

M04.06 – Executive summary

The spread of the culture of sustainable mobility is fundamental to reduce the use of private cars and mobility management actions can play an important role in this direction. The already existing actions needed to be coordinated following a systematic approach, aiming at a coherent vision in promoting sustainable mobility.

The following main activities promoted by the Area Mobility Manager of the Municipality of Brescia have been implemented during the measure implementation:

- surveys among the main companies and schools located in Brescia concerning their travel behaviour during the home to work/school trips finalized to the elaboration of Home to Work Travel Plans (for companies) and to the proposal of specific mobility management actions (for schools);
- experimentation of the Car-pooling service;
- training activities addressed to the companies/schools Mobility Managers;
- promotion of the initiative “bike tag” and targeting of a booklet to inform citizens about the advantages of using bicycle, the available anti-theft systems and the solutions offered by the city of Brescia for the cycle mobility;
- organization of events during the "European Sustainable Mobility Week" in Brescia, such as the promotion of thematic conferences to share knowledge with citizens, the dissemination of the implemented activities in the city, the dissemination of the researches results about mobility improvement and the promotion of existing and new transport services.

The evaluation activities were layout selecting indicators able to assess the overall measure performance, focusing on the Car-pooling service experimentation, on the Home to Work Travel surveys and on the bike tag initiative. At the end of the evaluation activities it has been possible to make the following general considerations:

- the behavioural change in the citizens’ life style patterns is a complicated issue and the mobility management actions aren’t so able to significantly affect consolidated travel habits, especially in the short period;
- the Home to Work Travel survey to companies allowed to investigate the mobility habits of the involved companies: the positive results in terms of switch toward more “sustainable” means of transport cannot be associated only to the actions performed by the measure: the general period of economic crisis experienced in Italy favoured the collective transport solutions and cheaper fuel vehicle powering. On the contrary, the availability of mobility management actions (such as the economic incentives for the purchase of clean vehicles or the promotion of collective transport services) are particularly important in times of economic crisis, when people is more predisposed to change their mobility habits to more sustainable behaviours;
- the experimentation of the car-pooling service was made according to the measure objectives, but probably recurring to the wrong technological solution. This can be considered the main reason of its substantial failure. At the same time, a quite consolidated attitude toward more

spontaneous way of car-pooling was observed in Brescia, therefore, other solutions for the car-pooling initiative promotion should be found.

- At the end of Civitas the number of tagged bike didn't reach the expected objective, notwithstanding a slight increasing trend during the project. This can be due to several reasons: the scarce effectiveness of the system itself or of the promotional activities. Anyway, the initiative will be re-proposed in the future, trying to find out the best way to promote it.

CO₂ emissions have been calculated by using the results of the Home to Work Travel surveys. The indicator cannot be representative of the whole city since it monitored the emissions produced by the vehicles used during the H/W trips of the interviewed employees.

The increasing trend observed between the 2010 survey and the 2012 one (+ 895.8 kgCO₂) has just been due to the higher number of filled in questionnaires, even if the same number of companies was involved: as the indicator was calculated basing on parametric estimation of the CO₂ emission, a higher number of filled in questionnaires corresponded to a higher amount of kms declared by the interviewees, then to higher emissions levels.

According to the answers provided by the interviewees, the number of people driving alone increased (the average occupancy went from 1.27 in 2010 to 1.23 in 2012), but, at the same time, the people who shared their car (making a spontaneous car-pooling) carried a higher number of people during the home to work trips (the average occupancy in car-pooling went from 2.15 in 2010 to 2.28 in 2012).

Concerning the "modal split" characterizing the home-to-work trips, the number of people using local PT and non-motorized means of transport (train, urban and extra-urban busses, bicycle, pedestrian mode) significantly increased from 8.49% of people using these means of transport in 2010 to 14.66% in 2012, notwithstanding the slight increase registered by the use of cars. The use of powered two wheels decreased from 2.60% in 2010 to 2.24% in 2012. Additionally, an increasing number of methane gas powered vehicles has been encountered. Anyway, the positive results in terms of switch toward more "sustainable" means of transport cannot be associated only to the Mobility Management actions performed by the measure. The general period of economic crisis experienced in Italy favoured the collective transport solutions and cheaper fuel vehicle powering.

The testing car-pooling service at the Tridentina School has been analysed also by performing a Cost-Benefit Analysis. The results showed that the initial investment cost for the Car-pooling experimentation (19.950 €) can be re-paid in 15 years, thanks to the benefits associated to the emission and fuel saving, only if the total mileage covered by the car-pooling service will be 134'572 km.

This means that the car-pooling experience in Brescia, which was characterized by an exiguous number of km covered in 2011 during the experimentation (1'647 km), should increase the mileage covered in the next 15 years by 21.5% per year, in order to register 25'169 km in 2025 and to reach the cumulative value of 134'572 km (15 years).

A. Introduction

A1 Objectives

The measure objectives were:

(V) High level / longer term:

- To decrease CO₂ emissions according to Kyoto dispositions for Italy.

(W) Strategic level:

- To prevent and to reduce the atmospheric emissions for health and environment protection according to the Regional Law¹² about sustainable mobility in urban areas.

(X) Measure level:

(1) To influence the travel behaviours through promoting specific mobility management actions (addressed to the main companies or schools located in Brescia), namely:

- To involve about 50% of the main companies located in Brescia (with more than 150 employees (corresponding to about 15 companies), including more companies than the ones who fitted with D.L.27 march 1998 on “Sustainable mobility”¹³
- To elaborate Home to Work/School Travel Plans for each site;
- Car-pooling service experimentation avoiding about 150.000 km/year with 10 crews;
- To spread the culture of sustainable mobility increasing public transport use for the home to work trip (+1%);

(2) To increase the number of tagged bicycles in Brescia, reaching 6.000 tagged bikes;

(3) To involve about 20.000 people

A2 Description

The spread of the culture of sustainable mobility is fundamental to reduce the use of private cars and the mobility management actions can play an important role in this direction. The activity of a Mobility Manager aims at spreading the culture of sustainable mobility and at promoting the use of alternative means of transport, proposing those actions, initiatives and plans which are able to go in that direction.

This measure consisted of some of the activities promoted by the Mobility Manager nominated by the Municipality of Brescia. Namely, the following activities were implemented:

- surveys among the main companies and schools located in Brescia concerning their travel behaviour during the home to work/school trips;

¹² Lombardia Region Law 24/2006.

¹³ Decree Law 27 March 1998 which instituted the Mobility Manager profile for the Companies/Public Bodies with more than 300 employees.

- elaboration of Home to Work Travel Plans as follows.
A unique plan at aggregate level as demo activity was initially elaborated and then single Local Plans;
- promotion of the experimental Car-pooling service through the installation of a data logger on board able to automatically compose the crews and calculate the fares and actual experimentation of the system involving one school;
- training activities addressed to the companies/school Mobility Managers;
- in order to stimulate the use of bike among citizens, the initiative “bike tag” was promoted. At dissemination level a dedicated booklet was targeted to inform citizens about the advantages of using bicycle, the available anti-theft systems and the solutions offered by the city of Brescia for the cycle mobility (including the bike sharing service);
- in order to sensitize people in relation to the mobility management actions carried out by the Municipality of Brescia in collaboration with companies, events during the "European Sustainable Mobility Week" in Brescia were organized. For example the promotion of thematic conferences to share knowledge with citizens, the dissemination of the implemented activities in the city, the dissemination of the researches results about mobility improvement and the promotion of existing and new transport services (LPT, Bike sharing, Car sharing, etc.).

B. Measure implementation

B1 Innovative aspects

- New mode of transport exploited
- Targeting specific user groups
- New economic instrument

The innovative aspects of the measure are:

- **Innovative aspect 1 (New methodological approach)** – As regards the Travel Plans elaboration, respect to the traditional methodology suggested by the National guidance, an innovative approach was followed in Brescia. The Municipality of Brescia started from a wide survey which involved as much as possible the most significant companies located in the city (characterized by more than 150 employees). Basing on the results of the survey, the most interested companies were fully involved in the Home to Work Plan elaboration process. The Municipality of Brescia decided to elaborate an aggregate Home to Work Travel Plan starting from a demo activity deeply developed on a small sample of companies (6 out of the 12 fully involved in the process). This demo activity was useful to analyse the main mobility patterns of the employees and to formulate a standard set of proposals to be included into the single Travel Plans.
- **Innovative aspect 2 (Targeting specific user groups)** – The surveys about the Home to School/Work travel behaviour, had never been done before in Brescia. They were addressed to the main schools or companies located in Brescia. An important aspect to highlight was the special attention given in 2010 to the translation in Chinese, Urdu, Punjabi, Arabian, Bengalese of the Home-School questionnaires into foreign languages, in order to reach a wider number of families (as Schools in Brescia registered a high number of students of immigrates families).
- **Innovative aspect 3 (Incentives)** – The Mobility Management actions promoted by the Municipality of Brescia scheduled incentives in order to increase the likelihood of succes of the surveys, such as the organization of a lottery with interesting prizes for those employees who filled in the questionnaires, special fares for car assurances and possibility to park in reserved parking lots for the car-pooling subscribers (in some cases and for limted period of time also economic incentives for ecological mopeds/CNG cars purchase were provided).
- **Innovative aspect 4 (New mode of transport exploited)** – The experimentation of the car-pooling service was considered an innovative transport solution, as in Brescia this kind of service didn't exist before the Civitas project, except for the organization of crews based on spontaneous initiative. The experimentation proposal was made to the Mobility Managers of the main schools/companies of the City, informing them about the potential suitability (both from an economic and an environmental point of view) of the car-pooling respect to the individual means of transport. The proposed Car-pooling system foresaw the installation on board of a special identification device, able to register all the information about the created crew and to calculate automatically the costs to be shared among the travellers through the use of a specific SW.

B2 Research and Technology Development

The most significant aspects relating to the RTD applied in Brescia regard the companies involvement process and the way to organize the surveys made by the Municipality of Brescia for understanding the travel behaviours of the main schools/companies located in the city, in order to layout specific actions, such as the Home to Work Travel Plans.

Here the main RTD activity linked to the home to Home to Work Plans elaboration process is reported.

- survey which involved as much as possible the most significant companies located in the city. About 2600 employees were surveyed from companies with more than 150 employees (corresponding to about 25 companies);
- involvement of the most interested companies (about 12) in the Home to Work Plan elaboration process;
- draft scheme of the Home to Work Travel Plan shared with the 12 companies involved in the process;
- demo activity deeply developed on 6 out of the 12 companies fully involved in the process;
- final elaboration of an aggregate Home to Work Travel Plan based on a standard set of proposals to be included into the single Travel Plans.

Here the main RTD activity linked to the home to schools survey conduction is reported.

As regard the surveys focused on Schools, preliminary meeting were arranged with the Headmasters to introduce the project and the objectives of the survey. The necessity of translating the questionnaires also into foreign languages emerged (Chinese, Urdu, Punjabi, Arabian, Benaglese) in order to involve in the survey also the foreign families.

B3 Situation before CIVITAS

Since 2002 the Municipality of Brescia has been promoting some mobility management actions in Brescia, according to an Italian national law, which schedules the nomination of a Mobility Manager and the elaboration of “Travel Plans” for the most important Companies/Public Bodies (the Decree 27 March 1998 scheduled the nomination of a Mobility Manager for all those companies with more than 300 employees).

Before CIVITAS, the Travel Plans had never been realized and the undertaken activities were sporadic and limited to single company initiatives.

The already existing actions needed to be coordinated following a systematic approach, aiming at a coherent vision in promoting sustainable mobility.

There was also the necessity to coordinate, train and support the Mobility Managers nominated by the involved companies/public bodies, as often they aren't technicians or professionals specialised in mobility issues.

The mobility manager of Brescia is also the “Area Mobility Manager” (i.e. the person) in charge of coordinating the activities carried out by the single companies through their Mobility Managers

B4 Actual implementation of the measure

The measure was implemented in the following stages:

- **Stage 1: Survey campaigns, involvement of the stakeholders and elaboration of the Home to Work/School Travel Plans** (from October 2008 to August 2010) – The survey campaigns were made in April-May 2010 and involved the main companies and school complexes located in Brescia. The surveys aimed at understanding travel behaviours for the layout of specific Home to School/Work plans. The main objective of these Plans, according to the Italian law, is to find out mobility solutions for the improvement of the travel quality, promoting the use of means of transport alternative to the private car, such as LPT, car-pooling, bicycle and bike-sharing, etc.. The elaboration of Travel Plans usually foresees the following steps:

- a survey phase,
- a description of the actual present situation
- the identification of the activities,
- the elaboration of the Plans.

Two different surveys were promoted by Brescia Municipality, one specifically addressed companies (including universities) the other specifically addressed to primary and secondary schools.

In order to increase the likelihood of success of the surveys also some incentives were also promoted, such as the organization of a lottery with interesting prizes for those employees who filled in the questionnaires, special fares for car assurances and possibility to park in reserved parking lots for the car-pooling subscribers, economic incentives for ecological mopeds/CNG cars purchase, etc.

1) ACTIVITIES RELATING TO HOME TO WORK TRAVEL PLAN

Home to Work survey

In 2010 survey - addressed to the companies with more than 150 employees - about 2600 questionnaire were filled in by the employees (corresponding to about 25 companies).

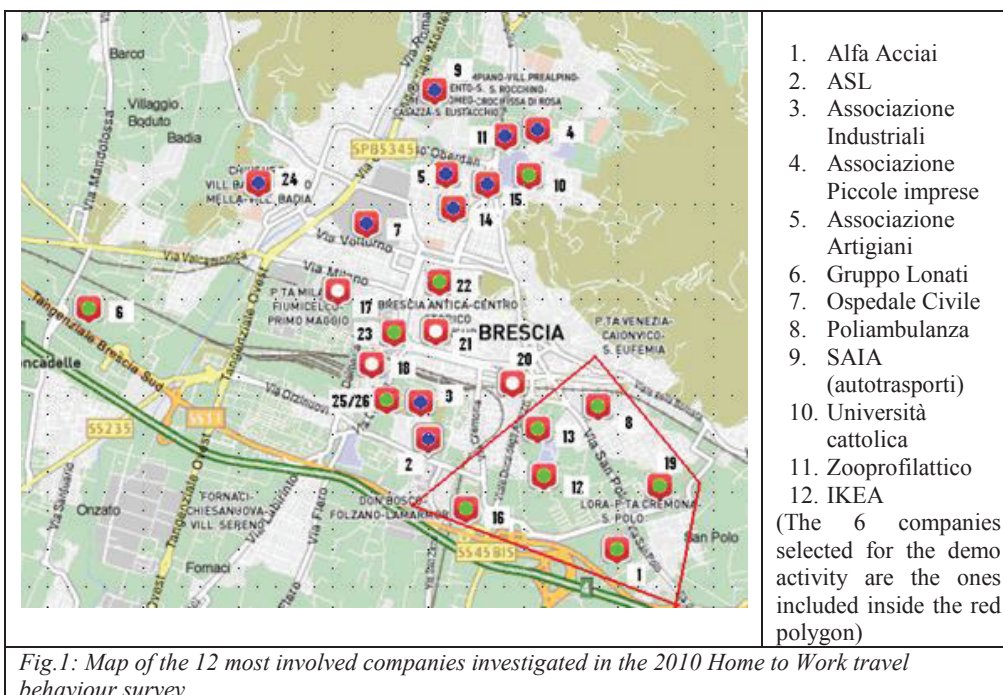
The collected database provided useful information about the mobility patterns of a representative set of companies located in the city of Brescia such as:

- the modal split,
- the kind of vehicles used in systematic trips,
- the reasons of the used vehicle,
- travel timings, etc.

In the questionnaire specific questions were also inserted to investigate the attitude of involved people to change their behaviour towards other means of transport, alternative to the individual ones.

Involvement of the stakeholders

12 out of the 25 companies were considered “fully involved” (see the Fig. 1 “Map of the 12 most involved companies investigated in the 2010 Home to Work travel behaviour survey”), as they contributed with more enthusiasm to the survey initiative, compiling the most part of the questionnaires. Therefore, in the Home to Work Travel Plans elaboration process the Municipality of Brescia decided to focus the attention on the results coming from this particular set of companies and to share with them a draft aggregate Home to Work Travel Plan.



As initial demo activity, the draft Plan foresaw to further focus the attention on 6 particular companies (see Fig. 1) aiming to point out the standard mobility actions to be then included in each single Home to Work Plans.

Elaboration of the Home to Work Travel Plan

The final aggregate Home to Work Travel Plan included the following standard proposals:

- ✓ to favour the LPT use introducing special ticket fare thanks to apposite agreements made with the LPT company;
- ✓ to favour cycle mobility for the H/W trips improving the parking availability, agreeing special fares for the bikes reparation/purchase, etc.;
- ✓ to favour higher vehicle occupancy suggesting the car sharing among the employees and proposing the experimentation of a Car-pooling system based on the data logger installation and on the automatic calculation of the crews and fares;
- ✓ to make communication campaigns to inform employees about the Mobility Management actions.

Elaboration of the single Home to Work Travel Plans

As final activity a total number of 15 single Home to Work Travel Plans were then elaborated, including the proposals to be implemented thanks to the collaboration of the Mobility Managers nominated by each site:

- Alfa Acciai
- ASL
- Associazione Industriali
- Associazione Piccole Imprese
- Associazione Artigiani
- Gruppo Lonati
- IKEA
- Ori Martin
- Ospedale Civile
- Palazzoli
- Poliambulanza
- Santoni
- SAIA (autotrasporti)

- Università Cattolica
- Zooprofilattico.

2) ACTIVITIES RELATING TO HOME TO SCHOOL

Home to school survey

As regard the surveys focused on the Schools, preliminary meeting were arranged with the Headmasters to introduce the objectives of the survey. The necessity of translating the questionnaires also into foreign languages emerged (Chinese, Urdu, Punjabi, Arabian, Bengalese) in order to involve also the foreign families in the survey.

During the survey campaign a total number of 20 schools joined the initiative (17 out of the 43 primary schools and 3 out of the 23 secondary schools, see Fig. 2 “Map of the 20 schools involved in the 2010 Home to School travel behaviour survey”) and 2.376 questionnaires were filled in, which allowed to collect information about the mobility needs of the students attending the involved schools and their families.

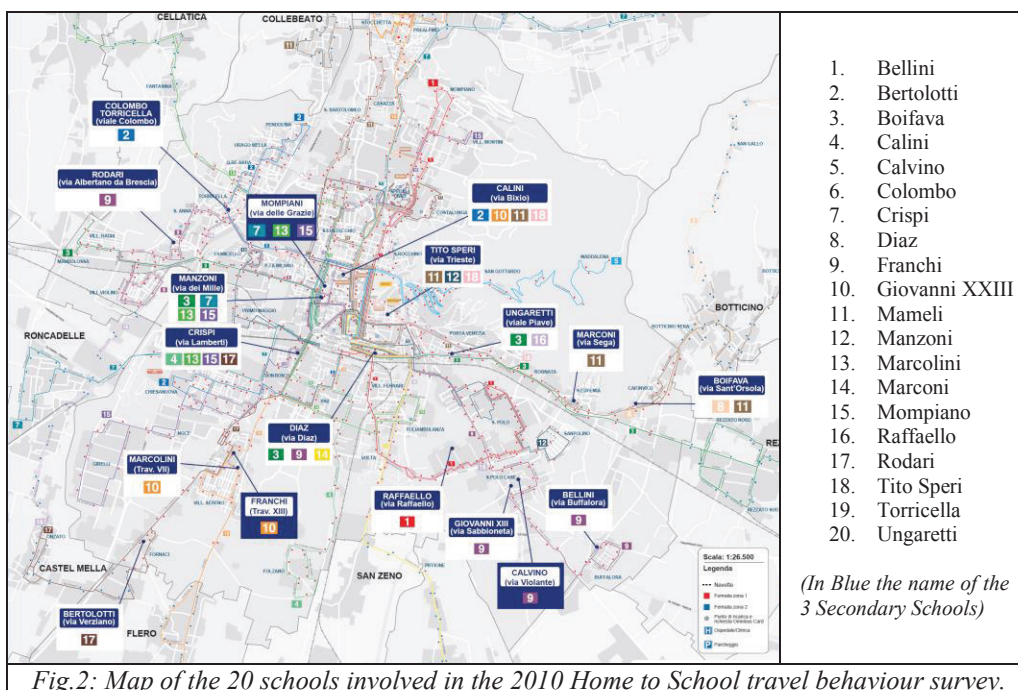


Fig.2: Map of the 20 schools involved in the 2010 Home to School travel behaviour survey.

Selected actions for schools

The output of the surveys to schools made evidence of the difficulties in implementing coordinated actions for all the involved schools, as they have differences in locations and students typology. Therefore it was decided to carry out several experimental and demo activities in the schools such as:

- car pooling;
- pedibus,
- bikebus
- on demand school bus

Car-pooling experimentation is described in “Stage n.3: Experimentation of Car-pooling and Bike Tag”.

- **Stage 1a: Second Home to Work survey (from April 2012 to October 2012)** – This stage was an additional activity (out of the DOW scheduled ones) and consisted in a second survey

campaign (which lasted from April to May 2012) addressed to companies. Respect to the survey to companies described in the “Stage 1: Survey campaigns for elaboration of the Home to Work/School Travel Plans”, the same questionnaire was administered and the same amount of companies were surveyed, in order to monitor any change in the travel behaviour of the interviewees and to update the Home to Work Travel Plans (either the aggregate one dedicated to 6 companies and the 15 single Plans).

- **Stage 2: Training of the Mobility Managers** (from October 2009 to May 2012) – *This stage consisted of different training activities addressed to the Mobility Managers nominated by the companies or schools involved in the survey described in the previous stage 1. These activities scheduled not only several educational seminars, but also some meetings organized in order to discuss the initiatives to be undertaken in the elaboration of the Travel Plans. The training phase was fundamental: as a matter of fact, often Mobility Managers aren’t qualified technicians, but they are chosen among the employees. Therefore, the training activities made them able to act consciously on the elaborated surveys data and to propose potentially effective alternatives for mobility.*

The training course was structured in 3 modules for a total of 40 hours.

- In particular, during the first module (12 hours – October 2011) Mobility Managers were introduced to the sustainable mobility topic, to the study of people’s transport habits and to the implemented survey methodology to define the “Home to Work/School Travel Plan”.

- In the second module (12 hours – February 2012) many topics were presented, such as the techniques for the data elaboration collected through the survey, the individuation of critical situations in the home/work/school journey and the communications channels to be used to better motivate people to care about sustainability in their journeys.

- In the last module (16 hours – April/May 2012) the experiences and suggestions about the design of the plans of journeys “home-work” for workers and “home-school” for students and teachers were presented.

This course involved a total number of 15 mobility managers, coming either from companies and schools.

Stage 3: Experimentation of Car-pooling and Bike Tag initiative (from October 2009 to October 2012)

Car-pooling experimentation

A promotional campaign (see fig. 3A) for the experimentation of the car-pooling service addressed to several companies and schools.

The car-pooling service was also promoted among the employees working at the Municipality of Brescia without any success. They received an internal staff communication informing them about the new service, foreseeing also incentives (identification of dedicated stop stalls, special fares for public transport tickets, facilities for bike sharing city service and score cards delivery, etc.),

Only one school (The Tridentina School) joined the initiative and it was considered as a starting point of a wider project (i.e. a demo activity) that aimed to make people more aware of the environment by reducing the individual traffic and to increase of the car occupancy in the daily systematic trips.

The external Local Private Company “AZ Mobility” was charged to manage this experimentation, which provided a car-pooling service based on:

- free trial of the data logger,*
- installation of the devices on board (see fig. 3B)*
- the automatic composition of the crews),*

- the automatic calculation of the fares for each crew.

At the end of the experimental phase, in June 12th a press-conference was organized. People who joined the experimentation were invited and awarded by the Alderman. The main prizes consisted in discounts for the car insurance, coupons for family travels and tickets to watch a football match at the Brescia stadium.



Fig.3A: Car-pooling promotional posters



Fig.3B: Data logger device to be installed on board provided by the company AZ Mobility for the CAR-POOLING experimentation in Brescia

Bike-Tag initiative

The “bike tag” initiative consisted in proposing a system for re-finding lost or theft bicycles. In case of theft, Police can use this national register to find out information about the vehicle and the owner, increasing the likelihood of finding the vehicle.

The the bike tag action was organised as following:

- “bike tag kit” (serial number for bikes - see fig. 4) was distributed trough bike shopkeepers, and during targeted events;
- the serial number should be posted on the bicycle frame;

- the bike owner should register this serial in the national database (accessing the website www.easytag.it), including also other relevant information for the vehicle identification.



Fig.4: The bike tag kit for cyclists

The Municipality of Brescia tried to increase the number of tagged bikes, purchasing 2500 tagging distributed to bike shopkeepers and during the main events organized in Brescia, such as the “European Sustainable Mobility Week” or the “Bike national day”, organized every year in May. Bike tag was also promoted through a targeting a booklet to inform citizens about the advantages of using bicycle, the anti-theft systems and the solutions offered by the city of Brescia for the cycle mobility.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **Measure 1 no. M.04.01** – “Mobility marketing”
- **Measure 2 no. M.04.03** – “Communication and educational campaigns”

The inter-relationships with these measures were given by the common objective to integrate the efforts to promote alternative solutions for the urban sustainable mobility.

Specific main indicators were set in order to specifically measure the impact of action carried out within this measure.

C. Evaluation – methodology and results

From the evaluation point of view, the main objective of the measure consisted in promoting Mobility Actions in Brescia, focusing on the Car-pooling service experimentation, on the Home to Work Travel surveys and on the bike tag initiative.

C1 Measurement methodology

The indicators were divided into two macro-categories: main indicators and complementary indicators. Main indicators were able to evaluate the measure efficiency in terms of objectives achievement. Complementary indicators were introduced in order to assess specific issues: namely, the travel behaviour of a representative sample of employees. These latter indicators were relevant only at local level and were used to give additional information in order to better understand the measure performance.

C1.1 Impacts and Indicators

Table C1.1: Indicators.

No.	Impact	Indicator	Data used	Comments
1.	Operating Revenues	Average operating revenues in car-pooling	Data provided by the service operator. As this measure was also object of CBA, it was possible to extract other useful information concerning the economic assessment of the initiative directly from the CBA itself	Main Indicator No ex ante data collection foreseen. First data collection after the o.p.: January 2012
2.	Operating Costs	Average operating costs in car-pooling	Data provided by the service operator. As this measure was also object of CBA, it was possible to extract other useful information concerning the economic assessment of the initiative directly from the CBA itself	Main Indicator No ex ante data collection foreseen. First data collection after the o.p.: January 2012
3.	Economy	N of "car-pooling" users / CBS investment	number of organized trip-crew and the total number of involved people divided by the cost incurred by the municipality for the car-pooling experimentation. As this measure was also object of CBA, it was possible to extract other useful information concerning the economic assessment of the initiative directly from the CBA itself	Main Indicator No ex ante data collection foreseen. First data collection after the o.p.: January 2012
4.	Fuel Consumption	Vehicle Fuel Efficiency	Estimated energy consumption per unit of transport activity	Complementary indicator First data collection after the o.p.: June 2012
5.	Emissions	CO ₂ emissions	This indicator can be calculated using data coming from PSCS/L survey and looking to REMOVE methodology	Complementary indicator First data collection after the o.p.: June 2012
6.	Vehicle Occupancy	Average vehicles occupancy in car-pooling	Data come from the PSCS/L survey. Persons who use car-pooling per vehicle	Complementary indicator First data collection after the o.p.: June 2012
7.	Vehicle Occupancy	Average Occupancy	average vehicle occupancy of the vehicles usually used by the employees (not necessarily those who use car-pooling service).	Complementary indicator First data collection after the o.p.: June 2012
8.	Modal split	Average modal split- trips	Kind of vehicles used for the Home-Work and Home-School travels	Complementary Indicator First data collection after the o.p.: June 2012

9.	Transport	Type of property cars used in HW trip /100 employees	“Type of property cars” refers to the kind of fuel used by the employees’ cars.	Complementary indicator First data collection after the o.p.: June 2012
10.	Transport	Type mopeds and motorcycles used in HW trip /100 employees	It’s considered the percentage of motorcycles/mopeds in H/W trips.	Complementary indicator First data collection after the o.p.: June 2012
11.	Transport	Type of property cars used in HW trip /100 employees in the peak hours	“Type of property cars” refers to the kind of fuel used by the employees’ cars.	Complementary indicator First data collection after the o.p.: June 2012
12.	Transport	N of car-pooling users /100 Car-pooling potential users	Number of the car-pooling users*100/total number of potential users Experimentation, promoted by Brescia Municipality in schools.	Main Indicator First data collection after the o.p.: June 2012
13.	Awareness	Awareness Level	Data from a specific questionnaire	Main Indicator First data collection after the o.p.: June 2012
14.	Acceptance	Acceptance Level	Data from a specific questionnaire	Main Indicator First data collection after the o.p.: April 2011
15.	Society	% of tagged bicycles per year during CIVITAS	Data come from the italian bicycle register	Main Indicator First data collection after the o.p.: April 2011

- **Indicator 1 (AVERAGE OPERATING REVENUES IN CAR-POOLING)** – This indicator concerns the car-pooling experimentation, managed by the Private Local Company “AZ Mobility”. The indicator is referred to the company revenues for the experimentation of the car-pooling service.
- **Indicator 2 (AVERAGE OPERATING COSTS IN CAR-POOLING)** – This indicator concerns the car-pooling experimentation, managed by the Private Local Company “AZ Mobility”. The indicator is referred to costs incurred by AZ Mobility for the experimentation of the CAR-POOLING service in Brescia.
- **Indicator 3 (N OF “CAR-POOLING” USERS / CBS INVESTMENT)** – This indicator concerned car-pooling experimentation, performed at the Tridentina school. It was collected as a confrontation between the number of organized trip-crews during the experimental phase (namely the total number of involved people) divided by the cost incurred by the Municipality for the car-pooling project.
- **Indicator 4 (VEHICLE FUEL EFFICIENCY)** – This indicator was defined as the energy consumption per unit of transport activity. It was possible to extract required data from the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies.
- **Indicator 5 (CO₂ EMISSIONS)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies. The indicator provides an estimation of the CO₂ produced by the trips generated by the employees involved in the survey. The adopted methodology was based on TREMOVE tables.
- **Indicator 6 (AVERAGE VEHICLES OCCUPANCY IN CAR-POOLING)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies. It was possible to extract the number of people who usually share their car. It was important to underline that this indicator

wasn't referred to the car-pooling experimentation proposed by Municipality of Brescia, but it monitored the spontaneous car-pooling among the employees.

- **Indicator 7 (AVERAGE OCCUPANCY)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies. This indicator represented the average number of passenger per vehicle and per trip. It was referred to the average vehicle occupancy of the vehicles usually made by the employees (who not necessarily share their car).
- **Indicator 8 (AVERAGE MODAL SPLIT-TRIPS)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies. It collected the means of transport daily used for the Home-Work trips.
- **Indicator 9 (TYPE OF PROPERTY CARS USED IN HW TRIP /100 EMPLOYEES)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies. “Type of property cars” referred to the kind of fuel used by the employees’ cars. This indicator was expressed as percentage respect to the total number of property used cars.
- **Indicator 10 (TYPE MOPEDS AND MOTORCYCLES USED IN HW TRIP /100 EMPLOYEES)** - The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies.
- **Indicator 11 (TYPE OF PROPERTY CARS USED IN HW TRIP /100 EMPLOYEES IN THE PEAK HOURS)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies. A data cross was made between the usual travel hour of the employees and the respective kind of car used, focusing on the movements during the peak hour
- **Indicator 12 (N OF CAR-POOLING USERS/100 POTENTIAL USERS)** – This indicator concerned car-pooling experimentation, performed at the Tridentina school.
- **Indicator 13 (AWARENESS LEVEL)** – This indicator is referred to the awareness level of the population respect to the bike tag initiative. It was expressed by the percentage of people who had knowledge of a specific aspect respect to the total number of people who answered to the questionnaire. The specific question of the questionnaire was: *“Do you know the possibility of providing your bicycle with an univocal code and with a dedicated stick on tag, which allows, in case of theft, to increase the possibilities to find it?”*
- **Indicator 14 (ACCEPTANCE LEVEL)** – In the same questionnaire used for the indicator n. 13 a specific question about the level of acceptance of the Car-pooling service in Brescia. The indicator was expressed by the percentage of people who was interested in Car-pooling service, respect to the total number of people who answered the questionnaire. The specific question of the questionnaire was: *“A way to reduce traffic is to share home-work movement with other people (Car-pooling principle). Would you be disposed towards doing it, knowing that on one hand there’s the opportunity of halve tip costs with vehicle , on the other hand of use privileges at work/study place (reserved parking, ect.)?”*
- **Indicator 15 (N OF TAGGED BICYCLES PER YEAR DURING CIVITAS)** – Using data coming from the Easy tag national bike register, it was possible to extract the number of registered bike per year in Brescia. It was also possible to extract some useful information from the same questionnaire administered for the data collection of the previous indicators 13 and 14, elaborating the answers given to the specific question about the possibility to tag bikes. In particular, the administered question was: *“Do you know that it’s possible to tag your bike with a specific univocal code that would increase the possibility to retrieve it in case of theft?”*

C1.2 Establishing a Baseline

The main Mobility Manager actions performed by this measure consisted in promoting several initiatives, such as the experimentation of the Car-pooling service, the bike tag initiative and the home to work travel surveys among the main companies located in Brescia.

The indicators, selected to evaluate the measure, were divided into 3 thematic areas, according to the aspects to assess:

- indicators which evaluated the experimentation of the Car-pooling in Brescia (indicator 1 “Average operating revenues in car-pooling”, indicator 2 “ Average operating costs in car-pooling”, indicator 3 N of “car-pooling” users / company investment”, indicator 12 “N of car-pooling users /100 Car-pooling potential users “, indicator14 “Acceptance Level of the Car-pooling service”);
- indicators which evaluated the bike tag initiative in Brescia (indicator 13 “Awareness level about bike tag initiative”, indicator 15 “N of tagged bicycles per year during CIVITAS”);
- indicators calculated basing on data coming from the home-work journeys (PSCL) surveys among the main companies located in Brescia. They were able to evaluate general aspects concerning the mobility of the employees working in the involved companies, in terms of modal split, pollutant gas emissions, travel behaviours, etc. (indicator 4 “Vehicle Fuel Efficiency”, indicator 5 “CO2 emissions”, indicator 6 “Average vehicles occupancy in car-pooling”, indicator 7 “Average Occupancy” indicator 8 “Average modal split - trips”, indicator 9 “Type of property cars used in HW trip”, indicator 10 “% of mopeds and motorcycles used in HW trip”, indicator 11 “Type of property cars used in HW trip in the peak hours”).

Car pooling experimentation

Before the beginning of Civitas project, any experimentation of the Car-pooling service was ever made in Brescia. At the most “Car-pooling” was spontaneously practiced by citizens. Thanks to the participation to the Civitas project for the first time it was possible to experiment a car-pooling service managed by an external company, which provided the data logger and the software to automatically calculate the car-pooling crews and the fares. Therefore, the indicators selected to evaluate the car pooling service experimentation (indicators 1 “Average operating revenues in car-pooling”, 2 “Average operating costs in car-pooling”, 3 “N of “car-pooling” users / company investment”, 12 “N of car-pooling users/100 Car-pooling potential users”, 14 “Acceptance Level of the car pooling service”) had no Baseline value (as a matter of fact, they didn’t schedule an ex ante data collection).

Indicators concerning the Car-pooling service	BASELINE
1. Average operating revenues in car-pooling	0 (no service)
2. Average operating costs in car-pooling	0 (no service)
3. N of “car-pooling” users/company investment	0 (no service)
12. N of car-pooling users/100 Car-pooling potential users	0 (no service)
14. Acceptance Level of the Car-pooling service	0 (no service)
<i>Tab.1: Indicators 1, 2, 3 and 4 baseline</i>	

Bike tag initiative

Indicators which evaluated the bike tag initiative promoted in Brescia during Civitas were n. 13 “Awareness level about bike tag initiative” and 15 “N of tagged bicycles per year during CIVITAS”. The year taken as reference for the Baseline situation was 2009 for the ind. 15 (using data provided by

the national tagged bike register) and March 2010 for indicator 13, that was calculated, administering a specific questionnaire to a sample of citizens living in Brescia.

Indicators concerning the Bike tag initiative	BASELINE
13. Awareness level about bike tag initiative (dedicated questionnaire March 2010)	20%
15. N of tagged bicycles per year during CIVITAS (2009)	2.341
<i>Tab.2: Indicators 13 and 15 baseline</i>	

Home to Work surveys

As regards the indicators selected to evaluate in general the mobility behaviours of the employees working in the main companies located in Brescia, the year taken as reference for the Baseline was 2010, when the first Home to work survey about the travel behaviour was made.

Indicators concerning the mobility behaviours of the employees working in the main companies involved in the PSCL survey	BASELINE (2010)																						
4. Vehicle Fuel Efficiency	Gasoline non catalytic = 2,8 MJ/vkm Gasoline catalytic = 2,2 MJ/vkm Gasoil = 2,2 MJ/vkm GPL/Methane gas = 8,15 MJ/vkm Electric = 540 MJ/vkm																						
5. CO ₂ emissions	Estimation of the CO ₂ emissions generated by gasoline and gasoil powered vehicles = 8.147 kgCO ₂																						
6. Average vehicles occupancy in car-pooling	2,15 person per shared vehicle (spontaneous car-pooling)																						
7. Average Occupancy	1,27 person per vehicle																						
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10. % of mopeds and motorcycles used in HW trip	The percentage of motorcycles/mopeds is 2,6% and they are all gasoline-powered.																						

11. Type of property cars used in HW trip in the peak hours	fuel type	% cars traveling during the peak hour
	No-catalytic gasoline	4,2%
	Catalytic gasoline	51,8%
	Gasoil	34,4%
	LPG/Methane gas	9,4%
	Electric	0,2%
	Total	100,0%

Tab.3: Indicators 4, 5, 6, 7, 6,7, 8, 9, 10 and 11 baseline

C1.3 Building the Business-as-Usual scenario

Car pooling experimentation

Coherently with the fact that in Brescia the Car-pooling service didn't exist before Civitas and that probably without the Civitas contribution the service wouldn't even be experimented, the BaU scenario for the indicators concerning the car-pooling service equalled 0, as shown in the table below.

Indicators concerning the Car-pooling service	BaU
1. Average operating revenues in car-pooling	0 (no service)
2. Average operating costs in car-pooling	0 (no service)
3. N of "car-pooling" users/company investment	0 (no service)
12. N of car-pooling users/100 Car-pooling potential users	0 (no service)
14. Acceptance Level of the Car-pooling service	0 (no service)

Tab.4: Indicators 1, 2, 3, 12, and 14 BaU

Bike tag initiative

As regards the indicators concerning the bike tag initiative, without the Civitas contribution, probably its promotion wouldn't be improved. Therefore the BaU scenario, which had a time horizon set in year 2012, was built as follows: indicator 13 (Awareness level about bike tag initiative) had no historical data series, as it derived from a questionnaire administered *ad hoc*. Therefore, it would likely be equal to the baseline value. For Indicator 15 (N of tagged bicycles per year during CIVITAS) some historical data (2007-2009) were collected, but the available series wasn't sufficient for a reliable statistical projection. Therefore, the average increment of the number of tagged bikes was calculated in order to obtain the BaU value referred to year 2012 (as shown in the table reported below).

Year	Registered bikes	Increment respect to the previous year
2007	1026	-
2008	1577	+ 53%
2009	2341	+ 48 %

Tab.5: Number of bike tagged per year (2007-2009)

From table n. 5 it's possible to notice that the increment respect to the previous year decreased by 5% from 2008 to 2009. Assuming this trend as the same for the following years, the number of tagged bikes in 2012 was estimated as reported in the table below.

Year	Increment respect to the previous year (estimation)	Registered bike (estimation)
2010	+ 43%	3537

2011	+ 38%	5343
2012	+ 33%	8072
<i>Tab.6: Indicator 15 BaU (2010-2012)</i>		

Therefore, the BaU values for indicators which evaluated the bike tag initiative in Brescia were:

Indicators concerning the Bike tag initiative	BaU (2012)
13 Awareness level about bike tag initiative	20%
15 N of tagged bicycles per year during CIVITAS (estimation)	8072
<i>Tab.7: Indicator 13 and 15 BaU</i>	

Home to Work surveys

As regards the indicators selected to evaluate the mobility behaviours of the employees of the companies involved in the Home to Work survey, it must be underlined that they were defined “complementary”, as they weren’t able to express the mobility patterns that characterized Brescia and didn’t evaluate the effective measure performance. The BaU scenario building had the time horizon set in year 2012, corresponding to the end of Civitas project when the metrobus wasn’t active yet (the start up of the metro line in Brescia was foreseen by 2013). The actions promoted by the Mobility Management had no tangible effects in the short term period, therefore it was possible to assume that the BaU values for these indicators didn’t change respect to the Baseline ones. At the most, at city level, the great success of the bike sharing service could likely increase the number of people who chose to move by bike.

Indicators concerning the mobility behaviours of the employees working in the main companies involved in the PSCL survey	BaU (2012)																						
4. Vehicle Fuel Efficiency	Gasoline non catalytic = 2,8 MJ/vkm Benzina catalytic = 2,2 MJ/vkm Gasoil = 2,2 MJ/vkm GPL/Methan gas = 8,15 MJ/vkm Electric = 540 MJ/vkm																						
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		Gasoil	34,4%
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		Electric	0,2%
		Total	100,0%

Tab.8: Indicators 4, 5, 6, 7, 6,7, 8, 9, 10 and 11 BaU

C2 Measure results

The results are presented under sub headings corresponding to the areas used for indicators – economy, energy, environment, society and transport.

C2.1 Economy

Table C2.1.1: Measure results for the indicators corresponding to area “Economy”

Indicator	Before	B-a-U	After	Difference: After –Before	Difference: After – B-a-U
1) Average operating revenues in car-pooling	Not scheduled ex-ante data collection	0 (no service) (year 2010)	€ 19.950,00 (year 2010)	€ 19.950,00	€ 19.950,00
2) Average operating costs in car-pooling	Not scheduled ex-ante data collection	0 (no service) (year 2010)	€ 42.167,00 (year 2010)	€ 42.167,00	€ 42.167,00
3) N of “car-pooling” users / CBS investment	Not scheduled ex-ante data collection	0 (no service)	12/ € 19.950	12/ € 19.950	12/ € 19.950

From the economic point of view, the service was free for users, therefore the company, which managed the service, partially covered its costs with the revenues coming from the Brescia Municipality investment.

The promotion of the car-pooling experimentation was addressed to the main companies and schools located in Brescia, but only one school joined the experimentation. Therefore as this three indicators were collected during the car-pooling service experimentation (which lasted from November 2010 to June 2011) it is not possible to assess the success of the car-pooling initiative in Brescia from the economic point of view.

As this measure is also object of a CBA, it is possible to extract proper information concerning the economic assessment of the initiative directly from the CBA.

However it's possible to make qualitative comments on the un-success of the demo activity: the data logger (i.e. the technical solution selected to manage the car-pooling service) wasn't much appreciated as the data logger wasn't seen as a user friendly system, it could be stolen from the car with consequent problem of potential claim of vehicle damages.

C2.2 Energy

Table C2.2.1: Measure results for the indicators of the category “Energy”

Indicator	Before (survey 2010)		B-a-U (2012)		After (survey 2012)		Difference: After – Before		Difference: After – B-a-U	
	fuel type	Indicator 4 [MJ/vkm]	fuel type	Indicator 4 [MJ/vkm]	fuel type	Indicator 4 [MJ/vkm]	fuel type	Δ [MJ/vkm]	fuel type	Δ [MJ/vkm]
4) Vehicle Fuel Efficiency	Gasoline catalytic non	2,8	Gasoline catalytic non	2,8	Gasoline catalytic non	2,8	Gasoline catalytic non	0	Gasoline catalytic non	0
	Benzina catalytic	2,2	Benzina catalytic	2,2	Benzina catalytic	2,2	Benzina catalytic	0	Benzina catalytic	0
	Gasoil	2,2	Gasoil	2,2	Gasoil	2,2	Gasoil	0	Gasoil	0
	GPL/Methan gas	8,13	GPL/Methan gas	8,13	GPL/Methan gas	8,13	GPL/Methan gas	0	GPL/Methan gas	0
	Electric	5,4	Electric	5,4	Electric	5,4	Electric	0	Electric	0

Indicator n. 4 “Vehicle Fuel Efficiency” was calculated using the results of to the Home to Work Travel surveys, therefore it wasn’t representative of the whole city but it monitored the efficiency of the vehicles used during the H/W trips of the interviewed employees. The difference between the before and the after situation is negligible (almost 0).

The mobility management actions promoted by the measure didn’t affect the vehicle fuel efficiency, as Local Plans implementation by the companies produced a too slight effect on the territory. This is evident also from a little change in modal split (see section C.2.4).

C2.3 Environment

Table C2.3.1: Measure results for the indicators of the category “Environment”

Indicator	B-a-U (2012)		After (survey 2012)		Difference: After – Before	
	Before (survey 2010)	B-a-U (2012)	After (survey 2012)	Difference: After – Before	Difference: After – B-a-U	

Indicator	Before (survey 2010)	B-a-U (2012)	After (survey 2012)	Difference: After – Before	Difference: After – B-a-U
5) CO ₂ emissions	Total CO ₂ emissions generated by gasoline and gasoil powered vehicles = 8.147 kgCO ₂	Estimation of the CO ₂ emissions generated by gasoline and gasoil powered vehicles = 8.147 kgCO ₂	Estimation of the CO ₂ emissions generated by gasoline and gasoil powered vehicles = 9042,8 kgCO ₂	+ 895,8 kgCO ₂	+ 895,8 kgCO ₂

Indicator n. 5 “CO₂ emissions” was calculated using the results of the Home to Work Travel surveys. As already said for the previous indicator it wasn’t representative of the whole city but it monitored the emissions produced by the vehicles used during the H/W trips of the interviewed employees. The increasing trend observed between the 2010 survey and the 2012 one (+ 895,8 kgCO₂) was just due to the higher number of filled in questionnaires, even if the same number of companies was involved: as the indicator was calculated basing on parametric estimation of the CO₂ emission, a higher number of filled in questionnaires corresponded to a higher amount of kms declared by the interviewees, then to higher emissions levels. The mobility management actions promoted by the measure didn’t affect CO₂, as Local Plans implementation by the companies produced a too slight effect on the territory. This is evident also from a little change in modal split (see section C.2.4).

C2.4 Transport

Table C2.4.1: Measure results for the indicators of the category “Transport”

Indicator	Before	B-a-U (2012)	After	Difference: After – Before	Difference: After – B-a-U
6) Average vehicles occupancy in (spontaneous) car-pooling* *This indicator is not referred to the car-pooling experimentation proposed by Municipality of Brescia, but is referred to a spontaneous car-	(survey 2010) 2,15 people per shared vehicle	2,15 person per shared vehicle (spontaneous car-pooling)	(survey 2012) 2,28 people per shared vehicle (spontaneous car-pooling)	+ 0,13	+ 0,13

MOBILITY MANAGEMENT ACTIONS IN BRESCIA

Measure title:

City: **Brescia**

Project: **MODERN**

Measure number: **04.06**

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MOBILITY MANAGEMENT ACTIONS IN BRESCIA

Measure title:

City: Brescia

Project: MODERN

Measure number: 04.06

Indicator	Before		B-a-U (2012)		After		Difference: After – Before		Difference: After – B-a-U																																																																
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The indicators reported above were made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns,

As regards indicators n. 6 “Average vehicles occupancy in (spontaneous) car-pooling” and 7 “Average Occupancy”, according to the answers provided by the interviewees, the number of people driving alone increased (the average occupancy went from 1,27 in 2010 to 1,23 in 2012), but, at the same time, the people who shared their car (making a spontaneous car-pooling) carried a higher number of people during the home to work trips (the average occupancy in car-pooling went from 2,15 in 2010 to 2,28 in 2012).

Indicator n. 8 expressed the “modal split” characterizing the home-to-work trips. For this indicator the following result was obtained: the number of people using LPT and non-motorized means of transport (train, urban and extra-urban buses, bicycle, pedestrian mode) significantly increased (from 8,49% of people using these means of transport in 2010 to 14,66% in 2012), notwithstanding the slight increase registered by the use of cars. The use of powered two wheels (also monitored through the indicator n. 10 ” mopeds and motorcycles used in HW trip/100 employees”) decreased (from 2,60% in 2010 to 2,24% in 2012).

Jointly observing the results obtained for indicators n. 9 “Type of property cars used in HW trip/100 employees” and 11 “Type of property cars used in HW trip/100 employees in the peak hours” an increasing number of methane gas powered vehicles was observed.

The positive results in terms of switch toward more “sustainable” means of transport cannot be associated only to the Mobility Management actions performed by the measure. The general period of economic crisis experienced in Italy favoured the collective transport solutions and cheaper fuel vehicle powering.

The following indicator n. 12 “N of car-pooling users/100 potential car-pooling users” concerned car-pooling service experimentation, performed at the Tridentina school.

Indicator	Before	B-a-U (2012)	After	Difference: After – Before	Difference: After – B-a-U
12) N of car-pooling users/100 potential car-pooling users	Not scheduled ex-ante data collection.	(2011) 0 (no service)	(2011) 2,73	Not assessable	+ 2,73

As regards indicator n. 12 “N of car-pooling users/100 potential car-pooling users”, which was referred to the car-pooling experimentation at the Tridentina School, it was possible to make the same consideration reported for the economic indicators (see “C2.1 Economy” subheading): the scarce success of the experimentation was probably due to the selected solution to manage the car-pooling service.

C2.5 Society

Table C2.5.1: Measure results for the indicators of the category “Society”

The following indicator n.14 “Acceptance Level” underlines that in Brescia there is a potential interest in car-pooling. This attitude should be better investigated in order to find out a suitable technical solution to organize crews and to manage car pooling actions.

Indicator	Before	After	B-a-U	Difference: After – Before	Difference: After – B-a-U

Indicator	Before	After	B-a-U	Difference: After –Before	Difference: After – B-a-U
14) Acceptance Level	Ex ante data collection not scheduled	March 2010: Acceptance level of the Car-pooling service: 13% April 2011: Acceptance level of the Car-pooling service: 9% April 2012: Acceptance level of the Car-pooling service: 14%	March 2010: 0 (no service) April 2011: 0 (no service) April 2012: 0 (no service)	Not Assessable Not Assessable Not Assessable	+13% +9% +14%

The following indicator n.13 “Awareness level”, n. 15 ‘N of tagged bicycles per year during CIVITAS” were selected to monitor the success of the bike tag initiative.

Indicator	Before	After	B-a-U	Difference: After –Before	Difference: After – B-a-U
13) Awareness Level	March 2010: Awareness level about bike tag initiative: 20%	April 2011: Awareness level about bike tag initiative: 35% April 2012: Awareness level about bike tag initiative: 39%	April 2011: Awareness level about bike tag initiative: 20% April 2012: Awareness level about bike tag initiative: 20%	+15% +19%	+15% +19%
15) N of tagged bicycles per year during CIVITAS	year 2009: 2341	year 2010 2854 year 2011: 3156 year 2012 (until the end of May 2012): 3168	year 2010: 3537 year 2011: 5343 year 2012 (until the end of May 2012): 6480	+513 +815 +827	- 1196 - 2187 -3678

The increasing levels of awareness toward the initiative registered during Civitas and the slight increase of the tagged bike underlined the difficulties in promoting campaigns even if made during the most significant events organized in the city, such as the “European Sustainable Mobility Week” or the “bike national day”.

Summary of the main CBA results (see Annex 3)

The following table shows the main results of the CBA made for this measure, which was made referring to the CAR-POOLING service experimentation of the Municipality of Brescia at the Tridentina School.

COST/BENEFIT ANALYSIS	2025
TOTAL KM RUNNING (km)	134.572
TOTAL KM SAVING (km)	291.502
INTEREST RATE	3,5%
NET PRESENT VALUE (€ 2010)	132
BENEFITS/COSTS RATIO	1,47
I.R.R.	3,6%

TABLE 9 – CBA results between Civitas Measure and Reference Measure/BaU (year 2025)

The initial investment cost for the Car-pooling experimentation (19.950 €) is re-paid in 15 years, thanks to the benefits associated to the emission and fuel saving, only if the total mileage covered by the car-pooling service will be 134'572 km.

This means that, the car-pooling experience in Brescia, which was characterized by an exiguous number of kms covered in 2011 during the experimentation (1.647 km), should increase the mileage covered by the car-pooling service yearly in the next 15 years by 21,5%, in order to register 25'169 kms in 2025 and to reach the cumulative value of 134'572 km (15 years).

As a matter of fact, only with this increasing rate, the Net Present Value and the Benefit/Costs Ratio become respectively higher than zero and higher than one in 15 years.

The Investment Return Rate in 2025 results 3,6%, practically equal to the estimated Interest Rate (3,5%).

C3 Achievement of quantifiable targets and objectives

No.	Target	Rating
1	<p>To involve about 50% of the main companies located in Brescia (with more than 150 employees (corresponding to about 15 companies), including more companies than the ones who fitted with D.L.27 march 1998 on “Sustainable mobility”¹⁴</p> <p><i>This objective was considered exceed.</i></p> <p><i>In occasion of the 2010 Home to Work Travel survey a total number of 25 joined the survey answering to about 1600 questionnaires.</i></p> <p><i>In occasion of the 2010 Home to School survey a total number of 20 schools joined the survey answering to about 2.300 questionnaires.</i></p>	***
2	<p>To elaborate Home to Work/School Travel Plans for each site</p> <p><i>This objective was considered substantially achieved.</i></p> <p><i>The 2010 Home to Work Travel survey to companies was used as basis for the elaboration of an aggregate Home to Work Travel Plan (as demo activity dedicated to a small sample of companies) and of 15 single Home to Work Travel Plans dedicated to each company. Instead of realizing Home to School Travel Plans, basing on the results coming from the Home to School survey, only specific actions were proposed, such as the Car-pooling service experimentation.</i></p>	*
3	<p>Car-pooling service experimentation avoiding about 150.000 km/year with 10 crews</p> <p><i>This objective was considered not achieved.</i></p> <p><i>During Civitas the car-pooling service was actually experimented, but the experimentation lasted only few months (from November 2010 to June 2011) and the crews were only 3. According to the CBA made for this measure, the mileage covered during the experimentation was 1.647 km, corresponding to about 3.569 km avoided at city level. These results weren't therefore considered significant respect to the original objective.</i></p> <p><i>The scarce success of the experimental initiative can be due to the solution selected to manage the car-pooling service: the installation of a data logger for the automatic composition of the crews and fares was perceived as a complicated system respect to a spontaneous car-pooling among colleagues.</i></p> <p><i>Indicator n. 12 (N of car-pooling users/100 potential car-pooling users) only 2,73 out of 100 potential users joined the experimentation at the Tridentina School</i></p> <p><i>Alongside this, the results of the Home to Work Travel surveys (one in 2010 and one in 2012) highlighted a quite consolidated attitude toward a spontaneous car-pooling among colleagues, even if characterized by a decreasing trend (see the information about the level of shared trips taken from the indicator n. 8 "Average modal split-trips"). At the same time, people who shared their car (making a spontaneous car-pooling) carried a higher number of people during the home to work trips, as it's possible to see from indicator n. 6 "Average</i></p>	0

¹⁴ Decree Law 27 March 1998 which instituted the Mobility Manager profile for the Companies/Public Bodies with more than 300 employees.

	<p><i>occupancy in car-pooling”:</i></p> <p><i>Indicator n. 8 "Average modal split-trips"</i></p> <table border="0"> <tr> <td><i>Before situation (survey 2010)</i></td> <td><i>After situation (survey 2012)</i></td> </tr> <tr> <td><i>Shared car (driver): 5,55%</i></td> <td><i>Shared car (driver): 4,85%</i></td> </tr> <tr> <td><i>Shared car (passenger): 5,78%</i></td> <td><i>Shared car (passenger): 2,12%</i></td> </tr> <tr> <td><i>TOTAL 11,33%</i></td> <td><i>TOTAL 6,97%</i></td> </tr> </table> <p><i>Indicator n. 6 "Average vehicles occupancy in car-pooling"</i></p> <p><i>Before situation (survey 2010) = 2,15</i></p> <p><i>After situation (survey 2012) = 2,28</i></p>	<i>Before situation (survey 2010)</i>	<i>After situation (survey 2012)</i>	<i>Shared car (driver): 5,55%</i>	<i>Shared car (driver): 4,85%</i>	<i>Shared car (passenger): 5,78%</i>	<i>Shared car (passenger): 2,12%</i>	<i>TOTAL 11,33%</i>	<i>TOTAL 6,97%</i>	
<i>Before situation (survey 2010)</i>	<i>After situation (survey 2012)</i>									
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<i>Shared car (passenger): 5,78%</i>	<i>Shared car (passenger): 2,12%</i>									
<i>TOTAL 11,33%</i>	<i>TOTAL 6,97%</i>									
<p>4</p>	<p>Spread of the culture of sustainable mobility increasing public transport use for the home to work trips (+1%).</p> <p><i>This objective can be considered achieved.</i></p> <p><i>According to the Home to Work Travel surveys, which was made among a representative set of companies, an increasing number of people decided to use collective means of transport for their H/W trips, as it's possible to observe through the indicator n. 8 "Average modal split-trips".</i></p> <p><i>indicator n. 8 "Average modal split-trips":</i></p> <p><i>Before situation (survey 2010)</i></p> <p><i>LPT transport: 2,83% Train: 0,18% (Total = 3,01%)</i></p> <p><i>After situation (survey 2012)</i></p> <p><i>LPT transport: 5,57% Train: 0,76% (Total = 6,33%)</i></p> <p><i>Even if the objective of increasing public transport use for the home to work trips by +1% was more than achieved, it must be underlined that the positive results in terms of switch toward more "sustainable" means of transport cannot be associated only to the promotion activities of alternative means of transport performed by the measure. The general period of economic crisis experienced in Italy favoured the collective transport solutions and cheaper fuel vehicle powering.</i></p>	<p>**</p>								
<p>5</p>	<p>Increase of the number of tagged bicycles in Brescia, reaching 6000 tagged bicycles</p> <p><i>This objective was considered not achieved.</i></p> <p><i>As it's possible to observe from indicator n. 15 "N of tagged bicycles per year during CIVITAS", the number of tagged bike didn't reach the expected objective, notwithstanding an increasing trend.</i></p> <p><i>Ind. 15 "N of tagged bicycles per year during CIVITAS"</i></p> <p><i>Before situation (Year 2009): 2.341</i></p> <p><i>After situation (partial data up to May 2012): 3.168</i></p>	<p>O</p>								
<p>6</p>	<p>To involve about 20.000 people</p> <p><i>The activities carried out during the measure implementation and during targeted events such as the "European Sustainable Mobility Week" in Brescia involved all the city, therefore the objective can be considered achieved in full.</i></p>	<p>**</p>								
<p>NA = Not Assessed O = Not Achieved * = Substantially achieved (at least 50%) ** = Achieved in full *** = Exceeded</p>										

C4 Up-scaling of results

Mobility management actions carried out by Brescia Municipality are usually opened to all the stakeholders (also according to the Italian law) of the city (companies, public bodies, citizens, etc.). It is up to them whether to join the initiatives or not.

The up scaling of the measure could consist in extending the elaboration of the Home to Work Plans to a wider set of companies (under 150 employees) located in Brescia in order to increase the impacts of the Mobility Management actions at city level.

C5 Appraisal of evaluation approach

The evaluation activities consisted in the collection of the necessary data to calculate the selected indicators for the ex-ante/ex-post situation. The chosen set of indicators was subdivided into five categories: "Economy", "Energy", "Environment", "Transport" and "Society".

I was decided to monitor mobility management actions through Main and Complementary indicators as following:

Car pooling

As regards the "Economy" category, indicators n. 1 "Average operating revenues in car-pooling", n. 2 "Average operating costs in car-pooling" and n. 3 "N of "car-pooling" users / CBS investment" were selected to assess the car-pooling service experimentation managed by the external company. These data were also useful for the CBA.

Indicator n. 12 "N of car-pooling users/100 potential car-pooling users" was collected in relation to the car-pooling experimentation carried out among schools in Brescia, promoted by the Municipality.

Finally, as regards the category "Society", the data related to acceptance level (indicator n. 14) was collected through specific questions in the questionnaire of the Municipality of Brescia about Civitas project activities.

Bike tagging

category "Society" was used to monitor the awareness (indicator n. 13) of the initiative through specific questions in the questionnaire of the Municipality of Brescia about Civitas project activities. and the indicator 15 "N of tagged bicycles per year during CIVITAS" was chosen in order to monitor the bike tagging activities, already implemented in the city and strengthened during the Civitas project.

Home to Work surveys

The indicators were selected in the categories "Energy" and "Environment". Indicators 4 "Vehicle Fuel Efficiency", 5 "CO2 emissions", 6 "Average vehicles occupancy in (spontaneous) car-pooling", 7 "Average Occupancy", 9 "Type of property cars used in HW trip /100 employees", 10 "Type mopeds and motorcycles used in HW trip /100 employees", 11 "Type of property cars used in HW trip /100 employees in the peak hours" were calculated basing on data coming from the home-work travels surveys to companies.

The indicators related to the pollutant emissions and to the fuel consumption were estimated through the REMOVE tables, as it was considered the more suitable methodology to be used. All these indicators allowed the evaluation of general aspects concerning the mobility of the interviewed employees, in terms of modal split, pollutant gas emissions, travel behaviours, etc. For this reason these indicators were defined "complementary" as they were not able to express the mobility patterns

that characterized all the city of Brescia (they were referred to a sample of companies) and didn't evaluate the effective measure performance.

C6 Summary of evaluation results

Even if the objective of the measure weren't achieved in full, it was possible to highlight the following key results:

- **Key result 1** – As regards the evaluation activities, the second Home to Work Travel survey to companies allowed to make some interesting consideration in relation to the mobility habits of the involved companies: the positive results in terms of switch toward more “sustainable” means of transport cannot be associated only to the promotion activities of alternative means of transport performed by the measure. The general period of economic crisis experienced in Italy favoured the collective transport solutions and cheaper fuel vehicle powering.
- **Key result 2** – The experimentation of the car-pooling service was made according to the measure objectives, but recurring to the wrong technological solution. This can be considered the main reason of its substantial failure.
- **Key result 3** – At the end of Civitas the number of tagged bike didn't reach the expected objective, notwithstanding an increasing trend (+ 35% in 2012 respect to 2009);

C7 Future activities relating to the measure

The future activities relating to the measure are here summarized:

- To keep the bike tagging initiative alive;
 - To update the 2012 Home to Work Travel Plans.
-

D. Process Evaluation Findings

D0 Focused measure

This measure was set as “focused” at the beginning of the Civitas project. The reasons of this choice are here reported:

1	The measure fitted into the city policy towards sustainable urban transport and/or towards sustainability in general
2	The high level of innovativeness of the measure with respect to technique, consortium, process, learning etc.
3	The interest in deepening a Cost Effective Analysis in relation to Car pooling action.

D1 Deviations from the original plan

No significant deviations from the original plan were pointed out, except from the administration of an extra Home to Work Travel survey to companies in 2012 (the DOW included only the 2010 survey).

D2 Barriers and drivers

D2.1 Barriers

Here the main barriers encountered during the measure implementation are reported:

Implementation phase

- **Organizational barrier** – In January 2011 the Measure Leader changed, therefore some problems were encountered in terms of measure activities reorganization;
- **Cultural barrier** – The behavioural change in the citizens life style patterns is a complicated issue and the mobility management actions aren't so able to significantly affect consolidated travel habits, especially in the short period.

Operational phase

- **Technological barrier** – The car-pooling service experimentation initiative didn't find rich soil among the involved potential users: the technological solution to manage the service proposed by the company AZ Mobility didn't please involved people. As a matter of fact, the installation on board of the data logger was perceived as a problem from the security point of view: the installation of visible devices on board could favour the thefts of the data logger itself, with consequent problem of potential claim of vehicle damages.

D2.2 Drivers

Implementation phase

- **Context driver** –The general period of economic crisis experienced in Italy generally favoured the collective transport solutions and cheaper fuel vehicle powering. Therefore, the positive results obtained during the measure implementation (in terms of switch toward more “sustainable” means of transport) cannot be associated only to the actions performed by the measure.

D2.3 Activities

Preparation phase

- **Communicational activity** – Meetings were arranged during the preparation phase of the surveys among the Municipality of Brescia and the companies/school representatives, in order to increase the success of the survey initiative.

Operational phase

- **Communicational activity** – In order to involve as much people as possible in the activities promoted by the Municipality of Brescia (during the Home to Work/School surveys and also during the events organized) also “incentives” were introduced: for example, the participants to the mobility projects were awarded with prizes and special discounts.

D3 Participation

D.3.1 Measure partners

- **Municipality of Brescia** – the actions promoted by the measure were performed and coordinated by the Mobility Manager nominated by the Municipality of Brescia. Its role consisted in delivering and sharing sustainable mobility proposals to targeted stakeholders, in order to promote the modal shift towards more sustainable means of transport.
- **AZ Mobility** – the external Company which managed the experimentation of the car-pooling.

D.3.2 Stakeholders

- **The involved Companies and their Mobility Managers** - They were involved during the two Home to Work Travel survey carried out by the Municipality of Brescia in 2010 and in 2012 to investigate the mobility habits of their employees and the activities. The survey activities were finalized to the elaboration of Home to Work Travel Plans, sharing the most suitable mobility actions with the companies themselves. Some of the Mobility Managers attended the training courses organized by the Municipality of Brescia.
- **The involved Schools and their Mobility Managers** - They were involved during the Home to School Travel survey carried out by the Municipality of Brescia in 2010 to investigate the mobility habits of students and their families. Schools were object of specific actions, such as the Car-Pooling experimentation. Some of the Mobility Managers attended the training courses organized by the Municipality of Brescia.

D4 Recommendations

D.4.1 Recommendations: measure replication

- **Use of the data logger** - The measure was devoted to mobility management actions, designed for and implemented in the specific reality. So, of course any kind of transferability is mainly methodological. No specific innovative methodology was used, as the analysis were performed using the current mobility management techniques. The innovative initiative was represented by the use of the on-board data logger for the collection of data about the use of car pooling by the crews. This technique could be transferrable, but unfortunately it wasn't a success. As a matter of fact, the installation of this device was perceived as a problem from the security point of view: the installation of visible devices on board could favour thefts, with consequent problem of potential claim for vehicle damages. Therefore, the car pooling scheme has to be managed in a different way.

D.4.2 Recommendations: process

- **More targeted and widespread information** – The availability of mobility management actions, such as the economic incentives for the purchase of clean vehicles or the promotion of collective transport services, is particularly important in times of economic crisis, when people is more predisposed to change their mobility habits to more sustainable behaviours.
- **Other car-pooling solutions** – As regards the car-pooling implementation, the solution promoted by the Municipality of Brescia, based on the data logger installation on board, wasn't appreciated by the users. At the same time, a quite consolidated attitude toward more spontaneous way of car-pooling was observed in Brescia. Therefore, other solutions for the car-pooling initiative promotion should be found.
- **Involve bicycle Companies in the bike tag initiative** – The bike tag initiative didn't reach the expected success. This can be due to several reasons: the scarce effectiveness of the system itself or of the promotional activities. Anyway, it would be useful if the bicycle companies could impress the security code directly on the bicycles frame, instead of posting a sticker.

Annex 1: Historical data series for the BaU calculation

Indicator 15 (% OF TAGGED BICYCLES PER YEAR DURING CIVITAS)

Year	2007	2008	2009
Number of registered bikes in Brescia	1026	1577	2341

Annex 2: Ex ante and Ex Post data collection

- **Indicator 1 (AVERAGE OPERATING REVENUES IN CAR-POOLING)** – This indicator concerns the car-pooling experimentation, managed by the Private Local Company “AZ Mobility”. The indicator is referred to the company revenues coming from the Municipality of Brescia for the experimentation of the car-pooling service.

As this measure is also object of a CBA, it will be possible to extract other useful information concerning the economic assessment of the initiative directly from the CBA itself.

EX ANTE SITUATION

Not scheduled

FIRST DATA COLLECTION

The first data collection was referred to the period 2009-2010, when the Municipality of Brescia gave its contribution to the Company AZ Mobility for the car-pooling service experimentation.

Ind.1 = € 19.950,00

- **Indicator 2 (AVERAGE OPERATING COSTS IN CAR-POOLING)** – This indicator concerns the car-pooling experimentation, managed by the Private Local Company “AZ Mobility”. The indicator is referred to costs incurred by the company for the experimentation of the car-pooling service in Brescia.

As this measure is also object of a CBA, it will be possible to extract other useful information concerning the economic assessment of the initiative directly from the CBA itself.

EX ANTE SITUATION

Not scheduled

FIRST DATA COLLECTION

The only data collection was made in January 2012, when the car-pooling experimentation could be considered finished (it lasted from November 2010 to June 2011). The costs incurred by Azmobility for the experimentation of the car-pooling service in Brescia included the purchase of the data logger, (the devices which had to be installed on the vehicles to automatically calculate the crews and the fares), but also to the dissemination campaigns for the car-pooling promotion and the technical assistance related to the devices and, in general, to all the operating costs.

Ind.2 = € 42.167,00

- **Indicator 3 (N OF “CAR-POOLING” USERS PER 100 EMPLOYEES / CBS INVESTMENT)**
This indicator is collected as a confrontation between the number of organized trip-crew (namely, the total number of involved people) divided by the cost incurred by the Municipality for the car-pooling project.

No ex-ante is foreseen but only one data collection after the operation phase of the measure. This indicator concerns the car-pooling experimentation which involved the Tridentina school (from November 2010 to June 2011). 3 crews were formed, composed each by 1 driver and 4 children attending the Tridentina School. The number of car-pooling users to be used for the calculation

of the indicator is 4/crew: this is given by the number of transported children excluding the driver.

Crew 1 = 4 people

Crew 2 = 4 people

Crew 3 = 4 people

Total number of Car-pooling users = 12 people

Ind. 2 (January 2012) = 12/19.950,00 €

- Indicator 4 (VEHICLE FUEL EFFICIENCY)** – This indicator was defined as the energy consumption per unit of transport activity. It was possible to extract the kind of fuel used by cars from the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies.

To calculate this indicator the “Guide for the fuel saving and about the CO₂ emissions”¹⁵ was taken as reference. This Guide was released as regulation for the implementation of the European Directive 1999/94/CE¹⁶ thanks to the collaboration among 3 Italian Government Departments: Ministero delle Attività Produttive, Ministero dell’Ambiente e della tutela del territorio and Ministero delle Infrastrutture e dei Trasporti (the picture below shows an extract of the tables that can be found in the Guide).

Casa costruttrice	Modello	Carrozzeria	Carburante	Cilindrata	Potenza Kw	Cambio	Emissioni CO ₂ g/km	Consumi (l/100 km)		
								Urbano	Extra	Misto
ALFA ROMEO	ALFA 147 1.6 TS 16V 105 CV	3P / 5P	BENZINA	1598	77	M - 5	192	11,1	6,3	8,1
ALFA ROMEO	ALFA 147 1.6 TS 16V 120 CV	3P / 5P	BENZINA	1598	88	M - 5	194	11,2	6,4	8,2
ALFA ROMEO	ALFA 147 2.0 TS 16V	3P / 5P	BENZINA	1970	110	M - 5	211	12,1	7	8,9
ALFA ROMEO	ALFA 147 2.0 TS 16V SELESPEED	3P / 5P	BENZINA	1970	110	A - 5	211	12,1	7	8,9
ALFA ROMEO	ALFA 147 GTA 3.2 V6 24V	3P	BENZINA	3179	184	M - 6	287	18,1	8,6	12,1
ALFA ROMEO	ALFA 156 1.6 TS 16V	4P	BENZINA	1598	88	M - 5	195	11,4	6,4	8,2
ALFA ROMEO	ALFA 156 1.6 TS 16V DEPOTENZIATA	4P	BENZINA	1598	81	M - 5	195	11,4	6,4	8,2
ALFA ROMEO	ALFA 156 1.8 TS 16V	4P	BENZINA	1747	103	M - 5	202	12,1	6,4	8,5
ALFA ROMEO	ALFA 156 2.0 JTS	4P	BENZINA	1970	122	M - 5	205	12,2	6,6	8,6
ALFA ROMEO	ALFA 156 2.0 JTS SELESPEED	4P	BENZINA	1970	122	A - 5	205	12,2	6,6	8,6
ALFA ROMEO	ALFA 156 2.5 V6 24V	4P	BENZINA	2492	141	M - 6	282	17,5	8,5	11,8
ALFA ROMEO	ALFA 156 2.5 V6 24V Q SYSTEM	4P	BENZINA	2492	141	A - 4	283	17,5	8,6	11,9
ALFA ROMEO	ALFA 156 GTA 3.2 V6 24V	4P	BENZINA	3179	184	M - 6	287	18,1	8,6	12,1
ALFA ROMEO	ALFA 156 GTA 3.2 V6 24V SELESPEED	4P	BENZINA	3179	184	A - 6	287	18,1	8,6	12,1
ALFA ROMEO	ALFA 156 SPORTWAGON 1.6 TS 16V	5P	BENZINA	1598	88	M - 5	198	11,5	6,5	8,3
ALFA ROMEO	ALFA 156 SPORTWAGON 1.6 TS 16V DEPOTENZIATA	5P	BENZINA	1598	81	M - 5	198	11,5	6,5	8,3
ALFA ROMEO	ALFA 156 SPORTWAGON 1.8 TS 16V	5P	BENZINA	1747	103	M - 5	205	12,2	6,5	8,6
ALFA ROMEO	ALFA 156 SPORTWAGON 2.0 JTS	5P	BENZINA	1970	122	M - 5	212	12,5	6,8	8,9
ALFA ROMEO	ALFA 156 SPORTWAGON 2.0 JTS SELESPEED	5P	BENZINA	1970	122	A - 5	212	12,5	6,8	8,9
ALFA ROMEO	ALFA 156 SPORTWAGON 2.5 V6 24V	5P	BENZINA	2492	141	M - 6	286	17,8	8,6	12
ALFA ROMEO	ALFA 156 SPORTWAGON 2.5 V6 24V Q SYSTEM	5P	BENZINA	2492	141	A - 4	291	18,1	8,8	12,2
ALFA ROMEO	ALFA 156 SPORTWAGON GTA 3.2 V6 24V	5P	BENZINA	3179	184	M - 6	293	18,4	8,8	12,3
ALFA ROMEO	ALFA 156 SPORTWAGON GTA 3.2 V6 24V SELESPEED	5P	BENZINA	3179	184	A - 6	293	18,4	8,8	12,3
ALFA ROMEO	ALFA GT 2.0 JTS	2P	BENZINA	1970	122	M - 5	208	12,2	6,7	8,7
ALFA ROMEO	ALFA GT 2.0 JTS SELESPEED	2P	BENZINA	1970	122	A - 5	208	12,2	6,7	8,7
ALFA ROMEO	ALFA GT 3.2 V6 24V	2P	BENZINA	3179	176	M - 6	295	18,6	8,7	12,4
ALFA ROMEO	ALFA 166 2.0 TS 16V	4P	BENZINA	1970	110	M - 6	230	13,8	7,3	9,7
ALFA ROMEO	ALFA 166 2.5 V6 24V	4P	BENZINA	2492	138	M - 6	284	17,2	8,8	11,9
ALFA ROMEO	ALFA 166 3.0 V6 24V SPORTRONIC	4P	BENZINA	2959	162	A - 4	310	19,4	9,3	13
ALFA ROMEO	ALFA 166 3.2 V6 24V	4P	BENZINA	3179	176,5	M - 6	297	18,3	9,1	12,5
ALFA ROMEO	ALFA GTV 2.0 TS 16V	2P	BENZINA	1970	110	M - 5	220	13,3	6,8	9,2

For each kind of power supply, the average consumption per km was calculated. As we know the kms made for the Home-Work travel survey (from the questionnaire database) for each fuel category, it’s possible to estimate the total fuel consumption (l, m³, etc). Using the calorific power (specific for each kind of fuel) it’s possible to estimate the total energy consumption (MJ). The calculation of the indicator follows the formula:

¹⁵ http://www.consumieclima.org/download/guida_risparmio_carburante_emissionico2.pdf

¹⁶ DPR 17 febbraio 2003 n.84 “Regolamento di attuazione della direttiva n. 1999/94/CE

$$A = B/C$$

A = Average vehicle energy efficiency = [MJ/vkm]

B = Total energy consumed by the fleet = [MJ]

C = Total amount vehicle kms completed by the vehicles = [vkm]

EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

The indicator was obtained by the data collection linked to the questionnaires for the integrated home to work plan, which involved significantly about 12 companies.

The amount of energy consumption refers to the declarations about the kind of fuel reported in the questionnaires (question number D31). The total number of cars used for the home-work travel is 2.249. For the calculation of the total number of kms per vehicle (parameter C) the information contained in the database were taken as reference. It's important to notice that only 2.125 people answered to the question about the kms traveled by car (question number D25).

Using the Ministry methodology, each vehicle consumes the following amount of energy:

	N. of cars	fuel type and unit of measure	Km (One way trip)	km (round trip)	Average fuel consumption [l/100km m ³ /100km kWh/km]	Total amount of fuel [l m ³ kWh]	Calorific power [MJ/l MJ/m ³ MJ/kWh]	Energy consumption (MJ)	Indicator 4 [MJ/vkm]
	78	Gasoline non catalytic [l]	962	1924	9	173,16	31,5	5455	2,835
	1108	Benzina catalytic [l]	12501	25002	7	1750,14	31,5	55129	2,205
	828	Gasoil [l]	13711	27422	6,5	1782,43	34,235	61021	2,225
	233	GPL/Meth an gas [m ³]	3483	6966	13	905,58	62,545	56640	8,130
	2	Electric [kWh]	9	18	0,15	0,027	3600	97,20	5,400
Totals	2249		30666	61332				187965	

EX POST DATA COLLECTION (June 2012)

The ex post data collection was made in occasion of the second survey campaign made by the Municipality of Brescia in 2012, in order to review the Home to Work Travel Plans. Following the methodology described for the ex ante data collection, the ex post of the indicator n. 4 was calculated as follows:

	N. of cars	fuel type and unit of measure	Km (One way trip)	km (round trip)	Average fuel consumption [l/100km m ³ /100km kWh/km]	Total amount of fuel [l m ³ kWh]	Calorific power [MJ/l MJ/m ³ MJ/kWh]	Energy consumption (MJ)	Indicator 4 [MJ/vkm]
	438	Gasoline non catalytic [l]	5347	10694	9	962,46	31,5	30317	2,835
	1079	Benzina catalytic [l]	15448	30896	7	2162,72	31,5	68126	2,205
	742	Gasoil [l]	14036	28072	6,5	1824,68	34,235	62468	2,225
	334	GPL/Methan gas [m ³]	5154	10308	13	1340,04	62,545	83813	8,131
	2	Electric [kWh]	9	18	0,15	0,027	3600	97	5,400
Totals	2595		39994	79988				244821	

- Indicator 5 (CO₂ EMISSIONS)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to companies. The indicator provides an estimation of the CO₂ produced by the trips generated by the employees involved in the survey. The adopted methodology was based on TREMOVE tables. Its application was suitable because the information contained in the questionnaires provided the information on the immatriculation years. Therefore, deriving the “EURO” label from it¹⁷, it was possible to estimate the CO₂ emissions using TREMOVE tables.

EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

Before the calculation of the indicator some clarifications are necessary:

Number of filled in questionnaires: 2596

Number of people who answered “type of car supply”: 2249

Of which we know the “matriculation year”: 1919

Of which we know both the “matriculation year” and the “travelled km in the HW travel: 1697

Therefore, the total km calculated for this indicator is different from the total ones calculated for the Indicator n.4 (Indicator n.4 vkm = 61.332, as you can see in the following table).

Label	Number of gasoline powered cars	Number of gasoil powered cars	vkm Gasoline powered (one way trip)	vkm Gasoil powered (one way trip)	vkm Gasoline powered (round trip)	vkm Gasoil powered (round trip)
Euro 0	12	0	117	0	234	0
Euro 1	66	3	807	63	1614	126

¹⁷ It’s important to notice that the assignment of the EURO label to a vehicle is usually based not only by the registration year but also on the caption that can be found in the log book (CE directives adopted by the vehicle manufacturer). As we don’t have at our disposal that paper, the attribution has been made basing only on the registration year.

Euro 2	276	101	2833	1589	5666	3178
Euro 3	390	347	4904	5301	9808	10602
Euro 4	220	236	2301	4325	4602	8650
Euro 5	22	24	283	583	566	1166
subtotals	986	711	11245	11861	22490	23722
totals	1697 [cars]		23106 [vkm]		46212 [vkm]	

Now that we know the number of vkm for each kind of EURO label and of fuel supply (only gasoline and gasoil vehicles), the following CO₂ emission factors (taken from the Tremove emissions tables) were taken into consideration:

Label	vkm Gasoline powered (round trip)	vkm Gasoil powered (round trip)	CO ₂ emission factors for the gasoline-powered vehicles [g/vkm]	CO ₂ emission factors for the gasoil-powered vehicles [g/vkm]	CO ₂ emissions (gasoline-powered vehicles) [kgCO ₂]	CO ₂ emissions (gasoil-powered vehicles) [kgCO ₂]
Euro 0	234	0	289,95	192,03	67,8	0,0
Euro 1	1614	126	202,21	203,87	326,4	25,7
Euro 2	5666	3178	194,48	190,72	1101,9	606,1
Euro 3	9808	10602	181,24	174,52	1777,6	1850,2
Euro 4	4602	8650	170,22	153,66	783,3	1329,2
Euro 5	566	1166	160,10	161,95	90,6	188,8
Subtotals	22490	23722			4147,7	4000,0
Totals	46212 [vkm]				8147,7 [kg CO₂]	

It's important to remark that only gasoline and gasoil powered vehicles have been taken into consideration because Tremove tables only provide the respective emissions factors. Therefore the emissions generated by GPL/Methane gas powered vehicles are not included in the calculation of the indicator. The indicator is obtained by the data collection linked to the questionnaires for the integrated home to work plan, which has involved 12 companies.

EX POST DATA COLLECTION (Home to Work survey made in June 2012)

Before the calculation of the indicator the following clarification is necessary: the number of people who answered to "type of car supply", of which we know the "matriculation year" and the "travelled km in the H/W travel is 1692.

Label	Number of gasoline powered cars	Number of gasoil powered cars	vkm Gasoline powered (one way trip)	vkm Gasoil powered (one way trip)	vkm Gasoline powered (round trip)	vkm Gasoil powered (round trip)
Euro 0	3	2	52	17	104	34
Euro 1	14	1	197,1	8,5	394,2	17
Euro 2	141	29	1458,5	463,1	2917	926,2
Euro 3	346	219	4695	4186,5	9390	8373
Euro 4	353	231	5120,5	4281,8	10241	8563,6
Euro 5	211	142	2952,6	3122,3	5905,2	6244,6
subtotals	1068	624	14475,7	12079,2	28951,4	24158,4
totals	1692 [cars]		26554,9 [vkm]		53109,8 [vkm]	

Now that we know the number of vkm for each kind of EURO label and of fuel supply (only gasoline and gasoil vehicles), the following CO₂ emission factors (taken from Tremove tables) have been taken into consideration for the Indicator n.5:

Label	vkm Gasoline powered (round trip)	vkm Gasoil powered (round trip)	CO ₂ emission factors for the gasoline-powered vehicles [g/vkm]	CO ₂ emission factors for the gasoil-powered vehicles [g/vkm]	CO ₂ emissions (gasoline-powered vehicles) [kgCO ₂]	CO ₂ emissions (gasoil-powered vehicles) [kgCO ₂]
Euro 0	104	34	289,95	192,03	30,2	6,5
Euro 1	394,2	17	202,21	203,87	79,7	3,5
Euro 2	2917	926,2	194,48	190,72	567,3	176,6
Euro 3	9390	8373	181,24	174,52	1701,8	1461,3
Euro 4	10241	8563,6	170,22	153,66	1743,2	1315,9
Euro 5	5905,2	6244,6	160,1	161,95	945,4	1011,3
Subtotals	28951,4	24158,4			5067,7	3975,1
Totals	53109,8 [vkm]				9042,8 [kg CO₂]	

It's important to remark that only gasoline and gasoil powered vehicles have been taken into consideration because Tremove tables only provide the respective emissions factors. Therefore the emissions generated by GPL/Methane gas powered vehicles are not included in the calculation of the indicator. The indicator is obtained by the data collection linked to the questionnaires for the integrated home to work plan, which has involved 12 companies.

- **Indicator 6 (AVERAGE VEHICLES OCCUPANCY IN CAR-POOLING)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns. It collected the number of people who share their car. It was important to underline that this indicator wasn't referred to the car-pooling experimentation proposed by Municipality of Brescia, but it monitored the spontaneous car-pooling among the employees.

EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

According to the results of the survey, the total number of people who spontaneously share their car is **544**. The average vehicle occupancy, considering their declarations, is **2,15** person per shared vehicle.

EX POST DATA COLLECTION (Home to Work survey made in June 2012)

According to this second survey, the total number of people who, before the starting of the official service experimentation, share their car is **554**. The average vehicle occupancy, considering their declarations, is **2,28** person per shared vehicle.

- **Indicator 7 (AVERAGE OCCUPANCY)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to campaigns. This indicator represented the average number of passenger per vehicle and per trip. It was referred to the average vehicle occupancy of the vehicles usually made by the employees (who not necessarily share their car)

EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

Using data coming from the answers to the question number D21 of the questionnaire used in the survey, it's possible to obtain how many people use the car alone (**1769** people). Using data from

question number D34 (the same information used for the ex ante of the previous indicator) is possible to consider vehicle occupancy for those who share their car for the home-work trip (**544** people).

The average vehicle occupancy is therefore **1,27** people per vehicle.

EX POST DATA COLLECTION (Home to Work survey made in June 2012)

According to the methodology described above, the results of this second survey showed that the number of people who use the car alone is **2510**. the vehicle occupancy for those who share their car for the home-work trip (**554** people).

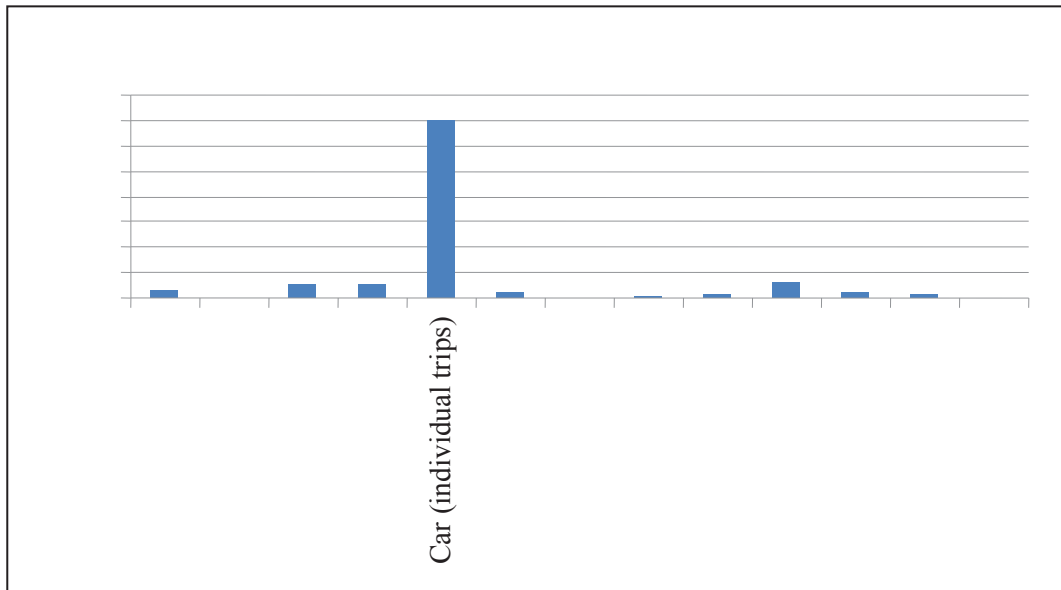
The average vehicle occupancy is therefore **1,23** people per vehicle.

- **Indicator 8 (AVERAGE MODAL SPLIT-TRIPS)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to compaigns. It collected the means of transport daily used for the Home-Work trips.

EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

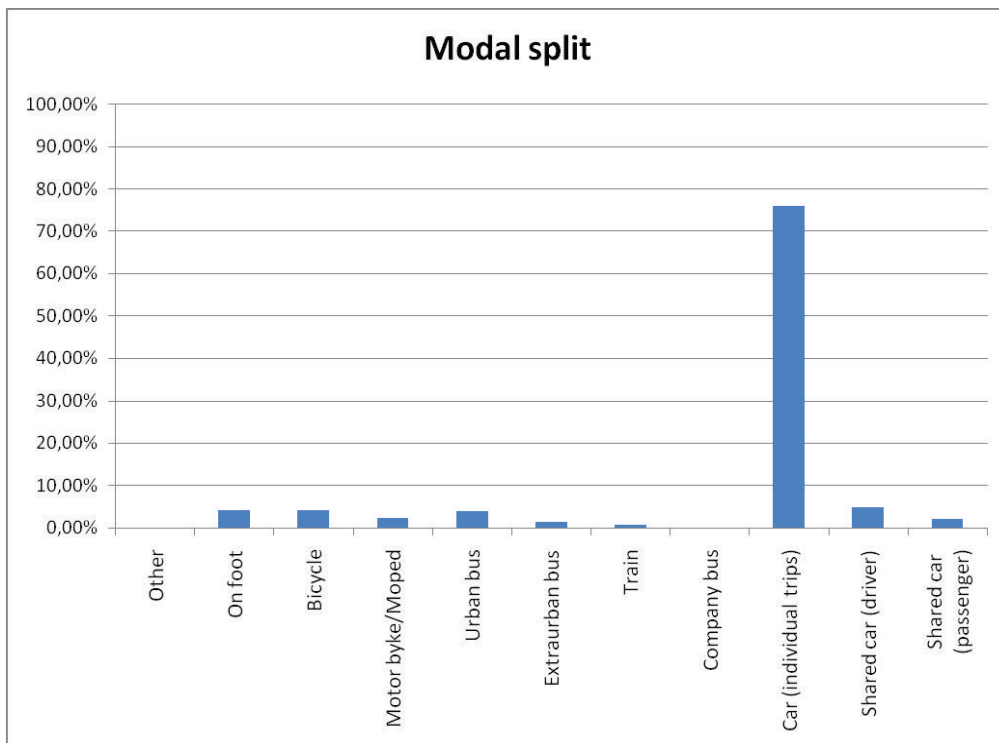
According to the survey results, data concerning the “use of car” derives from the sum of “shared cars (driver)”, “Shared car (passenger)” and “Car (individual trips)”. Likewise, the results for “use of bus” come from the sum of “Company bus”, “Extra-urban bus” and “Urban bus”.

Modal split	Partial	Total
On foot	2,83%	2,83%
Other	0,06%	0,06%
Shared car (driver)	5,55%	81,48%
Shared car (passenger)	5,78%	
Car (individual trips)	70,15%	
Bicycle	2,65%	2,65%
Company bus	0,06%	2,83%
Extra-urban bus	0,88%	
Urban bus	1,89%	
Intermodal	6,14%	6,14%
Motor bike/ Moped	2,60%	2,60%
Not Answered	1,24%	1,24%
Train	0,18%	0,18%
Total	100,00%	100,00%



EX POST DATA COLLECTION (Home to Work survey made in June 2012)

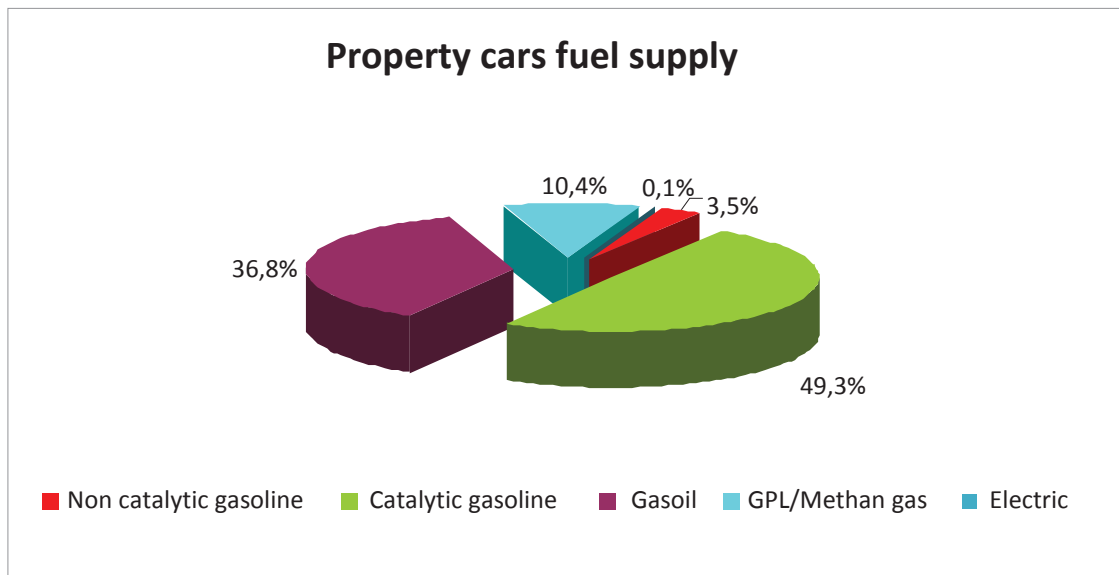
Modal split	Partial	Total
On foot	4,18%	4,18%
Other	0,06%	0,06%
Shared car (driver)	4,85%	83,03%
Shared car (passenger)	2,12%	
Car (individual trips)	76,06%	
Bicycle	4,15%	4,15%
Company bus	0,09%	5,57%
Extra-urban bus	1,48%	
Urban bus	4,00%	
Intermodal	0,00%	0,00%
Motor bike/ Moped	2,24%	2,24%
Not Answered	0,00%	0,00%
Train	0,76%	0,76%
Total	100,00%	100,00%



- Indicator 9 (TYPE OF PROPERTY CARS USED IN HW TRIP /100 EMPLOYEES) –**
 The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns to compaigns. “Type of property cars” referred to the kind of fuel used by the employees’ cars. This indicator was expressed as percentage respect to the total number of property used cars.

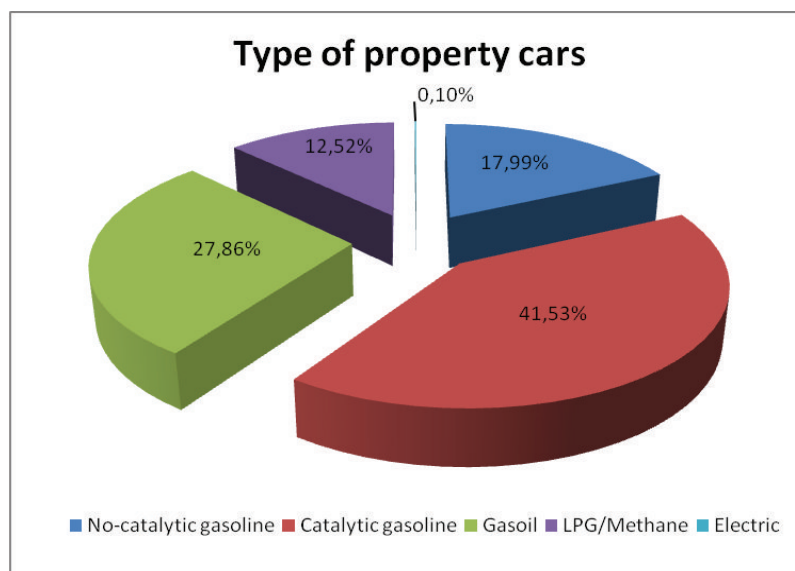
EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

Type of property cars	Absolute values	Percentage respect to the total amount of property cars
No-catalytic gasoline	78	3,5%
Catalytic gasoline	1109	49,3%
Gasoil	828	36,8%
LPG/Methane	233	10,4%
Electric	2	0,1%
Total	2250	100,0%



EX POST DATA COLLECTION (Home to Work survey made in June 2012)

Type of property cars	Absolute values	Percentage respect to the total amount of property cars
No-catalytic gasoline	516	21,9%
Catalytic gasoline	1191	50,6%
Gasoil	799	34,0%
LPG/Methane	359	15,3%
Electric	3	0,1%
Total	2352	100,0%



- **Indicator 10** (TYPE MOPEDS AND MOTORCYCLES USED IN HW TRIP /100 EMPLOYEES) – The calculation of this indicator was made using data provided by the

questionnaire distributed to the employees during the Home to Work travel survey campaigns to campaigns. From the distributed questionnaires it was not possible to extract the kind of fuel used by motorcycles/moped (usually they are gasoline-powered).

EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

Using the modal split coming from the PSCL survey (See indicator n. 8) the percentage of people using mopeds/motorcycles for their travel is **2,6%**. The indicator is obtained by the data collection linked to the questionnaires for the integrated home to work plan, which has involved 12 companies.

EX POST DATA COLLECTION (Home to Work survey made in June 2012)

Using the modal split coming from the PSCL survey (See indicator n. 8) the percentage of people using mopeds/motorcycles for their travel is **2,24%**. The indicator is obtained by the data collection linked to the questionnaires for the integrated home to work plan, which has involved 12 companies.

- **Indicator 11 (TYPE OF PROPERTY CARS USED IN HW TRIP /100 EMPLOYEES IN THE PEAK HOURS)** – The calculation of this indicator was made using data provided by the questionnaire distributed to the employees during the Home to Work travel survey campaigns. A data cross was made between the usual travel hour of the employees and the respective kind of car used, focusing on the movements during the peak hour (from 7:30 and 8:30 in the morning)

EX ANTE DATA COLLECTION (Home to Work survey made in 2010)

fuel type	N. cars traveling during the peak hour	% cars traveling during the peak hour
No-catalytic gasoline	45	4,2%
Catalytic gasoline	561	51,8%
Gasoil	373	34,4%
LPG/Methane gas	102	9,4%
Electric	2	0,2%
Total	1083	100,0%

The indicator is obtained by the data collection linked to the questionnaires for the integrated home to work plan, which has involved 12 companies.

EX POST DATA COLLECTION (Home to Work survey made in June 2012)

fuel type	N. cars traveling during the peak hour	% cars traveling during the peak hour
No-catalytic gasoline	100	13,51%
Catalytic gasoline	327	44,19%
Gasoil	211	28,51%
LPG/Methane gas	101	13,65%
Electric	1	0,14%
Total	740	100,00%

- **Indicator 12 (N OF CAR-POOLING USERS /POTENTIAL USERS)** – This indicator concerned car-pooling experimentation, performed by the Brescia Municipality at the Tridentina

school. It is calculated dividing the number of car-pooling users during the experimentation (A) and the potential number of car-pooling users (B), represented by the total number of students attending the involved school.

No ex-ante is foreseen but only one data collection after the operation phase of the measure (in **May 2011**). This indicator concerns the car-pooling experimentation which involved the Tridentina school (from November 2010 to June 2011). 3 crews were formed, composed each by 1 driver and 4 children attending the Tridentina School. The number of car-pooling users to be used for the calculation of the indicator is 4/crew: this is given by the number of transported children excluding the driver.

Crew 1 = 4 people

Crew 2 = 4 people

Crew 3 = 4 people

(A) Total number of Car-pooling users = 12 people;

(B) Total number of students attending the school (school year 2010/2011) = 439 children

$$\text{Indicator 12} = A * 100 / B = 2,73$$

(*) In order to estimate the car-pooling potential users, the total number of students has been considered, as each student is supposed to be carried to school by one parent.

- **Indicator 13 (AWARENESS LEVEL);** This indicator expresses the awareness level of the population toward the bike tag initiative promoted by the Municipality of Brescia. is measured through the administration of a questionnaire to the Brescia citizens. The questionnaire is the same used for the acquisition of indicators belonging to other CBS measures (M05.02, M06.05 and M04.06). As explained in the M05.02 Evaluation Results Template, a survey based on face to face interviews would have required more time than the scheduled, to collect a significant ex-ante before the implementation of the measure, a faster procedure (that slightly differs from the initial one) was chosen: the questionnaires were administered by phone by a charged company. The representative sample was chosen among the resident population (this choice was based on operative considerations: extending the survey also to the gravitating population would have introduced too many complications and would have incised the costs). The sample size, of 600 filled in questionnaires, was selected among the personal data of the Municipality (which allowed a statistical significance of more than the 90%).

EX ANTE SITUATION (Questionnaire administered in March 2010):

To reach the goal of 600 filled in questionnaires, the company in charge of the survey contacted 787 families. Only 220 of them answered to the phone calls but thanks to the fact that families are generally composed by more than one members, are collected totally **601 filled in questionnaires**. The questionnaires have been administered **from 5th February to 3rd March 2010**. This period can be considered as a valid ex ante for this measure.

The questions included in the questionnaire, able to express the indicator “Awareness level” is the following:

“Do you know that it’s possible to tag your bike (registering it into a National Register) in order to increase, in case of theft, the possibilities to find it?” The possible answers are: 1. Yes, but my bike hasn’t been tagged yet; 2. Yes and my bike has already been tagged; 3. Yes but I’m not interested/Don’t think it would be useful; 4. No but I’m interested; 5. No and I’m not interested.

The awareness level of the population respect to the bike tag initiative.

- Awareness level about bike tag initiative:

Yes, but my bike hasn’t been tagged yet	15,00%	20,00%
---	--------	--------

Yes and my bike has already been tagged	2,50%	
Yes but I'm not interested/Don't think it would be useful	2,50%	
No but I'm interested	47,50%	
No and I'm not interested	32,50%	
Total	100,00%	

AFTER SITUATION: (Questionnaire of April 2011)

- Awareness level about bike tag initiative:

Yes, but my bike hasn't been tagged yet	16,00%	35,00%
Yes and my bike has already been tagged	11,00%	
Yes but I'm not interested/Don't think it would be useful	8,00%	
No but I'm interested	30,00%	
No and I'm not interested	35,00%	
Total	100,00 %	

AFTER SITUATION: (Questionnaire of April 2012)

- Awareness level about bike tag initiative:

Yes, but my bike hasn't been tagged yet	22,00	39,00%
Yes and my bike has already been tagged	5,00	
Yes but I'm not interested/Don't think it would be useful	12,00	
No but I'm interested	28,00	
No and I'm not interested	33,00	
Total	100,00 %	

- **Indicator 14 (ACCEPTANCE LEVEL)** – This indicator expresses the acceptance level of the population toward a Car-pooling service in Brescia.

The indicator was calculated through the administration of a questionnaire to the Brescia citizens. Some questions about car-pooling service were inserted in the questionnaires elaborated for the measures 05.02 and 05.03. The methodological aspects and the timing of the data collection concerning this survey are the same described for the previous indicator n. 13 "Awareness level".

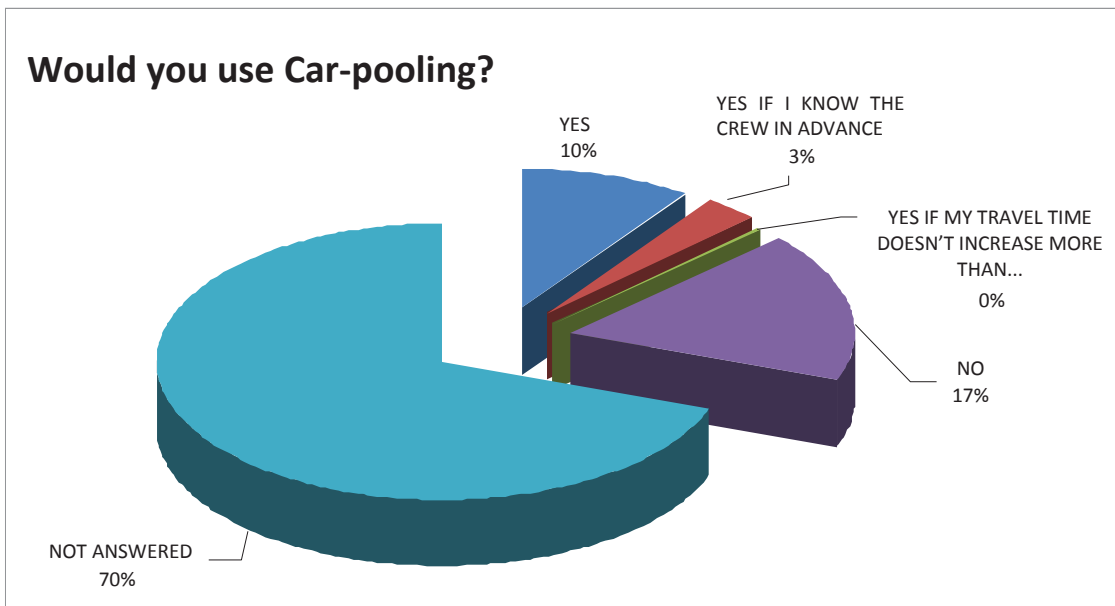
According to the specific topic investigated, the March 2010 survey represented the first data collection, as it's not possible to have an ex ante situation for a service that in Brescia wasn't active.

FIRST DATA COLLECTION (March 2010)

Results elaboration: To reach the goal of 600 filled in questionnaires, the company contacted 787 families. Only 220 of them answered to the phone calls but thanks to the fact that families are generally composed by more than one members, has been collected totally **601 filled in questionnaires**. The questionnaires were administered **from 5th February to 3rd March 2010**.

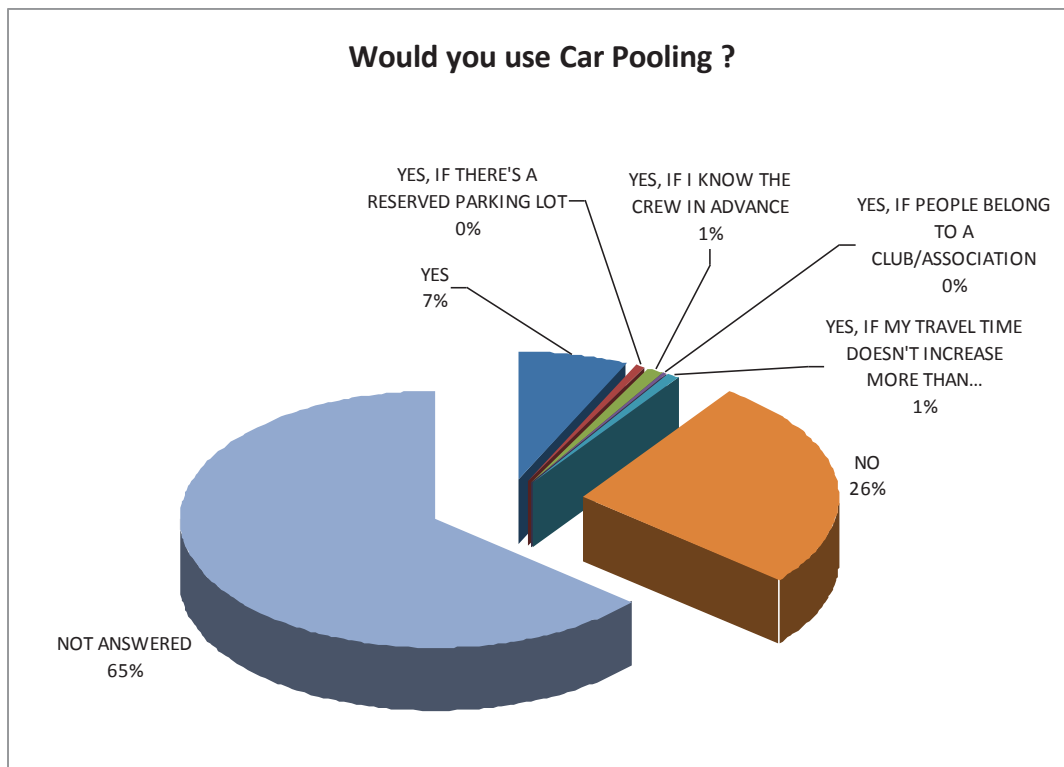
The Acceptance level indicator is composed by the acceptance level of the population toward the Car-pooling service.

- Acceptance level about Car-pooling: 10%+3% +0%= 13%



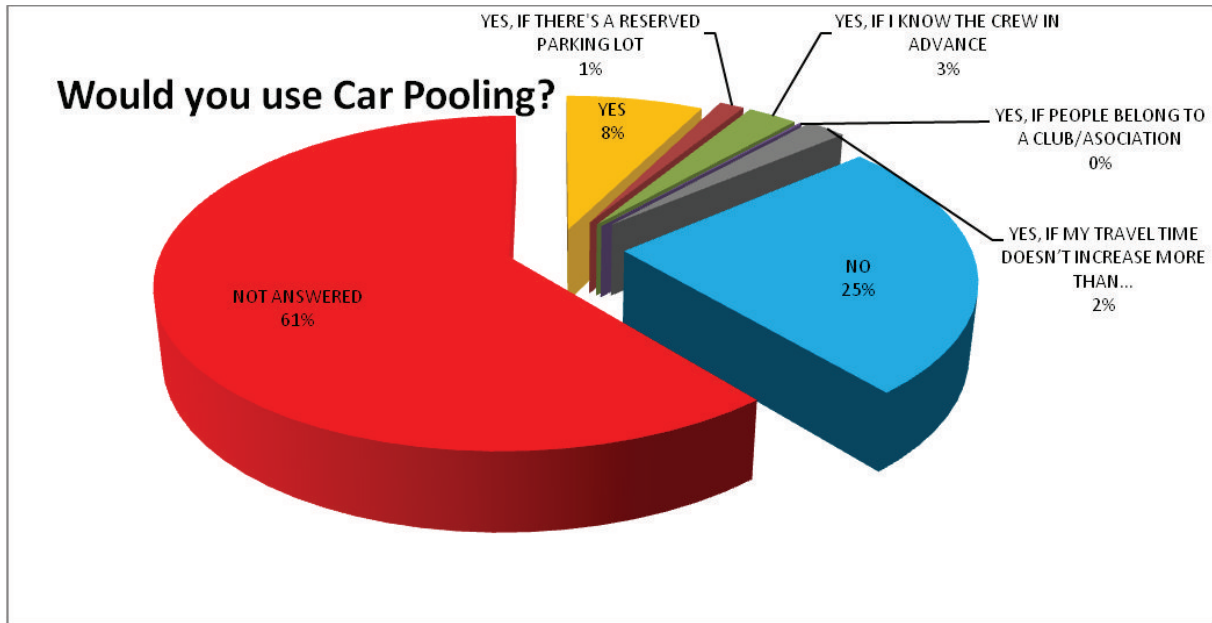
SECOND DATA COLLECTION (April 2011) :

- Acceptance level about Car-pooling: $7\% + 0\% + 1\% + 0\% + 1\% = 9\%$



THIRD DATA COLLECTION (April 2012) :

- Acceptance level about Car-pooling: $8\% + 1\% + 3\% + 0\% + 2\% = 14\%$



The questionnaire is reported below (in red the specific section of the questionnaire dedicated to car-pooling):



Comune di Brescia
Settore Mobilità e Traffico
Assessorato alla Mobilità e Traffico



THE CIVITAS INITIATIVE
IS CO-FINANCED BY THE
EUROPEAN UNION

INDAGINE “CIVITAS PLUS”
sul livello di conoscenza dei progetti
“Centro di Monitoraggio per la sicurezza stradale”, “Miglioramento
della sicurezza per i ciclisti”, “Car sharing” e “Car pooling”

Scheda familiare
Anno 2009

Informazioni sull'indagine

Il Comune di Brescia è coinvolto, dall'ottobre 2008, in un programma europeo chiamato Civitas Plus Modern. Tale programma riunisce in un consorzio 4 città europee (Brescia, Vitoria Gasteiz, Craiova e Coimbra) impegnate nell'implementazione di progetti che mirano alla mobilità sostenibile, alla riduzione dell'inquinamento e alla sicurezza. Le misure cofinanziate dalla Comunità Europea e portate avanti dalla città di Brescia sono in totale 14 e conseguono gli obiettivi del programma europeo agendo su fronti diversi: si stanno portando avanti progetti che vanno dalla promozione dell'uso di carburanti alternativi e mezzi ad elevata efficienza energetica allo sviluppo di sistemi integrati di bigliettazione del trasporto pubblico, dall'organizzazione di campagne informative allo studio di soluzioni innovative per gli spostamenti casa/lavoro o per le merci in città, dalla pianificazione della sicurezza stradale allo sviluppo di sistemi innovativi per la gestione della domanda per il trasporto pubblico.

Per i sotto progetti riguardanti il Centro di Monitoraggio per la sicurezza stradale, il miglioramento della sicurezza per i ciclisti, il Car Sharing e il Car pooling, gestiti dal Comune Di Brescia, è prevista, mediante indagini campionarie presso la popolazione residente, un'attività periodica di monitoraggio per valutare il livello di conoscenza dei progetti da parte della cittadinanza.

Il presente questionario raccoglie informazioni anche su aspetti demografici e sociali della famiglia intervistata, ma la scheda è anonima e la sua compilazione è facoltativa e lasciata alla disponibilità e collaborazione delle famiglie.

Ringraziamo le famiglie rispondenti e tutte le persone coinvolte nella rilevazione per la collaborazione.

Codice Famiglia

Codice rilevatore

Data di consegna

Numero di componenti

Circoscrizione di residenza
Quartiere di residenza

Componente 1

Relazione di parentela	<input type="checkbox"/> 1	Intestatario scheda anagrafica			
Sesso	<input type="checkbox"/> F	<input type="checkbox"/> M	Anno di nascita		
Stato civile	<input type="checkbox"/> 1	Nubile/celibe	<input type="checkbox"/> 2	Coniugata/o	<input type="checkbox"/> 3
				Separata/o	<input type="checkbox"/> 4
				Divorziata/o	Vedova/o
Titolo di studio	<input type="checkbox"/> 1	Nessuno	<input type="checkbox"/> 2	Licenza elementare	<input type="checkbox"/> 3
				Diploma media inferiore	
	<input type="checkbox"/> 4	Diploma media superiore o professionale	<input type="checkbox"/> 5	Laurea	
Condizione professionale	<input type="checkbox"/> 1	Occupato	<input type="checkbox"/> 2	Disoccupato/in cerca di lavoro	<input type="checkbox"/> 3
				Casalanga	
	<input type="checkbox"/> 4	Ritirato dal lavoro	<input type="checkbox"/> 5	Studente	<input type="checkbox"/> 6
				Altro	

Qual'è il principale mezzo di trasporto che utilizza abitualmente per...	Tragitto casa/lavoro o casa/scuola	Spese, commissioni, accesso ai servizi	Tempo libero	Altri spostamenti
Piedi	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1
Bicicletta	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2
Ciclomotore	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3
Automobile	<input type="checkbox"/> 4	<input type="checkbox"/> 4	<input type="checkbox"/> 4	<input type="checkbox"/> 4
Trasporto pubblico	<input type="checkbox"/> 5	<input type="checkbox"/> 5	<input type="checkbox"/> 5	<input type="checkbox"/> 5

Prima di essere contattato per questa indagine, era a conoscenza del Progetto Civitas Plus per la mobilità sostenibile, pulita e sicura? Sì No

SICUREZZA STRADALE:

Lei è a conoscenza di campagne informative (realizzate nelle scuole, in città, ecc) sul tema degli incidenti stradali? Sì No

Se sì, può precisare tramite quali mezzi di comunicazione? (Scelta multipla)

Cartelloni pubblicitari	<input type="checkbox"/>
Volantini o brochures	<input type="checkbox"/>
TV locali	<input type="checkbox"/>
Stampa	<input type="checkbox"/>
Siti web	<input type="checkbox"/>
Radio	<input type="checkbox"/>
Altro	<input type="checkbox"/>

Specificare "altro"

Solo per i maggiori di 14 anni:

Considera prioritario il problema dell'incidentalità? Sì No

Quale grado di priorità attribuirebbe ad interventi intrapresi al fine di risolvere tale problema? Alto Medio Basso

Tra le cause di incidente prevalenti riportate qui di seguito, qual è quella che le desta più preoccupazione?

Infrazioni semaforiche	<input type="checkbox"/>
Eccesso di velocità	<input type="checkbox"/>
Mancato rispetto di stop/precedenza	<input type="checkbox"/>
Mancato rispetto della distanza di sicurezza	<input type="checkbox"/>
Manovre/attraversamenti/svolte irregolari	<input type="checkbox"/>
Sosta vietata agli incroci o presso gli attraversamenti pedonali	<input type="checkbox"/>
Stato psico-fisico alterato	<input type="checkbox"/>
Altro	<input type="checkbox"/>

Specificare "altro"

E' a conoscenza del fatto che il Comune, attraverso il progetto Civitas Plus, intende dotarsi di un Piano della Sicurezza Stradale Urbano (PSSU) proprio per cercare di risolvere il problema dell'incidentalità stradale? Sì No

Quali sono le categorie di utenti della strada da favorire nell'ambito di una pianificazione della sicurezza stradale?
Potrebbe fornire un ordine di priorità?

Automobilisti	<input type="checkbox"/>
Pedoni	<input type="checkbox"/>
Ciclisti	<input type="checkbox"/>
Motociclisti e ciclomotoristi	<input type="checkbox"/>
Autobus	<input type="checkbox"/>

BICICLETTA:

Negli ultimi 6 mesi, ha utilizzato la bicicletta? Si No

Prosegue la compilazione solo chi ha risposto Si al quesito precedente:

Negli ultimi 6 mesi, ha utilizzato le piste ciclabili? Si No

Ritiene che i percorsi ciclabili, siano sufficientemente segnalati e riconoscibili? Si No

Conosce e ha utilizzato la mappa dei percorsi ciclabili cittadini?

Non sapevo dell'esistenza della mappa dei percorsi ciclabili	<input type="checkbox"/>
Conosco la mappa, ma non l'ho mai usata	<input type="checkbox"/>
Conosco la mappa e l'ho utilizzata saltuariamente	<input type="checkbox"/>
Conosco la mappa e la utilizzo spesso	<input type="checkbox"/>

Come giudica la dotazione di rastrelliere per biciclette in città nei luoghi da lei frequentati?

Inadeguata	<input type="checkbox"/>
Adeguate	<input type="checkbox"/>
Eccessiva	<input type="checkbox"/>

E' a conoscenza del fatto che il Comune, attraverso il progetto Civitas, intende dotare tutti i percorsi ciclabili cittadini di un'apposita segnaletica di direzione, nonché rinnovare e migliorare la segnaletica orizzontale e verticale esistente ed incrementare il numero delle rastrelliere in città? Si No

Conosce la possibilità di dotare la sua bicicletta di un codice univoco e di un'apposita targhetta adesiva che consenta, in caso di furto, di aumentare la possibilità di ritrovamento?

Si, ma la mia bicicletta non è ancora dotata di targa	<input type="checkbox"/>
Si e la mia bicicletta è già dotata di targa	<input type="checkbox"/>
Si, ma non mi interessa/non credo sia efficace	<input type="checkbox"/>
No, ma mi interessa	<input type="checkbox"/>
No, non mi interessa	<input type="checkbox"/>

CAR SHARING:

Ha mai sentito parlare di un servizio chiamato Car Sharing? Si No

Se sì, è a conoscenza che anche a Brescia presto sarà disponibile un servizio di Car Sharing? Si No

In caso di risposta negativa al primo quesito sul CS:

Il Car Sharing è un servizio innovativo che, nelle nostre città, può validamente rappresentare un'alternativa efficace e utile all'idea corrente di mobilità. Se già conosce il servizio BiciMia, le modalità di accesso al servizio sono simili e molto semplici: ci si associa ad un circuito che eroga il servizio gestendo una flotta di veicoli di diversa tipologia. L'utente può prenotare e prelevare in qualsiasi momento del giorno e della notte il veicolo richiesto dall'area di parcheggio più vicina. E' una soluzione ideale per spostamenti brevi e frequenti. Un'alternativa per chi percorre pochi chilometri o per chi non intende rinunciare all'auto di proprietà, ma deve fare i conti con esigenze di mobilità che oggi sono risolte con l'acquisto di una seconda o terza macchina.

Alla luce delle sue attuali esigenze di mobilità, ritiene questo servizio interessante? Si No

CAR POOLING:

Una modalità per ridurre il traffico è quella di condividere il percorso casa-lavoro con altre persone (principio del Car pooling). Lei sarebbe disposto a farlo sapendo che c'è da una parte la possibilità di dividere esattamente i costi del viaggio tra gli occupanti il veicolo e dall'altra di usufruire di privilegi una volta sul posto di lavoro/studio (parcheggi riservati, ecc...)? (Solo una risposta ammessa)

Si	
Si se ho un posto riservato	
Si se conosco prima le persone	
Si se le persone fanno parte di un "club" (quindi esiste un controllo dell'identità)	
Si se il mio tempo di percorrenza non aumenta più di....	
No	

- **Indicator 15 (NUMBER OF TAGGED BICYCLES PER YEAR DURING CIVITAS)** – Using data coming from the Easy Tag national bike register, it's possible to extract the number of registered bike per year. It's also possible to extract some useful information from the same questionnaire administered for the calculation of indicators n 13 and 14, elaborating the answers given to the specific question about the possibility to tag bikes. In particular, the administered question was: "Do you know that it's possible to tag your bike with a specific univocal code that would increase the possibility to retrieve it in case of theft?".

EX ANTE SITUATION:

The Municipality of Brescia purchased 2000 kit in 2007 and 2500 in 2010. As the indicator aims at monitoring the variation of the number of tagged bikes during the Civitas project, the ex ante situation is up to June 2010, when a massive distribution of the kit has been organized during specific initiatives.

Year	2007	2008	2009
Number of registerd bikes in Brescia	1026	1577	2341

AFTER AND EX POST SITUATION

Year	2010	2011	2012 (partial data until the end of May 2012)
Number of registerd bikes in Brescia	2854	3156	3168

Annex 3: Cost Benefit Analysis

Evaluation period for CBA

- *Defining reference case for CBA*
CBA has been carried out comparing the hypothetic situation without the car-pooling service (reference case or Business-as-Usual scenario) with the Civitas scenario, characterized by the Car-pooling experimentation, which lasted from November 2010 to June 2011.
- *Defining lifetime of the measure*
The reference year is 2010, when the Municipality of Brescia charged a private local Company to manage the car-pooling service experimentation. At the end of the experimental phase data were collected to monitor the experience. The whole period, taken into consideration by CBA to have a financing return, is 15 years (final CBA year: 2025).
- *Discount rate*
The average yearly interest rate estimated in the 15 years period of CBA (2010-2025) is 3,5%.

Method and values for modification

This CBA analysis was made referring to the car-pooling service experimentation.

This CBA considered as “capital costs” the contribution the Municipality of Brescia gave to the Private Company for the management of the experimentation.

As regard the benefits, from a theoretical point of view the introduction of a car-pooling service allows to reduce the car trips at city level and the mileage. As main consequence of that, the fuel consumption and polluting emissions are reduced: this CBA included these positive effects in the economic benefits in terms of operating cost saving at collective level (because they contribute towards the “expenses reduction” of imported goods from foreign countries).

Another benefit related to car-pooling initiative is the reduction of traffic congestion and road accident, but taking into consideration the exiguous number of car-pooling users during the experimentation, this benefit (conservative approach) was considered negligible and not evaluated in this CBA.

From the monitoring carried out in 2011, the total kms run during the car-pooling experimentation were 1.647, which corresponded to a mileage reduction of 3.569 kms at city level. The “kms saved / kms run” ratio is 2,17 and it was assumed constant in the following years of the CBA.

This CBA provides the yearly increasing rate of the kms to be covered by car-pooling users in order to re-pay the investment costs in 15 years (NPV at 2025>0)

- *Description of how the impacts were monetised:*

Fuel saving revenues: the average fuel consumption, referred to a car with medium cubic capacity that runs in urban network, was estimated 11 km/l; the fuel cost adopted by CBA is 0,6 € (economic cost excluding taxes and referred to year 2010).

Emissions costs:

The emission quantities of the main environmental polluting agents are shown in Table 1 for the different car types with medium cubic capacity (running in urban network): grams/km of

carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM) and carbon dioxide (CO₂).

TABLE 1 – Polluting emission factors of the different car types (source: Euro normative)

EMISSION FACTOR	GASOLINE CAR				GASOIL CAR			
	EURO1	EURO2	EURO3	EURO4	EURO1	EURO2	EURO3	EURO4
CO emission factor (g/km)	10,52	8,52	8,96	3,90	1,00	0,37	0,26	0,19
NOx emission factor (g/km)	0,59	0,31	0,21	0,11	1,21	0,87	0,76	0,44
PM emission factor (g/km)	-	-	-	-	0,13	0,09	0,05	0,03
CO2 emission factor (g/km)	385,90	385,90	385,90	347,30	276,50	276,50	276,50	248,90

The percentage composition of the different car types running in Brescia town in 2010 is shown in the following Table 2:

TABLE 2 – Car distribution in Brescia province at 2010 (source: ACI)

GASOLINE CAR				GASOIL CAR			
EURO1	EURO2	EURO3	EURO4	EURO1	EURO2	EURO3	EURO4
4%	17%	12%	21%	1%	6%	16%	23%

The money return of the environmental benefits was carried out basing on EU data; in particular the figures (total external costs in urban zone) referred to the main polluting agents (CO, NOx, PM and CO₂) taken into consideration in the CBA, are shown in Table 3 and referred to Euro 2010.

TABLE 3 – Money return of the main polluting agents (€2010/Kg)

EMISSION TYPE	ESTERNAL COST (€2010/kg)
CO emission (*)	0,004
NOx emission (**)	3,755
PM emission (**)	434,164
CO2 emission (**)	0,110

Source: (*) Astra – Scenario Low External Cost - 2005

(**) HEATCO, D5 Proposal for harmonised Guidelines – Brussels, 2006

• *References of values used*

- ACI statistics (2010)
- Astra – Scenario Low External Cost - 2005
- HEATCO, D5 Proposal for harmonised Guidelines – Brussels, 2006

Life time cost and benefit

TABLE 4 - Capital cost in the evaluation period (not discounted)

	Cases for comparison	Cost (e.g. €200,000)
Year 0	CIVITAS measure	€ 19,950
(2010)	Reference case (or BAU)	-

TABLE 5 - Operation cost/savings from fuel reductions in the evaluation period (not discounted)

	Cases for comparison	Values (e.g. €200,000)
Year 1	CIVITAS measure	€ 90
	Reference case (or BAU)	€ 285
Year 2	CIVITAS measure	€ 110
	Reference case (or BAU)	€ 347
Year 3	CIVITAS measure	€ 133
	Reference case (or BAU)	€ 421
Year 4	CIVITAS measure	€ 162
	Reference case (or BAU)	€ 512
Year 5	CIVITAS measure	€ 196
	Reference case (or BAU)	€ 622
Year 6	CIVITAS measure	€ 239
	Reference case (or BAU)	€ 756
Year 7	CIVITAS measure	€ 290
	Reference case (or BAU)	€ 918
Year 8	CIVITAS measure	€ 352
	Reference case (or BAU)	€ 1,116
Year 9	CIVITAS measure	€ 428
	Reference case (or BAU)	€ 1,356
Year 10	CIVITAS measure	€ 520
	Reference case (or BAU)	€ 1,647
Year 11	CIVITAS measure	€ 632
	Reference case (or BAU)	€ 2,001
Year 12	CIVITAS measure	€ 768
	Reference case (or BAU)	€ 2,431
Year 13	CIVITAS measure	€ 933
	Reference case (or BAU)	€ 2,954
Year 14	CIVITAS measure	€ 1,134
	Reference case (or BAU)	€ 3,589
Year 15	CIVITAS measure	€ 1,377
	Reference case (or BAU)	€ 4,361

TABLE 6 - Savings from reductions of environmental emissions (not discounted)

	Cases for comparison	Values (e.g. €200,000)
Year 1	CIVITAS measure	€ 64
	Reference case (or BAU)	€ 227
Year 2	CIVITAS measure	€ 78
	Reference case (or BAU)	€ 276
Year 3	CIVITAS measure	€ 94
	Reference case (or BAU)	€ 336
Year 4	CIVITAS measure	€ 115
	Reference case (or BAU)	€ 408
Year 5	CIVITAS measure	€ 139
	Reference case (or BAU)	€ 495
Year 6	CIVITAS measure	€ 169
	Reference case (or BAU)	€ 602
Year 7	CIVITAS measure	€ 206
	Reference case (or BAU)	€ 731
Year 8	CIVITAS measure	€ 250
	Reference case (or BAU)	€ 888

Year 9	CIVITAS measure	€ 303
	Reference case (or BAU)	€ 1,079
Year 10	CIVITAS measure	€ 369
	Reference case (or BAU)	€ 1,311
Year 11	CIVITAS measure	€ 448
	Reference case (or BAU)	€ 1,593
Year 12	CIVITAS measure	€ 544
	Reference case (or BAU)	€ 1,936
Year 13	CIVITAS measure	€ 661
	Reference case (or BAU)	€ 2,352
Year 14	CIVITAS measure	€ 803
	Reference case (or BAU)	€ 2,858
Year 15	CIVITAS measure	€ 976
	Reference case (or BAU)	€ 3,472

TABLE 7 - Lifetime cost/benefit of the reference measure/case and CIVITAS measure (discounted)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Reference Measure - Business as Usual: traditional transport without car pooling service implementation																
Investment costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel costs	285	347	421	512	622	756	918	1.116	1.356	1.647	2.001	2.431	2.954	3.589	4.361	
Emissions costs	227	276	336	408	495	602	731	888	1.079	1.311	1.593	1.936	2.352	2.858	3.472	
Civitas Measure: with implementation of car pooling service																
Investment costs (1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel costs	90	110	133	162	196	239	290	352	428	520	632	768	933	1.134	1.377	
Emissions costs	64	78	94	115	139	169	206	250	303	369	448	544	661	803	976	
Civitas Measure vs Reference Measure																
Investment costs (1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel saving revenues (2)	195	237	288	350	426	517	628	763	927	1.127	1.369	1.664	2.021	2.456	2.984	
Emissions cost saving (3)	163	199	241	293	356	433	526	639	776	943	1.145	1.392	1.691	2.055	2.496	
TOTAL	- 19.950	- 359	- 436	- 643	- 782	- 950	- 1.154	- 1.402	- 1.703	- 2.070	- 2.515	- 3.055	- 3.712	- 4.510	- 5.480	
OVERALL TOTAL	- 19.950	- 19.591	- 19.156	- 17.983	- 17.201	- 16.251	- 15.097	- 13.695	- 11.992	- 9.922	- 7.408	- 4.353	- 640	- 3.870	- 9.350	
TOTAL BENEFIT	-	359	436	643	782	950	1.154	1.402	1.703	2.070	2.515	3.055	3.712	4.510	5.480	
TOTAL COST	19.950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
INTEREST RATE																
NET PRESENT VALUE	- 19.275	- 18.941	- 18.547	- 18.086	- 17.544	- 16.908	- 16.162	- 14.257	- 13.049	- 11.632	- 9.968	- 8.014	- 5.721	- 3.029	132	
BENEFITS/COSTS RATIO	0,00	0,02	0,04	0,07	0,10	0,14	0,19	0,31	0,40	0,50	0,63	0,78	0,97	1,19	1,47	
I.R.R.							-23,8%	-17,8%	-13,0%	-9,0%	-5,6%	-2,8%	-0,3%	1,7%	3,6%	

NOTES:

- (1) Contract cost for car pooling implementation
- (2) Fuel saving due to the decreasing of km running
- (3) Emissions saving due to the decreasing of km running

Summary of CBA results

Table 8 shows the main results of CBA (net present value, benefits/costs ratio, investment rate return), referred to year 2025 (CBA period: 15 years).

TABLE 8 – CBA results between Civitas Measure and Reference Measure/BaU (year 2025)

COST/BENEFIT ANALYSIS	2025
TOTAL KM RUNNING (km)	134.572
TOTAL KM SAVING (km)	291.502
INTEREST RATE	3,5%
NET PRESENT VALUE (€ 2010)	132
BENEFITS/COSTS RATIO	1,47
I.R.R.	3,6%

The car-pooling investment cost of the Civitas measure (19,950 €) is re-paid in 15 years, thanks to the emission and fuel saving, only if the total mileage covered by the car-pooling service is 134'572 km.

This means that, the car-pooling experience in Brescia, which was characterized by an exiguous number of kms covered in 2011 during the experimentation (1.647 km), should increase the mileage covered by the CAR-POOLING service yearly in the next 15 years by 21,5%, in order to register 25'169 kms in 2025 and to reach the cumulative value of 134'572 km (15 years).

As a matter of fact, only with this increasing rate, the Net Present Value and the Benefit/Costs Ratio become respectively higher than zero and higher than one in 15 years.

The Investment Return Rate in 2025 results 3,6%, practically equal to the estimated Interest Rate (3,5%).