National Policy Frameworks

NPF Urban Transport

Assessment for Europe

National policy frameworks for urban transport

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Final Report:

Urban Transport Statistical and Public Perception Data

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ABBREVIATIONS AND ACRONYMS

BMVBW	Bundesministerium für Verkehr, Bau und Wohnungswesen (German Federal Ministry of Transport, Building and Housing)
BMVIT	Bundesministerium für Verkehr, Innovation und Technologie (Austrian Federal Ministry for Transport, Innovation and Technology)
CARE	Community database on Accidents on the Roads in Europe (EU road accident database)
CATI	Computer Aided Telephone Interviews
CEN	Comité Européen de Normalisation/European Committee for Standardization
CERTU	Centre d'Etudes sur les Réseaux de Transport et l'Urbanisme (French Government transport and urban study centre)
CO_2	Carbon Dioxide
DfT	UK Department of Transport
DG-TREN	Directorate General for Transport and Energy
EC	European Commission
ECMT	European Conference of Ministers of Transport
EEA	European Environment Agency
ELTIS	European Local Transport Information Service
ETSC	European Transport Safety Council
EU	European Union
EU-15	The 15 "old" EU Member States (pre-2004)
GART	Groupement des Autorités Responsables de Transports (French association of public transport authorities)
GDP	Gross Domestic Product
IEA	International Energy Association
ksi	Killed or seriously injured
ktoe	Thousand tonnes oil equivalent
LRT	Light Rapid Transit
mtoe	Million tonnes oil equivalent
NO_X	Nitrogen Oxides
OECD	Organisation for Economic Co-operation and Development
pkm	Passenger-kilometre
PM_{10}	Particle matter
PPP	Purchasing Power Parities
PT	Public Transport
SIKA	Statens Institut för Kommunikations Analys (Swedish Institute for Transport and Communications Analysis)

TERM	Transport and Environment Reporting Mechanism
UK	United Kingdom
UN	United Nations
UNECE	United Nations Economic Commission for Europe
VHC	Volatile Hydrocarbons

Country abbreviations used

References to the EU-15 Member States in this report use the ISO 3166-1 country designators, as follows:

AT – Austria	ES – Spain	IE – Ireland	PT – Portugal
BE – Belgium	FI – Finland	IT – Italy	SE – Sweden
DE – Germany	FR – France	LU – Luxembourg	UK – United Kingdom
DK – Denmark	GR – Greece	NL – Netherlands	

The ten new Member States which acceded to the EU in 2004 were not covered in this study.

1. INTRODUCTION

1.1 THE NPF-URBAN TRANSPORT PROJECT

1.1.1 Project Overview and Objectives

"National Policy Frameworks for Urban Transport"[1] was a three-year project (January 2003 to October 2005), commissioned by the European Commission's Directorate-General for Energy and Transport (DG-TREN), Clean Urban Transport Unit.

Its aims were:

- to collect information on urban transport performance at national level in the 15 "old" EU Member States;
- to provide comparative analyses between countries and on a temporal basis; and
- to draw conclusions in relation to national urban policy frameworks and data collection issues.

1.1.2 Background

According to the latest statistics, 80% of the population of the European Union lives in urban areas[2], and 40% lives in large urban areas of over 200 000 inhabitants. The distribution of mobility among the urban population as a whole and its subsequent costs to time, to the environment and other amenities, require policies and trade-offs between different interests, which in turn put great onus on the responsible authorities. The challenge to promote and sustain an ever-evolving transport system in a large urban area is a matter of great complexity, which requires consistent monitoring of transport performance and impacts of policies.

Europe face challenges regarding health, safety, economic development, accessibility, etc, and in urban areas effective transport policies can contribute to addressing such issues. However the policies pursued by local and regional authorities are affected, either positively or negatively, by institutional, policy and funding frameworks at national level. Depending on the country, local transport authorities may or may not have the power to raise their own revenue for transport investment (by levying local taxes, road user charges, parking fees, etc). In many countries such authorities rely to a greater or lesser extent on national or regional governments for central financial support, in return for which the funding authority may influence policy in some ways.

Few countries in fact have something which could be termed a "national policy framework" for urban transport, although all have certain structures, rules and procedures set at national level within which local authorities must act. An example of a country which does have some sort of formal framework is the United Kingdom, where local authorities in England are required to develop Local Transport Plans for submission to the Department for Transport[3]. Central

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1 EC contract number ETU/B2.704/STD/002/2002, "Assessment of National Policy Frameworks for Urban Transport (ARMOUR)". NPF-Urban Transport is the project's public name for dissemination purposes.

2 Source: Eurostat and World Bank, 2002

3 Separate (but similar) arrangements exist between Scottish and Welsh local authorities and their respective devolved governments.

government support is then allocated on the basis of these, judged on the importance, benefits, value-for-money and innovative aspects of the individual investment schemes proposed by local authorities. Most other countries follow a regional approach where the majority of urban transport decisions are made at local or regional levels with the national government setting broad guidelines and goals.

Against this background, the Commission for Integrated Transport (CfIT)[4], an independent body sent up by the UK Government in 1998 with the objectives of providing policy advice through evidence-based reports and refreshing the transport debate, suggested that DG-TREN commission a an urban transport comparative analysis study to investigate the existence of policy frameworks and performance (inputs, outputs/outcomes, perceptions, etc) by EU Member State. The inspiration for this study was a comparative European best practice study conducted in 2000 by the CfIT[5].

1.1.3 Objectives

The project does not aim to review national policy frameworks *per se*, but to assess urban transport performance (in terms of inputs, and intermediate and final outcomes) at a national level for the EU-15, which provides a rough indication of the level of success of the framework or structure at a national level.

This assessment is both "objective" (statistical) and "subjective" (perception-based). The "objective" part involves the collation and analysis of available and readily-accessible data for the EU-15 on a variety of urban transport indicators at the national level, such as capital investment, modal split, passenger-km or transport costs. This can in fact be more accurately termed as "statistical" than "objective", as the choice of data used, its interpretation, and selection of proxy data (in cases where the desired data at the national level is unavailable) means that such an assessment can never be wholly objective. The "subjective" part of the study includes an EU-wide survey of public perceptions of urban transport policy, in order to explore user-oriented urban transport issues and priorities within a pan-European context.

The outputs and recommendations of this project are primarily aimed at Member States' governments (including devolved administrations where these are responsible for setting the legislative and fiscal framework for transport and/or local government) and the European Commission.

This comparative analysis allows the performances of the Member States to be benchmarked against each other for a variety of indicators and could therefore be useful in terms of setting urban transport policy frameworks at national level.

The 10 new Member States were not covered in this project, as it was launched in January 2003, prior to their accession, thus they were not included in the project terms of reference.

Chapter 7 provides an overview of how effective the project was in meeting the objectives of the assignment.

4 www.cfit.gov.uk

5 Commission for Integrated Transport, "European best practice in transport - benchmarking", London, August 2000. Available at http://www.cfit.gov.uk/docs/2000/ebpt/index.htm

1.1.4 Project Structure

The project was undertaken by the following partners:

- ISIS S.A., France *(project co-ordinator and sole contractor to the European Commission)*
- Dorsch Consult Ingenieurgesellschaft m.b.H, Germany
- University of Leeds - Institute for Transport Studies (ITS), UK.

In addition, it was supported by specialist subcontractors and an Advisory Group of external experts.

The NPF-Urban Transport project was divided into six work-packages (WPs), as follows:

- WP1: Definition of Indicators;
- WP2: Data Collection and Reporting;
- WP3: Public Perception Assessment;
- WP4: Guidance and Advisory Group;
- WP5: Recommendations, Final Results and Dissemination;
- WP6: Project Management.

1.1.5 Advisory Group

The project's Advisory Group (WP4) was created in order to guide the project and to discuss its results. Its members, as suggested by DG-TREN, come from a variety of national, European and international organisations. It is chaired by one of the project partners, Prof. A D May (University of Leeds) and Advisory Group members (external to the project itself) were:

Mrs. M Crass	ECMT - European Conference of Ministers of Transport
Ms. C De Marco/Mr. A Braithwaite	Commission for Integrated Transport (UK)
Mr. P Jensen/Mr. W de Ridder	EEA - European Environment Agency
Prof. P Jones	University of Westminster (UK)
Mr. A Lauer	Conseil Général des Ponts et Chaussées (French Ministry of Infrastructure and Transport)
Mr. I Morton	UITP - International Association of Public Transport

1.1.6 Dissemination Activities

As part of WP5, the project has carried out the following dissemination activities:

- Creation of a project website at http://www.npf-urbantransport.org, from which approved and released project deliverables can be downloaded. Although English is the main language of the site, summary content is also provided in French, German, Italian and Spanish. The site has links from, among others, the EC's Transport Research Knowledge Centre (where there is a profile of this project), ELTIS and the EC's Transport Benchmarking site.

- Provision of a project leaflet.
- Two presentations made to the ECMT Urban Transport Data Task Force.
- A paper and presentation at the European Transport Conference, Strasbourg, October 2005.

1.2 THIS REPORT

1.2.1 Overview

This Final Report is a summary of the main findings and issues in the project, and recommendations.

It describes the methodology and findings of WP2: Data Collection. It also provides a condensed summary of the methodology key results of WP3: Public Perception.

Full details and analysis of the WP3 element of the project is provided in the report "D3.1: Public Perception of Urban Transport Performance and Policy: Survey Report for the EU-15" (see Chapter 9.1: Related NPF-Urban Transport Project Documents).

1.2.2 Structure

Following this introductory chapter, the remainder of this report is structured as follows:

- Chapters 2 and 3 cover the statistical data (or "objective") part of the project:
  - Chapter 2 focuses on development of indicators to measure urban transport performance in terms of policy inputs, intermediate outcomes and final outcomes (WP1 of the project) and also provides an overview of the data collection carried out (WP2);
  - Chapter 3 provides the results of WP2, comparing national performance in the 15 EU Member States in terms of the indicators defined in Chapter 2. Where appropriate Member State data is not available, sample data from one or more major urban areas is given (this can also be given in addition to national data in order to highlight specific examples and differences within a single country). Wherever possible, data is compared between countries and also temporally, where consistent data for different years has been obtained.
- Chapters 4 and 5 treat the public perception exercise (the "subjective" part of the project, covered by WP3):
  - Chapter 4 describes the survey terms of reference, design and methodology for this telephone interview survey of 3000 people across the EU-15;
  - Chapter 5 gives a summary of the key findings of the public perception survey, based on the D3.1 deliverable mentioned above.
- Chapter 6 looks at the issue of comparing statistical data with public perception data and provides three example comparisons, based on road safety, pollution and fuel use.
- Chapter 7 provides an overview of the experiences of the study, in terms of a short critique of the original aspirations and the limitations found.

- Chapter 8 provides the overall conclusions and recommendations of the project, including issues such as data availability and comparability, the value of the exercise, and recommendations on data harmonisation and "quick win" indicators for local, regional, national and European administrations, based on findings in the project.

In addition, an Executive Summary is available as a separate, stand-alone document. This summary is available in English, French, German, Italian and Spanish.

2. STATISTICAL DATA: PERFORMANCE INDICATORS AND DATA COLLECTION

2.1 OVERALL AIM AND PROCESS

In order to effectively assess, compare, and monitor national policy frameworks for urban transport policies and their outcomes, a set of indicators was needed. The aim was to define approximately 15 such indicators at a national level, which will then be applied to real data from the 15 EU Member States (in Work-package 2). This was to be used as a basis to collect national data.

Although the project can make some recommendations on indicators to be used for data collection in the future, its main task is to perform a comparative analysis exercise using data that already exists and is easily accessible. The key added value is therefore to bring as much relevant data together as possible and provide comparative evaluations.

A top-down approach was needed to ensure that the indicators are meaningful in terms of measuring national policy frameworks. Clearly, the data for most if not all indicators will be affected by other factors such as heterogeneous local and regional transport policies, existing infrastructure, social attitudes to different transport modes, geography and urban density, etc. A range of indicators is therefore needed which together (if not individually) can provide a good overview of the outcomes of national urban transport policy frameworks.

This involves the identification of requirements for the assessment of urban transport policy frameworks taking into account technical, economic, legal and urban policy constraints. The indicators proposed are also selected in order to address key European policy priorities, such as the recommendations of the EU's Transport White Paper covering modal balance, the environment, safety, etc.

2.2 APPROACH TO INDICATOR DEVELOPMENT

A draft list of 44 indicators was presented in a first draft paper, and discussed in an Advisory Group (AG) meeting in July 2003. The characterisation and parameterisation of indicators in this list included the following:

- Definition;
- Objective: policy which the indicator is supposed to assess;
- Possible measurement unit: a description of the alternative approaches used to measure and/or estimate the assessment indicator;
- Commentary / Observations: e.g. level of usefulness, limitations, degree of applicability to different countries where responsibility could be at a national level in some and a local level in others, etc;
- Likely data availability: based on preliminary checks in selected countries.

In this AG meeting, it was agreed to add a number of "context" indicators in addition to the 15 main indicators. These would use only readily available national data (e.g. from Eurostat), such as car ownership, urban density, etc.

It was agreed to divide the remaining indicators into inputs, intermediate outcomes and final outcomes. Figure 1 illustrates the relationships between the contextual factors, policy inputs, intermediate outcomes and final outcomes related to urban transport, upon which these indicators are based.

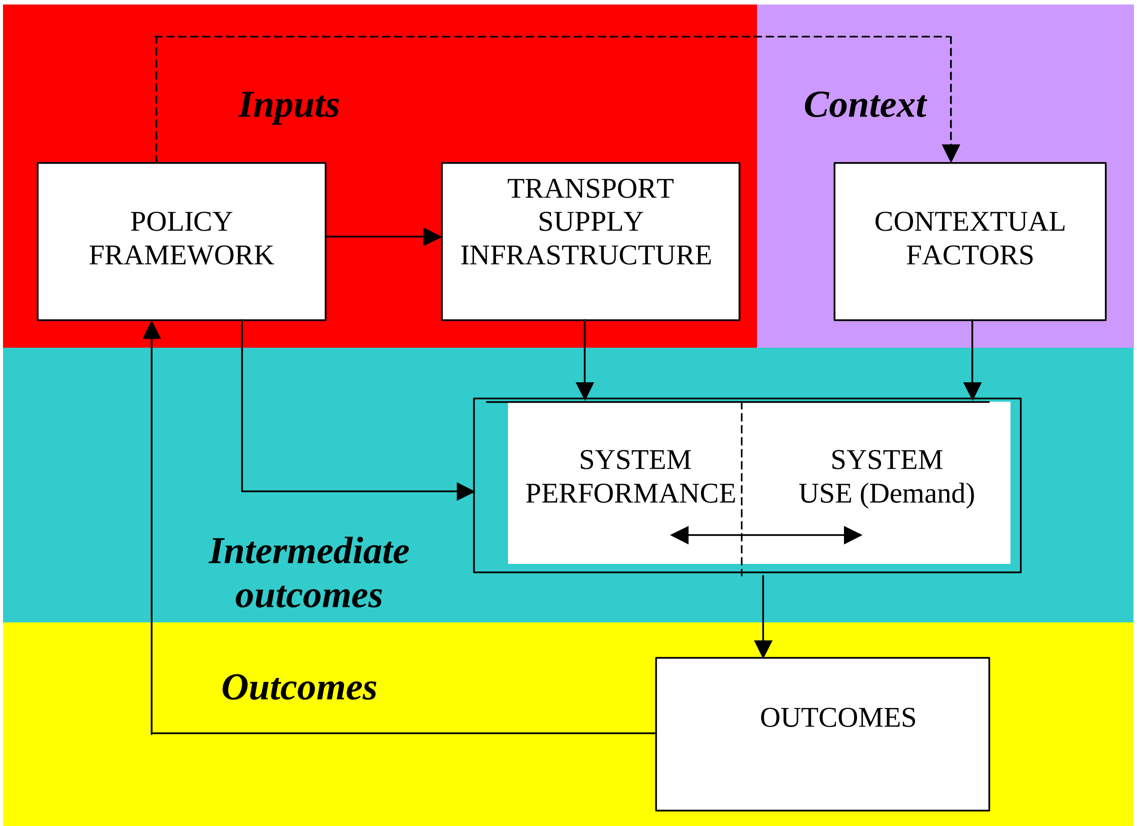

Figure 1: Relationships between Context, Input, Intermediate outcome and Outcome factors

2.3 LIST OF URBAN TRANSPORT INDICATORS

The indicators were classified in terms of context, input, intermediate outcome and outcome indicators, and are listed below under these four groups.

Out of the initial 44 indicators proposed and after consultation with the Advisory Group Members, 27 indicators were chosen for data collection at the national level and are listed. However two of them (public transport delays and cancellations) were not followed through after the early stages of the data collection exercise due to an almost total absence of available data at the national level, thus reducing the list to 25 indicators (with the agreement of the Advisory Group). However, data relating to many of these indicators are not directly comparable between countries, particularly when sample proxy data from cities had to be used. These issues are discussed in detail in Chapter 3.

2.3.1 Context Indicators

These provide a background against which the other indicators can be analysed. They cover "external" aspects such as urban density and income and, although these were not analysed per se, they are useful in explaining certain results, which emanate from the other three indicator groups.

These indicators are as follows:

- Population;
- Urban size and density;
- Gross Domestic Product (GDP);
- Car ownership;
- Car fuel costs;
- Car prices;
- Average age of cars.

Sub-chapter 3.1 gives a full description of each of these indicators, together with the data required and its availability.

2.3.2 Input Indicators

These are indicators of what is done to manage or change the transport system, including resources allocated in order to meet objectives.

The following input indicators were selected:

- Expenditure on transport infrastructure / network development;
- Expenditure on public transport service provision;
- Percentage of network competitively tendered;
- Transport supply (public transport/car);
- Average age of public transport fleet;
- Integration of public transport;
- Parking prices.

These are discussed in Sub-chapter 3.2.

2.3.3 Intermediate Outcome Indicators

Intermediate outcome indicators (or process indicators) refer to the changes within the transport system as a result of the inputs made. They can influence performance against objectives but are not measures of objectives in their own right. These can also be called intermediate outcomes, i.e. measures of resulting changes but which are not directly linked to objectives.

These are:

- Out of pocket urban travel costs (car/public transport) for peak and off-peak trips (counted as two indicators);
- Passenger-km by mode per capita;
- Number of trips made, by mode per capita;

- Traffic speeds.

Sub-chapter 3.3 covers intermediate outcome indicators in terms of data required, availability and analysis.

Indicators on public transport cancellations and delays were also initially proposed as intermediate outcome indicators, aiming to measure public transport reliability, looking at the total number of public transport cancellations as a percentage of all services (by transport mode), and at services delayed by over a certain limit. However given that data for this is generally not available in published form, it was agreed to drop this indicator. Data on public transport cancellations and delays is generally only available for rail services, where data is widely collected by national rail operators or authorities. However, whether or not this is disaggregated by suburban and other rail services depends on the structure of the rail operator (e.g. suburban services are often categorised with regional services which do not fulfil a purely urban role).

An important indicator initially reviewed was the accessibility of the population to urban transport services (e.g. percentage of urban population living within a certain distance or number of minutes walk of a bus stop, station, etc). However, such a measure, though important, was found to be unavailable even at the city level with only some public transport operators having estimates of the population catchment areas of their services.

2.3.4 Outcome Indicators

These cover the overall impacts of processes and intermediate outcomes in terms of factors such as mobility, social and environmental factors, and safety. They are therefore measures of performance against policy objectives.

The outcome indicators selected were:

- Transport fatalities and casualties;
- Transport energy use;
- Transport emissions;
- Transport noise;
- Link between traffic growth and GDP;
- Personal income and share of GDP spent on local transport.

These are further covered in Sub-chapter 3.4.

2.4 DATA COLLECTION

2.4.1 Methodology

Pre-formatted Excel spreadsheets were developed for data entry for each indicator, year and country. These constituted internal deliverable iD1.2 “Manual of Procedures”. These spreadsheets allow for a range of data to be entered in order to allow for different spatial, temporal and unit measurements.

Although the aim was to compare data over four years, many data elements were not available for the exact years required, at the right spatial level (often data is not purely urban), or in the specified units. The input spreadsheet therefore allow “next best” data to be entered (data from other years, in different units, or proxy data covering certain cities only) in separate cells, allowing the project to adjust and interpolate where necessary.

The project Terms of Reference specified national data at Member State level. In almost all cases, this data is not available nationally for urban transport (although it may be available nationally for all transport). In such cases, limited collection of data at city or conurbation level has been carried out. This is in order to provide a selection of examples and is not intended as a substitute for national data. One or two cities, or even five or ten cities, in a country cannot provide a reliable proxy, as “urban” can mean anything from towns of 20 000 inhabitants or less to major metropolises like London or Paris. Cities or urban areas were selected simply on the basis of data being accessible; there was no other scientific basis for this selection (nor can there be, unless a large number of cities are selected, which is beyond the scope of this project).

Where data for more than one city has been collected, the data shown in this report is either:

- an average figure (mean of the different cities), if these cities are similar in size and characteristics and if the data is similar; or
- separate figures per city, if the cities are very different, or if the data varies considerably such that an average figure would be misleading or meaningless.

This data is therefore not harmonised between countries (or even between cities in the same country) and cannot therefore be compared scientifically. It serves merely as a set of examples to illustrate performance against the indicator in question.

2.4.2 Sources

A wide variety of sources were used for the data collection. In several key countries, national experts were subcontracted to assist in the collection of data using the data collection format provided. Given the project’s constraints (approximately 4 person-days per country were budgeted for), most sources are from websites and from reports and data sets already in the possession of the consultant team and subcontracted national experts.

Key sources at the European level and their associated websites are listed in Chapter 9.2. These, as well as sources used at national level, are given in footnotes to the tables and graphs in this report.

3. STATISTICAL DATA: KEY RESULTS

3.1 CONTEXT INDICATORS

3.1.1 Overview

As previously stated, the aim of this project was not to analyse context data *per se*, but to show some key contextual information which can provide a background to other data and in some cases explain why certain data for certain countries might differ from the European norm or from what might be expected.

Table 1 below summarises the availability and accessibility of data for the context indicators.

Table 1: Overview of Context Indicator data availability

Indicator Name	Availability at national level for time series	Accessibility
Population	Yes, including urban population (but with different definitions of "urban")	Easily accessible (Eurostat, national statistics institutes)
Urban size and density	Yes, but not directly available in a comparable format	National statistics institutes or local authorities. In general there are no national or European categorisations and densities need to be calculated individually for each urban area. Densities depend on where the political boundaries of the municipality or metropolitan authority lie, so can be misleading if compared, even within a single country
GDP and consumer expenditure	Yes (for GDP) national and regional but not urban-specific	Easily accessible (Eurostat, national statistics institutes)
Car ownership	Yes, including for urban areas but with different definitions	Easily accessible (Eurostat, national statistics institutes)
Car fuel costs	Yes (except for ratio of petrol to diesel cars), national only	Easily accessible (Eurostat, national statistics institutes, motoring organisations)
Car prices	Not easily: Prices for previous years may be available but with some effort (and models of cars were sometimes different or non-existent in previous years)	Accessible with some research effort (individual searches in each country for price of each type of car necessary)
Average age of cars	Yes (national only)	Easily accessible (Eurostat, national statistics institutes)

3.1.2 Population

Population statistics have been collected to enable other statistics (transport investment, accidents, emissions, etc) to be calculated on a per head (per capita) basis, the aim being to examine total national population and total urban population in each country.

Comprehensive population statistics are of course collected by national statistics institutes in all countries. However, although “urban” population statistics are available from national sources, Eurostat, etc, these are not comparable between countries due to the different definitions used in each country of what constitutes an urban area or community.

While national population can be used in order to provide per-capita figures for other indicator statistics (where these refer to the whole country), data on “urban population”, as defined in each country, is not of any great use in the context of this project, as almost no other data is provided for on the basis of urban/rural areas (the exception is road accident data, where the urban/rural split is based on the speed limit of the road rather than the characteristics or population of a built-up area).

As an indication of urbanisation, an average of 80.1% of the EU-15’s population in the year 2000 was classified as urban (an increase from 76.8% in 1980), although this is based on each country’s own definition of “urban”, which can range from a population threshold of 200 to 10 000. In 2000, Belgium has the greatest percentage of its population classified as “urban” (at 97%, with urban being defined as communes of 5 000 people or more), followed by Luxembourg, the UK, the Netherlands and Germany. The percentage of total populations living in towns or cities has increased gradually in most countries (the greatest increases being in Portugal, Luxembourg, Germany and Ireland), while in Austria, Italy and Sweden, the urban/rural split of the population has remained broadly constant since 1980 (less than 1% change).

Of more interest to urban transport policy frameworks is the percentage of countries’ populations that live in cities and conurbations, as these larger urban areas are those where most urban transport problems (e.g. congestion) occur and where most of the public transport investment is made.

Figure 2 shows for each Member State of the EU-15, the percentage of national population living in urban areas of various sizes (200 000 to half a million, half a million to a million, and over a million), as well as the remaining “urban” population (i.e. living in settlements with a population above the national threshold for “urban” but below 200 000) and the “rural” population (living in settlements below the national threshold).

A population threshold of 50 000 or 100 000 would have been desirable in this figure, however data at these thresholds were not available for all countries from the source used (United Nations).

Although the majority of the population in each country is labelled as “urban”, most of them live in towns or villages of under 200 000 people, the only exception being Germany, where over half of the population live in urban agglomerations of 200 000 or more. A significant number (over 40%) of people in the UK and Austria also live in large urban areas, followed by France, Spain and the Netherlands. At a Europe-wide level, 40.1% of the EU-15’s population live in large urban areas (with a population of over 200 000). 25.4% of the population of the EU-15 live in large conurbations of over a million people.

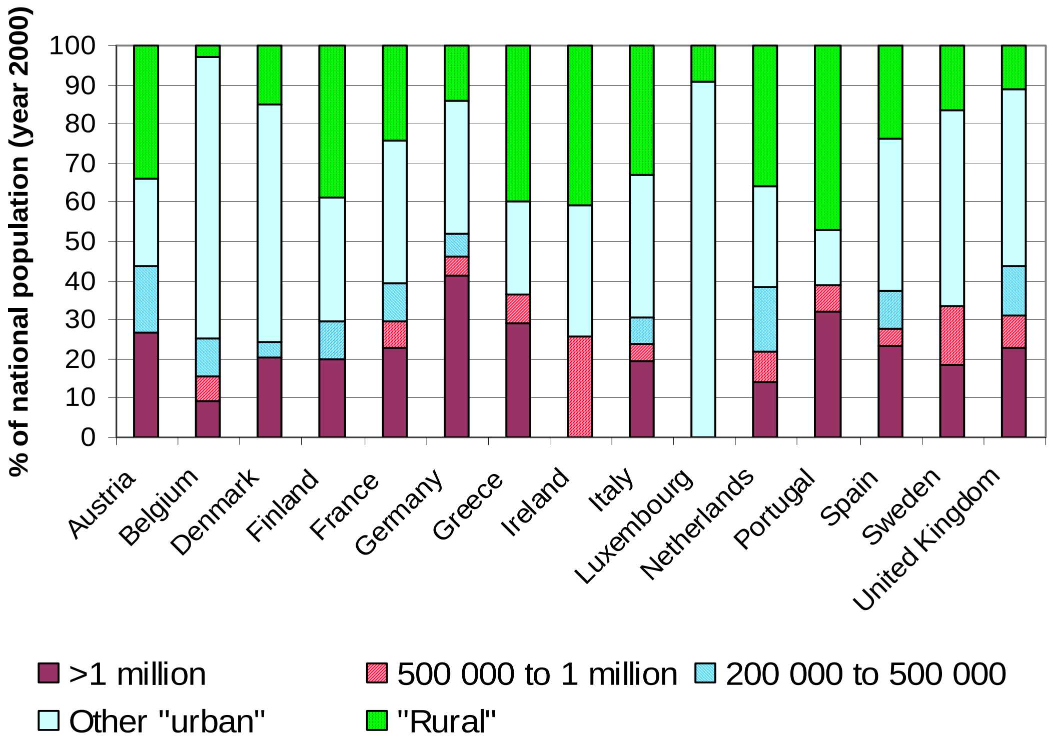

Figure 2: Proportion of Population of each Member State which is Urban (by different sized urban areas)[6]

Note to Figure 2: The limits between "Other urban" and "Rural" are affected by the threshold population for each Member State for an area to be defined as "urban". These are as follows:

- 200 - Denmark, Sweden
- 1 000 - UK
- 1 500 - Ireland
- 2 000 - France, Germany, Luxembourg, Netherlands
- 5 000 - Belgium
- 10 000 - Greece, Italy, Portugal, Spain

Population thresholds are not used in Austria and Finland. Also in some of the other countries other factors as well as population are considered, e.g. minimum land area or maximum distances between houses (density indicator).

3.1.3 Urban Size and Density

This indicator serves to illustrate the following:

- what percentage of the national population lives in large or medium sized cities
- what the average population density is for various sizes of cities.

Again, the purpose of this indicator is to use it to explain other indicators on a per capita basis, or to explore any link between data from other indicators and population density.

6 Source: United Nations, Economic and Social Affairs: "World Urbanization Prospects: The 2003 Revision Population Database)", http://esa.un.org

A sample of data (from 2001) is provided in Appendix 1. Figure 3 below illustrates some of this data for major European cities, showing densities from

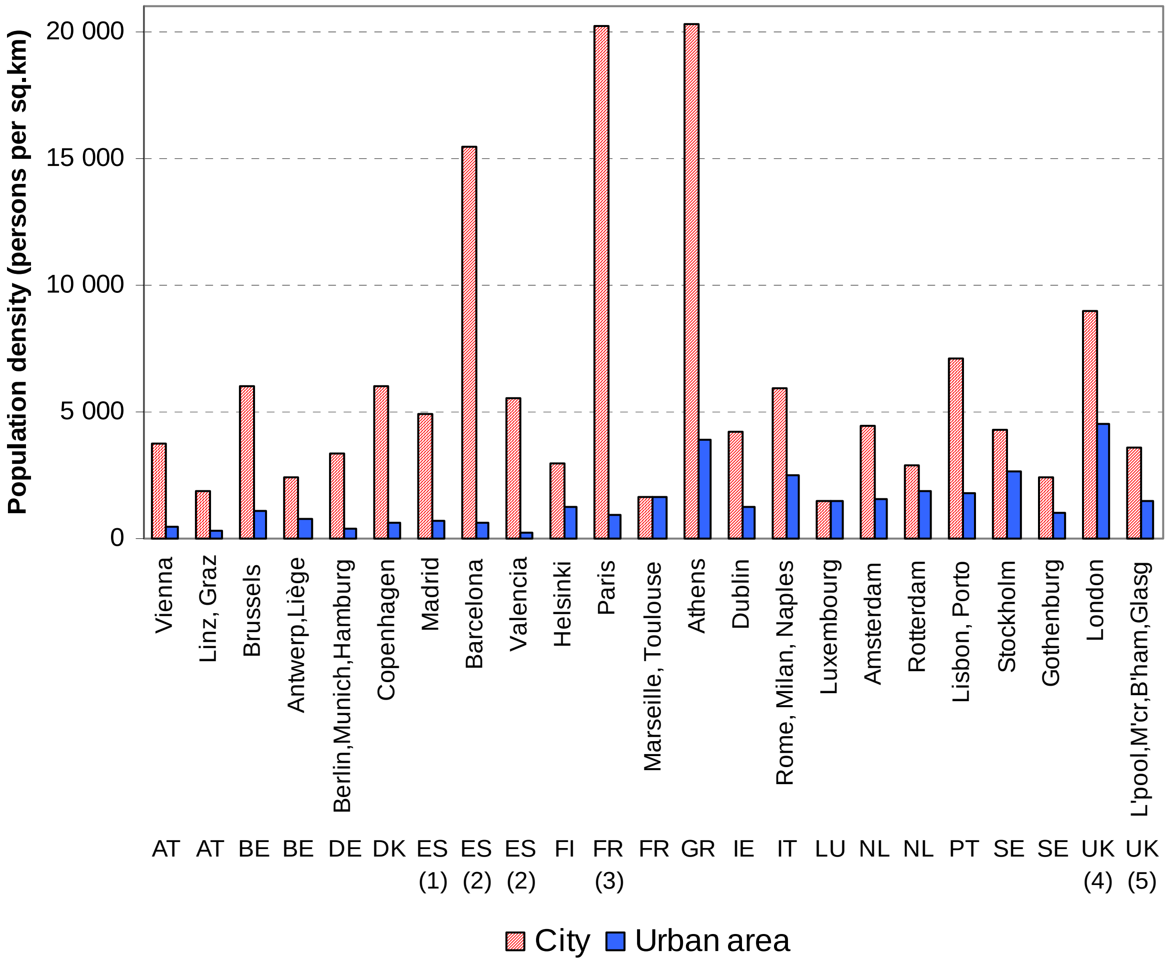

Figure 3: Densities of selected cities and metropolitan areas[7]

Notes to Figure 3: City densities are for the city council area. Urban area densities are generally for the "Larger Urban Area" as defined in the DG Regio Urban Audit (www.urbanaudit.org), which do not necessarily correspond with a metropolitan authority. Key anomalies noted in parentheses under the country code in the figure are:

(1) Urban area refers to the Community of Madrid (region)
(2) Urban areas refer to the provinces of Barcelona and Valencia
(3) Urban area refers to the Ïle de France region
(4) City refers to inner London boroughs, urban area refers to Greater London
(5) Cities refer to Liverpool, Manchester, Birmingham and Glasgow, urban areas refer to Merseyside, Greater Manchester, Birmingham & Black Country and Greater Glasgow.

Clearly, population densities can vary by country, by size of city, according to how closely the city or metropolitan authority boundary matches the actual urbanised area, and also historical factors. A key issue is the level at which data is collected: densities are clearly very different depending on whether the city only is used, the city and its inner suburbs, or the city-region. The

[7] Source: DG-Regio Urban Audit and National Statistics Institutes

fact that such regions are defined differently in different countries, and that city boundaries differ in terms of how closely they match the extent of the built-up area, makes any meaningful comparison impossible. This can be seen in Figure 3, where there is no relationship between city density and metropolitan area density and little relation between the size of an urban area and its density.

This data cannot be used in further calculations, however it provides background information which can help to explain discrepancies in transport performance between sample cities (particularly public transport and modal split).

3.1.4 Gross Domestic Product

This data required for this indicator is the GDP (Gross Domestic Product) per capita in purchasing power parities (PPP). Consumer expenditure (euro per capita) is an alternative indicator of wealth or purchasing power.

Per capita GDP in PPP (with the EU average being 100) is available for 1990 and 2000 for all Member States, from Eurostat. Data is not shown for 1980 as this is not available for all countries.

The greatest increase in GDP has been in Luxembourg, followed by Ireland (the latter having risen from third lowest to third highest GDP in the EU-15 over this ten year period). GDP rose slightly in most other countries, apart from Belgium, France, Germany and Italy, where it fell slightly.

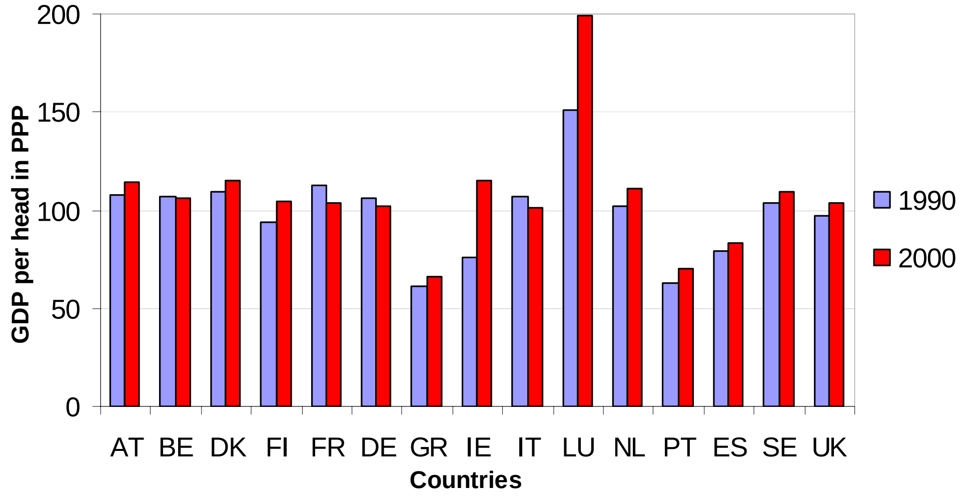

Figure 4: GDP per capita (1990-2000) in Purchasing Power Parities (EU-15=100)[8]

More recent GDP figures in PPP for EU countries are calculated on the basis of the EU-25 average being 100. The evolution from 1995 to 2003 is shown in Figure 5. The greatest increase over this period has been in Ireland, with a 34% growth in GDP, followed by Luxembourg with 20%, and Spain and Greece with 13% each.

[8] Source: Eurostat

At the other extreme, Germany showed a 9% fall in GDP in PPP over this eight year period, Italy had a 7% fall and Austria 5%.

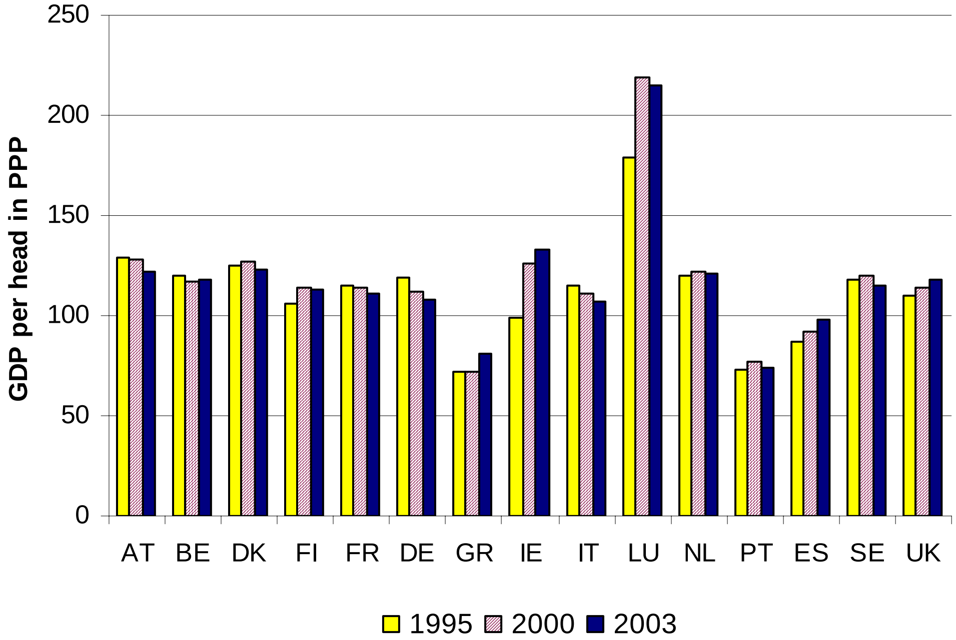

Figure 5: GDP per capita (1995-2003) in Purchasing Power Parities (EU-25=100)[9]

Figure 6 shows consumer expenditure in 2000, in euros per person. The pattern is very similar to that of GDP. The one major exception is the United Kingdom, where consumer spending is high in relation to GDP (placed second in the EU-15 in terms of expenditure but only ninth in terms of GDP). On the other hand, consumer expenditure in Ireland and the Netherlands is relatively low compared with their GDP.

[9] Source: Eurostat

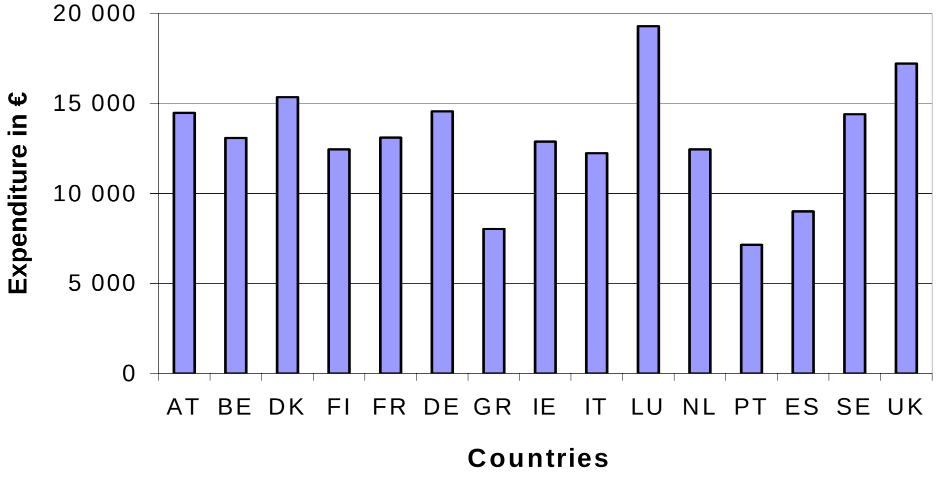

Figure 6: Consumer expenditure per capita in 2000

3.1.5 Car Ownership

Car ownership can be measured in terms of number of cars per 1000 population or in terms of percentage of households with access to a car.

Cars per 1000 people at national level is available from Eurostat, as is data on households with access to a car. However this is at national level only. Regional data is available for most countries but this does not distinguish between urban and non-urban areas.

Car ownership for 1980, 1990, 2000 and 2002 by country as well as the percentages of households with access to a car nationwide in 1994, are shown in Figures 7 and 8.

Since 1990, the highest levels of car ownership have been in Luxembourg and Italy, followed by Germany. The lowest levels have traditionally been in Greece and Portugal, although both have seen rapid increases in car ownership over the past few decades and Portugal has overtaken Denmark in terms of cars per 1000 inhabitants. Ireland and Spain also saw significant increases in the 1990s. Growth in car ownership since 1990 has been slowest in the three Nordic countries, and although care must be taken when interpreting small changes between 2000 and 2002, it appears that it has stabilised in most other countries as well (with even a slight fall in the rate of car ownership in Austria, which is matched by a fall in the stock of passenger cars).

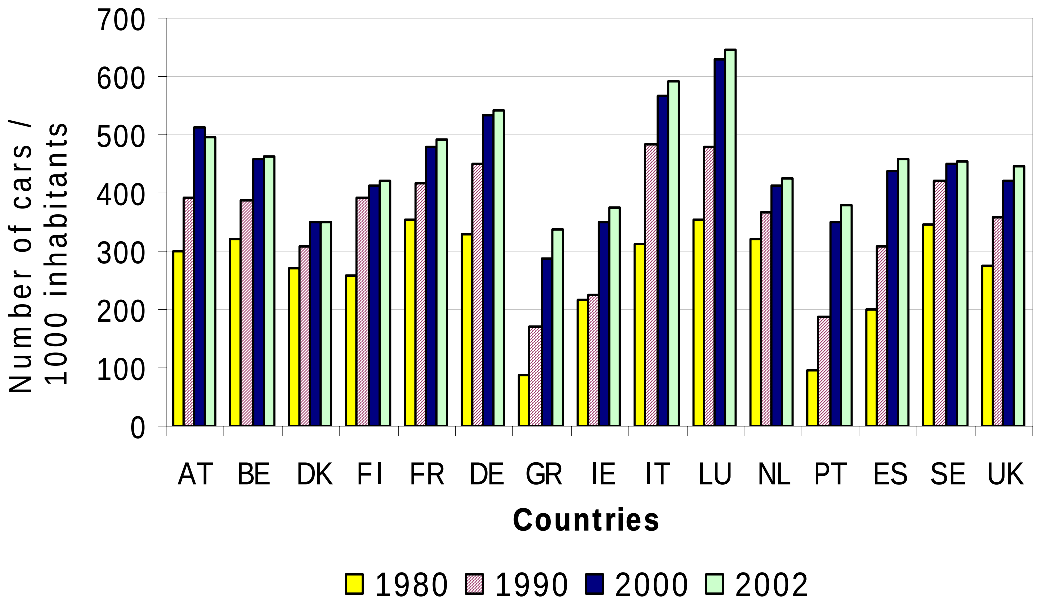

Figure 7: Number of private cars per 1000 inhabitants[10]

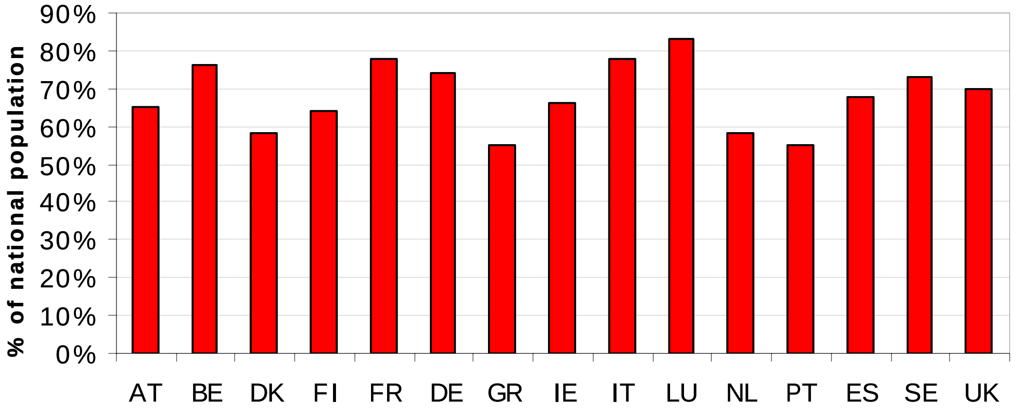

Figure 8: Percentage of households with access to a car in 1994[11]

10 Source: European Commission, DG-TREN

11 Source: European Commission, DG-TREN/Eurostat

3.1.6 Car Fuel Costs

Fuel costs are calculated using the following three data elements:

- Average national cost of a litre of standard unleaded petrol
- Average national cost of a litre of diesel
- Ratio of petrol to diesel cars

An average fuel cost per litre for cars was then calculated by weighting the petrol and diesel prices by the percentage of each type of car in circulation.

This data is then used to calculate average fuel costs for certain lengths of urban journeys (intermediate outcome indicators), using an average urban car fuel consumption rate of 8 litres/100km for 2004. It is assumed that fuel consumption reduces by 0.1 l/100km per year, to take account of increased fuel efficiency of cars (e.g. 8.4 litres/100km in 2000, 9.4 litres/100km in 1990, 10.4 litres/100km in 1980).

While this figure may be rather high[12], it has been inflated to reflect higher than average consumption in urban motoring, as well as the fact that an urban car trip of a certain crow-fly distance is often considerably more in vehicle mileage terms due to traffic management systems and distance travelled in many cases searching for a parking space.

It should be remembered that fuel costs for short trips are low in any case and the aim is to compare costs in each country. Therefore it is reasonable to use such a broad-brush assumption regarding fuel consumption in this case, as searching for or calculating a more “scientifically accurate” figure would not make any real difference in the cross-country comparison of costs of urban trips by car.

Petrol and diesel prices are available for all EU-15 from Eurostat from 1991 onwards. The ratio of petrol to diesel cars is only available for certain years, so estimates will be made in order to achieve an average fuel cost for other years.

The two following graphs show the fuel (petrol and diesel) prices per litre in 2004 and the percentages of petrol-engined cars in 2000.

12 Average global fuel consumption in 2004 for a small to medium car based on data from the UK Vehicle Certification Agency is in the order of 6.5 to 12 litres/100km for petrol cars and 4.5 to 10 litres/100 km for diesel cars.

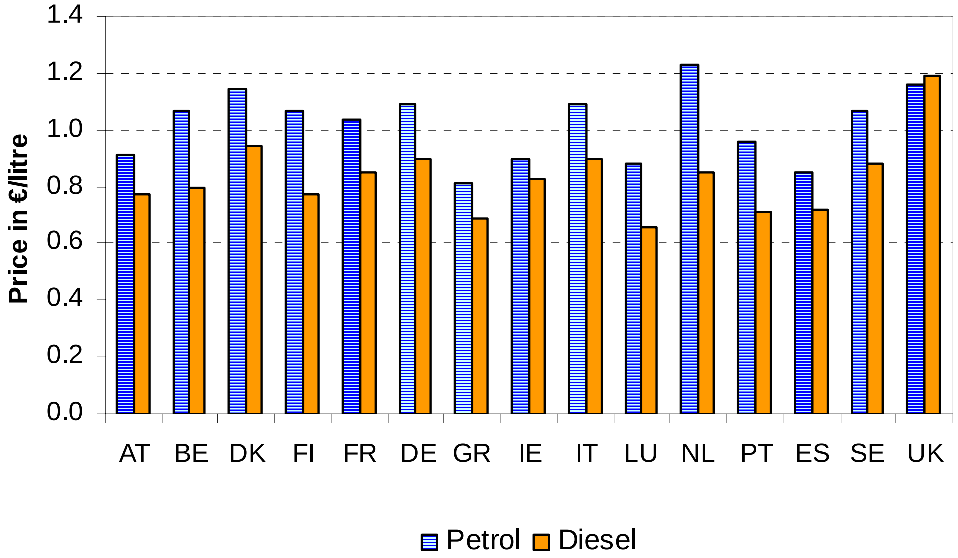

Figure 9: Petrol and diesel prices in 2004

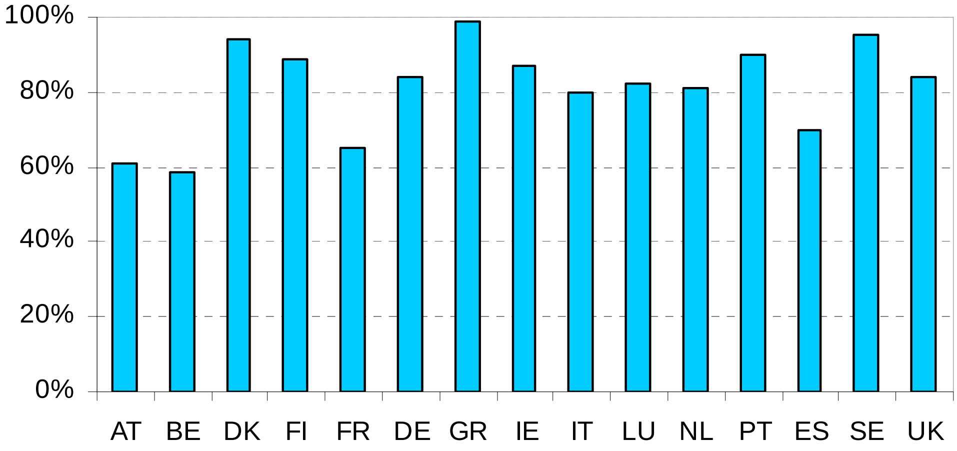

Figure 10: Percentage of petrol-engined cars in 2000

Figure 11 applies this data to obtain a composite petrol/diesel average fuel price for each country for 2000 and 2004, according to the split of petrol/diesel cars in the country in the year 2000 (later figures for petrol/diesel split are not yet available).

Average fuel prices have increased have increased in all countries except for Spain and the UK. The highest prices in 2004, at €1.16 a litre, are in the UK and the Netherlands, although in 2000, there was a €0.23 difference in the price between these two countries.

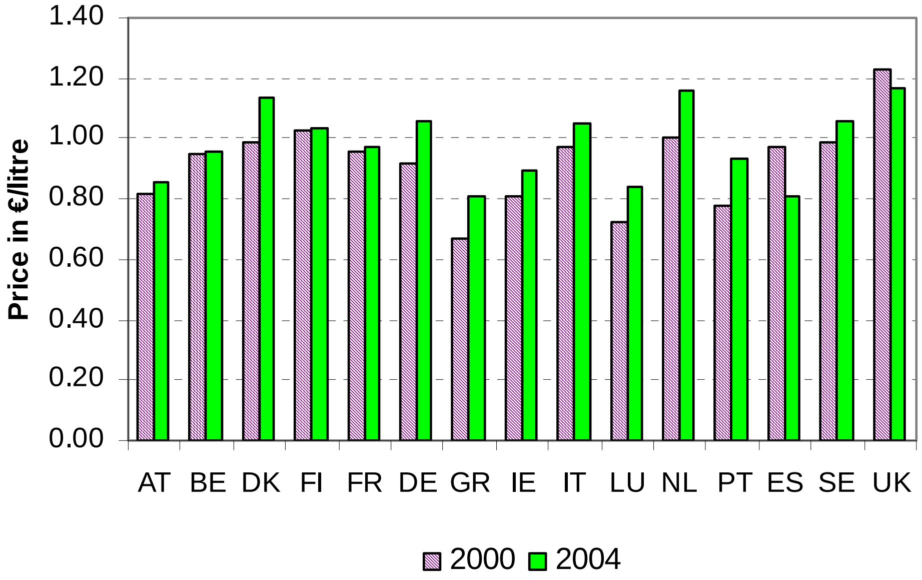

Figure 11: Composite average fuel prices

3.1.7 Car Prices

The aim was to compare average prices for a new car, including taxes.

This data has been collected for each of the EU-15 for 2004. An average price for a basic model (cheapest version available) of four popular small cars is used: Ford Fiesta, Volkswagen Golf, Renault Clio and Fiat Punto. This is to "smooth out" any anomalies due to a particular make of car being particularly cheap or expensive in a certain country compared with other makes. Prices for these models were taken from the national websites of the respective car manufacturers. The average prices for the four cars are as shown in Figure 12.

This figure also shows the percentage of tax added to the price of a new car (only available for 2002, based on a VW Golf 75, source: European Commission).

A clear link was identified between car prices and taxation, particularly in the case of Denmark, where the average price of the four cars surveyed is by far the highest in the EU-15 at €20 688, and the percentage of tax added to the price of a new car is also the highest at 164.1% (see Figure 12). Finland, the Netherlands, Ireland and Portugal also have relatively high taxation on vehicles and hence higher prices.

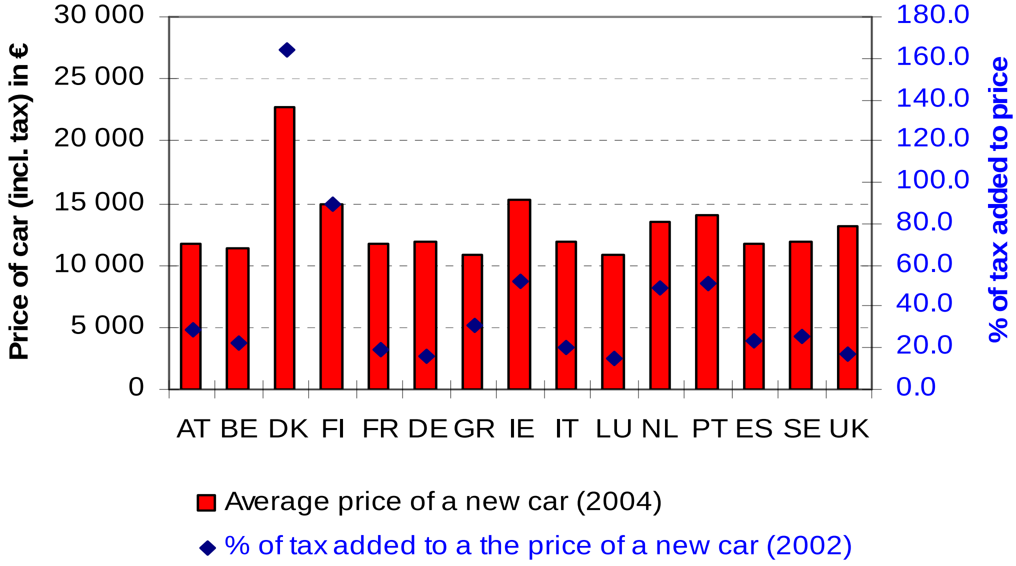

Figure 12: New car prices in 2004 and percentage of tax added[13]

3.1.8 Average Age of Cars

Data on the average age of cars for 1980, 1990 and 1998 are shown in Figure 13. Interestingly, the average age has risen in all countries. Only in Luxembourg and the UK was there a fall in the average age of cars between 1980 and 1990, however the car fleet grew older by 1998.

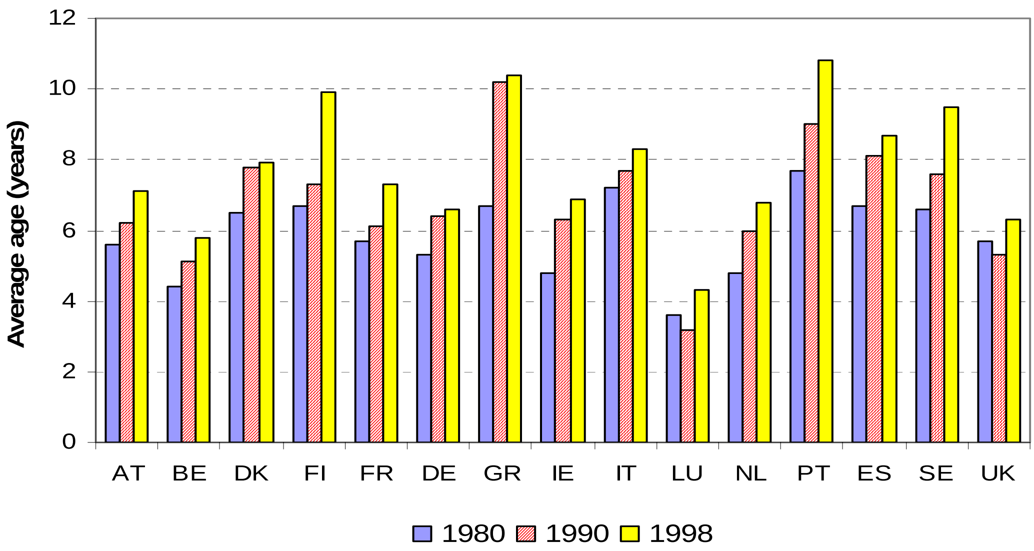

Figure 13: Average age of cars[14]

[13] Sources: Car prices: manufacturers websites or enquiries to car showrooms in each country; Percentage of tax: Eurostat

As an alternative, new car sales as a percentage of total registered cars can be used as a proxy indicator of average car age. New car sales are shown in Figure 14, which takes a three-year average of 1999, 2000 and 2001 in order to iron out any exceptionally high or low sales in a given year. The total number of registered cars in each country (available for every year) are shown for 1980, 1990 and 2000 in Figure 15. This shows a steady increase of vehicles, with the rate expected to increase despite efforts in some countries to curb car use.

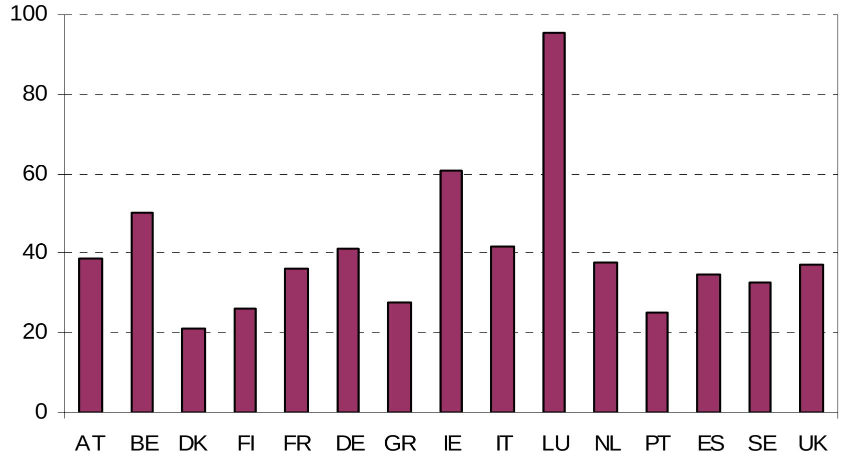

Figure 14: New car sales per 1000 inhabitants in 2000 (based on 3-year average)[15]

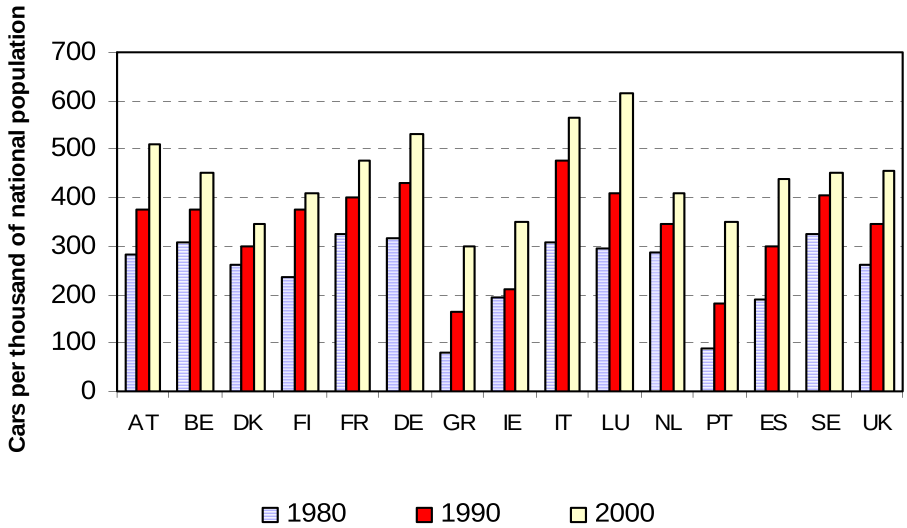

Figure 15: Number of registered cars per 1000 inhabitants[16]

14 Source: Eurostat

15 Sources: Eurostat and National Statistical Institutes

Figure 16 shows the new cars in each country in 2000 as a percentage of the total vehicle fleet in that year. Luxembourg has the highest percentage of new cars in this figure, and also the youngest fleet in Figure 13.

However, there is not such a correspondence with other countries, e.g. in Figure 13 the second youngest car fleet is in Belgium (which also has a high proportion of new cars), while the oldest are in Portugal and Greece (which are not the lowest in terms of new cars, in fact Greece is slightly above the EU average in terms of new car sales as a percentage of its fleet). This is because this proxy indicator says nothing about the age of the non-new fleet. Therefore in Figure 16, while new car sales in Ireland were high, this could hide the possibility that there might be a lot of very old cars still in use in this country.

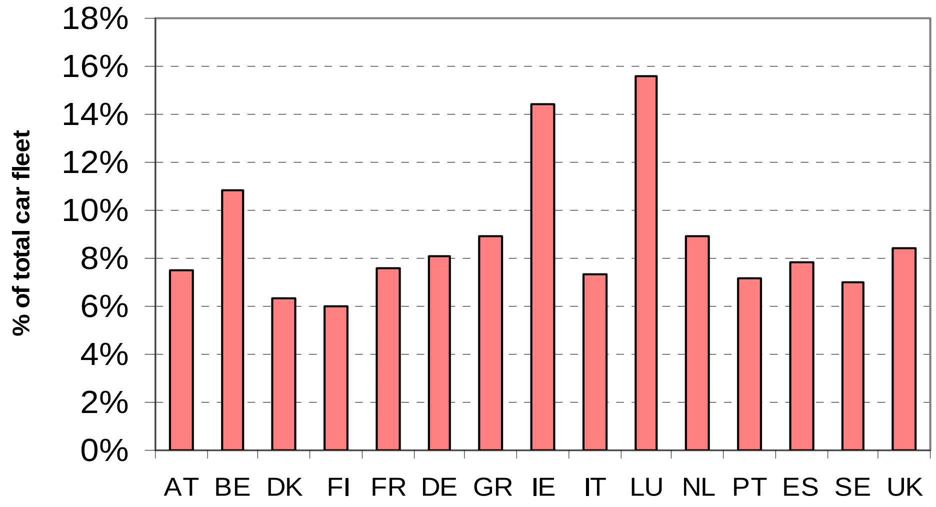

Figure 16: New cars as a percentage of total car fleet (2000)

3.2 INPUT INDICATORS

3.2.1 Overview

The following table summarises the availability and accessibility of data collected in the project relating to the input indicators. None of the indicators chosen are used at a national level with common data collection for all urban areas. This meant that data collected covers either certain cities or regions only (proxy sample data), which is either network-specific or operator-specific. This also shows that for many countries, investment and urban transport decisions for specific transport services are done mostly at the city or regional level.

[16] Source: Eurostat

Table 2: Overview of Input Indicator data availability

Indicator Name	Availability at national level for time series	Accessibility
Expenditure on transport infrastructure/ network development	No	Not easily accessible. Data is either national (including interurban and rural transport), or must be collected on a city-by-city basis. Road and public transport investment cannot often be compared as the responsible organisations often cover different areas
Expenditure on public transport service provision	No	As above
Percentage of network competitively tendered	No	Generally none. Most figures are estimated
Transport supply	No	Very difficult. Most data is by road authority or public transport operator. Figures for roads depend on the city's geography, density and historical factors. Road authorities do not distinguish between urban and other roads, but by road classification (motorway, primary, secondary, local,…)
Average age of public transport fleet	No	Sometimes available nationally (especially for rail). For urban areas, is either by operator (and not usually available in public reports, etc) or based on surveys and estimates
Integration of public transport	No	The use of such an indicator, although valuable, has not been found in any Member State. A qualitative multi-criteria analysis has been used, which is subjective (as based on individual experts providing a score)
Parking prices	No	Current prices easily available on a car park by car park basis, but not nationally, or even within a given city. Samples are taken from central car parks in main cities.

3.2.2 Investment

Two indicators related to investment were used. These are:

- Expenditure on Transport Infrastructure / Network Development
- Expenditure on Public Transport Service Provision.

3.2.2.1 Expenditure on Transport Infrastructure / Network Development

This indicator is designed to measure investment in transport infrastructure and network development in urban areas. This comprises construction and maintenance of roads, car parks, pedestrian and cycle facilities, urban railways, and local public transport infrastructure (tramways, dedicated busways, bus and tram stations/stops, interchanges, etc). Expenditure on public transport operations is not included (this is part of the following indicator, covering public transport service provision).

The aim was to divide this into public and private expenditure where possible, however almost no data could be found on private investments in urban transport infrastructure.

This data is not available at national level for urban areas for any country. It is available at individual city level in some cases, although what the figures include differs considerably and makes comparison difficult or impossible.

Investment data for roads and railways are generally national (or regional) and thus a large proportion will be non-urban. Furthermore, investment in rail in urban areas often fulfils a national role as well as an urban one (e.g. stations and tracks shared by suburban and long-distance rail services), so in most cases, “urban rail” infrastructure costs cannot be calculated.

Data on spending on pedestrian and cycle facilities is very rarely available and difficult to obtain: this sub-category has therefore been dropped. As an indication, data which was collected includes Graz (Austria), where an estimate of €600 000 was provided for this type of investment per year between 2000 and 2004, equating to €2.61 per inhabitant of the urban area.

Examples of data available are given in Table 3. Data is given as a per-capita figure, based on the population of the urban area in question, or the national population in case of statistics being only at national level. However, in some cases the public transport authority or operator’s area does not correspond exactly with the metropolitan authority. Clearly urban public transport is also used by people not resident in the metropolitan area (particularly commuters), and this can distort figures, especially for urban areas which have a large catchment area.

Note that investment statistics per head of population for urban/suburban rail should be treated with caution because such networks generally extend beyond the boundary of the metropolitan area. However as rail serves certain corridors only and not the whole wider region, dividing investment by the regional population is inappropriate. For this reason, total costs are given (in Tables 3 and 4), and the per capita figure is only indicative.

Table 3: Expenditure on transport infrastructure or network development (per head of population of country, region or city mentioned)

Country	Roads (construction and maintenance)	Local public transport infrastructure (construction and maintenance)
AT[17]	National investment in roads in 2000 (including non-urban) per head of national population: €442 (including asset depreciation), of which 47% is for motorways, expressways and national roads (Bundesstraße) and 53% for regional and municipal roads. Expenditure for maintenance only (in 2000) is €68 per head of national population, of which 45% is for motorways, expressways and national roads and 55% for regional and municipal roads.	Vienna region (2002): €186
FI[18]	3-year average (2000-2002) of €170 per head of national population for Finnra roads (urban and non-urban, except municipal streets)	
FR[19]		4 year annual average investment in local PT works (1998-2001, excluding suburban rail) per inhabitant for selected large urban areas: Lyon: €142.58; Marseille: €8.19; Nantes: €4.76; Strasbourg: €18.95; Toulouse: €59.56 Medium urban areas: Chambéry: €0.56; Clermont Ferrand: €9.43; Metz: €1.82; Mulhouse: €0.57; Quimper: €0.85; Rouen: €82.60
DE[20]	Estimate of between €65 and €75 per head of urban population for urban roads (based on nation-wide spending of €113 per head on all roads)	Estimate of between €30 and €40 per head of urban population for urban/suburban railways: this is based on about 50% of total national rail investment being for urban/suburban (i.e. national urban estimate of €1677 billion in 1991, €2354.5 bn in 1995 and €2229 bn in 2000)

17 Source: BMVIT/Büro Herry: Verkehr in Zahlen, Wien, October 2002

18 Source: Tiehallinto/Finnra (National Road Administration)

19 Source: GART (Association of local transport authorities) and CERTU (Government transport and urban study centre)

20 Source: BMVBW (German Federal Ministry of Transport, Building and Housing)

Country	Roads (construction and maintenance)	Local public transport infrastructure (construction and maintenance)
GR[21]	Annual average for Athens (from 2001 to 2004): €30.82 per head	Annual average for Athens for all modes (including vehicle purchase, which is not given separately): €10.8 million (€3.14 per person) in 1990 €134.2 million (€38.55 per person) in 2000 €115 million (€33.04 per person) in 2003. Note that in Athens investment rose very significantly since the end of the 1990s due to preparation for the Olympic Games.
IE[22]	Annual average for Dublin City Council (from 2000 to 2003): €84.89 per head Annual average for Galway City Council (from 2000 to 2003): €113.64 per head Waterford City (2000 only): €168.89 per head	Suburban rail enhancement programme in Dublin area: €176.2 million over 3 years = average annual spending of €56 per head of Dublin County population (however rail network extends beyond County Dublin and only serves limited corridors).
IT[23]	Expenditure per head in urban areas (expenditure by municipalities only with over 10 000 inhabitants): €48.29 in 1991 €30.76 in 1995 €50.26 in 1997 €32.18 in 1999 €42.41 in 2000.	€11 per head in urban areas (2000).
NL[24]	National investment in roads (including non-urban) per head of national population: €88.72 (1990-1992 annual average) €103.32 (2002-2004 annual average)	€32.10 per head for local public transport nationwide (not just urban), excluding rail (average annual for 2002-2004)
PT[25]	National investment in roads (including non-urban) (2000): €56.51 per head of national population	National investment in suburban railway infrastructure and maintenance (2003): €53.03 per head of urban population

[21] Sources: Financial tables for EP-OALAA (Operational Programme: Road Axes, Ports, Urban Development) and OASA (Athens Urban Transport Organization) annual report (metro & urban railway)

[22] Sources: Dublin, Galway and Waterford City Councils and Iarnród Éireann (Irish Rail)

[23] Source: Conto nazionale dei trasporti. Figures given are total expenditure by all Italian municipalities for traffic and viability, factored down as follows: Reduced by 47% (total mobility expenditure by municipalities which is spent on urban roads) and by 69% (total municipality expenditure which applies to municipalities with a population of over 10 000).

[24] Source: Central Bureau of Statistics (CBS), Netherlands and RAI/BOVAG

[25] Source: IEP (Instituto de Estradas de Portugal), JAE (Junta Autónoma de Estradas)

Country	Roads (construction and maintenance)	Local public transport infrastructure (construction and maintenance)
ES[26]		Madrid: annual average (for metro extension only) (1995-99): €303 million, or €8 per inhabitant (for region), or €9 per inh. for the city and suburbs (extent of the metro network).
SE[27]	National investment in roads (including non-urban) (2000): €134 per head of population	€54 per head in Stockholm (2000) €13 per head in Gothenburg region (Västra Götaland) (2000)
UK[28]	National spending by all English local authorities (including non-urban but not trunk roads and motorways) per head of population in England: €74.61 in 2001; €67.84 in 2002 Expenditure by authorities in Greater London per head: €118.93 in 2001; €87.25 in 2002 Expenditure in Edinburgh (by city council only) per head of city population: €47 (average for 2000-2002)	Strathclyde: €151 million (annual average for 2000-2002), or €72 per head of urban population

Figures 17 and 18 summarise the road investment data and public transport investment data as far as possible, although these should be read in conjunction with the table above as the comparisons are generally not consistent.

26 Source: Consorcio Transportes de Madrid

27 Source: Vägverket (Swedish Road Administration) and SIKA (Swedish Institute for Transport and Communications Analysis)

28 Sources: UK Commission for Integrated Transport (CfIT), UK Office of the Deputy Prime Minister (ODPM), Edinburgh City Council and Strathclyde Passenger Transport Executive

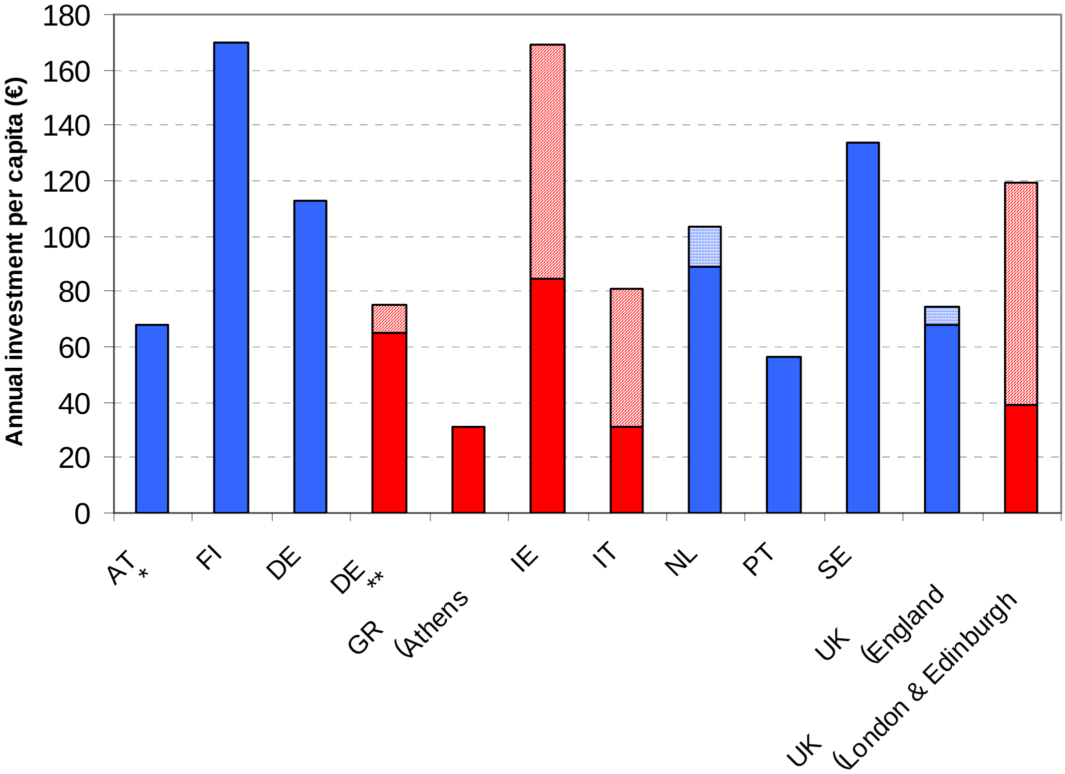

Figure 17: Expenditure on road transport infrastructure (construction and maintenance)[29]

Key:

* - maintenance costs only

** - estimate

National expenditure on roads (urban and non-urban)

Expenditure on urban roads

Difference between lowest and highest (in cases where there are different figures for different years or cities)

[29] Sources and explanations: see Table 3 (for various years, around 2000)

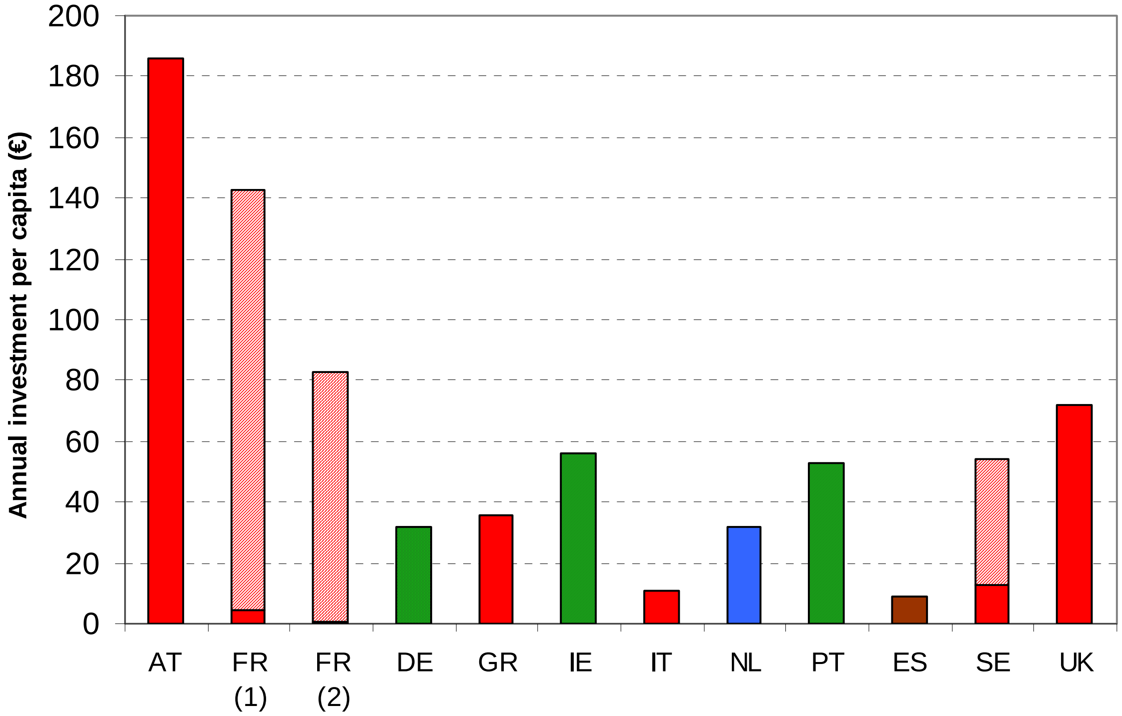

Figure 18: Expenditure on public transport infrastructure[30]

Key:

* Lyon, Marseille, Toulouse, Strasbourg, Nantes. Average for 4 years (1998-2001)

** estimate

National expenditure on PT infrastructure (urban and non-urban)

Expenditure on urban PT infrastructure

Metro only (ES)

Suburban rail only (DE, IE, PT)

Metro and suburban rail only (GR)

Difference between lowest and highest (in cases where there are different figures for different years or cities)

Notes to Figure 18:

AT: Vienna, 2002

FR (1) 4-year annual average (1998-2001) for 5 big cities: Lyon(highest), Toulouse, Strasbourg, Marseille and Nantes (lowest)

FR (2) 4-year annual average (1998-2001) for 6 medium/small cities: Rouen(highest), Clermont-Ferrand, Metz, Quimper, Mulhouse and Chambéry (lowest)

DE: national urban estimate for rail only, based on national data annual average over 3 years 1998-2000

GR: Athens, average for 2000 and 2003, including vehicle purchase

IE: Dublin area, rail only, annual average for a 3-year programme (2003-2005)

IT: Urban expenditure by municipalities of over 10 000 inhabitants (annual average for 1999 & 2000)

NL: National local public transport, 3-year annual average (2002-2004)

PT: Suburban rail only (Lisbon/Porto), 2003

ES: Madrid metro only (5-year annual average, 1995-1999)

SE: Stockholm (high) and Gothenburg (low) (2000)

UK: Strathclyde (Greater Glasgow), bus, rail and underground (3-year annual average, 2000-2002)

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30 Sources and explanations: see Table 3 (for various years, around 2000)

Notwithstanding the lack of comparability of data in the two preceding tables, even good investment data is misleading on its own: it must be seen in the light of actual investment needs. With more data, these figures could be correlated with intermediate outcomes such as network length, coverage & quality.

At a national level, Figure 19 shows infrastructure investment for all transport from 1980 to 1996. However, a significant proportion of this is on interurban infrastructure (particularly roads), and the table (from ECMT data) also includes port and airport investment. The source stated that no reliable data are available for urban transport investment. Even though each bar represents an annual average over three years, in order to smooth out annual peaks and troughs, there are nevertheless some major spatial and temporal difference. Significant growth in all transport investment is evident in Greece, Portugal, Ireland and Spain, commensurate with their economic growth over this period, whereas Austria and Belgium have seen falls from very high levels of investment in the early 1980s. As mentioned above, this needs to be seen in the context of public transport quality and needs: substantial investment in the 1980s may mean that such spending is simply not needed at present, whereas countries which invested little in the 1980s are investing to catch up. Only Luxembourg shows consistent high levels of investment.

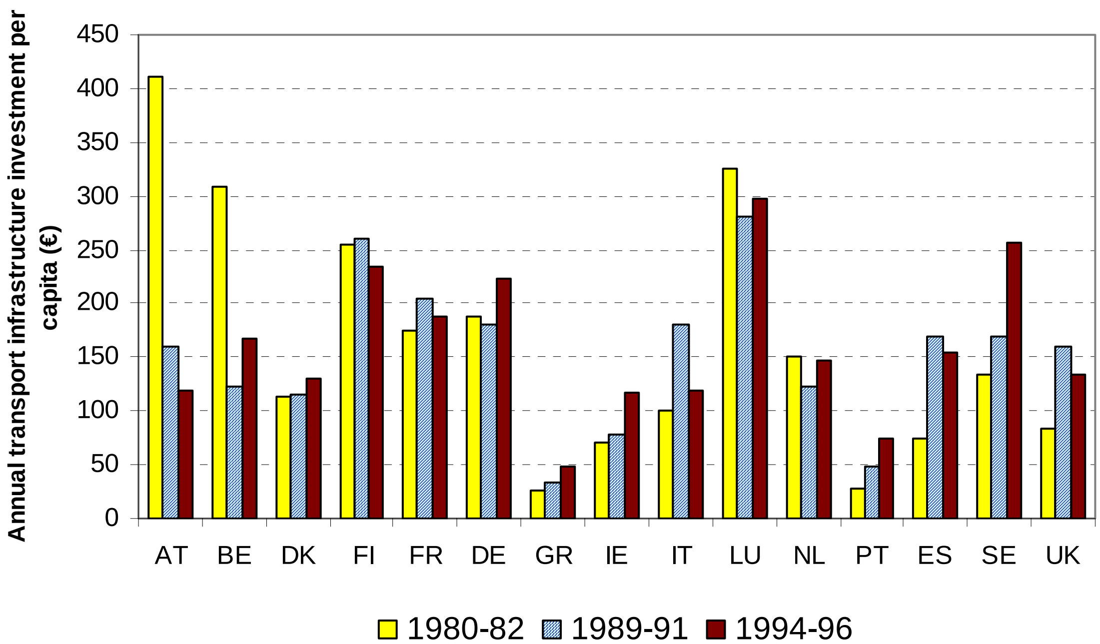

Figure 19: Annual Average National Investment in Transport Infrastructure per Capita, 1990-1995[31]

31 Source: European Environment Agency: http://themes.eea.eu.int/Sectors_and_activities/transport/indicators (taken from ECMT data)

3.2.2.2 Expenditure on Public Transport Service Provision

This indicator is designed to measure expenditure on urban public transport, excluding public transport infrastructure. It includes operational subsidies and new vehicles.

Where possible, data is given by mode (bus, tram, metro, suburban rail, etc).

Again, data is not available at national urban level for any country. It is available at individual city level in some cases, although what the figures include differ considerably and make comparison difficult. In many cases it covers urban public transport (bus, tram and metro combined), but not suburban rail, as in many countries, the subsidy for suburban rail comes from the national or regional level rather than the local city or metropolitan authority level. Note that investment statistics per head of population for urban/suburban rail should be treated with caution for the reason explained in section 3.2.2.1.

Examples of city data are given in the following table.

Table 4: Expenditure on public transport provision (per head of population of country, region or city mentioned)

	Vehicle purchase	Operating costs and subsidies
DK[32]	DSB suburban rail: average €46 per urban inhabitant in suburban rolling stock investment in 2002.	
FR[33]	4 year annual average investment in PT vehicles/rolling stock (1998-2001, excluding suburban rail) per inhabitant for selected large urban areas: Lyon: €17.09; Marseilles: €13.16; Nantes: €6.96; Toulouse: €8.35 Medium urban areas: Chambéry: €6.42; Clermont Ferrand: €11.17; Metz: €12.76; Mulhouse: €5.74; Quimper: €13.60; Rouen: €23.62	Urban public transport subsidy per head of population: Large urban areas (>300 000 inhabitants): Average €70.28 in 1997; €98.11 in 2002 Medium urban areas (100 000 to 300 000 inhabitants): Average €47.56 in 1997; €66.22 in 2002
DE[34]	Annual vehicle investment by operators within VDV (PT operators' association): €567.2m (average of 1999-2001). VDV covers most but not all urban PT operations, and the population covered by VDV operators is not known. Estimated vehicle investment per head between €8 and €11.	Annual operating costs by operators within VDV (PT operators' association): €6579.4m (average of 1999-2001), of which 32% is public subsidy. VDV covers most but not all urban PT operations, and the population covered by VDV operators is not known. Estimated operating costs per head between €80 and €100.

32 Source: DSB (Danish State Railways)

33 Source: GART (Association of local transport authorities) and CERTU (Government transport and urban study centre)

34 Source: VDV (Association of public transport operators)

	Vehicle purchase	Operating costs and subsidies
GR[35]	Investment in buses & trolleybuses in Athens €17 per head of metropolitan area population in 2003	Operating costs for all public transport (bus, trolleybus, metro and suburban rail) in Athens: €128 per head of metropolitan area population (annual average of costs from 2000 to 2003)
IE[36]	Investment in buses for Dublin: €14 per head of Dublin metropolitan (county) population in 2003	Bus operating costs for Dublin: €222 per head of Dublin metropolitan (county) population in 2002. Suburban rail operating costs €60 per person Total PT operating costs in Dublin area: €282 per year per inhabitant (2002).
IT[37]	Average investment per head for buses, trams and metro in all urban areas: €4.33 (2002)	
NL[38]	Investment in buses nationwide: €14 per head of national population (annual average of costs from 2000 to 2002)	
PT[39]	Investment in buses for Lisbon: €3 per head of Lisbon metropolitan population per year (4 year average 1998-2001). Investment in metro rolling stock in Lisbon: €12 per head (3 year average 2000-2002). Investment in suburban rail rolling stock in Lisbon: €10 per head (3 year average 1999, 2001 & 2002). Total PT vehicle investment per year in Lisbon area: €25 per head.	Bus operating costs for Lisbon: €95 per head of Lisbon metropolitan population per year Metro operating costs €77 per person (6 year average 1997-2002) Total PT operating costs in Lisbon area: €171 per year per inhabitant.
ES[40]	Madrid: annual average of €44.6m on metro rolling stock (1995-99) = €8 per inhabitant (for region), or €9 per inh. for the city and suburbs (extent of the metro network). For 1999-2003, the annual investment in metro rolling stock is €83.8m, an 88% increase.	Madrid Region: €490.3m in 2002 (operation and fare subsidies) = €90 per inhabitant, for all modes (urban bus, suburban bus, metro, suburban rail)

35 Source: OASA (Athens Urban Transport Organization)

36 Source: Bus Átha Cliath (Dublin Bus)

37 Source: ASSTRA database, average investment across operators in the following urban areas: Milan, Brescia, Rome, Turin, Bologna, Catania and Florence).

38 Source: RAI-BOVAG

39 Sources: Metro de Lisboa, Carris & CP (Portuguese Railways)

40 Source: Consorcio Transportes de Madrid

	Vehicle purchase	Operating costs and subsidies
SE	Total investment in land public transport vehicles in 2000 (bus, train, metro, tram) nationwide: €62 per head	Swedish county councils subsidise PT operations by about €1.62bn per year (local public transport, nationwide), equating to €182 per head of population. Operations in Stockholm (SL) amount to €183 per head of local population
UK[41]		Greater Manchester (public subsidy to operators 2002): bus: €6.69 per head; tram: €0.46 per head, suburban rail: €42.04 per head. Total public expenditure on PT operation subsidies in Greater Manchester: €49 per head (not including concessionary fares: if these are included, total public transport subsidy rises to €73 per head). At national level (for England only), local authority expenditure on public transport (urban and non-urban) was €53.74 in 2001 and €66.79 in 2002. This includes investment, operation subsidies to bus and rail operators, strategic planning and concessionary fares. The equivalent figures for Greater London are €113.35 in 2001 and €196.86 in 2002. Total bus operating costs in Great Britain in 2002/03 were approximately €113 per head of national population, of which 62% was covered by passenger fares and the remainder by various subsidies. Central government support to local authorities for local transport in England (annual average 1999-2004) approx. €49 per head of English population (urban and rural).

Figures 20 and 21 summarise this data graphically as far as possible, although these should be read in conjunction with Table 4 above as the comparisons are not necessarily like with like.

Note that for operating costs, it is difficult to draw conclusions as to whether cities or countries are performing well or not. High operating costs and high subsidies may on the one hand indicate a high level of service and public support, but on the other hand costs and subsidies may be high due to inefficiencies.

41 Sources: GMPTE, UK Commission for Integrated Transport (CfIT) and UK Office of the Deputy Prime Minister (ODPM)

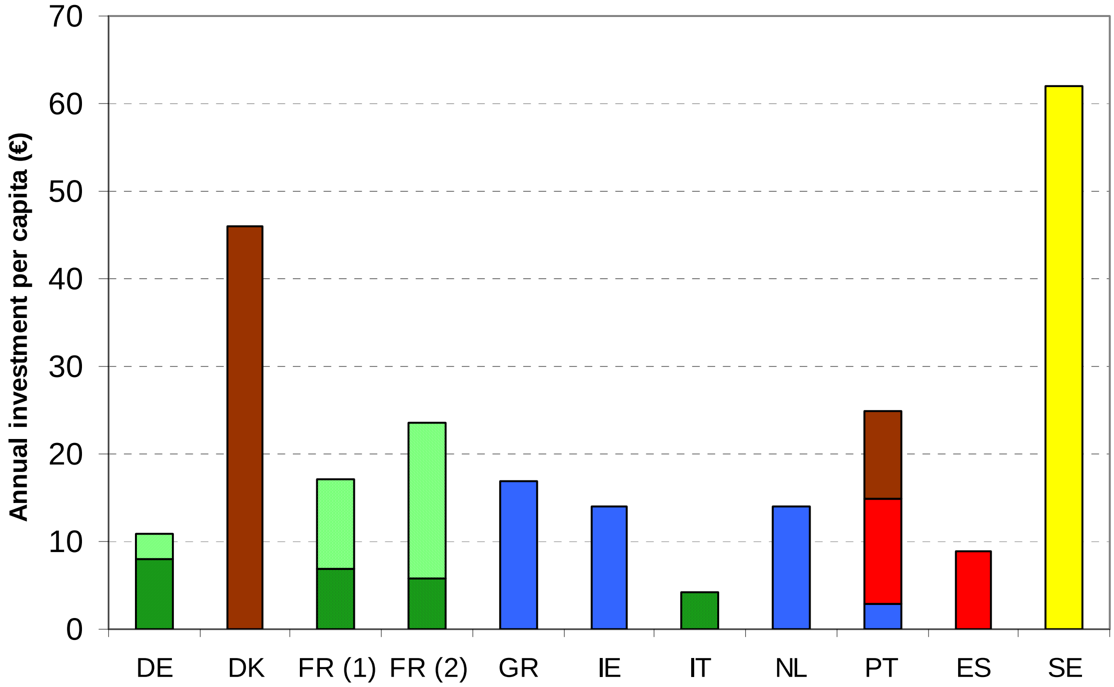

Figure 20: Expenditure on vehicle/rolling stock purchase for public transport[42]

Key:

- Bus
- Metro
- Urban/suburban trains
- All except trains
- All
- Difference between lowest and highest (in cases where there are different figures for different years or cities)

Notes to Figure 20:

DE: Operators within the VDV association only (national estimate based on VDV data), annual average 1999-2001

DK: DSB suburban rail stock, 2002

FR (1) 4-year annual average (1998-2001) for 4 big cities: Lyon(highest), Marseille, Toulouse and Nantes (lowest)

FR (2) 4-year annual average (1998-2001) for 6 medium/small cities: Rouen(highest), Quimper, Metz, Clermont-Ferrand, Chambéry and Mulhouse (lowest)

GR: Athens, buses & trolleybuses only, 2003

IE: Dublin area, buses only, 2003

IT: Urban expenditure on buses in municipalities of over 10 000 inhabitants (2002)

NL: National bus investment, 3-year annual average (2000-2002)

PT: Lisbon, 4 year average 1999-2002

ES: Madrid metro only (5-year annual average, 1995-1999)

SE: Total land public transport (urban and non-urban, including rail)

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[42] Sources and explanations: see Table 4

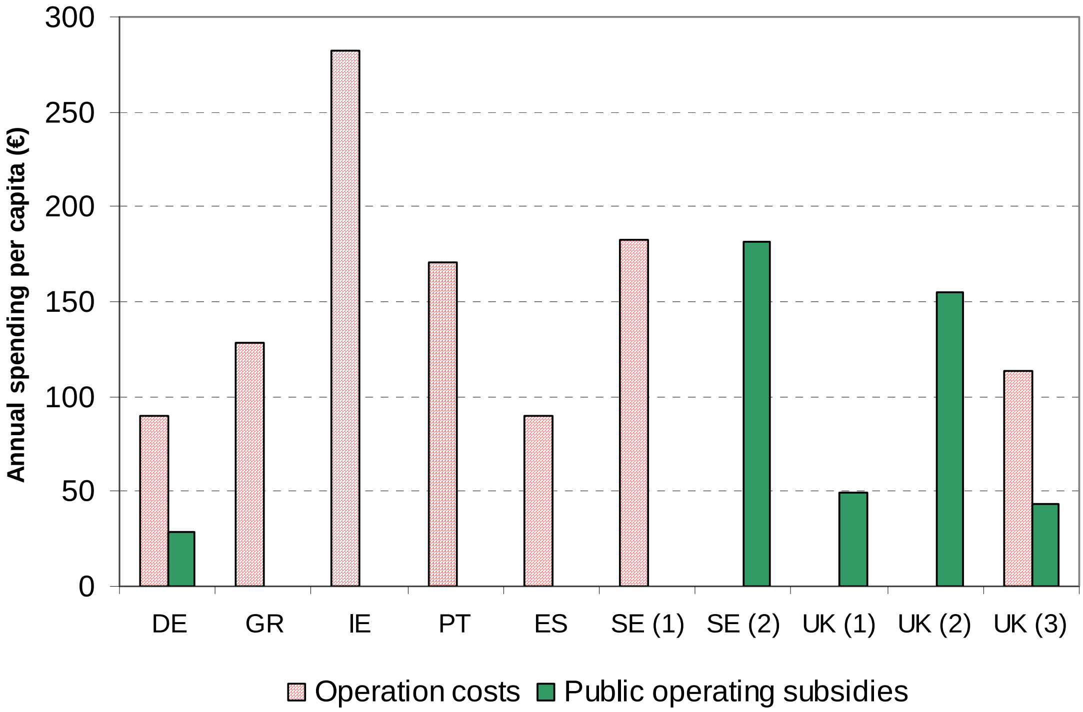

Figure 21: Operating costs of public transport[43]

Notes to Figure 21:

DE: Estimate based on operating costs for VDV association (national estimate, annual average 1999-2001)
GR: Athens, all public transport, annual average for 2000-2003
IE: Dublin area, bus and rail, 2002
PT: Lisbon, bus and metro, 6 year average 1997-2002
ES: Madrid, all public transport, 2002
SE (1): Stockholm (SL), 2003
SE (2): National subsidy for public transport from all Swedish counties (urban and rural)
UK (1): Greater Manchester (2002)
UK (2): Greater London (average of 2001 & 2002)
UK (3): National (Great Britain), for buses only, 2002-2003

Comparability is difficult as subsidies come from different sources and cover different modes. The UK examples illustrate differences within a single country, where subsidy levels for public transport are far higher in London than for other urban areas.

Data on revenue support for local bus services are available for some countries. The following examples illustrate the percentage of bus operating costs accounted for by subsidies and grants in 1998[44]:

- Austria and Belgium: 65-70% of bus operating costs;
- The Netherlands: 60%

43 Sources and explanations: see Table 4

44 Source: Jane's Urban Transport Systems 1999-2000

- Denmark and France: 48%
- Greece and Sweden: 45%
- Germany: 41%
- Spain: 33%
- UK: 19% (Although according to the UK Department of Transport, public support for bus services, including concessionary fare reimbursement, was 31% of operating costs in 1998 and 38% in 2003. Excluding concessionary fare reimbursement, the figures were 17% and 27% respectively).

3.2.3 Percentage of Network Competitively Tendered

The aim was to investigate the percentage of vehicle-km (or route-km) operated by buses, trams, metro and trains either by public operators with no tendering process, by operators (either public or private) following a competitive bid to run services on behalf of the transport authority, and commercially by private operators at their own risk (without any tender or public subsidy).

This data can generally only be estimated at urban level, as data (where it exists) generally covers either the whole country or individual cities. In most cases, obtaining a precise figure for this indicator would involve time-consuming extraction of data (vehicle-km, route-km) from numerous different public and private public transport operators.

Situations differ in many countries according to the city or region, in particular, some major capitals (e.g. London, Madrid and Paris) have regimes which differ from the rest of the country.

The following table summarises the situation (which is rapidly evolving in some countries).

Table 5: Public transport operation framework by country (public operation vs. competitive tendering)

Country	**Public operation** (no competitive process)	**Competitive tendering** to public or private operators	**On-the-road competition** (deregulated)	**Commentary**
AT	•			Almost all urban transport is publicly operated without any competitive tendering (although some regional services are operated privately)
BE	•			Almost all urban transport is publicly operated by regional companies (TEC, De Lijn and STIB/MIVB) and the national railways, without competitive tendering. However the regional operators subcontract certain services to private operators.
DK	o	•		Outside Copenhagen counties are responsible for organising local public transport and competitive tendering is the norm (although not obliged: some services are still operated in-house, notably in Odense and Århus). The counties outside Greater Copenhagen have a significant degree of freedom to choose how they organise public transport. In Greater Copenhagen, where there is an overall

Country	**Public operation** (no competitive process)	**Competitive tendering** to public or private operators	**On-the-road competition** (deregulated)	Commentary
				transport authority, at least 45% of public transport has to be tendered to bidders other than the traditional city operator.
FI	•	•		The 3 main cities (Helsinki region, Turku and Tampere) have public transport authorities which are responsible for either directly operating or tendering services: in the former two cities most services are tendered whereas in Tampere, most are operated by the public authority. In other cities, public transport is based on market initiative by private operators and authorisation from public authorities.
FR	o (• for rail)	•		Urban bus, tram and metro networks are put out to tender to private or mixed-economy operators with the exception of Paris/Île-de-France, where state enterprise RATP runs the service (although subcontracting private operators for some services). All rail services are publicly run without competitive tendering.
DE	•	o		About 90% of urban public transport is operated by public operators without any tendering process, although subcontracting of certain services to private operators is widespread. A major exception is Frankfurt, where competitive tendering is the norm. Urban and suburban rail services are increasingly being put out to tender.
GR	•	o		Public operation without any tender in Greater Athens (managed by the public authority OASA and operated by its four subsidiary operating companies), Thessaloniki, Rhodes and Kos. Elsewhere, operations are privately run.
IE	•	o (Dublin only, tram and some bus routes)		Almost all urban transport is publicly operated by Dublin Bus and (outside Dublin) by Bus Éireann, without any competitive tendering. However the new tram system as well as a small number of bus services in Dublin have been tendered to private operators.
IT	•	o		About 95% of urban public transport is publicly operated with no competitive process, however tendering is being introduced in terms of national and regional legislation.
LU	•			Almost all urban transport is publicly operated without any competitive tendering, although public operators subcontract certain services to private operators.
NL	•	o		About 95% of urban public transport is publicly operated without tendering, although a higher proportion of regional bus services are

Country	Public operation (no competitive process)	Competitive tendering to public or private operators	On-the-road competition (deregulated)	Commentary
				competitively tendered (and some rail services, particularly in the north of the country. All bus services must however be competitively tendered by 2009 and rail by 2017. Amsterdam, Rotterdam and The Hague have been given the option of simultaneous tendering of bus and rail services in 2012.
PT	●	o (Metro)		Almost all urban transport is publicly operated without any competitive tendering, although one metro system is tendered.
ES	●	●		Regions and autonomous communities are generally able to organise public transport as they see fit, with some opting for in-house public operation and some tendering to private or semi-public operators. There is a trend towards privatisation in some areas.
SE	o (Some bus and Göteborg tram)	● (Bus and rail)		All rail and most bus services are tendered. Metro services in Stockholm are also competitively tendered but not the tram network in Gothenburg.
UK (Great Britain)	o (Some metro services)	● (Bus and rail)	● (Bus, except London)	For buses (except in Northern Ireland – see below), competitive tendering or non-tendered services run at the operator's own risk are the norm except in Greater London (where tendering exists for bus services which are run by private companies in a regulated environment). In Great Britain (outside London) in 2003/4, almost 78% of bus services were commercially operated (with no subsidy) rather than tendered. For the six major metropolitan areas in England (outside London), this figure was even higher, at 86%. The London Underground, Glasgow Subway and Tyne and Wear Metro are publicly operated (although the track and infrastructure maintenance in London is tendered to private companies) while newer LRT systems (Manchester, Sheffield, West Midlands, Croydon and Nottingham) are tendered to private operators. All rail services are privately operated under competitively awarded franchises.
UK (Northern Ireland)	●			All bus and rail services (urban and other services) are operated by the state-owned company Translink without any tendering. However tendering to private operators on certain routes is planned, though initially not for urban services.

Key:

● - most services

o - some services

The MARETOPE project[45] identified four main groups of countries:

- Countries with a highly deregulated and privatised market (UK);
- Countries in transition towards competition by public tendering (Scandinavian countries, Netherlands, France, Italy);
- Countries with a mixed public / private regime without public tendering (Germany, Belgium, Luxembourg, Greece, Portugal, Spain);
- Countries in a decentralisation and privatisation process (Central European countries: this category does not apply to any of the countries covered in NPF-Urban Transport).

3.2.4 Transport Supply

This indicator aims to evaluate the transport supply for private road transport in terms of urban network-km per capita and high quality network-km per capita, as well as public transport supply, in terms or route-km and vehicle-km per capita.

This data is generally available only at national level, or for individual cities. Road network data is usually available by road classification, which differs in each country. As an example, in Austria there are some 107 000km of roads, of which 67% are municipal roads, 22% provincial roads and 11% national roads (including motorways). Clearly, in an urban area, all three types of roads exist and federal and provincial administrations do not designate their roads as urban or non-urban. This is the case in most other countries.

The road network and high quality road network per capita, in addition to being difficult to obtain, may not be a good input indicator of investment, transport policy, etc, as it also largely depends on historical and geographical factors (urban density, whether the city is mostly historic or modern, etc).

Public transport route and vehicle-km data are usually collected by operators and in most cases there is not a simple one conurbation, one operator system. Many cities are served by a number of bus and rail operators, among them regional or national ones whose data covers their entire operating area rather than just a specific urban area.

Table 6 provides some examples of data for this indicator:

45 EC DG-TREN project MARETOPE "Managing and Assessing Regulatory Evolution in local public Transport Operations in Europe", Deliverable D2 - (Legal, organisational and financial framework of local public transport in Europe), November 2001.

Table 6: Transport supply

Country & sample year	Total urban road network km per 1000 people	High quality urban road network km per 1000 people	Public transport route-km per 1000 people[46]	Public transport vehicle-km per capita
AT (2001)	0.16[47] (Vienna Region)	0.03 (Vienna Region)	0.44 (Vienna) 0.93 (Linz)	-
BE (2001)	-	-	3.30 (Charleroi) 0.53 (Brussels) 0.47 (Brugge)	-
DK (2001)	-	-	150.26 (Copenhagen) 5.12 (Århus) 1.18 (Aalborg)	-
FI[48] (2003)	0.1 (Helsinki city); 0.92 (average of next 5 biggest cities[49])	0.05 (Helsinki city); 0.25 (average of next 5 biggest cities)	6.19 (Helsinki) 5.82 (Turku) 1.91 (Tampere)	-
FR (2001)	-	-	1.43 (Dijon) 1.20 (Besançon) 1.14 (Lille) 0.90 (Grenoble) 0.85 (Clermont-Ferrand)	-
DE (1998)	2.37 (n)	-	10 (estimate for areas covered by VDV association (most cities))	51 (estimate for areas covered by VDV association (most cities))
IE (2004)	1.4 (average for Dublin, Cork, Galway & Waterford)	0.05 (Dublin)	-	Vehicle-km only for provincial cities
IT (2000)	4.44 (n)	-	2.88 (Ancona) 1.88 (Bari) 1.56 (Genoa) 1.35 (Florence) 1.34 (Bologna)	20.6 (n)
LU (2001)			1.77 (Luxembourg City)	
NL (1999)	4.26 (n)	-	2.15 (n) 1.44 (Utrecht) 2.50 (Heerlen) 0.82 (Den Haag) 0.92 (Rotterdam)	-

46 Source: DG-Regio Urban Audit, except for Germany (source: VDV: Association of German transport operators)

47 Source: BMVIT: Statistik Straße und Verkehr, January 2005. Figure for total road network is for national and regional roads only (Autobahns Schnellstraßen & Landesstraßen), hence this is artificially low (does not include municipal roads).

48 Source for Finland road data: Tiehallinto (Finnish National Road Administration - Finnra) only – this data covers only Finnra roads and does not include municipally-owned roads. Thus the total urban road network figures are artificially low, but the high quality road network figures are likely to be correct, as almost all high quality roads are national rather than municipal.

49 Espoo, Vantaa, Turku, Tampere and Oulu

Country & sample year	Total urban road network km per 1000 people	High quality urban road network km per 1000 people	Public transport route-km per 1000 people[46]	Public transport vehicle-km per capita
PT (2001)	-	-	6.57 (Coimbra) 4.08 (Lisbon) 1.86 (Setúbal) 1.83 (Porto)	16.0 (n)
ES (2001)	-	-	1.00 (Santander) 0.74 (Seville) 0.59 (Barcelona)	-
SE (2003)	5.4 (n)	-	-	129.8 (Stockholm) 11.9 (Gothenburg)
UK (2000)	3.13 (n) 1.4 (London)	0.24 (n)	3.09 (Belfast)	40.9 (n) 59.1 (London, bus only)

Notes:

- (n) = National average for all urban areas
- Data for Finland is for roads operated by Tiehallinto (Finnish National Road Administration) only, and does not include municipally-owned roads. Thus the total urban road network figures are artificially low, but the high quality road network figures are likely to be correct, as almost all high quality roads are national rather than municipal.

3.2.5 Average Age of Public Transport Fleet

Average ages of different types of urban public transport vehicles (buses, trams, trains, etc) are aimed at indicating service quality and passenger comfort.

This data is generally only available at a city level (or for railways, at a national level, covering all types of train service). This data can be used as a proxy, but the use of data from one or two cities can introduce bias, as levels of investment in new vehicles can vary considerably with a country. Data gathered is shown in the following table.

Table 7: Age of public transport fleet

Average age in years (in 2000)	Buses	Trams and metro rolling stock	Suburban rail stock
BE[50]	5 (Wallonia, not only urban)	-	-
DE[51] *	6.5 (Düsseldorf)	19 (Düsseldorf)	12 (estimate, Düsseldorf)
GR	10	-	-
IE[52]	4.3 (Bus Éireann, excl. Dublin but including rural and intercity buses & coaches)	-	-
IT[53]	11.4	31.3 (trams, Milan)	20.6 (all rail rolling stock)

50 Source: SWTC / TEC – Walloon Public Transport Company

51 Source: Rheinbahn Düsseldorf

52 Source: Bus Éireann

Average age in years (in 2000)	Buses	Trams and metro rolling stock	Suburban rail stock
NL[54]	7.5 (estimate)	15 (estimate)	20 (estimate)
PT[55]	12.3 (Lisbon & Porto)	-	-
ES[56]	4.5 (Madrid)	11.3 (Madrid)	-
SE[57]	7 (national)	18 (national: only networks are in Stockholm & Gothenburg)	27.2 (Stockholm & Gothenburg)
UK[58]	8.5 (England, not only urban)	-	20 (London & South East England) 16 (regional, including suburban, rural and inter-regional services other than intercity)

* Data for Germany refers to 2004.

This is shown graphically in the following figure.

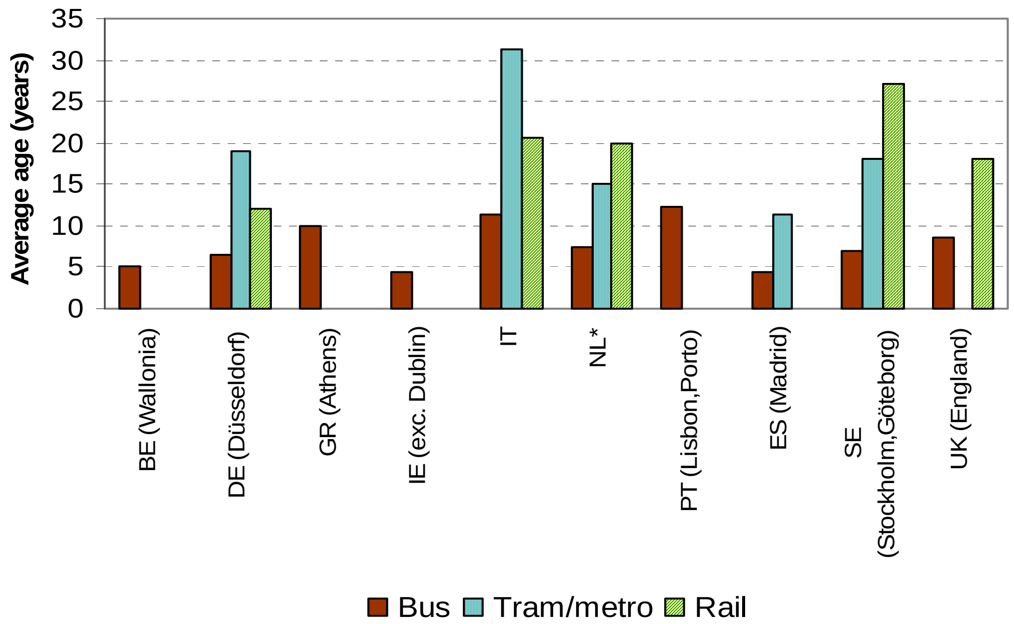

Figure 22: Age of public transport fleet

53 Sources: Conto Nazionale dei Trasporti and FS (Italian Railways)
54 Source: Estimate based on information from ROVER
55 Sources: Bus operators Carris (Lisbon) and STCP (Porto)
56 Source: CTM
57 Sources: SL and Västtraffik
58 Source: GB Department for Transport (DfT)

3.2.6 Integration of Public Transport

This is a qualitative indicator using a multi-criteria analysis:

- Integration of networks (including institutional/regulatory integration)
- Integration of information
- Integration of fares and ticketing
- "Wider integration" (e.g. integration with other modes and other policies, such as land use)

Scores are given for a number of attributes within the above four categories.

Data for this indicator is clearly subjective, based on the opinions of experts in each country, and are therefore subject to revision or national validation. Hence this can be seen as a demonstration of a possible method of measuring this indicator, as no common means of measurement is currently used.

Appendix 2 explains the precise categories for which scores were given, showing how the scores below were arrived at.

According to this scoring analysis, shown in Figure 23 below, Germany, Belgium and the Netherlands have the best institutional structures for network integration and Portugal and the UK the least. In terms of information, Germany, Belgium and the Netherlands also score well. Portugal and Ireland score least in terms of passenger information. In terms of ticketing, the Netherlands, Luxembourg, Austria and Spain are the most integrated, and Ireland, the UK, Greece and Italy the least. Overall, the Netherlands, Germany, Austria and Belgium appear to have the most integrated public transport according to this objective analysis, and Portugal, Ireland, Italy and the UK the least.

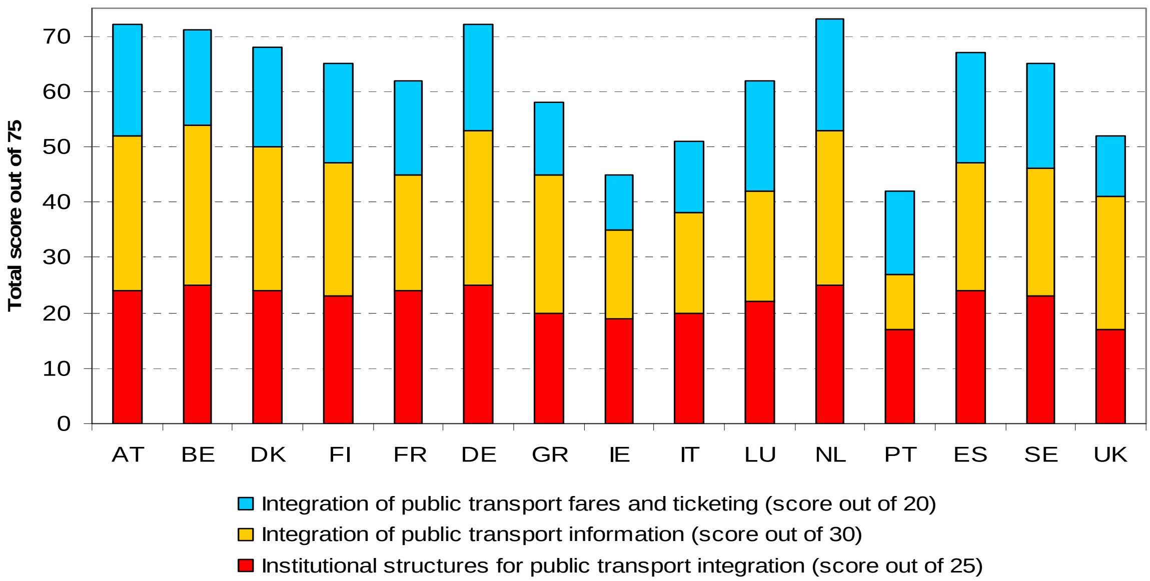

Figure 23: Integration of public transport (multi-criteria objective scoring)

In terms of "wider integration", the question: "do minimal public transport service requirements exist for new developments (such as shopping, leisure, housing, business parks)?" was asked to several national experts.

The answer was clearly "yes" in the UK and also positive to a large extent in Austria and France. On the other hand, there are relatively few standards of this kind in Portugal, Spain or Belgium. Germany and Ireland have some service requirements. Information was not found for the other countries.

3.2.7 Parking Prices

Average parking prices were found for a large city each country for the following:

- Eight hours during a weekday in the city centre;
- Two hours during a Saturday in the city centre.

This data is available for all countries, although only at individual city level. Parking costs sometimes vary considerably between cities, however for sampling purposes, only city centres of major cities (i.e. the top end of the price range) were considered. Furthermore, in some cases, a distinction for the biggest city (usually the capital) is needed, as the parking prices are higher and often not comparable to the rest of the country.

Clearly, even within the centre of some cities, parking charges can vary substantially between different car parks, so this data is indicative only.

The following table indicates the parking prices in several European cities:

Table 8: Parking prices in European cities

Country	**Cities**	**Parking costs in euro (2004)**	
		8 hours during a weekday	**2 hours during a Saturday**
AT	Vienna	23.10 to 40.00	3.30 to 16.00
	Graz, Klagenfurt, Innsbruck, Bruck, Linz and Salzburg	20.55	4.83
BE	Gent	10.00	3.50
DK	Copenhagen	10.80 to 30.70	2.70 to 6.70
	Aalborg and Århus	10.80	3.40
FI	Helsinki	24.00	8.00
FR	Paris	24.00	6.00
	Strasbourg	7.20	3.00
DE	Essen, Düsseldorf, Köln and Hamburg	14.00	3.50
GR	Athens	10.00	7.00
	Thessaloniki	9.00	4.50
IE	Dublin	11.00	4.00
	Cork and Galway	6.00	3.00
IT	Milan	12.00	3.00
LU	Luxembourg	5.60	1.40
NL	Amsterdam	19.20	6.40
PT	Lisbon	5.10	1.10
ES	Barcelona and Madrid	10.80	2.20
SE	Stockholm	6.50	2.60 to 4.40
UK	London	26.12	10.69
	Edinburgh	19.30	1.78

In 2004, Austria and the UK had the highest parking costs; especially Vienna and London, which appear to be the most expensive European cities to park in. On the contrary, the Portuguese capital has the lowest parking prices, followed by Luxembourg. Note that these are central area parking prices, therefore the prices in the most expensive cities fall considerably just outside the core city centre.

A parking pricing policy can be either as a tool to restrain car use and encourage public transport use or as a reaction to increased car use and limited parking capacities, or a combination of both. A parking policy is essentially made at the city level according to the situation at hand, or is dictated by market forces (in cities where a significant part of the parking supply is in privately-owned car parks).

Figure 24 shows parking prices for 8 hours on a weekday for a sample of these cities grouped by size. It shows that the population of a city does not significantly affect the parking prices. Context factors such as urban density do not appear to affect car parking prices: the densest city centres in Europe are Paris and Barcelona, whereas Vienna is not particularly dense. There is no relation with car ownership either.

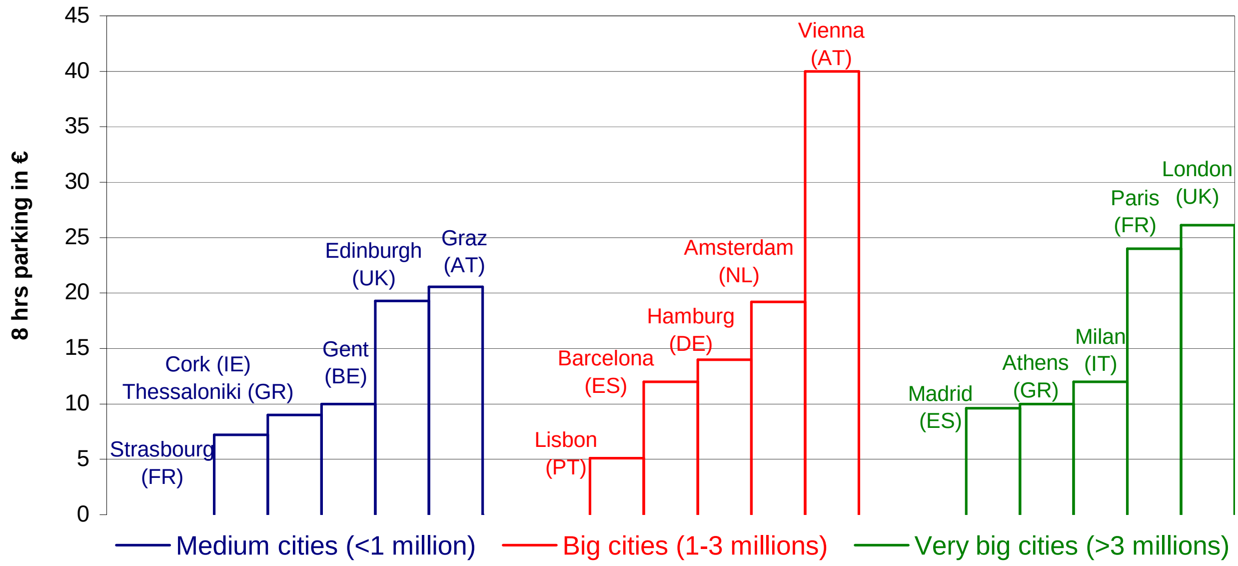

Figure 24: Parking costs in European cities (2004)

3.3 INTERMEDIATE OUTCOME INDICATORS

3.3.1 Overview

Table 9 below summarises the availability and accessibility of data relating to the intermediate outcome indicators within the project.

Table 9: Overview of Intermediate Outcome Indicator data availability

Indicator Name	Availability at national level for time series	Accessibility
Out-of-pocket urban travel costs	Only for individual urban areas, based on periodic surveys	Public transport fares available on a city-by-city basis from local transport websites for most cities. Car travel costs (fuel and parking) come from other indicators
Passenger-km by mode	Yes but not for urban data; only nation-wide	Easily available only on a nationwide basis. Sometimes available on a regional or city basis, but not for all urban areas.
Number of trips made by mode	No	Has been found only for a few countries, at nationwide level (urban and non-urban).
Traffic speeds	No	Limited access to data, on a city-by-city basis only, usually only for major cities.

An integral part of the urban transport policy performance is to assess the degree of how outcome indicators, either intermediate or end, are related to the delivery aspects of input indicators. As seen in the previous section, input indicators are done at the city level, it was thus difficult to relate inputs to outcome indicators at the national level.

3.3.2 Cost of Transport Use

This indicator looks at two trip lengths into a major city centre, by car and by public transport:

- an urban return journey of 5km each way; and
- a return journey from the suburbs to the city centre of 15km each way.

For each one, a peak hour commuting journey is first analysed (Sub-chapter 3.3.2.1), in which the traveller spends eight hours in the city (reflecting a typical working day). In the case of public transport use, it is assumed that the user has a season ticket. Secondly (in Sub-chapter 3.3.2.2), costs to the user for a one-off off-peak trip are analysed, for a shopping/leisure trip on a Saturday, spending two hours in the city centre. In this case, for public transport users, it is assumed that the user does not have a season ticket and single tickets (or an off-peak return ticket if available) are used. This explains why in several cases the off-peak trip appears to cost more than the peak hour trip.

The aim is to compare the prices for these two journeys by car and by public transport.

Costs by car are shown in two forms:

- Fuel costs (taken from the context indicator described in Sub-chapter 3.1.6) and any urban tolls that may exist (at present this only applies to the London Congestion Charge

– tolled infrastructure in other cities exists, but this is mainly on arterial routes and can usually be avoided by making a different route choice, whereas the London charge is compulsory for all entering the city).

- As above, with the addition parking charges in the city centre (taken from the input indicator data described in Sub-chapter 3.2.7), for eight hours (peak) or two hours (off-peak).

3.3.2.1 Peak Out-of-pocket Urban Travel Costs

Costs by public transport assume the use of a monthly season ticket with the daily cost assumed to be 1/20th of the monthly cost. If a monthly ticket is not available, the price of a weekly ticket is used, with daily cost assumed to be 1/5th of the weekly ticket price.

By public transport, the shorter (5km) journey assumes using just one mode (bus, tram or metro), covering the least number of zones possible (where fares are arranged zonally). The 15km trip assumes use of metro or suburban rail plus a connecting journey in the city centre by bus or tram. Therefore, where multimodal or multi-operator tickets are available, these are assumed to be used for this journey.

This data is available for all countries, although only at individual city level. In some countries, parking costs and public transport fares vary considerably between cities. Samples were taken from a few representative cities per country and they are presented in the following table.

Table 10: Peak out of pocket urban travel costs in 2004 in euro

	Cities	**5km each way**			**15km each way**		
		by car		**by PT (season ticket)**	**by car**		**by PT (season ticket)**
		Including parking	Not including parking		Including parking	Not including parking	
AT	Graz, Salzburg, Innsbruck	21.47	0.68	1.38	22.28	1.54	1.53
	Vienna	40.62	0.68	2.25	41.73	1.54	2.25
BE	average	10.64	0.77	1.40	11.79	1.73	2.35
DK	Copenhagen	11.54 to 38.30	0.91	1.94	12.90 to 39.66	2.04	4.36
	average outside Copenhagen	11.50	0.91	1.68	12.86	2.04	3.71
FI	Helsinki	24.62	0.83	1.92	25.72	1.87	3.40
FR	Paris	24.68	0.78	2.43	25.90	1.75	3.98
	average outside Paris	7.88	0.78	1.55	9.10	1.75	2.79
DE	average	14.72	0.85	1.74	16.02	1.91	2.70
GR	Athens	10.55	0.65	0.88	11.55	1.46	1.75
	Thessaloniki	9.55	0.65	1.10	10.55	1.46	2.50
IE	Dublin	11.66	0.71	3.50	12.86	1.60	4.90
	Cork	6.66	0.71	2.30	7.86	1.60	4.70
IT	average	12.70	0.84	1.49	13.95	1.89	1.98
LU	Luxembourg	6.27	0.67	1.03	7.48	1.51	2.05
NL	Amsterdam	20.20	0.93	2.77	21.70	2.08	5.48
PT	Lisbon	5.67	0.75	0.60	6.69	1.68	2.46
ES	Barcelona and Madrid	11.38	0.65	1.75	12.41	1.46	2.50

	Cities	5km each way			15km each way		
		by car		by PT (season ticket)	by car		by PT (season ticket)
		Including parking	Not including parking		Including parking	Not including parking	
SE	Stockholm	7.20	0.85	3.25	8.48	1.91	3.25
UK	London[59]	34.50	8.37	4.82	36.21	10.08	6.78
	Edinburgh	20.25	0.93	2.67	21.96	2.10	3.45

Clearly public transport is considerably cheaper in every case, assuming that car users pay full car parking fees in the city centre. However, in reality, most do not, and many have a private parking space that is not charged at all. A project such as this cannot analyse how much car users actually pay to park in cities, as this would require very extensive surveys, so the analysis is largely meant to show the differences in full parking prices between countries and differences in public transport fares. The following figure shows the data for a 5km trip, with the car costs including parking being omitted for clarity (as these are on a different scale, from around €5 to over €40 for an eight hour day).

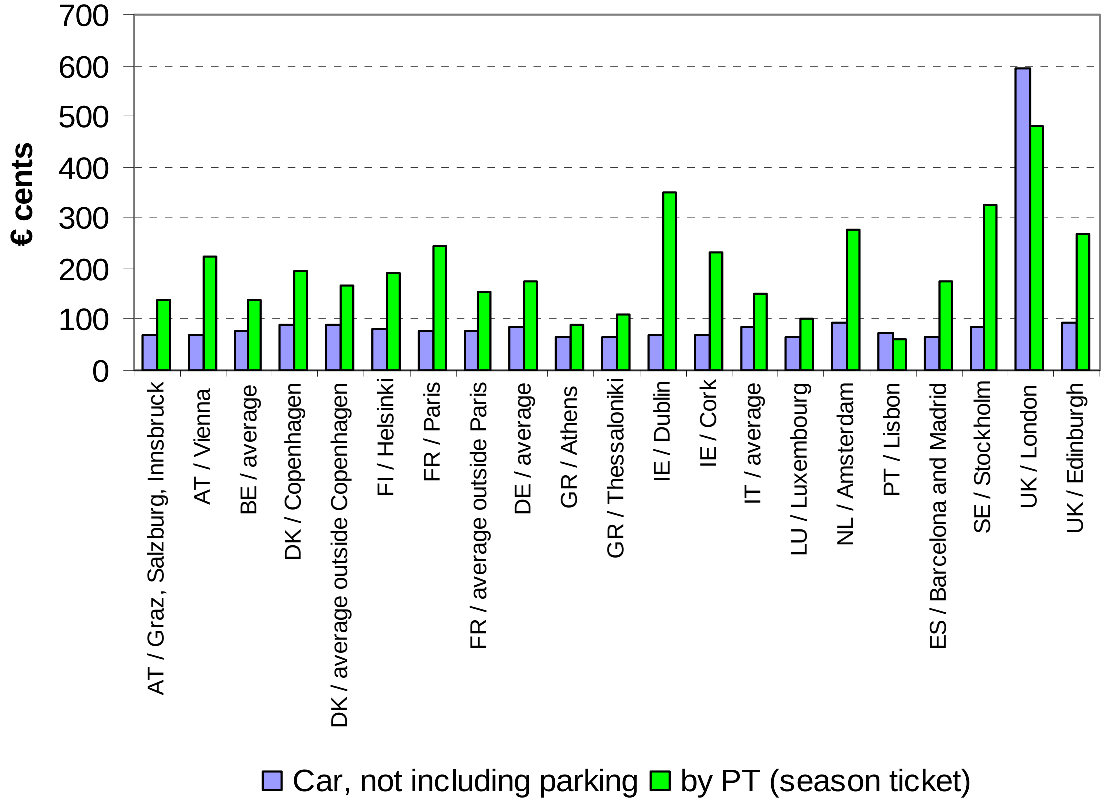

Figure 25: Peak out of pocket urban travel costs for a 5km return trip in 2004 (car, excluding parking, vs. public transport)

59 Cost by car includes £5 (€7.42) congestion charge (as at 2004).

Looking at car costs excluding parking, most are significantly less than the public transport fare, with the notable exception of London, where the Congestion Charge makes public transport cheaper (despite it being the most expensive public transport in Europe). Longer distance public transport commuting in many Austrian and Italian cities is however relatively attractive, being only marginally more expensive than car fuel costs for a 15km return trip.

The cheapest public transport is in Greece, Portugal, Luxembourg and Austria (outside Vienna), at under €1.40 for a 5km return trip. The most expensive is in London, Dublin and Stockholm (all over €3 for a 5km return trip).

For the longer (15km) journey, the cheapest public transport is in Austria (outside Vienna), Greece and Italy (all under €2 for a return trip based on a season ticket). The most expensive cities were London, Amsterdam (over €5), Ireland (Dublin and Cork) and Copenhagen (over €4).

The ratio of public transport fare to the cost of using a car (with full parking fees being paid) is also of interest: in Copenhagen, Helsinki, all Austrian cities, Athens and Paris, the cost of car use and parking is over ten times the price of a return public transport trip (5km each way). At the other end of the scale, Stockholm, Luxembourg, France (outside Paris) and Spain have the lowest ratio, with car between two and seven times more expensive than public transport.

Figure 26 shows the data for the longer 15km trip, again with car parking being excluded from the motoring costs. Again, London has the most expensive public transport fares, but taking into account the Congestion Charge, public transport into the city centre is still cheaper than by car.

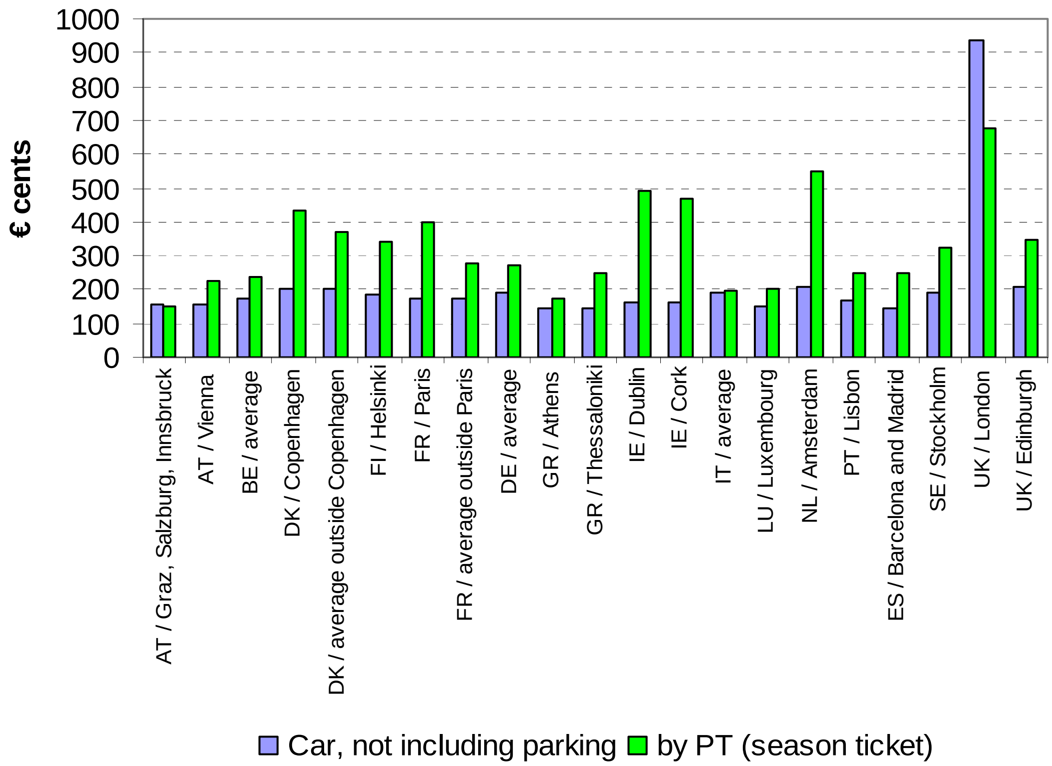

Figure 26: Peak out of pocket urban travel costs for a 15km return trip in 2004 (car, excluding parking, vs. public transport)

3.3.2.2 *Off-peak Out-of-pocket Urban Travel Costs*

This indicator is identical that above except that the trip type (again 5 and 15km return trips) is assumed to be a shopping/leisure trip on a Saturday, spending two hours in the city centre.

For the trip by car, fuel and two hours parking is assumed. By public transport, the price of a day return ticket (if available), or two singles, or a day rover type pass is used, whichever is the cheapest.

Given that single or day return fares often are more expensive than 1/20th of a season ticket, these “off-peak” public transport fares mostly appear to be more expensive than the “peak” ones: however, this analysis is based on an occasional traveller to the city centre who is faced with either paying the normal public transport fare or driving (regular commuters who have a season ticket clearly have an incentive to use public transport for their off-peak leisure journeys if their pass is valid, and in this indicator we are looking at users who do not have this incentive).

Table 11 shows the results. The columns for car costs excluding parking are not shown because, firstly the prices are equivalent to those in Table 10 (except that in London the Congestion Charge does not apply at weekends), and secondly, because occasional Saturday visitors are more likely to have to pay for parking than commuters who may have a free parking space.

The greatest price advantage for public transport over the car is in Austria (particularly Vienna), Greece, Helsinki, Copenhagen and London. For certain journeys in Sweden, the UK, Ireland, Germany and France, the fuel and parking for a car can be slightly cheaper than the public transport fare, particularly for the longer 15km trip.

Table 11: Off-peak out of pocket travel costs in 2004 in euro

	Cities	5km each way by car	5km each way by PT (return ticket)	15km each way by car	15km each way by PT (return ticket)
AT	Graz, Salzburg, Innsbruck	5.45	1.53	6.56	2.25
	Vienna	20.62	1.50	21.73	1.50
BE	Average	4.14	2.40	5.29	4.20
DK	Copenhagen	3.45 to 7.46	1.88	4.81 to 8.82	3.82
	average outside Copenhagen	4.12	1.41	5.48	1.88
FI	Helsinki	8.62	1.40	9.72	3.00
FR	Paris	6.68	2.60	7.90	7.00
	average outside Paris	3.68	1.92	4.90	6.40
DE	Average	4.22	3.60	5.52	5.95
GR	Athens	7.55	1.40	8.55	2.60
	Thessaloniki	5.05	0.90	6.05	1.50
IE	Dublin	4.66	3.00	5.86	7.00
	Cork	3.66	2.40	4.86	5.00
IT	Average	3.70	1.90	4.95	2.45
LU	Luxembourg	2.07	1.84	3.28	3.70
NL	Amsterdam	7.40	3.20	9.20	4.50
PT	Lisbon	1.67	1.30	2.69	1.65
ES	Barcelona and Madrid	2.78	2.30	3.81	4.60
SE	Stockholm	3.34 to 5.04	4.33	4.61 to 6.31	8.23
	London	11.64	3.71	13.35	7.57

	Cities	5km each way by car	5km each way by PT (return ticket)	15km each way by car	15km each way by PT (return ticket)
UK	London	11.64	3.71	13.35	7.57
	Edinburgh	2.73	2.97	4.44	5.34

3.3.3 Transport Demand

3.3.3.1 Passenger-km by Mode per Capita

This indicator looks at the number of passenger-km within or partly within urban areas, per capita, by mode of transport.

This data is available at a national level (with no distinction between urban/non-urban) from Eurostat. It does not include taxis as a mode. Therefore, only data for the tram and metro modes is useful in this respect, as this can be considered as 100% urban, whereas other modes are not.

The only country for which urban data was disaggregated was for the UK. Modal split per size of urban area is shown in Figure 27 below. The increased public transport mode share (at the top of the columns) can be seen for the larger urban areas, in particular Greater London.

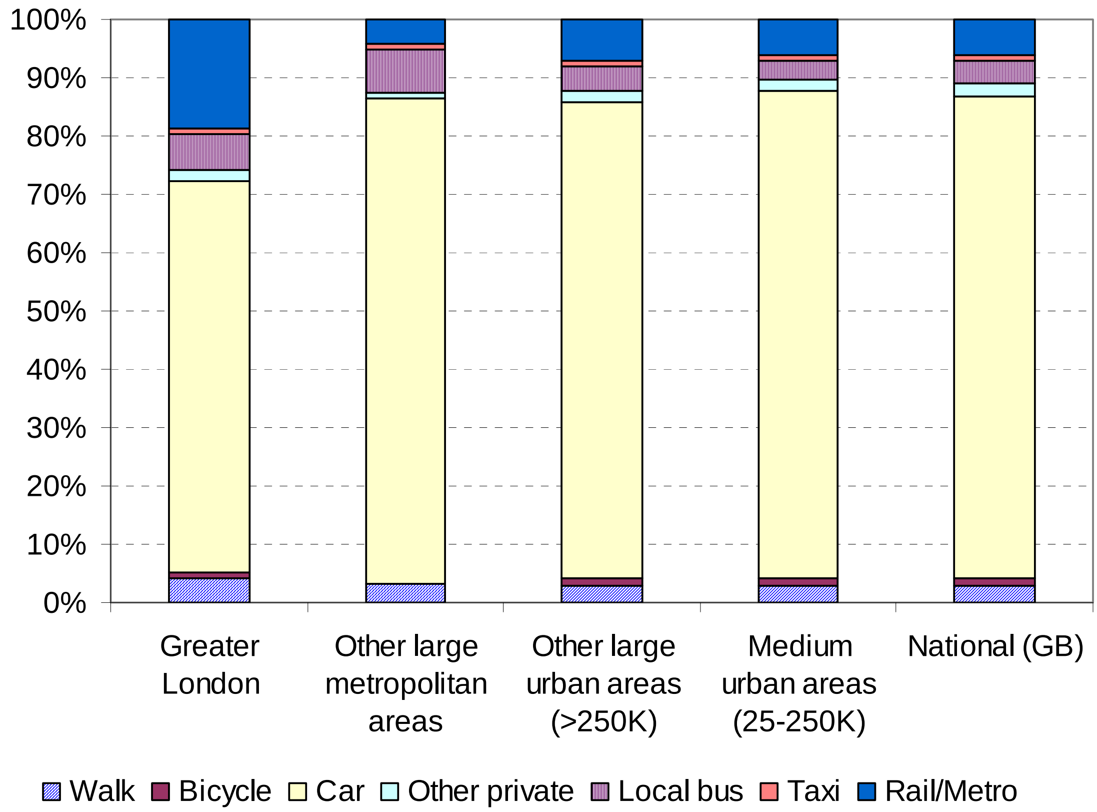

Figure 27: Modal split (percentage of distance travelled) in Great Britain, 1999/2001, by size of urban area[60]

60 Source: Department for Transport/National Statistics

Using national walking and cycling statistics, an inter-country comparison of the use of slow modes is shown in Figure 28. However, this is not necessarily representative of urban areas, as not all walking and cycling is urban (and the proportion that is not urban may differ substantially between countries).

Nevertheless, it is clear that the use of bicycles is higher in Northern Europe, especially in Denmark and the Netherlands, cycling constitutes a main mode of transport in cities. On the contrary, as far as walking is concerned, there are no major differences between the EU countries.

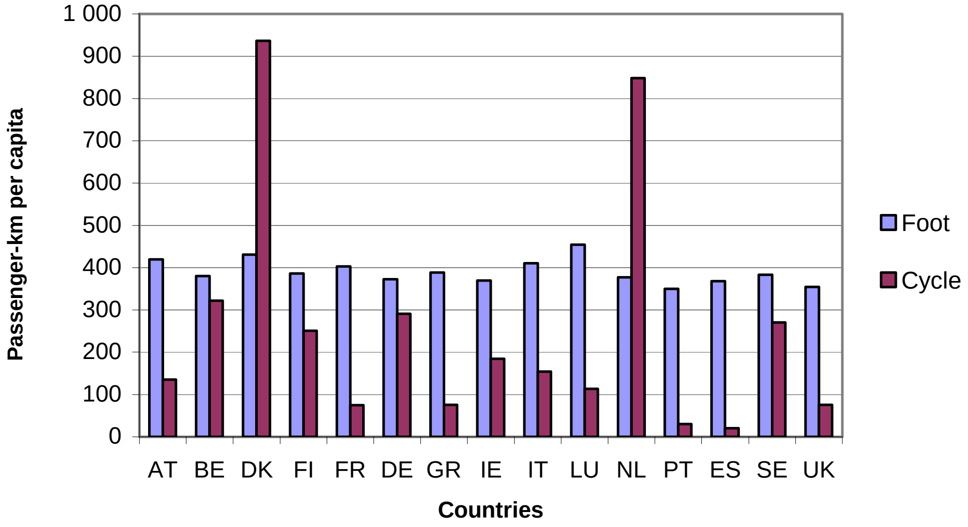

Figure 28: Person-km per capita for walking and cycling in 2000 at national level[61]

In the presence of accurate supply and demand data by mode, a useful indicator is to compare how well the current and forecasted demand for urban transport services is accommodated by the transport supply and capacities currently provided or planned. Such an indicator could be used to assess the performance of either a particular transport service or the overall transport service of a particular urban area. A demand/supply indicator is standard for public transport operators, however, an overall demand-supply analysis at an urban level is not readily available for many urban areas in Europe, requiring comprehensive data collection and analysis.

3.3.3.2 Number of Trips Made, by Mode per Capita

This indicator examines the annual number of trips within or partly within urban areas, per head of population in the urban area, by mode of transport. It is an alternative indicator to the one above on passenger-km.

Data (at least partly) is available for Germany, Netherlands and UK at national level. In general, there is a severe lack of data for this indicator at national levels. Data for the above three countries is shown in Figure 29. The high number of car trips for the UK can be seen, as well as the strong performance of cycling in the Netherlands and public transport in Germany and Spain.

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61 Source: Eurostat

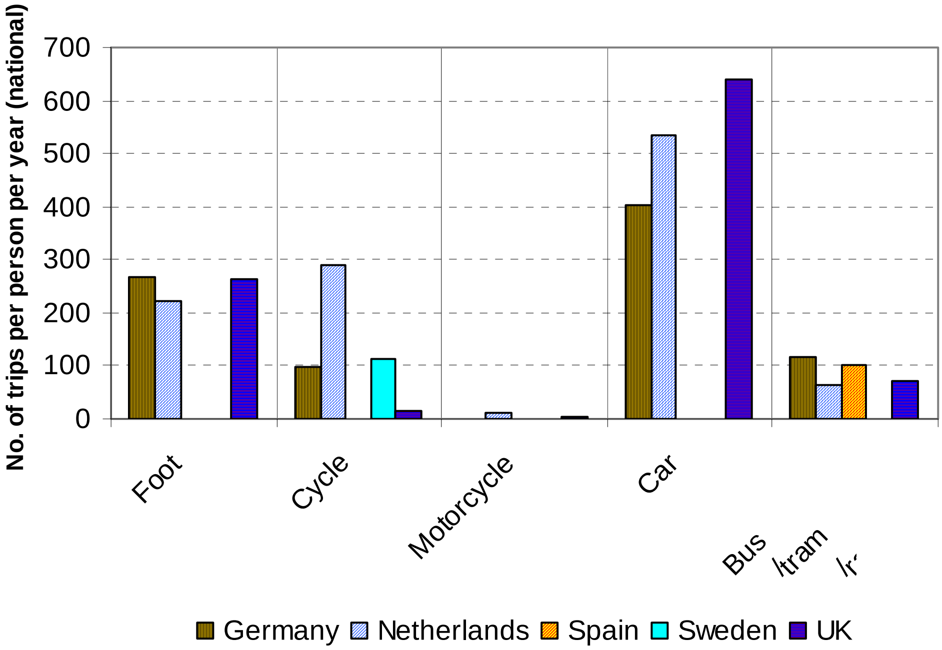

Figure 29: Number of trips by mode per capita (1999-2002)

3.3.4 Traffic Speeds

Average speed of surface public transport and average traffic speeds are the focus of this indicator. Measurements can be in city centres or in suburbs, and can take place in weekday peak periods or off-peak free-flow conditions (e.g. late evening or on Sundays).

One possible measurement is seconds per kilometre in travel time above free flow (night time) speed, which measures how severe traffic congestion at various times of the day are compared to situations without any congestion.

Limited data for average speeds is available, however this generally means calculating speeds from bus timetables. Taking such a sample would require considerable effort in terms of data collection (several bus routes in several cities) to be representative. It is not available on a time series basis.

Surprisingly, average traffic speeds are unavailable in most cases, following searches of studies, transport plans and reports of urban authorities in several countries, etc. However, a number of cities have limited data (although this risks being unrepresentative and difficult to compare).

Examples of average urban speeds (between 2000 and 2004) are:

- Greece (all traffic): city centres: 15 km/h, suburban areas: 40 km/h.
- Ireland (Dublin metropolitan area): all traffic: 18.7 km/h, buses: 14.6 km/h.
- Italy (surface public transport, Rome): 15 km/h.
- The Netherlands (The Hague):
  - city centre, peak periods: all traffic: 8 km/h, surface public transport: 18 km/h
  - city centre, evenings/Sundays: all traffic: 30 km/h; surface public transport: 20 km/h

- suburbs: all traffic: 40 km/h, surface public transport: 23 km/h.

- Portugal (surface public transport, peak periods): Lisbon: 14.4 km/h, Porto: 14.9 km/h.
- Sweden (surface public transport, Stockholm area):
  - city centre, peak periods: all traffic: 17 km/h, surface public transport: 13 km/h
  - city centre, evenings/Sundays: all traffic: 25 km/h; surface public transport: 15 km/h
  - suburbs: all traffic: 43 km/h, surface public transport: 21.5 km/h.
- UK (all traffic, London): city centre, peak periods: 15.8 km/h, suburbs: 27 km/h.

The use of speed *per se* as an indicator does not necessarily tell us whether a city is performing well or not. On the one hand, higher average speeds can be positive, indicating a low level of congestion. On the other hand, many cities implement traffic calming and reduced speed zones (e.g. 30 km/h) in order to improve safety, encourage walking and cycling, etc, therefore low speeds can also be seen as positive. What is not known is the extent to which low speeds are by design (traffic calming, enforcement, etc) or not (e.g. due to congestion). For this reason, the most appropriate indicator is perhaps the number of seconds per kilometre in travel time above free flow speed (comparing peak periods and other daytime periods with speeds as an uncongested time, e.g. at night). However, this is not available except for London.

The development of a standard unit for measuring congestion index for cities, similar to the mobility monitoring programme used in the US[62] to assess congestion conditions and trends for a large sample of urban areas, would provide a consistent and reliable measure of mobility performance in European cities.

3.4 OUTCOME INDICATORS

3.4.1 Overview

Outcome indicators describe how society is impacted by transport. Outcome indicators are the benchmarks by which transport policies and inputs are assessed in terms of impacts to the society and hence form the backbone for a performance assessment at the national and European levels. The following table summarises the availability and accessibility of data collected in the project relating to the outcome indicators.

Table 12: Overview of Outcome Indicator data availability

Indicator Name	Availability at national level for time series	Accessibility
Transport fatalities and casualties	Yes, includes also some data for urban areas, but this is generally based on the speed limit of the road rather than an urban population threshold	Good range of international comparative data from CARE, Eurostat, ECMT, etc. However inconsistencies exist between different data sets, particularly regarding injuries. Lack of a European standard for "slight" or "serious" injury makes injury data non-comparable.
Transport energy use	Limited (1990 and 2000),	Available at nationwide level only, covering long

[62] 2005 Urban Mobility Report. Texas Transportation Institute, Texas A&M University, 2005 (http://mobility.tamu.edu/ums/)

Indicator Name	Availability at national level for time series	Accessibility
	national only	distance transport, air transport, etc. Not collected at regional or city level
Transport emissions	Yes (national only) for CO_2, limited for PM_{10} and NO_X	Mostly available at global nationwide level or by mode (e.g. road, rail, without specifying urban/rural). Often based on fuel sales, so place of purchase may not necessarily be the place where the pollution is released
Transport noise	No	Very low, some samples from individual cities only.
Link between traffic growth and GDP	Only at nation-wide level	Can easily be measured at nation-wide level (including interurban travel), however this would not be an urban transport indicator. Lack of urban passenger-km data makes this measurement impossible
Personal income and share of GDP spent on local transport	Limited at national level, not available for urban areas	Available at national level, for "purchased transport" (everything from urban bus fares to airline tickets) and car running costs. Local data for public transport farebox revenue available for some urban areas, but total income for those areas not available

3.4.2 Safety

This indicator measures the annual number of persons killed, seriously or slightly injured in urban areas, by mode used by the casualty. This can be by 1000 vehicle-km, 1000 passenger-km, or 1000 population.

Most accident data covers national or regional levels and does not distinguish between urban and non-urban. Of the above modes, only tram/metro can safely be assumed to be 100% urban.

The European Commission's CARE database has data for urban areas, which covers fatalities for all the categories of users except pedestrians from 1991 to 2002. At national level, all fatalities are available in a time series basis.

Casualties for rail passengers are recorded nationally and no distinction is made whether this is on an urban/suburban network or train, or a rural/regional/intercity one. In addition, numbers are so low (in the order of 100 rail passenger deaths per year across the whole of the EU-15) that country-by-country or time series comparisons do not produce conclusive results, as a single major incident can significantly affect a country's performance. Data for urban rail is therefore not included in this analysis.

Casualties for taxi passengers are generally included in car accident data and are not separately identifiable. Similarly, sometimes buses are included in "other vehicles".

The categories used for the analysis have been slightly differentiated according to the data found; they were finally the following five: *pedestrians*, *cyclists*, *motorcyclists, car drivers/passengers*, *bus drivers/passengers* and *other* including lorries, tractors etc. However, data is not always available for all categories (for example pedestrian fatalities are not given at urban level, just national).

At national level in 1980, the highest rate of fatalities was in Portugal (303 persons killed per million inhabitants), followed by Luxembourg, Austria and France. The high Luxembourg rate can partly be explained by the fact that it receives a lot of road traffic (cross-border commuters and transit traffic) in relation to its low population. The country with the best record was Sweden (102 deaths per million population), followed by the UK and Finland.

Ten years later, in 1990, the worst country was still Portugal, indeed with a slightly increased fatality rate (304 killed per million inhabitants), followed by Spain, which saw a significant increase in death rates, as did Greece. This can partly be explained by the phenomenal growth in car ownership and distance travelled by car in these three countries over this ten year period: a 96% increase in car ownership in Portugal, 52% in Spain and 90% in Greece (compared with increases of 17, 20 and 35% for France, the UK and Germany respectively). Passenger-km by car also increased in Portugal by 40% in this period and by 76% in Greece, although only by 33% in Spain (against an EU-15 average of 40% and 52% in the UK, where fatalities fell).

The country with the best record in 1990 was still Sweden, followed by the Netherlands and the UK.

From 1990 to 2000, major reductions in the number of deaths in Portugal and Spain were achieved, though the reduction in Greece was less significant, making Greece the country with the highest number of deaths, followed by Portugal and Luxembourg. The UK overtook Sweden to be the “safest” country, with Sweden and the Netherlands close behind. These figures somewhat change when fatality rates are normalised by the level of demand.

The greatest reduction in road deaths from 1980 to 2003 was made by France, which reduced deaths by 60% from 254 to 102 deaths per million inhabitants. Major improvements were made by Germany (58% reduction), Luxembourg and Austria (57%) and the Netherlands (55%). The lowest reductions in per-capita road deaths between 1980 and 2003 were in Greece (only a 3% improvement), Spain (24%), Italy (36%) and Finland (37%).

At national level in 2003 there was a clear North-South pattern in the European league table of road deaths, with the UK, Ireland, the three Nordic countries, Germany and the Netherlands having a lower death rate than the EU-15 average (100 deaths per million inhabitants), and Belgium, Luxembourg, France, Spain, Portugal, Austria, Italy and Greece having a higher than average rate.

Possibly more relevant is the number of fatalities in terms of passenger-km by mode of transport. This relation is shown in the following figure.

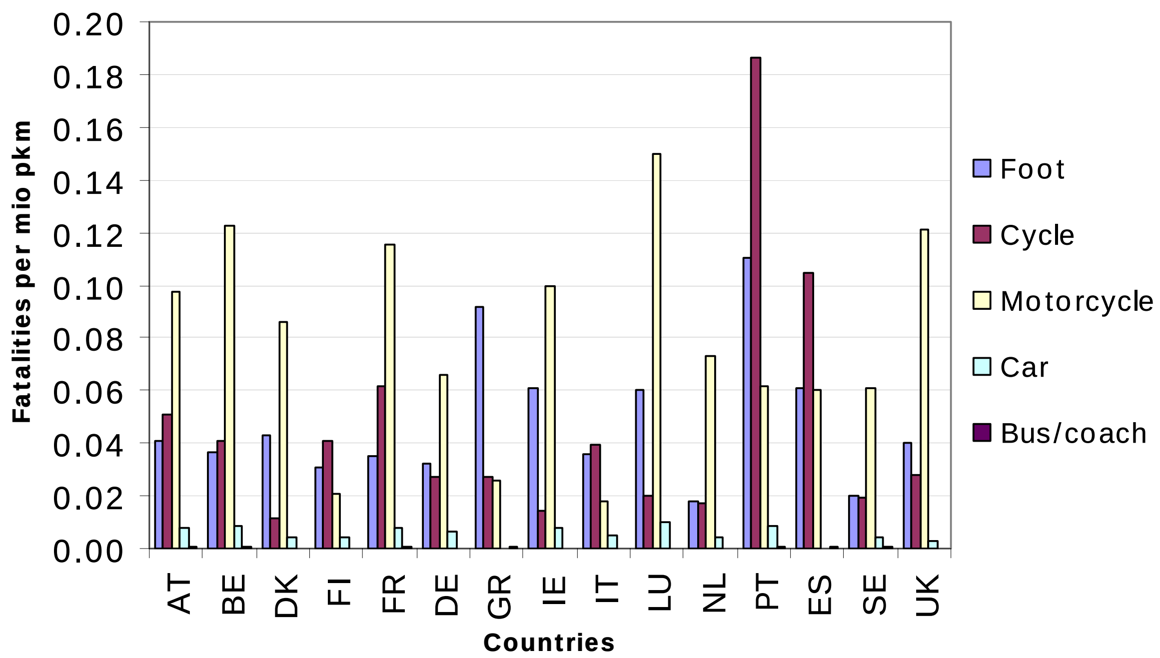

Figure 30: Fatalities by mode of transport per millions of passenger-km in 2000 at national level[63]

Portugal and Greece present the highest figures of fatalities compared to person-km on foot (110 and 90 per billion pedestrian-km respectively), while the average for the rest of EU is 40. Furthermore, figures show that Portugal and Spain are the least safe countries for cyclists (187 and 105 fatalities per billion cycle-km, while the EU average is 30).

On the contrary, for motorcyclists, countries with the lowest fatality level are Finland, Italy, Greece, Portugal and Spain. Apart from Finland, these countries have Europe's highest level of motorcycle use, although much of it is urban-based mopeds, which explains the lower death rate. Luxembourg, the UK and Belgium have the highest motorcycle death rates per kilometres travelled by this mode.

Finally, for cars, the European average number of fatalities per billions of passenger-km is 6. However, for Greece and Spain it is double this (12 and 11 respectively). Luxembourg, Portugal and Belgium also have a relatively low safety level (9 fatalities per billion passenger-km).

3.4.2.1 Urban Fatalities

An analysis of fatalities in urban areas is presented in the following three graphs. Firstly, a comparison between 1990 and 2000 shows that urban safety conditions in all countries have improved. The most important decrease of fatalities in urban areas is remarked in Luxembourg (71%), in Portugal 62% and in Finland 56%. The countries where rates remain high are Greece, Portugal and Italy.

63 Source: DGTREN/CARE

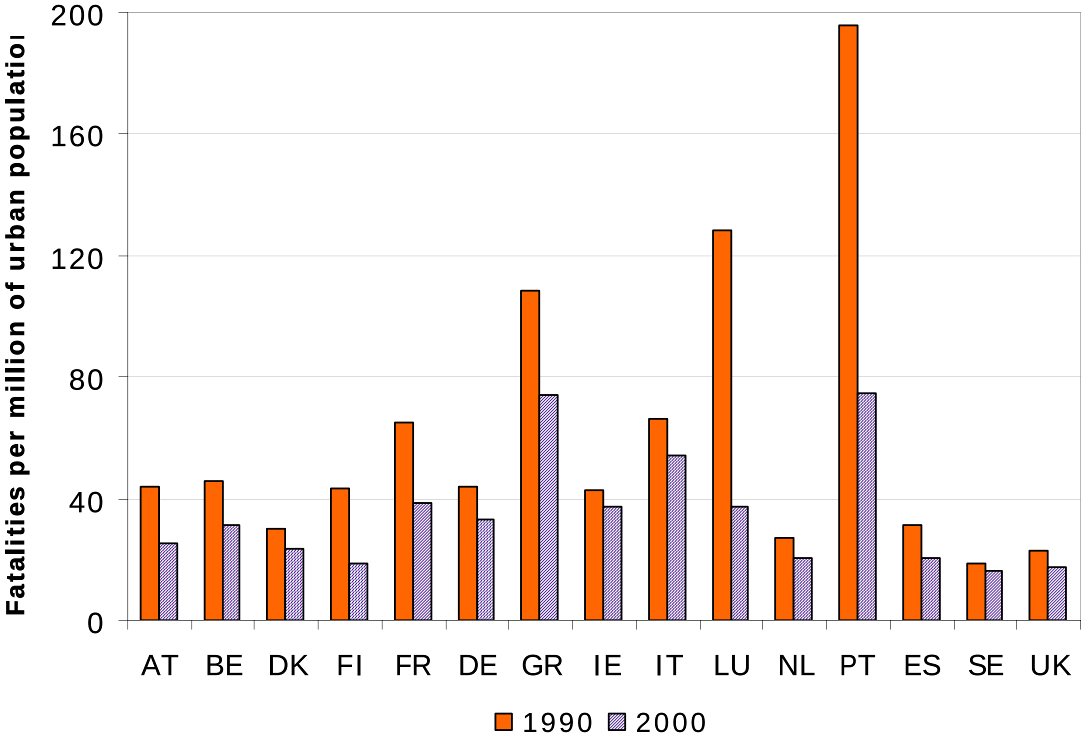

Figure 31: Total road fatalities in 1990 and 2000 in urban areas[64]

As has been already mentioned, CARE has data for national and urban level on which the analysis of fatalities presented above was based. But as far as casualties are concerned, data is much more scarce, as it cannot be found by an international source but mainly by individual countries' databases.

Also, in some countries, there is no distinction between "slightly" and "seriously" injured, and in any case where such a distinction exists, the definition of a "serious" injury varies considerably.

However, total figures of injured (slightly or seriously) for all modes of transport apart from buses are available from OECD for all countries for the year 1997 (for Greece, this data is available only for pedestrians and car drivers/passengers). The following graph presents this comparable data from OECD referring to casualties at national level and not only to accidents in urban areas:

64 Source: DGTREN/CARE

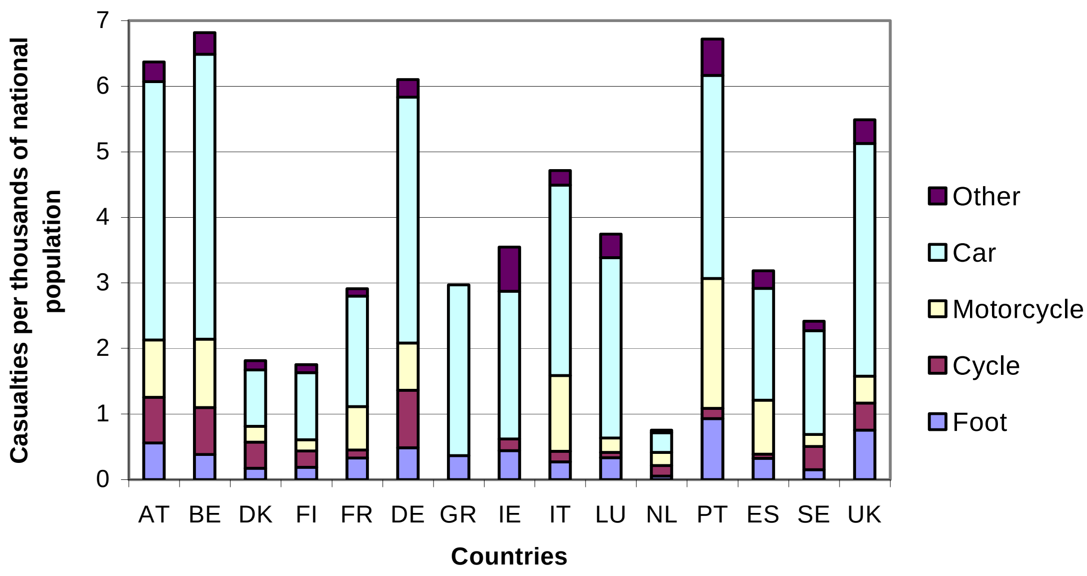

Figure 32: Casualties by mode of transport in 1997 at national level

** For Greece, only pedestrian and car driver/passenger data is available.*

The basic remark to make is that the tendencies of casualties are different compared to fatalities. Casualties are high in countries (such as Belgium, Austria, Germany and UK) that present low rates of fatalities.

The only country that remains low both in fatalities and casualties is the Netherlands. On the contrary, Portugal seems to have the lowest road safety level, as it is the country with the highest rates in both cases. For Greece, situation could be similar, as cyclists, motorcyclists and other casualties are not represented in this graph.

3.4.3 Transport Energy Use

Transport energy use is measured in tonnes of oil equivalent (toe[65]). According to the European Commission (DG-TREN), transport is the biggest single user of energy in the EU (excluding energy consumption by transformation losses, etc), using an estimated 345 mtoe for the EU-25 in 2005. This compares to a 2005 estimate for the EU-25 of 311 mtoe for industrial use and 293 mtoe for household use[66]. Furthermore, almost 98% of transport energy use is from oil, with less than 2% from electricity and negligible amounts from gas and renewable sources.

This data only available at a national level for all 15 Member States from 1990, from Eurostat and from the World Resources Institute[67]. Data for 1990 and 2001 from this source is shown:

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65 Ktoe = thousand tonnes oil equivalent; Mtoe = million tonnes oil equivalent

66 Source: European Commission (2005): "Doing More with Less: Green Paper on energy efficiency"

67 World Resources Institute, "Earthtrends" website: http://earthtrends.wri.org - data from the International Energy Association (IEA)

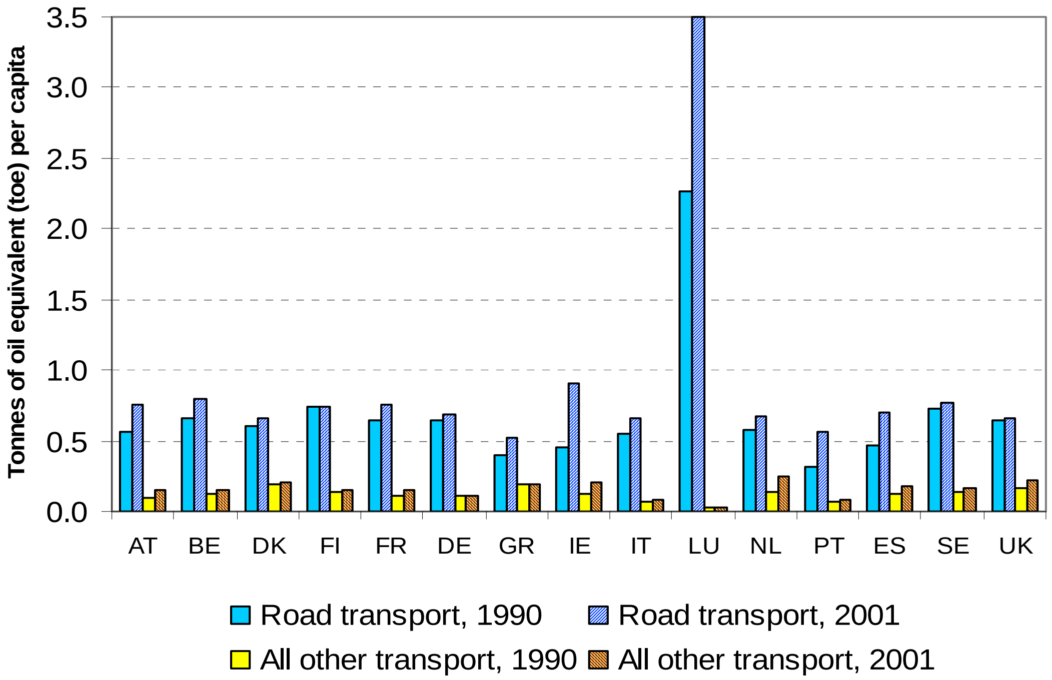


Figure 33: Transport energy consumption per capita in 1990 and 2001

Energy consumption by road transport nationally has increased between 1990 and 2001 in all countries except for Finland, where it fell by less than 1%. In the UK, it rose by only 2%. The case of Luxembourg differs particularly from the rest of Europe, as the energy consumption for road transport per capita in 2001 was 3.5 tonnes of oil equivalent, while the average for the other 14 countries is 0.7 tonnes. This is likely to be because people travel to, from and within Luxembourg who are not residents of the country, hence there is a lot of travel for a small resident population. Also cheap fuel in Luxembourg encourages cross-border buying (and energy consumption is measured in terms of fuel bought in the country). Note that the use of energy for modes other than road in Luxembourg is the lowest in the EU-15.

Apart from the special case of Luxembourg, two countries experienced a major increase of energy consumption during this decade: Ireland (103%) and Portugal (80%).

The greatest increase in energy use for modes other than road has been in the Netherlands (an 81% increase) followed by Ireland (63%). On the other hand, energy use for non-road modes fell by 4% in Greece and remained constant in Luxembourg. Note that this includes air transport, which has a significant effect on the figures (e.g. the 63% increase for Ireland can be seen in the context of a 250% increase in air travel to, from and within Ireland from 1990 to 2000). This non-road statistic is therefore not of interest for urban transport monitoring, but is included in the graph to put the road energy use statistics in the context of total transport energy use.

As an alternative measure, consumption of petrol and diesel (for all land transport) can be analysed. This is shown in the figure below for 14 Member States (data is not available for Luxembourg). As in the previous graph, major increases from 1990 to 2001 can be seen in Ireland (59%) and Portugal (44%), whereas in seven countries there was a fall in fuel use (largely due to more efficient vehicles), the largest falls being in France (-28%), Austria (-24%) and Belgium (-22%).

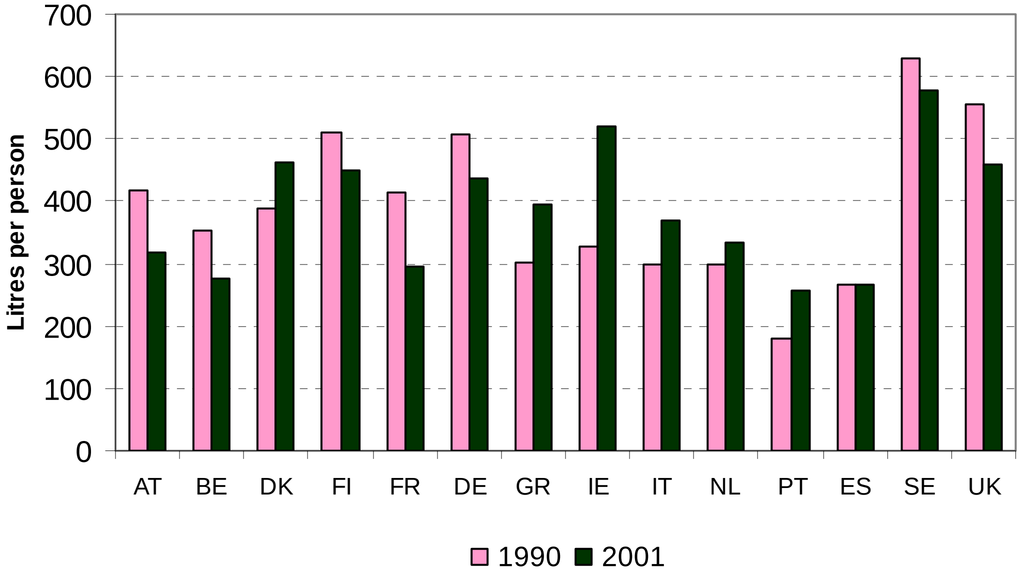


Figure 34: Annual petrol and diesel consumption

3.4.4 Transport Emissions

This indicator aims to compare tonnes of emissions in urban areas per 1000 residents for the following:

- CO_2 (carbon dioxide)
- PM_{10} (particle matter)
- VHC (volatile hydrocarbons)
- NO_X (nitrogen oxides)

CO_2 emissions data in time series basis is available from Earthtrends website, covering road and rail transport emissions at a national level, not just for urban areas.

Data on emissions of PM_{10} from road transport are also available at national level from Eurostat for the years 1990 and 2000.

Data on VHCs are very scarce, and finally, NO_X transport emissions are available for eight8 countries at a national level for 1990 and 2000.

The three following graphs present the available data for three types of pollutant:

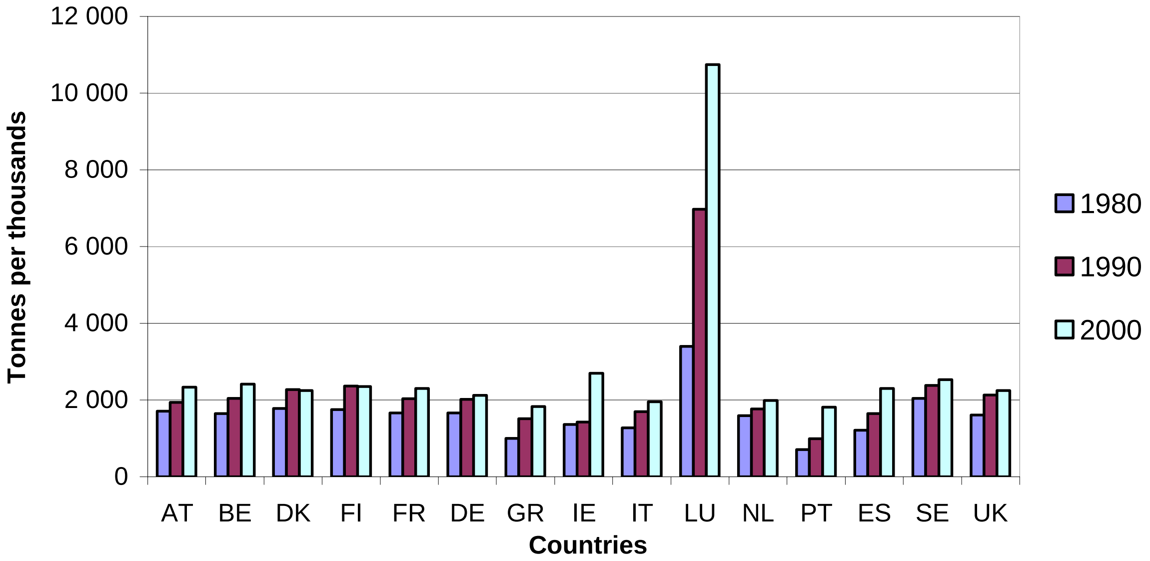


Figure 35: Road and rail transport emissions of CO_2 per 1000 inhabitants

CO_2 emissions are increasing through the years in all European countries. Luxembourg always differs particularly from the rest of Europe with respect to pollution (due to large numbers of non-resident cross-border visitors, and also cheap fuel which encourages cross-border shopping for petrol[68]); in 2000 the content of CO_2 in the air of Luxembourg was 5 times higher than the average of the other Member States.

Furthermore, the graph above shows that the change between 1980 and 1990 is greater than the change during the next decade for all the countries apart from Austria, Ireland, Portugal and Spain.

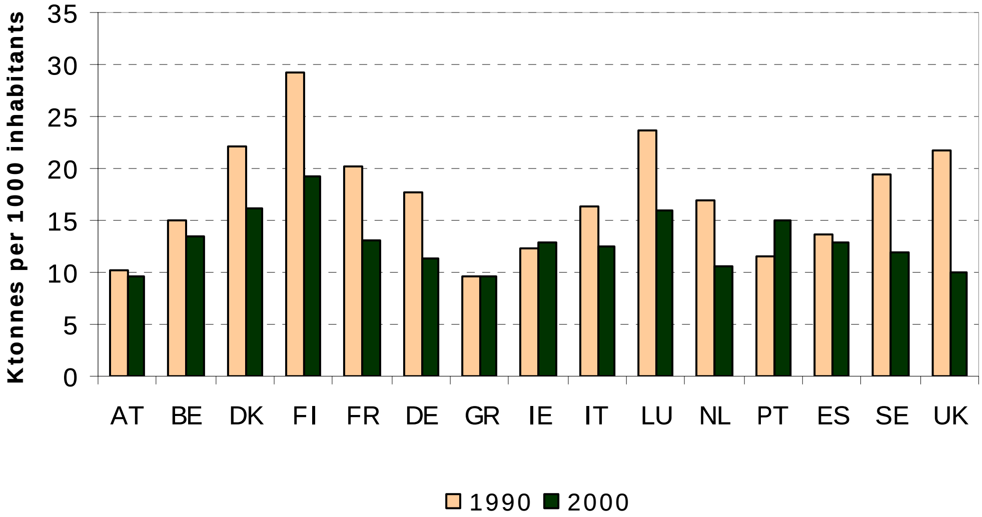


Figure 36: Road transport emissions of PM_{10} per 1000 inhabitants

68 CO_2 emissions are calculated from fuel sales, therefore figures do not account for fuel bought in one country and used (causing pollution) in another.

For Particulate Matter, emissions do not have the same tendencies as carbon dioxide, as these are measured from surveys of actual emissions rather than calculated. The level of this kind of emission is more variable between the Member States and for almost all of them, it is decreasing. The only countries where an increase is marked, are Ireland (5.5%) and Portugal (30%). On the contrary, in UK the amount of PM_{10} has been reduced by 54%. The highest levels of PM_{10} are shown to be in Finland, Denmark and Luxembourg, although differences in measurements (e.g. where, when and how often samples are taken) means that these figures should be treated with some caution.

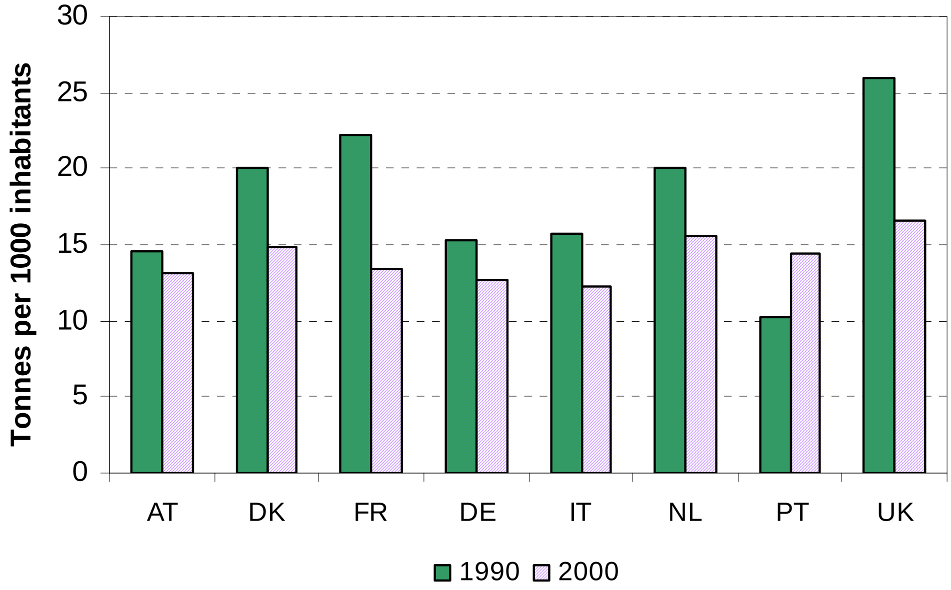


Figure 37: Transport emissions of NO_x per 1000 inhabitants

This graph does not provide a complete inter-country comparison, however it offers a glimpse of the NO_x emissions and the change between 1990 and 2000 in eight Member States. The amount of this type of pollution particles is generally decreasing; the only country, among the ones for which data is available, presenting an increase at 40%, is Portugal.

A recently introduced proposal for a “Directive of the European Parliament and Council on ambient air quality and cleaner air’’ for Europe directs Member States to undertake assessments of ambient air quality with respect to the pollutants throughout their territory, in accordance with respect to specific criteria (COM (2005) 447). The Directive provides specific criteria on the mandatory monitoring of ambient air quality in urban areas.

3.4.5 Transport Noise

This measures the percentage of urban population exposed to a specified noise level. It was recognised that data for this indicator was likely to be very patchy and therefore this would not be a priority indicator.

This data is not available nationally. However the EC (Eurostat/DG-Regio) Urban Audit contains this data (% population exposed to over 65 dB(A)) for a single year for a selection of cities (although not covering all 15 Member States). However, even in this survey, noise data was unavailable for the majority of cities covered.

Any further analysis would therefore be very limited in scope, accuracy and value, with at most three cities per country covered. Furthermore, this data is not restricted to noise caused by transport, but covers noise from all sources.

Data is available mainly at individual city level for various years, however for France, Germany and Italy, the respective percentage is given at a national level. Consequently, the comparison between countries or even cities is not accurate. The following table presents the percentages of urban populations exposed to noise >65 db(A) indicating the name of city and the year of reference. Population exposure to other levels of noise (<50 db(A), 50-65 db(A)) is not available for any countries or cities.

Table 13: Transport noise in European cities

	City	Year of reference	% of urban population exposed to >65db(A)
BE	Brussels	1996	30.5 %
DK	Copenhagen	1996	25.2 %
FI	Helsinki	1990	2.7 %
FR	-	2000	16.4 %
DE	-	2000	30.9 %
IE	Dublin	2000	0.04 %
IT	-	1996-1999	40.7 %
NL	Amsterdam - Rotterdam	1993	16 %
PT	Lisbon - Porto	2000	2 %

Note that dB(A) can be measured in L_{EQ} (generally on the Continent) or in L_{10} (generally in the UK and Ireland) – this explains the very low figure for Dublin.

3.4.6 Link between Traffic Growth and GDP

This indicator looks at the average traffic growth in vehicle-km and compares it with the growth in Gross Domestic Product.

Data on road traffic growth and public transport growth (vehicle-km and passenger-km) in urban areas are not available. This data is generally available at national level (urban and non-urban) and often at individual city level. Nevertheless, even obtaining this data on a city-by-city basis (in order to provide a sample national estimate) proved to be difficult and time-consuming.

The analysis can be done at national level (urban and non-urban), although the extent to which such growth mirrors the urban situation, and the value of such an analysis to the aims of this project, is questionable.

3.4.7 Personal Income and Share of GDP Spent on Local Transport

This indicator aims to analyse the total personal and public authority spending on urban transport (public and private), the percentage of Gross Domestic Product devoted to urban transport expenditure and the share of consumer expenditure on payment for urban transport.

Data is available at the urban level for only very few counties; this is not enough to arrive at conclusions. Eurostat has data on total spending on all transport (including interurban and international transport). Data is also available for purchased transport (all public transport, including air travel) and for motoring costs (fuel and other car running costs) – neither of these are purely urban. This data has been collected for the years for which it is available, but its use appears limited in terms of comparing outcomes of urban transport policies.

Rather than using this indicator, the most pragmatic solutions are to rely on the following indicators listed and to compare them with national GDP:

- Car prices;
- Expenditure on transport infrastructure / network development and Expenditure on public transport service provision (where available);
- Peak and off-peak out of pocket urban travel costs (car/public transport).

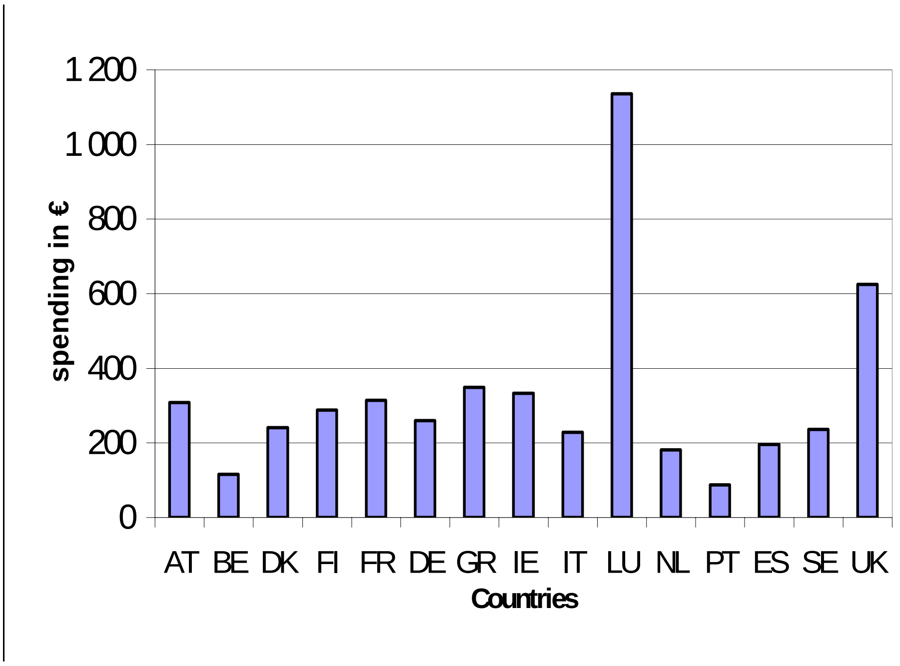


Figure 38: Total personal spending on purchased transport (2001)

“Purchased transport” in the above figure includes all public transport, including long-distance and international transport (by air, etc).

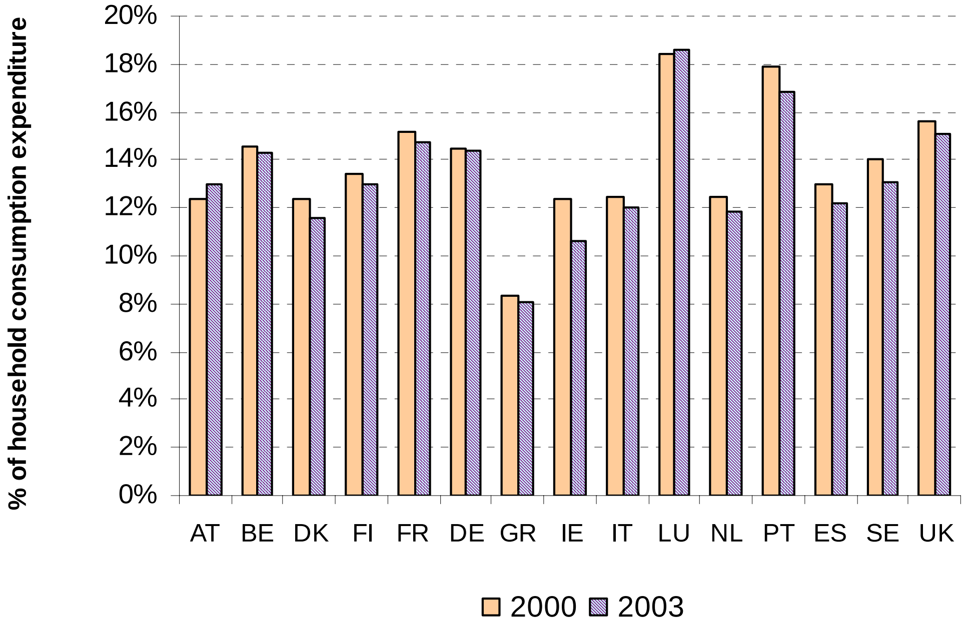


Figure 39: Share of consumer expenditure spent on transport (2000-2003)[69]

The above figure includes all personal transport expenditure, including air travel, motoring costs, etc but excluding vehicle purchase.

3.5 KEY CONCLUSIONS

3.5.1 General

A huge amount of data exists which is related to the indicators defined in this project, but most is either at a national or regional level, or at a city or conurbation level. The former are not suitable analysing transport performance at a purely urban level as they also contain significant regional, rural and interurban transport elements, whereas the latter are not representative of the whole country, but depend on the size of the urban area and its particular characteristics.

Data has therefore been collected at national level where available, and where appropriate it has been illustrated by examples from some cities (typically one or two per country). As collection of data at regional or local level was not within the scope of this project, such data collected serves only to provide examples and to compare with national data, or to substitute for national data where this does not exist (e.g. for local public transport fares). Cities were chosen on the basis of data availability and are not intended to be representative of the country. In order to provide a reasonably representative picture of each country using data collected at the local level, a project would need to define a series of urban area categories (based on population and possibly other criteria such as density or employment) and then collect data from a number of urban areas in each country within each category. This would be a major exercise involving perhaps 30 or more urban areas for a medium to large European country.

69 Source: Eurostat

3.5.2 Summary of Input, Intermediate Outcome and Outcome Indicators and Relation with Contextual Factors

A very diverse range of results were found, making it difficult to identify countries which are performing well and those which are not, and whether these performances are due to policy frameworks or external factors. Comparability is also limited by the different spatial scales and methods of data collection. A clear assessment would be possible if specific outcome indicators could be related to specific urban policy (mainly input) indicators at consistent space and time-series scales. It was found that such a clear definition is only present at a specific operator level and less at a city and rarely at a national level, with input indicator decisions clearly being done at the city or regional level for most countries. In addition, most outcome indicators measuring the impacts of the society by urban transport are not consistently measured at a national scale.

At a very general level, the Nordic countries appear to be successful in most areas, including investment, modal split and safety. Denmark and Finland do however score poorly in terms of PM_{10} (particle matter) emissions: this may be due to the way they are measured (note also that this indicator is at a national level). The UK is successful in terms of safety but much less so in terms of investment and support for public transport. Public transport investment and integration seems to be successful in Austria, where public operation of transport is the norm (in fact Vienna has amongst the highest public transport modal split in Europe).

Although energy use is lowest in Greece and Portugal, this is likely to be because of lower car ownership than successful urban transport policies aimed at reducing energy use (note also that this is an indicator at the national level). In both countries energy use has risen significantly in recent years, and even more so in Ireland.

In general, changes have been most marked in Greece, Portugal, Ireland and Spain, due to rapid economic growth in these countries since the 1980s. Many of these changes have been negative, such as increased use of cars, coupled with urban transport structures which have not significantly evolved. On the other hand, there has been increased public transport investment, especially in Spain, and public transport fares remain low in most southern European countries.

A major anomaly evident in much of the data collected is the case of Luxembourg. Transport use in this country is high in comparison to its low population, as it lies on several Trans-European routes and also attracts a significant number of cross-border commuters from France, Belgium and Germany. This means that data calculated on a per capita basis can be highly distorted (data related to the number of persons employed in the country or passenger-kilometres might provide a more comparable indication of performance). Similar anomalies may also have been found if other small states, such as Monaco or Andorra, were analysed, or indeed if a small urbanised region of a larger country (e.g. nearby Saarland in Germany) were to be studied in isolation.

The low fuel taxes in Luxembourg also distort some indicators, as people crossing the border to buy petrol and diesel artificially increase Luxembourg's energy use and CO_2 emissions. Although cross-border commuting and fuel buying exist in many parts of Europe, for larger countries the effects on the indicators studies are negligible at the national level.

As a conclusion it is somewhat difficult to assess urban transport performance at a national level especially if there are different policy frameworks and contexts at the city and regional levels within the same country. In most cases, input policy indicators are a matter of individual urban areas. What is needed and could be readily available at the national level are the indicators reflecting the "impact" side of the policies, i.e., outcomes such as energy, environment, mobility and safety indicators.

An important outcome indicator lacking at the national level and even for most cities in EU-15 is the level of accessibility of the urban population to urban transport services. Accessibility indices such as the percentage of population with specific walking distances of a particular transport service are present to a limited extent, with some public transport authorities keeping a close look at population catchment areas of their services. With the absence of such an indicator, it is difficult for transport authorities to assess how well urban transport services are accommodating the needs of the urban population.

4. PUBLIC PERCEPTION: SURVEY METHODOLOGY

4.1 SURVEY AIMS AND OBJECTIVES

Work-package 3 is the "subjective" part of the study. This complements the WP2 data collection and analysis part by endeavouring to provide a picture of how effective and successful European citizens perceive national policies and activities relating to urban transport to be, and where their concerns and priorities lie.

This task comprised the definition of around eight indicators on public perception, covering aspects such as inputs, policy outputs and real outcomes. The data collection exercise involved conducting some 200 interviews per Member State for the EU-15 (i.e. 3000 interviews in total). The goal was to provide a rough snapshot of public opinion on a European basis, rather than a comprehensive and statistically representative survey (which would be a major project in itself).

In addition to the public perception questions, a small number of questions were needed in order to obtain sufficient objective data to enable subjective responses to be analysed by user characteristics.

4.2 SURVEY DEFINITION AND PLANNING

4.2.1 Questionnaire Development

The overall aim was to devise a brief questionnaire which could easily be administered by telephone. An interview length of 8 to 10 minutes was deemed appropriate: more than this would result in refusals or in respondents terminating the interview before the end. In the time allowed, it was important to get a good level of attitudinal data on a range of urban transport issues, but also some basic factual data which describes the population (age, sex, modes of transport used, etc).

In order to obtain a maximum of usable data and to simplify coding and analysis, closed questions were used in almost all cases. Only where there was a non-standard response, e.g. "other", then it could be specified in free text form.

As the questionnaire is directed at members of the public, detailed and complex policy issues are avoided, as are any technical jargon. Wording also needed to be kept simple as the original questionnaire (in English) needed to be translated into ten other languages, and the scope for misunderstandings increases if questions are long, complex, etc. The aims were to firstly find out respondents' perceptions of various issues (do they consider them a problem or not, are they satisfied or not), and secondly to ascertain their preferences in terms of public spending and revenue raising for urban transport.

For the latter part (policy preferences), the questionnaire needed to be worded so that people do not have the option of saying that they want more spending on everything, but no new taxes, charges or tolls to pay for this spending.

The questionnaire aimed to relate to the respondents' own opinions and experiences, not to how they perceive the needs of other groups in society. Therefore questions such as "how well do you think public transport meets the needs of people in this area" or "how do you rate facilities for the disabled" (if the respondent is not disabled) were to be avoided.

4.2.2 The Questionnaire

The final questionnaire as agreed by the Advisory Group and DGTREN is presented on the following three pages (in blue text). It includes the basic interview script.

The questionnaire is in three parts and is shown on the following three pages:

- Questions 1, 2 and 3 (the first of the 3 pages) cover factual information;
- Questions 4, 5 and 6 (second page of the questionnaire) cover attitudes towards the current state of transport and its outcomes; and
- Questions 7 and 8 (third page) cover attitudes towards policies.

For more details on the choice and relevance of the questions to the issues considered, please refer to the WP3 Deliverable 3.1 “Public Perception of Urban Transport Performance and Policy: Survey Report for the EU-15”.

4.2.3 Selection of a Market Research Company

Ten European market research companies were invited to bid for the task of conducting 200 telephone interview surveys per country in each of the EU-15, i.e. 3 000 interviews in total, in the relevant national languages (11 languages).

Four quotations were received and the work was awarded to AMR – Advanced Market Research GmbH (Düsseldorf, Germany), which provided the most advantageous quote.

PUBLIC PERCEPTION QUESTIONNAIRE SURVEY ON URBAN TRANSPORT

Interview Ref. Code / ID: …………….. **Country:** ……………….

Date of Interview: …./…./2004

Sex of respondent: ❑ Male

❑ Female

(Brief introductory text introducing oneself, asking for permission, explaining the project, national and European contexts and the importance of measuring public perception towards urban transport problems and solutions. Also reassure respondent that the questionnaire is anonymous and confidential, that no record of their identity will be kept and that no information will be sold to third parties)

I want to start by asking a few questions about yourself:

Q1: Do you live in a large town or city?

☐ Yes → Can you tell me which one?

☐ No → Can you tell me which city you most frequently visit?

- Town/City: ….. …………. * ……………………..

* - if the interviewer does not recognise the city or town, ask the respondent where it is (region, county, nearest big city, etc)

*Note to interviewers: for the rest of the interview, replace "**[X]**" with the name of the town or city named by the respondent above.*

Q2 And can you tell me which kinds of transport do you use once a week or more in [X]?

(Spontaneous answer: do not read out list below. Multiple responses are allowed).

☐ Bus ☐ Car / van ☐ Bicycle

☐ Tram / metro ☐ Motorcycle / scooter ☐ Walk

☐ Train ☐ Other (specify: ________________________)

Q3 And can you tell me how old you are? Are you…. *(read out the 3 age groups)*

❑ under **25 y**ears old, ❑ 25-59, or ❑ 60 and over.

Q4 Now I want to ask you what your opinions are on congestion, accidents, energy use and pollution all caused by traffic in **[X]**. I will ask you if you think these four aspects of traffic, at the current moment, are a serious problem, a slight problem or not a problem – are you okay to go ahead?

a) So, would you consider traffic congestion in **[X]** in general to be…?

❑ a serious problem ❑ a slight problem, or ❑ not a problem

b) Would you consider accidents caused by traffic in **[X]** in general to be…?

❑ a serious problem ❑ a slight problem, or ❑ not a problem

c) Would you consider air and noise pollution caused by traffic in **[X]** to be…?

❑ a serious problem ❑ a slight problem, or ❑ not a problem

d) Would you consider the current rate of petrol and diesel use by transport, not just in **[X]** but at all levels, to be…?

❑ a serious problem ❑ a slight problem, or ❑ not a problem

Q5 How would you rate your level of satisfaction with the way the national government in **[name of country]** is tackling these four issues (congestion, accidents, energy use and pollution) in urban areas?

(Read out the first 3 possible responses only [satisfied/dissatisfied/neither]. Only if the respondent has difficulty answering [has no opinion / no experience of public transport, etc], suggest to them that you can record a "don't know" answer)

❑ satisfied ❑ dissatisfied

❑ neither satisfied nor dissatisfied *[❑ don't know]*

Q6 Now thinking about public transport in **[X]**, in particular, how would you rate your level of satisfaction with the …

(Read out the first 3 possible responses only [satisfied/dissatisfied/neither], as in Q4)

a) Reliability of public transport services?

❑ satisfied ❑ dissatisfied

❑ neither satisfied nor dissatisfied *[❑ don't know]*

b) The frequency and network coverage of public transport? (what times it operates, how often it is and where it goes)

❑ satisfied ❑ dissatisfied

❑ neither satisfied nor dissatisfied *[❑ don't know]*

c) Level of personal security you feel when using public transport?

❑ satisfied ❑ dissatisfied

❑ neither satisfied nor dissatisfied *[❑ don't know]*

d) Finally, how would you rate the overall level of public transport service in **[X]**?

❑ satisfied ❑ dissatisfied

❑ neither satisfied nor dissatisfied *[❑ don't know]*

Q7 We now want to ask your opinion about a number of transport policies and particularly whether you think the authorities responsible for transport have got their spending policies right.

Okay, would you say that the authorities should, over the next five years, spend more, spend the same or spend less on…*[repeat for each if necessary]*

	Should spend more	Should spend same	Should spend less	Don't know
a) Improving existing roads	☐	☐	☐	☐
b) Building new roads	☐	☐	☐	☐
c) Improving existing public transport services	☐	☐	☐	☐
d) Building new public transport infrastructure	☐	☐	☐	☐
e) Improving provision for walking and cycling	☐	☐	☐	☐

Ask the following only if respondent says "should spend more" to 3 or more items:

f) Which of these do you consider to be the top priority?

❑ (a) ❑ (b) ❑ (c) ❑ (d) ❑ (e) *[maximum 2 items]*

Thank-you. Now this is the last question:

Q8 If additional funds for transport investment were needed by the authorities in **[X]**:

(For both (a) and (b), do not read out the options in italic ("A mixture" or "Don't know"), although they can be accepted as responses)

a) Which of these 2 policies do you think would be the best way to raise the money?

- ❑ to get it from all citizens by general taxation
- ❑ to get it from those contributing more to pollution and/or congestion by targeted pricing or taxation

[❑ a mixture of the above] *[❑ don't know]*

b) *(Read only if response to (a) is the 2nd option [targeted taxation] or a mixture. If general taxation is preferred or a "don't know" is recorded, skip this final part of the question)*

So, which of the following ways of implementing targeted pricing or taxation would you prefer?

- ❑ higher parking charges
- ❑ a road charge (or urban toll), like they have in London
- ❑ another way (specify: ____)

[❑ a mixture of the above] *[❑ don't know]*

That ends all of the questions we wanted to ask you, do you have any questions you want to ask me or further comments you want to make?

Additional comments……

Okay, well thank you very much for your time.

4.2.4 Sampling Frame

Quotas were set on sex (50/50 male/female per country) and on age. The age quota was based on demographic data for the whole of EU-15 (rather than having different quotas per country to reflect national demographics). The quota was 16% of interviewees to be aged 16-24 (32 out of the 200 interviews per country), 56% to be aged 25-59 (112 interviews per country) and 28% of interviews to be of persons aged 60 or over (56 interviews per country). This frame was firstly to ensure a similar population for each country, so the results are comparable, and also to enable attitudes to be analysed on a pan-EU-15 basis by age group and by sex.

The sample was derived from the residential telephone directories of the countries in digital format. Within the given regions random dialling into households was done until the set quotas on age/gender were achieved. To ensure as wide a coverage as possible, within the constraints of the research objective, 10 Sampling Points per country were defined by AMR (150 in total), with 20 interviews per Sampling Point. Following discussions with ISIS, these were reduced in the smaller countries (where there are not ten places of sufficient size) by eliminating urban areas with populations of less than 50 000 and choosing either to move the Sampling Point to a larger urban area, or to add additional interviews to an existing sample city. Finally, 114 Sample Points were chosen for the survey. 20 persons were interviewed in each one for 94 of them, whereas there were 12 Sampling Points with 40 interviews each, four with 60 interviews each, three with 80 interviews each and one with 160 interviews.

The Sample Points with high numbers of interviews are in countries where there are not sufficient numbers of cities to enable a wider spread. For example, the Sample Point with 160 interviews was Luxembourg, the only major city in the country, while the remaining 40 interviews for the state of Luxembourg were conducted in the next biggest town, Esch-sur-Alzette. The three Sample Points with 80 interviews each were Dublin, Athens and Lisbon (as Ireland, Greece and Portugal also have a limited number of other urban areas for sampling).

Two-thirds of the sample surveyed lived in urban areas with a population of less than a million. The breakdown of interviews by size of urban area is as follows:

- Very large conurbations (>2 million inhabitants): 360 interviews (12%)
- Large conurbations (1 to 2 million inhabitants): 640 interviews (21%)
- Medium conurbations (500 000 to 1 million inh.): 320 interviews (11%)
- Small/medium cities (100 000 to 500 000 inh.): 1,220 interviews (41%)
- Large towns (50 000 to 100 000 inhabitants): 460 interviews (15%).

The distribution by city size between countries was not even, nor can it be, as some countries do not have any very large conurbations. There were relatively more large cities in Germany and Italy than in other countries, with a bias towards larger urban areas also in Spain, France, Greece and the UK. In Finland, Denmark, Belgium and Portugal, a number of smaller places (populations between 50 000 and 100 000) were included.

4.3 SURVEY FIELDWORK

The survey fieldwork was conducted by telephone in June 2004 from AMR's central CATI facility in Düsseldorf during weekday evenings and Saturday afternoons, using 40 experienced interviewers, who were native-speakers of the following languages:

English: 4	German: 4	French: 4	Spanish: 3	Greek: 5	Finnish: 4
Swedish: 3	Italian: 3	Dutch: 4	Danish: 3	Portuguese: 3	

As the interviewers are all experienced and qualified, the briefing (held on 14th June 2004) was project-specific, dealing mainly with the questionnaire. After the briefing, all were requested to complete two pilot interviews under supervision. These were quality checked and all issues immediately clarified. The questionnaire had, prior to fielding, been edited and formatted so that it was very operational and so, only very minor issues were raised at the briefing and piloting.

At random, AMR made use of the listen-in facility, which accesses any of the stations at any given time. On completion, all interviews were quality edited and then verified by 20% call-backs.

No problems were encountered in the fieldwork.

Over three telephone calls were attempted for each successful interview (9 088 attempts for 3 000 interviews). Just over half of the 9 088 attempted calls resulted in a successful connection to a private household. The most common cause of termination at this stage was no adult being at home. 558 people refused, plus another 15 terminated before the end, representing a 12% refusal rate overall (in terms of the number of successful connections to persons in private households).

5. PUBLIC PERCEPTION: KEY RESULTS

Full results and analysis of the Public Perception Survey are given in Deliverable 3.1, so are not repeated here. This section provides a brief overview of the key findings.

In evaluating the results, the following must be borne in mind:

- Results for each country are highly likely to be affected by the selection of cities made and the number of interviews in each city. The sample points used are described in the NPF-Urban Transport Deliverable 3.1 survey report and these should be consulted in any assessment by country;
- Results at the EU-15 level are simply the sum of the 200 interviews per country (3 000 in total) and do not attempt to weight country responses by population of the country. They are therefore a "country average" rather than a true EU average, as results are skewed towards the smaller countries (e.g. includes 200 German opinions and 200 Luxembourger opinions).

5.1 PERCEPTIONS OF TRANSPORT PROBLEMS AND SATISFACTION

5.1.1 Opinions on Congestion, Accidents, Pollution and Petrol/Diesel Use

This question asked for each of the issues below, whether the respondent considered it a serious problem, a slight problem or not a problem:

- Traffic congestion in respondent's city;
- Accidents caused by traffic in respondent's city;
- Air and noise pollution caused by traffic in respondent's city;
- Current rate of petrol and diesel use by transport at all levels (not just in respondent's city).

For each issue, respondents who consider it a serious problem form the largest single group, and are the majority of respondents for all the issues except for accidents. Petrol/diesel use comes first (61% consider this a serious problem), followed by congestion and pollution. Accidents are regarded as a serious problem by the least number of respondents (45%).

Results averaged across the 15 Member States are shown in Figure 40.

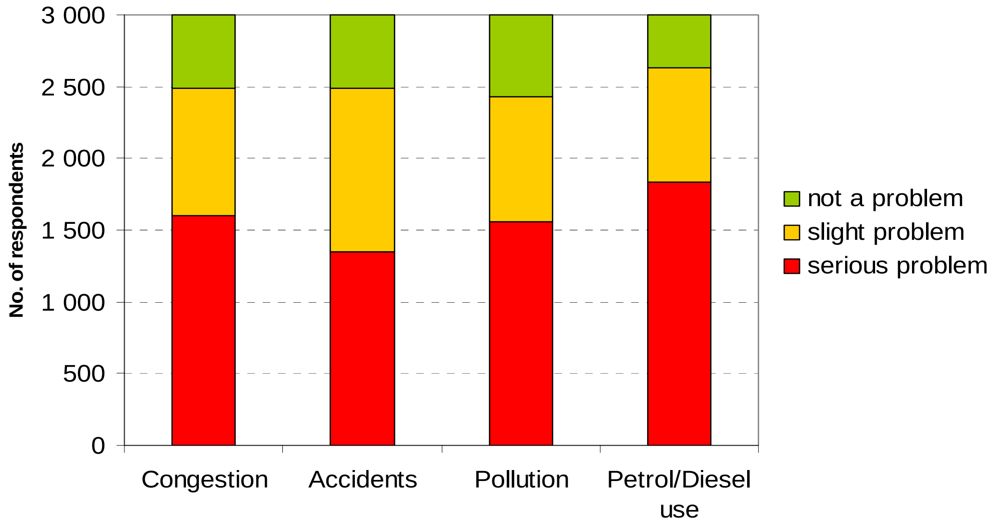


Figure 40: Perceptions of transport problems (EU-15 country average)

5.1.2 Level of Satisfaction with National Government on Congestion, Accidents, Pollution and Petrol/Diesel Use

This question asked whether respondents were satisfied, dissatisfied or neither with the way the national government in their country is tackling the four issues above. Only one response was allowed for this question: respondents were not asked for their level of satisfaction separately for each of the four issues mentioned, just a single global response.

Almost half of the European population interviewed stated that they were dissatisfied with the ways their national governments deal with problems caused by traffic, and only 28% of respondents said they were satisfied, the remainder being neither satisfied nor dissatisfied (18%), or unable to answer (5%). Only in Luxembourg did satisfied respondents outnumber dissatisfied ones.

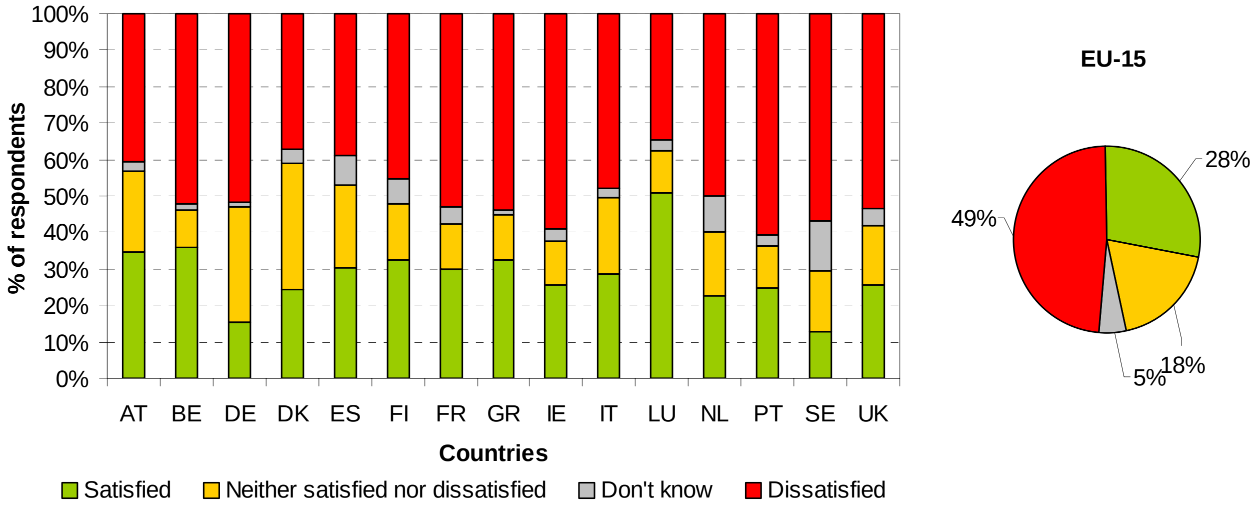


Figure 41: Level of satisfaction with the ways national governments are tackling transport problems (by Member State and EU-15 country average)

Levels of satisfaction with governments were also measured according to respondents' perceptions of the four issues. This was to ascertain whether people who considered congestion, accidents, pollution or fuel use to be serious problems were generally more satisfied or less satisfied with their governments' handling of these than respondents who did not consider them to be problems.

There is an almost identical pattern across the four issues, with respondents citing them as serious problems more inclined to be dissatisfied with their governments' handling of them. Between 24% and 27% of these respondents (depending on the issue concerned) were satisfied with their governments and 54 to 55% were dissatisfied. The respective rates for respondents who perceived the issues to be a slight problem were 29 to 34% satisfied and 43 to 46% dissatisfied.

5.1.3 Satisfaction with Public Transport in Respondent's City

This question asked respondents whether they were satisfied, dissatisfied or neither with four aspects of public transport in their city:

- Reliability;
- Frequency and network coverage;
- Level of personal security;
- Overall level of satisfaction with public transport.

The question made no distinction as to whether the respondent was a public transport user or not.

Overall, respondents appeared to be satisfied with their local public transport services. At the EU-15 level, over 50% of respondents were satisfied on all four criteria, as shown in Figure 42. The greatest satisfaction level was for personal security (68% satisfied and 15% dissatisfied) and the lowest was for frequency and network coverage (53% satisfied and 29% dissatisfied).

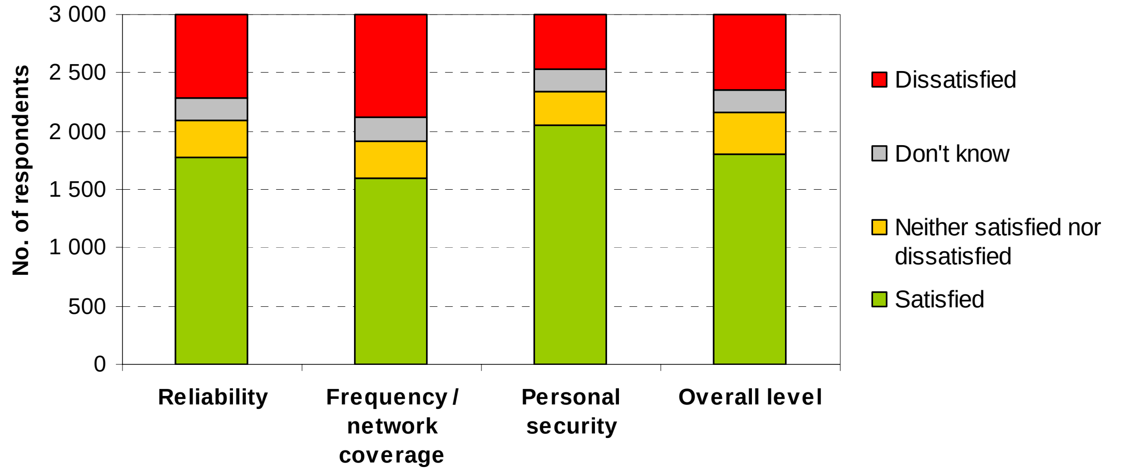


Figure 42: Levels of satisfaction with public transport (EU-15 country average)

5.2 OPINIONS ON SPENDING AND REVENUE RAISING

5.2.1 Opinions on Spending Priorities

This question aimed to gather views on whether public authorities (at all levels) have got their spending priorities right. It asked whether respondents feel that the authorities responsible for transport should spend more, less or the same over the next five years on the following:

- Improving existing roads;
- Building new roads;
- Improving existing public transport services;
- Building new public transport infrastructure;
- Improving provision for walking and cycling.

In all cases, more people wished to see spending increased than decreased (see Figure 43). At the EU-15 level, the most popular areas for spending were improving existing roads (63% wanted more spending and only 5% thought that spending in this area should be reduced). This was followed by improved provision for walking and cycling (61% for more spending and 8% for less), and improving existing public transport services (56% for more spending and 7% for less).

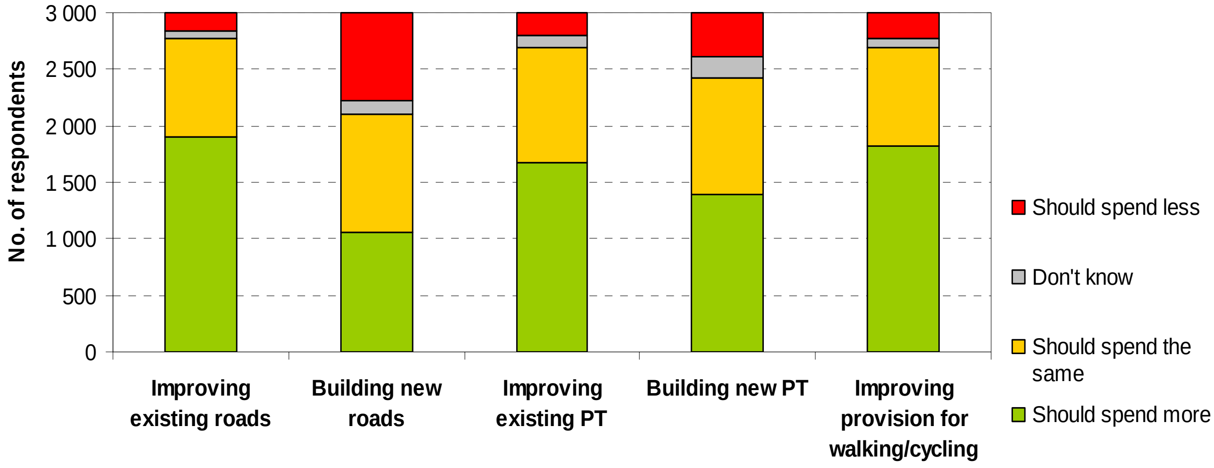


Figure 43: Opinions on transport policy issues (EU-15 country average)

The least popular option for increased spending was building new roads, where only 35% wanted to see spending increase, about the same number wanting it to remain the same, and over a quarter of respondents wanting spending to be reduced in this area.

As some respondents wanted more spending on everything, their relative priorities were also asked. The most popular top priority for spending was on improving existing roads (first priority for 45% of respondents), followed by walking and cycling investment (see left hand chart in Figure 44).

Taking respondents' top two priorities (right hand chart in Figure 44), increasing spending on existing roads still comes first, but by a smaller margin, and the next most popular is improving existing public transport services, followed by walking and cycling as the third priority. More than half of respondents mentioned one of these three as one of their top two priorities. On the other hand, less than half mentioned new construction (roads or public transport systems) as either a top or a second priority for spending.

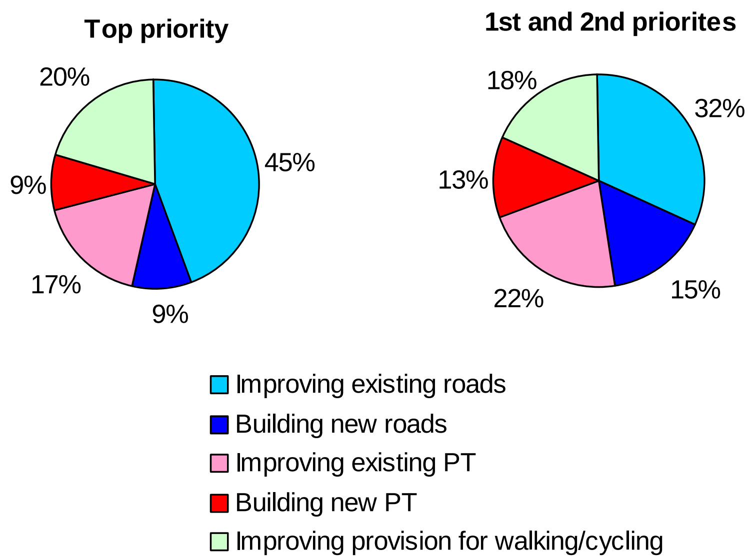


Figure 44: Opinions on spending priorities (EU-15 country average)

5.2.2 Opinions on Raising Revenue for Transport Spending

Given that it was expected that most respondents would advocate more public spending, the next logical question is where the additional funds should come from. This question therefore asked which policy would be the best way to raise the money, if additional funds for transport investment were needed in the respondent's city. Two options were given:

- To get the money from all citizens by general taxation;
- To get it from those contributing more to pollution and/or congestion by targeted pricing or taxation.

In addition, the responses "a mixture of both these options" and "don't know" were accepted, although they were not read out.

The split between respondents favouring general taxation and those favouring targeted taxation or charging was remarkably even, at 37% of respondents across the EU-15 for the first option and 39% for the second (see right hand pie chart in Figure 45 below). The remaining 24% were evenly split between preferring a mixture, and "don't knows". However, there were significant differences between the different countries, as shown in the main part of Figure 45, with over half of Germans and Austrians preferring targeted pricing compared to only 14% of Finns (73% of Finns preferring general taxation).

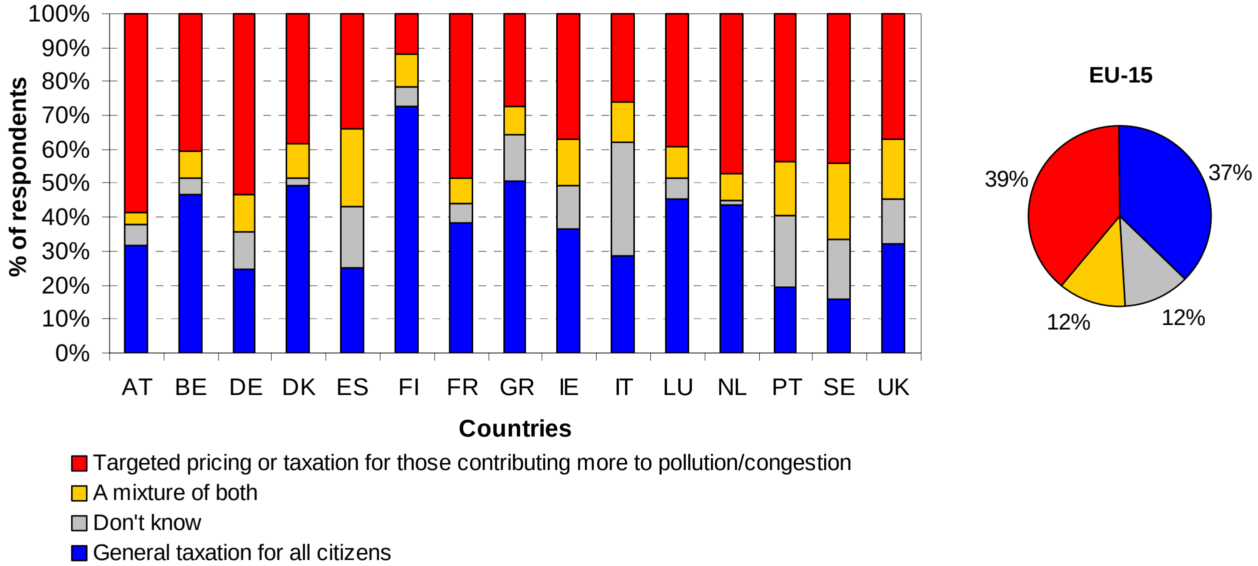


Figure 45: Opinions on raising funds for transport spending (by Member State and EU-15 country average)

The second part of the question asked (only for those opting for targeted pricing/taxation or a mixture of targeted and general taxation) which method of targeted pricing they would prefer. The options given were:

- Higher parking charges;
- A road charge or urban toll;
- Another way (specify).

Again, "a mixture of these" or "don't know" were accepted as responses, although not read out.

More than twice as many preferred road user charging or tolling to parking prices at the EU level (see right hand chart in Figure 46), although again there were significant differences between countries. 16% of respondents who were asked this question opted for higher parking charges and 37% opted for an urban road user charge. A further 16% suggested a mixture of these, 21% chose another way and 10% did not know.

Support for higher parking charges was highest in Austria, which in fact already has some of the highest urban parking charges in Europe. Support for road user charging was highest in the Netherlands.

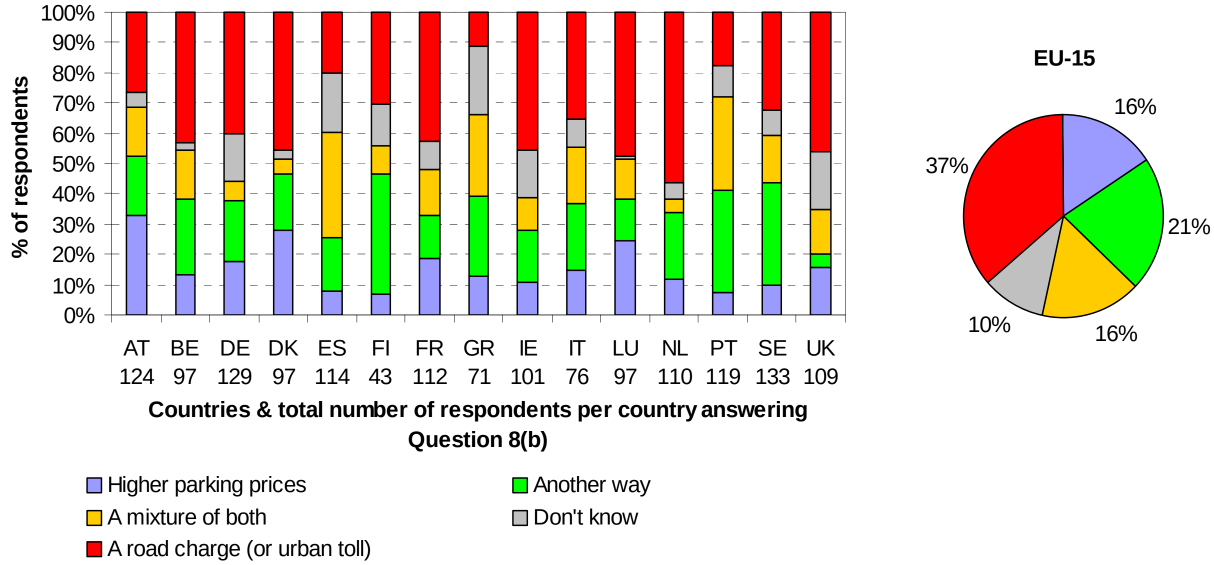


Figure 46: Opinions on ways of implementing targeted taxation (by Member State and EU-15 country average)

Many of the "other ways" mentioned were not concerned with raising revenue, e.g. "reduce traffic", "better parking facilities", "free travel on urban public transport", "improved public transport" and "educate the population". These were mentioned by 115 of those preferring "another way". Of the miscellaneous opinions which could actually raise revenue, the main ones were:

- Fuel taxes, car taxes and taxes on the automobile industry: 70 respondents;
- Better management of existing funds, reduce wastefulness: 65 respondents;
- Distance-based taxation for motorists (possibly on a nationwide basis, as otherwise this would be the same as an urban road charge): 31 respondents;
- Road use charges for foreign vehicles or transit traffic: 24 respondents;
- Road tolls for lorries and freight transporters: 20 respondents.

5.3 CROSS-ANALYSIS OF PUBLIC PERCEPTION DATA

Cross analyses were performed on several questions, as follows:

- Public opinion about transport policies and systems and perception of present transport problems, analysed by respondents' profiles (factual characteristics, i.e. sex, age group and size of city, and also the modes of transport respondents use in their urban area);
- Respondents' perceptions of "the problem" and "the solution", e.g. by crossing analysis of how serious they see problems such as congestion and pollution with their views on where more money should be spent (roads, public transport, etc);
- Level of satisfaction with public transport against the need to spend more on public transport.
- Respondents' views on prioritisation of spending, e.g. do people who want to see increased spending on public transport generally want to see more, the same or less spending on roads? How many people want more spending on everything and how many want a shift in priorities with more spending in one area and less in another?

5.3.1 Perception of Urban Transport Issues by Age and Sex

Analysis by users' profile characteristics (sex and age) led to the general conclusion that opinions and attitudes do not differ much between males and females and between different age groups. The main conclusions are:

- Older respondents were slightly more likely to rate issues such as congestion, accidents, pollution and fuel use as problems;
- Middle-aged people (aged 25-59) were less satisfied with governments and with public transport in their city than either the younger or older age groups;
- Men were slightly more likely than women to suggest increased spending on roads, while women were slightly more likely than men to advocate more spending on walking and cycling facilities (differences of only 2 percentage points in each case).

It is worth noting female survey respondents were more likely than males to walk and use buses, while more men interviewed used private transport. Rail (metro, tram and train) and cycle use by survey respondents is evenly balanced between the sexes.

5.3.2 Perception of Urban Transport Issues by Modes of Transport Used

Analysis by modes of transport frequently used for urban trips resulted in more significant disparities of opinion.

Congestion is seen as a serious problem by 60% of motorcycle users and at the other extreme, it was seen as a serious problem by only 45% of train users. The figure for car users was 54%. Interestingly walkers, cyclists and public transport users who did not also use cars were more likely to describe congestion as a serious problem than those who use cars only.

Regarding accidents, there were some unexpected results: tram and metro users appeared to be the most concerned (57% citing accidents as a serious problem) and train users the least concerned (39% saying they are a serious problem). These figures are quite possibly influenced by other modes used by these respondents. A higher proportion of cyclists consider that accidents are not a problem than users of any other mode (135 respondents, or 21% of cyclists). However, respondents who walk or cycle only and use neither public nor private transport on a regular basis are the most concerned about accidents (59% regarding them as a serious problem and only 16% saying that they are not a problem).

Public perceptions of pollution as a serious problem are greatest among motorcyclists, but interestingly, least among cyclists. Users of private transport means only perceive this least as a problem (44%, say it is a serious problem and 25%, say it is not a problem). Non-users of private transport are much more likely to see pollution as a serious problem (54%).

Petrol and diesel use by transport is of least concern among car and train users (although even for these respondents, over half describe it as a serious problem). Pedestrians and tram/metro users are most likely to see these as a serious problem (68% and 67% respectively). Looking at combined use of modes, a much clearer pattern emerges, with those using only private motorised transport being the least concerned about fuel use (although again a small majority, 52%, describe it as a serious problem), while 65% of those not using cars or motorcycles describe fuel use as a serious problem. Of those who walk and/or cycle only, 66% perceive fuel use as a serious problem.

Overall, petrol and diesel use by transport is perceived as being a problem by more respondents across every mode-use category than any of the other three issues. Respondents who only travel by car and/or motorcycle perceive all four issues to be less of a concern than do respondents who use other modes instead or as well as private transport.

5.3.3 Satisfaction with the way national governments are tackling transport problems - Analysed by modes of transport used

Cross-analysis with the mode of transport shows slight differences between different users' level of satisfaction with their governments' performance regarding the transport issues mentioned. Respondents using public transport modes – or combining them with other modes – are generally satisfied at higher rates. On the contrary, pedestrians and cyclists are the most dissatisfied (of those who walk and/or cycle only and use no motorised mode, only 23% are satisfied and 50% are dissatisfied).

5.3.4 Satisfaction of respondents with public transport services in their city - Analysed by modes of transport used

It is evident that there is a link between the choice of mode that people use in cities and their perception of public transport. The results of crossing overall public transport satisfaction levels with the mode of transport respondents mainly use are provided in the figure overleaf.

It appears that more users including public transport in their urban trips are satisfied than those not using public transport. The lowest level of satisfaction (46% satisfied and 32% dissatisfied) applies to non-public transport users who travel only by car and/or motorcycle, however even among these respondents, there are more satisfied than dissatisfied.

Unsurprisingly, the rate of "don't knows" is higher among non-users of public transport than for users.

It must be considered that users of one mode may also use other modes, and their opinions may be based on the other mode (if they use it more frequently), or on a combination.

Overall, it can be concluded that, while satisfaction is high across all groups, users of public transport are more likely to be satisfied than non-users.

The users being the most satisfied with public transport are those who use all the kinds of modes: public, private and walk or cycle: these people are more satisfied than those who only use public transport.

5.3.5 Opinions on policy expenditure - Analysed by modes of transport used

Respondents' use of different modes of transport has some impact on their opinions about authorities' expenditure and policy priorities, with the most marked differences being opinions on increased or reduced spending on new roads.

Over 60% of car and motorcycle users wish to see spending on existing roads increased, rising to 71% for respondents who only use car and/or motorcycle and not other modes. Among bus users, cyclists and pedestrians, around 60% wish to see an increase in spending, while the figure is lower for rail based users (tram, metro and train), although even here over half wish to see more investment in existing roads.

Greater differences are evident with regard to spending on new roads, with 40% of motorcyclists wanting more new road-building, 36% of car users, but only 24% of train users. More bus, tram/metro, train and cycle users wish to see less rather than more spending on road-building.

Users of public transport modes (even though they were mostly satisfied with public transport services) support the options related to improvement of public transport services at 58% (rising to 60% for tram/metro users). Users of public transport were more likely to desire higher investment in this mode than those who use private transport modes only.

There is however a high level of consensus across all types of users for increased investment in walking and cycling.

5.3.6 Opinions on raising revenue for transport spending and on the ways to implement targeted pricing/taxation- Analysed by modes of transport used

The results of analysing opinions on policies aimed at raising revenue by users of each transport mode show that persons travelling by motorised private transport show a higher preference for general rather than targeted taxation, while the inverse phenomenon occurs for users of both public and slow modes.

Respondents who consider that some targeted taxation has a role to play (choosing either "targeted taxation/pricing" or "a mixture of both") range from 48% to 57%, depending on mode used. A higher proportion of tram/metro users and cyclists supported more targeted taxation or pricing than users of the other modes. The lowest support was among motorcyclists (32% supporting targeted taxation).

Zooming in on ways of implementing targeted taxation or pricing, support for road user charging exceeds any other single method for all respondents, but particularly for public transport users and for cyclists. It should be noted however that this was one of only two methods put to interviewees, so real support for road user charging could be less, as some may have chosen it as the lesser of two evils.

5.3.7 Cross-Analysis of Perception of Urban Transport Problems with Views on Policy Priorities

An analysis was performed on the perceptions of urban transport problems (congestion, accidents, pollution and petrol/diesel use rates) by the views on policy spending priorities. This allows to us to observe to what extent respondents see these policy options as addressing the problems they have identified.

In particular, focus is given to respondents who consider each one of these issues as a serious problem and to those who do not consider them to be problems at all.

Of those respondents who regard congestion as a serious problem, 68% believe more should be spent on improving existing roads, 66% wish to see more spent on provision for walking and cycling and 64% wish to see more spent on improving existing public transport.

However, of those who do not consider congestion a problem, 61% wish to see increased spending on improving existing roads and 53% supported spending more on walking and cycling provision. For the other issues, "spending the same" seems to be preferred, while "building new roads" is the only option presenting high rates of "should spend less".

Thus considering congestion a problem or not has little influence on people's views on spending more on road improvements, but a greater influence on their views on other areas of spending. Note however that it was not specified exactly what constitutes "improving existing roads" – for some it may mean increased capacity, for others it may mean better quality road surfaces, better maintenance, or even reduced capacity (such as traffic calming measures).

An analysis of opinions on accidents by views on spending policies indicates that opinions are almost identical to those about congestion.

For pollution, there is little difference in spending preferences between those who consider pollution to be a problem or not, insofar as road investment is concerned. For public transport and slow modes, however, those who consider pollution to be a serious problem favour greater investment in these areas. For petrol and diesel use, again there is little difference between those who want more, the same or less spent on improved or new roads, but more support for higher spending on public transport and walking/cycling among those who consider petrol/diesel use to be a serious problem.

5.3.8 Views on Increased Expenditure on Public Transport According to Level of Satisfaction with Public Transport

This analysis looks at those who stated that they were satisfied with public transport in their city or urban area, and whether, despite their current satisfaction, they wished to see more money spent on this.

Overall, at EU level, 56% of respondents wished to see higher spending on existing public transport services and 47% wished to see more spent on new public transport infrastructure. Among those who are satisfied with urban public transport in their city (60% overall), the figure falls to 46% wishing to see increased spending on either public transport services or new infrastructure.

5.3.9 Cross-Analysis of Views on Public Spending

This analysis looks at the relationship between respondents wanting increased or reduced public spending between different expenditure domains, such as whether people want to see a transfer of resources (more spending in one area and less in another), or a change in total urban transport resources (e.g. more spending on everything). For example, how many people who want to see more spending on public transport want to see a commensurate reduction in spending on roads, and how many of them want more spending on both?

Overall, out of 3 000 respondents, 446 (15%) wanted authorities to spend more on all five of the domains proposed in the questionnaire (improving existing roads, building new roads, improving public transport services, building new public transport infrastructure, and investment in walking/cycling). Only 81 respondents (<3%) said spending on all five of these options should remain the same, 8 respondents wanted less spending on everything and 11 did not know. The remaining 2 454 respondents (82%) therefore gave answers which were not the same across all five spending domains.

Respondents wishing to see more spending on improving existing roads are slightly more likely than the entire survey sample to desire increased spending in all other areas as well, and slightly less likely to demand reduced expenditure in any area. Therefore, there is no trade off between these people wanting road expenditure to be at the expense of another mode: rather there is a desire for more spending all round.

The same pattern exists for those wishing to see more spending on building new roads, although it is more marked, particularly in terms of these people also being more likely to want more public transport infrastructure expenditure as well.

Of the 1 049 respondents wanting reduced spending on new roads, there is a tendency to support reduced spending in all other areas as well, particularly on existing roads. Therefore, relatively few respondents support reduced spending in one area in order to increase spending in another. To illustrate this, with respect to building new infrastructure (road and public transport):

- 295 respondents want to see less spending on new roads but more on new public transport infrastructure;
- 83 respondents wish to see the reverse, i.e. less on new public transport infrastructure and more on road-building;
- 646 respondents wish to see more spending on both of these; and
- 178 wish to see less spending on both of these.

Respondents supporting increased expenditure on public transport and walking/cycling are more likely to support new road-building than the average for respondents. The biggest difference is for supporters of increased spending on new public transport infrastructure, 79% of whom also support more spending on existing public transport services (and only 3% support less spending on existing PT), compared with 56% and 6% respectively for the whole survey sample.

5.3.10 Perception of Urban Transport Issues and on Policy Priorities by Size of Urban Area

In order to analyse respondents' perceptions of urban transport issues and on priorities in terms of the type of urban area where respondents live, urban areas used in the sample have been classified by population.

Urban areas have been divided into five size categories: under 100 000 inhabitants, 100 000 to 500 000, 500 000 to 1 million, 1 to 2 million and over 2 million.

Analysing perception of congestion and pollution by the size of urban areas confirms the common view that congestion and pollution are worse in larger urban areas.

For congestion, 67% of respondents in the largest cities (with over 2 million inhabitants) describe this as a serious problem, compared to an average of 53% for all respondents and 44% for those in smaller cities (less than 100 000 inhabitants). For pollution, 69% of those in cities with over 2 million inhabitants rate this as a serious problem, against an average of 50% for all respondents and just 34% for those in the smallest city category.

For accidents and petrol/diesel use, there is less of a clear trend according to city size, although there is some evidence that these are perceived to be more of a problem in larger cities.

The satisfaction with national governments by city size was also analysed, but no significant difference was found to exist between rates of satisfaction/dissatisfaction between small and large urban areas.

5.3.11 Analysis of Satisfaction with Public Transport by Size of Urban Area

In general, satisfaction levels of respondents with urban public transport services are not significantly different between different sizes of urban areas. However, as could be expected, residents of big cities are more dissatisfied in terms of security (26% dissatisfied compared to 14% for the smaller cities), while satisfaction with personal security ranges from 62% in the big cities to 76% in the smaller ones.

Respondents in the smaller urban areas were also slightly more likely to be satisfied with reliability and overall public transport than those in large conurbations, while for frequency and network coverage, there was no discernible difference by size of urban area.

5.3.12 Analysis of Spending Priorities and Raising Revenue by Size of Urban Area

Spending priorities by size of urban area show no clear pattern. In general respondents from the smallest and the largest groups of cities are the most in favour of additional spending.

Views on ways to raise funds for urban transport showed some difference by city size, with the percentage of respondents favouring general taxation falling as city size increases. However, this does not necessarily translate into increased support for targeted taxation, although support for this is strongest in urban areas of between half a million and two million inhabitants (42-43%). Only in cities of less than 100 000 inhabitants do more respondents prefer general taxation to targeted taxation.

Analysis of types of targeted taxation by city size was not performed due to the small numbers involved, thus making any result not statistically valid.

5.4 KEY CONCLUSIONS

The data collected and analysed presents an interesting snapshot of public perception towards urban transport problems, issues and policies in Europe. It does not provide a statistically-representative picture of urban population's concerns and opinions for each Member State due to the low numbers sampled (200 per country), the use of telephone interviews with their bias towards respondent accessibility, availability and limited interview lengths, and also due to the different selection of cities in each country.

However, at an EU-15-wide level, with 3000 responses, the data provides a first attempt to place user-oriented urban transport issues within a pan-European context, despite the contextual variances in urban areas within and between the Member States. The exercise can be seen as a ‘taster’ for problems and priorities perceived on a broad-basis by the public within a pan-European survey context.

More detail at the specific urban transport issue level and/or within each Member State can be considered and estimated within a more detailed survey context and format. Issues such as public perception towards the urban transport picture, in view of the different responsibilities of different levels of government in a specific Member State or the contextual factors of specific transport problems and financing options, can be dealt in more-depth through a specific survey on the basis of a specific issue at more detail, compared with this snapshot exercise dealing with a large variety of issues within a limited interview length.

This public perception exercise is useful to national urban policy making bodies within the Member States in order to assess how well their policies are received and what are the problems, priorities and issues seen by their urban populations with respect to their own national urban transport policy framework. In essence, national authorities should not only focus on budgets, process and intermediate outcomes (lane-km built, public transport line operations, etc); national urban transport policies should be oriented also towards the outcomes (mobility, accessibility, environment, etc) and how the urban population perceives the outcome of their policies and measures.

It is also important to note that urban transport policy making at the national level differs in functions and scope among Member States, with the majority of respondents’ focusing on urban transport problems and issues in their own urban areas, rather than the urban transport issues from a national perspective.

6. LINKS BETWEEN STATISTICAL DATA AND PUBLIC PERCEPTION

6.1 OVERVIEW

This chapter explores the relationship between some of the statistical data collected and the results of the public perception survey. Although these use different units and cannot be directly compared in a scientific way, examining the links between objective and subjective data is an innovative aspect which merits some discussion and experimentation.

The aim of any comparison would be to see how public perceptions match with statistical data, for example whether people perceive accidents or environmental issues as a serious problem, compared to how severe these problems are in the various countries.

The main reasons why a direct comparison is not possible are as follows:

- Statistical data collected is frequently patchy or not comparable across Member States. In many cases proxy data from a small number of cities has had to be used, in order to provide an example only (this data may of course differ substantially from city to city even within the same country).
- The cities used for proxy data are not necessarily the same ones sampled in the public perception survey, they were chosen simply to provide examples of data. In any case, the cities used in the Public Perception survey were Sample Points for their country: in other words (taking France as an example), the aim was not to gather data on the views of residents of Paris, Lyon, Toulouse, Strasbourg, etc, because only 20 people were surveyed in each city. Instead, the objective was to gather the views of 200 people in France, with these cities being used as Sample Points. Consequently, comparing statistical data for any one city with the views of just 20 or 40 people in the Public Perception survey is meaningless. The Public Perception results can only be compared with statistics on a national level, and matching the selection of cities for the Public Perception survey with that for the data collection has no value in this context (due to the size of the Public Perception sample). Even when comparing with national data, 200 national interviews cannot be considered statistically reliable.
- Statistical data collected is factual data such as numbers of accidents, tonnes of pollution, euros of investment, etc. The public perception data does not use the same units: people were asked whether they thought accidents, pollution, etc was a problem or not; they were not asked to quantify the amount. Similarly, respondents were asked whether they were satisfied with public transport, whereas public transport data collected includes fares and, to a more limited extent, investment, speeds and modal split.

Any comparison can therefore only be at a broad-brush overview level, using techniques such as ranking or plotting (e.g. countries where accidents are seen as a serious problem against number of accidents, from best to worst). The aim is therefore just to provide a broad feeling of the relationship between the two datasets, not to draw definite conclusions.

Some of the public perception questions, such as those relating to whether spending in certain areas should be increased or reduced, or how to raise revenue, do not relate to any of the statistical data indicators. However, the questions relating to the negative outcomes of urban transport (accidents, pollution, etc) can be analysed in terms of statistical data.

Three examples are presented here, covering the most easily comparable statistics: accidents, pollution and fossil fuel use.

6.2 ACCIDENTS

A comparison can be made between data on deaths or injuries in traffic accidents and public perceptions of accidents being a problem. Such a comparison cannot be direct, but it does show whether the public in countries with a poor accident record are more concerned about this problem than in countries that perform better in terms of road safety.

The figure below shows the number of deaths resulting from road accidents on urban roads per million urban inhabitants for each country. The fatality figures for urban areas are considerably lower than that for the country as a whole. While the number of deaths on urban roads is indeed lower per capita than the corresponding national figures (shown in Chapter 3), due to the lower general traffic speeds, there are two other points to consider:

- The national figures include pedestrian deaths, whereas the urban figures do not (as pedestrian casualties are not divided by urban/rural in DGTREN's CARE database from which this data was taken;
- The number of fatalities on urban roads has been divided by the urban population of the country, using each country's definition of "urban". These areas may not be consistent with the roads classified as "urban", which is usually based on the road's speed limit. Hence this data may not include fatalities on high-speed urban roads, whereas it may include fatalities in small villages which are subject to an urban speed limit but do not fall within the national definition of "urban";

These figures are compared to the percentage of respondents to the Public Perception survey in each country who considered accidents in their town or city to be a "serious problem".

In general, countries with high fatality rates also display a high level of concern in the Pubilc Perception survey (Portugal, Greece and Italy), while the reverse is true for countries with a better safety record (Denmark, Finland, Netherlands, UK). Some anomalies exist, e.g. Luxembourg and Ireland have higher than average urban fatality rates but lower than average percentages of respondents citing this as a serious problem. On the other hand Spain and Sweden have relatively low levels of urban fatalities (Sweden has the lowest in the EU-15) but a higher level of public concern, according to the survey.

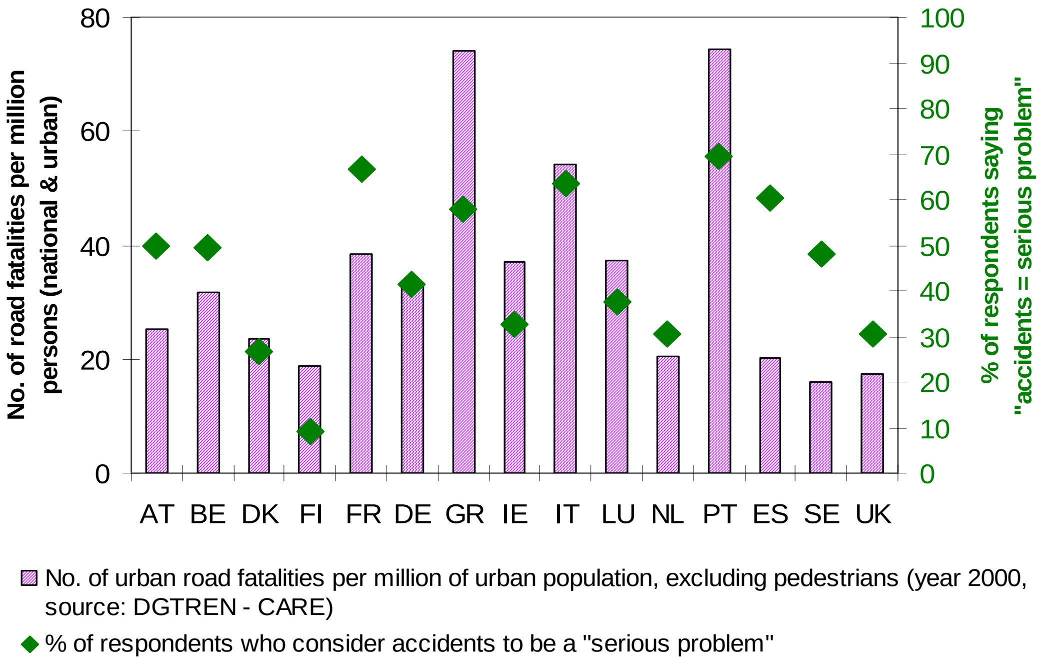


Figure 47: Comparison of urban road fatality statistics with public perception of accidents as a problem (by country)

The following scatter diagram (Figure 48) shows the same data, and a very loose correlation can be seen. The top right dot represents Portugal and the bottom left one is Finland.

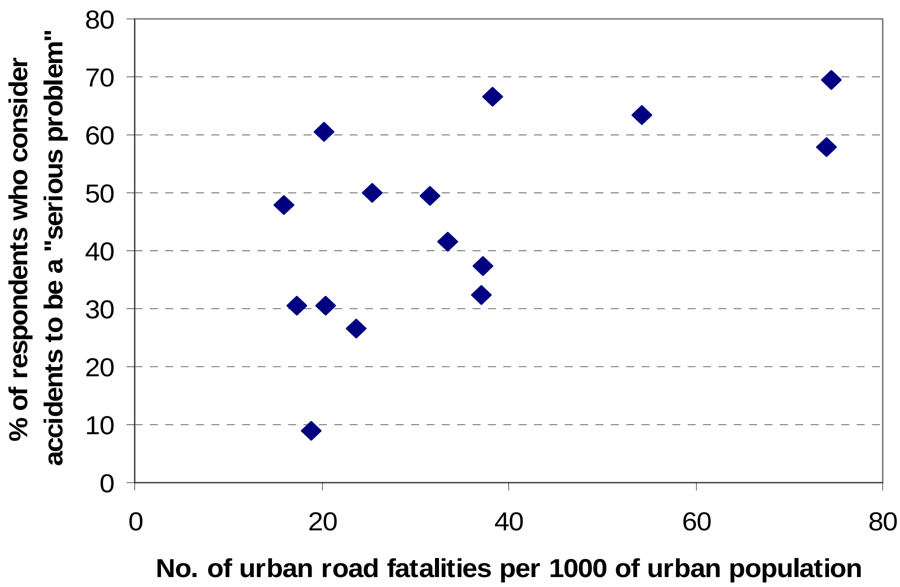


Figure 48: Comparison of urban road fatality statistics with public perception of accidents as a problem (scatter diagram)

It should be remembered that relatively few accidents result in a death, particularly in urban areas, and it is generally the number of accidents (including very minor ones) that is most likely to lead respondents to perceive problems the way they do.

The following diagrams (Figures 49 and 50) compares the public perception data for the same question with total numbers of road accidents per thousand of population for each country. Correlation is much less, however there are several reasons for this. The main one is the large discrepancy between number of accidents, based on different national definitions and rates of reporting. For example, in 2002 the UK reported 228 500 accidents but only 3 581 deaths (one death per 68.3 accidents) while France reported only 105 470 accidents but 7 655 deaths (one death per 13.8 accidents). Statistics for injuries (serious and slight) show similar discrepancies. In addition, this accident data is national, not just urban (not available at urban level).

Hence, the use of accident or injury data to compare with the public perception data is not reliable.

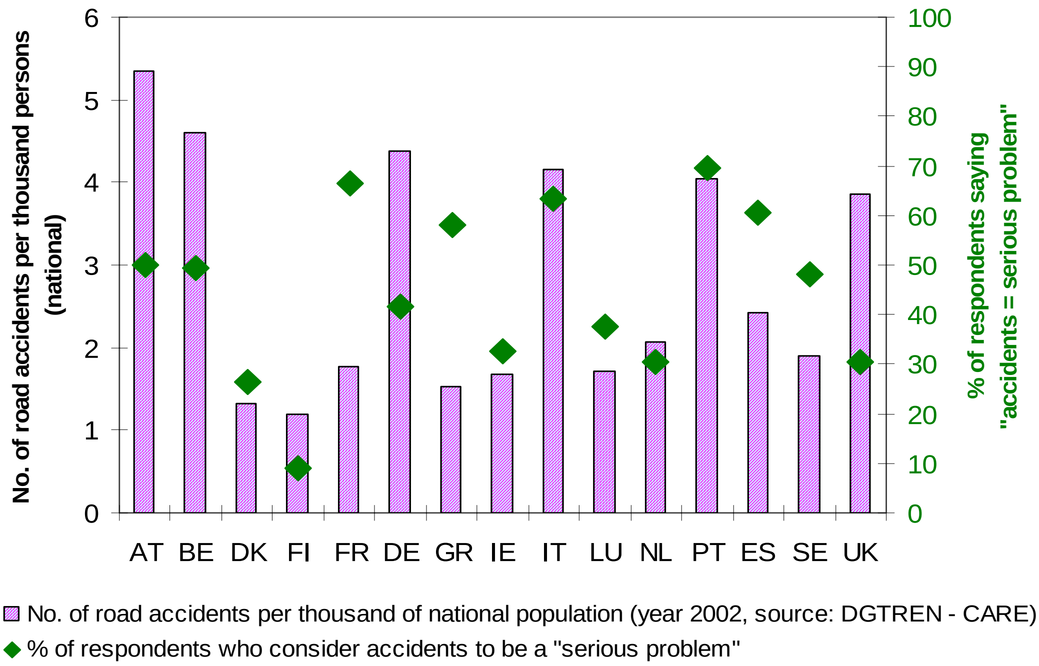


Figure 49: Comparison of road accident statistics with public perception of accidents as a problem (by country)

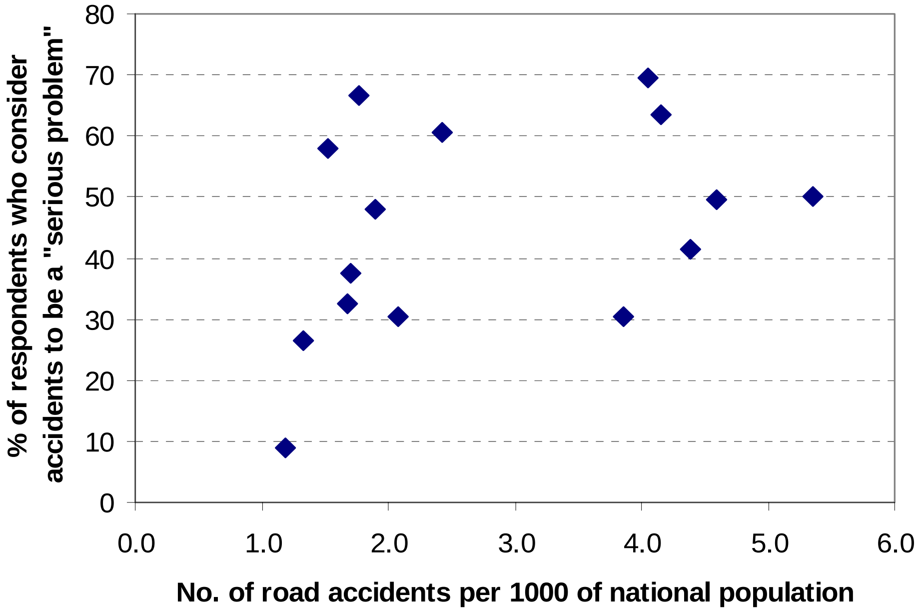


Figure 50: Comparison of road accident statistics with public perception of accidents as a problem (scatter diagram)

Finally, it should be noted that any correlations noted may well be merely coincidental, given that the perception data covers only 200 respondents per country, and that the questionnaire asked about their view of accident rates in their own urban area rather than in all urban areas of their country. This is therefore just a taster to explore how comparisons can be made between subjective and objective data. For any scientific comparison, a much larger and more comprehensive questionnaire survey would be required.

6.3 POLLUTION

The second exercise involved comparison between data on PM_{10} (particle matter) emissions (for all road transport, on a national level) and public perceptions of pollution being a problem. Figure 51 below shows this relationship by country and Figure 52 shows the level of correlation in a scatter diagram.

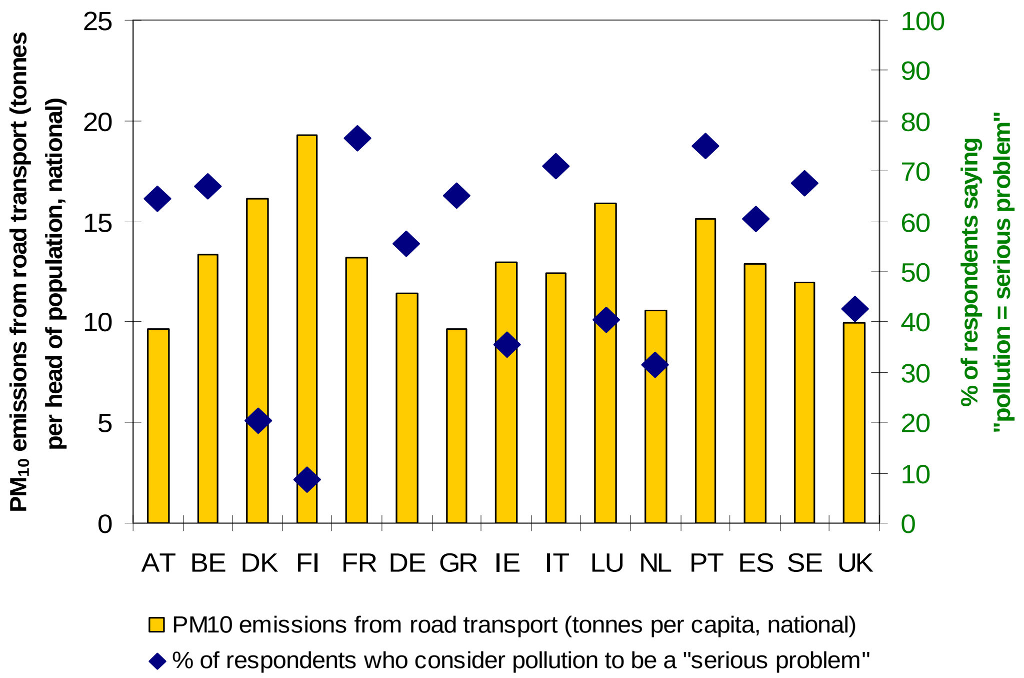


Figure 51: Comparison of road traffic pollution statistics (PM_{10}) with public perception of pollution as a problem (by country)

No correlation has been noted, in fact in Figure 52 there is even evidence of a negative correlation (countries with the highest PM_{10} emissions, Finland and Denmark, show the least public concern for urban pollution). One reason could be that the pollution figures are national, not only urban, and in addition there may be differences in how it is measured (where and how often) in each country.

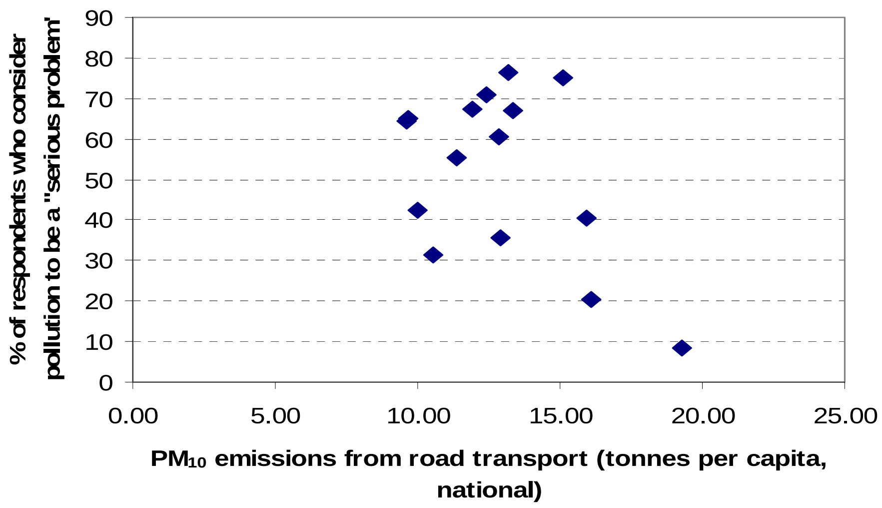


Figure 52: Comparison of road traffic pollution statistics (PM_{10}) with public perception of pollution as a problem (scatter diagram)

6.4 FUEL USE BY TRANSPORT

As CO_2 emission statistics are based on fuel sales, this statistic (at national level, for road and rail transport only) can be considered as a proxy for fossil fuel use. It was compared to the public perceptions of petrol and diesel use (at national level) being a problem. In addition, actual fuel use for all transport on a national level was compared with this public perception statistic. Figure 53 below shows this relationship by country.

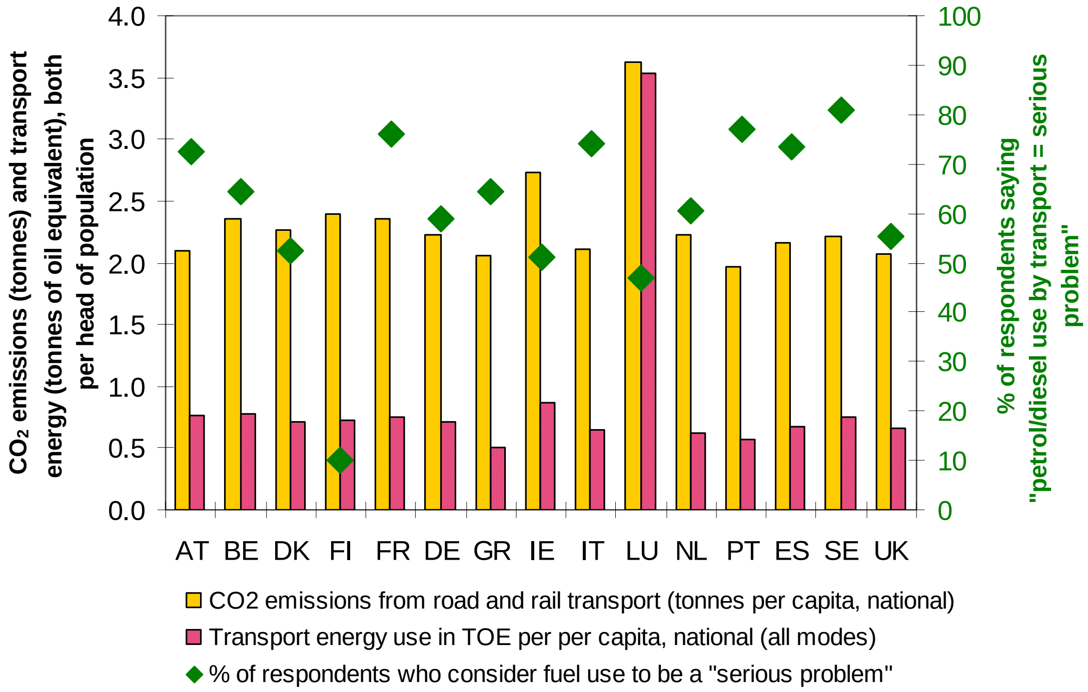
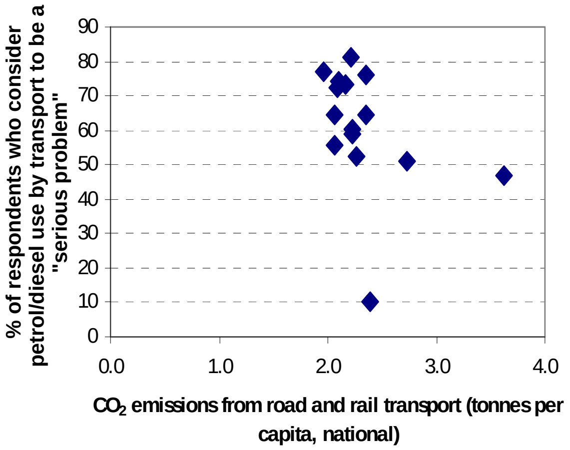


Figure 53: Comparison of road and rail CO_2 emission statistics with public perception of fossil fuel use as a problem (by country)

Figure 54 shows the levels of correlation in two scatter diagrams. In neither case is there a correlation: most countries have a very similar level of energy use, the main exception being Luxembourg, which is represented by the far right hand dot on each of the two scatter charts. Fuel use in Luxembourg is high due to low fuel prices and a large volume of cross-border and transit traffic taking advantage of cheap fuel, compared with a low national population. The level of concern regarding fossil fuel use in Luxembourg was however low compared to most other countries surveyed. Ireland also has high fuel use per capita but a relatively low level of public concern according to the survey, whilst the reverse is true for Sweden, Italy, Austria and Portugal.

In Finland, levels of concern for fuel use (as for accidents and pollution) were very low, possibly due to the fact that many of the Finns interviewed were from smaller cities. Finland is represented by the lowermost dot on each of the scatter charts in Figure 54.



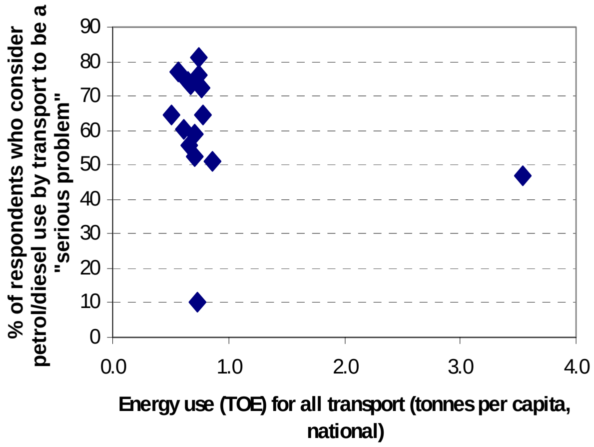


Figure 54: Comparison of CO_2 emission statistics national energy use statistics with public perception of fossil fuel use as a problem (scatter diagrams)

7. EXPERIENCES AND LIMITATIONS OF THE STUDY

7.1 INTRODUCTION

This chapter of the report provides a critique on the aspirations of the study and what has been achieved. Clearly, any project requiring data collection and analysis encounters issues and problems concerning data availability, effort required to access it, data reliability, consistency and comparability. Within a single country there are differences in what is collected and how it is collected, so a study such as this, covering a wide range of indicators and data elements from 15 EU Member States (with various levels of decentralisation of data collection and urban transport responsibilities), is bound to encounter difficulties but also provides a range of useful experiences and conclusions, which can feed into the recommendations in the following chapter.

The two main elements of NPF-Urban Transport were, firstly, the definition of indicators for statistical data (WP1) and the subsequent data collection and analysis related to these indicators for urban transport policies and measures at the national level (WP2), and secondly the public perception survey (WP3). These are described in turn below, covering the contract terms of reference[70], what was actually done, and real experiences, highlighting what was successful, what was not successful and the reasons for this.

7.2 STATISTICAL DATA

7.2.1 Terms of Reference

The aim of WP1 of the project was to select a limited number of indicators (around 15) in order to monitor the success of urban transport policies at the Member State level. Examples of such indicators given in the project terms of reference are capital investments, operations subsidies, real costs, modal split passenger-kilometres, freight-kilometres, vehicle-kilometres, infrastructure, external costs, energy consumption, environment, congestion, road safety, social inclusion and network integration/intermodality.

The data collection and reporting part of the project (WP2) was to collect the data defined in the indicators for each Member State (EU-15) for four years: two "base years" (e.g. 1980 and 1990), a recent year (e.g. 1999/2000) and the most recent year for which data is available (e.g. 2004). The data should be clearly presented, showing key trends.

7.2.2 Indicator Selection

A top-down approach was needed to ensure that the indicators are meaningful in terms of measuring national policy frameworks. A range of indicators was therefore needed which together (if not individually) can provide a good overview of the outcomes of national urban transport policy frameworks. Indicators also aimed to address key European policy priorities, such as the recommendations of the EU's Transport White Paper covering modal balance, bottlenecks, safety, etc.

70 "Specifications attached to the invitation to tender": Invitation to tender no. TREN/D4/14-2002 concerning Assessment of national policy frameworks for urban transport, European Commission, 13 July 2002.

The selection of urban transport indicators was first made by reference to a framework of contexts, inputs and outcomes (both intermediate and final), selecting a range of indicators for each. Indicators from other European initiatives were also checked for suitability.

Although the aim was to pursue a combined top-down and bottom-up approach, selecting urban transport indicators both on the basis of relevance to policy assessment and benchmarking, on the basis of reasonable data availability, in practice there was more of an emphasis on the top-down part and perhaps greater attention could have been given at an early stage to issues of data availability, the practicalities of collecting it, and its comparability. Although a largely top-down approach is essential in terms of measuring urban transport performance in terms of real inputs, intermediate outcomes and final outcomes, defining an indicator on this basis is clearly easier than collating the correct data with which to measure it.

Although some exploratory urban transport data collection was carried out for a small sample of countries (those in which project partners are based, i.e. France, Germany and the UK) and a review of previous data collection efforts at the European level, this was not an in-depth exercise and even at that stage it became evident that most data elements existed at local urban level only, or at national level without any urban/non-urban split. It was recognised at that stage that the main challenge at urban level was the different characteristics of different cities (area, population, dependent hinterland area and population, administrative structure, etc).

Furthermore, most of the indicators defined were broken down into various data categories. For example, urban transport safety needs to be examined in terms of fatalities and injuries, both serious and slight, by mode of transport; transport emissions needs to be analysed by type of pollutant (four were chosen); average age of the public transport fleet should be disaggregated by mode of public transport (as trains, metro cars, trams and buses typically have a different design life), and so on.

This means that the number of indicators selected (originally 27, then reduced to 25, of which 7 were "context" indicators) exceeded the planned 15, and given that the number of data categories split many indicators into several sub-indicators at data collection level, the final list was somewhat ambitious in relation to the project resources available for data collection (just a few person-days per country for all indicators).

7.2.3 Data Collection

The data collection was carried out mainly by the project team, with the assistance of transport research or consulting organisations in most of the countries, which were given short subcontracts (typically 3 to 4 days) to collect data from their country.

The indicators and data categories were organised into a comprehensive spreadsheet with full instructions to data collectors. The 27 indicators comprised a total of 132 separate data elements for each year, which equates to 7920 separate data elements if considered for 15 countries for four years. This compares with the planned 15 indicators x 4 years x 15 countries, = 900 data elements.

The data collection thus concentrated on the most accessible data at national level, rather than committing resources to finding data that may well exist but is time-consuming to access. This means that methods focused on reviewing transport masterplans, relevant databases and websites at national and European levels (transport and environment ministries, statistics institutes, operator associations, etc), reviews and annual reports of local and regional transport authorities, operators and associations of authorities and operators, etc. Personal contact with some organisations was made but this was the exception rather than the rule. Actual data collected was in the order of 2000 individual data elements.

As already stated, in almost all cases, national data for urban areas only does not exist, the only exception being road fatalities and injury statistics in DG-TREN's CARE database, which are based on whether the road has an urban speed limit (typically under 60 km/h) rather than the size of the urban area. Data collectors were therefore advised to collect national data (where available) and also sample data from urban areas. The urban areas for which sample data was collected were limited to typically one or two per country (to serve as "example data" rather than purporting to be representative of that country) and the cities were simply chosen on the basis of data being most easily accessible. For this reason, data collected at local level could not be compared between countries in a meaningful way.

A truly representative stratified sample would have required a number of urban areas in each of several size categories to be sampled for each country.

7.2.4 Lessons Learned

The main conclusion is that the expectations were not consistent with the size of the project, particularly as the indicator list developed by the project and the Advisory Group went well beyond what was originally envisaged.

The second conclusion is that, although it was expected that "national urban" data would not exist in most cases, the huge difference between local urban data, even for similar-sized cities in the same country, made it impossible to use such information as proxy data for the national level, even when based on a number of cities.

The indicators developed were, overall, the right ones in terms of assessing urban transport outcomes at local level, comparing them with inputs and contextual factors, and benchmarking overall urban transport performance (and hence the outcomes of national policy frameworks) at the national level.

The main omission in the list of indicators is a measure of the positive outcomes of urban transport. The outcome indicators defined cover negative aspects such as accidents and pollution; however benefits of transport such as accessibility or socio-economic benefits were not included. A practical reason for this is that these are not easily measured, and even where best practice measurement techniques exist, these are nonetheless rarely used by data collection agencies. Positive aspects are still the subject of research, such as in the EU project TRANSECON[71], where an in-depth study of 13 European cities revealed that the regional economic effects of urban transport infrastructure investment have a multiplier of about 2 to 2.5 of the transport investment costs and that there is an additional employment effect of around 30 persons per year for each million Euro invested in local transport infrastructure[72].

However, in order to conduct a true benchmarking using these indicators, a much larger project would be required in which a range of cities and urban areas would need to be pre-defined and categorised by population group. Between six and ten population groups would be required (e.g. with thresholds at populations of 20 000, 50 000, 100 000, 250 000, 500 000, 1 million and 3 million) and at least four cities in each category should be selected per country (clearly in the smaller countries there will be fewer than this for some categories and no cities in the larger categories). For a large European country, this would mean data collection for over 20 cities in order to get a true picture of the national urban transport situation, and in the order of 200 across the EU-15. This is an exercise larger than recent or existing major initiatives such as the

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[71] "Urban Transport and local Socio-Economic development", European Commission DG-TREN 5th Framework GROWTH programme

[72] Ref: TRANSECON Deliverable 7: Final Report, December 2003 (see www.transecon.org)

UITP's Millennium Cities Database (covering 100 cities worldwide, of which 31 are in the EU-15), the DG-Regio Urban Audit (covering 258 European cities, of which 189 are in the EU-15), or the SESAME project[73] (covering 40 cities in the EU-15), all of which are considerably larger than this project.

Within the scope of a project the size of NPF-Urban Transport, the quality of the overall results (concerning the statistical data) and the added-value in terms of assessing urban transport performance and thereby policy outcomes, would probably have been improved by the following:

- A more in-depth preliminary data collection exercise, before the definition of the final indicators, in order to assess real data availability. This should have been conducted not in France, Germany or the UK, where data collection and accessibility is above average, but in one of the more "difficult" countries, where there is relatively little reporting or benchmarking activity for urban transport related matters.
- As a result of the above exercise, a much-reduced set of indicators could have been defined, with a clear plan on how to deal with data that is not at national level. A pre-defined selection of cities per country should have been defined, based on a range of city sizes (although even with a considerably reduced list of indicators and data collection elements, only about four cities could realistically be researched for a large or medium-sized Member State, thus such a selection would be rather problematic and largely arbitrary).
- This reduced set of indicators would have focused on outcomes (intermediate and final), as input data, particularly investment data, is particularly difficult to compare between cities and between countries because of different spatial scales. Devising a way to successfully benchmark urban transport investment is a topic that would require a research project of its own to address.
- A project with more partners or major subcontractors would have ensured a better geographical coverage and local knowledge in some countries, however this would have required increased resources.
- The presence of representatives from Member States' governments in the Advisory Group would have been beneficial, in terms of providing access to additional data resources and giving reliable advice on what data is and is not collected at national level, what (if any) national urban indicators exist or are planned, etc. Member State representation in the Advisory Group was foreseen, however the absence of any formal Member States committee concerning urban transport (similar to the TEN-T Committee for Trans-European transport matters) seriously restricted avenues by which such participation could be encouraged. Participation was however promoted at an ECMT Urban Data Task Force meeting.
- An alternative data collection method would have been to devise a questionnaire and send it to the Member States' authorities themselves for completion. This was originally envisaged in the proposal for this project and would have required considerably fewer resources within the project. However this was not proceeded with for two main reasons. First, as noted above, there is no common first contact point to which such a questionnaire could be sent (equivalent to the TEN-T Committee for Trans-European Networks, which was used as a contact point for a previous project on TEN-T

[73] "Derivation of the Relationship between Land-use, Behaviour patterns and travel demand for political and investment decisions", European Commission DG-TREN 4th Framework Transport Research programme

indicators). Responsibilities for urban transport data at national level are generally poorly defined and could be split between a number of bodies (e.g. ministries of transport, ministries of internal affairs or regional/local government, ministries of the environment, national statistics institutes, etc). Secondly, previous experience has shown that sending lengthy questionnaires to public administrations normally elicits a very poor response if it comes from a private entity such as a consulting company (even if there is official support from the European Commission), as regional or local urban administrations are under no obligation to co-operate.

7.3 PUBLIC PERCEPTION

7.3.1 Terms of Reference

The project terms of reference stated that the "objective" data on policies and activities described above do not necessarily reflect how effective and successful citizens perceive them to be. For this reason, a Public Perception exercise was planned and executed (WP3 of the study).

The aim was to define about eight indicators on public perception covering inputs, outputs and outcomes and to use them to conduct a survey in the EU-15. It was agreed to use a centralised market research institute to undertake the fieldwork by telephone, with a target of 200 interviews per Member State (i.e. 3000 in total).

7.3.2 Indicator Selection

Indicators were aimed to mirror those developed in WP1 for the statistical data collection. However most of these were not conducive to being turned into a survey question for use on the general public. Therefore, while these questions were largely related to the WP1 indicators, they were put in a different way, for example:

- Concerning the (negative) outcomes of transport, citizens cannot be asked about precise levels of pollution, noise, accident numbers, etc, only to what extent they perceive them as a problem;
- Concerning investment expenditure, most citizens do not know current levels of expenditure, so perceptions cannot be compared to actual levels, however they can generally judge whether expenditure should be increased, reduced or remain the same for various elements (roads, public transport, etc), based on their experiences of the current transport system in their local area and on their political priorities (e.g. "pro-" or "anti-" road, public transport, etc, or neutral).
- As the assessment of policy is one aim of the study, and because the statistical indicators cannot explicitly assess policies or policy frameworks (as measured outcomes can be due to factors other than the policy in place), it was considered important to ask some policy-related questions such as satisfaction with government performance, relative priorities for different areas of spending on urban transport, and ways in which to raise revenue for this.

The major limitation to the selection of indicators was the number of questions that could be asked in a reasonable telephone interview. Interviews were planned to last an average of seven minutes, and certainly no longer than ten minutes, as beyond this time respondents are increasingly likely to refuse to participate or to terminate the call before the end of the interview.

Also questions had to be relatively short and simple, to allow translation and to enable clear understanding to people from different backgrounds and experiences who may have little or no knowledge on urban transport policy issues.

The selection of indicators and questionnaire wording was extensively discussed in the project's Advisory Group, and the questionnaire itself was pre-tested on a small selection of people from three countries, including people not specialised in transport.

7.3.3 Data Collection

The data collection for the questionnaire, awarded to market research company AMR in Düsseldorf, went smoothly with no problems reported. The number of telephone calls required to meet the sample frame varied greatly between countries (in terms of non-responses, refusals, etc) but 200 successful interviews per country were achieved.

The main issue related to the geographical spread of interviewees. AMR was asked to propose a geographical sample frame and initially broke down the 200 per country into 10 cities with 20 respondents each. This was modified by ISIS, in particular by eliminating towns with a population of under 20 000. For the smaller countries, where there are not ten sufficiently sized cities, the major cities were allocated a greater amount of interviewees. For example in Ireland there were 80 interviewees in Dublin and 40 each in Cork, Limerick and Galway. On the other hand, in countries such as Germany and Italy, most of the cities were large ones.

Results were therefore skewed somewhat by the choice of urban areas in each country. The country most affected appeared to be Finland, where car use tended to be very high in relation to public transport use, and respondents generally did not consider the negative effects of transport (pollution, accidents, congestion, etc) to be a problem, as a large part of the Finnish sample was from smaller cities e.g. in the 50 000 to 100 000 population range (the 40 respondents from Helsinki tended to have opinions closer to the EU average).

In analysing the data it was possible to break down results by age group, by sex, by country, by mode of transport used, etc, but not by two or more of these criteria at once (e.g. young people from France who are bus users) as the numbers of interviews becomes too small to give any statistical confidence to the results.

Finally, when considering results from the EU-15 as a whole, it should be recognised that the equal number of interviews per country, regardless of that country's population (or urban population) skews the results in favour of the smaller Member States, e.g. the opinions of the 200 Luxembourgers have the same weight as the 200 Germans interviewed. Hence the total figures presented in Chapter 5 of this report are an average of the 15 countries, and not an EU average.

7.3.4 Lessons Learned

Overall, this was a successful exercise, which produced some interesting results. It is also, to our knowledge, the only EU-wide public perception survey relating to urban transport issues since a Eurobarometer survey in 1991[74] (which covered only the then EU-12 Member States).

All of the questions asked were relevant and produced useful data, and it is unlikely that additional questions could have been added, given the constraints of a telephone interview.

[74] See Chapter 9.2 "Related Public Perception Studies" for details.

In retrospect, the main thing that would have improved results would have been a more rigorous selection of sample cities, with a certain number of cities of each size category per country. However this is difficult, as some countries do not have any very large cities, and others (such as Germany) have a high proportion of its population in large metropolises. Given that over half of Germans live in urban areas with a population of 200 000 or more, but only 25% of Belgians and Irish do, and Luxembourg has no urban area at all of this size, a fully consistent model for distributing the 200 interviews per country is impossible.

The best solution would perhaps be a hybrid one, with a minimum number of interviews for each country, but more for the larger countries, and a country weighting by population (or urban population) applied when analysing results at the pan-European level.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

The NPF-Urban Transport project worked on gaining a better understanding of the performance of the urban transport in Europe (EU-15 countries) through a combination of statistical data and public perception survey of problems and priorities. Specific conclusions relating to these two project activities are presented in Chapters 3.5 and 5.4 respectively. This chapter focuses on overall conclusions from experiences in the project that can feed into recommendations. Recommendations are aimed at all levels of administrations, including local and regional authorities, national governments and European institutions.

The conclusions and recommendations are divided into those related to methodology (data collection and harmonisation), and policy issues, and are discussed in the following two sub-chapters.

8.2 METHODOLOGY

This section stems largely from the experiences in this study (described in Chapter 7) and looks at what follow-up activities should be carried out to ensure an appropriate level of monitoring of urban transport policies and outcomes.

8.2.1 Clear Definition and Standardisation of Urban Areas

Issues such as measurability, precision requirements and time frame for the various urban transport data are not harmonised at the national level and consequently at the European level. One key example is the definition of "urban", which as shown in Chapter 3.1.2 of this report differs significantly in Europe, with population thresholds ranging from 200 to 10 000.

According to the United Nations Statistics Division[75], there is no internationally agreed upon definition of urban and rural that would be applicable to all countries. Indeed the UK Office of the Deputy Prime Minister commissioned a study in 2001 on defining urban and rural areas[76] for policy purposes and statistical reporting, and this found that even within the UK, no single existing definition of urban and rural areas could meet the needs of all users. It produced a user guide and also mapped out settlements in England and Wales with a population of over 1000 and over 10 000. Although 1000 is the current threshold for an urban area, it was recommended that 10 000 be a cut-off point for urban/rural statistical reporting. It also treats the issue of narrowly separated urban areas (criteria for deciding whether they are a single urban area or two separate ones).

For data to be disaggregated by urban/non-urban as recommended above, a common threshold is needed. This need not interfere with national definitions of urban for other purposes, but should be based on urban transport factors. So, while a town of 10 000 may well be urban, it is unlikely to have a specific urban transport policy, its urban bus network would normally be rudimentary, and so on. This study has focused on larger urban areas, from about 20 000 or 50 000 inhabitants upward. A population 100 000 is a common threshold for a major urban area

75 Ref: http://unstats.un.org/unsd/demographic/sconcerns/densurb/default.htm

76 Ref: http://www.statistics.gov.uk/geography/urban_rural.asp

(this threshold is used by the United Nations in its Demographic Yearbook for detailed population analysis[77]) and a city of this size will almost certainly have a reasonably extensive bus network and some sort of urban transport policy. Urban agglomerations of 200 000 to 500 000 people will tend to have some rail-based public transport system, while at over one million inhabitants, we have conurbations with a need for a well developed transport system, policies, indicators and reporting.

The following recommendation can thus be made:

Recommendation 1:

The European Commission, through Eurostat, should define a series of population thresholds for urban areas, for which national transport data should be disaggregated and reported to Eurostat. National and regional authorities should apply these thresholds wherever possible in their transport data collection. These thresholds should be without prejudice to existing definitions and thresholds used in the Member States.

The above recommendation would require a Commission Directive. The thresholds to use should be the result of consultation with Member States, as the imposition of too many different categories of urban area will clearly increase data collection costs.

At a very simple level, a single threshold for "urban", with respect to transport, could be set at either 50 000 or 100 000.

If two thresholds were acceptable, they could be 50 000 to 200 000 and over 200 000.

For three groups, the above could be used with an additional category of over 1 million.

Although more than three groups would be desirable in terms of permitting more detailed monitoring, this is not recommended in the short term at least, as the data collection and administrative burden may be too great.

8.2.2 National Monitoring for Key Urban Transport Statistics

In general, the amount of data in Europe related to urban transport covers a huge range of different aspects and measurements, and is very heterogeneous. A number of organisations and studies have attempted to develop databases of available transport data from a "patchwork" of various national, regional and city-based sources. However, in most countries there is no consistent data reporting and urban transport performance monitoring at the national level. Consequently, there is a lack of data that is specific to urban areas.

This not only impedes analysis of the situation at an urban level, but also distorts national and regional data, e.g. national or even regional statistics on aspects such as modal split, pollution, congestion or public transport supply can hide significant differences between urban and other areas. A greater disaggregation of data would also improve monitoring at other spatial levels (regional, long-distance, rural, etc). Hence, a first recommendation to Member States at a very general level would be as follows:

[77] Ref: http://unstats.un.org/unsd/demographic/sconcerns/densurb/urban.aspx

Recommendation 2:

Where performance is being measured against common overarching national and European objectives, it should be done in a consistent manner. National governments in the Member States (and also devolved or regional governments where these have statistical collection responsibilities) should aim to collect key transport statistics in a way which allows results to be shown separately for urbanised and non-urbanised areas (with a clear description of how these areas are defined).

8.2.3 Pan-European Reporting of Key Urban Transport Outcomes

Although urban transport policy is a matter for local and regional administrations, the European Commission and national governments also have an interest in ensuring that urban transport performs effectively, in order to play its part in meeting high-level objectives such as a reduction in pollution, fuel consumption and accidents. Specifically, they have an interest in the outcomes of the policies set at city, metropolitan authority or regional level. This in turn requires a consistent understanding of how urban transport is performing.

In many cases, even within major metropolitan areas in Europe, different entities such as municipalities, public transport companies and regional authorities have their own internal monitoring measures with no monitoring of overall urban transport performance over time. In contrast to strategic transport performance monitoring at the national or TEN-T (Trans-European Networks for Transport) level, no performance monitoring mechanism exists for urban transport performance at the pan-European level.

It is important not to lose sight of the desired outcomes, and to monitor them directly where possible. National and European monitoring of urban transport performance should concentrate on a common set of outcome type indicators of European importance, linking them with a common set of input indicators and intermediate outcome indicators which are needed to explain them, in order to show performance in relation to expenditure and investments.

At local, regional and national levels, a common reporting scheme should therefore be devised to report on the general urban transport performance picture, whereas at the local level, authorities will also be able to collect data relating to specific performance elements that reflect local circumstances and priorities. In other words, there should be a common set of overarching objectives for cities, which are of European importance and set by the EC and Member States. These should relate to European policy objectives (as in the White Paper), covering issues such as safety, air quality and climate change, modal balance, accessibility and placing users at the heart of transport policy. They should be developed under the auspices of Recommendation no.8 (in the Policy section of the recommendations, Chapter 8.3).

It is not proposed that the European Commission instigate a "heavy" reporting mechanism which puts a significant data collection burden on local, regional and national authorities, particularly as responsibility for urban transport does not rest at the EU level. However, in order to monitor specific urban elements contributing to EU policies in the Transport White Paper, such as accident and environmental performance, modal balance, etc, a small number of key data items should be available at national level for urban areas. These "quick win" indicators should concentrate on those for which data is already collected, with a focus on providing an urban/non-urban split (c.f. Recommendation no.2).

Recommendation 3:

The European Commission, through Eurostat, should specify a small number of "quick win" indicators for which the Member States should provide data at urban level, measured in a consistent way. These should concentrate on outcome indicators for which there are common objectives at the European level and for which national data is already collected for all countries. Where this imposes additional data collection and reporting effort on local and regional authorities, national governments should consider assisting this with central funding.

The project found that the indicators considered could be categorised as shown in Table 14. While ideally all are relevant and should be considered for implementation at national and European level, in practice some are more easily measured than others. This means that, even if the focus is on outcome indicators (related to objectives which are important at a European level), a pragmatic approach is needed whereby it may be appropriate to use intermediate outcome data in some cases as a proxy for outcome indicators. The "quick win" indicators mentioned in Recommendation no.3 above should therefore be drawn from the Level A indicators in the following table (and in the medium-term, Level B).

Other indicators identified in this project (e.g. at Level C, and eventually at Level D) could be gradually introduced with the formation of data collection mechanisms and the availability of the necessary funding for data collection.

It is also necessary to regularly review the performance indicators to add on to evolving priorities and monitoring schemes. International and European organisations, mainly Eurostat but also the EEA, OECD, ECMT and UITP, should also be closely involved in the harmonisation work, in co-ordination with current data collection activities which take place under their auspices.

Table 14: Recommended core indicators

Level of data availability and consistency	Category	Policy objective	Urban Indicator
Level A ("Quick win" indicators): Data collected and consistent	Context	None (context indicator only)	Car ownership
	Intermediate outcome	Achievement of an appropriate modal balance, with a shift towards more sustainable modes of transport	No. of trips by mode
	Outcome	Reduction in fossil fuel use and in air pollution (specifically CO_2 emissions)	Energy Use (mtoe per capita), Emissions (tonnes of CO_2 per capita)
Level B: Data collected and largely consistent, but some harmonisation needed	Context	None (context indicator only)	Urban population
	Input	Achievement of an appropriate modal balance Provision of quality public transport	Transport supply by mode Age of public transport vehicles/rolling stock

Level of data availability and consistency	Category	Policy objective	Urban Indicator
	Intermediate outcome	Achievement of an appropriate modal balance, with a shift towards more sustainable modes of transport	Passenger-km by mode, per capita, but for urban areas only, for intra-urban trips and trips between the urban area and neighbouring areas
	Outcome	Increasing safety	Transport accidents (deaths and serious injuries) by mode
Level C: Data collected (or sometimes collected) but not consistent, effective benchmarking currently impossible	Input	No direct objective but can explain other indicators, and also indicate relative priorities and/or investment needs across different types of transport	Investment expenditure on urban transport infrastructure Expenditure on public transport services
	Intermediate outcome	Provision of quality public transport	Public transport reliability (delays, cancellations)
	Outcome	Reducing congestion Reducing noise pollution Provision of transport system which responds to citizens' needs Health objectives (reducing respiratory illnesses, promoting exercise, etc)	Average traffic speeds (peak, off-peak and night time) Transport noise User satisfaction (public perception) Socio-economic and health benefits
Level D: Important indicator but no commonly agreed method of monitoring it: Requires further research.	Intermediate outcome	Provision of quality public transport and achievement of an appropriate modal balance	Public transport integration (for larger urban areas only, where there is more than one PT mode or operator)
	Outcome	Provision of quality public transport, social inclusion and provision of transport system which responds to citizens' needs	Accessibility of public transport services[78]

8.2.4 Standard Definition of Outcome Indicators

Beyond the key European and national indicators covered in Recommendation no.3 above, local and regional authorities may wish to (and should certainly be encouraged to) develop their own indicators in order to measure aspects of local importance. While these will differ by local and regional policy, and it is certainly not within the competence of this project or the EU to specify or suggest what local indicators should be adopted, there should be an effort to harmonise the format of data that is collected in order to allow comparisons between those areas where data is collected. This is indeed in the local authorities' own interest, as it allows

[78] This relates to general accessibility (distance from station/stop, frequency, etc), not to physical accessibility (e.g. for disabled people), which is more easily measured.

benchmarking to take place against other local authorities in Europe which are broadly comparable.

Priority should therefore be given to specifying a common format for indicators and data rather than obliging its collection. In other words, European and national authorities should provide advice not on *what* data to collect (beyond that specified in relation to Recommendation no.3), but on *how* to collect the data:

Outcome data for other local objectives may also be provided on a bottom-up basis by local authorities, even if there is no top-down requirement for this data. National governments and the European Commission should monitor such initiatives from local authorities with a view to possibly further exploring and adopting innovative new indicators where these provide a useful measure of performance.

Recommendation 4:

European institutions should specify standards for all urban transport related data which is submitted to national ministries or statistics institutes, regardless as to whether this submission is obligatory or not. The European Commission (either directly or via national governments) should also monitor any additional indicators used at local or regional level in order to assess their value for possible adoption at European level.

The above recommendation specifies that the standards be set at European level because doing so at national level would inevitably lead to different standards being adopted and becoming entrenched in different countries, thus hampering benchmarking. Once statistics are needed at a level above the city level, there should be a European standard developed, whether by the European Commission (including Eurostat), CEN (European Committee for Standardization),

In summary, a few common indicators should be developed to enable benchmarking, monitoring, and decision-making at the national and European level, with greater flexibility at regional and local levels.

Several outcome indicators, which relate to European policy goals (such as transport accidents, noise, traffic congestion and accessibility of different areas by appropriate transport infrastructure and services), do not have standard definitions or thresholds at European (and sometimes at national) level.

In some cases, such as accessibility of different parts of an urban area by public transport, there is no widespread method of measurement and standardisation is some way away. Similarly for congestion, creation of a standard definition is not a near prospect.

On the other hand, a “quick win” solution with respect to the different definitions that exist for injuries and deaths in accidents is relatively feasible in the short-term and could form the basis of a recommendation.

Regarding road related fatalities, the definition used by most EU countries is that the victim dies within 30 days of the accident as a result of their injuries. However some countries use other definitions (death within 7 days, 6 days or 1 day). For injuries there is a greater range of definition: some countries distinguish between slight and serious injuries and others do not. A serious injury in Spain is one where the victim is hospitalised for at least 24 hours, whereas in France it is one where the victim is hospitalised for at least 6 days. It is considered that the harmonisation of at least the definitions of “killed” and “seriously injured” at the EU level would be relatively straightforward and would be of great value in benchmarking transport safety indicators. Such a harmonisation, which would require a European Commission Directive, should apply to all transport fatalities (not just road).

Recommendation 5:

The European Commission, through Eurostat and in consultation with Member States, should specify a standard definition for transport fatalities and serious injuries. Member States should be required to use these definitions in their statistical reporting of transport accident and fatality/injury data.

Urban congestion is another major "outcome" issue, and although this is less easy to harmonise than accident data, as mentioned above, it is recommended that attention be given to this in the longer term, e.g. by monitoring different ways of measuring congestion in an urban area (average peak hour speeds against free-flow speeds, percentage of time speeds fall below a certain threshold, etc) and evolving a best practice solution which is relatively simple to implement. Therefore, no definite recommendation can be given for measuring congestion or accessibility, rather these are subjects which require further research to ascertain whether an agreed harmonised measurement method is indeed feasible. Concerning energy use and emissions, this is generally collected by transport mode, but the implementation of Recommendation no.2 (disaggregating by urban/non-urban wherever possible) would be highly beneficial.

Recommendation 6:

The European Commission should continue to support research aimed at defining means to characterise and benchmark transport outcomes. This should include positive outcomes (e.g. accessibility of places by public transport) as well as negative outcomes (e.g. congestion and noise from transport).

8.2.5 Definition of Other Indicators (Inputs and Intermediate Outcomes)

Although these indicators are generally of a lower priority than the outcome indicators for measurement and benchmarking at a European scale, they are nevertheless important and, where a common definition can be achieved, can be treated in the longer term. In some cases, such as number of trips by mode and passenger-kilometres by mode, definitions are fairly standard (with small exceptions, e.g. whether taxis are treated as a separate mode or treated under another mode or an "other" category) and the implementation of Recommendation no.2 to provide an urban/non-urban split would be sufficient.

For transport supply by mode, there are a number of different definitions, such as vehicle-kilometres (with trams, metros and trains sometimes being treated as a single vehicle, and sometimes in function to the number of carriages they have), seat-kilometres or place-kilometres (to take into account vehicles with few seats but a high standing capacity). It would appear that the latter is the fairest measure, as it accounts for networks with different modes and vehicle sizes. While harmonising this measure could be a longer-term recommendation, care needs to be taken with this indicator as a high level of public transport capacity does not necessarily mean that the capacity is in the right place at the right time, for example for operational reasons, many networks operate full size buses or standard length train sets at off-peak periods as well as peak periods, thus providing over-capacity which does not necessarily provide a benefit to the user.

Transport investment is one of the most difficult areas to harmonise and benchmark and any standard definition would require further research and considerable consultation with Member States and urban and regional authorities.

8.2.6 Continuous Gauging of Public Opinion Regarding Urban Transport

The survey used in the NPF-Urban Transport project provided a rich knowledge base of public perception and attitudes towards urban transport at the European level, and could form the basis for a repeat survey on a larger scale. In many cases, local authorities or operators providing transport services to the public conduct periodic surveys of customer satisfaction with the services they offer. Where there is a clear mismatch between policy performance and policy acceptance, this may indicate the need for more effective promotion and education.

At the national and European scales, a concerted effort should be made to develop and conduct a periodic survey to gauge and identify trends in public opinion regarding urban transport services, using a consistent sampling frame and methodology. Cultural differences and social and geographic factors which underlie differences in public perceptions and attitudes between countries (and indeed between regions within countries), should be recognised.

European efforts such as Eurobarometer conducted by Eurostat should be encouraged to obtain a clear picture of urban transport satisfaction among the general European population, particularly as there has not been a Eurobarometer survey on public perception related to local transport issues since 1991.

Such monitoring of public opinion, based upon a consistent representative sampling frame, serves to robustly measure the relevance and effectiveness of the measures and policies developed for urban transport and allows timely refinement of measures to achieve greater acceptance. Recent Eurobarometer surveys have had a sampling frame of an average of 1000 respondents per country, but with 1500 in Germany (500 of them in the Eastern Länder), 1300 in the UK (300 of them in Northern Ireland), and 500 each in the three smallest EU-25 countries (Luxembourg, Cyprus and Malta). This would appear to be appropriate in the case of an urban transport survey (approximately five times the sample size of the NPF-Urban Transport survey), even if they were done on a national basis and some interviews had to be discounted because they did not live in an urban area.

A Eurobarometer based largely on the NPF-Urban Transport questionnaire (with perhaps some changes) would be useful in terms of confirming or correcting results obtained in this study, and also exploring perceptions of people living in the ten New Member States.

Recommendation 7:

The European Commission should launch a Eurobarometer survey on urban transport issues for the EU-25 and repeat it periodically (e.g. every 3 to 4 years)

In particular, questions which could be changed from those in the NPF-Urban Transport survey might be as follows:

- A more specific question on modal experience, asking for all modes used but also asking to specify a main mode used (in terms of distance travelled in a typical working week *within* urban areas);
- A question on public transport accessibility;

- Possibly dropping the specific question about how to finance urban transport through user charges (parking or an urban toll), as this is a leading question which gives only two options.
- If asking opinions on national (or regional or local) government performance, a question should also be asked regarding that government's or authority's performance in general (regarding non-transport activities), possibly asking whether performance on transport is better or worse than overall performance.

Note that other useful suggestions for a Eurobarometer survey might come from urban transport authorities themselves, therefore umbrella organisations such as CEMR (Council of European Municipalities and Regions) and POLIS (network of cities and regions for innovative transport solutions) should be consulted.

As seen in the NPF-Urban Transport project results, greater care is needed in comparing attitudinal responses with objective or physical data. This should be possible in due course to compare attitudes to problems with objective measures of those problems, as was attempted in this project for the three examples given in Chapter 6.

Finally, it can be noted that public perception surveys are one way to measure indicators for which there is no real agreed measurement yet, such as transport accessibility or integration.

8.3 POLICY

8.3.1 Clear Vision of Overarching Urban Transport Goals

As already noted in Sub-chapter 8.2.3, European and national administrations have an interest in ensuring effective measures and performance of urban transport, although the policies and tools to achieve this are generally devolved to regional and local levels. This principle of subsidiarity in the EU should not be a reason for lack of action at European or national level, although at European level at least, actions should focus on supporting valuable policy initiatives and monitoring the outcomes of urban transport, rather than on creating a specific urban transport policy (beyond the general policy goals given in the Transport White Paper).

At the EU level, such a set of common European goals and objectives for urban transport should be placed in a specific document similar to the Transport White Paper but specifically tailored towards urban transport (or a revision of the White Paper itself). This should not be a specific policy, as that is not within the EU's remit, but rather a vision bringing together high-level outcome goals (relating to safety, the environment, modal balance, etc), but at an urban level. This will help give guidance to local and regional authorities and also help clarify the areas of specific interest at the European level (key outcomes), while stressing that policy remains a devolved matter. This is consistent with the recommendation made by the Working Group on Sustainable Urban Transport that a clear vision at EU level should be developed on sustainable urban transport[79].

[79] Reference: *Working Group on Sustainable Urban Transport, Final Report*, European Commission, DG Environment, January 2004

Recommendation 8:

The European Commission should prepare a short policy document setting out its broad vision, interest, and high-level goals for urban transport, and clarifying actions that will be carried out at European level (e.g. monitoring, benchmarking and specification of harmonised data collection standards for certain indicators).

8.3.2 User-Orientation of Policies and Measures

Some of the results of the public perception survey have relevance to policy recommendations. While this project does not make specific policy recommendations based on these results, as they are based on a small sample of 3000 European, it does recommend that policy makers take greater account of public attitudes through relevant surveys (c.f. Recommendation no.7 in Sub-chapter 8.2.6).

For example, this survey showed that only 28% of the urban populations surveyed in the EC-15 stated that they were satisfied with their national government's performance in tackling four major types of urban traffic problem (congestion, pollution, accidents and fossil fuel use). While this was a specific question (which could be influenced by other factors) and the result was based on this small sample, it seems to suggest that, in the eyes of the public, national administrations need to take stronger action in these areas. On the other hand, perceptions of respondents towards local public transport in their cities were largely positive.

Another interesting result was that, from the public perception perspective, the top priority for urban transport investment was on improving existing roads and public transport services, with walking and cycling measures also receiving very strong support. These were all preferred compared to increased investment in new road or public transport infrastructure. Thus it appears that the general mood is in favour of localised, small-scale schemes and improving what is already there, rather than major investment in grand projects.

Lastly, preferences between general taxation and targeted pricing differed considerably between different countries. This suggests that national and local consultation with citizens is important before developing any pricing or local taxation scheme. In some areas support was shown for road user charging in principle (either on its own or combined with other measures), provided that revenue was invested in transport. In others, there was opposition. This reinforces the need to keep actual policy-making at local level, but to allow local authorities to develop innovative schemes where these have public support.

While this project cannot recommend particular policies based on a limited public perception survey, a general recommendation is as follows:

Recommendation 9:

Local, regional and national authorities should place a greater emphasis on public involvement, perception and opinion in urban transport policy development, particularly in view of the European Transport White Paper objective to place users at the heart of transport policy. Methods, such as public perception surveys, are for these authorities to decide, however results should be made public and national authorities should encourage the benchmarking of user opinion wherever possible.

9. BIBLIOGRAPHY AND DATA REFERENCES

9.1 RELATED NPF-URBAN TRANSPORT PROJECT DOCUMENTS

- D1.1: Working Paper on Indicators, March 2004
- D3.1: Public Perception of Urban Transport Performance and Policy: Survey Report for the EU-15, July 2005
- Urban Transport Performance and Policy: Results of a European Public Perception Survey: paper by A. Winder, A. D. May and K. El-Araby for the European Transport Conference, October 2005.

The above documents are available at http://www.npf-urbantransport.org/download

9.2 MAIN DATA SOURCES

The following list covers the main sources of information at European level used in WP2 of the project (Statistical Data Collection – Chapter 3).

- European Commission, DG-TREN: CARE (Community road accident database): http://europa.eu.int/comm/transport/care/index_en.htm
- European Commission, DG-TREN: MARETOPE research project ("Managing and Assessing Regulatory Evolution in local Public Transport Operations in Europe"): http://www.tis.pt/proj/maretope/maretope.html
- European Commission, DG-REGIO Urban Audit: http://www.urbanaudit.org
- European Commission, DG-Environment: http://europa.eu.int/comm/environment/index_en.htm
- European Commission, Eurostat: http://epp.eurostat.cec.eu.int
- European Conference of Ministers of Transport (ECMT): http://www.cemt.org
- European Environment Agency (EEA): http://themes.eea.eu.int/Sectors_and_activities/transport/reports
- OECD: International Road Traffic and Accident Database
- European Transport Safety Council (ETSC): http://www.etsc.be
- United Nations Environment Programme: GEO Data Portal
- United Nations Economic Commission for Europe (UNECE)
- United Nations Department for Economic and Social Affairs: http://esa.un.org/unup
- International Energy Agency: http://www.iea.org
- World Resources Institute (EarthTrends data): http://earthtrends.wri.org

9.3 RELATED PUBLIC PERCEPTION STUDIES

The following is a list of previous public perception studies relevant to urban transport issues.

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  - http://www.urbanaudit.org
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- Scottish Executive [2005], "Public Perceptions of Travel Awareness, Phase 3". Report by TNS Social, Tri Napier University & Robert Gordon University for the Scottish Executive (Social Research – Transport Research Planning Group), Edinburgh, January 2005. Available at:

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APPENDIX 1: URBAN POPULATION DENSITIES

The following tables provide examples of urban population densities, relating to Sub-chapter 3.1.3 of this report. They are provided for selected cities in 2001, for each of the EU-15 Member States. The first table gives densities for the metropolitan areas and the second for the area covered by the city council only. In each case, the example cities are grouped by size into three columns. The tables illustrate the wide variations in density even between cities of a similar size within the same country.

Urban Densities (metropolitan areas), 2001[80]

Country	Density of metropolitan areas (persons per km ^{2})		
	Population of 100 000 to 500 000	**Population of 500 000 to 1 million**	**Population of over 1 million**
AT	291 - Graz	301 - Linz	460 - Vienna/Wien
BE	627 - Charleroi 738 - Gent	963 - Antwerp/Antwerpen 592 - Liège	1 097 - Brussels/Bruxelles
DE	544 - Darmstadt		284 - Berlin 422 - Hamburg 433 - Nuremberg/Nürnberg 444 - Munich/München 579 - Frankfurt a. Main 1 140 - Cologne/Köln
DK	1 853 - Aalborg	140 - Århus	655 - Copenhagen
ES		1 499 - Seville/Sevilla	206 - Valencia (province) 620 - Barcelona (province) 670 - Madrid (region)
FI		1 219 - Helsinki	
FR	1 391 - Strasbourg	1 625 - Toulouse 1 634 - Marseille	938 - Ile de France (region)
GR	55 - Kalamata		3 933 - Athens/Athinai
IE			1 220 - Dublin (county)
IT			2 496 - average of Rome; Milan & Naples
LU	1 489 - Luxembourg		
NL	496 - Eindhoven	1 903 - Rotterdam	1 591 - Amsterdam
PT			1 602 - Lisbon/Lisboa 1 936 - Oporto/Porto

80 Source: DG-Regio Urban Audit. Metropolitan areas are the Larger Urban Zone ("LUZ") as defined by this project – see http://www.urbanaudit.org/help.aspx

Country	Density of metropolitan areas (persons per km ^{2})		
	Population of 100 000 to 500 000	Population of 500 000 to 1 million	Population of over 1 million
SE		1 011 - Gothenburg	2 669 - Greater Stockholm
UK	67 - Aberdeen	452 - Edinburgh 677 - Belfast 705 - Cardiff	462 - W. Yorkshire: Leeds & Bradford 522 - Greater Glasgow 1 462 - Birmingham-Black Country 1 969 - Greater Manchester 2 115 - Merseyside: Liverpool 4 562 - Greater London

Urban Densities (cities), 2001[81]

Country	Density of cities[82] (persons per km ^{2})		
	Population of 100 000 to 500 000	Population of 500 000 to 1 million	Population of over 1 million
AT	1 773 - Graz 1 910 - Linz		3 735 - Vienna/Wien
BE	1 448 - Gent 1 965 - Charleroi 2 229 - Antwerp/Antwerpen 2 668 - Liège	5 980 - Brussels	
DE	1 133 - Darmstadt 2 636 - Nuremberg/Nürnberg	2 389 - Cologne 2 581 - Frankfurt a. Main 2 813 - Essen	2 286 - Hamburg 3 800 - Berlin 3 955 - Munich/München
DK	2 240 - Odense 2 319 - Aalborg	667 - Århus	6 007 - Copenhagen
ES		575 - Saragossa/Zaragoza 1 356 - Malaga 4 966 - Seville/Sevilla 5 551 - Valencia	4 886 - Madrid 15 247 - Barcelona
FI		2 974 - Helsinki	
FR	1 488 - Strasbourg 1 492 - Nice	1 038 - Nantes 1 201 - Bordeaux 1 588 - Toulouse 1 634 - Marseille	1 787 - Lille 2 388 - Lyon 20 248 - Paris

81 Source: DG-Regio Urban Audit

82 City council areas

Country	Density of cities[82] (persons per km ^{2})		
	Population of 100 000 to 500 000	Population of 500 000 to 1 million	Population of over 1 million
GR	242 - Kalamata 569 - Volos 1 084 - Larissa 1 358 - Patra	20 287 - Athens/Athinai 21 060 - Thessaloniki	
IE	1 072 - Waterford 1 302 - Galway 2 655 - Limerick 3 107 - Cork		4 215 - Dublin
IT	2 863 - Bari 3 672 - Florence/Firenze	2 592 - Genoa/Genova 4 272 - Palermo	2 067 - Rome/Roma 7 151 - Milan/Milano 8 551 - Naples/Napoli
LU	1 492 - Luxembourg		
NL	2 175 - Groningen 2 313 - Eindhoven 2 442 - Utrecht	2 870 - Rotterdam 4 432 - Amsterdam	
PT	465 - Coimbra 589 - Setubal 6 337 - Oporto/Porto	7 913 - Lisbon/Lisboa	
SE	3 528 - Malmö	2 421 - Gothenburg/Göteborg 4 324 - Stockholm	
UK	1 142 - Aberdeen 1 278 - Bradford 1 701 - Edinburgh 2 197 - Cardiff 2 297 - Newcastle-u-Tyne 2 522 - Belfast 3 609 - Manchester 3 923 - Liverpool	1 296 - Leeds 3 293 - Glasgow 3 609 - Manchester 3 646 - Birmingham 3 924 - Liverpool	8 980 - London (inner boroughs)

APPENDIX 2: CALCULATION OF PUBLIC TRANSPORT INTEGRATION INDICATORS

The following three tables explain the calculation of the scores given in the indicator on public transport integration described in Sub-chapter 3.2.6. This is a subjective multi-criteria analysis using a questionnaire addressed to correspondents in the various countries. For each of the three categories (institutional structures for public transport integration, integration of information and integration of fares and ticketing), scores from 1 (rarely or never) to 5 (always or almost always) were given for a number of attributes, as shown in these tables.

An equal weighting was given to each criteria, although in reality certain criteria are more important in public transport integration than others. Rather than providing a true benchmarking of countries with respect to public transport integration, this is merely the demonstration of a possible method of measuring this indicator.

Institutional structures for public transport integration

	AT	BE	DK	FI	FR	DE	GR	IE	IT	LU	NL	PT	ES	SE	UK
a) Do major urban areas have a single strategic public transport authority for the metropolitan region?[83]	5	5	5	5	5	5	5	3	5	5	5	3	5	5	4
b) Do these authorities also have a role in planning regional services which cross their boundary?	5	5	4	4	4	5	0	5	0	3	5	0	5	4	5
c) Where there are different urban operators (several bus companies, or metro/tram, etc), are they obliged by the authority to co-operate?[84]	5	5	5	5	5	5	5	4	5	5	5	5	4	5	1
d) Is local public transport promoted as a single network[85]* in urban areas?	5	5	5	4	5	5	5	3	5	5	5	4	5	5	3
e) Is a single authority responsible for all bus stops in an urban area?	4	5	5	5	5	5	5	4	5	4	5	5	5	4	4
Total score out of 25	**24**	**25**	**24**	**23**	**24**	**25**	**20**	**19**	**20**	**22**	**25**	**17**	**24**	**23**	**17**

83 Covering not only the city authority itself but a wider area

84 If only one operator, give a score of 5

85 "Single network" means a common identity for the network and measures to facilitate multi-operator and multimodal trips. Where there is more than one local operator, this implies that either a public authority or a formal grouping of operators is responsible for promoting the network.

Integration of public transport information

	AT	BE	DK	FI	FR	DE	GR	IE	IT	LU	NL	PT	ES	SE	UK
a) Are network maps and timetables (showing all services by all operators) available in major urban areas?	5	5	5	4	5	5	3	4	4	2	4	4	5	4	4
b) Does each major urban area have a single telephone enquiry service for local public transport (for all operators)?	5	5	4	4	5	4	5	2	4	4	5	1	3	4	5
c) Does each major urban area have a single website for local public transport with timetables and/or interactive journey planners? (covering all operators)	5	5	4	4	4	5	4	4	4	4	5	1	4	4	4
d) Level of integration with regional rail (info on door-to-door services), e.g. by phone, web, etc.	5	5	5	4	2	5	5	2	1	4	5	0	4	4	4
e) Is there a multimodal telephone enquiry service/website at regional or national level, enabling users to plan an door-to-door trip between 2 towns or cities in the same region?	3	5	4	4	1	4	5	2	2	3	5	0	3	4	5
f) Do urban bus stops feature comprehensive information on all services calling there, and a map?	5	4	4	4	4	5	3	2	3	3	4	4	4	3	2
Total score out of 30	**28**	**29**	**26**	**24**	**21**	**28**	**25**	**16**	**18**	**20**	**28**	**10**	**23**	**23**	**24**

Integration of public transport fares and ticketing

	AT	BE	DK	FI	FR	DE	GR	IE	IT	LU	NL	PT	ES	SE	UK
a) Do single bus tickets allow transfer within a set time period? (e.g. one hour to other services)	5	5	5	5	5	5	3	0	5	5	5	5	5	5	0
b) Are suburban / regional rail or coach tickets available which allow transfer to the urban network?	5	2	4	4	3	5	0	0	2	5	5	0	5	4	3

	AT	BE	DK	FI	FR	DE	GR	IE	IT	LU	NL	PT	ES	SE	UK
c) Are all-operator day tickets available? (for urban public transport)	5	5	4	4	5	5	5	5	3	5	5	5	5	5	5
d) Are all-operator season tickets (weekly, monthly, etc) available for urban public transport + suburban rail?	5	5	5	5	4	4	5	5	3	5	5	5	5	5	3
Total score out of 20	**20**	**17**	**18**	**18**	**17**	**19**	**13**	**10**	**13**	**20**	**20**	**15**	**20**	**19**	**11**

The persons consulted were project partners, subcontractors and external persons (experts and others with a practical knowledge of public transport in several urban areas in their country, and in many cases knowledge in more than one country). Contributors were as follows:

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