



**COMPETITIVE AND SUSTAINABLE GROWTH  
(GROWTH)  
PROGRAMME**



Contract for:  
**Shared-cost RTD and  
Demonstration project**

***Deliverable 4.3  
Final Evaluation Report***

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**Part II Final Evaluation Reports of the TELLUS cities**

**Final Evaluation Report Berlin**

**Final Evaluation Report Bucharest**

**Final Evaluation Report Gdynia**

**Final Evaluation Report Göteborg**

**Final Evaluation Report Rotterdam**

**Part III Annex: TELLUS Indicator Fact Sheets**

**TELLUS Indicator Fact Sheets Berlin**

**TELLUS Indicator Fact Sheets Bucharest**

**TELLUS Indicator Fact Sheets Gdynia**

**TELLUS Indicator Fact Sheets Göteborg**

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## Abbreviations

ARMAAG	Agencja Regionalnego Monitoringu Atmosfery Aglomeracji Gdańskiej
CBG	Compressed Bio Gas
CIVITAS	Cities Vitality Sustainability
CNG	Compressed natural gas
COPERT	COmputer Programme to calculate Emissions from Road Transport
DER	Draft Evaluation Report
EU	European Union
FER	Final Evaluation Report
GPS	Global Positioning System
HDV	Heavy Duty Vehicle
IMT	Individual motor traffic
IPP	Innovative Pilot Project
IVAM	Environmental Research University of Amsterdam
IVP	Integrierte Verkehrsplanung
LPG	Liquid Petroleum Gas
MAESTRO	Monitoring Assessment and Evaluation of Transport Policy Option in Europe
METEOR	Monitoring and Evaluation of Transport and Energy Oriented Radical strategies for clean urban transport
MIRACLES	Multi Initiative for Rationalised Accessibility and Clean Liveable Environments
NG	Natural Gas
P&R	Park and Ride
PT	Public Transport
RAR	Registrul Auto Roman
RATB	Regia Autonoma de Transport Bucuresti
RVMK	Regionale Verkeers Milieu Kaart
TELLUS	Transport & Environment aLLiance for Urban Sustainability
TRENDSETTER	Setting Trends for Sustainable Urban Mobility
TUB	Technische Universität Berlin
VIVALDI	VISIONary and Vibrant Actions through Local transport Demonstration Initiatives
WP	Work package
WZB	Wissenschaftszentrum Berlin für Sozialforschung (Social Science Research Centre Berlin)
ZKM	Zarząd Komunikacji Miejskiej







## Foreword

The deliverable at hand – the TELLUS Final Evaluation Report – provides an overview of the evaluation activities carried out in the course of the TELLUS project in the five participating cities Berlin, Bucharest, Gdynia, Göteborg and Rotterdam and presents results and findings. The Final Evaluation Report consists of three parts:

- **Part I: Evaluation and the TELLUS Project,**
- **Part II: Final Evaluation Reports of the cities, and**
- **Part III Annex: TELLUS Indicator Fact Sheets**

Part I gives an introduction to the TELLUS Final Evaluation Report, its aims and structure, the TELLUS project and its context, the evaluation context of the TELLUS project, and finally findings on project level.

Part II consists of the five city-specific Final Evaluation Reports. Each city report is divided into five parts: Part A “Introduction”, Part B “Evaluation on demonstration measure level”, Part C “Evaluation on city level”, Part D “Final conclusions” and Annexes.

Part III provides an overview on the development of the TELLUS Key Indicators over the TELLUS lifecycle in each city.

The key word for TELLUS as well as for its evaluation is **variety**. The TELLUS project consists of a variety of very different cities applying a variety of transport strategies and innovative transport measures in order to shape urban transport more sustainable. A variety of approaches were used to implement those measures and a variety of methods and instruments were applied to conceptualise, monitor, analyse and assess the measures in order to show the results and impacts as well as to explain processes and promoting and hindering factors of the TELLUS measures.

The evaluation report presents a comprehensive picture of the results and processes related to the implementation of innovative transport measures in the TELLUS cities. The report should be understood as a basket of information for implementers, urban transport decision makers and evaluators, containing a great variety of approaches applied by the TELLUS cities, a large quantity of solutions elaborated by the implementing actors, and a wide spectrum of methods and instruments used to assess and analyse the results and processes of the demonstration measures. And finally, the basket contains valuable lessons learnt which might assist other European cities in successfully promoting sustainable urban transport.

Berlin, Bucharest, Gdynia, Göteborg and Rotterdam in November 2005 / December 2006





**Part I:**

**Evaluation and the TELLUS Project**



## A INTRODUCTION TO TELLUS FINAL EVALUATION REPORT

### A.1. CIVITAS context

#### 1 CIVITAS

CIVITAS (City – Vitality - Sustainability) is a European Commission (Commission) initiative to promote cleaner and better transport in cities. Through the CIVITAS Initiative, the Commission aims to generate a decisive breakthrough in clean and better urban transport by supporting and evaluating the implementation of ambitious integrated and sustainable urban transport strategies that make a real difference for the mobility and quality of life of citizens<sup>1</sup>.

CIVITAS started in early 2002 within the 5<sup>th</sup> Framework Research Programme and includes 19 cities clustered in four projects (MIRACLES, TELLUS, TRENDSETTER and VIVALDI). Following the success of the first phase of the Initiative, CIVITAS II was launched in 2005 to support 17 cities in a further four projects. The overall budget of these 36 cities for implementing urban transport strategies comprises more than 300 M Euros including a contribution of about 100 M Euros from the Commission. In November 2005 at the CIVITAS Forum held in Nantes, the Commission announced its commitment to continue with the Initiative's programme beyond 2007 and to prepare CIVITAS III.

#### 2 Strategies and aims

Eight urban transport policy strategies were identified to promote the CIVITAS aims:

1. Access Restriction,
2. Integrated Pricing Strategies,
3. Collective Passenger Transport,
4. New Forms of Vehicle Use and Ownership,
5. New Concepts for Distribution of Goods,
6. Innovative Soft Measures,
7. Integration of Transport Management, and
8. Clean Public and Private Vehicle Fleets.

Based on these strategies each project defined qualitative and quantitative objectives and decided on a set of measures to reach these objectives. A variety of approaches and strategies were applied by the cities to shape urban transport more sustainable and to improve quality of life for citizens today and in the near future.

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<sup>1</sup> [www.civitas-initiative.org](http://www.civitas-initiative.org)

## A.2. Aim and structure of the TELLUS Final Evaluation Report

### 1 Aim

The aim of the Final Evaluation Report (FER) is to provide an overview of the evaluation activities carried out in the course of the TELLUS project in the five participating cities Berlin, Bucharest, Gdynia, Göteborg and Rotterdam. These activities are based on the methodology stated in TELLUS Evaluation Plan and the related city-specific Local Evaluation Plans<sup>2</sup>, processed information derived from TELLUS reporting, regular meetings and interviews with the demonstrators, as well as data collected by means of surveys and measurements.

The Final Evaluation Report provides information on:

- the implementation process of the measures,
- the framework conditions that promoted or hindered the success of the measure, the drivers and barriers,
- the impacts of the measures assessable,
- the grade, to which the stated objectives have been achieved, and
- the development of the TELLUS Key Indicators.

### 2 Structure

#### *Final Evaluation Report*

The Final Evaluation Report consists of three parts: Part I: TELLUS Final Evaluation Report - providing a general introduction and project related findings; Part II: Final Evaluation Reports of the cities - containing five city reports; and Part III: Annex – providing an overview on the TELLUS Key Indicators.

#### *Local Final Evaluation Report*

Each city-specific report is divided into five parts: Part A “Introduction”, Part B “Evaluation on demonstration measure level”, Part C “Evaluation on city level”, Part D “Conclusions” and lastly Annexes.

Part A introduces the TELLUS landscape in the respective city, the types and strategies of the demonstration measures, their geographical contexts, and the thematic clusters covered by the demonstration measures implemented. Furthermore it is explained how the measures fit in with the overall transport strategy of the city. Part A is completed by a brief introduction of the different actors constituting the local evaluation teams.

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<sup>2</sup> TELLUS Evaluation Plan (2003)



Part B contains the evaluation of the measures. However, since some of the measures are still ongoing and data collection in some cases is also continuing the assessment covers the period up to month 42.

Part C covers the evaluation on city level. It contains the TELLUS Key Indicators and their respective measurements. The evaluation for 2010 is based on the up scaling potential for each measure.

Part D outlines conclusions based on the experiences and results from the process and impact related evaluation.

The Annexes contain measure-specific indicator lists, details on the assessment of the demonstration measures, examples for and information on surveys, detailed description of scenarios, methods of the participatory evaluation, METEOR-related Common Core Indicator lists and a transfer guide for METEOR in order to link TELLUS evaluation reporting and METEOR evaluation sheets.

#### *Evaluation on Demonstration Measure Level*

The evaluation reports on measure level cover aspects such as evaluation criteria, objectives, spheres of evaluation (process, concept and impact) as well as details on the evaluation of the measures itself. In order to provide for comparability, the evaluation of every measure adheres to the same report structure: 1) introduction, 2) description of the demonstration measure, 3) implementation process, 4) results of the evaluation, 5) conclusions, 6) scenario, and 7) recommendations.

#### *TELLUS Indicator Fact Sheets*

Part III of the TELLUS Final Evaluation Report contains the TELLUS Indicator Fact Sheets that provide an overview of the development of the TELLUS Key Indicators over the lifecycle of the project.

These Fact Sheets contain all the important information concerning the key indicators. Elements of the Fact Sheets are the name and the description of the indicator including context and impacts, the unit of the indicator, indicator-related objectives, methods of measurement, sources of data, a timetable for the measurement of the data, the legal basis, the development of the indicator, the relation to other indicator systems and references.

### A.3. TELLUS project

#### 1 Innovative urban transport measures

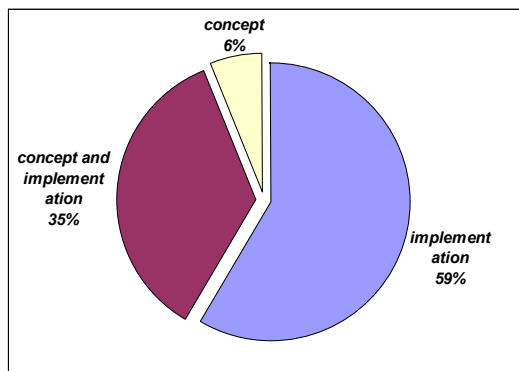
TELLUS is a complex integrated project carried out in the cities Berlin, Bucharest, Gdynia, Göteborg and Rotterdam. Within the TELLUS project 48 demonstration measures were to be implemented, which varied in number and differed widely regarding contents, type and underlying policies. Particular local circumstances, specific city characteristics as well as needs expressed, problems faced and priorities given shaped the selection of a specific set of innovative transport measures in each city.

##### 1.1 TELLUS demonstration measures

The number and spectrum of measures differed from city to city according to the focus identified as relevant for the respective city and the city’s role within the CIVITAS-Initiative (leading cities and followers). Rotterdam implemented 26 measures, Berlin ten, Göteborg eight, Bucharest four measures, and Gdynia implemented one measure. Table 1 provides an overview of all TELLUS measures in the participating cities.

The TELLUS demonstration measures were not an isolated attempt to improve the living conditions of the citizens, but they were integrated into the cities’ urban transport policies and plans. In general, the focus of the TELLUS project was on translating urban transport policy into practical implementation of innovative measures, whereas ‘innovative’ is understood in the city-specific context. However, not all measures were concerned with implementation, but some aimed at preparing the ground while others supported strategies and measures by developing a concept to be implemented later and/or through a different scheme. Out of the 48 TELLUS measures 28 were aiming at direct implementation, 17 at concept development and implementation, and 3 measures developed concepts only (see Figure 1).

**Figure 1: Types of the 48 TELLUS demonstration measures**



**Table 1: TELLUS Demonstration Measures and CIVITAS Work Packages <sup>3</sup>**

<b>WP5: Access Restrictions</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
5.1 Access time window to promote clean commercial vehicles					
5.2 Dedicated bicycle routes					
5.3 Truck parking management for residential areas					
5.4 Transport priority and dedicated lanes					
5.5 Parking restrictions in central area					
5.6 Transforming the city centre into clean Urban Transport Area					
5.7 Environmental zone for heavy duty vehicles					
<b>WP6: Integrated Pricing Strategies</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
6.1 P&R pricing strategies for target groups					
6.2 Demand depending strategies for paid parking					
6.3 Public-private partnership regarding construction and maintenance of new road infrastructure					
6.4 Tele-parking System-new telematics-based system for city park parking					
6.5 Concept for HD vehicles road pricing					
6.6 Incentives for purchasing of CNG heavy duty vehicles					
<b>WP7: Collective Passenger Transport</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
7.1 Integration of cycling and public transport					
7.2 Large scale expansion of P&R					
7.3 Public transport over water					
7.4 Automated people movers					
7.5 Future Management of urban public transport					
7.6 Environmental optimised ferry shuttle					
<b>WP8: New Forms of Vehicle Use and Ownership</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
8.1 Electric two-wheelers					
8.2 Expansion of van-pooling for commuters					
8.3 Expansion of car sharing					
8.4 Metropolitan Fleet Car –business/private shared use of fleet cars					
8.5 Car Modal –new service for organised passenger transport in private cars					
<b>WP9: New Concepts for distribution of goods</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
9.1 E-commerce logistics					
9.2 Implementation of multi-core tube logistics					
9.3 Inner-city logistics centre					
9.4 New forms of financing-contract for NG vehicles					
9.5 Incentives for improving the load factor in inner-city freight transport					
<b>WP10: Innovative Soft Measures</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
10.1 Green commuter plans and mobility management					
10.2 Integration of public and private transport initiatives					
10.3 New approaches to integrated planning					
10.4 Customer and user participation					
10.5 Consumer driven goods management from a Mobility Centre base					
<b>WP11: Integration of Transport Management Systems</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
11.1 Integration of Transport Management					
11.2 Intermodal Travel Information					
11.3 Dynamic public transport information					
11.4 Fleet management by GPS					
11.5 Modernising the ticketing and payment system of the public transport					
11.6 Dynamic real-time passenger information for trams and buses					
<b>WP12: Clean public and private vehicle fleets</b>	<b>RO</b>	<b>BU</b>	<b>GDY</b>	<b>BER</b>	<b>GÖT</b>
12.1 Clean & silent public transport fleet					
12.2 Electric vehicles for the distribution of goods					
12.3 Cleaner vehicles for waste collection					
12.4 Electric vehicles in public fleets					
12.5 Clean & silent public transport fleet					
12.6 Introduction of CNG-powered vehicles					
12.7 Promoting the introduction of clean vehicles in private and public fleet					
12.8 Introduction of clean waste collection vehicles					

RO=Rotterdam, BU=Bucharest, GDY=Gdynia, BER=Berlin, GÖT=Göteborg

## 1.2 TELLUS objectives

The TELLUS project set itself ambitious transport-related, environmental and societal objectives to be reached after four years. Moreover the project formulated target quantifications also for 2010 (see Table 2). This orientation towards objectives emphasised

<sup>3</sup> based on TELLUS Inception report (2002) and Draft Evaluation Reports (2005)

the process character of the project not ending with its financial assistance but bringing effects for the city beyond this phase.

**Table 2 : TELLUS objectives**

TELLUS OBJECTIVES	Quantification for 2006	Quantification for 2010
<b>TRANSPORT</b>		
Increase the modal share in favour of public transport	3%	5%
Increase public transport use	5%	10%
Reduce road casualties and injured people	10%	20%
Reduce congestion	5%	10%
Reduce car kilometres	3%	5%
Increase bicycle kilometres	15%	30%
<b>ENVIRONMENT/ENERGY</b>		
Reduce air pollution and noise to levels below national and EC directives	to be specified	to be specified
Reduce NOx emission from heavy traffic	5%	10%
Reduce traffic related CO2 emissions and energy use	5%	10%
<b>SOCIETY</b>		
Improved intra-organisational co-operation at the city level	not quantified	not quantified
Achieve extensive political and public awareness for TELLUS	not quantified	not quantified
Improved public-private co-operation	not quantified	not quantified

### 1.3 Strategy and policy

Each city implemented a set of measures according to the needs of and priorities given by the cities. There are no two cities that had exactly the same mix of measures. Table 3 to Table 7 give an overview on the types of measure, the underlying strategies and policies in each TELLUS city.

**Table 3: TELLUS measure in Gdynia**

Name of demonstration measure	Type of demonstration measure	Strategy	Policy
5.6 Transformation of the City Centre into the Clean Urban Transport Area	Implementation [Implementation of the environment friendly PT technology and access restrictions for motorized private vehicles].	Improvement of the city's public transportation system. Enhance the quality of life.	Decrease of private vehicle usage in favour of PT.

**Table 4: TELLUS measures in Bucharest**

Name of demonstration measure	Type of demonstration measure	Strategy	Policy
5.5 Parking restrictions in central area	Implementation	Parking management in central area of the city	Decrease of private car traffic
11.4 Fleet management by GPS	Concept development and implementation	GPS implementation	Increasing the quality of public transport service
11.5 Modernising the ticketing and payment system of the public transport	Concept development and implementation	Implementation of the smart-card and of a modern statistical analysis system	Changing modal split in favour of public transport
12.5 Clean & silent public transport fleet	Concept development and implementation	Introduction of an promotion of the electrical vehicles with improved performances	Encouraging the use of clean vehicle

**Table 5: TELLUS measures in Berlin**

Name of demonstration measure	Type of demonstration measure	Strategy	Policy
6.4 Mobile Parking	Concept development and implementation	On-street parking management with time adjusted pricing, parking enforcement	Increase cost efficiency
6.5 Road Network and Concept for HD Vehicles Road Pricing	Concept development	Emission-based road-pricing for HDV-traffic	Internalise external costs of transport
7.5 Future Management of Urban Public Transport	Concept development	New concepts for public transport under competition	Changing modal split towards Public Urban Transport by increasing service quality
8.4 Metropolitan Fleet Car	Concept development with Implementation	Provision of vehicle fleets for private use through car-sharing	Optimising capacity-utilisation
8.5 Car Modal	Concept development with Implementation	Provision of CharterCab in peripheral areas with low public transport service	Reduction of private car use and single occupancy by offering alternative solutions for mobility (flexible PT service), enhance PT access
9.3 Inner City Logistics Centre	Implementation	Supporting measures for tri-modal inner city logistics centre, promotion of clean vehicles, intermodal freight transport	Changing modal split in freight transport towards sustainable modes, improving intermodal co-ordination
9.4 New Forms of Financing-Contracts for HG Vehicles	Concept development with Implementation	New concepts for leasing	Encouraging the use of clean vehicles
10.4 Customer and User Participation	Implementation	User oriented approach	Increasing public participation in the field of transport
11.6 Dynamic Real-Time Passenger Information for Trams and Buses	Implementation	Dynamic real-time passenger information for PT	Changing the modal split towards Public Transport by improving the quality of passenger information
12.6 Introduction of CNG-powered Vehicles	Implementation	Promotion and Incentives for CNG-vehicles	Encouraging the use of clean vehicles

**Table 6: TELLUS measures in Rotterdam**

Name of demonstration measure	Type	Strategy
5.1 Access time window to promote clean commercial vehicles	C, I	Regulation of traffic
5.2 Dedicated bicycle routes	I	Support increased use of bicycles
5.3 Truck parking management for residential areas	I	Provide alternatives for long term parking
5.4 Public transport priority and dedicated lanes	I	Enforcement of public transport
6.1 P&R pricing strategies for target groups	I	Demand based pricing
6.2 Demand depending strategies for paid parking	I	Demand based pricing
6.3 Public private partnership regarding the construction and maintenance of new road infrastructure	C	New concepts for the mobility market
7.1 Integration of cycling and public transport	C, I	Parking management at PT-locations
7.2 Large scale expansion of P&R	I	Parking management at PT-locations
7.3 Public transport over water	I	New concepts for public transport
7.4 Automated people movers	I	Provide new and innovative vehicles
8.1 Electric two-wheelers	I	Provide alternatives for cars
8.2 Expansion of van-pooling for commuters	I	Provide alternatives for cars in areas with low PT service
8.3 Expansion of car sharing	I	Introduction support for car-sharing
9.1 E-commerce logistics	I	Traffic management for goods
9.2 Implementation of multi-core tube logistics	I	Provide an alternative for truck transport
10.1 Green commuter plans and mobility management	I	Mobility management for commuters
10.2 Integration of public and private transport initiatives	I	Supporting activities for traffic management
10.3 New approaches to integrated planning	C, I	Integrated planning
11.1 Integration of transport management systems	I	Dynamic information for traffic management
11.2 Intermodal Travel Information	I	Support co-operation. Improved information for the public
11.3 Dynamic public transport information	I	Dynamic information for traffic management in PT
12.1 Clean & silent public transport fleet	I	Support clean PT
12.2 Electric vehicles for the distribution of goods	I	Support clean transport of goods
12.3 Cleaner vehicles for waste collection	I	Support clean transport for collected waste
12.4 Electric vehicles in public fleets	I	Support alternative clean transport for cars

I = Implementation

C = Concept development

**Table 7: TELLUS measures in Göteborg**

Name of demonstration measure	Type of demonstration measure	Strategy	Policy
5.7 Environmental Zone for heavy duty vehicles	Concept development and implementation	Further design and enlargement of the existing environmental zone, introduce an on-site measurement system	Stimulate the incorporation of Euro IV engines, new results from on-line emission measurements
6.6 Incentives for purchasing of CNG/CBG heavy duty vehicles	Concept development and implementation	Heavy trailers and distribution vehicles will be exchanged for CNG/CBG vehicles	Decrease emissions of NOx and particles from heavy traffic
7.6 Environmentally optimised river shuttle	Concept development and implementation	Plan and build an environmentally optimised river shuttle	Demonstration of new technology, decreasing emissions
9.5 Incentives for improving the load factor in inner city freight transport	Concept development and implementation	Design and introduce incentives for increased load rates in an inner city zone	Reducing the number of distribution vehicles in an inner city area
10.5 Consumer driven goods management from a mobility centre base	Concept development and implementation	Promote smarter mobility solutions to suppliers	Increase the efficiency of transport of goods and people in a development area
12.7 Promoting the introduction of clean vehicles in public and private fleet	Concept development and implementation	Affect suppliers' methods in purchasing clean vehicles. Develop methods for the promotion of clean vehicles.	Introduction of clean cars
12.8 Introduction of clean waste collection vehicles	Concept development and implementation	Introduce a new type of CNG/CBG heavy vehicles for waste collection	Introduction of clean heavy-duty trucks/working machines

## 1.4 Urban transport focus

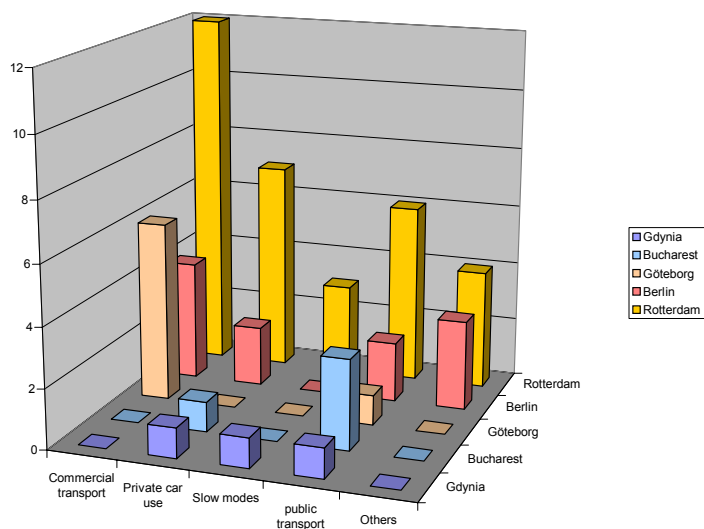
The cities themselves focussed on different areas of the complex system urban transport in order to contribute to cleaner and better transport in their cities (see Figure 2):

- Göteborg considered **commercial transport** as the relevant urban transport sector to be addressed – six measures dealt with commercial transport and one with passenger transport;
- Rotterdam considered a combination of strategies as suitable and used a balanced **mix between commercial and passenger transport** – 12 measures dealt with commercial transport addressing technology (clean vehicles), traffic flow, accessibility and planning/organisational aspects; 18 measures referred to transport of people addressing slow, public and private car transport, as well as mobility management and planning aspects;
- Berlin too considered a combination of strategies as appropriate and used a balanced **mix between commercial and passenger transport** as well as **conceptual** measures – four measures addressed commercial transport and another four dealt

with public transport and private car use; three measures referred to concept development and cross-sectional aspects such as user participation;

- Bucharest considered **public transport** as the relevant sector to be addressed – three measures dealt with public transport and one with private car transport;
- Gdynia implemented one measure with emphasis on physical implementation in the central area of the city, addressing public and private **passenger transport**.

**Figure 2: TELLUS cities and transport sector focus**



## 2 Urban context

### 2.1 City characteristics

Different city characteristics imply different framework conditions for designing urban transport policies. Furthermore, they influence the type, size, number and spectrum of interventions to improve the current transport situation in the cities. Choices between road-based, rail-based and water-based transport systems are not always given, which cuts down the range of possibilities and leads to optimisation of the existing systems. Furthermore, differences in city characteristics narrow the possibility of simply transferring successful concepts from one city to another.

The TELLUS cities differ remarkably in their characteristics (see Table 8). An attempt to classify them and render them more comparable could thus use different approaches. For example, a classification of the cities could be made by using transport and structural city parameters. In this regard, three TELLUS cities could be described as having their structure and development shaped by the presence of a seaport and the related activities. Here, the movement of goods determines mobility patterns that differ from those in cities without a port.



Two cities are capitals accommodating a combination of functions on national and international level such as administration, services, production, consumption and culture. Regarding population numbers, three cities are medium-sized while two are metropolises. All of these cities are highly entwined with their hinterland, however, the surrounding regions experience dramatic increases in population and mobility-related figures compared to the developments in the administered city areas.

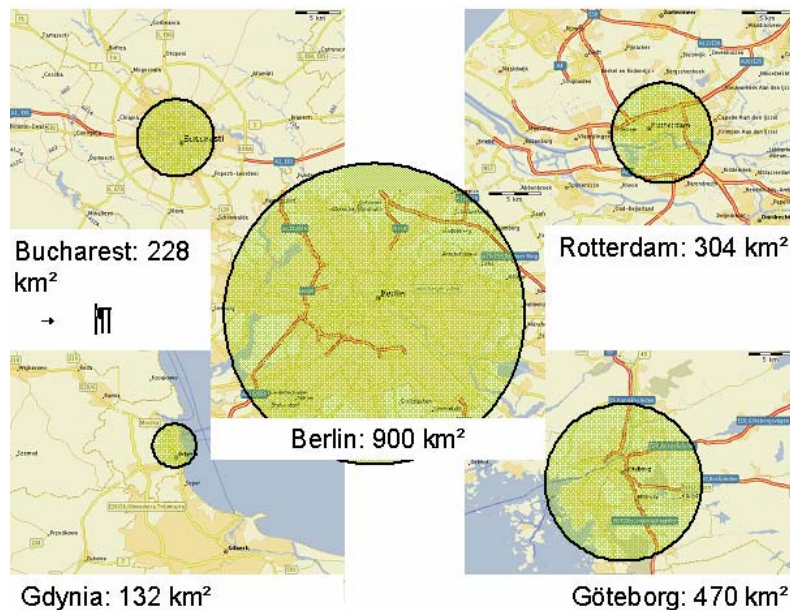
**Table 8: City characteristics of TELLUS cities**

		Berlin	Bucharest	Gdynia	Göteborg	Rotterdam
<b>Population</b>	Inhabitants	3,400,000	2,100,000	255,000	457,000	600,000
<b>Area</b>	km <sup>2</sup>	900	228	132	470	304
<b>Density</b>	Inhabitants per km <sup>2</sup>	3,780	9,210	1,932	983	1,790
<b>Region</b>	Inhabitants	4,200,000	3,400,000	800,000	600,000	1,200,000
	Description	Commuter belt	Conurbation	Tri-city	Conurbation	Conurbation
<b>River / Bay</b>	Description	Spree River	Dambovita River	Gdansk Bay	Götaälv River	Maas River
<b>Characteristic</b>	Description	Multi-centre structure	Mono centric	Harbour	Harbour	Harbour
<b>Public Transport systems</b>	Description	Light rail, underground, bus, tram	Underground, bus, trolley bus, tram	Trolley bus	Tram, bus, ferry	Underground, tram, bus, ferry
<b>Modal Split</b>	PT: % IMT: % Others: % Truck: %	27% 38% 35% -	52% 28% 16% 4%	61% 39% - -	20%, 50%, 30% -	15% 41% 44% -
<b>Car ownership</b>	Cars / 1,000 inhabitants	350	239	300	333	327
<b>Car density</b>	Cars per km <sup>2</sup>	1,300	2,412	580	327	645

Regarding mobility patterns the cities show significant distinctions. Car ownership is relatively low in all TELLUS cities and ranges between 239 and 350 cars per 1,000 inhabitants, but car density presents a different picture. For example, while Berlin shows the highest car ownership rate amongst all TELLUS cities, the city of Bucharest features the highest car density brought about by the expansion of the city.

Transport systems shape the urban structure and vice versa. The allocation of urban public transport systems in the TELLUS cities shows this close relationship just as well as does the historical development of the respective cities. In this respect, Gdynia focuses on road-based bus systems whereas Berlin attempts to balance the rail and road-based systems. All cities are characterised by a river, but different approaches are used to cross the natural barrier. Berlin prioritises ground-based over water-based transportation preferring bridges to cross the river, whereas Göteborg and Rotterdam increasingly include ferries into the public transport systems.

**Map 1: Comparison of city area of TELLUS cities**



Furthermore, the modal split figures allow for categorising the cities into two groups: While Gdynia and Bucharest could be called ‘public transport cities’ due to high public transport shares, Berlin, Göteborg and Rotterdam could be called ‘multi-modal cities’ due to considerably lower public transport shares and nearly balanced car and slow mode shares.

## 2.2 Classification and transferability potential

The heterogeneity of the cities, the different sizes, densities and functions as well as mobility patterns reveal that grouping the TELLUS cities into a standardised system of classification is not an easy task. Thus, any consideration of the transferability potential of measures needs to take the different city backgrounds and characteristics into account.

## 2.3 Geographical context

The TELLUS demonstration measures were implemented in different geographical contexts of the respective cities. They might have been site-based, area-based or corridor-based measures.

The geographical context of the demonstration measures is relevant for the reference area of the impact-related evaluation. The consideration of different contexts is important for both, the impact evaluation on measure level and the evaluation on city level. The area-based demonstration measures were expected to hold impacts within the area itself, whereas the site-based demonstration measures should have had impacts that extended into the adjoining areas. The corridor-based demonstration measures were supposed to generate effects along the corridor area.

Moreover some of the measures did not have a distinct geographical focus at all but address either the city as a whole, or else they were concerned with processes and structures (conceptual measures), which can not be spatially located.

Furthermore, the geographical context influences the potential for interaction between the different measures as well as the grade of possible synergy effects.

All types of geographical contexts can be found in the TELLUS cities. Interactions are given in cities such as Rotterdam, Bucharest and Göteborg either by the number of measures implemented in a selected area or by clustering measures thematically. However, measures were often operating on a rather small, sometimes even local and generally geographically dispersed scale. As a consequence, there were only limited possibilities to create and make use of synergies between the measures.

## 2.4 Integration into local transport policy

The TELLUS demonstration measures in the TELLUS cities were not an isolated attempt to organise urban transport in a more sustainable way, but instead they were related to the cities' local transport policies and their respective transport plans. They are part of the many urban transport activities undertaken in the cities. Furthermore, the societal objectives set by TELLUS aimed at improved intra-organisational co-operation and public private co-operation and thus the objectives called for strengthening integration and co-operation with urban transport stakeholders. The involvement of different departments of the city administration and politicians, but also the huge number of private partners ranging from scientific institutions, over small entrepreneurs, local and international operating companies to public transport companies give evidence of the strong integrative character of the project.

## A.4. Evaluation aspects

### 1 Evaluation Approach

#### 1.1 Evaluation – a progressive process

In the context of TELLUS, evaluation is not a one-time exercise, but it is understood as a progressive process. Two components are inherent in this process, a component of consultation and a component of learning. Evaluation within TELLUS accompanied the measures throughout the life-cycle by guiding the partners professionally through the project process. It gave assistance, advice, feedback and monitored, assessed and evaluated the steps, results and processes. At the same time a mutual learning process took place for both, the measure and the evaluation team, learning from each other and shaping the performance of the measures and the evaluation.

The cities played an important role in the CIVITAS / TELLUS project, and likewise in the evaluation. For that reason the emphasis of the Final Evaluation Report is put on the cities and the related demonstration measure level, implementation processes and impacts.

By and large, there are two levels of evaluation considered – the measure level and the city level. Moreover according to the TELLUS objectives two periods are relevant for the evaluation – the TELLUS project period (2002 -2006) and the up-scaling period (2006 – 2010). Five different fields of evaluation had a forming influence on this report: the impact-related evaluation, concept-related evaluation, the process-related evaluation, the objectives-related evaluation and scenarios.

An analysis of the demonstration measures and their potential impacts carried out already in the initial phase of the project showed that solely through the implementation of the TELLUS project the target values of the objectives were not to be reached on a city level, particularly not within the limited time frame of four years. Therefore it was decided for the evaluation to rather focus on the measure level and the analysis of the implementation process.

## 1.2 Impact-related evaluation

The impact related evaluation was based on the city-specific Local Evaluation Plan, which presented a detailed outline of the evaluation areas, evaluation categories, impacts and indicators considered relevant for the assessment of each demonstration measure. These were developed on the basis of the MAESTRO impact/indicator tables and had been worked out in a discussion process between evaluation teams and demonstrators.

Five evaluation areas are considered as relevant: transport, society, economy, environment, and energy. Naturally and due to the varying character of the TELLUS measures, these five areas do not apply to all of the measures to the same extent. Therefore, only the evaluation areas relevant for the individual case have been considered in the course of the evaluation.

## 1.3 Concept evaluation

Conceptual measures are a special type of transport measures, often preparing the ground for the implementation of demonstration measures. The impacts are rather difficult to determine. The conceptual measures were evaluated according to the evaluation criteria and objectives stated in the Local Evaluation Plans. Altogether 20 TELLUS measures fall under the category ‘concept measure’, but three out of those are of pure conceptual nature whereas the remaining 17 measures were implemented after concept development.

## 1.4 Process-related evaluation

The process-related evaluation analyses the actual implementation of the measures and the reasons for changes and deviation from the plan. In the course of the TELLUS project, it turned out that the factors influencing the outcome of the measure, such as drivers of and

barriers to success are of high importance both, to the demonstrators and to the evaluation team. Especially in cases where the implementation could not be carried out as planned information on why it did not work out is crucial for follow up projects. The information required for the process evaluation was mainly derived from interviews with stakeholders and TELLUS reporting.

## 1.5 Scenarios

Scenarios were developed to estimate the impacts of TELLUS measures after a period of four years following the TELLUS project and assuming an up-scaling of the measures. In order to estimate the potential impacts the results of the measure implementation during the life cycle of TELLUS were used as starting point for further assessment and were supplemented with data and information derived from other studies, projects and the urban transport plans. In addition assumptions were made as to the possible future outcome of the measures if performed on a larger scale. Whereas impact and process evaluation were carried out by the evaluation teams on their own, scenarios were elaborated in an extended group, including project partners and external experts.

## 1.6 TELLUS objectives-related evaluation

The objective-related evaluation aims at assessing the overall contribution of the measures to the ultimate goal of achieving more sustainable urban transport. Since the quantification of the TELLUS objectives distinguishes between two different periods (2002-2006 and 2006-2010), the objectives relevant for the demonstration measures are stated according to this categorisation. The achievement of objectives until 2006 was assessed in the conclusions, while the long-term perspective, i.e. the estimation of impacts for the time beyond TELLUS, was carried out by means of scenario building. However, the long-term time horizon differs in the cities depending on time horizons considered for local transport and environmental plans.

## 1.7 Objectives

The objectives of the demonstration measures were divided into three levels.

### *Immediate objectives (demonstration measure-related objectives)*

Immediate objectives are the objectives that are directly related to the implementation of the demonstration measure. They are concerned with the actions to be undertaken during the implementation of the demonstration measure.

These objectives are taken from the Description of Work<sup>4</sup> and supplemented with information from interviews with the demonstrators. The immediate objectives had been monitored

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<sup>4</sup> Description of work, ANNEX A TELLUS Project descriptions, issued 29 October 2001

during the life cycle of the demonstration measure in the process- and impact-related evaluation.

### *Intermediate objectives*

Intermediate objectives relate to the effects that are expected to be generated by the implemented measure. In most cases they are associated with a wider implementation and can serve as a logical link between the demonstration measure-related implementation objectives and the TELLUS objectives on city level.

The intermediate objectives have been worked out by the Local Evaluation Manager and the demonstrators.

A majority of these intermediate objectives could not be monitored formally within TELLUS, since the introduction of the measures beyond mere demonstration was not part of the project life cycle. However, in order to bridge the information gap and provide insights on intermediate level, supplement sources, such as case studies from other cities have been used.

### *Ultimate objectives*

The ultimate objectives refer to the desired long-term impacts of the measures. In many cases, these objectives are identical with the TELLUS quantified objectives and were therefore monitored within the TELLUS objectives-related evaluation. Due to the short-term character of the TELLUS project and the low implementation level of a considerable number of measures these objectives were not assessed. The estimation of future impacts of up-scaled measures was carried out by means of scenario building (if applicable) for the time horizon 2006-2010.

## **2 Actors of evaluation**

Each TELLUS city had its own organisational set-up as well as co-operation and communication approach to execute the evaluation. The organisational set-up resulted from the implementation approach favoured by the cities. Throughout the TELLUS cities the evaluation was carried out by various actors. In each city an evaluation team headed by the Local Evaluation Manager was formed, which received support from internal and external experts and the demonstrators. The Local Evaluation Manager was the person in charge for the local evaluation and co-ordinated all activities.

### ***Berlin***

The evaluation in Berlin was carried out by the Evaluation Consortium, the Local Evaluation Manager (IVP, TUB) and the demonstrators. The Evaluation Consortium consisted of experts

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from different institutions providing environmental (Öko-Institut), social (WZB) and transport expertise (IVP, TUB) supported by representatives of the Participatory Evaluation (CTS, TUB) and members of the Berlin Senate Department of Urban Development.

Regular meetings were carried out to discuss issues related to the local evaluation and decide on the procedure to be chosen. Moreover, the consortium offered advice and support to the demonstration measures when it came to choosing evaluation and monitoring instruments and to design surveys.

However, the demonstration measures themselves were responsible for carrying out monitoring activities as stated in the Local Evaluation Plan. Therefore, close co-operation was needed between the Local Evaluation Manager as a representative of the Consortium on the one hand and the demonstrators on the other to ensure both quality standards of the evaluation and monitoring as well as consideration of the possibilities and needs of the demonstration measures.

### ***Bucharest***

The evaluation in Bucharest was carried out by a team supported by external co-operation partners. The Public Transport Authority (R.A.T.B.) provided an evaluation team consisting of members from different departments such as International Projects, Marketing, Urban Planning, and Operational Department. An external consultant (Impact Consulting) supported the team in choosing the proper evaluation instruments and finalising the ex-ante and ex-post evaluation studies. Furthermore the evaluation team collaborated with Auto Vehicle Romanian Authority (R.A.R. - Registrul Auto Roman) for emission and air pollution measurement. The evaluation activities were supervised by the Local Evaluation Manager who kept the contact with demonstrations leaders and with other partners involved in the evaluation process.

### ***Gdynia***

The evaluation in Gdynia was carried out by the Local Evaluation Manager supported by internal and external experts. The Local Evaluation Manager, a staff member of the European Integration Department, co-operated closely with the Environmental Protection Department and the Traffic Department of the City Hall of Gdynia. The Public Transport Authority (ZKM), a municipal unit created to manage the collective passenger transport, completed the evaluation team. To provide consistent and reliable data ARMAAG Foundation and the Police as well as external experts from the Technical University of Gdansk and Info-Eko Company were involved. The Local Evaluation Manager (European Integration Department) was responsible for the co-ordination of the monitoring and evaluation activities stated in the Local Evaluation Plan as well as providing Gdynia's part for the TELLUS reports.

***Göteborg***

The Local Evaluation Manager in Göteborg, a staff member of the Local Transport Authority (Trafikkontoret), together with an external consultant, carried out the evaluation on city level in close co-operation with the demonstrators. The demonstrator contacts were responsible for the evaluation of their measures. There was a continuous dialogue between the Local Evaluation Manager and the demonstrators to secure a good quality of the evaluation. Regular local meetings were held at least twice a year. In addition, a special scenario meeting was held in 2005 to agree on a common methodology and time frame.

***Rotterdam***

The evaluation in Rotterdam was carried out mainly by the Local Evaluation Manager (IVAM) and the demonstrator contacts. The Municipality of Rotterdam (Department for Urban Planning, Housing and Traffic) gathered further information required for scenarios.

The demonstration measures themselves were responsible for carrying out the monitoring and evaluation activities stated in the Local Evaluation Plan Rotterdam. Results of the monitoring were transferred from the demonstrator contact to the Local Evaluation Manager. Furthermore regular meetings between the Local Evaluation Manager and demonstrators took place as well as interviews and forums dedicated to the subject of evaluation.

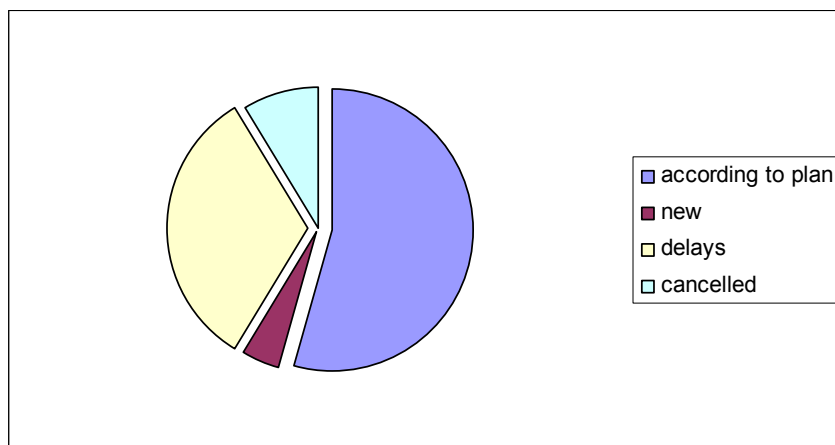


## B Evaluation findings

### B.1. Implementation

After forty two months, the TELLUS measures had been in different stages of implementation due to varying performances. Some measures had performed according to plan, some in a flexible way, modifying the measure and activities according to required changes, and some had started late. However, the vast number of TELLUS measures was under implementation and about 30% of the measures were delayed compared to the original plans (see Figure 3).

**Figure 3: Status of TELLUS demonstration measures (month 42)**



Innovative transport measures in general are not easy to implement. Although the ideas and proposals sound reasonable they face institutional, political, legal, market, acceptance and design problems. Delays in implementation, redesign of the concept, termination of implementation and replacement with alternative measures determine everyday project life. The TELLUS measures experienced all those problems and changes just as well and tackled them by taking adequate actions.

TELLUS started up with 46 measures to be implemented and later expanded to include 48 demonstrations. During the TELLUS life-cycle some measures faced crucial implementation problems leading to the termination of activities started or even to the cancellation of the demonstration. This happened to five out of the 48 TELLUS measures.

Some of the measures underwent a transformation process as they were initially planned for implementation but became conceptual during their lifetime. Three measures were confronted with this type of change.

Modification of measure components is an appropriate action in order to react on problems occurring during the different stages of a measure life-cycle. Modifications were necessary for fifteen measures. Furthermore delays in implementation were one of the consequences resulting from the problems mentioned above. This happened to fifteen measures.

The following tables (Table 9 to Table 13) provide for each city an overview on transformation and modification of TELLUS measures.

**Table 9: Transformation and modification of measures in Berlin**

City	WP No.	Measure title	Planned as a - Concept development - Concept development and implementation - Implementation measure	Realised as a - Concept development - Concept development and implementation - Implementation measure	Remarks:
Berlin	6.4	Teleparking systems/ Mobile Parking	Concept development and implementation	Concept development and implementation	Implementation modified in comparison to original work plan: changed from Teleparking System to Mobile Parking
	6.5	Road Network and Concept for HD Vehicles Road Pricing	Concept development	Concept development	
	7.5	Future Management of Urban Public Transport	Concept development	Concept development	The original contents of parts 2 and 3 were altered
	8.4	Metropolitan Fleet Car	Concept development and implementation	Concept development and implementation	Implementation mainly in the last months of TELLUS, and after the end of the TELLUS project
	8.5	Car Modal	Concept development and implementation	Concept development and implementation	Measure leader and city looking for new implementation possibilities (part of the work plan)
	9.3	Inner City Logistic Centre	Implementation	Implementation	Implementation modified in comparison to original work plan: Part 1 and 2 not realised within TELLUS, change in demonstration design of part 3.
	9.4	New Forms of Financing- Contracts for HG Vehicles	Concept development and implementation	Concept development and implementation	Implementation modified in comparison to original work plan: the project design had to be adapted
	10.4	Customer and User Participation	Implementation	Implementation	
	11.6	Dynamic Real-Time Passenger Information for Trams and Buses	Implementation	Implementation	
	12.6	Introduction of CNG-powered Vehicles	Implementation	Implementation	Implementation modified in comparison to original work plan. More and other types of vehicles were introduced.

**Table 10: Transformation and modification of measures in Bucharest**

City	WP No.	Measure title	Planned as a - Concept development - Concept development and implementation - Implementation measure	Realised as a - Concept development - Concept development and implementation - Implementation measure	Remarks:
Bucharest	5.5	Parking restrictions in central area	Implementation	Implementation	Implementation modified in comparison to original work plan: implementation area changed and access restriction was introduced
	11.4	Fleet management by GPS	Concept development and implementation	Concept development and implementation	Implementation modified in comparison to original work plan: pilot within project period, complete implementation summer 2006
	11.5	Modernising the ticketing and payment system of the public transport	Concept development and implementation	Concept development and implementation	Partial implementation due to delays, complete implementation in summer 2006
	12.5	Clean & silent public transport fleet	Concept development and implementation	Concept development and implementation	Implementation modified in comparison to original work plan: fewer trams introduced but more attention for energy saving aspects.

**Table 11: Transformation and modification of measures in Gdynia**

City	WP No.	Measure title	Planned as a	Realised as a	Remarks:
			- Concept development - Concept development and implementation - Implementation measure	- Concept development - Concept development and implementation - Implementation measure	
Gdynia	5.6	Parking restrictions in central area	Implementation	Implementation	Last phase of implementation to be finished after TELLUS, in 2006

**Table 12: Transformation and modification of measures in Göteborg**

City	WP No.	Measure title	Planned as a	Realised as a	Remarks:
			- Concept development - Concept development and implementation - Implementation measure	- Concept development - Concept development and implementation - Implementation measure	
Göteborg	5.7	Environmental zone for heavy duty vehicles	Concept development and implementation	Concept development	Extensions and new regulations not implemented within TELLUS
	6.6	Incentives for purchasing of CNG/CBG heavy duty vehicles	Concept development and implementation	Concept development and implementation	
	7.6	Environmentally optimised river shuttle	Concept development and implementation	Concept development	Concept and other documents available (draft tender, design, alternative propulsion systems). Original measure was cancelled, and replaced by measures 12.7 and 12.8
	9.5	Incentives for improving the load factor in inner-city freight transport	Concept development and implementation	Concept development and implementation	
	10.5	Consumer driven goods management from a Mobility Centre base	Concept development and implementation	Concept development and implementation	
	12.7	Promoting the introduction of clean vehicles in public and private fleet	Concept development and implementation	Concept development and implementation	
	12.8	Introduction of clean waste collection vehicles	Concept development and implementation	Concept development and implementation	

**Table 13: Transformation and modification of measures in Rotterdam**

City	WP No.	Measure title	Planned as a - Concept development - Concept development and implementation - Implementation measure	Realised as a - Concept development - Concept development and implementation - Implementation measure	Remarks:
Rotterdam	5.1	Access time window to promote clean commercial vehicles	Concept development and implementation	Concept development	Work plan changed and focused on regional policy for sustainable freight traffic.
	5.2	Dedicated bicycle routes	Implementation	Implementation	Implementation modified in comparison to original work plan: only one route could be implemented within the TELLUS period. Others expected in years '06 and onwards
	5.3	Truck parking management for residential areas	Implementation	Implementation	
	5.4	Public Transport priority and dedicated lanes	Implementation	Implementation	
	6.1	P&R pricing strategies for target groups	Implementation	Implementation	
	6.2	Demand depending strategies for paid parking	Concept development and implementation	Concept development and implementation	The concept was developed; as a first step paid parking was introduced in target area. This alone already had the desired effect; there was no need to introduce demand oriented parking tariffs
	6.3	Public private partnership regarding the construction and maintenance of new road infrastructure	Concept development		not continued/ cancelled
	7.1	Integration of cycling and public transport	Concept development and implementation	Concept development and implementation	
	7.2	Large scale expansion of P&R	Implementation	Implementation	
	7.3	Public transport over water	Implementation	Implementation	

Details on the commencement, the process of implementation, the resulting changes and barriers and drivers are outlined in the city-specific Final Evaluation Reports.

## B.2. Clustering

The clustering helps to identify measures implemented under the same urban transport strategy but in a different urban context, and details might be looked up in the corresponding evaluation report of the cities. However the different city backgrounds and characteristics as well as the different cultural, political and legal factors have to be taken into account when comparing the results of similar measures.

Regarding the thematic clusters agreed upon with the other TELLUS project cities, six relevant clusters were identified. Table 14 provides an overview of the thematic clusters.

**Table 14: Thematic Clusters of TELLUS measures (without others)**

City	Demonstration measure	Promotion of clean vehicles	Increasing attractiveness of PT (ticketing, information)	Distribution of goods	Innovative mobility services	Access restrictions	Parking management	Others
Berlin	9.4 New forms of financing-contract for NG vehicles	■						
Berlin	12.6 Introduction of CNG-powered vehicles	■						
Göteborg	6.6 Incentives for purchasing of CNG heavy duty vehicles	■						
Göteborg	12.7 Introduction of clean vehicles in public and private fleet	■						
Göteborg	12.8 Introduction of clean waste collection vehicles	■						
Rotterdam	12.1 Clean & silent public transport fleet	■						
Rotterdam	12.3 Cleaner vehicles for waste collection	■						
Rotterdam	12.4 Electric vehicles in public fleets	■						
Bucharest	12.5 Clean & silent public transport fleet	■						
Berlin	11.6 Dynamic real-time passenger information for trams and buses		■					
Gdynia	5.6 Transforming the city centre into clean Urban Transport Area		■					
Rotterdam	5.4 Transport priority and dedicated lanes		■					
Rotterdam	7.1 Integration of cycling and public transport		■					
Göteborg	9.5 Incentives for improving the load factor in inner-city freight transport			■				
Rotterdam	9.2 Implementation of multi-core tube logistics			■				
Rotterdam	12.2 Electric vehicles for the distribution of goods			■				
Berlin	8.4 Metropolitan Fleet Car –business/private shared use of fleet cars				■			
Berlin	8.5 Car Modal –new service for organised passenger transport in private cars				■			
Göteborg	10.5 Consumer driven goods management from a Mobility Centre base				■			
Rotterdam	7.3 Public transport over water				■			
Rotterdam	7.4 Automated people movers				■			
Rotterdam	8.2 Expansion of van-pooling for commuters				■			
Rotterdam	9.1 E-commerce logistics				■			
Göteborg	5.7 Environmental zone for heavy duty vehicles					■		
Rotterdam	5.1 Access time window to promote clean commercial vehicles					■		
Bucharest	5.5 Parking restrictions in central area						■	
Berlin	6.4 Mobile Parking						■	
Rotterdam	5.3 Truck parking management for residential areas						■	
Rotterdam	6.1 P&R pricing strategies for target groups						■	
Rotterdam	7.2 Large scale expansion of P&R						■	
Number of measures within the cluster		9	4	3	7	3	5	

Out of the 48 measures 30 belong to the clusters identified. 18 measures can not be clustered thematically but belong to different important subjects. Clean urban transport is strongly related to *clean vehicles* and valuable information on promotion can be found in nine measure reports. *Innovative mobility services* aim at clean alternatives and a modal shift, therefore this cluster contains a mix of measures addressing commercial and passenger transport as well new forms of private vehicle use - seven measures are included in this cluster. The *public transport* sector is addressed by the strategy of increasing attractiveness, for which four measures hold valuable information. *Parking management* is an instrument becoming more and more important to influence transport demand and experience and results of five measures are presented. The clusters ‘*distribution of goods*’ and ‘*access*

*restrictions*' address mainly the commercial transport sector and valuable information might be found in three measure reports of each cluster.

### **B.3. Methods and instruments**

The city evaluation reports show a broad range of solutions of how to evaluate innovative transport measures. Evaluation of transport projects is complex and demanding, aiming to show and explain the transport, environment, energy, economy and society related changes that occurred by implementing transport measures. To understand the changes (intended or unintended, according to or deviating from objectives) it is necessary to know about the processes accompanying the implementation of innovative transport measures. To understand the processes and the impacts arising from transport interventions all kinds of data needed to be gathered. The analysis and assessment of the data is resource and research-intensive. Each city faced different challenges during the implementation of the TELLUS project such as data availability, changes in implementation, availability of models to estimate the environmental or transport effects. The reports provide answers to the questions 'How to handle a complex evaluation task?' and 'How to deal with the specific situation and frame conditions?'. The variety of solutions should be understood as a basket of choices containing a variety of approaches, methods and tools for a complex evaluation task.

The types of evaluation applied and aspects analysed in the cities are shown in Table 15 to Table 19. The overviews are separated according to measure and city level and consider the two periods, the TELLUS project period and TELLUS up-scaling period.

**Table 15: Evaluation types and aspects on measure level (Berlin, Bucharest)**

		Evaluation type		Berlin		Bucharest	
				Section Evaluation Report & Evaluation aspect		Section Evaluation Report & Evaluation aspect	
Measure level	TELLUS project period (2002 – 2006)	Ex-ante at the beginning		Situation before TELLUS		Situation before TELLUS	
				Innovative aspects		Innovative aspects	
						Environmental evaluation	Replacement of bus fleet
		Ex-post at the end	Process evaluation	Description	Design, transport plan context, objectives	Description	Design, transport plan context, objectives
				Implementation process		Implementation process	
				Conclusions	Barriers and drivers	Conclusions	Factors of success and Barriers
			Impact evaluation	Results	impacts (evaluation areas)		Results
		Effects (public awareness)					
		Objective related evaluation	Resume	Achievement of objectives	Resume	Achievement of objectives	
	TELLUS up-scaling period (2006 – 2010)	Ex-ante at the end of implementation	Scenario (for four measures)	Measure characteristics	Description of future design	Scenario	Short description of up-scaling potential based on Master Plan
				Framework conditions	Changes required		
				Analysis of potential	Possible impacts		
				Resume	Contribution to objectives		

**Table 16: Evaluation types and aspects on measure level (Gdynia, Göteborg)**

		Evaluation type	Gdynia		Göteborg	
			Section Evaluation Report & Evaluation aspect		Section Evaluation Report & Evaluation aspect	
Measure level	TELLUS project period (2002 – 2006)	Ex-ante at the beginning	Situation before TELLUS		Situation before TELLUS	
			Innovative aspects		Innovative aspects	
					Environmental zone	
		Ex post at the end	Description	Design, transport plan context, objectives	Description	Design, transport plan context, objectives
			Implementation process		Implementation process	
			Conclusions	Drivers and Barriers	Conclusions	Drivers and Barriers Synergies
	Results		Impacts (evaluation areas)	Results	Impacts (evaluation areas)	
	Contribution to TELLUS objectives				Additional impacts	
	Resume	Achievement of objectives	Objective fulfilments	Achievement of objectives		
	TELLUS up-scaling period (2006 – )	Ex-ante at the end of implementation	Scenario	Short description of expanding the measure	Scenarios	Up-scaling on optimistic but realistic assumptions; (Descriptive)
						Do nothing scenario and 2010 scenario (Descriptive)

**Table 17: Evaluation types and aspects on measure level (Rotterdam)**

		Evaluation type	Rotterdam		
			Section Evaluation Report & Evaluation aspect		
Measure level	TELLUS project period (2002 – 2006)	Ex-ante at the beginning		Description – Ex-ante evaluation	Review on similar measures
			Ex post at the end	Process evaluation	Description
		Implementation process			Barriers and drivers
		Conclusions			Failure and success
	Impact evaluation	Results	Impacts evaluation areas		
	Objective related evaluation	Implementation process	Achievement of targets		
TELLUS up-scaling period (2006 – 2010)	Ex-ante at the end of implementation		Scenarios	Description up-scaling potential and transferability	



**Table 18: Evaluation types and aspects on city level (Berlin, Bucharest)**

		Evaluation type		Berlin		Bucharest	
				Section Evaluation Report & Evaluation aspect		Section Evaluation Report & Evaluation aspect	
City level	TELLUS project period (2002 – 2006)	Ex post evaluation	Impact evaluation	TELLUS indicator development (including social indicators)	Key indicators and assessment of achievement of TELLUS objectives	TELLUS Key Indicators	Key indicators including TELLUS Social indicators
				Contribution to METEOR	Common Core indicators	Contribution of TELLUS	(Descriptive)
		Process evaluation	Implementation analysis	Drivers and barriers			
			TELLUS project assessment	Implementation process and results			
		Special evaluation types			Baseline and trend scenario	Not carried out	
			Participatory evaluation	Assessment of measures by citizens			
		period 2006 - 2010	Ex-ante evaluation	Future potential	Durability	What will happen after the TELLUS project?	City scenario
	Up-scaling				See scenario on measure level		

**Table 19: Evaluation types and aspects on city level (Gdynia, Göteborg, Rotterdam)**

		Evaluation type		Gdynia		Göteborg		Rotterdam	
				Section Evaluation Report & Evaluation aspect		Section Evaluation Report & Evaluation aspect		Section Evaluation Report & Evaluation aspect	
City level	TELLUS project period (2002/06)	Ex post evaluation	Impact evaluation	TELLUS Key Indicators	Key indicators including social indicators	Ex post evaluation 2006	Assessment of Key Indicators and objectives	Ex-post evaluation 2006	Key Indicators
				Contribution of TELLUS				Contribution of TELLUS	Evaluation areas transport, environment, energy
				Contribution to METEOR	Common Core indicators				
		Process evaluation	Final Conclusions	Barriers and Drivers					
		Special evaluation types	Baseline and trend scenario	Not carried out	Baseline and trend scenario	Possible Synergies	Clean urban transport scenario	Likely contribution	
	Period 2006 2010	Ex-ante evaluation		Ex-ante for 2010	Descriptive based on Integrated Development Plan	Contribution of TELLUS	Based on Environmental plan	Baseline (2001) and trend scenario (2010)	Key indicator: monitored and traffic and transport model calculations.
								CIVITAS scenario	Potential size and potential impacts

The following sections provide an insight into

- the methods and instruments used,
- how the different evaluation types were applied, and
- which evaluation aspects have been addressed in the TELLUS cities.

#### *Ex-ante evaluation*

The term ex-ante evaluation is used for evaluating the possible effects of measures in the future. There are two different moments at which an ex-ante evaluation is relevant: at the beginning and at the end of the TELLUS project.

The *ex-ante evaluation at the beginning* serves to estimate effects of the planned TELLUS measures: in most cities it is understood as describing the situation before implementing the transport measure. Moreover, the innovative aspect of the measure is emphasised.

Rotterdam took up a further aspect and conducted a review on similar measures implemented in other cities world wide. The objective was to assess whether a prediction of impacts beforehand is possible. The review identified a number of comparable measures, but it was concluded that it seems appropriate to predict the expected impacts rather in a qualitative than in a quantitative way. This of course differs for various types of measures, for example straight forward technical measures can be predicted more easily compared to soft measures.

Bucharest picked up the quantitative aspect and carried out an environmental ex-ante evaluation to estimate the effects of the replacement of one third of the conventional diesel bus fleet by LPG buses. The COPERT model was used for calculating the effects.

*Ex-ante evaluation at the end* of the TELLUS project serves to assess the possible effects of up-scaled measures for the period 2006 – 2010. The appraisals were carried out in different ways and there is a close link to the scenarios developed in the cities (see scenarios).

In Rotterdam the ex-ante evaluation followed a two-step procedure. First a baseline and trend scenario was developed, estimating the trends of some indicators with the help of the Rotterdam trend model for traffic and transport (*RVMK*), which is also fed with actual monitoring data. In a second step a CIVITAS scenario based on expert judgment was carried out, determining the potential up-grading of the measures and estimating the impact with a three-point scale.

In Berlin the ex-ante evaluation covers a longer period due to the time horizon given by the city's Integrated Transport Plan (2006/2015). It focussed on two aspects, durability and up-scaling potential. Durability concerns the question 'What will happen after the funding of the EU will come to an end?'. Most of the measures will continue, some in a modified way. The up-scaling potential relates to the question 'How could the measures continue?' and

concerns the expansion of the measures under certain conditions. Conditions and lines of development were elaborated with a scenario approach.

In Göteborg the Environment Plan is the starting point for the assessment and the possible contributions of the TELLUS measures are discussed considering realistic assumptions.

In Gdynia the Transport Policy and Integrated Development Plan of Public Transport in Gdynia for the years 2004-2013 are the starting points for discussing the likely development of a number of important indicators.

In Bucharest a city scenario was established taking into account the future urban and transport plans of the city and the designed transport projects and the possible integration of the TELLUS measures was discussed.

### *Scenarios*

Scenarios and up-scaling are used synonymously but they are presented in different ways. Scenarios were often carried out in co-operation with internal and/or external experts facilitating the process of looking at the issue from different angles. Generally three approaches were used to perform the exercise of up-scaling:

- i) Assessing the chances of up-scaling based on the results achieved and future urban transport plans of the city;
- ii) Assessing the possibility of up-scaling, based on the results achieved, an ex-ante assessment, and future development and transport policy directions;
- iii) Assessing the possibilities of up-scaling based on the results achieved and discussing with experts in a step-wise process possible lines of development, necessary frame conditions and finally estimating the likely impacts on city level.

In Rotterdam the up-scaling potential of the measures was determined through interviews with the demonstrators

In Göteborg the likely impacts of the measures for the time frame 2006-2010 if implemented on a larger scale were estimated by the demonstrators. The scenarios are based on optimistic, but still realistic and achievable assumptions.

In Gdynia and Bucharest the up-scaling was based on the results achieved and considered the future transport policy and the possible integration of the measures.

In Berlin a comprehensive process of scenario building was applied. The results of five measures were used as a starting point and supplemented by information from other studies, reports, and projects and the urban transport plan. Furthermore, assumptions were made and current and future developments carefully considered. The up-scaling and projection of the measure took place in three steps. The evaluation team worked out the development lines considering the impacts and presented the findings to a group of experts during a

special scenario workshop. The inputs and suggestions made by the experts were incorporated in the final scenario version.

### *Impact evaluation*

The impacts of the measures were determined by using a set of indicators. The indicators were monitored by means of measurements, surveys and calculations. *Measurements* consist of real time data or data gathered in retrospect such as kilometres travelled, fuel used, costs and revenues. *Surveys* were carried out as face-to-face interviews, written questionnaires or on-line questionnaires. *Calculations* were made using the data from measurements and surveys. Calculated data is in particular used for environmental indicators such as emissions, noise impact and quality of air.

The impact evaluation is mainly measure-related, which is justified by the small and dispersed geographical scale and the relative small number of measures. The impacts of each measure are presented in the city reports as far as possible at this stage.

Rotterdam, implementing a complex system of measures, developed a method to handle the huge number of impact indicators, the different values of indicators and to provide an overview on the impact reached in the different impact areas. The procedure is based on a *simplified scoring method* (positive, neutral and negative) comparing the indicators before and after implementation of the measures. The results of the indicators are added up in the five impact areas (society, transport, economy, environment and energy) providing an overview of the overall impacts of the measures (see Table 20).

**Table 20: Simplified scoring method for evaluating the impact of measures in Rotterdam**

	Measure	SOCIETY	ECONOMY	TRANSPORT	ENERGY	ENVIRONMENT
<a href="#">5.1</a>	Access time windows					
<a href="#">5.2</a>	Dedicated bicycle routes	+	-	+	+	+
<a href="#">5.3</a>	Truck parking management	+	-	+		+
<a href="#">5.4</a>	Transport priority and dedicated lanes	?	+	?	+/-	+
<a href="#">6.1</a>	P&R pricing strategies for target groups	+/-	-	+	+/-	+/-
<a href="#">6.2</a>	Kilometer pricing					
<a href="#">6.3</a>	Demand dependent paid parking					
<a href="#">7.1</a>	Integration of cycling and public transport	+	-	+	+	+
<a href="#">7.2</a>	Large scale expansion of P&R	?	?	?	?	?
<a href="#">7.3</a>	PT over water	+	?	+	-	-
<a href="#">7.4</a>	Automated people movers					
<a href="#">8.1</a>	Electric two-wheelers	+	-	+/-	+	+
<a href="#">8.2</a>	Expansion of van pooling for commuters	+	?	+	+	+
<a href="#">8.3</a>	Expansion of car sharing	+	+	+	+	+
<a href="#">9.1</a>	E-commerce logistics					
<a href="#">9.2</a>	Multi core tube logistics	+	+/-	+	+/-	+
<a href="#">10.1</a>	Green commuter plans	+	+/-	+		
<a href="#">10.2</a>	Integration of P-P transport Initiatives.	+				
<a href="#">10.3</a>	New approaches to integrated planning					
<a href="#">11.1</a>	Integration of transport management systems	+	-	+	+/-	+/-
<a href="#">11.2</a>	Intermodal travel information					
<a href="#">11.3</a>	Dynamic PT information	+	?	?		
<a href="#">12.1</a>	Clean and silent PT fleet: DNOx	+/-	-	-	+/-	+/-
<a href="#">12.1</a>	Clean and silent PT fleet: SCR	+	-	+	-	+
<a href="#">12.2</a>	Electric vehicles for the distribution of goods	+/-	-	+/-	+/-	+/-
<a href="#">12.3</a>	Clean vehicles for waste collection: active filter	-	-	-	+/-	+/-
<a href="#">12.3</a>	Clean sweeping machines: CPO filter system	+	-	+	+/-	+
<a href="#">12.4</a>	Electric vehicles in public fleets	+/-	+/-	+	+	+

+ = area improved, +/- = no change or negative impact equals positive impact  
 - = area worsened, ? = unknown

*Key indicators*

The Indicator Fact Sheets provide the basis for the continuous monitoring and further evaluation. Their structure enables transparency and comprehensibility, as well as the documentation of the development of the indicators. In Part III of the Final Evaluation Report all indicators and their development can be retrieved.

The Indicator Fact Sheets contain valuable information on all relevant TELLUS indicators covering in some cases more than a decade of monitoring. Elements of the fact sheets are the name and the description of the indicator including context and impacts, the unit of the indicator, indicator-related objectives, methods of measurement, sources of data, a timetable for the measurement of the data, the legal basis, the development of the indicator, the relation to other indicator systems and references.

The developed key indicator monitoring system, often in line with the direction of the local transport strategy of the cities, was interpreted as an instrument to monitor the development of the transport and related environmental conditions as a whole beyond the TELLUS project. So the monitoring system can be understood as a tool to identify areas for future action.

However, it is suggested that the key indicator system, which provides information on the city level, should be developed into the direction of identifying problematic spots or sections in the transport system similar to the screening and hot spot analysis for noise abatement planning. Indicators should be a tool to assess the quality of the indicator and its development as well as to identify areas of intervention. The combination of high level and low level aggregated data (in terms of spatial aggregation) is required to understand in which direction the indicators are moving and to determine the actions (on local level, area based or city wide) to change the value and/or direction of development of indicators. Key indicators or Common Core Indicators are suitable for high level aggregated transportation modelling estimating the transport and environment related effects of transport measures on the city level (see e.g. ITMES). For transport measure decision making it can only be the starting point for further local analysis. Air quality planning and traffic accident mapping already apply such an approach. Table 21 provides an overview on the overall situation of the development of the Key Indicators in the TELLUS cities and shows the relevance for taking action on certain indicators.

**Table 21: Development of TELLUS Key indicators in TELLUS cities during the TELLUS life cycle**

TELLUS objective	TELLUS Key Indicator	Unit	Specificati-on	Bucha-rest	Gdynia	Göte-borg	Rotter-dam	Berlin
<b>TRANSPORT</b>								
Reduce road casualties and injured persons	Fatalities	Number					😊	😊
	Injuries						😊	😊
Reduce congestion	Average vehicle speed	Km/h	cars peak		😊	😊	😊	😊
			cars off-peak		😊	😊		😊
			buses	😊				
Reduce car kilometers	Car kilometer	Car-km/a				😞	😞	
Increase public transport use	PT passenger Movement	Number		😊				😊
		Passenger km		😞			😊	
Increase the modal share in favour of PT	Modal split	Number of trips		😊			😊	😊
<b>ENVIRONMENT</b>								
Reduce air pollution to levels below national and EC directives	PM <sub>10</sub> levels	µg/m <sup>3</sup>	annual mean	😊	😞	😊	😊	😊
			24h average	😞		😊		😞
			annual mean (40)	😞	😊		😊	😊
	NO <sub>2</sub> levels		annual mean	😞	😊	😊	😊	😊
			1h average	😞		😊		😊
	Benzene		annual mean (40)	😞	😊		😊	😊
			annual mean			😊	😊	😊
	CO		annual mean (5)	😞			😊	😊
			annual mean			😊		😊
			max daily 8 h conc.	😞	😊	😊		😊
Reduce traffic related CO <sub>2</sub> emissions	CO <sub>2</sub> emissions	t/a	primary energy					
			final energy					
Reduce NO <sub>x</sub> emissions fr. heavy traffic	NO <sub>x</sub> emissions	t/a		😊		😊		😊
Reduce noise to levels below national and EC directives	Noise level dB(A) road length	Equivalent noise level L <sub>aeq</sub> in dB(A)	days	😞	😊		😞	😞
			nights		😊		😞	😞
<b>ENERGY</b>								
Reduce energy use	Final energy use by traffic	Terajoule/a						😊
	Primary energy use by traffic							

😊 positive

😞 neutral

😞 negative

*Process evaluation*

The process evaluation helps to understand changes that occurred during the implementation of the measures. Furthermore it helps to identify the forces promoting (drivers) or hindering (barriers) the implementation and influencing the results and effects of the measure. Process evaluation was based on a range of data, but mainly on interviews with stakeholders, project-related meetings, and reporting documents.

Berlin carried out the process evaluation on two levels. For each measure a detailed analysis of the drivers and barriers for the implementation was carried out. Moreover on city level the results were summarised. Therefore the promoting and hindering factors were clustered in seven categories: institutional, legal, financial, structural, communication, user orientation/acceptance, and commitment related drivers/barriers. If none of these categories applied for a certain driver/barrier it was assigned to the category “others” (see Table 22).

Furthermore, recommendations regarding the action areas “Introduction of CNG Vehicles”, “Promotion of Combined Freight Transport”, “New Mobility Services as Part of Urban Public Transport” and “Measure Design and Implementation Process” were derived.

The recommendations address politicians and planners on EU and local level that are responsible for shaping the transport policy of the future as well as implementers that want to learn and benefit from the experiences made within TELLUS Berlin.

**Table 22: Drivers and Barriers for TELLUS measures in Berlin**

	Drivers							Barriers								
	Institutional	Legal	Financial	Structural	Communication	User orientation/ accept.	Commitment	Other	Institutional	Legal	Financial	Structural	Communication	User orientation/ accept.	Commitment	Other
Demonstration Measures																
6.4 Mobile/Tele Parking																
8.4 Metropolitan Fleet Car																
8.5 Car Modal																
9.3 Inner City Logistics Centre																
9.4 New Forms of Financing Contracts																
11..6 Dynamic Real-Time Passenger Information																
12.6 Introduction of CNG-powered Vehicles																



Table 22 shows clearly that an easy answer to the question which categories were the most important ones on city level cannot be found. For that the demonstration measures are too heterogeneous.

Nevertheless what becomes obvious is that the measures revealed a wide range of barriers that are being faced when innovative measures are implemented to create a more sustainable urban transport in Berlin. Moreover, important results are the experiences that have been made on how to overcome these barriers and make implementations a success.

In Rotterdam the process evaluation was as well carried out on both levels. On measure level the drivers and barriers were identified in the scope of the process evaluation. Furthermore, the Local Evaluation Manager held a special TELLUS Forum-meeting with the demonstrators to identify the main barrier and main driver for their measures. To be able to produce an overview, the barriers and drivers were classified into the following five categories: Society, Finance, Technique, Policy and Process.

In Table 23 the barriers and drivers are summarised combining measure and city level. The table shows a colourful picture of drivers and barriers. It becomes obvious that it is difficult to determine the importance as well as influence of the barriers and drivers on project level.

Furthermore an overall assessment of the TELLUS project in Rotterdam was made containing conclusions and recommendations based on the findings and results of the process and impact evaluation.

In Bucharest, Gdynia and Göteborg barriers and drivers were identified on measure level. A summarised view including conclusions and recommendations was carried out in the Final Conclusions.

Regarding the process evaluation and drivers and barriers the following conclusion can not be emphasised strongly enough: Process evaluation played an important role to understand changes that took place during the implementation of the TELLUS measures, to understand the underlying processes, to identify the promoting and hindering factors and to relate the changes and processes to the findings and results. Process evaluation and impact evaluation are of equal importance for the evaluation of innovative transport measures complementing each other.

**Table 23: Drivers and barriers for TELLUS measures in Rotterdam**

Demonstration measure	Major Driver					Major Barrier				
	Society	Finance	Techniq	Policy	Process	Society	Finance	Techniq	Policy	Process
5.1 Access time window										
5.1 Dedicated bicycle routes										
5.3 Truck parking management										
5.4 Transport priority and dedicated lanes										
6.1 P&R pricing strategies for target groups										
6.2 Kilometer pricing										
6.3 Demand dependent paid parking										
7.1 Integration of cycling and public transport										
7.2 Large scale expansion of P&R										
7.3 PT over water										
7.4 Automated people movers										
8.1 Electric two-wheelers										
8.2 Expansion of van pooling for commuters										
8.3 Expansion of car sharing										
9.1 E-commerce logistics										
9.2 Multicore tube logistics										
10.1 Green commuter plans										
10.2 Integration of P-P transport Initiatives.										
10.3 New approaches to integrated planning										
11.1 Integration of transport management systems										
11.2 Intermodal travel information										
11.3 Dynamic PT information										
12.1 Clean and silent PT fleet										
12.2 Electric vehicles for the distribution of goods										
12.3 Cleaner vehicles for waste collection										
12.4 Electric vehicles in public fleets										
Total number of drivers and barriers per category	8	4	4	7	2	3	7	1	8	6

## B.4. Findings

The following findings are a compilation of the findings concluded in the TELLUS cities. There are more findings on city level referring to the specific conditions, results and experiences. They can be consulted in the City Evaluation Reports especially in the chapters Conclusions and Final Conclusion. Recommendations are not part of this chapter. They will be addressed in a separate deliverable 'Deliverable 4.4 Policy Recommendations'.

### *General findings*

- In general, the implementation process of innovative transport measures in the TELLUS cities is regarded as successful.
- TELLUS provided the opportunity to discuss transport topics neglected so far, especially commercial/goods transport.
- The results achieved from TELLUS and the awareness that TELLUS has raised in the cities among all stakeholder groups will greatly facilitate present and future environmental work in the cities.
- TELLUS contributed to increase awareness among the business community and especially logistic companies; in some cities these companies participated in more than one measure increasing the chances for synergy effects.
- There are first signs that companies looked beyond the city boundaries and established a kind of European co-operation policy, e.g. DHL started to co-operate in the field of clean vehicles with TELLUS Göteborg, continued at a later stage with TELLUS Berlin and started recently co-operation with Bremen (VIVALDI project).
- Measures were often operating on a rather small, sometimes even local and generally geographically dispersed scale. As a consequence, there was only a limited possibility to create and make use of synergies between the measures.
- Future budgets should give more finances to 'soft activities', such as marketing and awareness rising, since without the content of the envisaged users, no measure can run successfully. A user-orientated perspective thus needs to be applied for organisational approaches but also and especially for technological applications.

***Findings on implementation and framework conditions***

- The creation of appropriate conditions for the implementation of measures as well as the creation of acceptance and moreover utilisation of these potentials are central aspects, that need to be considered and addressed with more emphasis.
- Identification of drivers and barriers for the implementation of innovative projects as well as the initiation of communication processes and the stimulation of co-operation on different levels are crucial for successful implementations.
- Changes in framework conditions, which can not be influenced directly, should be considered and if possible backed up by appropriate risk management.
- Experiences made with transport innovations in other cities and / or different contexts should be taken into account before the plan for a demonstration or pilot project is being drawn up.
- EU, national and local legislation and administration play an important role in the transport sector. These can positively contribute to transport innovations (e.g. the Air Quality Directive supported the wider introduction of CNG-vehicles), but they can also act as a barrier (e.g. legislation hindering the introduction of mobility services or changing political preferences).

***Findings on support and private stakeholders***

- Successful implementations need a strong policy support.
- Backup and support given from city administration are essential for the realisation of measures. Personal and institutional commitment is a factor that can be decisive for the outcome of a measure and the project.
- Committed and enthusiastic persons on city and measure level are a strong driver.
- The TELLUS approach in the cities resulted in an improved co-operation on all levels and strengthened the involvement of stakeholders such as residents, politicians, administration, research and development institutions, business community and media.
- Private demonstrators are a strong driver especially in providing innovative transport solutions in many areas e.g. mobility services, vehicle technology, information technology as well as new forms of co-operation.

***Findings on co-operation***

- TELLUS strengthened co-operation between cities on TELLUS, national and international level by exchanging and transferring knowledge and experience.
- Successful strategies to overcome barriers require intensive co-operation and a mutual understanding of the aims.
- Co-operation with a multitude of partners was influenced by different backgrounds of the partners and led to planning, management, organisational and communication differences. Overcoming those differences and using the opportunities depends on a common understanding of the aims and objectives of the project.
- Co-operational difficulties also increase if some of the partners have to act on the verge of economic viability. Small companies, that often obtain an enormous innovative potential, are sometimes overloaded with the financial, administrative and reporting requirements and procedures of EU projects.
- The collection of data and information needed for the evaluation were often not budgeted, co-operation with the evaluation posed an additional workload for some demonstrators, the advantage of which was not always immediately perceived.

***Findings on durability***

- Since TELLUS initiated in the participating cities a process of learning and awareness creation many measures will be continued in one way or the other after the formal end of the TELLUS project.
- Some of the measures will continue in the way they were conceptualised for TELLUS; others will carry on in a modified way, taking parts of the developed solutions and use them for example for a different target group. Some measures will pass on knowledge and experience gathered within the project period.
- Some measures will be part of the future urban transport policy or the knowledge gained will be applied to shape it.

***Findings on evaluation issues***

- The TELLUS objectives were too ambitious and could not be achieved by the TELLUS measures only.
- Not only the measures proved to be of the innovative kind, but also the evaluation had to test new ways to deal with this complex integrated project.
- Process evaluation and impact evaluation are of equal importance for the evaluation of innovative transport measures complementing each other.

- Process evaluation played an important role to understand changes that took place during the implementation of the TELLUS measures, to understand the processes behind the changes, to identify the promoting and hindering factors and to relate the changes and processes to the results and findings.
- The evaluation period should be longer than the demonstration period. A lead phase for harmonisation of common objectives and determining evaluation requirements on measure level as well as a post-implementation phase facilitating a comfortable period for the evaluation are regarded as inevitable.
- Local and small scale effects contribute to improve conditions on local level, and they are often essential elements of a changing future transport policy.
- The effects analysed and findings gained are relevant for further development of the measures and future policy decisions.
- A great variety of innovative transport measures is associated with a wide range of drivers and barriers.
- The evaluation shows that drivers and barriers are strongly measure specific making it difficult to draw general conclusions.
- Impact evaluation faced crucial problems because:
  - time for evaluation was shortened by implementation delays, thus not all surveys and counts could be carried out as planned;
  - some measures changed in design and implementation as well as in objectives resulting in eliminating agreed surveys and monitoring of indicators;
  - some measures were implemented on a low level presenting rather results of a case study than a pilot project;
  - the separation from effects due to implementation of non-TELLUS measures was difficult; combined effects posed a challenge for the development and proof of cause-effect relationships.
- The assessment of environmental effects is more easy for measures addressing technology both on local level and city level; the crucial questions to be answered are 'How to penetrate the market?' and 'How to reach a critical mass?'.
- The assessment of behavioural changes like modal shifts is rather complicated and requires sophisticated survey techniques which were beyond the capacities of the TELLUS project.
- In general, the Common Core / Key Indicators and evaluation areas are useful for evaluation. However, the methodology could be improved by rules for aggregation and system boundaries.

- TELLUS evaluation took over a strong moderation role concerning integration of the various demands and expectations of the different levels and balancing between the interest of the European Commission on hard facts and knowledge transfer as well as the limited resources of the demonstration measures to collect and provide data.

### ***The role of innovative pilot projects***

The fact that the objects of the evaluation were not only innovative transport measures but as well innovative pilot projects (IPP) had several consequences for the evaluation.

- i) IPP are not readily shaped in the beginning of a co-operation. They are often highly flexible, undergo changes and modifications and expect from co-operation partners flexibility as well.
- ii) Evaluation should give careful attention to the analysis of the implementation process, drivers and barriers in order to provide information that helps to overcome barriers and to respond appropriately to changed circumstances.
- iii) Changes in implementation due to stepwise adaptation of the IPP to the specific situations require a highly flexible evaluation. The evaluation concept developed in the beginning can not be followed through without likewise being adapted to the changed conditions.
- iv) Difficult implementation processes often lead to delays and consequently effects of the measures during the project time are not visible and measurable. But this does not mean that there would be no impacts at all. Innovation needs time. The measures that address long established mobility routines of people or measures that require a change of legal framework in order to be implemented could only be the start of a longer process.
- v) Innovative projects need care and thus the evaluation had to take over a strong process role. In co-operation with the demonstrators the evaluation team should establish an integrating framework for the single measures by relating the measure level objectives with the objectives on city and project level. This approach asks for a close contact, which can be valuable in terms of exchanging intensively information and understanding the process. At the same time it will also be very resource intensive for the evaluation team.
- vi) Conclusion: it would be advisable for future CIVITAS projects to either allocate more resources to the horizontal evaluation work package or to require a sound evaluation concept as an integrated component of the measure design already at the very start of the project. In either case a lead time to set up a common implementation and evaluation framework for the project would be a valuable means to increase the efficiency and effectiveness of the implementation process.

