Measure title: **Park & Ride Guidance system**

City: **Donostia–San Sebastián** *Project:* **ARCHIMEDES** *Measure number:* **75**

Executive Summary

The search for an available parking space could be considered as an additional factor in traffic generation, particularly at times of peak demand when finding an available space is difficult. For this reason, it is clear that the mobility generation by the search for parking also needs to be controlled.

Parking Guidance Systems (PGS) are designed to contribute to ease congestion resulting from vehicles travelling to a city's parking facilities by directing vehicles to the nearest available parking space, at the same time that they promote energy savings by means of shorter journeys.

In this context, the municipality of Donostia – San Sebastian has seen the need to reform, improve and complete the existing parking information system. An integrated parking guidance system to help drivers in their search for parking has been implemented in the city, providing information through the use of Variable Message Signs (VMS) about the location and occupancy rates of both inner-city underground parking facilities and Park & Ride (P&R) facilities. The goal is to reduce on-street parking and more particularly increase the use of Park & Ride facilities (to which drivers are preferably directed), while reducing car circulation in search for an on-street parking spot.

Parking management measures, such as the guidance system implemented in Donostia-San Sebastián, in combination with other measure aiming at promoting sustainable modes of transport, has resulted in significant impacts over the transport system in the city.

On the one hand, in a context of a steady increase in car travel, a modal shift towards sustainable modes of transport such as public transport and bicycle has been achieved, resulting in a reduction in car use of 0,1% as compared with the situation before the CIVITAS project started. If compared to the BaU situation, the modal shift away from car achieves a 0,4% in 2011, while cycling increased by a 0,3% and public transport by a 0,1%. On the contrary, walking levels seems to be slowly going down, which is not a desirable result. Attention should be placed to this issue in the coming years. Consequently, a reduction in traffic levels has also been experienced. The number of cars entering the city through the CIVITAS corridor has been reduced in more than 7.500 cars per day as compared to the before situation.

In terms of parking demand, the implementation of the CIVITAS measures has leaded to a general decline of vehicles using the parking facilities in the city These situation had an impact in terms of the average occupancy of parking facilities which average reduction of 4,5%.

As for the public perception of the measure effectiveness, the surveys conducted have revealed that the majority of the population (78%) assess the measure as positive after its implementation (before the measure was implemented there was a high share of unaware citizens, which reveals that communication efforts were not sufficient). Also a majority of the population believes that the measure helps to improve the parking situation in Donostia-San Sebastian.

This measure has been prompted by the implementation of an overall strategy to change parking behaviour in the city. It is linked to the development of a P&R network and a new pricing scheme for on-street parking in the city.

Its optimal implementation relies to a great extent in the cooperation will of diverse parking operators, sometimes competing between each other. On-going communication efforts should be made to clearly explain the shared benefits of the initiative and gain their support. Also for technical purposes, since the same information from each parking operator is required in order to build a common connection system..

A Introduction

A1 Objectives and target groups

A1.1 Objectives

The measure objectives are:

(A) High level / longer term:

Reduce the use of private car in favour of public transport and cycling.

(B) Strategic level:

Offer more affordable parking alternatives regarding parking fares in the centre of the city.

(C) Measure level:

Contribute to reduce mileage and emissions from cars searching for parking in the city centre~~a 5% reduction in the number of vehicles entering the city centre~~.

A1.2 Target groups

Travellers to the city centre who do not have a good public transport connection.

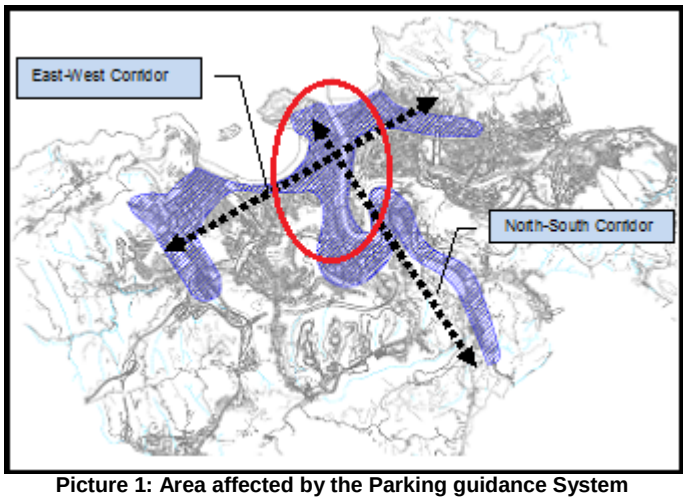
A2 Description

The use of parking facilities is a remarkable factor that can be seen as an indicator of the amount of cars that move through the city. In fact, it can be considered that the search for an available parking space is an additional factor in traffic generation, particularly at times of peak demand when finding an available space is difficult.

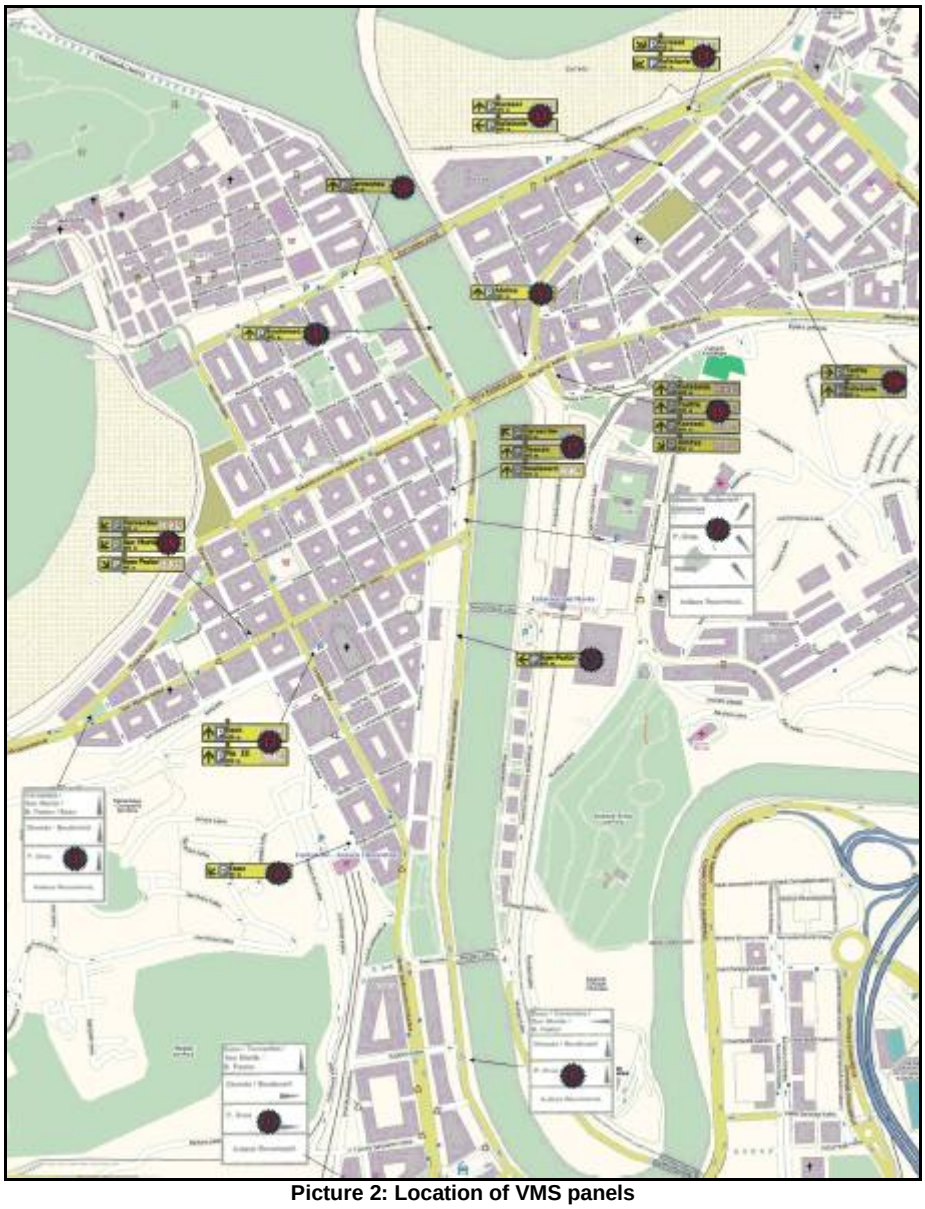
Taking into account the increasing traffic levels in Donostia-San Sebastian and more particularly the demand for parking, it is clear that the mobility generated by drivers searching for parking also needed to be controlled.

Within this measure, the Municipality of Donostia-San Sebastián implemented an integrated parking guidance system to help drivers in their search for parking, providing information through the use of Variable Message Signs (VMS) about the location and occupancy rates of both inner-city underground parking facilities and Park & Ride (P&R) facilities. The goal is to reduce on-street parking and more particularly increase the use of Park & Ride facilities (to which drivers are preferably directed), while reducing car circulation in search for an on-street parking spot. This guidance system complements the already existing static signposting regarding parking facilities location.

A more efficient use of the existing Park & Ride facilities contributes to an increase in Public Transport usage and to a decrease of car use along the CIVITAS corridors in the city of Donostia - San Sebastián.



Picture 1: Area affected by the Parking guidance System



Picture 2: Location of VMS panels

Two types of panel were installed depending on the type of information to be provided:

- Variable Message Signs – VMS (5 units), installed at entrance points to the city and at key strategic points on main routes. On these panels, the city's parking status information is shown, either individually or grouped by zones. Warnings/recommendations, or any other type of information that the system co-ordinates can also be also displayed.

Picture 3: VMS panel in Paseo Bizkaia

- Parking availability information signposting (14 units), installed along the main routes used by drivers when searching for parking spaces. On these panels information is displayed about the available places in each parking facility plus an arrow indicating its location.

Picture 4: Underground parking information panel in San Martin Street

B Measure implementation

B1 Innovative aspects

The innovative aspects of the measure are:

- **Use of new technology/ITS (at regional level)** – New real time information and guidance system to inform about parking occupancy rates of both on-street and underground parking facilities, as well as to guide drivers to the most convenient parking facility.

B2 Research and Technology Development

Prior to the implementation of the real time parking guidance system, the design and technical specifications of the two kinds of panels to be used, as well as of the data centralisation system, were defined:

Variable message signs (VMS)

Each panel consists of 4 lines of related information and each information line is composed of 15 digits. Information is shown in Red, Green or Yellow. Variable information brightness level needs to be programmable in order for it to adapt it to existing lighting conditions.

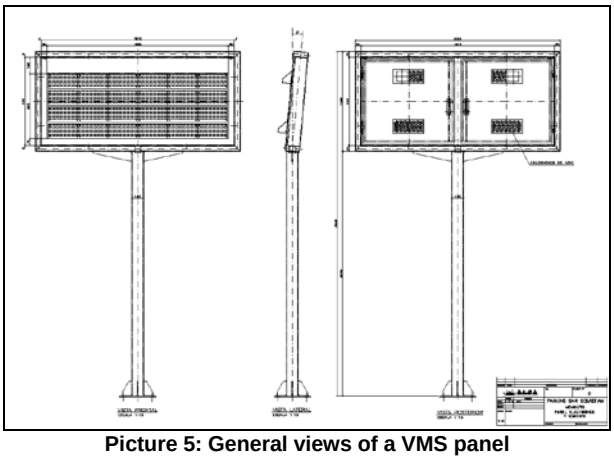
The recommended technical specifications were as follows:

- 3 colours alphanumeric information display (Red, Green, Yellow), depending on the message to show.
- Alphanumeric character of 124 mm in height: LED matrix minimum size of 124,46 x 88,9 mm.
- 5 columns and 7 rows consisted LED matrix. Minimum pixel spacing of 17,78 mm.
- Pixel: 2 diagonal LED, one in green color and the other one in red, both with a typical value of 2 Cd and a 30º (or similar) viewing angle.

As for the information to be displayed, VMS panels were required to show at least the following set of information:

- Occupancy status parking facilities (including P&R), individually or grouped by zones
- Warnings, recommendations, or any information that may be interesting to improve the overall traffic flow of the city

Depending on the occupancy status of each zone, information will be given out in different colours to inform the driver, at a glance, the occupancy status of the zones.



Picture 5: General views of a VMS panel

Parking availability information signpost

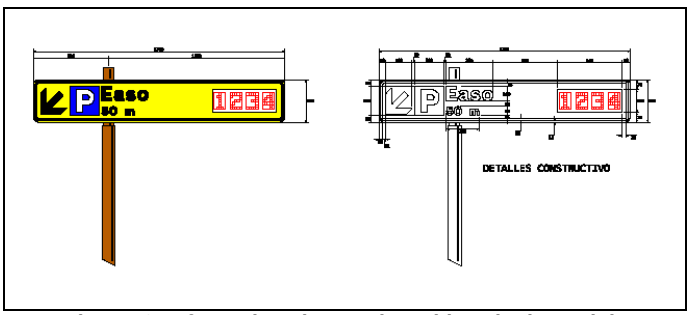
These are simpler information panels in which one or several modules providing information about the available places in parking facilities are included. Each information line or module is required to contain the following information:

- S-17 sign.
- Parking name and distance from panel to nearest access.
- 4 digits informing of the quantity of free parking places and the overall status of the facility (Free; Full; Maintenance work in progess).
- Directional information (Arrow).

Like VMS, information is shown in Red, Green or Yellow. Variable information brightness level needs to be programmable in order for it to adapt it to existing lighting conditions.

As for the technical specifications, these were as follows:

- Numerical indication of available-places in 3 colours (Green, Red, Yellow) depending on occupancy levels.
- Alphanumeric character of 124 mm in height: LED matrix minimum size of 124,46 x 88,9 mm.
- 5 columns and 7 rows consisted LED matrix. Minimum pixel spacing of 17,78 mm.
- Pixel: 2 diagonal LED, one in green colour and the other one in red, both with a typical value of 2 Cd and a 30º (or similar) viewing angle.



Picture 6: Information signposting with a single module

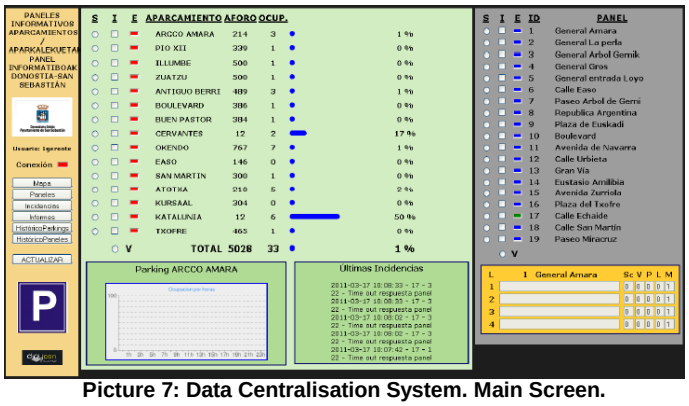
Data centralisation system and operation device

A data centralisation system was required to enable data process and warnings/recommendations to be broadcast from the traffic control centre towards the panels located throughout the city.

The system is required to be totally customisable and programmable, allowing possible to:

- Modify expected parking groupings.
- Emit different warnings/recommendations in each of the VMS panels.
- Store Park & Ride parking bay occupations historically.
- Store Warnings/Recommendations historically.
- Schedule events to display in VMS panels.
- Emit operating alarms
- Record operating alarms
- Expand the number of Park & Ride areas operated within the system.

Data centralisation automatically captures the occupation status information of each parking facility from the data obtained by the operating device, and is transferred to the control centre.



Picture 7: Data Centralisation System. Main Screen.

B3 Situation before CIVITAS

Before the CIVITAS-ARCHIMEDES project, drivers are guided to their car park locations by static signposting (which has remained as a complement of the new guidance system). In some cases, green and red lights were used to provide information regarding the status of parking facilities.

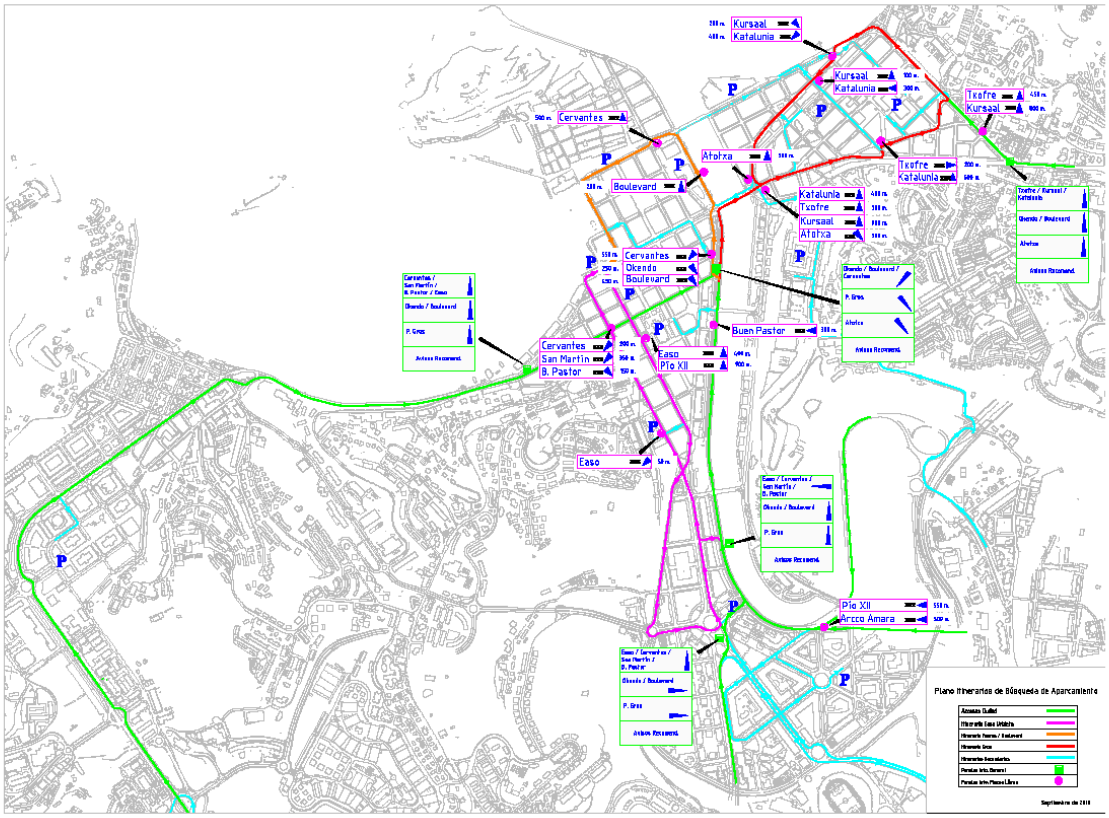
Also, parking information was limited to inner-city underground parking. Information about P&R and on-street parking occupancy rates has never been available.

B4 Actual implementation of the measure

The implementation of the real time parking guidance system was conducted according to the following process:

- **Stage 1** - Definition of the routes for underground parking or P&R search (September 2008 – May 2010).

- **Stage 2** - Definition of the adequate display location and information to be shown (September 2008 – May 2010).



Picture 8: Parking search routes and proposed location of information panels

- **Stage 3** - Tender for installation contract (May 2010).

- **Stage 4** – Installation (June 2010 – December 2010)

Picture 9: Information panels

- **Stage 5** - Demonstration and monitoring (December 2010 – September 2012)

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **Measure 18.** – This measure is related to task 2.12. Its aim is to conceive a system to integrate public transport with Park& Ride sites and to launch an informative campaign explaining P&R location and use.

C Planning of Impact evaluation

C1 Measurement methodology

C1.1 Impacts and indicators

C1.1.0 Scope of the impact

Parking policy is one of the main drivers for car use, as well as one of the more effective tools to moderate its use. This measure is part of a package of measures (measures nº 18, 23 and 75) aiming at reducing the number of cars entering the city of Donostia-San Sebastian by changing parking behaviour.

The new Park & Ride policy introduced with this measure is expected to encourage drivers whose public transport option at origin are limited to use the car as an access mode to efficient public transport services. It is expected that this measure will alleviate traffic congestion in inner city streets, improving private cars but also public transport operation, making the latter a more competitive and attractive mode. Also, an efficient intermodal integration of private vehicles and public transport (both form a technical and the fare system side) is expected to foster the use of the municipal bus service, increasing its operational revenues.

The overall strategy to reduce the number of cars entering the city and circulating within its neighbourhoods is expected to provide benefits in the form of better air quality, less carbon emissions and reduced noise levels, resulting in a better health and quality of life for Donostia-San Sebastian citizens. It is also expected that the need for on-street parking spots will be reduced, allowing the municipality to recover public space for other uses.

C1.1.1 Selection of indicators

NO.	EVALUATION CATEGORY	EVALUATION SUB-CATEGORY	IMPACT	INDICATOR	DESCRIPTION	DATA /UNITS
	ECONOMY					
2a		**Costs**	Costs	Capital costs	Capital cost per system or unit	Euros, quantitative
2b				Operating costs	Costs per pkm or vkm	Euros/pkm or Euros/vkm, quantitative, derived or measured
	ENVIRONMENT					
8		**Pollution and Nuisance**	Emissions	CO2 emissions	CO2 per vkm by type	G/vkm, quantitative, derived
9				CO emissions	CO per vkm by type	G/vkm, quantitative, derived
10				NOx emissions	NOx per vkm by type	G/vkm, quantitative, derived
11				Particulate emissions	PM10 and/or PM2.5 per vkm by type	G/vkm, quantitative, derived
	SOCIETY					
14		**Acceptance**	Acceptance	Acceptance level	Attitude survey of current acceptance of the measure	Index (%), qualitative, collected, survey
	TRANSPORT					
		Quality of Service	Acceptance	Occupancy Rates	Average number of vehicles using parking facilities as compared with its capacity	%, quantitative, derived
29		**Transport System**	Modal Split	Average modal split-trips	Percentage of trips for each mode	%, quantitative, derived
			Traffic Levels	Number of private cars entering the city along the CIVITAS corridors	Number of private cars (ADS is responsible)	No, quantitative, measurement

C1.1.2 Methods for evaluation of indicators

No.	INDICATOR	TARGET VALUE	Source of data and methods	Frequency of Data Collection
2a	Capital costs		ADS expenses in infrastructure and technology associated to the VMS.	When implementation or purchase takes place
2b	Operating costs		Financial accounts from ADS with costs related to the operation of VMS.	Annual
8, 9, 10, 11	CO_2, CO, NOx, PM emissions		Model based on the mobility survey and traffic flows data	One in 2012
14	Acceptance level		Data has been collected through a specific survey over a representative sample of potential parking facilities users. The target audience were citizens of all ages and gender living or working in the city centre. The survey method consisted of on-street personal interviews to randomly selected individuals. The questionnaire included questions regarding acceptance levels. A sample size of 400 interviews was used (95% confidence level)	2 times, before and after the implementation of the measure
	Occupancy Rates		The number of vehicles using underground and P&R parking facilities sites has been calculated based on records from the parking operators and manual counts in paid parking areas.	Monthly
29	Modal split	Maintain the 47% of pedestrian mobility on modal split	Actualization of the Regional Mobility Survey (Basque Govern) based on a field work campaign (mobility survey) conducted in the framework of the studies for the implementation of the metro network in Donostialdea	One in 2012
	Number of private cars entering the city along the CIVITAS corridors	Reduce the 5% the number of cars entering compared to 2006	ADS is responsible for the monitoring of the number of private cars entering the city centre along the CIVITAS corridors. Automatic traffic counters implemented in the main arterial roads entering the city are used for that purpose.	Annual (average per week-day)

C1.1.3 Planning of before and after data collection

EVALUATION TASK	INDICATORS INVOLVED	COMPLETED BY (DATE)	RESPONSIBLE ORGANISATION AND PERSON
Analysis of financial accounts.	2a, 2b	Months 30, 42	ADS – J Ramón Ordoñez (ADS)
Model based in the Regional Mobility Survey and data of traffic flows	8, 9, 10, 11, -	Month 42[1]	ADS – J Ramón Ordoñez (ADS)
Specific survey to reveal the attitude towards the implementation of VMS.	14	Month 36	ADS – J Ramón Ordoñez (ADS)
Occupancy rates		Month 30 onwards	ADS – J Ramón Ordoñez (ADS)
Model based in the Regional Mobility Survey and data of traffic flows	29	Month 42[1]	ADS – J Ramón Ordoñez (ADS)
Traffic counts and/or traffic modelling		Months 39	ADS – J Ramón Ordoñez (ADS)

C1.2 Establishing a baseline

The main scope of the evaluation process is to assess the impact on mobility patterns, namely modal share and traffic levels, of a more efficient management of parking facilities in Donostia-San Sebastián. But also environmental, cost and acceptance issues are considered in the evaluation plan, since these are also important assets of the mobility strategy deployed by ADS within the CIVITAS project.

The data collection method for the evaluation of the measure is as follows:

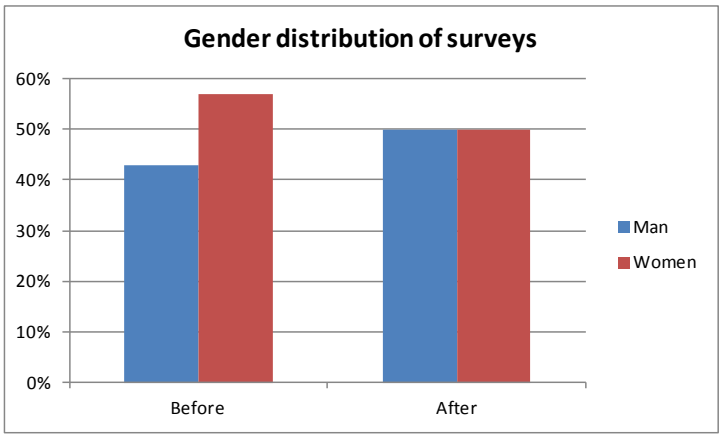
Cost indicators results have been gathered from the parking area of the mobility department.

Society indicators results have been gathered through on-street surveys in neighbourhoods affected by the measure. The criteria used to distribute surveys in order to achieve a representative universe with a 95% confidence, has been as follows:

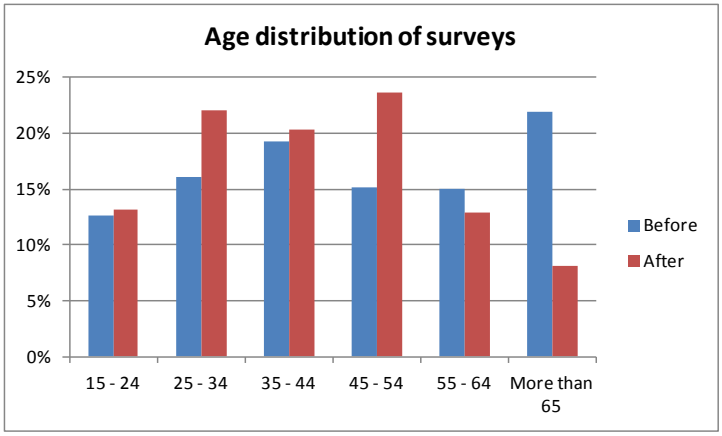
DISTRICTS TO SURVEY	ANTIGUO	CENTRO	GROS	AMARA	TOTAL
Population	17.411	14.200	20.396	26.004	78.010
% Population	22,32%	18,20%	26,15%	33,33%	100%
Nº Survey	**85**	**70**	**100**	**128**	**383**

Table 1: Distribution of Acceptance surveys by districts

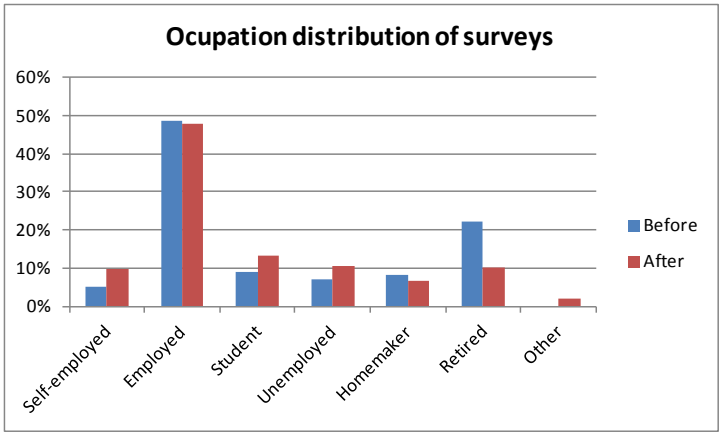
Two survey campaigns were conducted in order to cover both “before” and “after” scenario. The “before” survey was made in July 2010, while the “after” was made in March 2012. In both cases, a representative sample of citizens of all ages and gender living in or visiting the neighbourhoods affected by the new parking policy were randomly selected for on-street personal interviews. The questionnaire included questions regarding awareness levels (see questionnaire annexed to this report).



Picture 10: Gender distribution of surveys



Picture 11: Age distribution of surveys



Picture 12: Occupation distribution of surveys

Regarding **traffic levels**, the permanent automatic traffic counters network implemented in the main arterial roads entering the city are used to monitor the current number of private cars entering the city centre along the CIVITAS corridors. Future traffic levels are forecasted by means of the Traffic Model explained below.

As for **modal split** information, it is provided through a Traffic Model built based on data from the previous Regional Mobility Survey performed by the Basque Government (data referred to 2006) updated with traffic counts on the different modes.

A classic four step model has been designed to assess modal shift, traffic performance and emissions. Car traffic, public transport and non-motorized modes have been considered within the demand model.

In order to replicate trips generation (including origin and destination), modal share and traffic assignment to the road network, the following input has been used:

- Urban zoning according to Regional Mobility Survey traffic zones and census division
- Road network characteristics (nº lanes, speed management, traffic regulations, etc.)
- Non-motorized transport network characteristics (walking and cycling exclusive connections)
- Public transport service provision characteristics (frequency, capacity, etc.)
- Socioeconomic variables (population projections, income, etc.)
- Urban development plans

- Baseline modal share: actualization of the Regional Mobility Survey (Basque Govern) based on a field work campaign (mobility survey) conducted in the framework of the studies for the implementation of the metro network in Donostialdea
- Traffic counts from automatic traffic gauging devices in the main corridors entering the city
- Cycling levels from Bicycle Observatory statistical database

CUBE (Citilabs) modelling software has been used for calibration and future projections. CIVITAS and BaU scenarios have been projected. The modelling software includes an emissions module used to determine emission volumes in both scenarios.

For **environment** indicators the travel forecasting model has been used in the assessment of the emissions data.

C1.3 Method for Business as usual scenario

If this measure would not be implemented the awareness level about changes on underground and Park & Ride facilities would be limited, favouring public opposition to these measures, and reducing its potential for success. Also, fewer drivers would leave their cars at home or would connect with public transport for the final stage of their trips. As a result, car use reductions promoted by changes in parking policy would be minored.

For evaluation purposes, the BaU scenario has been estimated as follows:

Capital cost
It has been considered that fixed panels instead of VSM panels would have been implemented to indicate the additional parking itineraries created.

Operational costs
Previous signposting did not have any equipment, therefore if the measure would have not been implemented there would be no operating costs associated to the information panels.

Emissions
BaU scenario is calculated by the demand model calibrated within this measure according to the evolution in traffic levels without the implementation of the CIVITAS measure.

Society
Before the CIVITAS project there was not a regular survey program regarding acceptance, lacking of reference data. Therefore is not possible to estimate a BaU scenario in this regard.

Occupancy
Occupancy rates under the BaU scenario have been estimated according to the evolution trend experienced during the previous years.

	2007-2008	2008-2009	2009-2010	2010-2011	Average yearly increase
Boulevard	51%	48%	49%	47%	-1%
Buen Pastor	34%	35%	36%	35%	1%
Okendo	32%	-	27%	26%	-3%
Txofre	-	10%	11%	12%	1%
Easo	29%	28%	30%	29%	0%
Pio XII	9%	10%	11%	10%	1%

Average modal split- trips
The BaU scenario is calculated by the demand model calibrated within this measure according to the evolution in traffic levels without the implementation of the CIVITAS measure.

C2 Measure results

C2.1 Economy

Table C2.1.1: Costs

Indicator	Before (2000)	BaU (2011)	After (2011)	Difference: After –Before	Difference: After – BaU
2a. Capital costs	61.358,10	13.953,81	239.304	177.945,90	225.350,19
2b. Operating costs	0	N/A	5.868	5.868	N/A

Operation costs of the before scenario does not exist because the previous signposting did not have any equipment. The only cost that can be attributed after installation is the maintenance.

Maintenance costs are mainly referred to the server which manages the proper connections with all parking facilities. The maintenance of the signposting facilities is covered for the first three years by the initial contract.

To estimate BaU scenario it has been considered that fixed panels instead of VSM panels would have been implemented. In particular, it is assumed that the existing parking information network would have been expanded to indicate the two additional parking itineraries created: Urbieta-Easo and Gros, the former requiring 9 new fixed panels while Gros itinerary would need 4 new panels.

C2.2 Environment

Table C2.2.1: Pollution and Nuisance

Indicator	Before (2008)	BaU (2011)	After (2011)	Difference: After –Before	Difference: After – BaU
8. CO_2 emissions	249.777,00 Tonnes/year	262.389,86 Tonnes/year	261.943,75 Tonnes/year	12.166,75 Tonnes/year	-446,12 Tonnes/year
9. CO emissions	21.854,80 Tonnes/year	22.958,58 Tonnes/year	22.923,32 Tonnes/year	1.068,52 Tonnes/year	-35,27 Tonnes/year
10. NOx emissions	1.562,00 Tonnes/year	1.640,67 Tonnes/year	1.636,27 Tonnes/year	74,27 Tonnes/year	-4,40 Tonnes/year
11. Particulate emissions	11.301,40 Tonnes/year	11.766,57 Tonnes/year	11.733,61 Tonnes/year	432,21 Tonnes/year	-32,96 Tonnes/year

There is an overall increase in emission levels as compared with the situation before the CIVITAS project, due to the increased mobility levels experienced in the city.

Nevertheless, although moderate in relative terms, both regarding GHG and pollutant emission levels, significant reductions have been achieved by the CIVITAS project as

compared to the BaU scenario (ranging from nearly 450 tonnes per year of CO_2 to 4,5 tonnes per year of NOx).

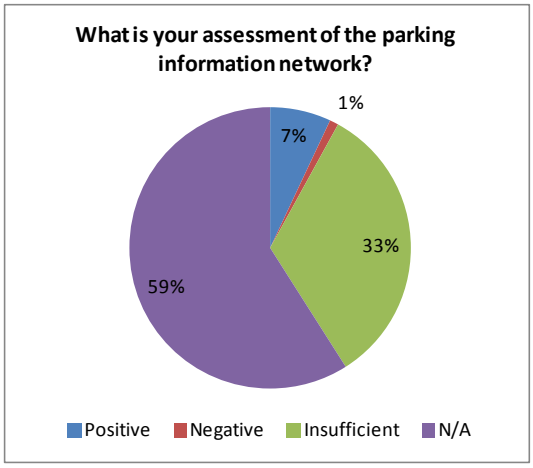
C2.3 Society

Society indicators have been assessed through on-street surveys in the neighbourhoods affected by the measure.

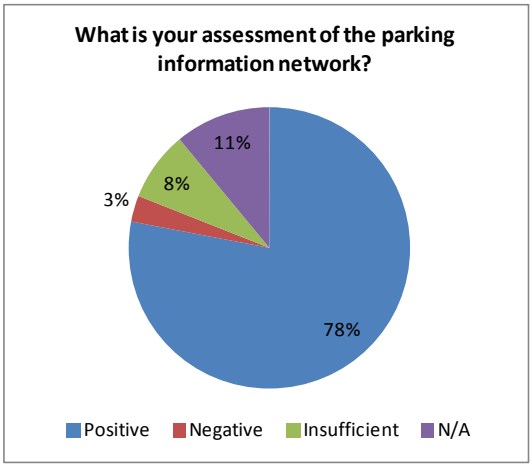
Table C2.3.1: Acceptance

Indicator	Before (2010)	BaU (date)	After (2012)	Difference: After –Before	Difference: After – BaU
14. Acceptance level	59,11%	N/A	61,78%	2.67	N/A

Regarding the acceptance of the measure, citizens were asked what was their assessment of the parking information network provided by the city council.



Picture 13: Acceptance level. "Before" situation

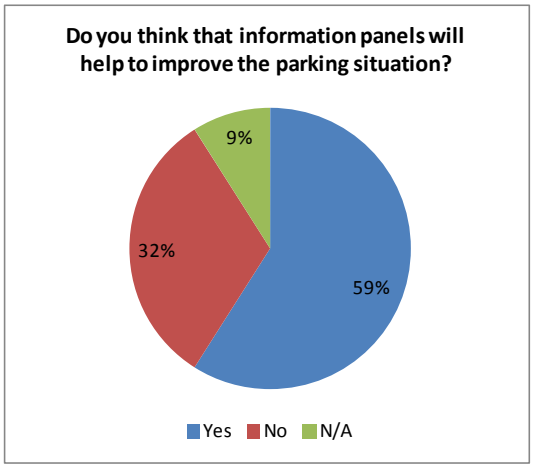


Picture 14: Acceptance level. "After" situation

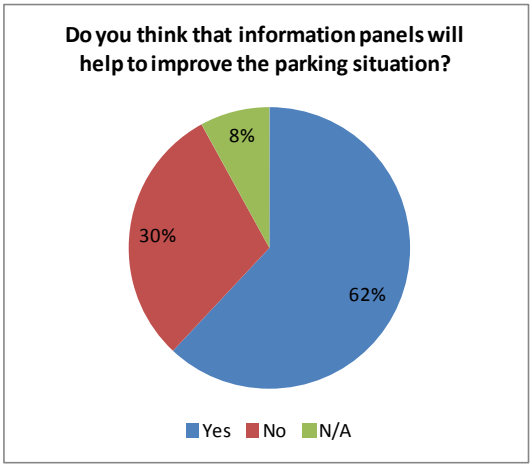
Taking into account the high percentage of "Do not know" response, it is clear that people were not very aware of the plans of the City Council concerning the network of information panels before their installation. However, among those who responded, it is remarkable the high proportion of those who think that the provision of panels is still not enough.

But after the implementation of the measure, the situation significantly changed. First of all, the awareness level clearly raised and only an 11% of the surveyed people didn't provide any answer. Bu most importantly, "after" survey results reveals that the measure has been widely accepted as very positive, and the benefits that panel network are clearly perceived by the population.

In this regard, the population was asked whether they thought the information panels help to improve the parking situation in Donostia-San Sebastian.



Picture 15: Effectiveness. "Before" situation



Picture 16: Effectiveness. "After" situation

It can be seen how the opinion of the population was clearly positive, even considering the important share of people unaware of the measure, which reveals that citizens required to be helped to find park location. The survey also revealed a slight increase in positive answers after the implementation of the system, which confirms the effectiveness of the measure.

C2.4 Transport

Table C2.4.1: Quality of Service

Indicator	Before (2010-2011)	BaU (2011-2012)	After (2011-2012)
Occupancy rates	Boulevard: 313.235 (47%) Buen Pastor: 253.061 (35%) Okendo: 249.066 (26%) Txofre: 97.486 (12%) Easo: 80.448 (29%) Pio XII: 70.614 (10%)	Boulevard: 311.147 (46%) Buen Pastor: 255.170 (36%) Okendo: 241.594 (23%) Txofre: 97.973 (13%) Easo: 80.716 (29%) Pio XII: 70.967 (11%)	Boulevard: 282.788 (43%) Buen Pastor: 229.621 (31%) Okendo: 207.862 (16%) Txofre: 76.517 (9%) Easo: 72.156 (25%) Pio XII: 59.478 (8%)

Occupancy rates are regularly assessed over a one year period (from the 1st July to the 30th June). In addition to the occupancy rates, the total amount of vehicles entering each parking facility is included, providing the whole picture of the parking demand in the city.

Indicator	Difference: After –Before	Difference: After – BaU
Occupancy rates	Boulevard: -30.447 (-4%) Buen Pastor: -23.440 (-4%) Okendo: -41.204 (-10%) Txofre: -20.969 (-3%) Easo: -8.292 (-4%) Pio XII: -11.136 (-2%)	Boulevard: -28.359 (-3%) Buen Pastor: -25.549 (-5%) Okendo: -33.732 (-7%) Txofre: -21.456 (-4%) Easo: -8.560 (-4%) Pio XII: -11.489 (-3%)

Average occupancy rates range from 43% in Boulevard to 8% in Pio XII. While the parking facility with the highest demand is also Boulevard, with 282.788 cars parked in 2012.

The figures of the "After" scenario show a general decline of parking demand, with Okendo being the parking facility experiencing the highest decrease. The reason for that circumstance is that Okendo parking went through maintenance works was and is steadily recovering its usual demand.

Table C2.4.2: Transport System

Indicator		Before (2008)	BaU (2011)	After (2011)	Difference: After –Before	Difference: After – BaU
29. Average modal split-trips	Car	48,9%	49,2%	48,8%	-0,1%	-0,4%
	Public Transport	15,3%	15,2%	15,3%	0%	0,1%
	Cycle	4,5%	4,5%	4,8%	0,3%	0,3%
	Walk	31,3%	31,1%	31,0%	-0,3%	-0,1%
Number of cars entering the CIVITAS corridors		51.343 Cars/day		43.720 Car/day	-7.623 Cars/day	

Modal shift in favour of sustainable modes of transport is moderate in the short term, achieving a reduction in car use of 0,1% as compared with the situation before the CIVITAS project started. It should be highlighted that this achievement is made in a context of a steady increase in car travel, thus it can be considered a positive result.

If compared to the BaU situation, the modal shift away from car achieves a 0,4% in 2011, while cycling increased by a 0,3%. On the contrary, walking levels seems to be slowly going down, which is not a desirable result. Attention should be placed to this issue in the future.

Indicator	Before (2006)	BaU (2011)	After (2011)	Difference: After –Before	Difference: After – BaU
Number of cars entering the CIVITAS corridors	51.343 Cars/day	44.015 Cars/day	43.720 Car/day	-7.623 Cars/day	-295 Cars/day

The number of cars entering to the CIVITAS corridor has been reduced in more than 7.500 cars per day as compared to the before situation. This situation has been possible due to the combination of parking management and the promotion of sustainable modes of transport.

C3 Achievement of quantifiable targets and objectives

No.	Target	Rating
1	There are no quantifiable targets associated to this measure. ~~To reduce the number of cars entering the city centre by 5% compared to 2006 levels.~~ ~~Maintain the share of pedestrian mobility on modal split~~	~~***~~
2		~~*~~

NA = Not Assessed O = Not Achieved * = Substantially achieved (at least 50%)
**** = Achieved in full *** = Exceeded**

C4 Upscaling of results

Up-scaling this measure to the whole city would mean that Park & Ride facilities are implemented in all corridors entering the city and more employment areas (including business and commercial areas) are included in the Park & Ride policy. VMS would be in operation associated to all of them. Achievements in terms of modal share and occupancy ratios would be transferred to other areas of the city.

C5 Appraisal of evaluation approach

Overall, it is considered that the evaluation approach is in concordance with the measure objectives, and data collection procedures adequate.

A survey assessing the time spent searching for parking by drivers could have been included in the analysis in order to evaluate the improvement driven by the parking guidance system.

C6 Summary of evaluation results

Parking management measures, such as the guidance system implemented in Donostia-San Sebastián, in combination with other measure aiming at promoting sustainable modes of transport, has resulted in significant impacts over the transport system in the city.

On the one hand, in a context of a steady increase in car travel, a modal shift towards sustainable modes of transport such as public transport and bicycle has been achieved, resulting in a reduction in car use of 0,1% as compared with the situation before the CIVITAS project started. If compared to the BaU situation, the modal shift away from car achieves a 0,4% in 2011, while cycling increased by a 0,3% and public transport by a 0,1%. On the contrary, walking levels seems to be slowly going down, which is not a desirable result. Attention should be placed to this issue in the coming years.

Consequently, a reduction in traffic levels has also been experienced. The number of cars entering to the CIVITAS corridor has been reduced in more than 7.500 cars per day as compared to the before situation.

In terms of parking demand, the implementation of the measures has leaded to a general decline of vehicles using the parking facilities in the city These situation had an impact in terms of the average occupancy of parking facilities which average reduction of 4,5%.

As for the public perception of the measure effectiveness, the survey campaigns conducted to evaluate acceptance levels have revealed that the majority of the population (78%) assess the measure as positive after its implementation (before the measure was implemented there was a high share of unaware citizens, which reveals that communication efforts were not sufficient). Also a majority of the population believes that the measure helps to improve the parking situation in Donostia-San Sebastian.

C7 Future activities relating to the measure

Although there are no future plans to enlarge the system in the short term, the information provided by it is continuously under revision in order to improve its usefulness. In particular, future enhancements will consider the possibility to guide drivers towards available space areas rather than guiding them by individual parking availability. The possibility to inform about the availability of on-street parking space in the city centre is also being assessed, mostly as a deterrent effect.

Due to future actions in terms of new city entrances it may be required to reposition the VMS signals of the city, which would lead to a new analysis of routes towards parking facilities.

D Process Evaluation Findings

D0 Focused measure

X	0	No focussed measure
	1	Most important reason
	2	Second most important reason
	3	Third most important reason

D1 Deviations from the original plan

The deviations from the original plan comprised:

- **Unavailability of Regional Government mobility survey:** there was a delay in the delivery of the Regional Government mobility survey which has make it impossible to use this data source for evaluation purposes. A model based on the previous mobility survey and traffic flows data have been used instead. Due to the differences in the tools and data sources used, modal share results are not directly comparable. Therefore, the target objective of maintaining a 47% share of pedestrian mobility in modal share has been adapted to the actual situation regarding data sources.
- **Underground parking provision** – Until the final commissioning of P&R sites, information provided by the panels will be limited only to the underground parking
- **System Integration** – The system was intended to be integrated with the Road Information System of the Diputación Foral de Guipúzcoa (Provincial Government), but the latter didn't implemented any information panel in the Donostia area, therefore there was no need for integration yet.

D2 Barriers and drivers

D2.1 Barriers

The main barriers encountered for the development of measure 75 are:

Preparation phase

- **Financial:** Electronic real time guidance systems are very expensive.
- **Organizational:** If several parking operators work in the city it can be a problem to get a proper common connection system and to gather the same information from each parking provision.

Implementation phase

- **Spatial:** Their installation can affect the width of pavements or pedestrians routes or reduce the visibility of existing signposts, in general, where the available space is limited.

Operation phase

- **Technological:** The lack of flexibility of the automatic counting system, when sporadic situations happen (closing entrances or exits for specific events), require alternative counting systems.

D2.2 Drivers

As for the drivers, the main ones affecting the measure are:

Preparation phase

- **Positional:** This measure is part of an overall strategy to change parking behaviour in the city. It is linked to the development of a P&R network and a new pricing scheme for on-street parking in the city.
- **Technological:** New technological developments make it easier and more affordable to implement electronic real time guidance systems.

Implementation phase

- **Financial:** The availability of CIVITAS funding has been a significant opportunity to develop this measure.

D2.3 Activities

In order to handle the above referred barriers and/or to make use of the drivers, the following activities were taken during the implementation of the measure:

Implementation phase

- **Involvement/Communication:** An informative campaign explaining parking location and its operation was designed and launched at the time of the system's implementation.

Operation phase

- **Organizational:** An on-going dialogue with parking operators is taking place in order to solve potential technical, operational and organization problems

D3 Description of organisations and risks

D.3.1 Measure partners

Following there is a brief description of all project partners and its level of involvement with the measure:

- **Department of Mobility - City of Donostia-San Sebastian -** Design a real time parking guidance system including the identification of parking routes and VMS location. Principal role.

D.3.2 Stakeholders

The main stakeholders involved in the measure are:

- **DYNICON -** Implement VMS displays and develop a communication system.
- **Inmobiliaria Frontera.** Operator of Buen Pastor, Easo and Pio XII underground parkings.
- **EMPARK.** Operator of Kataluña, Cervantes, Okendo and Atotxa underground parkings.
- **Estacionamientos nuevo Gros.** Operator of Txofre underground parking
- **Kursaal.** Operator of Kursaal parking.
- **SKIDATA.** Parking management system supplier

D4 Recommendations

D.4.1 Recommendations: measure replication

- **System planning:** It is very important to select the proper route or routes to guide vehicles towards the different parking facilities in the city. That selection depends on the time needed and the distance travelled to access the corresponding parking. For that reason, it is important to show the remaining distance in the signposts so that the user can choose the parking place based on its occupation and the distance to its location. It is a delicate process because depending on the itinerary it may increase in general the congestion of the city, generating a negative effect of the P&R guidance system.
- **Technical specifications:** It is important to define from the beginning all the components that will form part of the network connection, to get a general idea of the requiring maintenance.

D.4.2 Recommendations: process replication

- **Stakeholders cooperation –** This measure relies to a great extent in the cooperation will of diverse parking operators, sometimes competing between each other. On-going communication efforts should be made to clearly explain the shared benefits of the initiative and gain their support. Also for technical purposes, since the same information from each parking operator is required in order to build a common connection system.

E Summary time schedule

Task No.	Task name	YEAR 1											YEAR 2												YEAR 3												YEAR 4											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
8.10	Park & Ride VMS												E1												X						E 2												E 2						
11.8.2	Park & Ride Parking Guidance System												E1						P												X E 2												E 2						
Evaluation tasks																																																
Process evaluation report																				x												x												x						
Deliverables																																																
M12.1 Draft MLEP							X																																									
D12.1 Final MLEP																												X																				
D12.3 Draft results Temp																																															X
D12.4 Final result temp																																															X

F Annex: Survey Questionnaires

Before Survey

Profile

a) Age:……

b) Gender (Male, Female)

c) Occupation (Self-employed; Employed; Student; Unemployed; Homemaker; Retired; Other)

d) Municipality:……

e) Do you have a car available daily trips? (Yes, No)

Specific Questionnaire

1. Do you have a reserved parking place at home?

(Yes, No, DK/DA)

2. In case you don't have a reserved parking space, how much time do you spend looking for parking?

(0-5 minutes, 5-15 minutes, 15-30 minutes, more than 30 minutes)

3. Do you have a reserved parking place at your work/study?

(Yes, No, DK/DA)

4. In case you don't have a reserved parking space, how much time do you spend looking for parking?

(0-5 minutes, 5-15 minutes, 15-30 minutes, more than 30 minutes)

5. What is your assessment of the current situation regarding parking in Donostia-San Sebastián?

(0/very bad – 10/very good)

6. Which actions do you think are needed in order to improve parking in Donostia - San Sebastián?

(Improve public transport, Promote cycling, More parking spaces, Car-pooling, Other:……)

7. Are you aware of the municipality plan to extend parking regulation?

(Yes, No, DK/DA)

8. What is you assessment of the extension of the parking regulation?

(0/very bad – 10/very good)

9. What is you assessment of the P&R network foreseen by the municipality?

(Positive, Not enough, Negative, I don't know it)

10. What is you assessment of the parking guidance system foreseen by the municipality?

(Positive, Not enough, Negative, I don't know it)

After Survey

Profile

f) Age:……

g) Gender (Male, Female)

h) Occupation (Self-employed; Employed; Student; Unemployed; Homemaker; Retired; Other)

i) Municipality:……

j) Do you have a car available daily trips? (Yes, No)

Specific Questionnaire

11. Do you have a reserved parking place at home?

(Yes, No, DK/DA)

12. In case you don't have a reserved parking space, how much time do you spend looking for parking?

(0-5 minutes, 5-15 minutes, 15-30 minutes, more than 30 minutes)

13. Do you have a reserved parking place at your work/study?

(Yes, No, DK/DA)

14. In case you don't have a reserved parking space, how much time do you spend looking for parking?

(0-5 minutes, 5-15 minutes, 15-30 minutes, more than 30 minutes)

15. What is your assessment of the current situation regarding parking in Donostia-San Sebastián?

(0/very bad – 10/very good)

16. Which actions do you think are needed in order to improve parking in Donostia - San Sebastián?

(Improve public transport, Promote cycling, More parking spaces, Car-pooling, Other:……)

17. Are you aware of the extension of the parking regulation implemented by the municipality?

(Yes, No, DK/DA)

18. What is you assessment of the extension of the parking regulation?

(0/very bad – 10/very good)

19. What is you assessment of the P&R network implemented by the municipality?

(Positive, Not enough, Negative, I don't know it)

20. What is you assessment of the parking guidance system implemented by the municipality?

(Positive, Not enough, Negative, I don't know it)