffic Congestion in Britain

The reason for congestion charging being applied to Central London is that traffic congestion had reached an intolerable level. Average traffic speeds went below 10 mph in 2000, the first time since records began.

Traffic congestion is a problem in all towns and cities in Britain, and indeed most cities around the world (see Tolley and Turton 1995, Hoyle and Knowles 1998, Whitelegg 1992). In Britain, the huge increase in car ownership from about 2 million cars in 1950 to 21 million in 2000, together with the increase in car use, means that 85% of all distance travelled is by car. Similarly, the vast majority of freight is now carried by road, not rail. There has been a change in land use patterns in most British

urban areas, with old centers of employment closing and being replaced with a far more dispersed pattern. Out-of-town shopping centers have grown up as urban areas have expanded. All these changes have resulted in a much more mobile population, largely choosing to travel by car and consequently a massive increase in traffic volumes. Most city centers have a historic road network that was not designed for the car, and so it is in city centers that the worst congestion generally occurs.

From 1945 to the early 1990s, every effort was made to provide more road space. This involved traffic management schemes to achieve maximum flows of traffic on existing roads, and an extensive road building program. The policy became known as 'predict and provide' where the supply of road space was expanded to fit the ever increasing demand. It was a policy followed by every developed country in the world. In Britain a large national motorway network was built between 1959 and about 1985. Traffic management schemes were applied extensively and very successfully to existing roads, and especially urban areas. To assist public transport, many bus lanes were provided on roads in urban areas. All these schemes helped to increase traffic volumes in urban areas, but still there was traffic congestion.

By the early 1990s, it was generally recognized that limits had been reached on the provision of extra road space and therefore, since the mid-1990s, there has been a change in policy to one of traffic demand management. This policy tries to influence demand for road space so that it fits the supply. In the late 1990s, the government announced that new road building would be a policy of last resort. In 2000, Parliament passed a government bill that allowed Local Authorities to introduce congestion charging, with money collected being spent on transport improvements. The bill also allowed Local Authorities to introduce workplace car parking fees on companies in their area in order to discourage people traveling to work by car.

In 2001, with severe congestion on Central London roads, and speeds well below 10mph, the new Mayor and Greater London Authority decided to introduce road pricing as the only conceivable way of reducing the level of traffic. Every day 1.1 million people travel to work in Central London and 85% already travel by public transport. In 2002, there were 40,000 vehicles an hour driving into the congestion zone during the morning peak period and the scheme aims to reduce this number. The main aims of the scheme are to reduce congestion and through traffic, further encourage the use of public transport, create a better environment for walking and cycling, and to help businesses by speeding up the movement of goods and people.

4. The Principles of Congestion Charging

The ideas on congestion charging have been discussed for many years (May 1992). Economists argue that congestion is a market failure and that urban motorists do not pay the full cost of their use of a scarce resource, road space. When motorists make decisions about travelling, they only consider their own private marginal cost and do not think about costs to the general community which include environmental costs like noise and air pollution, delay costs to other motorists, accidents and public service costs. These community costs are always present, but they increase considerably as congestion increases. Charging motorists an extra fee for entering an urban area will create a market for road space, with some motorists deterred by the cost while others will continue to make their journey and pay the fee.

The big unknown with congestion charging is the price elasticity of demand for road space by motorists in an urban area. Will the £5 per day fee to travel into Central London deter a large or a small number of motorists from travelling? Surveys of motorists were carried out in London in 2002 to ask about what they intended to do when the £5 fee was imposed and then estimates made about the likely effect of the fee. However, it is only when a scheme is implemented that the true impact is known. With a decrease in congestion and fewer trips, there will be an improvement in the environment of the urban area with less pollution for pedestrians. The effect on businesses is generally positive as accessibility is improved. Some smaller businesses might be adversely affected, but most prefer to pay a fee to travel on less congested roads, rather than suffer the costs of a congested road system.

Revenue from the £5 per day fee does not go to the Government, but is used to pay for operating the system (£50 million per year) and all the profits must be spent on transport provision for the area (estimated at £80 million per year). Spending the profit on improving transport in the area, does make the charge far more acceptable to the public. Getting the motorist and general public to accept congestion charging is a major concern of politicians. Motorists have always had free access to roads in Britain and so the imposition of a fee to enter an urban area is a major change. Motorists do not like restrictions on their travel and politicians are very reluctant to upset motorists who of course vote at the next elections. The interesting point here will be whether Ken Livingstone, the London Mayor, can get re-elected in May 2004 after introducing congestion charging. There is an added political issue in London with a general disagreement between the Government and the Mayor over several transport issues, particularly the way the underground should be improved.

There are still very few cities in the world that have introduced congestion charging. This is mainly because of a lack of political will, but also because of the technical difficulties involved in introducing a scheme. The best example is Singapore which has been running a scheme in its central business and shopping district since 1975, firstly by a manual system and then since 1995, an electronic system (see Hoy le and Knowles 1998). The Singapore Government decided that a small island with a large population (over 3 million in 2001) could not cope with high car ownership. As well as congestion charging, they have made car ownership extremely expensive and put limits on the number of new licenses issued. A second country to introduce congestion charging is Norway in the early 1990s when it was introduced in Oslo, Bergen and Trondheim. The fee is not high and the number of motorists deterred was rather small, but since the money collected is used for transport improvements, the scheme was accepted by the public. This was not the case with a pilot scheme in Hong Kong in the 1980's which worked well, but was abandoned for political reasons.

5. Public Transport

If congestion charging is being introduced to deter motorists from using their cars, then it is essential to have good public transport in order to attract motorists to an alternative mode of travel. Singapore has developed a mass-rapid rail transit system with an extensive bus network that feeds the stations and travels the island. Fares and services are regulated and it is estimated that most of the population live within 5 minutes walk of one the 250 bus routes. So people living in Singapore have a very good alternative to using the car.

The situation in London is very different. Under-investment in public transport in Britain over many years has resulted in a system that is often overcrowded and expensive. Currently, about 940,000 people use public transport to travel to work in Central London and the effect of congestion charging will be to increase that number. The London Underground and rail routes into London, are very crowded at peak times and also the most expensive in Western Europe. Bus travel, which is also an important mode of travel within London, is cheaper than rail, but is disrupted by traffic congestion. The problem for TfL and the Mayor, is that major improvements to public transport require many years to implement. Singapore has worked for 28 years to develop a suitable system to go with its congestion charging. Therefore, London has developed short term and long term strategies for public transport improvements.

The only conceivable way of providing extra public transport for February 2003, was to provide

extra buses (London Transport Website 2003). Over 200 extra buses were run on routes into the zone from 17 February 2003. Over the previous year, new bus lanes were designated, road junctions altered and traffic lights rephased, all to improve the speed of buses into the area. These improvements will also make it better for pedestrians, which is important because most people making the journey to work will walk the final part of their journey. Further improvements will be made over the next few years to improve bus provision, using money collected from the congestion charge.

In the long term, there is some interest in new tramway systems, similar to the recently opened Croydon TramLink which is proving highly successful. However, the big long term improvement should be an upgrade to the London Underground. There has been underinvestment for many years and at last this problem is being addressed. There was considerable disagreement on the method of upgrading the system. The Government wanted a Public Private Partnership (PPP) scheme with private companies operating the network and improving the system with investment money raised on the open market. The Mayor wanted TfL to organize the upgrade using money raised from a Bond issue, similar to the way the New York subway system was successfully improved. After several court cases, the Government finally won the issue (see Transport for London Website 2003). The underground system has been divided into three infrastructure companies and 30 year contracts signed with private companies in May 2003. London Underground, which previously organized the system, will become part of TfL and will manage the PPP contracts. Delivery dates for infrastructure improvements are written into the contracts. It is going to take some time to improve the system, but with better track and signalling systems, a greater frequency of trains can be gained and hence the capacity of the underground can be increased.

6. Results of the Scheme after 3 months

TfL carried out extensive research during 2001-2 in order to assess the likely impact of congestion charging on London traffic (see Transport for London Website 2003). However, nobody quite knew what would happen until it began on 17 February 2003. Would there be mass protests? Would there be chaos on the roads? Would motorists know how to pay the fee? Would £5 deter sufficient motorists? Many newspapers carried stories about the problems that might occur or the first few days (Observer 16-2-03).

To many peoples amazement, the congestion charging scheme ran very smoothly from day one. All the technology worked, the cameras, computer systems and the organizations behind them. There

was little confusion about the method of payment with most motorists entering the zone having already paid the fee. There was a substantial reduction in vehicles entering the zone. There were no protests from motorists, they just accepted a new situation and adapted to it. The people changing mode of travel had worked out their new method of travelling beforehand. Although the scheme was introduced at school half-term, the second week ran just as smoothly and this has continued over the months.

The congestion charging scheme is being monitored very carefully by TfL. They report that after 3 months (see Transport for London Website 2003, The Times 9/6/2003), congestion inside the zone has been reduced by 40%, well above the expected reduction of 20-30%. The number of vehicles in the charge zone has decreased by 16% which is broadly similar to the 15% reduction expected. The average speed of vehicles in the zone has increased from 9mph to 11mph. On average, each day, payment is made by 98,000 individual motorists and for 12,000 company vehicles. Public transport has coped adequately with the extra passengers and pedestrians are enjoying a less congested central London. The one problem has been that extra traffic has diverted to roads close to the charge zone where traffic speeds have been further reduced.

Why is it that congestion charging has been introduced so smoothly, when many people were predicting chaos? There seems to be two main reasons. Firstly, in Britain, traffic congestion has become such a problem that almost everyone has come to accept that some form of restraint in urban areas is necessary and inevitable. Motorists and businesses would rather not pay the fee, but cannot suggest any better method of restraining traffic in towns and cities. They seem to feel that the time has come to 'do something'. Also any profit from the fees paid will go directly to improving transport in the area, which is far more acceptable to motorists than a general tax. Secondly, new technology is available in the form of cameras and computer systems, which has allowed a scheme to be developed that is very easy for the motorist to use. There is no complicated in-car equipment, no toll booths, just the same road system as before with road signs indicating entry to the zone. A motorist just pays a fee for the day and this can be done before or after entering the zone. All very simple for the motorist to use.

At the same time, Central London is a unique situation. About 1.1 million people enter Central London each day and 85% already use public transport. Therefore, an extensive public transport system already exists which is available to those people changing mode of travel away from the car. The 40,000 people who live in the charge zone and own a car are entitled to a 90% discount on the fee, although surveys show that a third of them never drive their cars within the hours when the charge is in operation. Other cities and towns in Britain have a very different pattern of employment, residential

population, public transport provision and level of car use and congestion charging might well produce more problems than the Central London situation.

7. Conclusion

Introducing congestion changing into Central London was a bold plan, but it has been implemented with very few problems and can be deemed a success. It has been accepted by motorists, businesses and the general public and the new technology has ensured that the scheme has run smoothly. It has worked far better than most people expected.

Many other Town and City Councils in Britain are looking at how successfully the scheme works in Central London before deciding whether to commit themselves to congestion charging in their urban area. The London Mayor is so pleased with the first 3 months of the scheme that he is already talking about expanding the zone westwards into Westminster, Kensington and Chelsea by 2005. This would be a different test for congestion charging in London, because these areas have a high residential population and a high car ownership.

Mayors and city councils throughout the world are also looking at the results of the scheme in London. All cities have traffic congestion problems and their mayors or councils are interested in any method of redressing the problem. Above all, they want to know if a Mayor can introduce congestion charging and still get re-elected. If the answer is no, then politicians around the world will be very reluctant to upset motorists and new congestion charging schemes are unlikely to happen. However, if the answer is yes, and Ken Livingstone wins in May 2004, then other city mayors and councils will look very seriously at introducing congestion charging schemes in their cities.

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デイヴィッド・フット氏は、本学の協定校であるイギリスのレディング大学の地理学科で教鞭をとっておられます。ご専門は交通論ですが、地域・都市経済や経済立地の分野にも造詣が深く、本学の徳田堅二所員や黒田彰三所員も在外研究時にフット先生のお世話になったと聞いております。2003 年 4 月からは、本学経済学部客員教授として「地域研究特殊講義」や「国際事情」等 4 科目を担当していただきました。この論文は、6 月 17 日（火）に生田校舎 8 号館 832 会議室で人文科学研究所との共催で開かれた研究会での発表をまとめられたものです。

Urban Transport in France: moving to a more sustainable policy

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Abstract

The organisation of urban public transport in France has some specificity in comparison to other European countries, even if problems are similar and the creation of the European Union leads progressively to an harmonisation. To understand these differences, it is first necessary to focus on historical and institutional aspects, including the 1982 Transport Law. This paper describes the evolution of the urban transport policy, giving illustration through the case of Lyon's conurbation; it highlights the reasons for an unsuccessful attempt to reduce car use for urban trips, and discusses the main stakes for implementing new sustainable transport policies in French cities.

1. Introduction

Since the sixties, the development of car industry in France led to a high level of households' motorisation. The consequence is to increase car use in the cities and to favour peripheral urbanisation which induces more traffic jams, especially in the city centre where the street network cannot absorb car flows. For several years, French cities tried to contain congestion by developing public transport (PT) supply. But the PT market share remains low and tends to decrease over years. As air pollution, noise and congestion are still growing, the 1982 Transport Law asserts the need to give priority to PT reinforcement to cope with the objectives of a sustainable development. As larger cities can get financial resources from a dedicated Transport Tax, created in the middle of 70's, many projects of right-of-way transport system are now implemented in order to create a more attractive alternative to car use. The choice is made to favour on-street systems, such as tramway lines, which have a capacity more adapted to the patronage flows, and offer an opportunity to reduce road capacity and to re-design urban public spaces for pedestrian and cycles. Despite these heavy investments, the reduction of car use is not

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achieved. Moreover, the low level of patronage limits the fare revenue and can lead to a hard financial crisis for PT networks. Nowadays, city councillors are convinced the urban transport policy cannot be limited to PT supply increase and have to penalise car use by different ways.

To illustrate this new orientation, a brief description of the evolution of urban transport policies in France is necessary (part 2), then a presentation of the institutional organisation is made to understand the difficulty to implement coherent transport policies in urban areas (part 3). Finally the main characteristics of daily mobility are presented through the example of the Lyon agglomeration and its transport policy is detailed (part 4). The conclusion discusses some ways to go further in the control of car use in French cities.

2. A recent history of urban transport in France

Some years after the reconstruction following the second World War, the French government decided to build a strong automobile industry, which can favour a quick economic development. The national Planning Agency[2] promoted in the 3rd and 4th five-year plans the progressive adaptation of the old Latin-typed cities to the automobile through a massive programme of urban renewal and road construction. As the exodus from rural areas to cities was very strong, a hard housing crisis obliged the government to create new suburban residential zones, which cheap industrialized buildings. City planners were influenced by the American way of life and the belief in automobile as a symbol of social progress led to a zoned planning, sharing employment location and residential areas. Such a spatial segregation of activities can be done if most of the households can have a car. At the end of the 50's, most of the main cities decided to close their streetcar networks, which were perceived as old technologies and signs of the past.

The inability to finance urban road networks leads to develop Public Transport

At the end of the 60's, the quick increase of population and the higher level of car ownership lead to a heavy traffic congestion in the small roads of the historical city centres. Even if huge programs of modernisation of road networks are planned, most of the cities are unable to finance these projects (Dupuy, 1991). In a so centralised country, the State only can manage the realisation of new

[2] Commissariat Général du Plan

infrastructures. In this 'era of concrete', the cities are then obliged to reduce pavements to increase the capacity of existing streets.

In such a context, the public transport (PT) is considered as a 'social service', i.e. a means of transport for poor people who cannot buy a car. The reorganisation of PT networks is done to reduce the level of service, as private companies cannot get benefits. Bus lines are limited to radial routes, to let people travel from their peripheral flat to their work in the city centre. Tariffs are drastically lowered to cope with the limited revenue of their customers. In order to save money, private companies reduce the number of on board employees from 2 to 1 in the buses. Indeed the quality of service is very low, and the rolling stock cannot be renewed. This 'vicious circle' leads to a higher use of private cars and an increase of traffic congestion (Lefebvre, Offner, 1990).

To cope with these traffic trouble in the centre of the main French cities, the Ministry of Transport proposes in 1971 to implement new Traffic Management Schemes (TMS). Their goal is to reduce congestion through two main actions: i) increasing the number of traffic lights at the main crosses, ii) generalising one way streets. If these measures let to increase the average speed for cars, they are quickly insufficient to improve traffic, and the cities decide complementary measures, such as pedestrian areas for too narrow streets, and bus lanes on radial routes, to favour modal split.

But the most important decision taken by the Ministry of Transport is to create the *'Versement Transport (VT)'*: this transport dedicated tax is based on the total wages paid by the firms of more than 9 employees, and located within the Urban Transport Area. The idea is that firms indirectly benefit from the existence of a PT network (home-to-work trips, traffic congestion reduction, improved accessibility).[3] The VT lets the cities get a large amount of money to increase and improve the transport supply. Another important impact is to incite the communes to create a union to manage together the PT network, as this tax is allowed only for conurbation of more than 100 000 inhabitants (see below for institutional aspects).

Then the 70's are a period of a fast and strong development of public transport in French cities. The 1973 oil crisis incites to implement energy saving policies, and the population begins to be sensitive to environment (air pollution, noise,…). The Ministry of Transport helps cities with PT Development Grants to buy modern buses, and supports the decision of the three main French conurbations (Lille, Lyon, Marseille : more than 1 million inhabitants) to build their first subway lines. At the same time, the

[3] The VT varies from 0.5% to 2.5%, depending on the size of the Urban Transport Area, and the existence of right-of-way transport systems.

road policy changes: the creation of radial roads to enter the city is banned to favour PT use, and the funds are given for building by-passes of inter-city highways. In the cities, the TMS are designed to penalise through-traffic, but an effort is still made to increase the number of parking lots for cars, often very close to the city centre.

The 1982 Transport Law and the Urban Trips Plans

The beginning of the 80's is characterised by a large movement of decentralisation in the country: the government decides to transfer a lot of responsibilities from the State level to the regional and local levels. Then the cities get financial means from the State, calculated in relation to their population and richness, and can decide locally which their priorities are. Even if urban transport is already a question managed by cities, the 1982 Transport Law[4] re-designs the share of responsibilities. As public transport is recognised as a main public service, which can be accessible to everyone, the law creates new Transit Authorities (*'Autorités organisatrices' –AO*) in charge, not only of the PT organisation, but of the whole local transport policy, including car traffic, parking, and 'soft modes' (cycling and walking). Such a multi-modal orientation means a fundamental change for local policies, as the competition between private car and PT is replaced by a search for complementarity between transport modes (Lefebvre, Offner, 1990).

As PT appears to be the more efficient transport mode in dense areas, a lot of French Transit Authorities decided to create surface light rail lines, such as tramways, in medium sized cities: Nantes (1985) and Grenoble (1987) are the first cities to do so. Three reasons can explain the choice of the tramway: i) the investment cost is 5 times cheaper than a subway line, as it is built on surface; ii) the rail track needs to be out of traffic jams and let have an attractive commercial speed for customers; iii) implementing the line on existing streets is a way to reduce road capacity and penalise car use.

The 1996 Air Quality and Energy Rational Use Law lets now the Urban Trips Plans be an obligation for cities of more than 100 000 inhabitants and decides then the reduction of car traffic is one of the main objectives of such plans. The 2000 Urban Solidarity and Renewal Law is a latest step to a more sustainable policy, as it imposes the local Land Use Plans to be compatible with the urban Trips Plans. It also give the possibility to Transit Authorities to be responsible for parking policy (including tariff) and to extend the Urban Transport Area in order to take into account peripheral urbanisation. It

[4] *Loi d'Orientation sur les Transports Intérieurs (LOTI)*

also decides to transfer the regional railways management to the Regional Councils, to incite for a better co-operation between regional and local networks.

Nowadays most of middle sized cities have implemented (or will implement) surface right-of-way transport lines, such as tramways or guided buses. But the main goal of reducing car traffic is not yet achieved. Several reasons can explain it: i) the institutional organisation in France is very complex and not really adapted to the management of transport; ii) the urban sprawl to peripheral areas, where households can buy a small house with a garden, is not in favour of PT use, as distances are longer, and low density zones cannot favour a high quality transport supply.

3. Institutional aspects of local transport in France

The French administrative system comes from the 1789 revolution, and since that time, it has only slightly changed. Its main characteristic is to share competencies between a large number of local actors who are responsible on various territories. The 1982 Decentralisation Law tries to reorganise the share of responsibilities in a more clear system, but such an evolution will need time, after so many years of central administration dependency.

The three main levels of territorial administration

The basic level is the *'commune'* (a village or a city), which was pertinent two centuries ago, as it corresponded to the catholic parish-based organisation. There still are more than 36 000 communes, some of them can be very big (like the city of Marseilles – more than 1 million inhabitants), some others having only 200 inhabitants or less[5]. Each commune has its own mayor and city council, and is responsible for all aspects of the administration duty and the management of public services. In the field of transport, the mayor is in charge of roads works and traffic management and can operate its own public transport system.

In order to adapt the administrative organisation to functional territories, several laws were voted to create unions of communes. The 1999 National Territorial Administration Law creates three types of unions:

[5] The Paris region has a specific organisation, due to its status of capital of the country

- the Urban Community for the major agglomerations (more than 500 000 inhabitants) can benefit from an obligatory quasi full transfer of competencies from the communes which decide to be members;
- the Agglomeration Community is a union for middle-sized cities (more than 50 000 inhabitants, with one commune of more than 15 000 inhabitants): the main competencies (economic development, land use planning – including PT, housing policy) have to be transferred, but some others can be transferred or stay under the responsibility of each commune, such as street and parking, public utilities, water supply, environment, sports and cultural equipment,…
- the Commune Community is for smaller cities, and only land use planning and economic development are responsibilities which have to be transferred; in this case the organisation of public transport is a facultative competency to be transferred.

One of the main differences between these three types of unions concerns the creation of a unique local tax for firms for the first two cases, i.e. this tax revenue is then managed by the community. This is a way to reduce inequities between poor and rich communes. In the case of Commune Community, each commune keeps its tax revenue and just gives a grant to the community.

It has to be noted that the adhesion to a community is voluntary, but financial incentives from the State will help to develop that kind of unions of communes. If the responsibility of public transport is transferred the community becomes the Transit Authority, but the urban Transport Area can be smaller than the territory of the community. Nowadays, more than 200 Transit Authorities are born by the way of these communities.

The second official level of territorial administration is the *'Département'* (99 in France), which is now in charge of education (2° degree – '*collèges'*), social assistance (low income households, aged people), local inter-city roads and non urban road public transport (and especially school bus lines).

The third level is the Region (21) which is in charge of education (professional training and 1° degree – '*Lycées'*), economic development and land use, and since 2001, regional railways lines.

In this organisation, the State has no more responsibility for local transport, but it keeps a wide influence through the organisation of highways and national roads networks, national railways lines (including High Speed Trains), and it can still act on local policies by the way of investment grants.

The main difficulty induced by the administrative organisation is to generate a gap between political and functional territories, as the borders of each commune has nothing to do with the geography of inhabitants' daily trips. Figure 1 shows the case of Lyon's conurbation case, where the Urban Transport Area (55 + 6 communes) is nearly the same as the Urban Community, but the pertinent area to manage daily mobility should be the Urban Area (239 communes) which is defined taking into account the home-to-work trips distribution. This means the organisation of public transport has to be co-ordinated between the Urban Community (urban transport), three *'Départements'* (non urban bus networks, school buses) and the Region (suburban regional trains). It is a source of difficulties, as the co-ordination in terms of level of service (frequency, interchanges) is not well assumed and tariff systems are rarely integrated: everything works separately.

The role of private transport companies in urban public transport

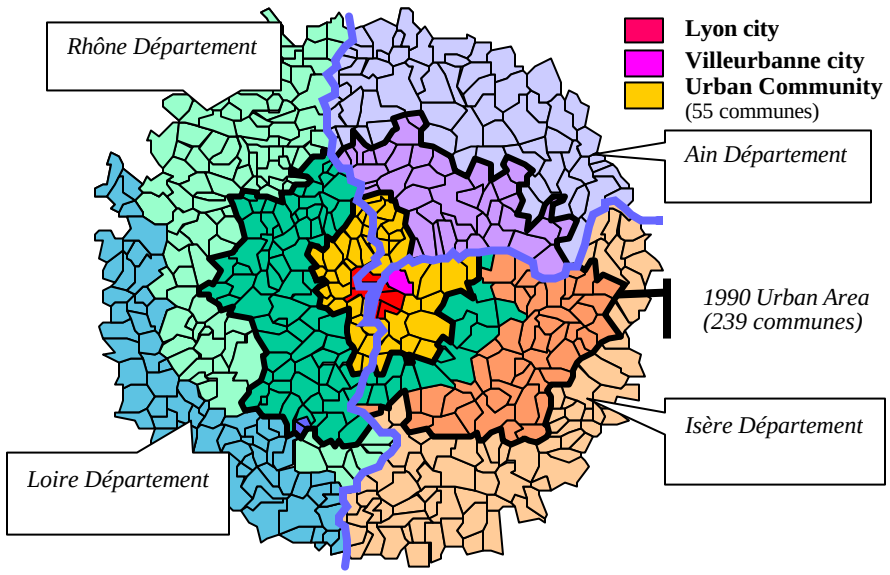
In France, the Transit Authority can decide to operate the public transport by itself (*'Régie'* type) or to transfer this duty to a private company. In this case two main types of contracts exists (CERTU, 2000):

- a public/private company is created, in which more than 50% belongs to the public institution : it is called *'Société d'Economie Mixte'- SEM*. The rolling stock and the buildings belong to this company.
- A contract is signed with a private company. Depending on the type of contract, rolling stock and buildings can belong to the Transit Authority or the private company.

In general the contract is signed for a 5-6 years period. In every case, the operating company has a monopoly on all the concerned transport area. For example, non urban bus companies cannot have bus stops within the urban transport area, except if the urban Transit Authority agreed to allow a limited number of stops.

For several years a concentration of transport companies has taken place since the reinforcement of competition due to the 1982 Transport Law. Moreover, the European Union's directives incite now to a wider competition, opening national markets to foreign companies. There are now three main groups in France, which are:

Figure 1 : the territorial administrative organisation in the Lyon's conurbation



- CONNEX, which is the world-wide leader in passenger transport, even if it is only the number 2 in France (in terms of the number of operated urban networks). This company is a subsidiary of the *Vivendi Environnement* Group (VEOLIS).
- KEOLIS is the number one in France. It is now a subsidiary of the French National Railway company (SNCF). The Lyon's network (which is the main network in France, the Paris Region excluded) is operated by a subsidiary of KEOLIS.
- TRANSDEV is the third group. Its specificity is to propose SEM type contract, as it is a semi-public company.
- Some public transport networks are still operated by smaller private companies, mainly in smaller cities, but they are now frequently contested at each new tender. Some of them created an association, named AGIR, to be stronger in the competition with the three main groups.

In the contracts, different types of remuneration are possible, depending on the way the risks on the commercial revenue are shared: in most cases the fare revenue is given to the Transit Authority, which pays to the operator the difference between total operation cost and fare revenue. It is the responsibility of the Transit Authority to design all the characteristics of the transport service, such as frequency, bus stop location, and so on, as urban transport remains a public service, even if it is operated by a private

company. The 6 year bidding system is supposed to favour a reduction of the operation costs. This seems to work for smaller cities, but in the main ones, changing the operator is rare, except in case of a specific conflict with the Transit Authority.

The responsibilities of the Transit Authority

In accordance with the 1982 Transport Law, the Transit Authority assumes the following missions:

- It defines all the characteristics of the transport supply, i.e. routes, location of bus stops, frequency, time-table; it can also determine the level of service quality the private operator has to reach, such as punctuality, cleanliness, users' information, through a system of financial penalties in the contract.
- It defines the fare systems, including social fare reduction (students, aged or unemployed people), but it has to cover the deficit due to this social fares. If the private operator wants to offer other commercial reduction it is under its own responsibility. As a consequence, the Transit Authority will pay for the deficit due to the difference between operation costs and fare revenue.

Table 1: main characteristics of the Lyon's transport network in 2001

Transport systems	Number of lines	Length (km)	Rolling stock	Vehicle.km	Number of trips
Subway	4	30	184	28 %	52 %
Tramway	2	19	39	3 %	6 %
Bus routes	100		945 buses 87 trolley buses 31 mini buses	62 % 5 % 2 %	42 %
Bus lanes		62			
Park-and-ride	9	3,600 cars			
Total (per year)				50.4 millions	1.2 millions
Total per year and per inhabitant				45 km	140 trips

Source : SYTRAL, 2002

Table 2: the Lyon's Transit Authority budget in 2001

Resources			Expenses		
Fare revenue	53 M€	9.5 %	Operating contribution	154 M€	27.5 %
Transport Tax	168 M€	30.0 %	Current expenses	37 M€	6.6 %
Community funds	121 M€	21.7%	Financial charges	59 M€	10.5 %
Other receipts	53 M€	9.5%	Sinking funds	76 M€	13.6 %
Loans	106 M€	18.9 %	Investments	116 M€	20.7 %
Other Investment receipts	59 M€	10.5	Savings	118 M€	21.1 %
Total	560 M€	100 %	Total	560 M€	100 %

Source : SYTRAL, 2002

- It defines and finances the investment plans for the development or the improvement of the transport network: building a new tramway line, renewing bus fleet or fare collection system, building park-and-ride lots or interchange stations, and so on.
- It has to define the multi-modal transport policy on all the Urban Transport Area. Such an Urban Trips Plan (UTP) is designed for 10 years and revised after 5 years; it covers all aspects of transport conditions, such as the public transport supply development, the traffic and parking conditions, pedestrian and cycling routes, and since a couple of years, the urban goods logistic scheme and the companies' employees home-to-work trip organisation.

In the case of Lyon, the Transit Authority is an institution regrouping the Urban Community and the *Département du Rhône.* This kind of mixed union is not frequent and it is due to the fact that the Lyon Agglomeration is the second one in France and plays an important role in the *Département*. This is a way to favour a better co-operation between urban and non urban transport, even if the urban transport areas is limited to the Urban Community's one. The development of such mixed union is now encouraged.

Before presenting the main orientation of the present Lyon Agglomeration UTP, let me describe some characteristics of the evolution of daily mobility in this area.

4. The urban transport demand and the new policies in the Lyon Agglomeration

Evolution of daily mobility in the Lyon Agglomeration

Transport demand depends on many parameters, which include home and activities location. As in

many French cities, one can observe an important trend of peripheral location, which has two consequences: i) the density of the central area is lower; ii) the distance for travelling is increasing. The evolution of job location in the Lyon urban area is given in table 3.

Table 3: Evolution of job location in the Lyon urban area

	1990/1982	1999/1990	1999 Distribution	1999 Population
Central area (communes of Lyon and Villeurbanne)	-0.5 %	- 4.4 %	42 %	35 %
Urban Community (53 communes)	+ 14.5 %	+ 5.9 %	36 %	36 %
1999 Urban Area (241 communes)	+ 23.6 %	+ 26.7 %	22 %	29%
Total	+8.4 %	+4.9 %	100 %	100 %

Source : SYTRAL, 2003 Data on daily mobility is only available on the Urban Community area, as it corresponds to the urban transport area. Several surveys were conducted in 1976, 1986 and 1995, which give a good image of the main changes in transport demand. The main features are :

- A continuous increase of car ownership, especially in peripheral areas, where there are now about 800 cars for 1,000 inhabitants of more than 18 years old. This fact is important as the more people have cars, the more they use it.
- The daily mobility is more slowly increasing reaching 4.0 trips per day and per inhabitant. But the modal split is still evolving in favour of car use, as it can be seen in table 4. Between 1986 and 1995, the number of trips made by car increased by 38 %, as the number of trips by PT increased only by 17 %.
- The geography of trips is changing and reinforces the use of car. In the city centre, where PT supply is the more dense, the number of trips by PT increased by 20%, as the number of trips by car increased by 28 %. On the radial routes between city centre and peripheral areas, results are respectively +8 % and + 25 %, and on peripheral trips, + 9% and + 47 %
- The activity pattern is also changing, as the duration of work is reduced and leisure activity are growing. Observing the purpose of trips shows home-to-work trips represent only ¼ total trips, as leisure and shopping trips are growing to 48%. Another characteristic is the progression of accompaniment trips, i.e. trips done to accompany children to school or to leisure activities. This is due to the growing number of households living in low density peripheral areas, where distances are seen too long for children.

Table 4: Evolution of modal split in Lyon urban community

	1976	1986	1995
Walking	45.8 %	37.1 %	31.4 %
Private car	38.1 %	46.1 %	53.0 %
Public transport	11.0 %	15.1 %	14.3 %
Cycling	5.1 %	1.7 %	1.2 %

Data : Lyon Household Travel Survey – 1976, 1986, 1995 – Source : Masson at al., 1997

Table 5: Evolution of trip purpose in Lyon urban community

Trip purpose	1976	1986	1995
Home-to-work	29.6 %	27.8 %	25.2 %
Home-to-school	16.1 %	14.6 %	13.6 %
Accompaniments	11.6 %	11.4 %	13.2 %
Leisure / shopping	42.7 %	46.1 %	48.0 %

Data : Lyon Household Travel Survey – 1976, 1986, 1995 – Source : Masson at al., 1997

This evolution of mobility has several consequences on the public transport network. First new lines have to be created to keep close to home location, but the low density makes such lines very costly, and the level of service is too weak to make PT attractive, in comparison with the availability and the speed of private cars. Second, the changes in the origin-destination matrix show the development of peripheral trips, as traditionally the PT network is designed for radial routes to the city centre. All these elements can explain the loss in market share for public transport, and the continuous increase of the deficit the Transit Authority has to cover.

Even if the Lyon Urban Community got benefit from the building of the subway network in the middle of the 70's, avoiding traffic congestion and increasing patronage, it seems the global transport system improvement and the lack of control on land use in peripheral areas induced a wider urban sprawl, which is now a problem for the efficiency of the PT network. As in many French cities, the balance sheet of a supply oriented policy appears to be inefficient, and new strategies have to be defined to fight the present trend.

The 1997 Lyon Agglomeration Urban Trips Plan

Facing these problems, the Transit Authority decides in 1997 to design a new Urban Trips Plan, following the recommendations of the 1976 Air Quality Law. One of the goals is to make people

understand the necessity to change some important features of the transport policy. The main one is to stop building new subway lines, due to the bad financial situation of the Transit Authority (the total debt reaches 1.2 M€ in 2001). Another reason is underground subway lines have no impact on car traffic limitation, as they reduce traffic congestion and favour induced traffic. In order to cope with sustainable development objectives, the transport policy must try to stop the increasing use of car, mainly in the more dense areas of the agglomeration. Consequently, the main goals of the 1997 UTP are (SYTRAL,1997):

1. Reducing negative external effects:
    - Decreasing the number of accidents by 40% in 10 years
    - Stabilising the level of noise in the city
    - Limiting local air pollution (NO^2, particles)
    - Improving the quality of urban public spaces (decreasing on street parking)

2. Improving accessibility and equity
    - Inciting households to stay in the dense area
    - Developing a credible alternative to car use with a high quality PT network
    - Reducing the differences in PT service quality among districts

3. Increasing the PT market share for mechanised trips
    - The 2005 trend is 19.0 % (1995 = 20.6%)
    - The 2005 objective is 22.5 %

4. Keeping walking practise at a good level
    - City centre trips
    - Inner districts trips

To reach these objectives, several measures are decided :

1. Creating 12 ‘high quality’ new PT lines (figure 2)
    - completing the structure of the PT network and creating a direct link between the main peripheral poles and the city centre.
    - Implementing right-of-way systems, such as tramway or guided trolley buses, with a high level of service (frequency, punctuality)

- Restructuring the bus network to provide links between peripheral areas and city centre with not more than one transfer

2. Developing regional railway lines in co-operation with the Regional Council for longer trips

3. Creating a Cycle Route network in the city (up to 200 km in 10 years)

4. Developing urban public spaces for pedestrian and residents

5. Restructuring parking supply (fares, residents' parking, goods delivery)

6. Reorganising car traffic conditions (road capacity reduction on radial roads, speed limited area in residential areas

7. Defining a more coherent land use policy
   - Limiting urban sprawl
   - Giving priority for urbanisation to areas with a good PT supply (housing and economic activities)
   - Defining a hierarchical structure for the urban road network

8. Rejecting inter-city traffic on peripheral by-pass highways (to be financed by the State)

In 2003, a first balance sheet of the UTP implementation is now on work. Two tramway lines are now operating and give goods results in terms of patronage. The other right-of-way PT lines are planned for the next 5 years. But it seems the fight to reduce private car market share is still not won, and difficulties for parking cars in the city centre are increasing.

5. Conclusion: the need to go further

The transport policies based on the increase of PT supply show their limits. In order to favour a sustainable mobility, it becomes now to be clear that transport policies have also to act more drastically against car use. It means to modify the relatively good traffic conditions (except in the very city centre where PT is faster than car: its market share is more than 40 %). Several possibilities are presently studied, as in many European countries:

- Limiting door-to-door car speed can be done through different ways : reducing road and/or parking capacity, limiting car access by regulations (no car streets in dense area). Such a measure needs to strongly increase PT supply, in order to avoid congestion, air pollution and negative impacts on economic activity in the city.

- An alternative is given by the city of London, where an urban pricing scheme is implemented to reduce car use in the city centre. This solution seems to be more efficient, as it reduces car traffic, without limiting average car speed (for people who accept to pay the toll), and it can have a positive impact on companies productivity. On the contrary, this solution can raise some questions about social equity, as low income households are more penalised than rich ones. Different types of road pricing can be implemented to reduce this problem, such as a fixed monthly tax, which level can be adapted to the willingness to pay for some social groups.

- Another strategy, which can be more coherent with the objectives of a sustainable development is not to act on the number of trips done by car, but on the total travel distance done by households. Some researches are presently conducted on a system of gasoline rights to limits car use. A free rights market can then operate, in which people who don't use all their rights can sell them to those who need to travel frequently by car.

- In the same way, land use policies can be designed in order to reduce travel distances, favouring short distance trips, whatever the mode of transport is. But such a policy needs a good co-operation between communes, and previous experiences show how difficult it is.

These examples of new strategies give an idea of what future urban transport policies in European cities could be. Up to now, road pricing policies are not possible in France, due to juridical problems (tolling is only allowed for bridge or tunnel, and cannot be applied on the whole street network). Even if transport experts are able to invent sophisticated solutions to improve transport policies, it will be necessary to incite to a public debate on their objectives, as it is not easy to get the agreement of a population whose style of life is built on the basis of easy and speedy trips in the city. This can be the most difficult challenge for the next years.

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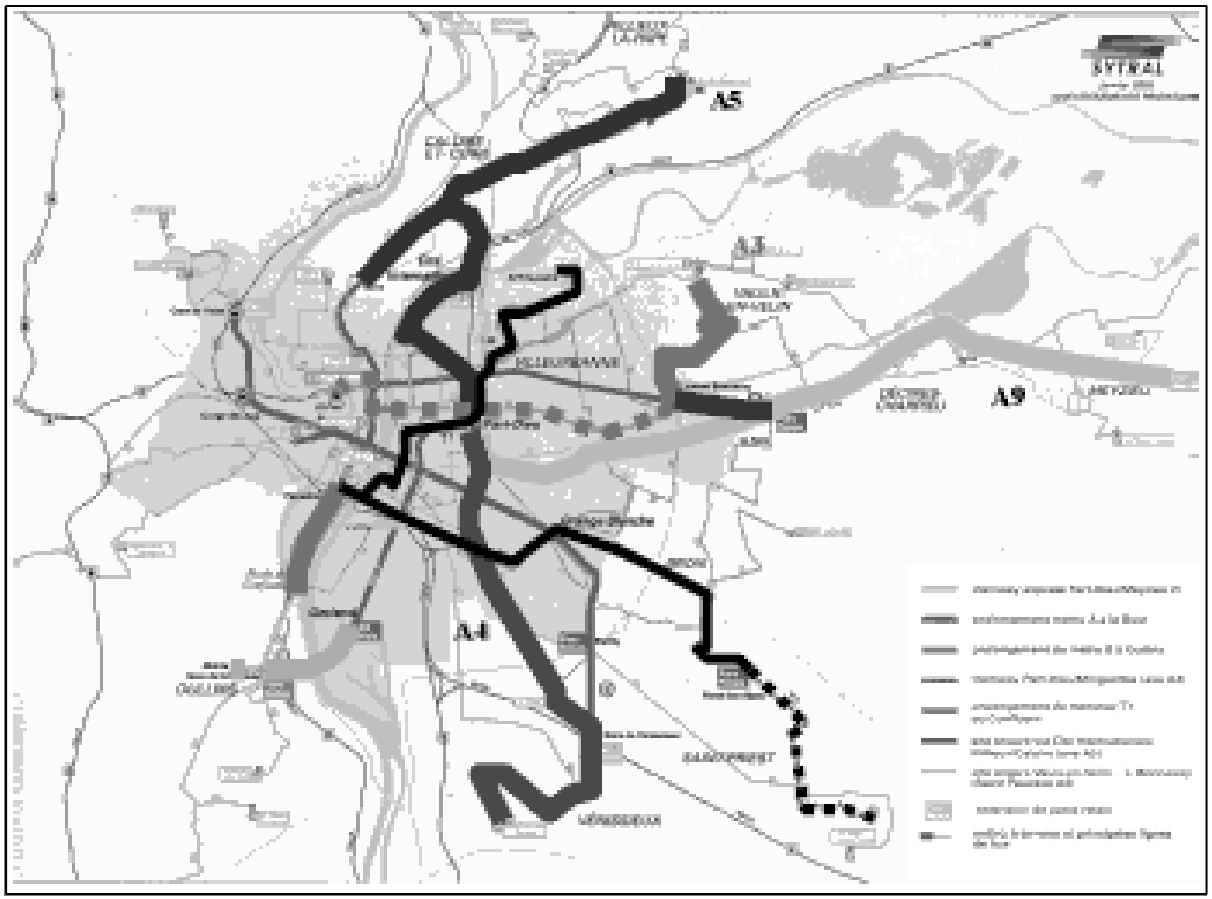

The 900 M€ Investment Plan for 2002-2007

Figure 2: the urban transport network in the agglomeration of Lyon, and the present 5 year investment plan
Source: SYTRAL, 2002

ブルーノ・フェーブル＝ダルシエ先生は、フランスにあるルミエール・リヨン第 2 大学経済・経営学部の教授です。先生のご専門は交通政策・交通計画であり、以前には同大学の交通経済研究所に所属しておられました。この夏には休暇を利用して客員研究員として本学を訪問され、7 月 8 日（火）に社会科学研究所で「フランスにおける公共都市交通組織」（仏語）というタイトルで講演していただきました。講演会では樋口淳所員に通訳の労をとっていただき、ご婦人のイブリン・ルクレール教授（リヨン第 2 大学）、デイヴィッド・フット教授（レディング大学）はじめ社研所員、本学大学院生など多数の参加者を得て、国際的な雰囲気の中で活発な討論が行われました。本稿は当日の議論をもとに英文に書き直されたものです。

〈編集後記〉

月報本号は英仏両国の都市交通論の英語論文二本からなっております。第一論文はイギリス・レディング大学のデイヴィッド・フット氏、第二論文はフランス・ルミエール・リヨン第二大学のブルーノ・フェーブル＝ダルシエ氏の論文です。両先生のご紹介は、各論文末に堀江洋文所員、嶋根克己所員によってなされておりますので、そちらをご参照下さい。

デイヴィッド・フット氏の研究会発表は６月 17 日（火）、ブルーノ・フェーブル＝ダルシエ氏の研究会発表は７月８日（火）でした。したがって月報への掲載も別号となる予定でありましたが、偶然、都市交通論という共通の領域における報告でしたので両論文を今月号にとりまとめることとし、両先生には無理を言って、論文のとりまとめを短時間にてお願いしました。また、原稿化の過程で両先生とのコンタクトや執筆者紹介をお書きいただいた堀江、嶋根両所員には、学期末のお忙しい中、綱渡りのような原稿化作業にご協力いただきました。ありがとうございました。

ところで、こうした「偶然」と特定の方々のご尽力だけに頼り切って、月報刊行が健全に継続されるとは思われません。研究会開催予定と月報投稿論文との、今よりさらに密な有機的な連携が望まれます。また、諸般の事情で研究会開催日時の選定が難しいのは周知のことですが、教授会開催日を避ける工夫を凝らしながら、今号のように共通のテーマが設定できるのであれば、その機を逃さず討論を深めて、投稿論文に反映させる工夫も考えなくてはならないでしょう。

かくいう私、今年度初めて社研・事務局の編集担当を仰せつかり、この編集後記執筆が初仕事となります。今後ともよろしくお願いいたします。　（Ｊ）

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