11TH CONFERENCE ON COMPETITION AND OWNERSHIP IN LAND PASSENGER TRANSPORT

Delft University of Technology (The Netherlands)
20-25 September 2009

HOW TO IMPROVE THE FINANCIAL SITUATION OF URBAN PUBLIC TRANSPORT? THE FRENCH CASE

Bruno FAIVRE D'ARCIER
Transport Economics Laboratory, University of Lyon, France

ABSTRACT

French local Public Transport Authorities consider urban public transport as a Public Service with four missions: accessibility to the city (low income households), reducing traffic congestion (urban economy), improving central area attractiveness (limiting urban sprawl), and limiting environmental damages. But the design of networks is often resulting from incremental changes, leading to a poor global performance. Trends show a risk of major crisis. Operating costs are increasing fast, as fare box revenue is lazing, leading to an increase of the operating deficit. Reducing CO2 emissions implies to reconsider the design and the level of service to better attract car users. The performance of the service then is a key point to increase both patronage and revenue.

Based on national data on Public Transport Networks (1995-2005), the paper presents financial simulation for different strategies and discusses how to stabilise public contribution. Two main paths emerge, but have to be applied together: improving the productivity through an in-depth study of operating conditions for each route, and redesigning the fare structure in a more personalised way to cope with the higher car drivers' willingness to pay. Conditions for such a large restructuration mean discussing contractual relations between Transport Authorities and operating companies (margin for manoeuvre to optimize performance).

INTRODUCTION

The revival of urban Public Transport (PT) now relies on the new objectives of a sustainable development. As the transport sector remains one of the main sources of CO2 emissions, reducing car use – especially in urban areas, leads cities to centre their mobility plans on the development of PT supply. As in most European countries, many efforts are conducted in France to offer citizens alternatives to car use, while car traffic is discouraged through speed limitation, car parking reduction, or even road capacity

restrictions. Improving PT supply implies a better quality of service and higher frequencies. In the main French cities, new tramway lines were newly implemented, as a visible sign of the clear priority given to public transport.
However, this important effort in investments seems to have a strong financial impact. Benefiting from State subsidies, as well as the important resource coming from the Transport Tax, local Public Transport Authorities (PTAs) could consider ambitious plans. But a lack of clarity and long term view often conducted to favour city-planning objectives rather than to try to improve PT modal share.

France is generally presented as one of the countries where the private sector is strongly implied for many years (Van de Velde, 2005). However, the global performance of public transport networks does not appear as very high. One of the invoked reasons comes from a failing process in delegation contracting (Yvrande-Billon, 2007): it is due to a small number of operating companies and a strong involvement of local Public Transport Authorities in the definition of the supply. Detailed analysis of the ownership regime and of the type of contract shows variations in the technical efficiency (Roy & Yvrande-Billon, 2007), but these elements seem insufficient to explain the observed high operating cost and the important public contribution to finance the transport supply.
The French model holds in itself other elements which can explain its low technical efficiency. The hypothesis presented in this paper relies on the importance given to public service obligations and on the easy money obtained from the Transport Tax that do not encourage Public Transport Authorities to look for a higher productivity. Present financial constraints will change the situation, but, following lessons from European experience (Pruijmboom & Van de Velde, 2005; Stanley et al., 2007) important savings could be obtained by a redefinition of the tactical level management.
After presenting the French institutional aspects and the specific financing structure, the importance of public contribution will be described to explain the reasons of its dangerous drift (Part 1). Simulation results will then be presented, focussing on how to limit this contribution by the 2015 (Part 2). Conditions for a better equilibrium between contributors will finally be discussed in order to favour a 'sustainable' financing of urban public transport (Part 3).

The specificity of the French urban public transport financing scheme

Since the seventies, France introduced progressively a new means of funding urban public transport, by the way of a specific Transport Tax ('*Versement Transport' – VT*). At first limited to the funding of investment, VT let main cities developing ambitious projects, like subways in the 70's (Lille, Lyon, Marseille) and then tramways in the 80's (Nantes, Grenoble). This tax, decided by local Public Transport Authorities, concerns all public and private companies of more than 9 employees, located within the Urban Transport Area where the PT network operates. It is a percentage on the total wages of the company, which can vary, depending on two parameters: 1) the size of the city and 2) the existence of 'right-of-way' transport system. Progressively, the size limit was downed from 300,000 inhabitants in the 70's to 10,000 now (Table 1). In the same time, the revenue from the VT could be used freely by PTAs.
Although company's employees can use the PT network to go to work, the VT is not a fee companies pay to get a service. Its main justification relies on the indirect benefit companies get from the existence of a PT network, which contributes to the reduction of traffic congestion.

Table 1: Level of Transport Tax

Rate on total wages	Cities from 10,000 to 100,000 inhabitants	Cities with more than 100,000 inhabitants	Cities with 'Right-of-way' transport projects
France	0.55%	1.00%	1.75%
	+0.05% in case of inter-municipal organisation		
Ile de France Region	Paris + Hauts de Seine county 2.60%	Seine St Denis & Val de Marne counties 1.70%	Essonne, Yvelines, Val d'Oise & Seine et Marne counties 1.40%

Source: Ministère de l'Ecologie, de l'Energie, du Développement Durable et de la Mer, en charge des Technologies vertes et des Négociations sur le climat, 2009, [on line] : http://www.transports.equipement.gouv.fr/article.php3?id_article=7342

Recently, the obligation for companies to reimburse 50% of the PT monthly ticket of employees using the PT network to go to work, a measure already existing in the Ile de France region, was extended by law to all French cities. In parallel, development of Company Mobility Plans helped in offering reduced fares for employees.

The counterpart of the creation of the VT was the removal of all State subsidies for local Public Transport Authorities (except in the Ile de France region). This can then be seen as a kind of decentralisation measure, where local PTAs are fully responsible for their local development. In fact, some subsidies still existed up to 2004, for investment in right-of-way transport projects (from 15% for subways up to 35% for BRT). Present discussions in the 'Grenelle Environnement' (a national consultation on sustainable development) let think new subsidies could be decided by the government to help cities developing their PT network.

Anyway, this dedicated resource was a breath of fresh air for municipalities, but also appeared as easy money. It generated an important investment to develop the supply, but sometimes with a lack of rigor on the financial consequences of carried out projects. Another consequence was to keep fares low, which was a political will for public services.

THE DRIFT OF PUBLIC CONTRIBUTION

Observing the results of the PT supply development on the 1995-2005 period on a sample of 103 cities[1], shows most ratios are evolving in the wrong direction (Appendix 1)… Except in the cities of more than 250,000 inhabitants, the average annual increase rates of the number of trips are lower than those of the number of vehicle kilometres (Table 2). The better results between 2000 and 2005 might be explained by the development of new Urban Mobility Plans, which try to reduce car use by constraints on parking supply and traffic speed.

[1] Data come from the annual national survey on PT networks, done by the State Centre for Transport Studies (CERTU), the PT Authorities association (GART) and the PT Operators association (UTP). The author would like to thank them for providing these data. The Ile de France region and Paris case is excluded from the present analysis.

Table 2: the 1995-2005 evolution of main ratios (average annual increase rates)

	1995/2000 average annual increase rate		2000/2005 average annual increase rate		Elasticity	
	Vehicles Kilometres	Trips	Vehicles Kilometres	Trips	1995/ 2000	2000/ 2005
> 250,000 inhabitants [22]	1.40%	1.80%	1.80%	2.40%	1.27	1.36
100 to 250,000 inhabitants [34]	1.80%	0.40%	1.70%	0.50%	0.21	0.29
< 100,000 inhabitants [47]	1.50%	0.00%	2.30%	0.00%	0.02	0.01
Total [103 PT networks]	1.60%	1.30%	1.80%	1.80%	0.86	1.00

Analysing more in details the evolution of operating costs and fare box revenue shows significant differences depending on the size of the city (Table 3). The load factor (number of trips per vehicle kilometre) increase is slightly positive in the biggest cities, a fact that can be explained by two factors. First, more important traffic congestion could encourage some people to shift to Public Transport, especially when paid parking is developed in the city centre. Second, these cities have implemented new metro or tramway lines which are more attractive than traditional bus routes. On the contrary, the load factor variation is negative in cities lower than 250,000 inhabitants. It comes from extension of bus routes to peripheral areas where the density of population is lower.

The PT supply development led to a strong increase in operating expenses. The cost per vehicle kilometre rose at an average of 1.9% per year (in real term). It is higher in big cities, due to the development of metro and tramway lines, but also due to a lack of effort to improve the commercial speed of buses. In parallel, the fare box revenue per trip is decreasing in cities of more than 100,000 inhabitants. This phenomenon comes from two elements. First, fares did not increase on average (just following inflation). Second, the willingness to secure the loyalty of clients led to increase the share of monthly tickets; then the increase of PT use often comes from existing clients, which does not generate supplementary revenue.

Table 3: the 1995-2005 evolution of main ratios (average annual increase rates)

	> 250,000 inhabitants [22]	100 to 250,000 inhabitants [34].	< 100,000 inhabitants [47]	Total [103 networks]
Served population	0.76%	1.28%	1.35%	1.00%
PT supply (vehicle kilometres per inhabitant.)	0.83%	0.48%	0.52%	0.67%
Patronage (Trips per inhabitant)	1.34%	-0.83%	-1.31%	0.56%
Load factor (Trips per vehicle km)	0.50%	-1.31%	-1.83%	-0.11%
Covering ratio (fare box revenue / operating expenses)	-2.35%	-3.30%	-2.77%	-2.59%
Fare box revenue per trip	-0.92%	-0.11%	0.78%	-0.60%
Fare box revenue per vehicle km	-0.43%	-1.42%	-1.06%	-0.70%
Operating expenses per trip	1.46%	3.30%	3.64%	2.05%
Operating expenses per vehicle km	1.97%	1.95%	1.75%	1.94%
Operating deficit per trip	3.55%	5.42%	5.25%	4.11%
Operating deficit per vehicle km	4.07%	4.04%	3.33%	4.00%

The consequence is a tremendous increase of the operating deficit per vehicle kilometre, with a 4.0% average annual increase rate in real term. Such a situation is not 'sustainable' and projections for the next ten years lead to a major financial risk for PT Authorities.

Indeed, PT Authorities have also to finance the development of new routes and infrastructures, particularly to cope with the new mobility policies aiming at a sustainable development. In most French cities the PT Authority, as the owner of equipments and rolling stock, has to finance all investments. A simplified PT account can be drawn (Table 4). It allows calculating the Total Network Cost (NTC), taking into account operating expenses (OPE) and all other expenses for investment, depreciation and PTA operating budget (PTE). Available data do not make possible estimating PTE in a more disintegrated way, due to several changes in the accounting PT Authorities system between 1995 and 2005. Three sources of revenue can be stated: the fare box revenue (FBR), the revenue from the Transport Tax (NTT) and the public contribution (PUC) needed to cover the difference between NTC and the dedicated revenues.

Table 4: Simplified PT account

Expenses	Revenue
Operating expenses – OPE Other expenses (Investment, depreciation, PTA operating budget) – PTE	Fare box revenue – FBR Net Transport Tax – NTT Public Contribution – PUC
Network Total Cost – NTC	Network Total Revenue – NTR

The interest of such a simplified account is to estimate the total public contribution (PUC). On the 1995-2005 period, PUC increased by an average annual rate of 7.4% in real term (Table 5):

Table 5: The 1995-2005 expenses and revenue average annual increase rates

PT networks		> 250,000 inhabitants	100 to 250,000 inhabitants.	< 100,000 inhabitants.	Total
Operating expenses	OPE	3.6%	3.8%	3.7%	3.6%
Other PTA expenses	PTE	4.9%	3.2%	4.6%	4.7%
Fare box revenue	FBR	1.2%	0.3%	0.8%	1.0%
Net Transport Tax	NTT	3.8%	4.3%	4.1%	3.9%
Public contribution	PUC	7.8%	5.8%	6.6%	7.4%
Network Total cost	NTC	4.2%	3.6%	3.9%	4.1%

Table 5 shows that other PTA expenses often increased faster than operating ones, stating the important effort in investment on the period. The revenue of the Transport Tax also rose, but this can be deceptive. As many cities implemented their first tramway line during the studied period, they benefited from a Transport Tax rate of 1.75%, instead of 1%. Now they have reached this legal maximum rate, the revenue from the Transport Tax cannot experience the same increase level anymore. Moreover, as the tax is based on the wages of employees, the present economic crisis could even make this revenue decrease in the short term…

The first conclusion which can be drawn from these statistics highlights the increasing gap between expenses (operation but also investment) and revenues. It questions the global performance of networks, as the patronage does not increase at the same level and the French tradition of low fares obliges PT Authorities to add more money each year. The municipalities members of the PT Authorities now begin to be reluctant to dedicate more money to transport, preventing them to use it for other public services, such as day-nursery, cultural activities or any other social expenses. Some of them intend to reduce their contribution and require for cost cutting.

HOW LIMITING THE PUBLIC CONTRIBUTION BY THE 2015

Statistics are given here by city size categories. This offers the advantage to avoid variations due to the local context of each city (such as the opening date of a tramway line) on the 1995-2005 period. Then linear adjustments could be considered with good correlation coefficients, even if such a simplification can be easily contested. Trying to get forecasts on a relatively short term (2015), a simulation model was drawn with the objective to test contrasted policies to stabilise the public contribution (PUC). Equations will be briefly described before presenting some scenarios for the future.

A simulation model to test some strategies

The Public Contribution (PUC) is defined as the difference between the Total Network Cost and the dedicated revenues (Fare Box Revenue + Net Transport Tax):

$$PUC = OPE - FBR + PTE - NTT \quad (1)$$

In order to simulate different strategies, eight variables were identified:

- The Number of Vehicle Kilometres per Inhabitant (NVKI)
- The Fare Box Revenue per Trip (FBRT);
- The load factor: Number of Trips per Vehicle Kilometre (NTVK);
- The Operating Expenses per PT Employee (OPTE);
- The number of PT Employees per million Vehicle Kilometre (EVKM);
- The PT Authority's other expenses per Vehicle Kilometre (AVKM);
- The Net Transport Tax per Inhabitant (NTTI)
- The PT Area Population (PTAP);

Operating Expenses (OPE), Fare Box Revenue (FBR), Other PTA Expenses (PTE) and Net Transport Tax (NTT) then can be calculated as:

$$OPE = PTAP \times NVKI \times OPTE \times EVKM \quad (2)$$
$$FBR = PTAP \times NVKI \times FBRT \times NTVK \quad (3)$$
$$PTE = PTAP \times NVKI \times AVKM \quad (4)$$
$$NTT = PTAP \times NTTI \quad (5)$$

Finally, the Public Contribution can be written:

$$PUC = PTAP \times [NVKI \times ((OPTE \times EVKM - FBRT \times NTVK) + AVKM) - NTTI) \quad (6)$$

The evolution of the eight variables was calibrated on the basis of the trends on the 1995-2005 period (linear adjustment). Of course, these variables are not fully independent: for example, an increase of the number of vehicle kilometres (NVKI) can lead to new investments and then influences the Other PTA Expenses (PTE), depending on the type of transport system required. Here, the objective is not to build a complete financial model, but just to get a simulation tool, in order to estimate the order of magnitude of each variable needed to reach pre-determined objectives (back-casting). Detailed estimations and parameters are available in (Faivre d'Arcier, 2008).

Then, considering that past trends are still valid for the next ten years, if nothing is done to change present policies, a '2015 reference scenario' can be drawn,. Tables 6 and 7 show the main results.

Table 6: The 2015 reference scenario: financial data

	Simulation data Thousand € 2005	Operating Expenses OPE	Other PTA Expenses PTE	Network Total Cost NTC	Fare Box Revenue FBR	Operating Deficit OPD	Net Transport Tax NTT	Public Contribution PUC
> 250,000 inhabitants	1995	1,201	1,023	2,224	688	513	1,031	506
	2005	1,725	1,652	3,377	799	926	1,534	1,044
	2015	2,400	2,439	4,839	907	1,492	2,098	1,834
100-250,000 inhabitants	1995	453	166	619	161	291	294	163
	2005	639	268	906	158	480	448	300
	2015	872	395	1,267	150	723	629	489
< 100,000 inhabitants	1995	117	51	168	40	77	83	45
	2005	166	77	242	42	124	122	79
	2015	228	109	337	41	188	169	127
Total [103 networks]	1995	1,771	1,240	3,011	889	881	1,408	714
	2005	2,530	1,997	4,525	999	1,530	2,104	1,423
	2015	3,500	2,943	6,443	1,098	2,403	2,896	2,450

Table 7: The 2015 reference scenario: average increase rates

2015/2005 variation	Operating Expenses	Other PTA Expenses	Network Total Cost	Fare Box Revenue	Operating Deficit	Net Transport Tax	Public Contribution
> 250,000 inhabitants	39%	48%	43%	14%	61%	37%	76%
100-250,000 inhabitants	36%	47%	40%	-5%	51%	40%	63%
< 100,000 inhabitants	37%	42%	39%	-2%	52%	39%	61%
Total [103 networks]	38%	47%	42%	10%	57%	38%	72%

The reference scenario shows some differences according to the size of the cities. The main one concerns the fare box revenue which is decreasing in the smaller cities. This is coherent with the trend observed on the 1995-2005 period. In every case, the Other PTA

Expenses are growing faster than the Operating Expenses, due to an effort in investment, leading to a heavy burden in depreciation for PTA. Even if the revenue from the Transport Tax is still important, the low level of fare box revenue leads to a higher deficit, and then to an explosion of the Public Contribution. It also can be observed that the financial stakes mainly concern cities of more than 250,000 inhabitants (75% of the sample's Total Network Cost in 2015).

Table 8: The 2015 reference scenario: average Public Contribution per inhabitant

€ 2005	2005	2015 Reference scenario	Variation
> 250,000 inhabitants	97.53 €	159.74 €	64%
100 to 250,000 inhabitants	51.24 €	74.55 €	45%
< 100,000 inhabitants	28.98 €	41.84 €	44%

The main worrying question for local PTAs is the increase of the Public Contribution per inhabitant (Table 8), as this generally implies to increase local taxes. However, in the present situation, such a growth becomes impossible. As already mentioned, municipalities will not easily accept to reduce other public expenses to finance public transport more. Looking for new resources is of course the first considered solution. Resorting to loans is already used for financing new transport infrastructure, but will generate future recurrent burden. Road pricing is not politically acceptable now in France, even if paid parking was strongly developed these last years. Increasing the Transport Tax would induce growing labour cost for companies and results in a loss of competitiveness.
Then four options remains: 1) looking for new contributors (land value recovery, car users contribution); 2) increasing the Fare Box Revenue (presently covering a little more than 20% of the Total Network Cost; 3) reducing the Total Network Cost; or 4) improving the PT network performance…

Some scenarios to stabilise the Public Contribution

The simulation tool can help to estimate the possible impact of different strategies to stabilise the Public Contribution. Here the objective is not to design detailed actions, but to measure the importance of efforts needed to improve the financial situation of PT networks. It is a means to explain PTAs that the streamlining they wish cannot be obtained through soft measures, and will request structural changes in PT policies. Four scenarios were tested. In order to avoid a too long discussion, results will be limited here to networks of cities with more than 250,000 inhabitants

The main goal of the first scenario aims *at reducing the 2015 Public Contribution to its 2005 level*. According to the simulation tool, reaching this objective makes necessary to achieve simultaneously (in comparison with the 2015 reference scenario):

- A 10% reduction of the operating expenses per PT employee (OPTE)
- A 10% reduction of the number of employees per million vehicle kilometre (EVKM)
- A 20% increase of the Fare Box Revenue per Trip (FBRT)
- A 20% increase of the Number of Trips per Vehicle Kilometre (NTVK)

All other variables are supposed to follow variations identical to those of the reference scenario. A comparison with the trends observed on the 1995-2005 period, clearly confirms that such hypotheses require structural changes (Table 9).

Table 9: Scenario 1 – Hypotheses

22 networks with more than 250,000 inhabitants (simulation data)	2005 value	Reference scenario (2015)	Scenario 1 (2015)	Variation	2015/2005 Annual increase rate (Scenario 1)	2005/1995 Annual increase rate
Operating Expenses per PT Employee (OPTE)	62,204 €	66,295 €	59,665 €	-10%	-0.4%	0.7%
Number of Employees per million Vehicle Kilometre (EVKM)	83	93	84	-10%	0.1%	1.3%
Fare Box Revenue per Trip (FBRT)	0.60 €	0.55 €	0.66 €	20%	1.0%	-0.8%
Number of Trips per Vehicle Kilometre (NTVK)	4.01	4.26	5.12	20%	2.5%	0.7%

Table 10: Scenario 1 – Results

(Thousands € 2005)	2005	2015 Reference scenario	2015 scenario 1	Variation	2015/2005 Variation
Operating Expenses	1,725	2,400	1,944	-19%	13%
Other PTA Expenses	1,652	2,439	2,439	0%	48%
Network Total Cost	3,377	4,839	4,383	-9%	30%
Fare Box Revenue	799	907	1,307	44%	64%
Operating Deficit	926	1,492	637	-57%	-31%
Net Transport Tax	1,534	2,098	2,098	0%	37%
Public Contribution	1,044	1,834	978	-47%	-6%

As the rhythm of investment is not changed in this scenario, the increase of the Total Network Cost is mainly due to the other PTA expenses. The reduction of the operating deficit comes from the strong increase of the Fare Box Revenue.

Presented at the PTAs Association (GART), this scenario was perceived as totally unrealistic, but led to an interesting discussion about the strong inertia of the different components of PT expenses and resources. It let the local representatives becoming aware of the need of deep reforms in the PT governance.

The second and third scenarios have less ambitious objectives. For scenario 2 (S2), the objective is *to stabilise the 'Fare Box Revenue / Operating Expenses' ratio at the 2005 level* (Table 11). Priority is given to a reduction of the Operating Expenses, by stabilising the Operating Expenses per PT Employee (OPTE) and the number of PT Employees per million Vehicle Kilometres (EVKM) at their 2005 level. This means a 6% reduction for OPTE compared to the reference scenario and an 11% reduction for EVKM. This appears insufficient to reach the objective. A 2% increase of the Number of Trips per Vehicle Kilometre, or a 2% increase of the Fare Box Revenue per Trip, is

also needed. But this scenario leads to a 36% increase of the Public Contribution compared with 2005 (or a 23% reduction compared to the reference situation).

Table 11: Scenarios 2 and 3 – Objectives

			Objective (2005 value)	2015 Reference scenario
Scenario 2	Fare Box Revenue / Operating Expenses	FBR/OPE	46.3%	37.8%
Scenario 3	Public Contribution / Total Network Cost	PUC/NTC	30.9%	37.9%

For its part, Scenario 3's objective (S3) is *to stabilise the share of Public Contribution in the total of resources.* It put a slant on looking for new resources, as the conditions of production are supposed unchanged. In the case of cities with more than 250,000 inhabitants, taken here as an illustration, stabilising the share of the Public Contribution means finding extra 337 M€ (or 29 € per inhabitant), while this Public Contribution grew by 450 M€ compared with 2005. The scenario suggests sharing equally the effort between three variables: the Transport Tax (+5% compared with the reference scenario), the Fare Box Revenue per Trip (+12%) and the number of Trips per Vehicle Kilometre (+12%). Increasing resources from the Transport Tax seems unrealistic for reasons already tackled about the reference scenario. First, the law would have to be modified, whatever to increase the rate or to decrease the number of employees from 9 to 5, for example. Second, as already mentioned, the companies' economic situation could be penalised by the correlative increase of labour cost. Increasing fares should be necessary, as the users' contribution remains low in France, but municipalities are still afraid of the political consequences. In such a context, increasing the load factor may appear as a solution, but restructuring the PT networks will be necessary to make them more attractive.

The fourth scenario replies to a request from the PTAs Association, in relation to the objective of a sustainable mobility, nationally expressed in terms of a 20% reduction of CO2 emissions by 2020. It means a strong reduction in car use for daily trips. Such a transfer from car to PT was estimated as *a 60% increase of the number of trips on PT networks*. The design of the scenario then is quite complex, as several actions can be considered. Table 12 presents the chosen hypotheses.

Table 12: Scenario 4 (Sustainable Mobility) – Hypotheses

Scenario 4: Sustainable Mobility (> 250,000 inhabitants)	Number of Vehicle Kilometre per Inhabitant (NVKI)	Number of Trips per Vehicle Kilometre (NTVK)	PTA's other expenses per Vehicle Kilometre (AVKM)	Fare Box Revenue per Trip (FBRT)
Increase rate compared with 2005	25%	30%	30%	25%

These mix an increase of PT supply with an improvement of its attractiveness, in spite of fare growth. It appears very hard to design realistic features, because the 20% reduction of CO2 emissions should be accompanied by measures dissuading car use such as urban car traffic restrictions, oil price increase… Citizens' environmental

sensitivity is also supposed to become higher and to lead to a greater use of alternative modes of transport. Of course, these hypotheses can easily be contested, but the goal of this scenario is only to demonstrate that efforts for a better management of PT networks could lead to satisfactory results, without a Public Contribution explosion, compared with the reference scenario (Table 13).

Table 13: Scenario 4 (Sustainable Mobility) – Results

(Thousands € 2005)	2005	2015 Reference scenario	2015 Scenario 4	Scenario /Reference Variation	2015/2005 Variation
Operating Expenses	1,725	2,400	2,772	16%	61%
Other PTA Expenses	1,652	2,439	2,878	18%	74%
Network Total Cost	3,377	4,839	5,650	17%	67%
Fare Box Revenue	799	907	1,740	92%	118%
Operating Deficit	926	1,492	1,032	-31%	11%
Net Transport Tax	1,534	2,098	2,098	0%	37%
Public Contribution	1,044	1,834	1,812	-1%	74%

These four scenarios are only examples of the possible future financial situation of French PT networks. Many others hypotheses can be simulated, some might be more realistic. The described scenario's main advantage was to quantify options and to show PTAs the necessity to think differently about PT management. As the present economic crisis encourages them to a more strict control on public expenses, opportunities for reforms appear. Looking for new resources has been studied since many years in France and official suggestions made (Philip & Gauthier, 2003; Commissariat Général du Plan, 2003; Orfeuil, 2005; Pitaval, 2006). But it clearly appears that improving the financial equation of public transport means acting for its better economic performance.

IMPROVING THE PT NETWORKS PERFORMANCE

In spite of the efforts conducted by PTAs to develop their public transport networks between 1995 and 2005, results are disappointing in terms of patronage. Several reasons can explain this situation:

- Except for cities of more than 250,000 inhabitants, traffic congestion remains low and concentrated in the city centre during peak hours. Therefore car use is still well performing and faster than PT, which clients remain mainly 'captive' ones (i.e. people without access to a car). At the end of the 90's, new Urban Mobility Plans ('*Plans de Déplacements Urbains*' – PDU) started to be implemented with strong objectives of car use reduction. Real impacts took several years to be observed, but in the biggest cities (Lyon, Lille), travel surveys conducted in 2005-06 show a small but promising reduction of the share of car trips. This was reinforced in 2007-08 by the high level of oil price, and recent statistics show a significant increase in PT use (UTP, 2008): on a sample of 102 networks, the number of vehicle kilometre increased by 2.3% in 2007, while the number of trips increased by 5.9%.

- Number of customers is measured in France by the number of 'travels'. This can overrate the importance of PT use for two reasons. First, the number of passenger kilometres is never measured, meaning that short and long trips have the same weight. Long trips are made mainly by cars (commuters), a fact which is not in favour of reducing CO2 emissions. Second, a trip by PT including a transfer from bus to tramway, accounts for two travels. This statistic bias is even more important because, when developing new tramway lines, the bus network is restructured to encourage such transfers. Therefore travels are artificially multiplied, although this increase in number does not mean new customers, or additional fare box revenue[2].

- The users' contribution remains low. This comes from the traditional vision PTAs have of what a 'Public Service' should be, i.e. mainly designed for low income people. Local representatives request that each district should be served, but as the number of possible clients is low, PTAs tend to implement a minimal service, making it poorly attractive. So a great number of vehicle kilometres are produced in low density or peripheral areas with weak results. But now, the objective is to attract car users, which means developing high quality and level of service to compete with car. Moreover, car users have a higher willingness to pay (as revealed by the use of their car) as long as they can enjoy travel time reduction, reliability and comfort, elements they are sensitive to.

- In the French system, PTAs have most of the responsibilities. They define services in details (first and last departure, frequency…), they decide the level of fares, and they own the rolling stock and infrastructures. It is why the call for tender for the delegation contract is a huge document, giving little freedom for operators to improve the operation of the network. Surprisingly, the size and skill of PTA staff are limited, and relations with operators are characterised by a lack of trust, making cooperation difficult. Often, the PTA defines standards (such as a 10 minutes frequency in peak hour for all routes) without taking into account the operating speed and the duration of a return trip: then the bus fleet can be oversized, and the waiting time of bus drivers at the terminus can represent more than 20% of the paid hours…

All these elements explain the low fare box revenue and the high operation costs. Global restructuration of the network is rarely considered, even when new tramway lines are implemented. Moreover, no real optimisation processes are decided. PTAs generally consider optimisation of the operation is under the responsibility of transport operators. But as often strong financial incentives are not planned in the delegation contract, the remuneration of operators is mainly linked with the turnover, and mobilising a great number of buses and drivers will increase it.

Three main issues can be considered to improve the performance of PT networks: reforming the delegation contract to give more responsibilities to operators; developing performance measuring at each route level; better identifying the 'missions' of PT network and their respective costs.

[2] Except in the Paris region, where distance-based tariff exists to some extent, transfers within PT networks are free.

In theory, the Net Cost Contract[3] should encourage operators to a better management of operation, through sharing industrial and commercial risks. But the willingness of PTAs to keep the control on the Tactical Level has led to a too normative definition of the level of supply. Standards should be flexible in relation to the conditions of operation, and adapted to the type of clients the network wants to attract. This means a deep change of PTAs mentality would be needed in terms of network governance. More trustee relations with operators should be established and based on clear performance indicators, as well as a new share of responsibilities. As the delegation contract authorises a negotiation phase on the bids, this could allow proposals of modification of the technical specifications (with respect to the global economy of the contract).

Diagnostics on the performance of each component of the network should be developed. This could lead to get a thinner image of the contribution of each route to the PT network utilisation. Such a research is in progress on the Lyon PT network and will be extended to other cities. Its objective is to put into relation both the assented level of service (and its cost) and the level of patronage, taking into account the contribution of the route to feeding the network (transfers) and its assumed 'missions'. Indicators such as the number of passengers per kilometre per period (peak/off peak) can be interesting to measure the degree of attractiveness of the supply, and will help looking for a better performance of each route. The example of the Berlin PT network restructuration (Reinhold, 2008) shows cost cutting and patronage increase can be obtained together.

A better identification of the 'missions' of the PT network could also help at two levels. First, adapting the standards of the level of service to the public policy goals can lead to a better definition of the conditions of a satisfactory attractiveness, with regards to the characteristics of the targeted clients. This will probably make it necessary to diversify the standards of service, because, as briefly mentioned present car users will request reduced travel time, higher reliability, higher frequency for off peak period, but they will be ready to pay twice the price to get such a quality. Nevertheless, this will induce difficult discussions to convince local representatives that a diversified level of service can be more efficient than the territorial fairness they generally promote. Second, a clear identification of the missions can help to estimate the additional costs and benefits they generate. Then, financing these costs can lead to pricing measures focussed on specific payers. For example, the lack of revenue due to fare reductions for low income people is a 'social expense' which can be attributed to municipal social budgets. But developing such an approach needs to design robust methodologies to help building consensus within local representatives.

CONCLUSION

The present financial structure of French PT networks seems reaching a deadlock. While the Transport Tax makes many other countries jealous, this source of revenue can also generate negative side effects. On a long period, statistics clearly show it contributed to a significant supply increase, but also operating expenses drift, while fares were kept at a low level without catching new passengers. Such easy money did not encourage PTAs to implement coherent mobility strategies or to develop

[3] In 2007, 54% of the French networks have Net Cost Contracts (GART, 2008)

optimisation processes to stabilise operating costs. Now that public money becomes scarce, and that sustainable development objectives strongly encourage to reducing car use in cities, new strategies should be developed. Cost cutting will be needed, and this constrains to think PT networks structure differently. Searching for a better performance is the present new keyword, even if most PTAs have not a clear idea of what it will imply in the PT network governance. One of the main lessons from the past twenty years is that it is not sufficient to develop high quality networks to attract car users. Restrictions on car use should be implemented, and the new French Carbon Tax decided this summer (+0.07 € per litre) will probably be insufficient to encourage a significant car traffic reduction.

Performance management appears to be unavoidable to look for a greater efficiency in PT network design and operation. But fare structure should also be reconsidered, taking into account the fact new targeted customers are car users having a higher willingness to pay, and being more demanding high levels of service.

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APPENDIX 1: : THE 1995-2005 EVOLUTION OF FRENCH PT NETWORKS

Figure 1: Evolution of PT supply per inhabitant

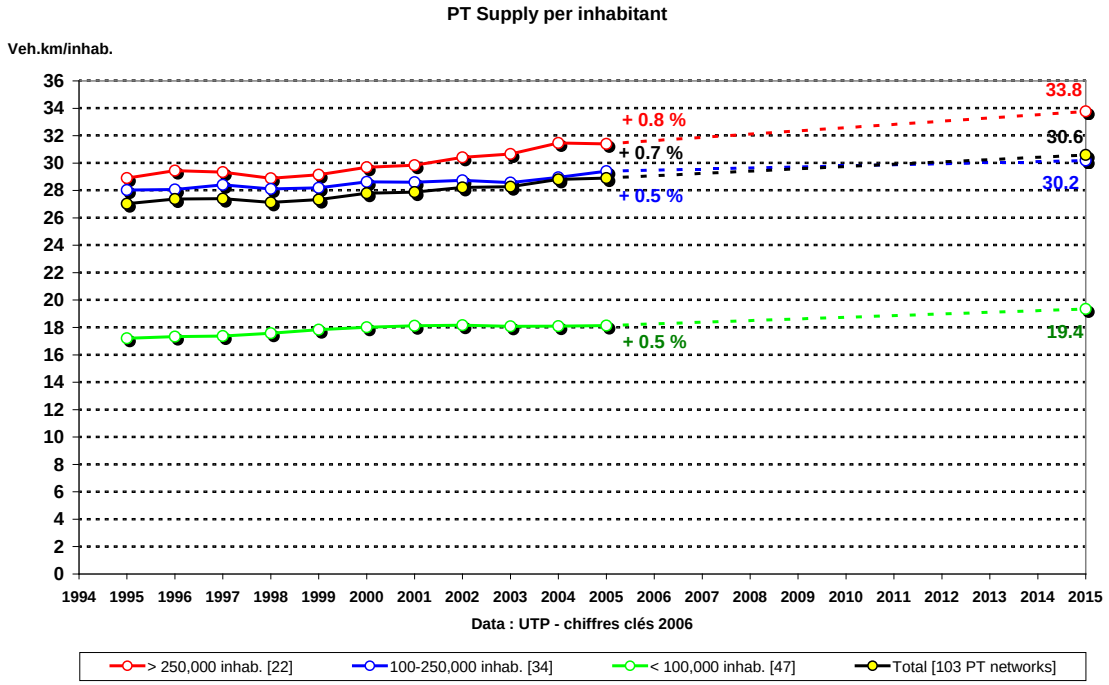

Figure 2: Evolution of the number of trips per inhabitant

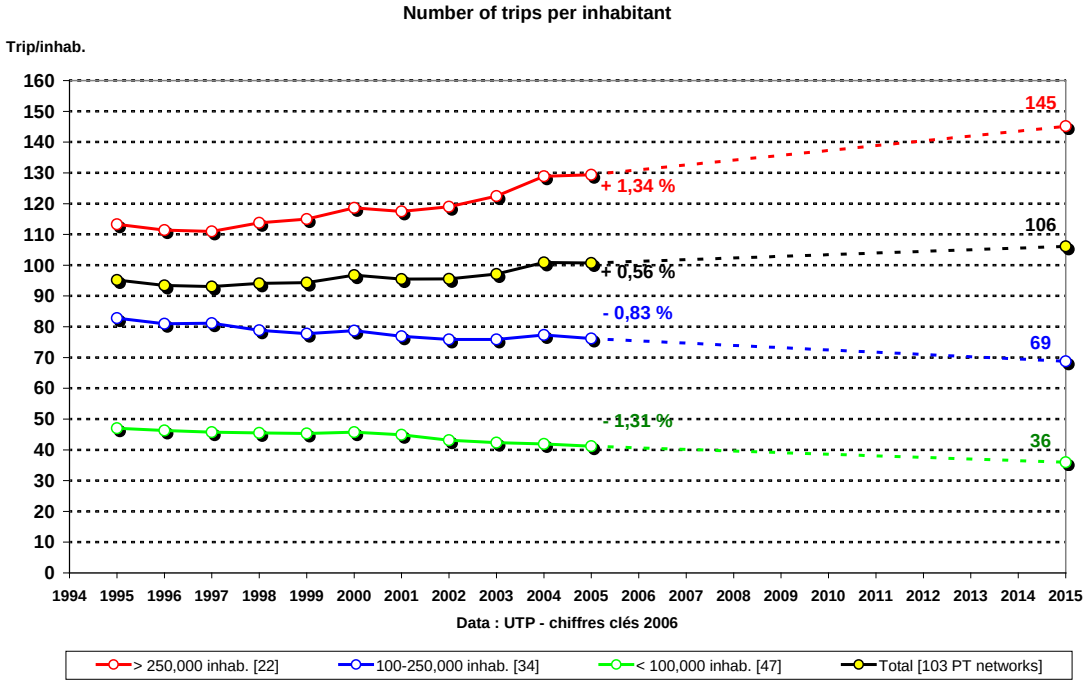

Figure 3: Evolution of the number of trips per vehicle-kilometre

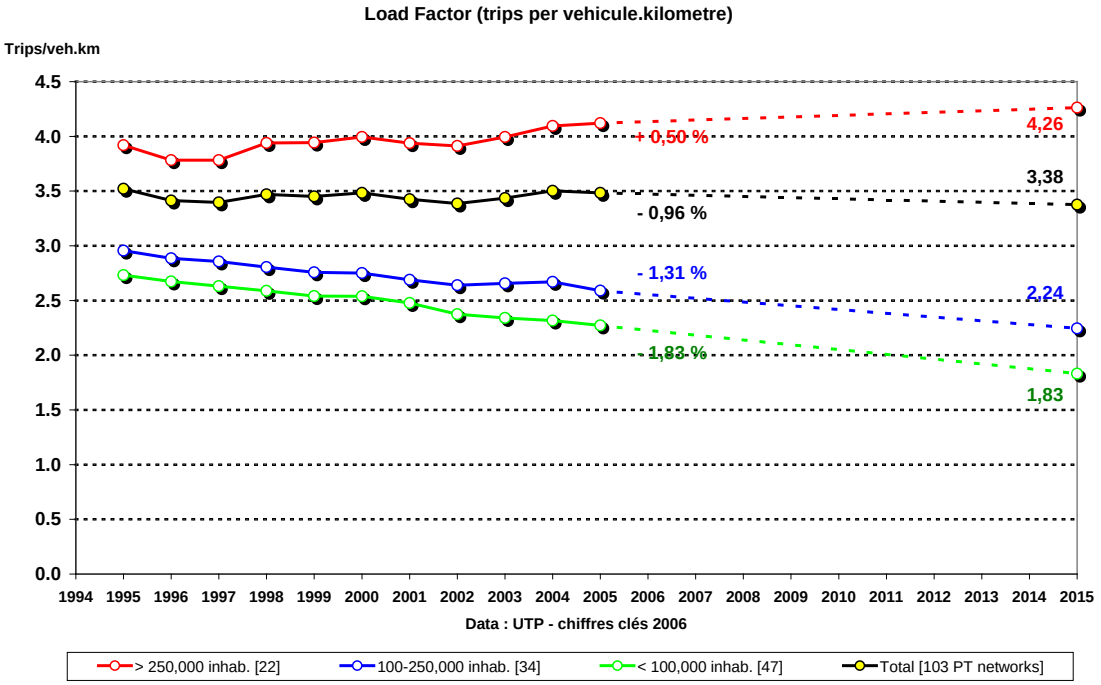

Figure 4: Evolution of the fare box revenue / operating expenses ratio

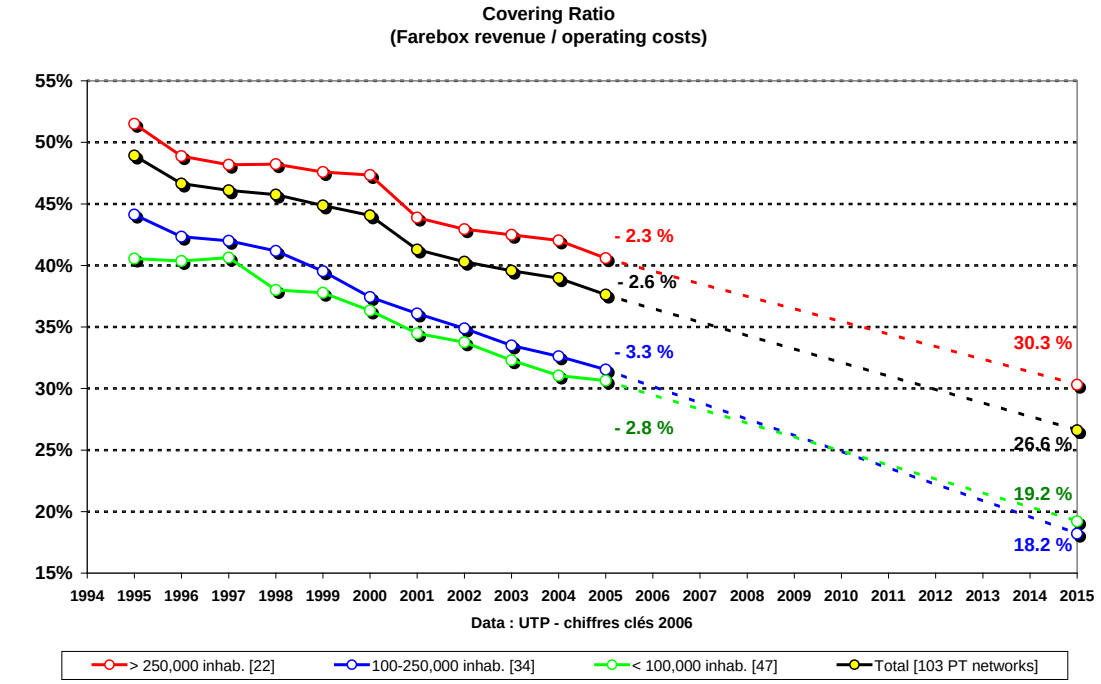

Figure 5: Evolution of the fare box revenue per trip

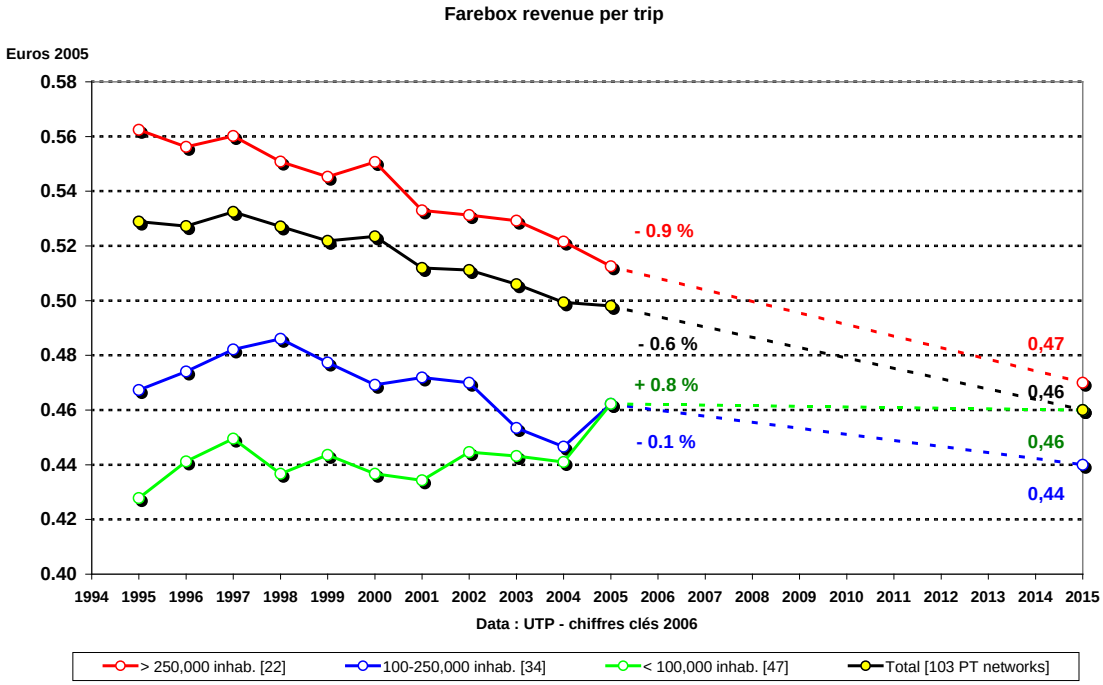

Figure 6: Evolution of the fare box revenue per vehicle-kilometre

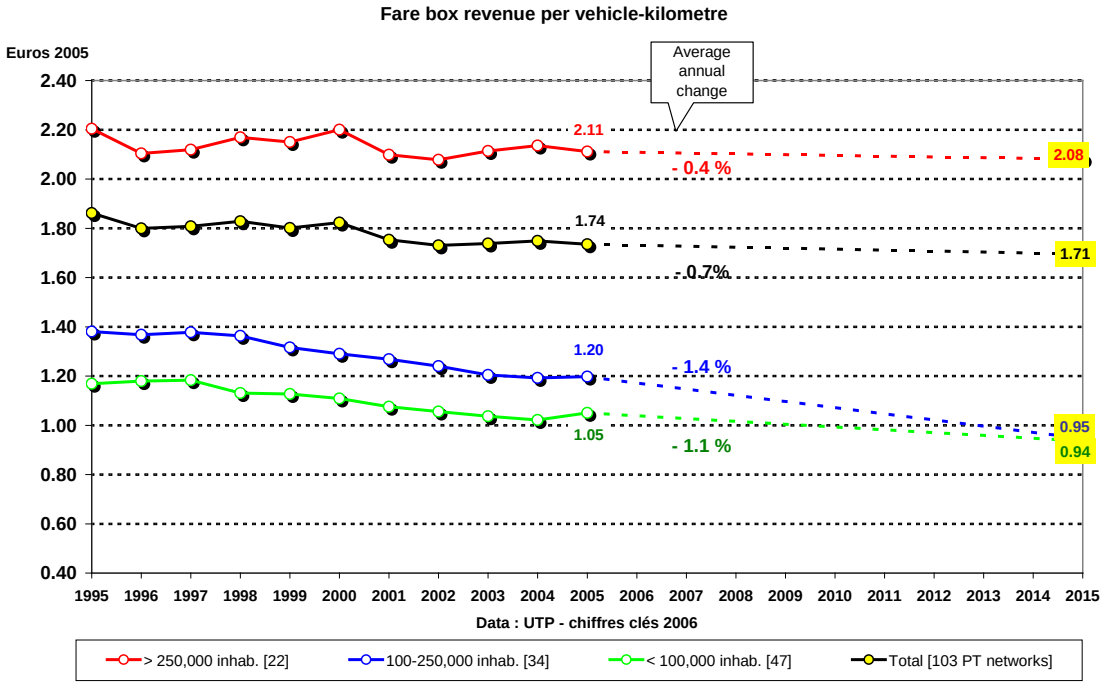

Figure 7: Evolution of the operating cost per trip

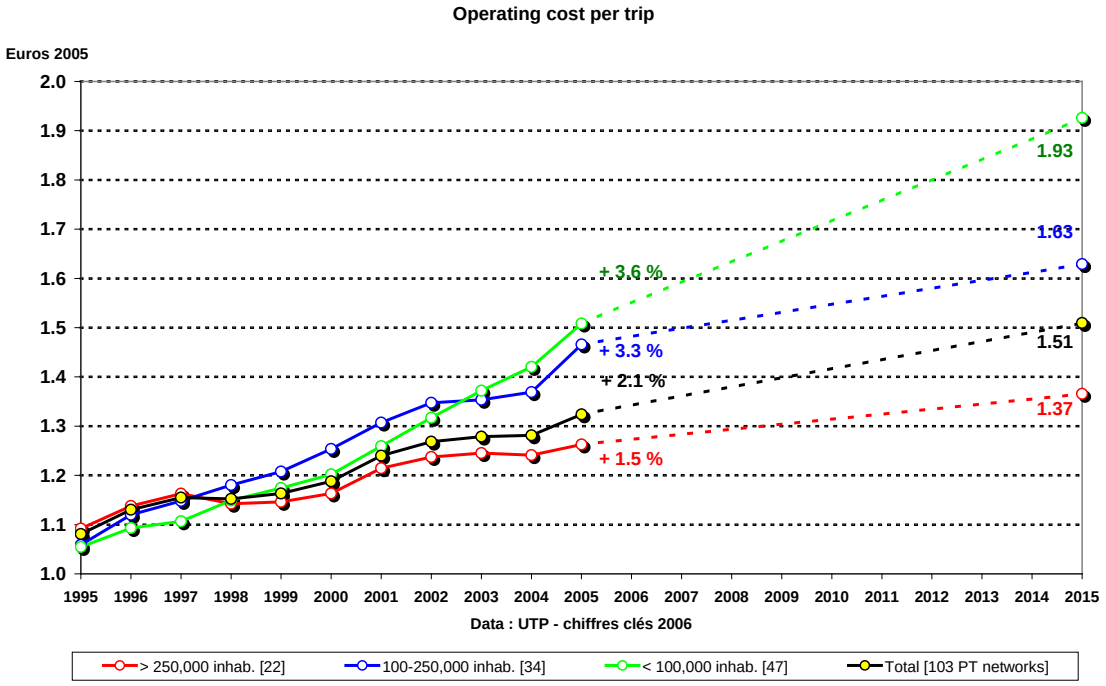

Figure 8: Evolution of the operating cost per vehicle kilometre

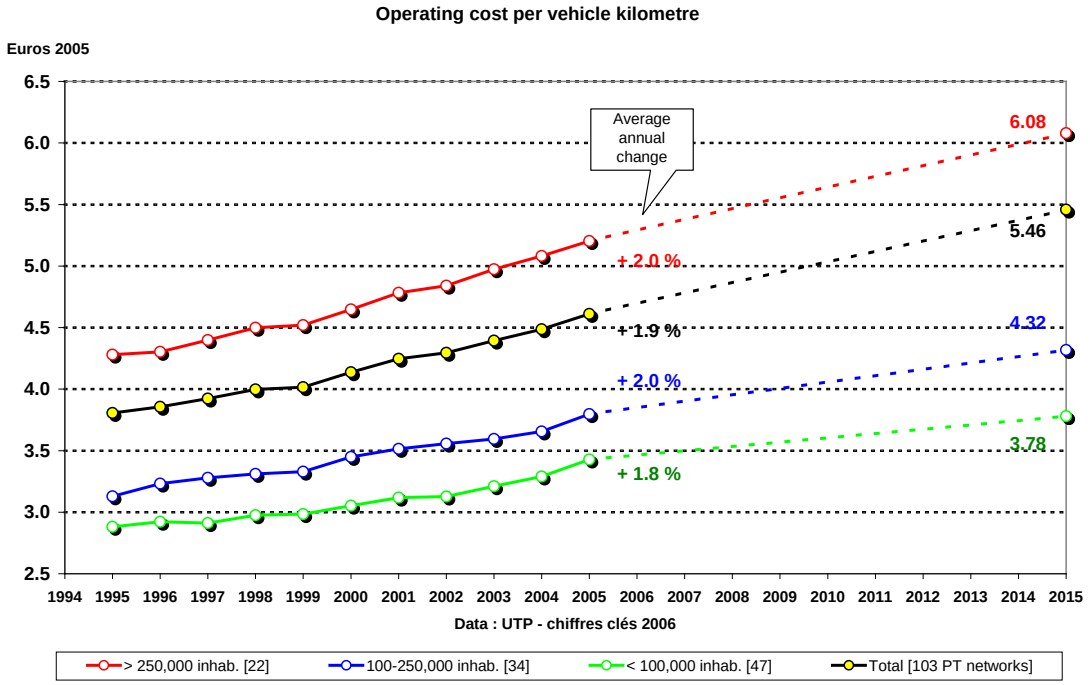

Figure 9: Evolution of the total network cost – main cities

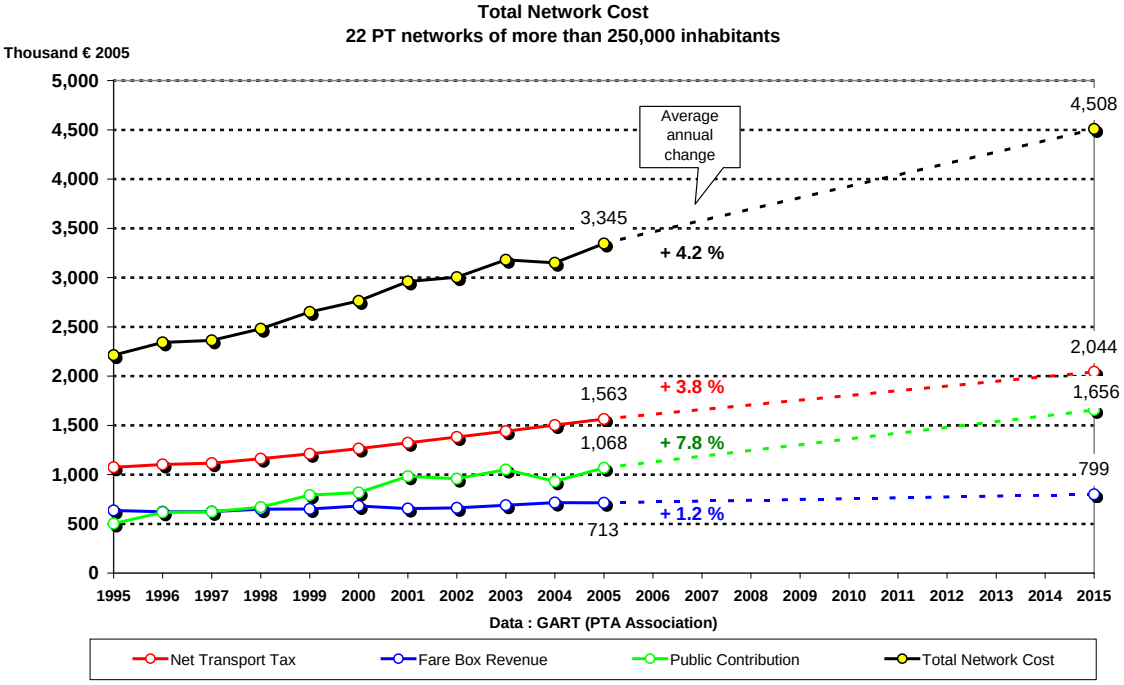

Figure 10: Evolution of the structure of financing – main cities