Measure title: **Travel Plans (Commuters)**

City: **Donostia–San Sebastián** *Project:* **ARCHIMEDES** *Measure number:* **33 b**

Executive Summary

The characterisation of mobility patterns in the municipality of Donostia – San Sebastian and its metropolitan area reveals that the main purpose for travelling is related to work reasons. This mobility is a major source of traffic congestion problems in the city, calling for a deep reflection on citizens', especially commuters', mobility behaviour.

In order to do so, the municipality of Donostia – San Sebastián (ADS) has developed five Commuter Travel Plans for five employment/business areas at the peri-urban fringe of the CIVITAS Plus corridor (Zuatzu, Miramón, Igara, Poligono 27 and Belartza). Based on a comprehensive research phase aimed at the understanding of travel behaviour in each business area, particularly the high incidence of car use and the reasons behind such car dependency levels, Commuter Travel Plans identify actions to reduce car use, the promotion of cycling and walking and the introduction of programmes for car-pooling and car-sharing, together with an effective monitoring and evaluation plan.

Commuter Travel Plans have been developed according to a four stage process:

- **Diagnosis:** Analysis of commuters' mobility patterns in Donostia – San Sebastian has been operationally structured around a data collection campaign (research and field work), used to obtain a clear picture of the mobility situation in each of the analysed business areas.
- **Data Gathering and Processing**: All the information from the fieldwork campaign was recorded, coded and refined, and fed into a database. Data was then analysed using spatial statistical analysis techniques.
- **Action Plans:** To address all issues, including individual or collective claims, identifies during the diagnostic phase in each business area, four main strategic lines were defined:

    1) Promoting collective public transport
    2) Motorised transport demand management
    3) Promote non-motorised mobility
    4) Interaction, information and awareness

- **Evaluation Plan:** within Commuter Travel Plans, an Evaluation Plan according to CIVITAS methodology including data collection for key indicators was defined.

It was planned that the implementation of the foreseen actions would started right after the presentation of the Action Plans in each industrial and business are. Unfortunately, while all of these Action Plans have been presented and discussed with stakeholders, the current financial crisis has delayed the implementation of most of the initiatives which require any kind of investment. Most of the activities carried out so far lies under the strategic line "Interaction, information and awareness", which do not require large resources and are essential to establish the grounds for the success of future developments.

The process implementation of this measure has revealed that, in order to guarantee success, political and strategic involvement of all stakeholders and resources allocation should be gained during the planning phase, before further progress in the implementation of the measure is achieved.

A Introduction

Within this measure, two different kinds of actions have been implemented:

- School Travel Plans
- Commuter Travel Plans for Companies

Given the differences in the methodological approach between them, as well as the different rhythm in its implementation, the assessment of these measures has been split in two separate reports, corresponding this one to the Commuter Travel Plans for Companies.

A1 Objectives and target groups

A1.1 Objectives

The measure objectives are:

(A) High level / longer term:

- To reduce congestion and pollution

(B) Strategic level:

- To reduce car use, and increase cycling and walking
- To develop a strategy for increasing the use of sustainable modes of transport to and from business areas

(C) Measure level:

- To develop a mobility plan for 5 business areas
- To raise awareness about sustainable transport among employees, employers and management staff
- To distribute material to promote walking and cycling: maps of the pedestrian and cycling networks, brochures explaining the basic norms for riding a bicycle on public roads, etc.

A1.2 Target groups

This measure targets commuters who travel to and from business areas in Donostia-San Sebastian every day.

The city of Donostia / San Sebastian has developed the mobility plans in co-ordination with the managers of each of the 5 business areas in the city, including participation of employees in the design of the actions.

A2 Description

The characterisation of mobility patterns in the municipality of Donostia – San Sebastian and its metropolitan area reveals that the main purpose for travelling is related to work reasons. This mobility is a major source of traffic congestion problems in the city, calling for a deep reflection on citizens', especially commuters', mobility behaviour.

In order to do so, the municipality of Donostia – San Sebastián (ADS) has developed five Commuter Travel Plans for five employment/business areas at the peri-urban fringe of the CIVITAS Plus corridor (Zuatzu, Miramón, Igara, Poligono 27 and Belartza). Based on a comprehensive research phase aimed at the understanding of travel behaviour in each business area, particularly the high incidence of car use and the reasons behind such car dependency levels, Commuter Travel Plans identify actions to reduce car use, the promotion of cycling and walking and the introduction of programmes for car-pooling and car-sharing, together with an effective monitoring and evaluation plan.

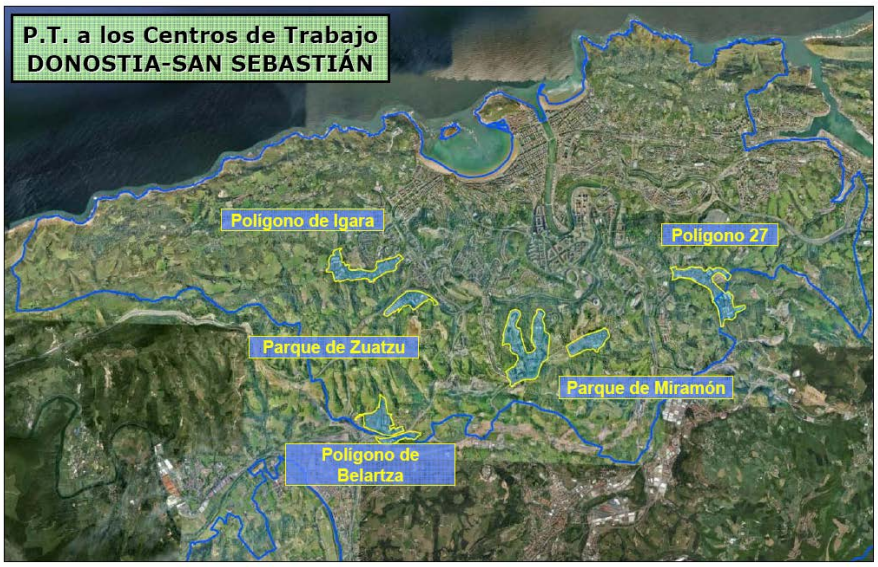

Figure 1: Situation of five economic areas in the city

Following is a list of the benefits associated to Commuter Travel Plans, including overall or social benefits, benefits for the companies and benefits for individuals/employees.

- Fewer traffic jams and a reduction in the effects of road traffic congestion.
- Reduction in energy consumption.
- Reduction in pollutant emissions.
- Increase in space for public use (less space required for road traffic and transport infrastructures).
- Less absenteeism from work and increased productivity, prompted by an improved performance due to reduced stress.
- Improvement in staff punctuality.
- Fewer parking spaces required.
- Reduction in anxiety resulting from traffic congestion.
- Travel costs savings (e.g. by splitting with a fellow colleague through car-sharing)
- Time savings (e.g. by means of reserved infrastructures for high occupancy vehicles.
- Less traffic accidents

To perform a proper design of the project the following objectives for Commuter Travel Plans in San Sebastian were defined:

- To functionally characterise urban and metropolitan collective transport providing access to these industrial and business areas, proposing measures for optimising the service and promote a modal shift towards this mode.
- To analyse the intermodality of the system, focusing particularly on metropolitan and urban public transport mode interchanges.
- To analyse the parking provision at the industrial and business areas, proposing measures for a more rational use of the existing parking spaces.
- To review the pedestrian and cycle routes, proposing new measures for extending and completing the already-existing routes and interconnecting them with the urban and inter-city public transport.
- To assess the different measures applicable in accordance with the mobility problems of each industrial or business area: company involvement, worker awareness-raising, reducing mobility needs (number of journeys), encouraging car-sharing, etc.
- To implement the measures proposed.
- To evaluate the effect of applying the Commuter Travel Plans as compared with the initial data.

To accomplish these goals, a four stage project structure was deployed:

- **Diagnosis:** Analysis of commuters' mobility patterns in Donostia – San Sebastian has been operationally structured around a data collection campaign (research and field work), used to obtain a clear picture of the mobility situation in each of the analysed business areas.

  The fieldwork was divided into two groups of activities:

  - Qualitative approach, which helped to structure preferences, understand behaviours and guide actions to implement,
  - Quantitative assessment, that enabled the quantification of key variables, helped establishing relation between parameters and provided background data to support findings.

- **Data Gathering and Processing**: All the information from the fieldwork campaign was recorded, coded and refined, and fed into a database. Data was then analysed using spatial statistical analysis techniques.

- **Action Plans:** To address all issues, including individual or collective claims, identifies during the diagnostic phase in each business area, four main strategic lines were defined:

  1) Promoting collective public transport
  2) Motorised transport demand management
  3) Promote non-motorised mobility
  4) Interaction, information and awareness

  Action Plans included a series of proposals for action in line with the specific features of each industrial or business area, taking into account all the impacts and interventions planned in each case.

  Once, action plans were completed, they were presented to all involved parties and stakeholders, in order to define responsibilities and an implementation plan.

Fig 2. Action Plans presentation workshop

- **Evaluation Plan:** within Commuter Travel Plans, an Evaluation Plan according to CIVITAS methodology including data collection for key indicators was defined. It also provides insights on how the data for each of the selected indicators should be obtained (surveys, censuses, measurement, models, etc.) On the basis of the indicators proposed, a multi-criteria assessment regarding the pursued goals has been established at least six months after implementation of the measures and a year after application of the measures contained in each Commuter Travel Plan.

Currently, all five Commuter Travel Plans are implementing their Action Plans. While all of these Action Plans have been presented and discussed with stakeholders, unfortunately, the current financial crisis has delayed the implementation of most of the initiatives which require any kind of investment.

Nevertheless, some have seen the light, such as Miramon's shuttle bus pilot project, which has been implemented thanks to the cooperation and financial aid provided by other institutions such as the Basque government.

Fig. 3. Shuttle bus and route in Miramon.

The rest of the activities carried out so far lies under the strategic line "Interaction, information and awareness", which do not require large resources and are essential to establish the grounds for the success of future developments. In order to assure a direct with the parties involved, workshops or seminars has been selected as the preferred mean for awareness rising.

Fig 4. Workshop in Zuatzu business area

B Measure implementation

B1 Innovative aspects

- **New organisational arrangements or relationships** (at regional level) – ADS has develop a mobility plan for the 5 business areas in co-ordination with the managers of each of the business areas and the employees.

B2 Research and Technology Development

As already explained before, the development of Commuter Travel Plans has been made based on a comprehensive research phase aimed at the understanding of travel behaviour in each business area, particularly the high incidence of car use and the reasons behind such car dependency levels.

A twofold fieldwork campaign was developed for that purpose:

- Qualitative approach, which helped to structure preferences, understand behaviour and guide actions to implement.
- Quantitative assessment, that enabled the quantification of key variables, helped establishing relation between parameters and provided background data to support findings.

B3 Situation before CIVITAS

In the five selected business districts the modal share of the car represents more than 95% of all trips. Main causes for this high car use are the free availability of parking space and the relatively poor public transport connections.

At the time that the CIVITAS project was starting, in 2008, the Miramón Technology Park in the municipality of Donostia – San Sebastian published the document “Transport Plan for Improving Mobility at the San Sebastian Technology Park”, in which it analysed the existing mobility options in this business area, including public transport services, parking policy and company-based mobility initiatives. The document also included proposals for the improvement of the current situation, connected with each of these mobility options.

Polígono 27 industrial are has also been the object of several studies which, although they cannot be considered Transport Plans, has served as a reference for the development of its Commuter Travel Plan. “Labour Mobility in Polígono 27 (December 2006) and “New Company Signage Project at Polígono 27 in San Sebastián” (June 2007) are the most significant documents issued within this employment area.

B4 Actual implementation of the measure

The measure has been implemented according to the following stages:

- **Stage 1: Pre-diagnois/Diagnosis phase** (January 2011 - March 2011)
  Analysis of commuters' mobility patterns in Donostia – San Sebastian was been operationally structured based on two well differentiated working:

  1. Pre-diagnosis phase. During the Pre-diagnosis phase all the agents of the institutional, social and business deemed relevant for the purposes of the project were contacted and interviewed. Groups represented in this process prior to diagnosis were:

     - Institutions and public bodies
     - Management and representative agencies of business areas
     - Private companies
     - Trade unions
     - Transport operators

     The results of the interviews served to deepen the general issue of labour mobility and the perception of the problems specific to each business area.

  2. Diagnosis phase. In the diagnosis phase data collection activities were conducted. The following table shows the type of information collected with an indication of whether the task was qualitative or quantitative in nature:

Data sources	Character
Statistical and documentary research	Qualitative / Quantitative
Telematics and onsite surveying	Qualitative / Quantitative
Public transport counting	Quantitative
Private transport counting	Quantitative
Inventory and parking demand	Quantitative
Daily experiences (interviews with users)	Qualitative

Table 1.- Data sources during diagnosis phase

- **Stage 2: Data gathering and processing** (March 2011 – July 2011)
  At this stage the data collected in the previous phase was analysed and processed. The following types of analysis were performed:

  - Spatial Analysis of labour mobility
  - Public vs. Private Competitive Analysis, in relation to origin-destination
  - Competitiveness matrix: Public transport vs. Private vehicle

  The results obtained during this phase have served to define the implementation proposals presented in the action plan of each business area.

- **Stage 3: Action Plan. Presentation and Implementation** (September 2011 onwards)

  Action Plans included a series of proposals for action in line with the specific features of each industrial or business area, taking into account all the impacts and interventions planned in each case.

Within this stage, the first step was to present each action plan to each business area with the aim to raise awareness about the measures intended to be undertaken. These meetings are, indeed, part of one of the strategic action plan, "Interaction, information and awareness" and they were aimed primarily to the companies of each business area.

Fig.5 Workshops held in Igara and Belartza

Alongside to those workshops a brochure for each business area was launched, reporting on the provision of public transport specifically to each business area, and informing about the benefits of using the public transport in relation to private vehicle in both economic and environmental terms.

Fig. 6. Brochure about mobility related to each business area

As mentioned in the introduction, all the actions that require any type of investment have been delayed due to current financial crisis. In the same way, all the parking management related initiatives have been postponed to a better economic framework. Nevertheless, public transport operators have been provided with the analysis and proposals which were made in the action plan of each business area, and may be used in their strategic planning of services.

- **Stage 4: Evaluation.** (September 2011 onwards)

  Developed according to the CIVITAS MLEP, the evaluation of the measure has been conditioned to the delay in the implementation of the action plans.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **Measure DSS 24**. **Extension of the infrastructure for cycling and walking**. The road space dedicated to these modes has increased, easing non-motorized access to business areas.
- **Measure DSS 17. Business District Bus Service in Donostia-San Sebastián.** This measure entails the introduction of new bus services for commuters that connect the business districts to the ARCHIMEDES high quality public transport corridors and mayor public transport nodes in the city.
- **Measure DSS 56. Car-Sharing Scheme in Donostia – San Sebastián.** The measure comprises the introduction of a car sharing scheme that could be useful for commuter trips to/from business and industrial areas.

C Planning of Impact evaluation

C1 Measurement methodology

C1.1 Impacts and indicators

C1.1.0 Scope of the impact

This measure is aimed at promoting a modal shift to environmental friendly and energy saving transport modes by involving all relevant stakeholders from important trip generation centres (such as business and employment areas) in the definition of the more suitable alternative mobility services for their students, employees, etc.; This measure is also directed at rising awareness on the benefits of these modes and providing high quality information about available transport alternatives.

The involvement of all relevant actors in the development of the Plans has increased public acceptance of the measures included in them, as well as all other sustainable mobility measures implemented by the city.

Once fully developed, this measure is expected to increase walking and cycling levels, as well as public transport use. The measure will also promote a more efficient use of private vehicles by promoting car-sharing, car-pooling and eco-driving.

The measure is in line with the overall strategy to reduce the number of cars entering the city and circulating within its neighbourhoods, and is expected to reduce their number of motorized trips to business and employment areas. Furthermore, it is expected that management staff and employees will extend this sustainable habits to other activity fields (i.e. other trips).

As a result, the measure will provide benefits in the form of better air quality, less carbon emissions and reduced noise levels, leading to a better health and quality of life for Donostia-San Sebastian citizens.

C1.1.1 Selection of indicators

NO.	EVALUATION CATEGORY	EVALUATION SUB-CATEGORY	IMPACT	INDICATOR	DESCRIPTION	DATA /UNITS
	ENVIRONMENT					
8		**Pollution and Nuisance**	Emissions	CO2 emissions	CO2 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					
13		**Acceptance**	Awareness	Awareness level	Awareness of the policies/measures	Index (%), qualitative, collected, survey
14			Acceptance	Acceptance level	Attitude survey of current acceptance of the measure	Index (%), qualitative, collected, survey
	TRANSPORT					
21		**Transport System**	Traffic Levels	Traffic flow by vehicle type - peak	Average vehicles per hour by vehicle type - peak	Veh per hour, quantitative, measured
22			Traffic Levels	Traffic flow by vehicle type - off peak	Average vehicles per hour by vehicle type – off peak	Veh per hour, quantitative, measured
29			Modal split	Average modal split-trips	Percentage of trips for each mode	%, quantitative, derived
28			Vehicle Occupancy	Average occupancy	Mean no. persons per vehicle/day, per mode	Persons/vehicle, quantitative, derived, measurement

C1.1.2 Methods for evaluation of indicators

No.	INDICATOR	TARGET VALUE	Source of data and methods	Frequency of Data Collection
8, 10, 11	CO_2, NOx, PM emissions		Emissions have been estimated based on the mobility survey and traffic flow data. COPERT IV emission factors have been used for that purpose..	2 times during ARCHIMEDES
13	Awareness level	To raise awareness among business areas employees	Questionnaires among target companies to address awareness of the commuter travel plan. The target sample size was 25% of all employees at the 5 selected business areas (3.000 questionnaires aprox.).	2 times during ARCHIMEDES
14	Acceptance level	To raise awareness among business areas employees	Questionnaires among target companies to address acceptance of the commuter travel plan. The target sample size was 25% of all employees at the 5 selected business areas (3.000 questionnaires aprox.).	2 times during ARCHIMEDES
21	Traffic flow by vehicle type - peak		Traffic counts at selected stretches of the business areas	2 times during ARCHIMEDES
22	Traffic flow by vehicle type - off peak		Traffic counts at selected stretches of the business areas	2 times during ARCHIMEDES
28	Average occupancy		Specific counting of occupancy at the involved companies to see if car pooling is increasing	2 per involved company
29	Average modal split-trips	Maintain pedestrian mobility levels while increasing public transport and bicycle use, as well as reducing car use.	Data on modal split has been obtained through a specific survey at the involved companies.	2 per involved company

C1.1.3 Planning of before and after data collection

EVALUATION TASK	INDICATORS INVOLVED	COMPLETED BY (DATE)	RESPONSIBLE ORGANISATION AND PERSON
CO_2, NOx, PM emissions	8-10-11	Month 18/ Month 42	ADS, Leire Aguirre
Questionnaires among target companies.	13-14-29	Month 18/ Month 42	ADS, Leire Aguirre
Specific counting of occupancy at the involved companies to see if car pooling is increasing	28	Month 18 /Month 42	ADS, Leire Aguirre
Traffic counts at selected stretches or intersections in the corridor	21-22	Month 18/ Month 42	ADS, Leire Aguirre

C1.2 Establishing a baseline

Survey campaign

The survey process involved the distribution and collection of surveys on the characteristics, mobility habits and preferences of both companies and employees in each of the business areas under study, specifically in the areas of Igara, Zuatzu, Belartza and Poligono 27. The initial idea was to assess these issues in two scenarios: one corresponding to the situation before the implementation of the measure and other corresponding to the situation were mobility alternatives were already implemented. Given the delay in the implementation of the Action Plans due to the economic context, only the Before scenario has been assessed (although an additional survey was conducted after one year since the measure started. See below for details).

It should be noted that the Miramon business area did not participated in this survey process, since due to the proximity in time of the data obtained in their Mobility Plan published in 2008, it has been possible to exploit the results of that study.

Employees survey

Initially, a target sample size of 25% of the working population of each business area was set. One of the main problems that arose when planning the survey process was the lack of a reliable business census in the areas of Igara and Belartza, which allowed knowing the total working population.

Under these conditions, the sample size was estimated based on the analysis of secondary sources of information and pre-diagnosis work developed in each business area mentioned.

The table below details the key features of the survey campaign to employees, special mention of the surveys, the representativeness of the sample with respect to the estimated population size and the resulting reliability for a confidence level of 95%.

Business Area	Survey	Population	%	Error-reliability (CL-95%)
Zuatzu	505	2200	23%	3.8%
Igara	432	1800-2200	20-24%	4.2%
Belartza	211	800-1000	22-26%	5.9%
Subtotal	**1148**	**4800-5400**	**21-24%**	
Poligono 27	168	2500	7%	-

Table 2.- Employees survey characteristics

As it can be seen, the representativeness and reliability of the sample are in line with the target set at the beginning. In the particular case of Poligono 27, a much lower response rate was accounted, due to the discouragement with the lack of policies and institutional initiatives to improve the accessibility and working conditions in the area.

Companies survey

The survey also included the views of enterprises in each of the areas of economic activity. The following table shows the distribution of surveys collected by each business centre, and their representation in total employment.

Companies Survey			
Business Area	**Survey**	**Employment**	**Representation**
Zuatzu	21	475	21.6%
Igara	41	715	35.8%
Belartza	8	190	21.1%
Poligono 27	16	241	9.6%

Table 3.- Companies survey characteristics

To reach the targeted volume of surveys, it was needed to expand the distribution channels of the questionnaires. Telematics and postal mailing was used as complementary means to the on-street surveying.

In those industrial and business areas where there were already governing bodies (Zuatzu and Poligono27), questionnaires and presentation letters were electronically distributed through the entity representing the business area, while for the other areas (Belartza and Igara) postal mailing was used for its distribution. Over 800 copies of the project's questionnaires were distributed.

Additional survey

Since the After scenario could not be assessed due to the delay in the Action Plans development, and in order to assess potential attitudinal and behavioural changes in the target groups, it was decided to undertake a second survey campaign during the Action Plan presentation workshops in each business and industrial area.

Attendance to these workshops was lower than expected. Nearly 50 questionnaires were distributed, with an 80% response rate. This amount of responses did not allow for a comparison with the before scenario, therefore this survey was not used as a source for "After" indicators completion. It was only used as an additional information source.

Emissions calculation

Emissions have been calculated according to the values of COPERT IV in the table below, considering the age, type of fuel and engine technology (according to Euro standards for petrol and diesel cars). This emission factors are applied to the mobility behaviour identified during the fieldwork campaign (mainly mileage).

Cars	**CO2 (g/km)**	**Nox (g/km)**	**PM 2,5 (g/km)**	**Age of the vehicle**
Euro 0 gasoline	289,95	2,500	0,0240	1993
Euro I gasoline	202,21	0,434	0,0240	1996
Euro II gasoline	194,48	0,237	0,0240	2000
Euro III gasoline	181,24	0,096	0,0110	2005
Euro IV gasoline	170,22	0,061	0,0110	2009
Euro 0 diesel	192,03	0,723	0,2460	1993
Euro I diesel	203,87	0,691	0,0877	1996
Euro II diesel	190,72	0,726	0,0594	2000
Euro III diesel	174,52	0,780	0,0412	2005
Euro IV diesel	153,66	0,601	0,0342	2009
Light Duty Vehicles	**CO2 (g/km)**	**Nox (g/km)**	**PM 2,5 (g/km)**	**Age of the vehicle**

Euro 0 diesel	400,96	1,66	0,356	1993
Euro I diesel	400,96	1,22	0,117	1996
Euro II diesel	400,96	1,22	0,117	2000
Euro III diesel	400,96	1,03	0,0783	2005
Euro IV diesel	400,96	0,831	0,0409	2009
Heavy Duty Vehicles	**CO2 (g/km)**	**Nox (g/km)**	**PM 2,5 (g/km)**	**Age of the vehicle**
Euro 0 diesel	535,61	4,7	0,333	1993
Euro I diesel	456,7	3,37	0,129	1996
Euro II diesel	437,96	3,49	0,061	2000
Euro III diesel	460,6	2,63	0,0566	2005
Euro IV diesel	432,08	1,64	0,0106	2009

Table 3.- COPERT IV emission factors

This methodology requires knowing the year of enrolment of each car, in order to determine engine category (according to Euro standards). Given that the data come from the traffic counts conducted in each business area, there is no possibility of identifying the age of each vehicle. Therefore, the year 2005 has been used as a reference for all vehicles (highlighted in yellow rows), cars, light duty vehicles and Heavy duty vehicles. The average age of the sample of vehicles accounted during the traffic counting campaign in each business area has been used as a reference.

Also, it has been assumed an average route of 10km, and a proportion of 50% between petrol and diesel cars. Regarding duty vehicles, it has been considered a proportion of 75% Light Duty Vehicles and 25% of Heavy ones. These estimations are made according to the results of the survey and traffic counts campaign in the business areas.

C1.3 Method for Business as usual scenario

If this measure would not be implemented, mobility patterns associated to important trip generation centres (such as employment areas) would follow the same trend as experienced in previous years, characterised by an increasing car use and a reduction in walking and cycling.

Although, in the case of business areas, this increasing trend in car use would be counterbalanced by the decrease in economic activity resulting from the economic crisis across the continent. It can be assumed that overall mobility would be reduced in the same pattern as commercial and industrial activity did along these past years. Nevertheless, the use of private cars would remain prevalent in those areas.

For evaluation purposes, before the CIVITAS project there were not regular field data collection programmes and/or surveys in industrial and business areas. Therefore is not possible to estimate BaU indicators, due to the lack of historic reference data.

C2 Measure results

C2.1 Environment

Table C2.1.1: Pollution and Nuisance

Indicator (kg/day)	Before (2011)	BaU (date)	After (2012)[1]	Difference: After – Before	Difference: After – BaU
8. CO_2 emissions	52.753,84	N/A	48.944.33(60.672,8)	-3.809,51	N/A
10. NOx emissions	146,81	N/A	132,17 (162,94)	-14,64	N/A
11. Particulate emissions	8,43	N/A	7,79 (9,57)	-0.64	N/A

(1) Between brackets, total emission levels including Miramon industrial area

As it can be seen, a significant reduction in emission levels has been accounted. It is more likely that this reduction is achieved due to the overall sustainable mobility strategy in the city, together with the reduced economic activity in the industrial and business areas driven by the economic context, than due to the initiatives put in place within this measure, which have been very limited, mostly dealing with awareness raising.

In the following table, the detailed results in each business area are shown.

(kg/day)	Zuatzu		Igara		Poligono 27		Belartza		Miramón
	2011	**2012**	**2011**	**2012**	**2011**	**2012**	**2011**	**2012**	**2012**
CO_2	8963,5	9537,9	14848,8	14473,8	18792,11	17032,63	10149,43	7900	11728,47
NOx	22,2	23,7	36,9	36	58,2	51,09	29,51	21,38	30,77
PM	1,4	1,5	2,3	2,3	3,11	2,77	1,62	1,22	1,78

As mentioned before, Miramon business area has not participated in this first data gathering stage (Before scenario), so the only environmental data available is the data supplied from the previous study performed in 2008. In that study, no information on the effect of each of the pollutants was provided, and instead, a global data was provided, identified as "total emission of pollutants" with a figure of 6237,40 kg/day.

C2.2 Society

Within Commuter Travel Plans, two indicators were identified regarding the social context: Awareness and Acceptance.

Table C2.2.1: Acceptance

Indicator	Before (2011)	BaU (date)	After (2012)	Difference: After –Before	Difference: After – BaU
13. Awareness level	56,40%	N/A	N/A	N/A	N/A
14. Acceptance level	16,1%	N/A	N/A	N/A	N/A

The indicator of Acceptance in the Before scenario has been estimated as the ratio of distributed surveys and received questionnaires. These are the results in this regard for each business area.

Level of Acceptance 2011					
	ZUATZU	IGARA	P27	BELARTZA	TOTALS
Workers sample	2000	2000	2000	800	6800
Collected surveys	505	432	168	211	1316
Acceptance (%)	**25,3%**	**21,6%**	**8,4%**	**26,4%**	**19,4%**
Companies sample	115	150	350	50	665
Collected surveys	21	41	16	8	86
Acceptance (%)	**18,3%**	**27,3%**	**4,6%**	**16,0%**	**12,9%**
Impact on employment	475	715	241	190	1621

Table 4.- Acceptance level. Before scenario.

The value of acceptance indicator is calculated as the average of both employees and companies' acceptance level.

Awareness indicator is derived from survey responses, therefore its assessment is only possible over th16,1% who filled in the questionnaire For those who didn't responded, lack of awareness regarding the measures is assumed.

The results about awareness level for each business areas are as follows:

Level of Awareness 2011				
	ZUATZU	IGARA	P27	BELARTZA
Awareness level (of respondants)	**63,09%**	**50%**	**59,38%**	**53,13%**

Table 5.- Awareness level. Before scenario.

Complementing the Acceptance and Awareness indicator, several questions were included in the survey which reflects the willing of employees and companies to take part in the initiative. Following is the assessment of the Before scenario:

1.- How do you assess the implementation of measures to reduce individual use of private vehicles? Following table the percentage of positive responses for each business area.

ZUATZU	IGARA	P27	BELARTZA
61,90%	63,41%	87,50%	87,50%

Table 6.- Assessment of individual car use. Before scenario.

2.- Would your organization be willing to change work schedules of employees to ensure the use of public transport services? Affirmative responses percentage is shown in the table below.

ZUATZU	IGARA	P27	BELARTZA
61,90%	41,46%	50%	12,50%

Table 7.- Willingness to change work schedules. Before scenario.

3.- If new public transport solutions were proposed in the business area. Would the company boost its use? Affirmatives responses proportion is shown.

ZUATZU	IGARA	P27	BELARTZA
80,95%	60,97%	50%	87,50%

Table 8.- Willingness to promote public transport use. Before scenario.

4.- Would you be willing to cooperate in the financing of initiatives to be implemented?
Affirmatives responses proportion is shown.

ZUATZU	IGARA	P27	BELARTZA
47,61%	34,14%	50%	25%

Table 9.- Willingness to cooperate in the financing. Before scenario.

Finally, a second assessment was undertaken through a survey distributed to all the participants who took part in the action plan presentation workshops of each business area.

Regarding acceptance, participants were asked whether they believed that these studies serve as a step towards improving the mobility in your Business area. 97% of the surveyed people agreed on this assumption. Following is a detailed description of this assessment in each business and industrial area:

ZUATZU	IGARA	P27	BELARTZA
100%	100%	80%	91%

Table 10.- Acceptance of Commuter Travel Plans.

Also they were asked whether they would be interested in taking part in those activities that require the participation of / the business / industrial employees. 62% of all surveyed people were willing to collaborate in the initiative:

ZUATZU	IGARA	P27	BELARTZA
40%	70%	40%	75%

Table 11.- Willingness to cooperate in de development of Commuter Travel Plans.

C2.3 Transport

Table C2.3.1: Traffic Levels

Indicator	Before (2011)	BaU (date)	After (2012)	Difference: After –Before	Difference: After – BaU
21. Traffic flow by vehicle type - peak	900 veh./hour		906 veh/hour	6 veh/hour	
22. Traffic flow by vehicle type - off peak	375 veh./hour		260 veh/hour	-115 veh/hour	

The overall indicator is calculated as the average of all industrial areas. It reveals a significant different between peak and off-peak levels. Nevertheless it is recommended to look at the individual figures in each business area.

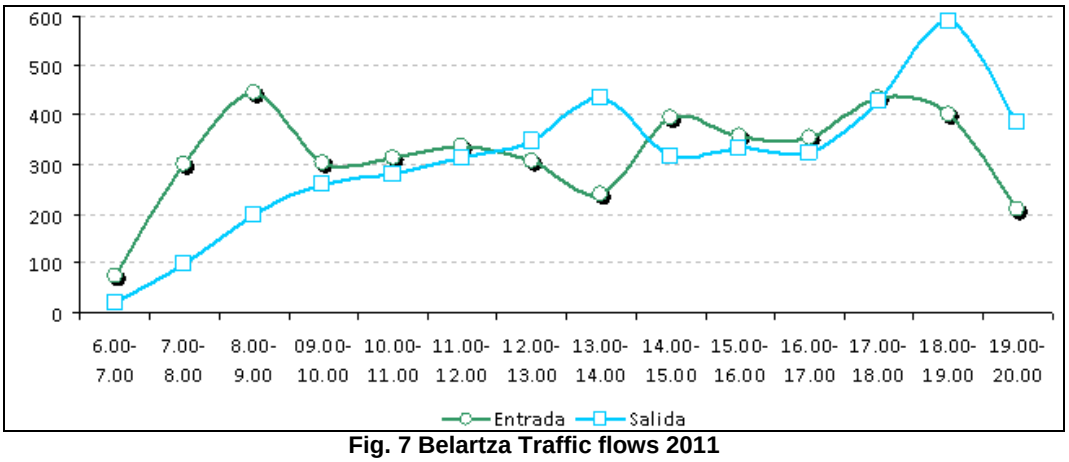

Fig. 7 Belartza Traffic flows 2011

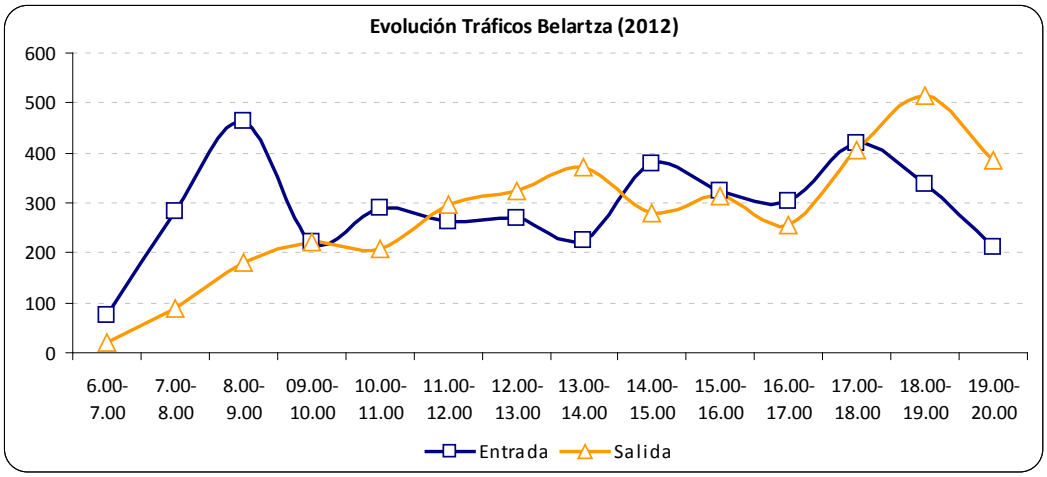

Fig. 8.- Belartza Traffic flows 2012

Compared to other business areas, Belartza do not show a big difference between peak and off-peak traffic. Actually the highest rate is produced in the afternoon, leaving the site (600 veh./hour).

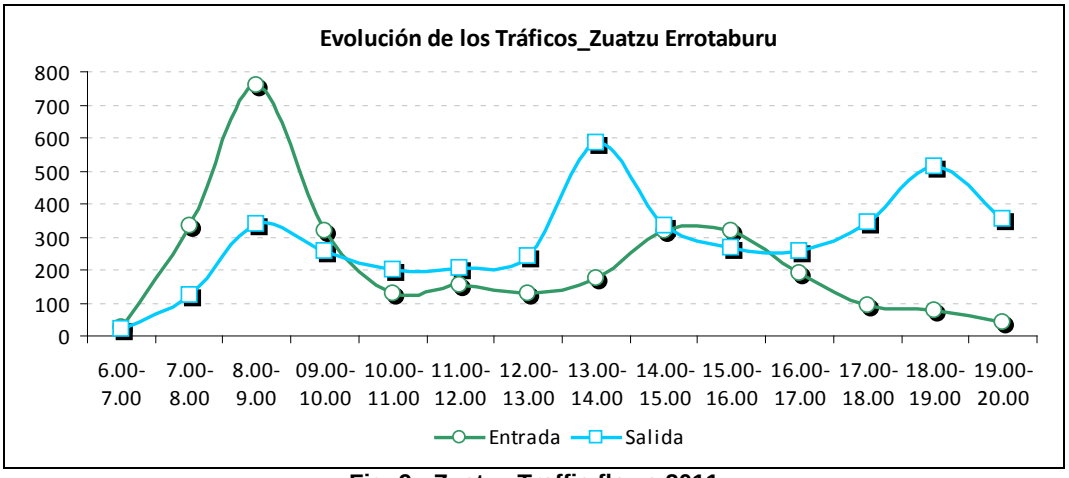

Fig. 9.- Zuatzu Traffic flows 2011

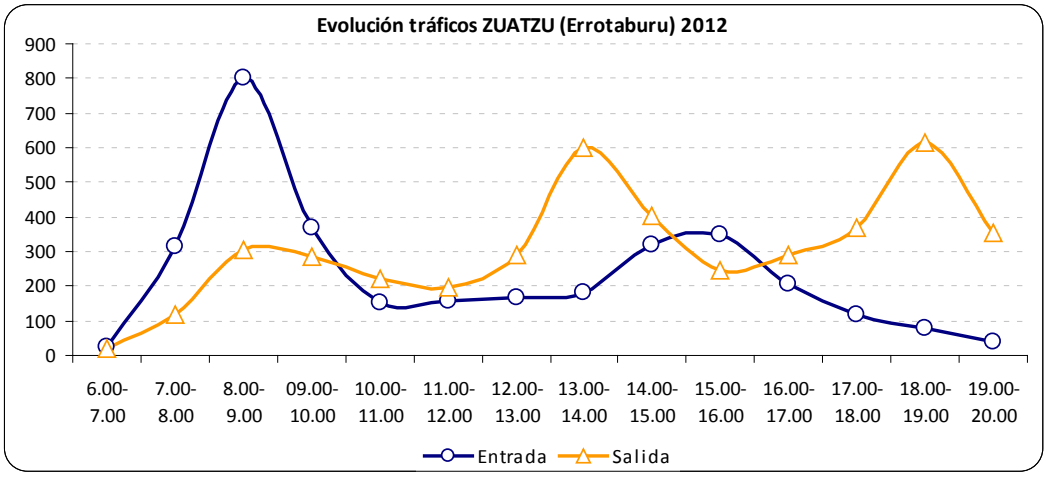

Fig. 10.- Zuatzu Traffic flows 2012

Zuatzu responds to the typical pattern of a high proportion of vehicles entering the place during the early hours (7.00 to 10.00), a slight increase during the lunch time, corresponding to those leaving the place to their homes, and a final increase to leave definitively the area in the afternoon.

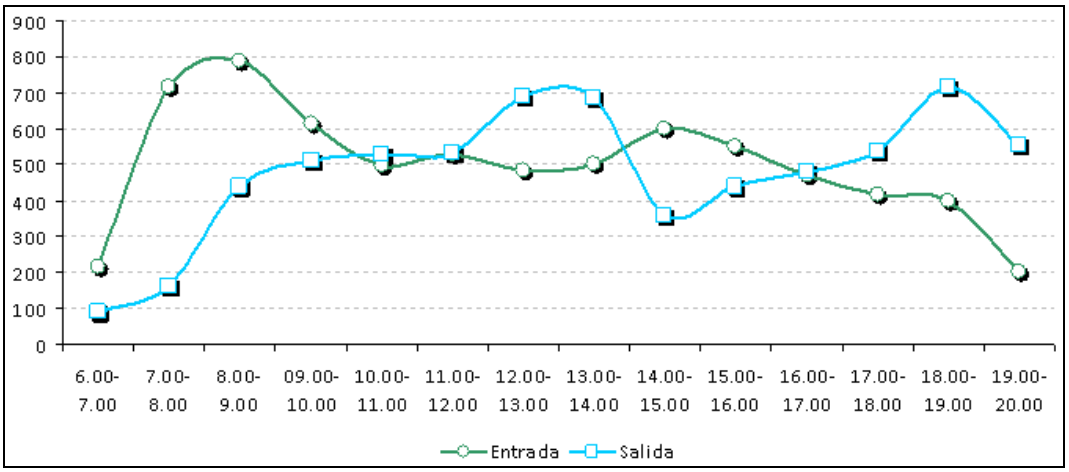

Fig. 11.- Poligono 27 Traffic flows 2011

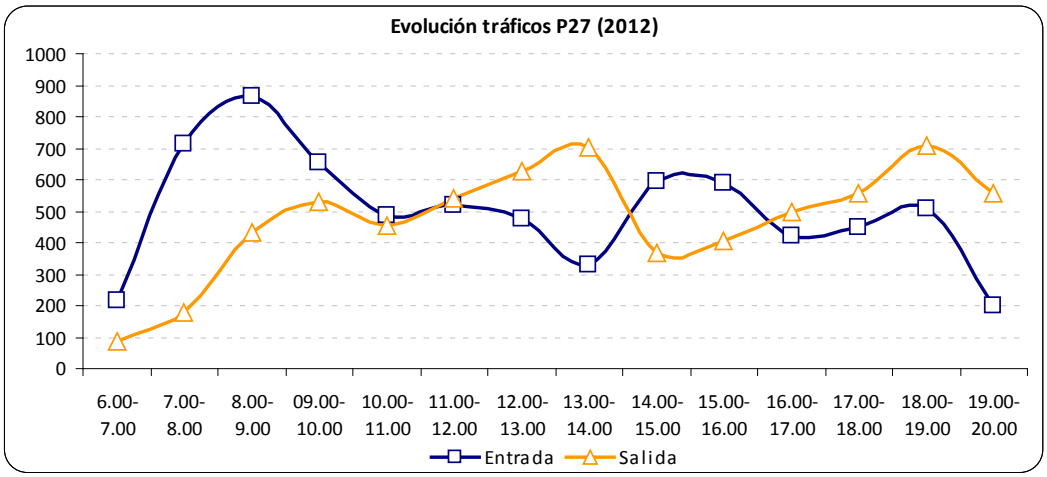

Fig. 12.- Poligono 27 Traffic flows 2012

The Poligono 27 shows a smaller variation in their traffic flows, but as expected it increases in the critical hours of the day. The particularity of this site is that their off-peak flows remain high (about 500 veh./hour)

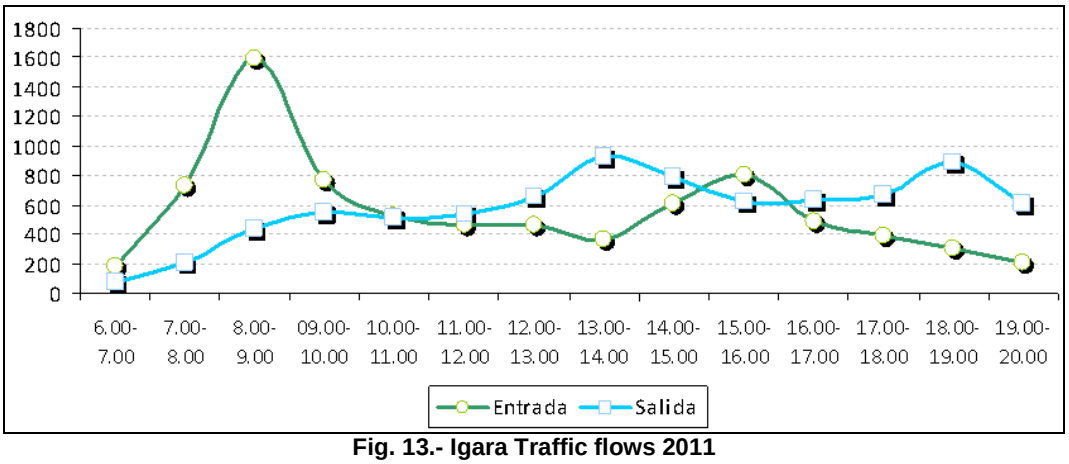

Fig. 13.- Igara Traffic flows 2011

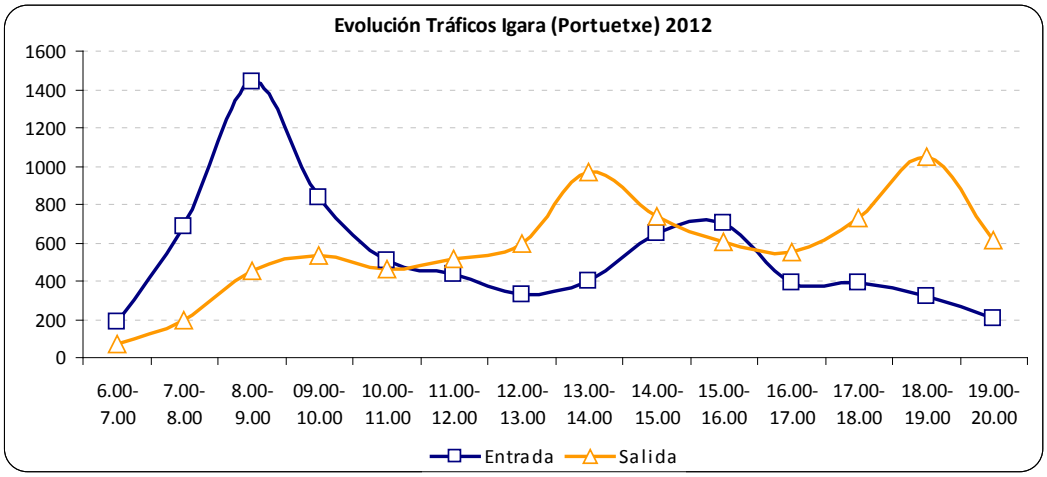

Fig. 14.- Igara Traffic flows 2012

The main feature of Igara traffic flow is its high rate of vehicles at the entrance of the area in the initial hours of the day (1600 veh./hour). Traffic flows during the rest of the day remain similar to other business areas.

In general, there were no significant changes in traffic intensity records (vehicles) as compared to the previous year. There is, however, a decline in business activities, including transport, in Poligono 27 and Belartza. Although it could be a temporary situation, this could be the result of reduced activity motivated by the financial crisis.

Table C2.3.1: Modal Split

Indicator	Before (2011)	BaU (date)	After (date)	Difference: After –Before	Difference: After – BaU
29. Average modal split- trips	Walking 1% Car 83,8% PT 11,2% Bicycle 0,8% Bike 7%				

The following charts show the modal split for each business area. As regards of public transport, it should be highlighted that bus modal share is an average between urban bus and inter-urban bus. In this regard, the use of the urban bus is significantly higher than the inter-urban, due to the fact that urban bus in all cases provides at least one-direct line to business areas.

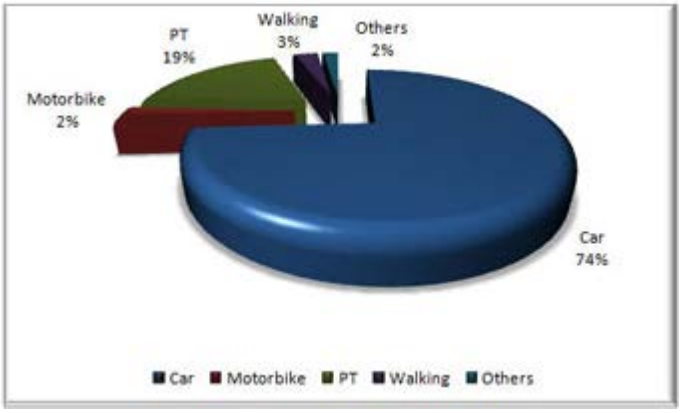

Fig. 15.- Igara business area modal split

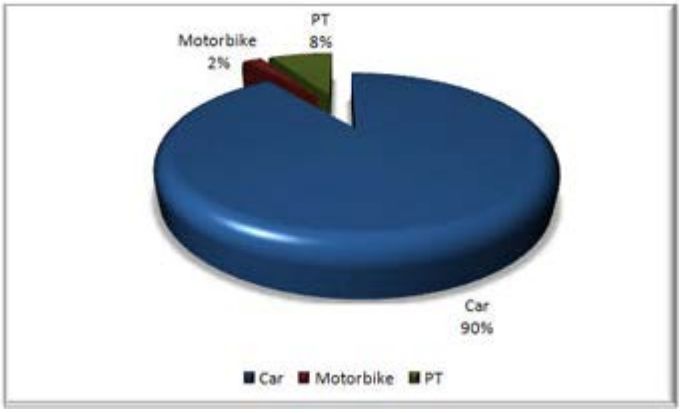

Fig. 16.- Belartza business area modal split

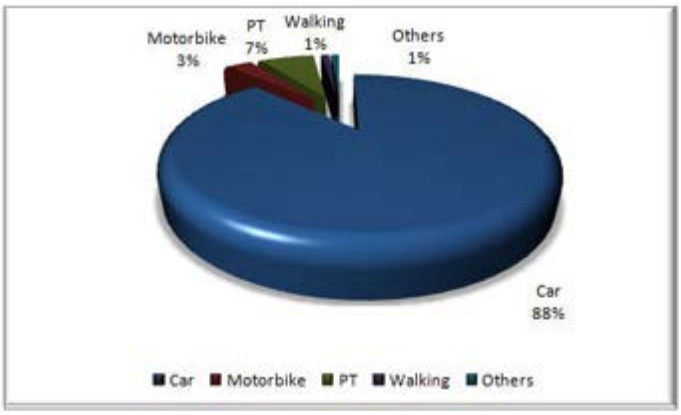

Fig. 17.- Zuatzu business area modal split

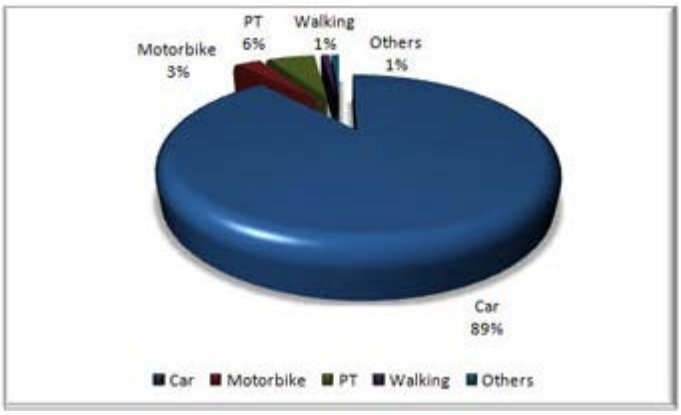

Fig. 18.- Poligono 27 business area modal split

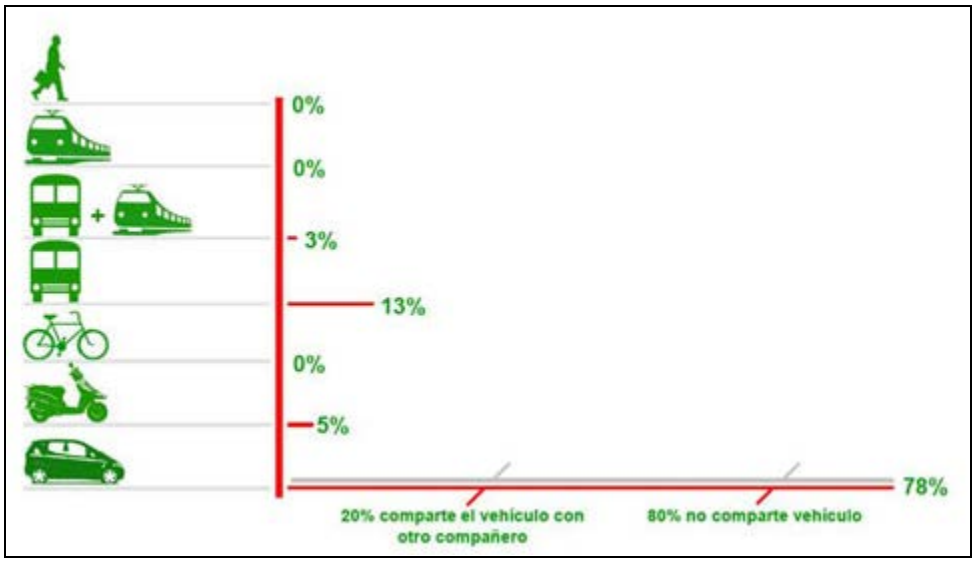

Fig. 19.- Miramon business area modal split (2008)

Table C2.3.3: Vehicle Occupancy

Indicator	Before (2011)	BaU (date)	After (2012)	Difference: After –Before	Difference: After – BaU
Average occupancy	1,15		1,2	0,05	

Vehicle occupancy rates in every business area, are very low. This explains the high parking demand existing in all the business and industrial areas considered. Because of that, some activities with the aim to boost car sharing or car pooling initiatives have been proposed in all business areas.

The occupancy rates for each business area are shown in the following table. Unfortunately there is not information about Miramon site.

OCCUPANCY RATE	ZUATZU	IGARA	P27	BELARTZA	MIRAMON
Year 2011	1,15	1,1	1,13	1,24	-
Year 2012	1,2	1,14	1,13	1,34	1,2

Table 12.- Car occupancy rates

The higher value of Belartza may be due to the existence of a shopping centre in the area, which usually attracts a greater number of people, frequently sharing the car ride.

C3 Achievement of quantifiable targets and objectives

No.	Target	Rating
	There are no quantifiable targets associated to this measure	

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

C4 Upscaling of results

Up-scaling this measure would mean that all employment areas (including business and commercial areas) in Donostia-San Sebastián would develop a Travel Plan. 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.

Further background research could have been helpful during the survey planning process in order to clearly determine the number of population served by the measure in each business and industrial area, as well as the number of companies involved, given the lack of a reliable census in the areas of Igara and Belartza. This information is relevant for the design of the survey campaigns.

C6 Summary of evaluation results

Since the measure implementation has been delayed there are no results to be highlighted.

C7 Future activities relating to the measure

Two of the five business areas, Belartza and Igara, do not have any representative organization and as their respective action plan proposes, this is an important asset when they need to contact external entities and/or organizations, also for mobility related issues.

In this regard, the next step will be to organize a workshop in each mentioned business area to raise awareness about the creation of a representative organization. During the presentation of each action plan a survey was delivered to all participants asking about the

creation of that organization, and taking into account their positive attitude towards its creation, a following workshop to treat directly its operational was proposed with a quite good response.

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:

- **Delayed Implementation:** It was planned that the implementation of the foreseen actions would started right after the presentation of the Action Plans in each industrial and business are. Unfortunately, while all of these Action Plans have been presented and discussed with stakeholders, the current financial crisis has delayed the implementation of most of the initiatives which require any kind of investment.

  Most of the activities carried out so far lies under the strategic line "Interaction, information and awareness", which do not require large resources and are essential to establish the grounds for the success of future developments.

  Consequently the second field data collection round, including a second survey to employees and companies, has been cancelled, since it was planned for the situation the situation where mobility alternatives were fully deployed and potential behavioural change may have took place.

D2 Barriers and drivers

D2.1 Barriers

The main barriers encountered for the development of the Commuter Travel Plans are:

<u>Preparation phase</u>

- **Cultural:** The extended car culture, with car as the prominent mode of transport among a majority of commuters acts as a barrier to the promotion of alternative modes of transport and the achievement of a modal shift towards sustainable modes of transport.
- **Political/Strategic:** The required collaboration between ADS and the business areas managers has not always been as smooth as desired.
- **Organizational:** Two of the five business areas, Belartza and Igara, do not have any representative organization. Therefore the desired level of communication has been more difficult to achieve.
- **Problem Related:** The lack of a census in some of the selected business and industrial areas made it more difficult to plan fieldwork and surveys during the diagnosis phase.

Implementation phase

- **Financial:** The limited availability of resources has conditioned the deployment of the mobility alternatives and incentives foreseen by this measure.

Operation phase

N/A

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 mobility behaviour in the city. As a consequence a high level of cooperation with the whole mobility department of the city council has been achieved, and measures have been developed complementing each other.
- **Cultural:** Concern about environmental issues is steadily growing among the citizens. CIVITAS developments, among others, are changing public attitude towards sustainable mobility.

Implementation phase

- **Financial:** The availability of CIVITAS funding has been a significant opportunity to develop this measure, although not enough for its full deployment.
- **Positional:** A good co-ordination with other measures concerning public transport improvements, road safety and non-motorized infrastructure has helped in the preparation of the Action Plans in each industrial and business area.

Operation phase

N/A

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:

Preparation phase

- **Organizational:** On-going dialogue with stakeholders (employers, employees, labour unions, etc.) has been developed in order to raise awareness on the benefits of the measure and establish solid grounds for the successful implementation of the measure.

Implementation phase

- **Involvement/Communication:** Strong emphasis has been placed on awareness rising campaigns in order to highlight the advantages of sustainable mobility habits and reduce car dependency. These kind of activities does not require important investments

- **Positional:** Although the lack of resources has postponed the implementation of the measure, the close cooperation with the public transport company of Donostia - San Sebastián has made it possible to implement pilot experiences such as the Miramon shuttle bus service, which is very important to provide visibility to the measure.

Operation phase

N/A

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 -** Responsible for the planning and implementation of Commuter Travel Plans. Leading role.

D.3.2 Stakeholders

The main stakeholders involved in the measure are:

- **CONSULTRANS** – Subcontractor for the development of the fieldwork and the development of the Commuter Travel Plan, including the corresponding Action Plans.
- **Business Areas Managers** – Support to the development of the measure, including financial support to the implementation of the measures. Promotion and awareness rising activities.
- **Labour unions** - Support to the development of the measure. Promotion and awareness rising activities.
- **Employees -** Support to the development of the measure. Participation in the working groups and attendance to seminars and workshops.
- **Public Transport Company -** Support to the development of the measure. Service improvements to attract more users to the bus.

D4 Recommendations

D.4.1 Recommendations: measure replication

- **Sound research phase:** The implementation of this measure requires a clear understanding of the reason for current mobility behaviour and its high level of car dependency. Make sure that the implementation process starts with a sound research phase, including fieldwork and surveys.

- **Key stakeholders as a supportive factor** – It is recommended to identify those agents who may be used to widespread the measure within the different bodies in the selected business and industrial areas, significant and reputed persons, agencies or organizations capable of leading the others towards the required direction.

- **Combination of push and pull measures –** Achieve a behavioural change when mobility is concerned is very difficult. Even if incentives are deployed, most often people are reluctant to change their habits unless they are obliged to do so or that the economical cost would force them using the same transport means as before. Therefore, in addition to promotion measures, this kind of restrictive measures should also be included in the action plans, especially at the beginning stages.

D.4.2 Recommendations: process

- **Political involvement** – Before further progress in the implementation of the measure is achieved, make sure the political involvement is gained during the planning phase and resources allocated for that purpose.

- **Employees' involvement.** It is very important that employees are involved in the strategies to change mobility behaviour. On-going communication and awareness raising activities are required.

- **Planning**: This measure is directed towards commuters, in some cases travelling from outside the municipality. Emphasize integrated planning of mobility alternatives with other territorial transport planning and management bodies (metropolitan, regional and national).