



Competitive and Sustainable Growth Programme

VIVALDI Project GRD1 – 2001 - 40060
VISIONARY & VIBRANT ACTIONS THROUGH LOCAL TRANSPORT
DEMONSTRATION INITIATIVES

Bristol • Bremen • Nantes • Aalborg • Kaunas



Deliverable 4.1

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EVALUATION PLAN

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Executive summary

This deliverable sets out the planned evaluation activities for the VIVALDI demonstration sites. It is the second full version of the plan, which builds on the version submitted in March 2003 and takes accounts of comments made by the Commission and further developments at the demonstration sites. Although this is a final version of Deliverable 4, it is seen as an evolving document that will continue to be developed throughout the project as the VIVALDI sites implement the demonstrations schemes, and through further discussions with the thematic network METEOR that is responsible for comparing results across the CIVITAS projects.

The plan builds on the evaluation framework developed jointly with the METEOR thematic network. However, within VIVALDI a bottom up approach has been taken with each site taking the basic framework and applying it in their local circumstances. In doing this the VIVALDI evaluation team has exchanged ideas and views on the evaluation process and developed an overall project approach, which can be viewed as the VIVALDI interpretation of the METEOR framework. The key aspects of this approach are:

- Evaluating at the level of integrated packages of measures, rather than individual measures;
- Including a consideration of the implementation process as an evaluation topic, and a key element for transferring results;
- Focusing on direct 'before' and 'after' data for the packages;
- Developing a detailed data collection programme for each site with respect to the indicators being measured for each package;
- Linking this data collection programme to the implementation programme.

Working in this way the VIVALDI demonstration will provide direct results for each of the 21 integrated packages being evaluated in the project, across the 5 sites. The evaluation work will also analyse the package results to assess the impact of individual measures. Finally the evaluation manager and work package leaders will look at the results across the demonstration sites to provide assessment of the impacts with respect to each of the 8 CIVITAS policy fields.

The evaluation is structured in two parts – part 1 giving overview of the evaluation activities in VIVALDI and Part 2 providing the detailed site evaluation plans.

Within Part 1 of the evaluation plan an overview of the demonstration activities in each site is given, and the evaluation approach being taken by the VIVALDI project is set out. Section 1 provides an introduction to CIVITAS, the VIVALDI project and the evaluation requirements. Section 2 describes the demonstrations being carried out at each of the demonstration sites and defines the idea of the integrated package. Section 3 discusses the evaluation approach being taken by VIVALDI and section 4 sets out the impacts and indicators that are being measured. Section 5 sets out the structure of the data collection activities in the project. Section 6 concludes with a discussion on the relationship between VIVALDI and the thematic network METEOR, the potential risks to successful evaluation and the next steps in taking the evaluation work forward.

Part 2 provides detailed evaluation plans for each of the demonstration sites: Bristol, Bremen, Nantes, Aalborg and Kaunas. Each plan provides an overview of the city context in which the demonstrations are being carried out, and a description of the integrated demonstration packages. This is then followed by a discussion of how each package of measures will be evaluated – defining the objectives of the package and how these relate to the overall project objectives, the impacts and indicators that will be used to assess these objectives, and the basic approach the evaluating these impacts. The last section provides a detailed data collection for site defining what will be collected, how it will be collected, by whom and when. This is summarised in a data collection inventory which is used to identify the data source for each of the indicators being measured.

PART 1 OVERVIEW OF THE EVALUATION ACTIVITIES IN THE VIVALDI PROJECT

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1 INTRODUCTION

1.1 Background to CIVITAS and the VIVALDI project

CIVITAS, a major new urban transport initiative supporting demonstration projects in a number of laboratory cities across Europe, is a key element of the new strategy on Clean Urban Transport prepared by the Transport and Energy Directorate-General of the European Commission. The initiative is supported with 50 million € from the budget of the Fifth Framework Programme for co-funding the demonstration projects.

The objective of CIVITAS is to assess the impacts of the introduction of radical integrated sustainable urban transport strategies, supported by innovative measures, technologies and infrastructures. These strategies should aim, in particular, to promote the development of an attractive alternative to use of private cars in cities.

Within the initiative eight basic strategies or policy fields have been identified that will be demonstrated through-out the projects sites:

1. Energy-efficient, cost-effective and clean public and/or private vehicle fleets.
2. Demand management strategies based upon access restrictions to the inner city areas and other sensitive zones.
3. Integrated pricing strategies.
4. Stimulation of collective passenger transport and its quality of service.
5. New forms of vehicle use and ownership, and new mobility services.
6. New concepts for the distribution of goods in urban centres.
7. Innovative 'soft' measures for managing mobility.
8. Integration of transport management and information systems.

VIVALDI is one of the 4 demonstration projects being supported by the CIVITAS initiative. It provides a major integrated European laboratory in clean urban transport measures involving four primary sites with established reputations in, and commitment to, the European transport and energy policy agendas. Each of the main demonstration sites will implement and evaluate an integrated package of innovative transport measures addressing each of the CIVITAS policy fields. In addition an Eastern European site will carry out demonstration within the field of collective modes and assess the potential transferability of the other demonstration elements to an Eastern European context.

The laboratory sites, Bristol, Bremen, Nantes, Aalborg and Kaunas are major European cities at the forefront of transport policy development and innovation. They have populations of between 170,000 and 550,000 and are regional centres for employment and economic activities. As such they need to not only support the mobility needs of their own citizens but also the many people accessing the cities for jobs, retail and leisure activities. Kaunas, the second city of Lithuania has a strong industrial background, and faces issues that are common with many other cities across Eastern Europe.

By working together the sites will:

- provide each other with political support and promote the political agenda;
- exchange knowledge and experience between key organisations in each site including city authorities, public transport operators and local businesses;
- develop a body of results that are transferable to a large number of similar medium sized cities across Europe.

1.2 Objectives of the project and evaluation plan

As part of the CIVITAS initiative the VIVALDI demonstration project seeks to contribute to European policy development with regard to:

- the Citizens' Network;
- the Green paper on Clean Urban Transport;
- the European Transport Policy white paper;
- the Environmental Action Programme "Towards Sustainability";
- and the implementation of the Kyoto protocol.

More specifically the VIVALDI project seeks to demonstrate an integrated package of innovative transport strategies and measures, in five EU city laboratories, and to assess their contribution to improving the four key urban policy goals of:

- urban vitality and economic success;
- social inclusion;
- the health and well being of the citizens;
- sustainability.

Therefore the evaluation plan sets out how the VIVALDI project will evaluate the demonstrations being carried out in each of the sites and assess their contribution to policy goals at both the local and European level. As such the evaluation plan will define:

- the impacts that will be measured, with respect to the policy objectives;
- the assessment methods that will be used;
- and the planned data collection activities

1.3 Evaluation approach and structure of the document

The basis of the evaluation approach taken in VIVALDI is the evaluation framework provided by the METEOR project (METEOR deliverable D2 'Assessment Framework and Evaluation Guidelines for Data Collection'). The METEOR project is an accompanying measure within the CIVITAS initiative, designed to assist the European Commission with monitoring, evaluating and disseminating the results of the CIVITAS demonstration projects throughout Europe. In this context, it is the task of METEOR to undertake a cross-site evaluation, whereas the CIVITAS cities will evaluate their own performance at the local/regional level.

The framework provided addresses the needs of a cross-site evaluation and most of the needs for local evaluation. The VIVALDI project has taken this framework and interpreted it for implementation at the site level and to ensure that it meets local needs. The key issues of interpretation have been:

- An understanding of the framework working from the level of the measures being implemented on the ground up to the policy objectives, or in other words using the framework in a bottom-up approach.
- Recognition that the demonstration measures and CIVIATS policy fields are not independent, rather they are being implemented as integrated packages. These integrated packages have therefore become the a key focus of the evaluation analysis.
- The need to understand the implementation process of the measure being demonstrated, an area not covered in the METEOR framework.

This document therefore seeks to address these issues and provide an overall evaluation plan for the VIVALDI project. Section 2 provides an overview of the demonstration sites in the project and how the integrated packages of measures are defined. Section 3 sets out how we have interpreted the METEOR evaluation framework and so arrived at our evaluation approach. This is followed, in section 4, by an overview of the impacts being evaluated in the VIVALDI sites and how these are being used to assess local and project level objectives. Section 5 gives an outline of the data collection activities being carried out in each site, that will provide the data for the evaluation results. Final section 6 provides some concluding remarks cover risks in the evaluation process and the integration of the VIVALDI evaluation work with METEOR and the other CIVITAS projects.

In addition part 2 of the evaluation plan provides the more detailed information on the evaluation activities in each of the sites, following the approach set-out in part 1.

2 THE VIVALDI INTEGRATED DEMONSTRATIONS

2.1 The city context

The demonstrations in the VIVALDI project are being carried out in five cities across Europe: Bristol, Bremen, Nantes, Aalborg and Kaunas. The location of these sites is shown in Figure 1 and each is described briefly below, with more detail being given in the individual site plans in Part 2

Each of the VIVALDI cities has different characteristics and transport contexts that will affect the results of the demonstration work.. A comparison of some of the key city characteristics is given in table Table 1. The main demonstration sites of Bristol, Bremen and Nantes are all of similar size, around 500, 000 population. Bristol shows the highest population density, but this is based only the cities administrative boundary. If the wider urban conurbation is considered, spreading into neighbouring authorities, the population density is nearer 1,700 per sq km closer to that of Nantes and Bremen. Aalborg is the smallest site and also has the lowest population density, where as Kaunas is more similar in size to the main demonstration sites and has one of the higher population densities.

The size and structure of the demonstration cities in VIVALDI is common to around 100 more cities across the EU. Therefore these sites provide a significant potential for developing transferable results

Figure 1 Location of the VIVALDI demonstration sites



Bristol (UK)

Bristol is characterised as being the largest urban area in the South West Region of the UK, with a population of some 500,000 in an area of 290 km². Rapid growth is occurring on the fringe of Bristol, in terms of housing, offices and other employment uses, and shopping and leisure developments. These developments have been concentrated along motorway interchanges and the Avon Ring road orbital routes (the North Fringe).

Bristol is in the centre of a growing region and is a focus for employment in the area. Some 79,000 people commute in from the outside of Bristol to the city daily. Bristol is also the focus for government, business, shopping and leisure, culture and social activities for the region. In terms of industry, Bristol has experienced the national trend for declining traditional industries with a reciprocal growth in office development, hi-tech service industry and warehouse distribution, with an increase in demand for out-of-town development in leisure, business and housing.

Communauté Urbaine de Nantes

Currently the seventh most important French city in population, Nantes urban area is situated on the river Loire, on the western part of France. It comprises 550,000 inhabitants and employs 255,000, within 24 communities over 555 km.

Within the framework of the communauté urbaine Authority, 21 mayors of Nantes Urban area joined their forces in order to provide the range of services essential to the quality of life of more half a million inhabitants. The communauté urbaine has defined five major spheres of action : transportation and traffic movements, environment and quality of life, housing and social care, economic development and planning, training and human resources. Among areas for priority action, particular attention is paid to transport and traffic movements.

After a period of relative decrease in the population in central locations and the disappearance of industrial activities historically located in these places, there has been a return to a demographic increase in the central part of the urban area. This is linked to a strong will of urban densification, and re-urbanization of central city which has proved important in enabling the core city Nantes to carry on playing a major role in terms of commercial and economic activities. The central area currently represents 1/3 of all households, 1/4 of the population, 1/3 of activities employing more than 10 persons, 1/4 of the employers, 1/5 of the commercial surface of which includes 1,200 shops and retailers or 110,000 m² of retail space.

City of Bremen

Free Hanseatic City of Bremen is an International seaport and trading centre near the North Sea. It is an independent state of the Federal Republic of Germany, consisting of the cities of Bremen and Bremerhaven. The two-city states cover an area of 400 square kilometres, making it the smallest of the 16 German states. The state's total population is 681,722, thereof 550,392 live in Bremen, making it the tenth largest city in Germany, and 131,330 in Bremerhaven.

Table 1 Key Characteristics of the VIVADLI sites

Characteristic	Bristol	Bremen	Nantes	Aalborg	Kaunas
<ul style="list-style-type: none"> Area Population Pop/sqkm 	110sq km 380,615 3,460	326 sq km 541,200 1,660	523 sq km 555,000 1,061	125 sq. km 120,000 960	157 sq. km 375,300 2,390
<i>Transport</i>					
<ul style="list-style-type: none"> Car ownership (per 1000 inhabitants) % daily trips by mode of transport <ul style="list-style-type: none"> - Car - Walk/cycle - Bus Road traffic accidents <ul style="list-style-type: none"> - per 1000 inhabitants 	478 59.1 23.2 13.6 1,527 4	427 41 42 17 2,742 5.1	475 57,6 27 15,4 ¹ 1,070 1.9	298 52 35 11 614 ² 3.8	330 28.5 6.3 33.5 626 1.67
<i>Society and economy</i>					
<ul style="list-style-type: none"> % unemployment % pop over age 65 % pop under age 16 	3.2 17.1 19.4	12.8 18.3 14.6	- 17,7 ³ 24,7 ⁴	6.8 13 19	8.3 13 17.4
<i>Energy and environment</i>					
<ul style="list-style-type: none"> % estimated energy use - Transport % emissions of Carbon Dioxide by road sector 	29.7 25	18.3 23.6	27% 36%	- -	- -

City of Aalborg

With a population of 161.000 inhabitants Aalborg is the fourth largest city in Denmark. Being the centre of the County with a population of further 65.000 persons in the neighbouring areas form part of the daily activities in Aalborg – working, shopping, visiting public service facilities or making use of the recreational attractions in the city.

Aalborg is geographically located where the distance over the Limfjord is shortest and consequently infrastructures for crossing the Limfjord have been placed here. Therefore the city has always been the "key" to the northern part of Jutland and the connections onwards to Norway and Sweden. The impacts of the continuous growth in regional and interregional relations therefore have an immediate impact on Aalborg

¹ All Public Transport

² Total number of accidents within the municipality

³ % pop over age 60

⁴ % pop under age 20

and it faces the risks of becoming a future bottleneck with adverse effects on the opportunities of economic development in the region and negative environmental impacts as likely consequences.

Kaunas City

Kaunas is the largest industrial area in Lithuania and totals a population of 375,300 inhabitants in an area of some 157 sq. km, i.e. 2390 citizens reside in one square kilometre. Located in the valley of the two longest rivers of Lithuania, the Nemunas and the Neris, the town itself became an example of confluence of people and cultures, an attractive mixture of architecture and nature. Kaunas' location right in the centre of Lithuania gives the city an opportunity for rapid development. The city has a well developed infrastructure and communications network, linking it with all the largest cities in Lithuania and with other European cities.

In the context of Lithuania, Kaunas is in a very convenient location with regard to transit, because it is centrally situated in the country and forms a major transport junction of East-West and North-South rail and motorway corridors.

- North-South direction: International Corridor No. 1 - the motorway Via Baltica and the railway line Tallinn-Riga-Kaunas-Warsaw.
- East-West direction: middle sections of road and rail branches of Corridor No. 9, 9B (Kiev-Minsk-Vilnius-Kaunas-Klaipėda) and 9D (Kaunas-Kaliningrad).

2.2 The demonstration areas

Demonstration results will not only be affected by the characteristics of the city as a whole, but also by the characteristics of the area where the demonstration is being carried out. Within each laboratory site demonstration activities will focus on the following generic area types:

- the city core or central business district – this is the focus for much of the commercial and retail activities within the city;
- inner city areas – areas around the main city core, particularly those where social issues need to be tackled such as low incomes and unemployment;
- peri-urban areas – areas on the edge of the main urban area, which can provide significant trips into the city core;
- key transport corridors – the main transport corridors linking these areas.

The range of demonstration areas within the cities and how they compare is described briefly below and shown in Table 2. Statistics on the character of each area is provided in Annex 1, with more detailed information on the areas and the measures being implemented given in the individual city plans in Part 2.

The demonstration of measures in these specific areas allows a concentration of resources to achieve more tangible results, but with an assessment method to replicate the results city-wide. .

Table 2 VIVALDI demonstration areas

City Topology	Bristol	Bremen	Nantes	Aalborg	Kaunas
<i>City core</i>	City centre Clear Zone	Historic Centre 'Mitte'			
<i>Inner city area</i>	Barton Hill district	Neustadt district			
<i>City periphery district</i>	Hartcliff and Withywood	Huchting and Stuhr			
<i>Transport corridors</i>	5 quality bus corridors	Hybrid tram corridor	South-east, North-west 'Routes de Vannes'		
<i>City wide</i>	New mobility services	City wide measures		Bus priority. RTPI	Rationalisation of PT network
<i>Other specific area</i>			Terte University Campus	New coach terminal	

City core areas

Bristol and Bremen are both using the central area of the city as a core demonstration area. In Bristol the area is the focus of the access management work, through their Clear Zones concept. This concept aims to promote a better management of vehicle use in the area to promote a better environment for the cities core retail and commercial activities.

In Bremen the old city 'Mitte' is a centre for retail and leisure activities and has an increasing number of residential districts. The residents in this area are particularly receptive to new mobility service and so there is considerable work on car sharing and soft modes.

Inner city districts

Again both Bristol and Bremen are carrying out work in inner city districts. The Neustadt area in Bremen is a largely residential area on the edge of the main city centre. It has a significant issue with traffic as it is a main route to and around the city centre. As such this is a key area for public transport improvements along the main tram corridors.

In Bristol the focus area is a district called Barton Hill. This is one of the deprived areas of the city and suffers from transport issues including severance from the main city centre by an inner ring road and urban motorway. The measures in this area are intended to provide better links to the centre and improve road safety in the residential area of 'The Dings'.

City periphery districts

The Hartcliff and Withywood areas on the Southern edge of Bristol are another deprived area of the city. They suffer from employment issues and a lack of good transport to the main employment areas in the city. The aim of the work in this area is to improve social inclusion through better access and involvement in transport provision.

The “Huchting” and “Stuhr” areas in Bremen are on the edge of the city and will be the starting point of the new ‘hybrid tram’ that is core of the package of transport improvement measures in Bremen.

Transport corridors

Transport corridors are a key focus for the public transport improvements in all the demonstration sites. In Bristol the project is working with innovations on several quality bus corridors and park & ride services. In Nantes a significant amount of work is being carried out in two main transport corridors in the North-West and South-East of the city. These measures are multi-modal measures looking at public transport improvements and the management of private cars.

In Bremen the corridor along the route of the new hybrid tram is the focus for many of the complementary measures being carried out in the city.

Other specific areas

In Nante the University campus is being used a focus for its access management work, and measures to reduce car use to the site. And in Aalborg the new coach terminal provides a focus for the public transport improvements that are being carried out in the city.

City wide

Some of the measures in the cities are not being carried out in specific areas, but across the city. These include:

- clean fuelled vehicles in public and private fleets,
- information and awareness campaigns,
- elements of public transport improvements and information systems.

In particular is the case of Kaunas which is looking at the re-organisation of it public transport services across the city.

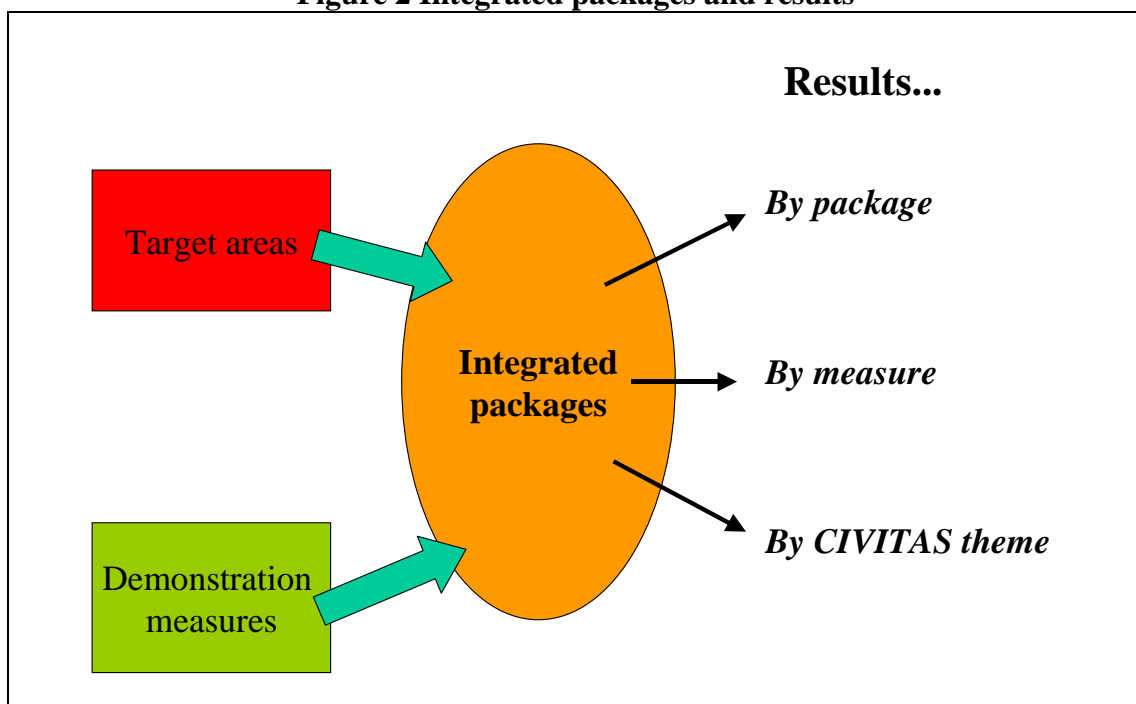
2.3 The integrated packages

Each of the demonstration sites in VIVADLI is implementing a range of measures across the themes set out in CIVITAS. In the larger sites Bristol, Bremen and Nantes

the range of measures is large. These measures were organised within the Inception Report (D1) mainly by CIVITAS theme, but also by target areas.

When planning the evaluation work it became clear that the grouping of measures by CIVITAS theme was somewhat artificial. In reality the measures were organised into integrated packages focused on a specific area or objective. This is shown schematically below in figure 2. For example a group of measures may be implemented along a given bus corridor such as real time passenger information, new alternative fuelled buses and improved bus stops. These measures fall across several of the CIVITAS themes, but are working together to attract more passenger to the public transport system.

Figure 2 Integrated packages and results



By viewing the demonstration measures in this way, and this is how they are seen by the user, the integration of the measures can be assessed. Also it is a natural way to group the evaluation and data collection activities.

The integrated packages being demonstrated in each site are described briefly below. Also table 3 shows how each of the packages relates to the CIVITAS themes and demonstration areas in the sites. Further information on the packages is provided in Part 2 for each of the sites, and also in the implementation deliverable D5.

Bristol

The Bristol site is working with 6 demonstration packages:

- *Clean and efficient vehicles* – pulls together all the measures that are involved in promoting clean-fuelled vehicles in Bristol, looking at both the municipal and private vehicle fleets in the city.

- The city centre *Clear Zone* - pulls together a number of key transport initiatives in the centre to provide an integrated approach to meeting economic development, environment and transport targets for the centre.
- Improving *safety and access* in an inner city area - integrates a number of access management measures and soft measures to reduce car activity in the Barton Hill inner city area and improve cycling and walking links.
- Developing *social inclusion* in South Bristol - to improve the level of inclusion in this area of the city by providing the residents with better access to employment opportunities, education and health services, and leisure and retail facilities
- Measures to *improve public transport* including new ticketing systems, better passenger information and clean vehicles have been pulled together on a number of key quality services.
- *New mobility services*, working across the city, have been integrated into one package and include the development of the city car club and the dial-a-ride system.

Bremen

These are also 6 packages of measures in Bremen, covering a range of measures in the different city areas:

- *Developing the CNG fleet* - support measures for the usage and purchase of CNG cars in Bremen.
- Improving the *information and ticketing* system for public transport, to increase the attractiveness of the system.
- Assessing the impacts of the *new tram lines*.
- Development of the existing *car sharing services* in Bremen to provide new services and attract different user group.
- Improvements to the *cycling infrastructure* in the city centre and inner city areas.
- Development of the *city freight service* to improve its efficiency and reduce its environmental impact.

Nantes

Nantes is the third of the big demonstration sites and has 6 integrated packages of measures:

- *Demand management strategies* - access restriction to a sensitive ecological area at Tertre campus, and Southeast and Northwest urban areas.
- *Collective passenger transport stimulation* - Access restriction must be linked with a tangible improvement of collective transport passenger services including new public transport structures, new CNG low floor buses and fuelling station, integrated public transport systems, and improved accessibility security and safety
- *New mobility concepts* - new forms of two wheeled usage both on the Campus area and on the two specific park and ride sites, also to encourage High Occupancy of Vehicles on park and ride sites by offering incentives to car drivers on the Southeast and Northwest areas.
- *Distribution of goods* - locally influence the organisation of goods delivery.
- *Innovative soft measures for managing mobility demand* - promotion campaigns enhancing new mobility ideas and company mobility plans to find specific

approaches with large employers to find efficient solutions for their employees to imagine other transports modes other than the private car .

- *Integration of transport management systems* - first steps towards a mobility centre and preliminary studies and specification description for an electronic ticketing system based on contact less cards

Aalborg

Aalborg is one of the two smaller demonstration sites in the project and is focusing its efforts on two packages of measures:

- The development of public transport *Telematics* including RTPI, Travel Information Centre, and Bus Priority - are all part of an integrated package that is aimed at improving public transport.
- Establishing a *Car sharing* scheme for the city transferring the experience from the Bremen site.

Kaunas

In Kaunas the demonstration work focuses on one overall package of measures which aims to rationalise the current public transport system. The measures in the package include a reorganisation of the bus services, integrating the micro-buses into the main service plan and an integrated ticketing system.

Table 2 The VIVALDI integrated packages

	Demonstration area	CIVITAS themes							
		Clean vehicles	Access management	Pricing measures	Collective modes	New forms of vehicle use	Goods distribution	Soft modes	Telematics
Bristol									
Clean vehicles	City wide	✓							
Clear Zones	City Core	✓	✓	✓	✓		✓	✓	✓
Inner city access	Inner city area		✓			✓	✓	✓	✓
Inclusion	Periphery area				✓	✓	✓	✓	✓
Better PT	Key corridors	✓		✓	✓				✓
Mobility services	City wide				✓	✓			✓
Bremen									
CNG Fleet	City wide	✓							
Information/ ticketing	City wide			✓					✓
New tram line	Tram corridor				✓				
Car sharing	Inner city				✓	✓			✓
Cycling infrastructure	Inner city		✓					✓	
City freight service	City wide	✓					✓		
Nantes									
Demand management	Terte Campus		✓		✓			✓	
Better PT	Corridors	✓	✓		✓			✓	✓
New mobility services	Terte/Corridor				✓	✓		✓	
Fright services	City wide						✓	✓	
Mobility management	City wide				✓	✓		✓	✓
Systems integration	City wide							✓	✓
Aalborg									
PT telematics	City wide								✓
Car sharing	City wide					✓			
Kaunas									
Rationalising PT	Citywide			✓	✓				

3 THE EVALUATION APPROACH

3.1 The METEOR guidelines

The METEOR project, a thematic network within the CIVITAS initiative, is tasked with carrying out cross-site evaluation with respect to each of the CIVITAS demonstration projects. From this evaluation it is intended that METEOR will draw policy conclusions at the EC level and provide dissemination of best practice across the EU.

In order to carry out this role METEOR needs to work with the CIVITAS demonstration projects to achieve some level of consistency in their approaches to evaluation. This has led to the ongoing development of evaluation guidelines for use by the CIVITAS cities, the final version of these guidelines is set out in METEOR's deliverable D2 'Assessment Framework and Guidelines for Evaluation'. This evaluation framework sets out the general evaluation process, common impacts and indicators to measure and suggested measurement techniques.

The framework provided addresses the needs of a cross-site evaluation and most of the needs for local evaluation. The VIVALDI project has taken this framework and interpreted it for implementation at the site level and to ensure that it meets local needs. The key issues of interpretation have been:

- An understanding of the framework working from the level of the measures being implemented on the ground up to the policy objectives, or in other words using the framework in a bottom-up approach.
- Recognition that the demonstration measures and CIVIATS policy fields are not independent, rather they are being implemented as integrated packages. These integrated packages have therefore become a key focus of the evaluation work.
- The need to understand the implementation process of the measure being demonstrated, an area not covered in the METEOR framework.

3.2 Evaluation objectives

The aim of the evaluation plan is to set out a framework of data collection activities that allows the assessment of the demonstration against the objectives that have been set. With regards the VIVALDI projects objectives these have been set at three levels:

- *VIVALDI or policy objectives* – are the wider project level objectives that have been set with respect to each of the CIVITAS policy fields.
- *Local package objectives* – have been set for each of the integrated demonstration packages. These set out what the specific package of measures is aiming to achieve or demonstrate at the local level, such as reducing vehicle emissions or traffic in a given area.

- *Measure objectives* – these are specific objectives for individual measures and relate largely to implementation objectives such as purchasing 5 CNG buses, or rolling out RPTI on 3 bus corridors.

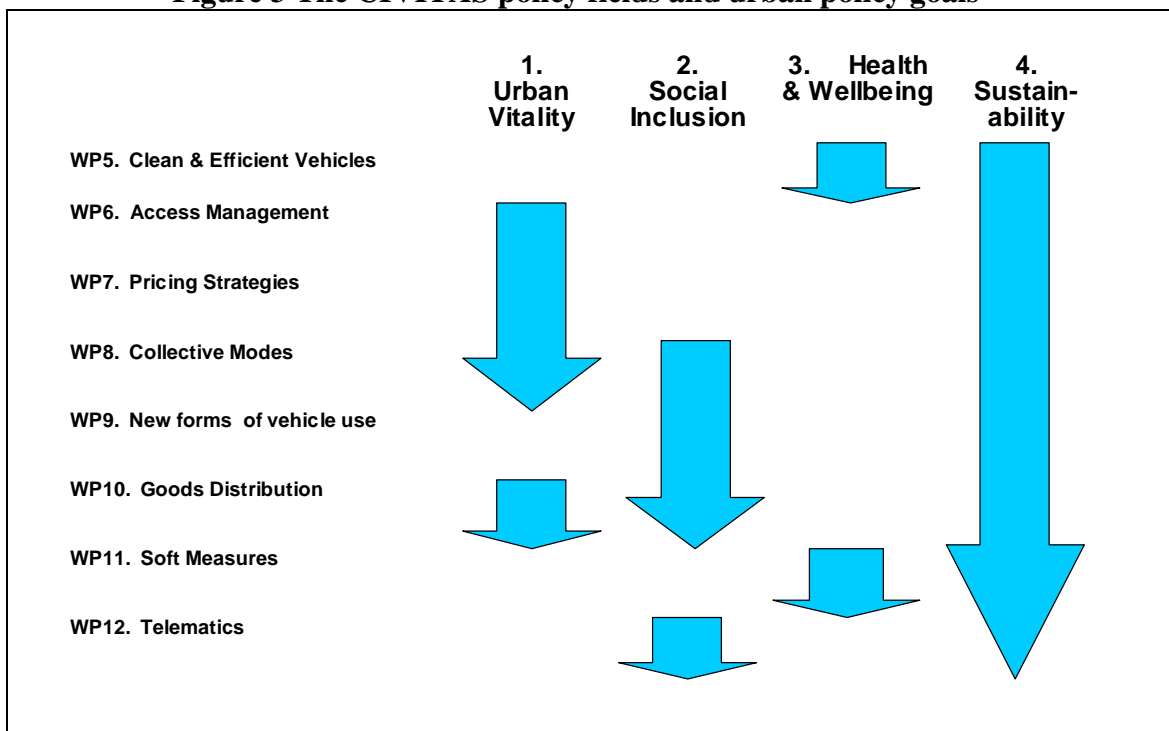
3.2.1 Project level objectives

The overall aim of the VIVALDI project is to assess the contribution of the demonstrated measures to each of 4 key urban policy areas:

- urban vitality and economic success;
- social inclusion;
- the health and well being of the citizens;
- sustainability.

Each of the demonstrated measures lies with in one of the 8 CIVITAS policy fields or strategies. The relationship between these CIVITAS policy fields, which also form the basis of the project’s demonstration work packages, and the 4 key urban policy goals is shown schematically in figure 3 below:

Figure 3 The CIVITAS policy fields and urban policy goals



Working in this way VIVALDI has set it’s project level objectives for each of the CIVITAS policy fields. This allows the contribution of the VIVALDI demonstrations to be seen in the context of the overall CIVITAS project.

The objectives set for each of these policy fields and their associated headline targets are shown in table 3 below. Each of the objectives has been numbered to allow linkage through to the local package objectives.

Table 3 VIVALDI demonstration objectives

CIVITAS Field	Objectives	Headline Targets
Clean Vehicles	<ul style="list-style-type: none"> Reduce emissions of, and human exposure to, air and noise pollution Ensure transport systems complement good health and well-being Ensure the transport system contributes towards a successful economy by creating access to jobs and creating an attractive environment 	VT1. 250 Clean Vehicles across the sites VT2. Reduce energy use and CO ₂ by 8% in demonstration area VT3. Meet national air quality objectives
Access management	<ul style="list-style-type: none"> Lessen dependency on the car, especially at peak periods Ensure that development takes place in such a way that it reduces the need to travel 	VT4. Reduce car traffic in managed area by 10% VT5. Increase economic activity in area by 5% VT6. Increase employment opportunities by 5% VT7. Reduce parking space in area by 10%
Pricing strategies	<ul style="list-style-type: none"> Lessen dependency on the car, especially at peak periods Ensure the transport system contributes towards a successful economy by creating access to jobs and creating an attractive environment 	VT8. Reduce mode share for cars by 5%
Stimulation of collective modes	<ul style="list-style-type: none"> Lessen dependency on the car, especially at peak periods Ensure the transport system contributes towards a successful economy by creating access to jobs and creating an attractive environment Provide quality alternatives to the car and encourage their use 	VT9. Increase patronage on key corridors by 20% VT10. Increase access to PT system VT11. Reduce transit time from peri-urban areas to centre by 15% VT12. To obtain a modal shift for students in the Nantes demonstration zones doubling the use of public transport and two wheelers.
New forms of vehicle use and ownership	<ul style="list-style-type: none"> Lessen dependency on the car, especially at peak periods Provide quality alternatives to the car and encourage their use Foster a cultural climate that is receptive to alternatives to the car 	VT13. Increase number of car share sites by 5 VT14. All new car share sites with clean vehicles VT15. Regain urban space by replacing about 1000 private cars
Goods distribution	<ul style="list-style-type: none"> Ensure the transport system contributes towards a successful economy by creating access to jobs and creating an attractive environment Implement actions in terms of goods delivery organisation in the aim of identifying best way of conducting future actions in that field. 	VT16. Reduce lorry movements by 5% VT17. Reduce lorry loading and access times by 10%
Soft measures	<ul style="list-style-type: none"> Lessen dependency on the car, especially at peak periods Reduce transport collisions and improve safety and security Ensure transport system addresses needs of disabled people Foster a cultural climate that is receptive to alternatives to the car 	VT18. Increase cycle trips by 30% VT19. Increase walking trips by 10% VT20. Travel plans in all organisation in target areas VT21. Decrease road accidents by 20%
Telematics	<ul style="list-style-type: none"> Develop integration of individual (motorised and non-motorised) modes to ensure that the transport system serves the function the City 	VT22. Real time information on all quality corridors VT23. Increase number accessing PT information by 50% VT24. Electronic payment 40% of all fares VT25. 100% increase in DRTS trips

3.2.2 VIVALDI objectives and local objectives

At the local level the demonstration measures are being implemented in integrated packages as has been described above. Each of these packages has been set objectives designed to meet local needs. These local objectives relate to the area where the measures are being demonstrated or a specific policy focus. These local objectives are summarised in table 4 below and discussed in more detail in each of the site evaluation plans in Part 2.

Table 4 VIVALDI local demonstration objectives

Bristol	Bremen	Nantes	Aalborg	Kaunas
<i>Clean vehicles</i> LO1 - stimulate the market LO2 - improve air quality LO3 - promote mode shift	<i>CNG fleet</i> LO1 – stimulate market LO2 – improve air quality		<i>Car sharing</i> LO1 – assess market for CS LO2 – stimulate the market LO3 – reduce environmental impact of car use	<i>Improving public transport</i> LO1 - Promote PT as main mode of city transport LO2 – Ensure reliability LO3 – Better information LO4 – Improve air quality
<i>Clear Zones</i> LO4 – reduce traffic levels LO5 – reduce parking levels LO6 – reduce emissions LO7 – increase economy LO8 – increase employment	<i>Information and ticketing</i> LO3 – better PT information LO4 – easier access to PT		<i>Public transport telematics</i> LO4 – PT integration LO5 – increase PT reliability LO6 – increase passengers LO7 – Increase user satisfaction	
<i>Inner city access & safety</i> LO9 – lessen use of car LO10 – reduce travel LO12 – improve alternatives LO13 – improve safety LO14 – regenerate area LO15 – increase participation	<i>Improve tram links</i> LO5 – increase PT use LO6 – reduce energy use and emissions LO7 - reduce PT costs			
<i>Inclusion in south Bristol</i> LO16 – increase access to PT information LO17 – Lessen use of car LO18 – provide alternatives LO19 – reduce travel LO20 – increase employment	<i>Improve car sharing</i> LO8 – Lessen use of car LO9 – increase awareness of CS LO10 – increase CS and PT co-operation			
<i>Better public transport</i> LO21 – reduce car mode share LO22 – increase PT patronage LO23 – decrease transit time LO24 – Better PT information LO25 – introduce electronic payment LO26 – reduce energy use and emissions from PT fleet	<i>City logistics</i> LO11 – increase efficiency of freight distribution			
<i>New mobility services</i> LO27 – provide alternatives to the car LO28 – meet needs of mobility impaired LO29 – reduce energy & emissions	<i>Improve cycling conditions</i> LO12 – improve safety LO13 – increase trips			

Since the local integrated packages are the focus of the evaluation work in VIVALDI the local objectives will direct the evaluation work at the local level. Also the key results and analyses collected by the sites will be used to assess how the measures have performed against these local objectives.

However, since each of the integrated packages are composed of measures from the CIVITAS policy fields local objectives relate to those set at the project level for each of the policy fields. This relationship between the local objectives and project objectives is shown in Table 5 below. This allows us to see how each of the local demonstration projects are contributing to the policy objectives and targets at the project and CIVITAS level.

Table 5 Relationship between local and project objectives

CIVITAS policy field	Bristol	Bremen	Nantes	Aalborg	Kaunas
Clean vehicles (VT1 to VT3)	LO1, LO2, LO6, LO26, LO29	LO1, LO2, LO6		LO3, LO6	LO4
Access management (VT4 to VT7)	LO4, LO5, LO7, LO8, LO10, LO20				
Pricing strategies (VT8)	LO9, LO19, LO21	LO5, LO9			
Stimulation of collective modes (VT9 to VT12)	LO 3, LO22, LO23,	LO3, LO5, LO8, LO10		LO4, LO6, LO7	LO1, LO2
New forms of vehicle use and ownership (VT13 to VT15)	LO12, LO18, LO27, LO29			LO2	
Goods distribution (VT16 to VT17)	LO4	LO11			
Soft measures (VT18 to VT21)	LO4, LO9, LO13, LO17,	LO12, LO13			
Telematics (VT22 to VT24)	LO16, LO24, LO25, LO28	LO4		LO5	LO3

3.3 The evaluation process

The evaluation process suggested by METEOR builds on the approach developed by the MEASTRO project, a previous EC supported study aimed at providing definitive guidelines for the evaluation of transport related pilot and demonstration projects.

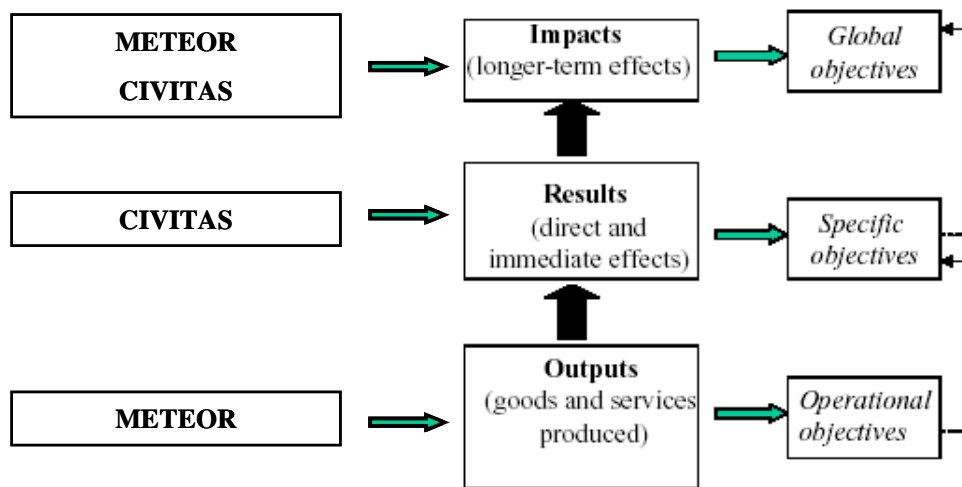
In relation to this overall evaluation process METEOR has defined three basic levels of evaluation, and the roles of the respective projects with respect to these levels, as shown in figure 4.

Operational data or outputs – is simply the monitoring of what measures have been implemented in the demonstration site. For example how many clean-fuelled vehicles have gone into operation or what proportion of the fleet is now fitted with vehicle

location systems. This information will be contained within the VIVADLI progress reports and will be reviewed by METEOR.

Direct results – these are the direct results being measured by the CIVIATS sites for the measures and packages of measures they are implementing. The results will be compared against the local objectives that have been set for each package of measures. This work will be solely carried out by the VIVADLI partners. The results will then be provided to METEOR for cross-site analysis.

Figure 4 Levels of evaluation



Impacts – these will be derived largely from the analysis of the site results to consider the wider impacts of the measures if they were carried out as part of an urban transport policy. At the VIVALDI level this analysis will be carried to assess the objectives set at the project level for each of the CIVITAS policy fields. In addition there will be work with METEOR both in terms of ex-ante modelling and analysis of site results consider policy implications at the EU level.

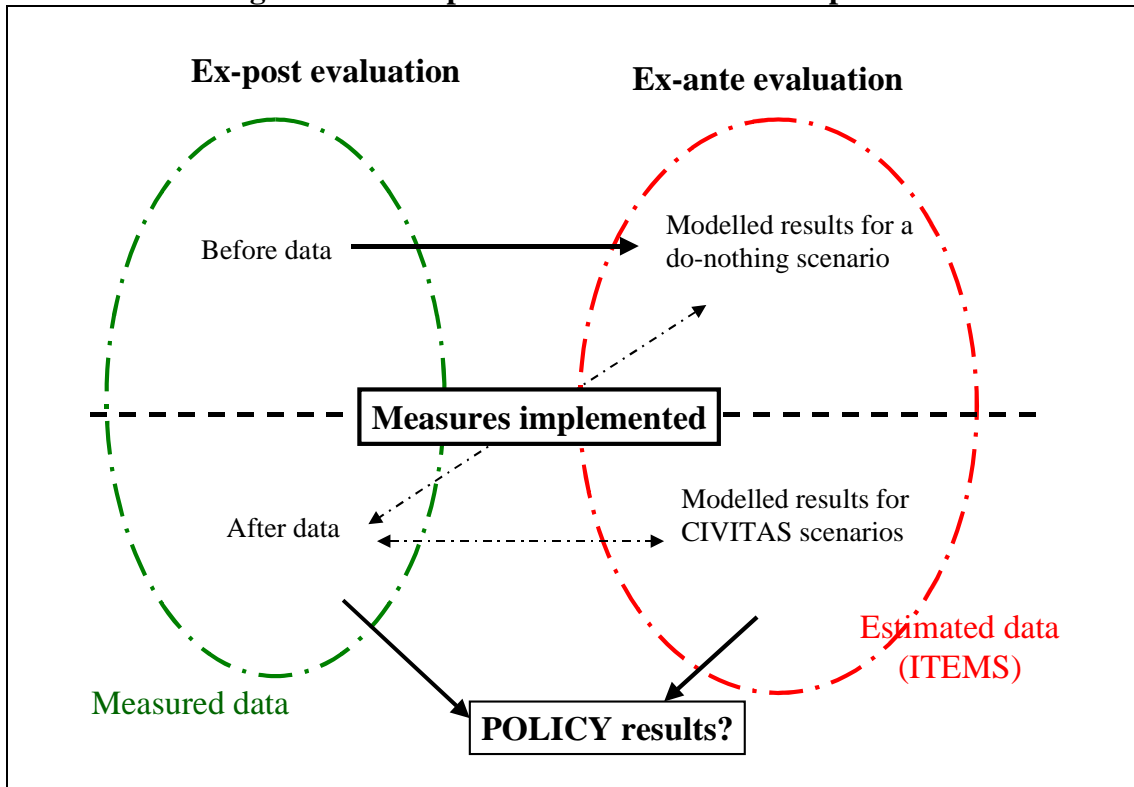
The focus of both this evaluation plan and the METEOR guidelines is the evaluation of the direct results and long term impacts.

3.4 Ex-ante and Ex-post evaluation

Within the overall evaluation approach there are two key concepts that need to be considered: ex-post evaluation and ex-ante evaluation. These concepts are shown schematically below in figure 5

The ‘ex-post’ evaluation is what could be considered a simple ‘before’ and ‘after’ evaluation, using measured data. A baseline of data is collected to reflect the current situation, the measures are then implemented and the respective data is collected again afterwards. The difference between the two gives a change or the calculated impact of the measures. *This is the approach that the cities will be using to measure the direct results for each of the demonstration packages.*

Figure 5 The ex-post and ex-ante evaluation process



However, a number of issues arise with ex-post evaluation particularly when evaluating large city scale demonstration:

- When do you carryout the after measurements? Measures may be implemented at different times and the effect of a measure can take some time (months or years) to manifest itself.
- What is the effect of other changes happening during the implementation process? Or in other words what would have happened anyway? This is particularly important in larger scale, longer-term projects where a large number of factors could affect the results.

The first issue can be dealt with to a large degree by careful planning of the data collection exercise, which can also be phased. There may also be a benefit to this in that you may be able to see the effect of multi-measures being implemented sequentially.

To consider the latter problem, the effect of factors which are not being measured, ex-ante evaluation is used. This approach uses the measured baseline and other data to model what may happen in the future. Two future scenarios are modelled:

- The ‘do-nothing’ which gives an estimate of the future without using the measures;
- The ‘do-something’ scenario an estimate of what will happen with the measures implemented.

These two scenarios can then be compared to provide another estimate of the potential impacts of implementing the measures.

The ex-ante of modelling approach can also have other uses:

- the expected impact of the measures can be modelled to see if they are likely to have the desired effect, if not changes can be made to the scheme design;
- the modelling approach can be used to estimate to effect of a wider scale implementation of the measures to give what could be considered policy level results

The ‘ex-ante’ evaluation work will be used to support the wider impact analysis at the policy level. The larger VIVALDI sites, Bristol, Bremen and Nantes, are working with METEOR and the common modelling tool they provide – the ITEMS modelling system. The work with METEOR will aim to:

- provide a common basis for the cross-site evaluation;
- provide broader policy level results to support EC policy development.

However in working with METEOR it is recognised that the ITEMS model results are purely an interpretation of the project for policy purposes, not direct results from the demonstration sites. It is also expected that not all the measures being demonstrated in the VIVALDI project can be interpreted with the ITEMS model.

Local modelling work will also be carried out in all the sites. This modelling work will be used to generate some of the direct impacts on the measures that are not practical to measures, such as vehicle emissions. In addition Aalborg will use this work to consider the do-nothing results.

3.5 Working with integrated packages

The evaluation work in the VIVALDI project, and for each individual site, is structured around the integrated packages described in section 2. Each of the packages will compromise a number of related measures, and will be focused in a specific area of the city. Each package has a consistent set of local objectives that have been summarised above and are defined in more detail in the site plans in Part 2.

These packages represent the reality of how the measures are being implemented on the ground and as such they will not be mutually exclusive and will have a combined effect. Therefore at the top level ‘before’ and ‘after’ data will be collected with respect to the package as a whole, and the direct evaluation results provided for the package. For example if a bus corridor is improved with real time passenger information and low floor accessible buses that are also low emission vehicles this will have an effect on patronage. However, we can only collect one set of patronage data and see only the combined effect.

Although our key level of results will be for the packages, we can also try to disaggregate these results to look at the contribution of individual measures. In some cases this may be straightforward. For example the change in fuel consumption of an individual vehicle fitted with exhaust emission after treatment - in this case the fuel consumption can be measured and the impact for the individual vehicles as well as for the route or fleet can be calculated.

However, in other cases it will not be so clear, as with the example above on improving the bus corridor. In these cases two potential approaches will be used:

- *Phasing the implementation* of individual measures, so that the cumulative effect can be seen. For example implementing the new buses 6 months before the passenger information system and looking at the change in patronage over this time. However, this will depend on the practicalities of the implementation programme and taking advantage of what phasing opportunities exist.
- Using *survey work* to try and establish the proportionate effect of the measures on peoples behaviour. For example in choosing to use the new bus service what was more important to you the new vehicles or passenger information system.

In addition there is a need to assess the results for the individual packages in relation to the objectives set for the VIVALDI project for each of the CIVITAS themes. This analysis will be carried out looking across all the sites. To assist this analysis we have:

- The common indicator set provided METEOR that provides the basis of the indicators for each package of measures;
- The linkage between the local objectives of the integrated packages and the VIVALDI level objectives shown above;
- And an understanding of the composition of each integrated package from measures from each of the CIVITAS themes.

This cross-site analysis to provide results for the CIVITAS themes will be carried out by each of the demonstration work package leaders who will have expert knowledge in the area.

So the integrated packages provide a practical structure to the evaluation and implementation work in VIVALDI. However, results will be demonstrated not only at the package level but also for the measure and project level.

4 IMPACTS AND INDICATORS

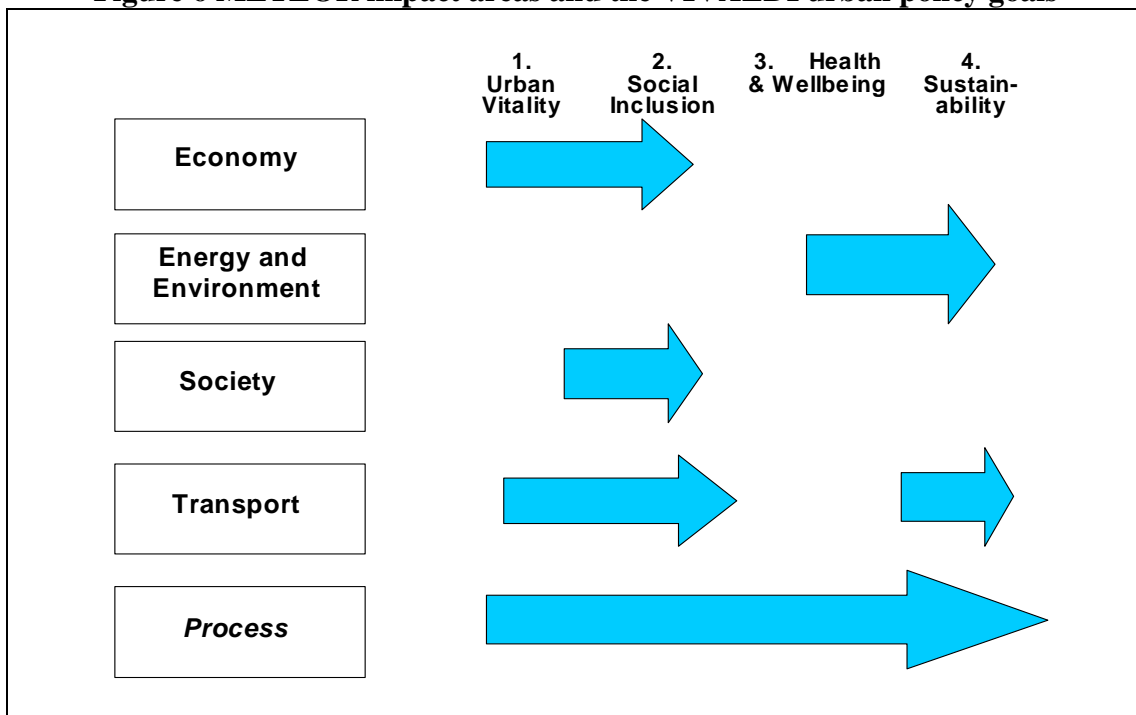
4.1 The common indicator set

To assist in cross-site comparison within VIVALDI and with the other CIVITAS projects, METEOR has developed a common definition of impacts and a set core of indicators to use in measuring these impacts. The core impact areas set out by the METEOR team are:

- Economy,
- Energy,
- Environment,
- Society,
- and Transport.

However, the impacts which are measured need to relate to the project objectives in order to allow an assessment of how well these objectives have been achieved. At the top level figure 6 shows how the impact areas chosen relate to the 4 overall urban policy goals that are driving the demonstrations in the VIVALDI project. For example urban vitality and social inclusion are key urban policy goals and we have METEOR impacts and indicators in relation to economy and society that can be used to assess these goals.

Figure 6 METEOR impact areas and the VIVALDI urban policy goals



In addition to these core evaluation categories the VIVALDI project has added an additional category on process. This evaluation category looks at the issues surrounding the implementation of the measures and will be crucial to the

transferability of the project results. This gives 6 impact areas for which data will be collected within the VIVADLI sites as shown in Table 6.

Table 6 – Evaluation categories in VIVALDI

EVALUATION AREA	IMPACT CATEGORY	IMPACT SUB-CATEGORY
ECONOMY		
	Benefits	Operating Revenues
	Costs	Operating Costs
ENERGY		
	Energy Consumption	Fuel Consumption
ENVIRONMENT		
	Pollution/Nuisance	Air Quality
		Emissions
		Noise
SOCIETY		
	Acceptance	Awareness
		Acceptance
	Accessibility	Spatial Accessibility
		Economic Accessibility
	Security	Security
TRANSPORT		
	Quality of Service	Service reliability
		Quality of service
	Safety	Transport Safety
	Transport System	Traffic Levels
		Congestion Levels
		Freight Movements
		Modal split
		Vehicle Occupancy
PROCESS		

Within each of these impact areas there are a number of subcategories, such as air quality, transport safety, and so on. There are also a great number of potential indicators that could be used. By working with the CIVITAS cities METEOR has tried to derive a set of core indicators that most sites will be able to measure with respect to their demonstrations. These core indicators are shown in Annex 2.

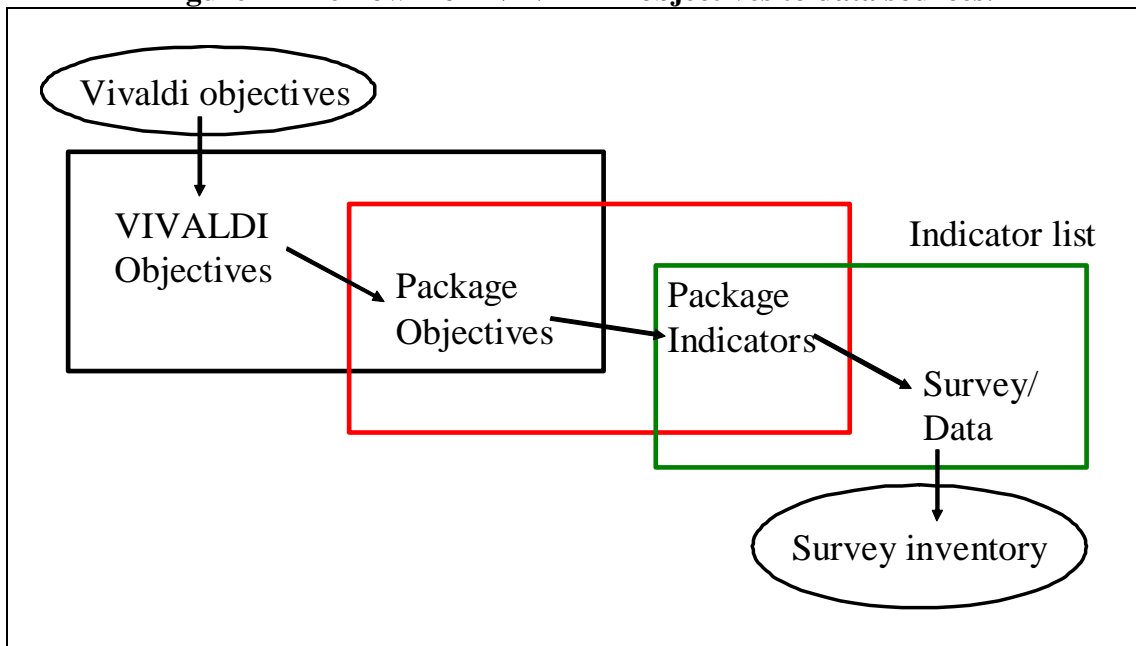
4.2 Impacts and indicators for the integrated packages

The impacts and indicators used for evaluating the integrated packages are based on these 6 impact categories and the core indicator set developed with METEOR. Indicators have been selected from this core list where they are relevant for the assessment of local objectives. Where impacts and indicators from the core list are not relevant to local objectives they have only been used where the additional data collection required is not onerous. In addition new impacts and indicators have been included where appropriate ones do not exist in the core list.

This process of developing an impact/indicator list for each of the integrated packages has been carried out across each of the sites. The site plans in Part 2 have a table of impacts and indicators for each package. This table shows which indicators are from the core list, how these relate to the local objectives and from where the data will be collected.

Working in this way we can see a clear path from the overall project objects, to the local package objectives, the indicators used to measure these objectives and the source of the data for the indicators. These linkages are shown schematically in Figure 7 below.

Figure 7 The flow from VIVALDI objectives to data sources.



A summary of the indicators being measured for each of the integrated packages is shown below in Table 6. For each of the integrated packages this table shows the number of core METEOR indicators and local indicators that are being measured with respect to each of the impact areas.

Table 7 – Summary of indicators being measured for each integrated package

	Integrated packages	Economy		Energy		Environment		Society		Transport	
		Meteor	Local	Meteor	Local	Meteor	Local	Meteor	Local	Meteor	Local
Bristol	Promoting clean and efficient vehicles	1	0	2	0	8	0	2	0	3	0
	The city centre Clear Zone	0	8	2	0	8	0	3	1	5	1
	Improving safety and access in an inner city area	1	0	0	0	1	3	3	3	5	2
	Developing Social Inclusion in South Bristol	0	1	0	0	0	0	3	2	6	1
	Providing better public transport services	2	0	2	0	7	0	4	0	8	5
	Developing new mobility services	2	0	2	0	4	0	4	0	2	6
Bremen	Development of a CNG fleet	1	0	2	0	7	0	2	0	1	2
	Information and ticketing measures	1	2	2	0	4	0	2	0	1	7
	Improving Tram Links	2	0	2	0	5	1	5	0	3	7
	Car sharing	2	0	2	0	4	0	5	0	3	10
	City logistics	1	0	2	0	4	0	2	0	1	5
	Cycling	1	0	2	0	0	0	0	0	1	7
Nantes	Demand management strategies	2	0	2	0	8	0	5	0	11	0
	Collective passenger transport stimulation	2	0	2	0	8	0	5	0	11	0
	New mobility concepts	2	0	2	0	8	0	5	0	11	2
	Distribution of goods	2	0	2	0	8	0	5	0	11	0
	Innovative soft measures for managing mobility demand	2	0	2	0	8	0	5	0	11	1
	Integration of transport management systems	2	0	2	0	8	0	5	0	11	1
Aalborg	Car sharing	2	0	1	0	4	0	2	0	1	0
	Telematics	2	0	1	0	5	0	3	0	2	2
Kaunas	Public transport rationalisation	2	0	1	0	3	5	2	1	4	4

5 DATA COLLECTION ACTIVITIES

5.1 Introduction

The measurement of the indicators discussed above will require the collection of data in each of the demonstration sites. The data that is needed relates to the indicators chosen to assess each of the integrated packages, and the nature of the package of measures itself. Therefore the programme of data collection activities in each site is very specific to that site and the packages of measures being demonstrated, and is described in detail for each site in Part 2.

However, there are a number of common features of the site data collection activities that are discussed below.

5.2 Generic data collection activities

It was recognised at each site that quite often the data being collected for one measure could be combined with other data collection activities happening at the same time, with the same target audience or same area. Therefore the last section of each of the site evaluation plans pulls together all the proposed data collection activities into a single programme. Within this programme of there are 4 basic types of data collection activities:

Operational data – relating to the data on the operation of a given scheme or measure, for example fuel consumption, patronage figures, transaction data from an ITS system. In other words all the hard data collected from the running of a scheme.

Traffic and transport data – is all the data related to transport activities in the demonstration area. For example vehicle flows, traffic speeds, accident rates, etc. Again this is all hard quantitative count data.

Attitude and behavioural surveys – covering both quantitative and qualitative surveys assessing peoples' attitudes and perceptions with respect the implemented measures, and how their travel behaviour has been affected. Such surveys cover user satisfaction surveys, travel behaviour surveys, and so on.

Process interviews – these are interviews with key stakeholders in the implementation process of a given measure or package of measures. They will seek to assess what issues were faced during implementation, how these were over come and lessons that have been learnt for use by other cities.

In addition there are some specific data collection activities related to a given site or package of measures. These include:

- Video data to assess how the use of a given space or area is changing;
- Broader socio-economic data to assess how the measures may be impacting on the local economy and community;

- Modelling results for energy use and emissions, and some transport results;
- Data required for the ITEMS model.

5.3 The data collection inventory

Each of the site evaluation plans discusses the details of the data being collected in each of these categories. This discussion covers:

- What data is required with respect to the impacts and indicators being measured?
- How is this data going to be collected?
- Who is responsible for the collection?
- When will it be collected?

In all cases the data collection consists of existing ongoing data collection activities and new activities being carried out specifically for the purposes of evaluating the VIVALDI demonstration.

Each plan includes an overview of all the data being collected – the data collection inventory. This inventory shows the basic nature of the survey method, units and timing. Each data collection activity has been numbered in the inventory and is used to identify the data source in the indicators tables for the assessment of each of the integrated packages. As shown in figure 7 above this inventory allows the full path from data collection to assessment of the VIVALDI and CIVITAS objectives to be seen.

5.4 Timing of data collection activities

Along with the nature of the data collection activities, the timing of these activities will be very specific to each site. This relates to two basic temporal approaches to data collection:

Before and after data – as described above the focus of the evaluation work in VIVALDI is a before and after evaluation with real measured data. As such the data must be collected before and after the implementation of a measure or package of measures, with the difference being the measured impact of the scheme. Therefore the timing of these activities must be related to the implementation plan for the demonstration measures, which is specific to each site.

Time series data – in some cases the data is being collected continuously over time. In this case changes in the time series data are analysed before a measure is implemented and after. Data in this category includes operational data, such as monthly fuel consumption records, and ongoing data collection programmes such as annual travel behaviour studies.

Each of the site plans provides a detailed evaluation schedule.

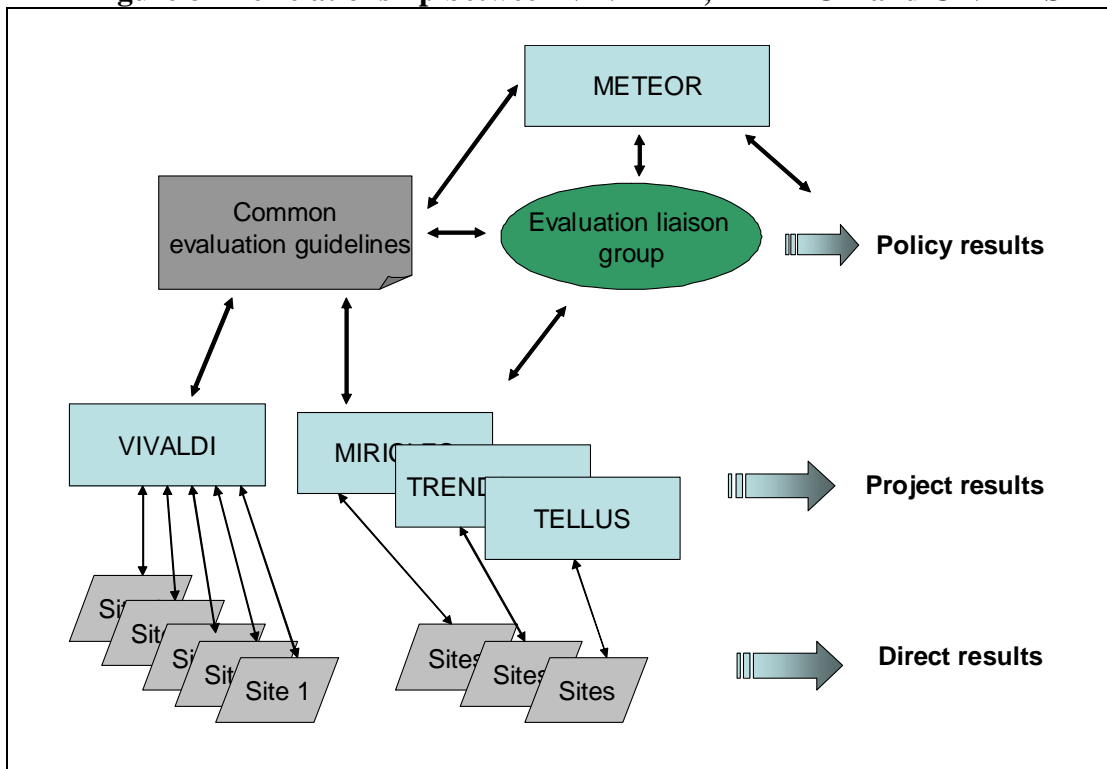
6 CONCLUSIONS

6.1 Relationship between VIVALDI, METEOR and CIVITAS

The evaluation work within the VIVALDI project forms part of the evaluation activities across the whole of the CIVITAS initiative and contributes to the wider development of clean urban transport policy. As such the VIVALDI project needs to work with the other demonstration projects in CIVITAS and the thematic network METEOR.

The roles of the different projects within the evaluation process has been largely set down in the guidelines provided by METEOR and is represented by the levels of evaluation described in section 3 and shown in figure 4. The focus of the evaluation work in VIVALDI, as in the other demonstration projects, is the direct evaluation of the measures being implemented at the site level. This will provide results at the site level and at the project level as shown in figure 8.

Figure 8 The relationship between VIVALDI, METEOR and CIVITAS



However, in order to provide results that are consistent with the other demonstration projects VIVALDI has been working with a common evaluation framework. As described previously this has been developed by METEOR in consultation with the demonstration projects. This consultation has been carried out through the Evaluation Liaison Group that is co-ordinated by METEOR.

The evaluation managers from each of the demonstration projects are represented on this liaison group. The evaluation managers feed in the views of their demonstration

projects to the overall CIVITAS evaluation process, and feed the wider picture back down to the sites. In practice the guidelines have been developed from a top-down perspective and have been interpreted by the sites to provide a detailed bottom-up evaluation plan for the local demonstrations.

As well as supporting the evaluation at site level, the METEOR project is responsible for assessing the results from across the sites and projects, and providing results at the policy level for transfer to other cities and decision makers. This is also shown in figure 8. However, the individual demonstration projects will also have a role, through the evaluation liaison group, in supporting the development of the cross-site and policy level analysis.

Therefore the evaluation liaison group is a key mechanism in ensure effective evaluation across the CIVITAS initiative.

6.2 Evaluation risks

In a project of this nature there are a number of risks to a successful and meaningful evaluation of the results. The key risks are summarised below:

The scale of the demonstrations – the size of the demonstration projects is significant. In VIVALDI there are 63 schemes being implemented, grouped into 21 packages, across the 8 CIVITAS themes and in 5 cities across Europe. A project of this size holds a risk of being just too complicated to evaluate effectively. It requires expertise across a wide range of subjects and an enormous data collection exercise. In VIVALDI we have tried to minimise this risk by focus on the 21 packages as the main evaluation level and developing detailed data collection programmes to ensure that we have considered all the necessary data for evaluation.

Timing – within a major demonstration project measures will be implemented at different times and not always as originally planned. In this situation there is a danger that data for the before and after analysis is not collected at the right time. For example before data may be missed and after data may be poor if it is collected too early to allow the full impact to be seen. To reduce this risk the VIVALDI sites are monitoring the implementation status along side the data collection programme. If things in the implementation programme change, then the data collection programme can be adjusted accordingly. Therefore the site evaluation plans are living documents.

Inconsistency in data – across the wide range of measures being implemented and demonstration sites there will be a lot of different data collected. Comparing and analysing this data will be very difficult. This problem is the main reason for the METEOR evaluation guidelines. However, there will still be differences in approach for practical reasons, specific local situations and to allow the use of existing data sets. This is one of the reasons that the VIVALDI project has included the assessment of the implementation process in its evaluation work, as this is a key area for transferable results, rather than the direct impacts of the measures which will depend on local situations.

6.3 Next steps and evaluation deliverables

This evaluation plan is the second version of deliverable D4 and includes adjustments as a result of comments made by the Commission and METEOR, and developments in the local evaluation work since the initial plan was submitted in March 2003. However, as noted previously, the evaluation plan should always be seen as a living document that can take account of changes in the measures being implemented.

Ongoing work on evaluation includes the following steps:

- *Continue to develop the ITEMS* model for use with the demonstration sites in Bremen, Bristol and Nantes. The first target is establishing the baseline data for the model and the do-nothing scenarios. The next stage will be working with METEOR of establish a sensible approach of modelling the measures being implemented in each of these sites.
- *Collection of initial results and baseline data* – each of the sites are now working on collecting initial data for the evaluation process, as set out in their evaluation plans. In some case measures have already been implemented and some early results will be available. Annual working papers on results are planned, which will feed into the final evaluation deliverable.
- *The mid-term review* – will provide the next opportunity to take stock of how the evaluation activities are progressing.

The final output of the evaluation work will be the Deliverable 9 ‘Evaluation results’ due in month 46. However, in working towards this the sites will develop local working papers on results, and there will be regular meetings of the site evaluation managers to discuss how the evaluation work is progressing. In addition the VIVALDI evaluation manager will participate in the CIVITAS evaluation liaison group to ensure consistency with the other projects.

Annex 1 – Characteristics of the demonstration target areas

Indicator	Bristol			Bremen		Nantes				Aalborg	Kaunas
	City Centre	Barton Hill	South Bristol	City-centre	Neustadt	Centre	SE	NW	Tertre	Coach Terminal	-
• Area	291 ha	406 ha	291 ha	-	-	1,973 ha	6,716 ha	6,255 ha	190 ha	-	-
• Population	11,680	13,869	12,283	-	-	145,500	63,500	77,000	NS	-	-
<i>Transport</i>											
• Car ownership (per 1000 inhabitants)	441	260	438	665	402	462	500	509	-	-	-
• % daily trips by mode of transport											
- Car	44.3	36.4	70.9	38	27.9	45.8	65.6	62.3	-	-	-
- Walk/cycle	40.5	48.5	7.8	42	41.1	35.8	22.6	25.1	-	-	-
- Bus	6.3	9.1	9.7	15	30.6	18.4 ¹	11.8 ¹	12.6 ¹	-	-	-
• Road traffic accidents	213	147	32	-	-	32	64	138	12	-	-
- Per 1000 inhabitants	18.2	10.6	2.6	-	-	1.9	2.3	1	1.8	-	-
<i>Society and economy</i>											
• % unemployment	3.4	11.3	3.0	-	-	-	-	-	-	-	-
• % pop over age 65	13.5	19.1	14.1	13.7	16.8	19.2 ²	18.0 ²	21.0 ²	-	-	-
• % pop under age 16	11.1	19.8	21.5	5.8	13.4	19.5 ³	26.9 ³	24.0 ³	-	-	-
<i>Energy and environment</i>											
• % estimated energy use Transport	-	-	-	-	-	-	-	-	-	-	-
• % emissions of Carbon Dioxide by road sector	-	-	-	-	-	-	-	-	-	-	-

¹ All public transport

² % population over age 60

³ % population under age 20

Annex 2 The METEOR core indicator list

NO.	EVALUATION AREA	IMPACT CATEGORY	IMPACT SUB-CATEGORY	FORMER INDICATOR	CURRENT INDICATOR	DESCRIPTION	DATA /UNITS	COMMENTS
ECONOMY								
1		Benefits	Operating Revenues	<i>Operating revenues</i>	Operating revenues per PT passenger	Revenues per pkm	Euros/pkm, quantitative, derived or measurement	<ul style="list-style-type: none"> Data on costs and revenues easy to collect (for the PT option considered); Pkm easy to derive from vkm and occupancy rate data.
2		Costs	Operating Costs	<i>Operating costs</i>	Operating costs per PT passenger	Costs per pkm	Euros/pkm, quantitative, derived or measurement	
ENERGY								
3		Energy Consumption	Fuel Consumption	<i>Total fuel use</i>	Vehicle fuel efficiency	Fuel used per vkm, per vehicle type	MJ/vkm, quantitative, derived or measurement	Vehicle fuel efficiency is more appropriate than total fuel use to assess improvements produced by the measures.
4				<i>Fuel mix</i>	Fuel mix	Energy used per type of fuel, per vehicle type	MJ, quantitative, derived or measurement	No comments.
ENVIRONMENT								
5		Pollution/Nuisance	Air Quality	<i>CO levels</i>	CO levels	CO concentration	Ppm or g/m3, quantitative, measurement	<p>General consensus on the fact that coherence between air quality and emissions indicators must be granted; emissions are important to evaluate concentrations data.</p> <p>Agreement on the inclusion of NOx levels and CO emissions:</p> <ul style="list-style-type: none"> NOx levels are important to assess air quality both for their own toxicity and for their contribution, under certain conditions, to particulate level (which would not be otherwise taken into account). CO emissions per vkm are very easy to calculate; thus, it would be convenient to derive them in order to have a full outline of the effects of the measures on emissions.
6				-	NOx levels	NOx concentration	Ppm or g/m3, quantitative, measurement	
7				<i>Particulate levels</i>	Particulate levels	Particulate (pm10) concentration	Ppm or g/m3, quantitative, measurement	
8			Emissions	<i>CO2 emissions</i>	CO2 emissions	CO2 per vkm	G/vkm, quantitative, derived	
9				-	CO emissions	CO per vkm	G/vkm, quantitative, derived	
10				<i>NOx emissions</i>	NOx emissions	NOx per vkm	G/vkm, quantitative, derived	
11				<i>Small particulate emissions</i>	Small particulate emissions	Pm10 per vkm	G/vkm, quantitative, derived	
12			Noise	<i>Average noise</i>	Noise perception	Perception of noise	Index, qualitative, collected, survey	Perception (scales of values, total, day/night) is much more suitable to point out contingent changes in the level of noise. Indeed the measurement of noise level can be made only for very small areas and it is unlikely to be properly modelled.

NO.	EVALUATION AREA	IMPACT CATEGORY	IMPACT SUB-CATEGORY	FORMER INDICATOR	CURRENT INDICATOR	DESCRIPTION	DATA /UNITS	COMMENTS
SOCIETY								
13		Acceptance	Awareness	<i>Information/Awareness</i>	Awareness level	Degree to which the awareness of the policies/measures has changed	Index, qualitative, collected, survey	Awareness level includes information and knowledge of the measures. Acceptance level includes satisfaction about the measures and therefore Satisfaction level was excluded.
14			Acceptance	<i>User Acceptance/Satisfaction</i>	Acceptance level	Attitude survey of current acceptance with the measure	Index, qualitative, collected, survey	
15		Accessibility	Spatial Accessibility	-	Perception of PT accessibility	Attitude survey of perception of physical accessibility of PT network (distance to nearest PT stops)	Index, qualitative, collected, survey	User feeling of inclusion was deemed too generic, difficult to define and scarcely revealing of the equity impact category. Such category (complex to measure) was replaced with the easier “accessibility” impact category. Two measures of accessibility have been introduced: <ul style="list-style-type: none"> spatial (user perception of PT accessibility) economic (PT relative cost)
16			Economic Accessibility	-	PT services relative cost	Cost of PT related to average personal income (i.e. cost of a weekly, monthly or annual pass in proportion of the average weekly, monthly or annual income, respectively)	Index, quantitative, measurement	
17		Security	Security	-	Perception of PT security	Perception of security when using PT options	Index, qualitative, collected, survey	The perception of security is critical to the improvement of the attractiveness of PT.
TRANSPORT								
18		Quality of Service	Service reliability	<i>Accuracy of timekeeping</i>	Accuracy of PT timekeeping	Percentage of services arriving/departing on time compared to timetables (each city should fix the interval of time considered as a delay compared with timetable)	% , quantitative, collected, measurement	Important to assess whether the implemented measures have improved the attractiveness of PT. Data are quite easy to collect or calculate.
19			Quality of service	-	Quality of PT service	Perception of quality of PT services	Index, qualitative, collected, survey	
20		Safety	Transport Safety	<i>Accidents no.</i>	No. of injuries and deaths caused by accidents	General transport accident no. within the city causing injured and deaths	Quantitative, measurement	In terms of safety it is more interesting to measure the number of injured and deaths rather than simply the number of accidents.
21		Transport System	Traffic Levels	<i>Vkm/nos by mode</i>	Vkm by vehicle type - peak	Total trips length per vehicle per day	Vkm per day, quantitative, derived	Congestion levels was complemented with Traffic levels as Impact sub-category. As suggested by some cities, average speed is not a relevant indicator of congestion whenever speed reduction measures are foreseen. However, since the CIVITAS measures do not seek speed
22					Vkm by vehicle type – off peak	Total trips length per vehicle per day	Vkm per day, quantitative, derived	
23		Congestion Levels			<i>Average vehicle speed</i>	Average vehicle speed - peak	Average vehicle speed over total network	

NO.	EVALUATION AREA	IMPACT CATEGORY	IMPACT SUB-CATEGORY	FORMER INDICATOR	CURRENT INDICATOR	DESCRIPTION	DATA /UNITS	COMMENTS
24					Average vehicle speed – off peak	Average vehicle speed over total network	Km/hr, quantitative, derived	reduction (with the exception of one case) the indicator has been retained. In order to avoid the overlooking of important differences, peak and off peak hours have been included.
25			Freight Movements	<i>Total no. of goods vehicles moving in demo areas</i>	Total no. of goods vehicles moving in demo areas	Assessment of whether the daily no. of goods vehicles accessing city centre changes as a result of the demonstrations	Quantitative, derived or measurement	No comments.
26			Modal split	<i>Avrg modal change - PAX</i>	Average modal split-PAX	Percentage of pkm for each mode	% , quantitative, derived	Wording changes from modal change.
27				<i>Average modal change - vehicles</i>	Average modal split-vehicles	Percentage of vkm for each mode	% , quantitative, derived	
28			Vehicle Occupancy	-	Average occupancy	Mean no. persons per vehicle/day	Persons/vehicle, quantitative, derived, measurement	This indicator also affords the possibility to switch from vkm to pkm (in particular with reference to energy and environment indicators)