

## M03.03 – Executive summary

The city of Brescia was traditionally characterized by mono-modal mean of transport. The realization of a metro line, in addition to tradition LPT (namely, bus lines), and, at the same time, the Civitas project implementation were considered good occasion to implement a measure, which aimed to predispose the Park and Ride (P&R) system in Brescia, to be implemented after the light metro activation in 2013. This service was considered particularly important to reduce the private traffic entering the city from the suburbs.

Considering the advancement state of the metro works in Brescia, the interchange Parking weren't, as they're part of the complementary civil works still to be completed by 2013, the activities implemented in this measure have to be considered necessary and preliminary to the actual P&R system implementation. The P&R solution for Brescia, from the technological point of view, was based on the identification of two kinds of P&R users: the systematic ones and the occasional ones. The technological solution to manage the special P&R fares have been developed separately: for the systematic users it's possible to use the new contactless and integrated Omnibus Card (realized thanks to the Civitas Measure 02.03 ("Development and upgrade of e-ticketing system in Brescia"), able to manage at the same time 4 different kind of season tickets (LPT, metro, bike sharing and parking). For the occasional users, a special double-face ticket was developed, able to register on a unique support both the LPT and the Parking validations, in order to apply the special P&R fares.

The activities were concluded after the successful experimental phase concerning the communication between the ticket, the software and the ticket machine and in the application of the special P&R fare.

In this framework the main results have been:

- The successful development of a software able to manage the P&R system (The test phase has been carried out in September 2011);
- The positive upgrade of the existing HW platform for Park & Ride in terms of technology development (Omnibus cards, double face tickets);
- The distribution of more than 7000 4k Mifare cards towards parking, bike sharing and LPT users.

Creation of interoperability between public transport services and parking services

In addition to the new designed and realized Omnibus Card, it has also been possible to update the ticketing system for the parking users and to test a new integrated technology (software and hardware), with new double face tickets for occasional parking users.

## A. Introduction

### A1 Objectives

The measure objectives are:

(M) High level / longer term:

- To accomplish the dispositions of the Regional Plan for the development of an “Intelligent Mobility”<sup>10</sup> the main objectives of which are the development and the promotion of Intelligent Transport Systems (ITS) technologies for the enhancement of the infomobility services to citizens.

(N) Strategic level:

- To strengthen intermodality among different PT modes and vectors through integrated ticketing systems over wide areas including different transport services.

(O) Measure level:

- (1) To develop a new software (SW) functionality for the Automatic Fare Collection (AFC) management system for Park & Ride services;
- (2) To develop a new hardware (HW) platform for Park & Ride gates and ticketing machines;
- (3) To create interoperability between public transport services and parking services and to purchase/distribute at least 1.000 new cards (Mifare 1K or Mifare 4K) supporting also the new P&R service;
- (4) To define new typologies of fares for Park & Ride services;

To integrate the existing local public transport services with P&R, taking into consideration the start up of the new metro line in Brescia foreseen by 2013.

### A2 Description

The city of Brescia is building a metro line (Metrobus). Its start up is foreseen by 2013. Intermodal integration between private and public transport modes are the main goal for the City. Park and Ride services are particularly important in order to reduce the private traffic entering the city from the suburbs. To prompt Park and Ride new technologies have been developed:

- the Omnibus card, for seasonal users (developed in detail in measure 02.03 “Development and upgrade of the e-ticketing system in Brescia”);
- An integrated system SW/HW that allows Park and Ride using only one ticket for occasional users.

This technology development is the main focus of the present measure.

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<sup>10</sup> D.g.r. 27/12/2007-8/6411

Another important aspect of this measure is related to fare integration between LPT (Metrobus, buses) and parking that was investigated in order to reach the integration by the start up of the metro.

## B. Measure implementation

### B1 Innovative aspects

- New conceptual approach
- Use of new technology/ITS

The innovative aspects of the measure are:

- **Innovative aspect 1 (New conceptual approach)** – Nowadays in Brescia there is not a common ticketing system able to manage at the same time Parking and Public Transport tickets. The new designed system should grant intermodality among different services. This new intermodality approach should promote the use of alternative transport modes.
- **Innovative aspect 2 (Use of new technology/ITS)** – The innovative aspect consists of the technological integration of the public transport and parking system introducing new cards compatible with ISO 14443A & B standards (the international standard that defines proximity cards used for identification and the transmission protocols): one is the ticketing system based on a microchip contactless card able to manage different services (such as LPT, Parking, Bike Sharing and the new metro line). This system was developed in Civitas measure M02.03 (“Development and upgrade of the e-ticketing system in Brescia”); the other is the development of a bi-modal (magnetic/optical) ticket and its related SW and HW.

### B2 Research and Technology Development

The integration of the P&R service in the new multiservice cards was part of a wider project (developed in Brescia through the implementation of the measure 02.03 “Development and upgrade of the e-ticketing system in Brescia”) for the integration also of the bike sharing and the future metro ticket services.

The main research activity for this measure consisted in finding out the best way to integrate the parking tickets and the Local Public Transport (LPT) tickets managed by different Brescia Mobilità companies. The goal was to provide a single ticket to those users that would reach “interchange parking” and would take the future metro line.

The results of the undertaken research activities led Brescia Mobilità to integrate the technological solutions already adopted in the existing system adapting the parking ticket machines to treat also PT new tickets. This solution seemed to be the best one, both for the occasional and the seasonal users, especially from an economical point of view.

This result was useful also for the new “Omnibus” cards – “seasonal users” (Civitas measure M02.03 “Development and upgrade of the e-ticketing system in Brescia”) that are used in LPT and were integrated with the parking access control system, from a software compatibility and tickets readability point of view.

The deadline for parking facilities construction (P&R facilities) is foreseen at the metro line start up by 2013.

### B3 Situation before CIVITAS

For Public transport service since 2003 there has been an electronic ticketing system based on the use of magnetic and contactless cards (standard ISO 14443 B type). For the parking system there are RFID (Radio Frequency IDentification) magnetic cards and bar code tickets.

There wasn't an easy solution for the integration of these technologies.

Civitas project can be considered fundamental, as it allowed the development of the necessary research, demo and testing activities in terms of technology development.

### B4 Actual implementation of the measure

The measure was implemented in the following stages:

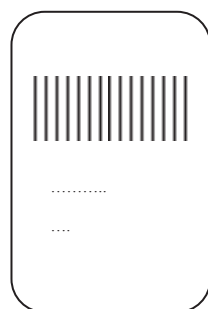
**Stage 1: research activities and software development for the communication with card ISO 14443A type** (from October 2009 to October 2011) – The main objective was to provide the executive design of the park and ride system that Brescia Mobilità SpA intended to carry out for the management of the intermodality, proposing solutions that allowed users to easily access to the future metro line through interchange parking areas.

Starting from classifying users into different kinds (“occasional users” (short-lasting parking) and “regular users” (longer parking) and that usually purchase season parking tickets), the following solutions were studied: tickets for Park & Ride system based on the use of magnetic tickets for the occasional customers and Mifare cards for the subscribers.

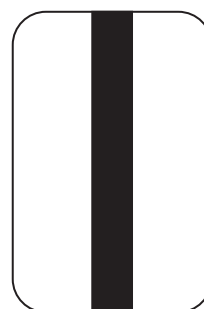
In particular, at the beginning, for the so called “occasional users” the technical feasibility for the implementation of a ticket management system based on a chip installed on paper support was investigated. The cost of these tickets was too high (about 0.40 € / each). It was decided to look for a cheaper solution that could integrate the readability of the Local Public Transport tickets and the parking tickets. The solution was to use tickets compatible with the existing magnetic ticketing system.

The readability problem was caused by the presence of two different kinds of ticket reader machines (one for parking and the other for LPT) and besides by the monopoly of the company which provides the parking devices. This company didn't want to substitute its devices: a new card that could be read by both the devices had to be developed.

The new ticket is double face (fig. 1). It has a thermal paper on one side for the parking service and a magnetic stripe on the other for the public transport. This solution allowed the P&R using only one ticket, with acceptable costs for the citizens.



Side A thermal paper  
(parking)



side B magnetic  
stripe (public)

Fig. 1 – New double face ticket

*Another problem related to the use of a single ticket was the computation of different fares applied for parking and LPT (Rides). Therefore special attention had to be paid to the system configuration for the management of different fares and for the computation of the effective amount due to the customer (a single card deals services managed by different companies). The problem for the systematic users (season tickets subscribers) had already been solved in Civitas measure M02.03 (“Development and upgrade of the e-ticketing system in Brescia”). The Omnibus card developed can manage up to 4 different services at the same time, namely Bike Sharing, existing Local Public Transport, Parking and the future metro service. In this measure the evaluation of users’ attitude towards intermodality was explored in order to better manage the assessment of the Omnibus cards in relation to Park and Ride action.*

**Stage 2: compatibility test and equipment of the park & ride site** (from October 2011 to October 2012) – This stage consisted in several compatibility tests that were necessarily carried out in order to set up P&R service.

*Tests were carried out on the existing electronic ticketing machines and sale devices, already upgraded with a new management system. The installation of the necessary devices was made during a test phase (as it was not possible to make a real system implementation on the metrobus because it was not active yet).*

*On 18<sup>th</sup> of May 2012 also a demonstration was organized in order to present the new ticketing system for P&R users and test the new HW-SW system at the stakeholders’ presence (Brescia Mobilità and other companies involved in this project).*

*During the demo activity, a more compact HW device was presented. This is the one used for the P&R parking columns (fig. 2).*

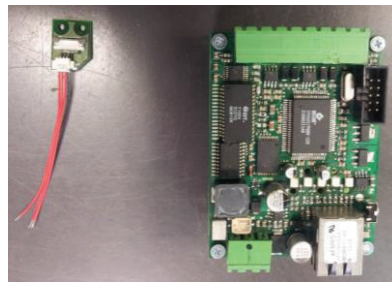


Fig. 2 - The HW part of the system for P&R service

*In synthesis, Brescia Mobilità has integrated the parking thermal ticket with the magnetic public transport ticket, through a double face one (with a thermal paper on one side for the parking service and a not standard magnetic stripe on the other for the public transport – fig.3).*



Fig. 3 - An example of punched double face ticket punched both for park service and LPT service

During the system design and realization, for what concerns the HW-SW functioning several scenarios were considered. The new ticket works as following (test phase done in September 2012, using an existing parking, technological device.

- When the “occasional user” enters the parking and pushes the button, the “Skidata” small column produces a double face ticket.
- If the user punches the ticket on LPT, this activity is recorded by the magnetic stripe.
- when leaving, the ticket is put into the “Skidata” small column slot in the right way and the magnetic stripe is read on both sides as the barcode allows to detect the signal directly from the second magnetic head of Coder Unlimited Skidata;
- If the ticket was punched on LPT, a discount is applied; otherwise the user pays the full price.

The actual use of these tickets will begin with the start up of the Metrobus by 2013, the new ticket machines to be installed in interchange parking have already been ordered.

As result of the test phase it should be underlined that no breakings, system errors or anomalies occurred and no errors of the special fares assigned were pointed out.

## B5 Inter-relationships with other measures

The measure from a theoretical point of view is grouped with all the other measures proposed in Brescia, using Civitas plus funding, to study the new public transport asset after metro realization (Metro package):

- M.02.02 “Intermodality with public transport”;
- M.02.03 “Development and upgrade of the e-ticketing system in Brescia”;
- M.08.05 “Brescia Mobility Channel”.

In particular from a research and technological development point of view it is linked to

- M.02.03 “Development and upgrade of the e-ticketing system in Brescia”;

If the new contactless cards hadn’t been developed, subscribers wouldn’t have had the possibility to use a unique ticket for the P&R solution. Besides the measures have common indicators related to seasonal users (i.e. Omnibus card) and are based on similar assumptions for what concerns the BAU building.

## C. Evaluation – methodology and results

From the evaluation point of view this measure consists mainly of research and demonstration activities, as its outputs will be tangible only after the realization of suburban parking structures and, above all, after the start up of the Metrobus (2013).

Anyway, some considerations can be made starting from interchanges between Park/LPT and Bike Sharing (even if bikes haring isn't funded by Civitas).

In fact, citizens attitude to intermodal split can be measured trough the Omnibus card monitoring users of Bike Sharing/Parking and/or of Bike Sharing/buses and/or of Parking/buses. Besides this activity is also useful to check the new cards functioning.

The measure outputs regard the solution of technological problems:

- on the one hand the new e-ticketing testing (Measure 02.03 "Development and upgrade of the e-ticketing system in Brescia") through the distribution to the public of Mifare cards able to manage 4 mobility services at the same time (including P&R);
- On the other the new HW platform development for the P&R gates/ ticketing machines able to manage P&R service for the occasional users (who use magnetic tickets).

### C1 Measurement methodology

In order to evaluate the capability and the effectiveness of P&R measure, besides the quantitative indicators reported below, a round table was arranged among the people in charge of the services chargeable on the new cards (regardless of their participation in Civitas).

The goal of the round table was to measure:

- The new card outputs crosswise
- The kind of season ticket loaded on the cards
- The use subscribers made of it and
- The number of potential Park & Ride users.

These data were useful to get additional quantitative information adding to the simulation activities, as, for example, indicator 3.1 "Number of potential P&R users per day (simulation)" (calculated through model-based simulations referring to the future metro line).

The measure was considered like a qualitative measure because it developed a technological solution and device to allow P&R with a single ticket. Therefore the indicators below should be considered as complementary indicators.

#### C1.1 Impacts and Indicators

As the measure mainly consisted in research/demo and technological development activities, the indicators must be considered as additional information to the technological implementation of the measure.

**Table C1.1: Indicators.**

No.	Impact	Indicator	Data used	Comments
1	Transport	Percentage of cards validation per year	Validations of the contactless cards recorded by the system	Complementary indicator First data collection after the o.p. in November 2011
2	Transport	Percentage of new cards validation per month	Validations of the new cards recorded by the system	No more collected, because the system is not able distinguish old and new cards, replaced by 2.1
2.1	Transport	Number of new cards activated with at least 2	recorded by the system	Ex ante not foreseen First data collection after the o.p. in



		season tickets		March 2012
<b>3</b>	Transport	Number of interchanges per km of trip		No more collected, substituted by 3.1
<b>3.1</b>	Transport	Number of potential P&R users per day (simulation)	Simulation model M02.02 (Intermodality with public transport)	Main Indicator Ex ante not foreseen (Simulation)
<b>4</b>	Society	Awareness level	Survey	Ex ante: survey May 2011 (before cards distribution) + information coming from Customer satisfaction scheduled for M02.03 After data collection: survey April 2012 + information coming from Customer satisfaction scheduled for M02.03. Complementary Indicator
<b>5</b>	Society	Acceptance level	Survey	Ex ante: survey May 2011 (before cards distribution) + information coming from Customer satisfaction scheduled for M02.03 After data collection: survey April 2012 + information coming from Customer satisfaction scheduled for M02.03. Complementary Indicator

## Detailed description of the indicator methodologies:

- **Indicator 1** (*Percentage of cards validation per year*) – The existing parking system users can be divided into two categories: season tickets holders (who use a contactless card) and occasional users (who use a bar code ticket). The calculation of this indicator can be made dividing the total number of season tickets validations in regulated car parking by the total number of valid season tickets. The ex ante situation is referred to the period previous to the new contactless card distribution (Mifare cards) scheduled in September 2011, according to the progress in the implementation of the measure 02.03 (“Development and upgrade of the e-ticketing system in Brescia”). Data are provided by the company “SINTESI S.p.A.” that manages the parking system in Brescia.
- **Indicator 2** (*Percentage of new cards validation per month*) – This indicator can be measured using validations data (as scheduled for the indicator 1) referred only to the new mifare contactless cards. Data are provided by the company “SINTESI S.p.A.” that manages the parking system in Brescia. **NO MORE COLLECTED.**
- **Indicator 2.1** (*Number of new cards activated with at least 2 season tickets*) - This indicator has been added to measure the attitude to interchange in LPT in Brescia, even if the metro start up is foreseen in 2013 and the interchange parking are not available at the moment.
- **Indicator 3** (*Number of interchanges per km of trip*) - The existing LPT network has been taken as reference for the ex ante situation and the simulated new network scenarios don't depend neither on the parking nor on the interchange parking localization. **NO MORE COLLECTED.**
- **Indicator 3.1** (*Number of potential P&R users per day - simulation*) - P&R structures won't be ready before the Metro start up, therefore this indicator is calculated basing on a simulation model (CUBE). The scenario takes into account the future metro line and the location of the interchange parking (that have already been designed). Simulation activities take into consideration also the parking capacity, which is strictly related to the selected area. Indicator

values have been taken from the simulation activity carried out during the Civitas measure implementation M02.02 ("Intermodality with public transport in Brescia"). The scenarios aimed to reorganize the potential P&R users in the view of the metro start up (2013).

- **Indicator 4 (Awareness level)** - According to the progress in the implementation of the measure 02.03 (e-ticketing), a consistent number of new cards has been distributed in September 2011. (By the end of April 2011 a Focus Group has been arranged to better understand the interest towards P&R solutions in Brescia and towards its awareness in relation to the potential offered by the integration of transport fare system. In particular, the situation concerning the increasing number of multi-service cards and their potentials in mobility applications has been presented. The meeting has been an occasion to prepare the questionnaire to be administered to P&R potential users in order to collect this indicator after the new cards distribution). An interesting source of information about the aptitude towards the multi service cards introduction and the integration of different transport solutions can derive from the specific question inserted in the May 2011 customer satisfaction in occasion of the collection of some M02.03 ("Development and upgrade of the e-ticketing system in Brescia") indicators. The specific question is the following:  
"Would you be interested in a multi-service card able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro?"  
Another questionnaire has been carried out among the parking users in March 2012, in addition to the customer satisfaction questionnaire administered in April 2012.

The question of the focus group survey was:

*"Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be soon introduced?"*

The specific question of the customer satisfaction survey was:

*"Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be distributed soon in Brescia?"*

These questions have been updated during the Civitas project, considering the implementation of the measure and the distribution of the new integrated card.

- **Indicator 5 (Acceptance level)** – The methodology is the same reported for the indicator n.4.

The question of the focus group survey was:

*"With such a card, would you be more disposed to make the best use of P&R service (intermodal Parking – Local Public Transport)?"*

*"Would you be disposed to pay a symbolic key money (5€) for this new card?"*

The specific question of the customer satisfaction survey was:

*"Would you be disposed to pay a symbolic key money (5€) for this new card?"*

These questions have been updated during the Civitas project, considering the implementation of the measure and the distribution of the new integrated card

## C1.2 Establishing a Baseline

Since the beginning of the twentieth century the city of Brescia has characterized by an integrated management of the local public transport. Progressively, also the parking service and other complementary activities, such as the traffic lights management and the violation enforcements (multaphot and multanova) have been added to the integrated management.

Brescia Mobilità Spa (metropolitan mobility company) was born in December 2001, after the divestiture from the original Company ASM Brescia Spa. Brescia Mobilità Company structure includes the following services and sectors:

- Public Transport (Brescia Trasporti Spa)
- Parking and parking meters (Sintesi)
- Traffic lights and innovative technologies
- Driverless light metro (Metrobus)

It's important to highlight that at the moment the promotion of the interoperability between the public transport and the parking system before the start up of the metro (foreseen in 2013) can be considered as a strategic measure objective.

The new metro line will make the public transport more efficient, but it the modal shift from car to Metrobus will be conditioned by the efficiency of intermodal areas and mainly by the Park and Ride organization (their location, equipment, and the development of flexible and easy to handle tickets).

Before the start up of the metro line, the new technology introduced by the CIVITAS measure 02.03 ("Development and upgrade of the e-ticketing system in Brescia"<sup>11</sup>), represented a valid tool able to significantly test the new card potential towards the future intermodal mobility attitude of the city. This is why the indicator 1. Percentage of cards validation per year was chosen as reference for the monitoring of the measure impacts, as its trend could be influenced by the introduction of the new contactless card, scheduled in October 2011.

Therefore the baseline of the measure was set in spring/summer 2011, before the new card distribution foreseen in autumn 2011

Indicators M. 03.03	BASELINE (spring/summer 2011)
1. Percentage of cards validation per year	April 2011 20,3 (Total number of season tickets validations in regulated car parking / Total number of valid season tickets)
Tab.1 - Baseline value of indicator 1	

The indicator 2.1 (Number of new cards activated with at least 2 season tickets) has 0 (no service) as baseline value because it's referred to the new cards.

Indicator 3.1 (Number of potential P&R users per day - simulation) isn't considered in the baseline, because before Civitas the city hadn't developed P&R services yet (i.e. parking areas for the Metrobus + integrated fares) and its citizens still have mainly a "mono-modal" attitude in relation to P&R action.

Indicator 4. (Awareness) and 5. (Acceptance) are the results of a "test survey" administered on P&R in June 2011 specifically to the focus group members (this survey is not statistically relevant) and it proves the interest for P&R service (91% of the interviewed would use P&R service).

Indicators M. 03.03	Focus group (spring/summer 2011)
4. Awareness level	June 2011 59% of the interviewed is aware of the new card distribution in Brescia
5. Acceptance level	<ul style="list-style-type: none"> <li>• June 2011</li> <li>• 91% of the interviewed would use P&amp;R service</li> <li>81% of them is disposed to pay 5€ key money for the card</li> </ul>
Tab.2 - Focus group (spring/summer 2011): value of indicators 4 and 5	

<sup>11</sup> which consists of a contactless card able to manage at the same time four different kind of season tickets, such as public transport, parking, bike sharing and the future metro line)

To build a quantitative baseline on awareness and on acceptance the same baselines used for measure 02.03 “Development and upgrade of e-ticketing system in Brescia” were used, because they investigate the citizens’ interest (attitude) for intermodality and it was performed through a customer questionnaire.

Indicators from M. 02.03 used for M03.03	Baseline
4. Awareness level From M.02.03 ind. 6. Awareness level	<ul style="list-style-type: none"> <li>5,1% (informed on a multi-service card - able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro).</li> </ul>
5. Acceptance level From M. 02.03 ind. 7. Acceptance level	<ul style="list-style-type: none"> <li>26% (interest in a multi-service card able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro); 22% (payment of a symbolic 5€ key money)</li> </ul>

Tab.3 - Baseline value of indicators 4 and 5

### C1.3 Building the Business-as-Usual scenario

Brescia Mobilità (subsidiary of the Municipality of Brescia) was born to carry out and manage initiatives aiming at improving mobility in the urban area. The most important objective of the Brescia Mobilità Group’s mission is planning and managing the city, according to the Municipality’s strategies and policies, developing different activities regarding mobility.

In time, the Group acquired the management of several parking and set up new parking structures (table 4). Urban parking policies developed by Brescia Mobilità Group introduced new technologies for the parking season tickets management, such as RFID.

PARKING	N. OF PARKING SPACES	BUILDING/TAKING OVER YEAR
Autosilo 1	350	Taking over since 2010
Benedetto Croce	72	2003
Brescia 2 (ex Inail)	153	Taking over since 2006
Crystal	500	Taking over since 2004
Domus (reserved for the hospital employees)	200	2008
Fossa Bagni	385	2002
Freccia Rossa	2500	2008
Massimo D’Azeglio	35	2004
Ospedale nord	1260	2002
Ospedale sud	500	already managed by ASM Brescia SpA before 2001
Palagiustizia	570	already managed by ASM Brescia SpA before 2001
Piazza Mercato	190	already managed by ASM Brescia SpA before 2001
Piazza Vittoria	450	Taking over since 2006 (built in the seventies).

PARKING	N. OF PARKING SPACES	BUILDING/TAKING OVER YEAR
Randaccio	170	2001
San Domenico	72	2005
Stazione	1000	already managed by ASM Brescia SpA before 2001

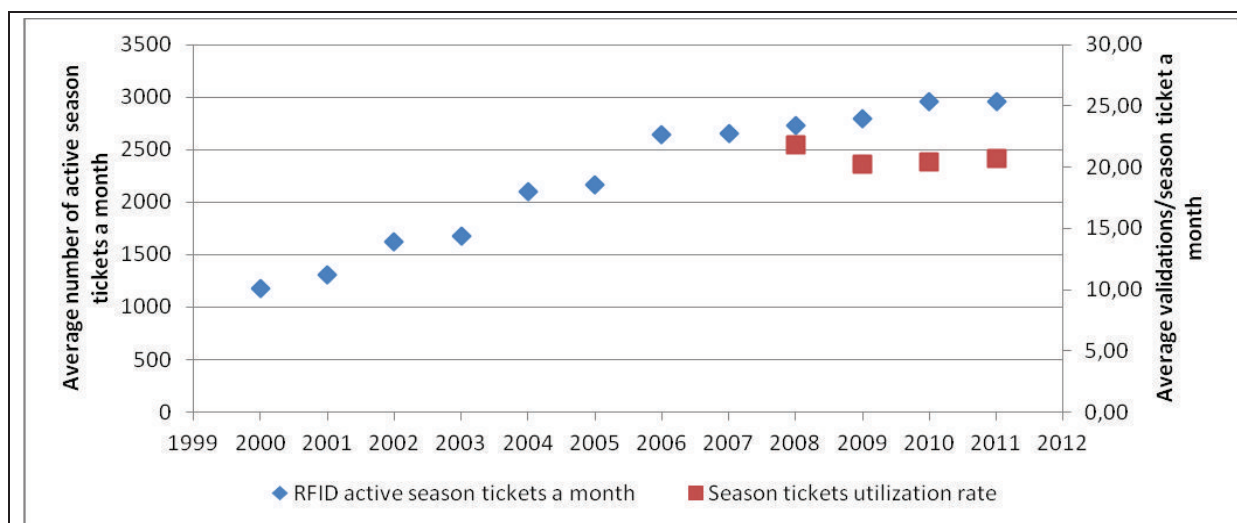
Tab.4 - Parking structures managed by Brescia Mobilità Group

The integrated mobility management done by Brescia Mobilità Group led to the introduction of parking fare policies addressed to the promotion of the public transport. For example a free bus ticket is offered whenever the parking fare is higher than the regular bus ticket cost.

the effective use of the free bus ticket cannot be assessed because because the paper ticket doesn't need to be stamped on the bus: it valid only for the parking day, so the users cannot be monitored in any way.

In order to build the BAU it must be underlined that the number of fee parking season tickets has been growing in time.

In fact the monthly average number of active fee parking season tickets (fig. 4), in relation to the number of parking spaces, is characterized by a positive trend and the RFID season tickets utilization rate (expressed by the average number of validations per ticket a month) strengthens the role of the fee parking season ticket in the city of Brescia.



**Graph 1**

**NOTES:**

- a) The Company which manages the fee parking system has collected data about the number of season tickets only since 2007. The reconstruction of the previous data has been made estimating the number of active season tickets in proportion to the total parking spaces offering.
- b) The RFID season tickets utilization rate has been calculated as the ratio between the number of season tickets validations and the number of active season tickets. It expresses the average number of validations per ticket a month.

Fig. 4 - Trend of monthly average number of active fee parking season tickets

In order to investigate the opinions and strategies toward CIVITAS measures, several interviews have also been arranged involving politicians and technicians.

As regards this measure, the Brescia Deputy Mayor (who is also Mobility and Traffic Town Councillor) and the Brescia Mobilità Spa General Director have been interviewed. Both of them consider CIVITAS an essential driver for the pushing forward of the activities linked to the Metro line launch.

In particular, the Brescia Mobilità Spa General Director, interviewed in July 2011, highlighted the crucial importance of the CIVITAS contribution in the realization of the new contactless cards and bi-modal tickets (i.e. P&R tickets). As a matter of fact, this activity wouldn't have been implemented (due of lack of resources) before the start up of the Metrobus.

The Business as Usual scenario equals the alternative zero, i.e. the "do nothing" alternative. In order to correctly evaluate the scenario 0, the following considerations have been made.

Basing on the preliminary remarks illustrated before, this measure can be considered a preparatory phase for the organization of the integrated management of city services (as far as the ticketing system is concerned) before the start up of the metro line scheduled by 2013.

The available historical data series, considered significant respect to the attended measure outputs, consists of the average number of active parking season tickets a month respect to the parking spaces offer (Fig.5). Data go back to year 2000 and can be considered sufficient for the creation of a trend curve able to represent a baseline.

The best fitting trend curve has been chosen on the basis of the lowest standard deviation value and the confidence interval has been stated at the 95% confidence level.

The trend curve has been created using historical data on "active season tickets" up to the Operative Phase (October 2011 – distribution to the public of the new cards) (see Graph 2).

Looking at the historical series, data seem to have a more constant trend since year 2002. As regards years 2010 and 2011 a light decrease of the number of season tickets subscriber can be read.

This negative trend could be temporary, it could be caused by external factors, such as the economical crisis. Since summer 2009 and in all 2010 and 2011 Brescia has been characterized by an important contraction of the level of employment with redundancy fund..

BAU scenario has been obtained projecting the historical data trend curve.

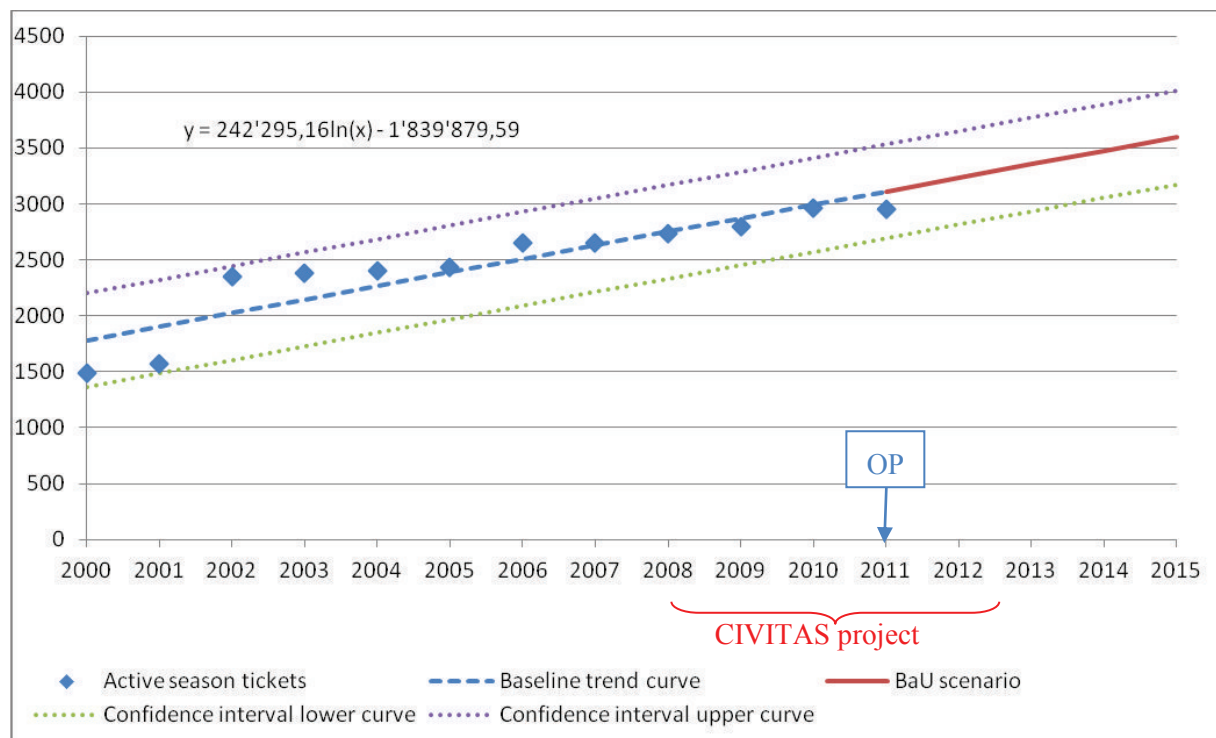


Fig. 5 - BASELINE and BAU scenario for the monthly average number of active season tickets. Trendline built using data up to 2011 (beginning of OP in autumn)

As regard indicator 1 (Percentage of cards validation per year) the historical data series trend curve has been projected to year 2012, and the obtained data can be taken as reference for the BaU scenario in 2012 (See Graph 3).

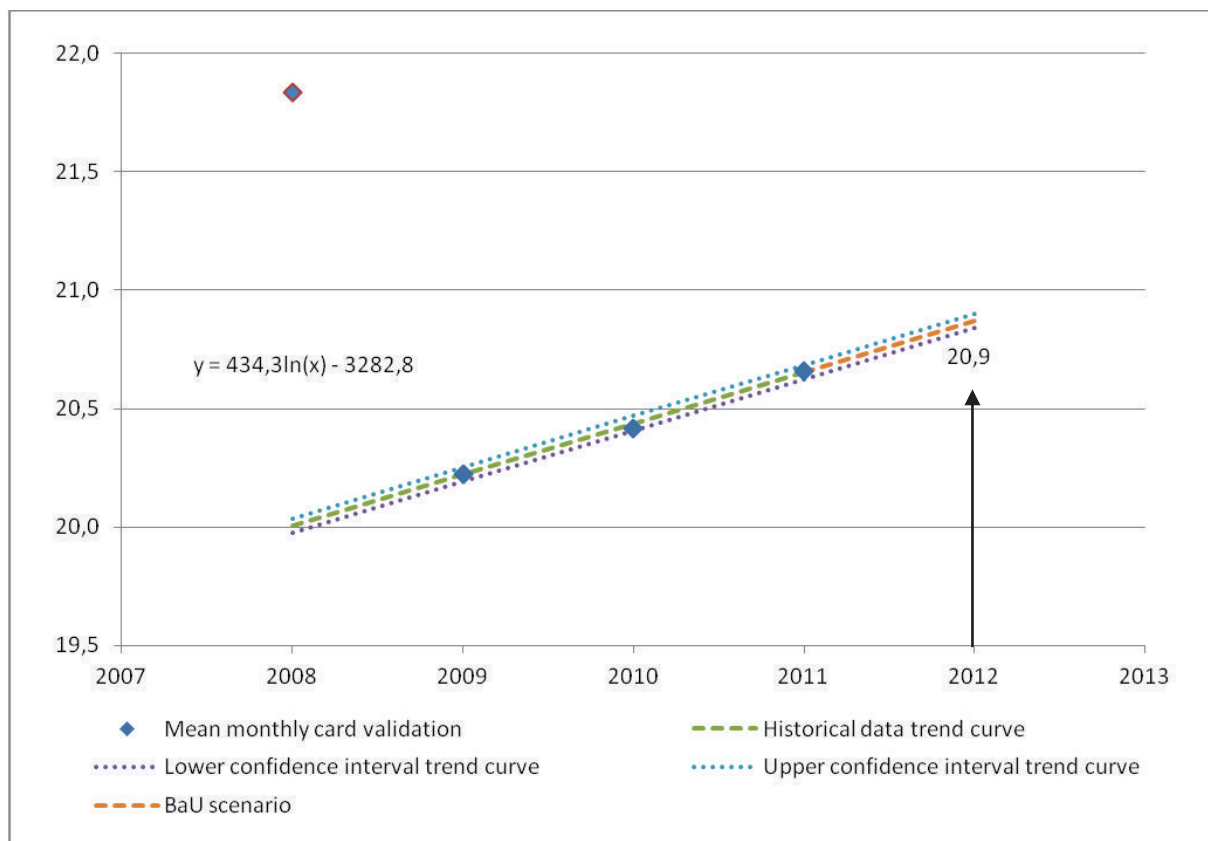


Fig. 6 - BaU scenario for the indicator 1

Indicator	BaU (2012 – before the start up of the metro)
1. Percentage of cards validation per year	20,9 average

Tab.5 - BaU value of indicator1

Tab.5 - BaU value of indicator1

As regards indicator 2.1 (Number of new cards activated with at least 2 season tickets), it has 0 (no service) as BaU value because it's referred to the new cards, distributed during Civitas.

Indicator 3.1 (Number of potential P&R users per day - simulation) was taken from the simulation activity carried out during the implementation of M02.02 "Intermodality with public transport in Brescia".

The scenario aimed to evaluate the potential number of P&R users in the view of the metro start up by 2013.

This simulation activity was done in M02.02 "Intermodality with public transport in Brescia". taking into account:

- the new already designed parking for the Metrobus
- -the new Metroline
- the new LPT network

and the results are presented in table n. 6.

It must be underlined that the new parking areas related to P&R for the metro would have been realised as designed anyway, also without Civitas initiative.

Parking	Parking spaces foreseen	Maximum occupancy (%)	Turnover index	Users per day	Peak hour users
Prealpino	435	90%	1,2	522	261



Poliambulanza	266	90%	1,2	319	160
S.Eufemia	500	90%	1,2	600	300

Tab.6 - BaU value of indicator 3.1, from the simulation activities carried out in the Civitas measure M02.02 ("Intermodality with public transport in Brescia")

The Bau value for ind. 3.1 Number of potential P&R users is 1441 users per day.

In order to build BaU for “society” indicators, it should be underlined that giving a look to the baseline of Civitas measure M.02.03 “Development and upgrade of e-ticketing system in Brescia” and in particular to indicators 6 (Awareness) and indicator 7 (Acceptance) which are built to understand the interest of the citizens on multimodal mobility choices introducing a unique card, it is clear that only few people are aware of this possibility.

The following indicators collected in the customer survey for M.02.03 “Development and upgrade of e-ticketing system in Brescia” administered generic questions on multiservice cards – i.e. non specifically dedicated to park and ride service – and they are useful for several considerations in the BaU scenario of this measure.

In particular the following questions were put in May 2011:

- Are you informed on a multi-service card - able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro? (ind 6. Awareness level, M.02.03 “Development and upgrade of e-ticketing system in Brescia”)
- Are you interested in a multi-service card able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro? (ind. 7 Acceptance M.02.03 “Development and upgrade of e-ticketing system in Brescia”)
- Are you favourable to pay a symbolic 5€ key money for the card? (ind. 7 Acceptance M.02.03 “Development and upgrade of e-ticketing system in Brescia”)

The BaU scenario for these indicators is the same of the baseline.

As a matter of fact in the Omnibus card (e-ticketing) the P&R season ticket was already included.

Therefore the information can be monitored thanks to the questions asked for M.02.03 “Development and upgrade of e-ticketing system in Brescia” and mentioned above.

Indicators M. 03.03	BaU (2012 – before the start up of the metro)
4. Awareness level	5.1% is aware of the new card distribution in Brescia
5. Acceptance level	<ul style="list-style-type: none"> <li>• 26% of the interviewed would use multi-service card a</li> <li>22% of them is disposed to pay 5€ key money for the card</li> </ul>

Tab.7 - BaU value of indicators 4 and 5

## C2 Measure results

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

### C2.4 Transport

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

Indicator	Before	After	B-a-U	Difference: After – Before	Difference: After – B-a-U			
1. Percentage of cards validation per year	20,3 (April 2011)	21,2 (after the new card distribution)	20,9 (2012)	+3,6	+0,6			
2. Number of new cards activated with at least 2 subscription	Not scheduled	Month	Number of cards with parking +bike sharing both active season tickets	Number of cards with LPT +parking active season tickets	Number of cards with LPT +bike sharing both active season tickets	0 (no service)	Not Assessable	Not Assessable
		mar-12	13	2	351			
		apr-12	14	2	366			
		may-12	14	2	389			
		jun-12	14	2	416			
		jul-12	14	2	416			
		aug-12	14	2	416			
		sep-12	14	2	416			
3. Number of potential P&R users per day (simulation)	Not scheduled	(Scenario 2013) 1.441 P&R users/day	(Scenario 2013) 1.441 P&R users/day	Not Assessable	0			

The indicator 1 "Percentage of cards validation per year" is interesting at local level in order to evaluate the systematic use of parking. This data is useful in order to understand the users' attitude in using structured parking areas. From the data there seem to be a growing interest in such kind of parking.

- The indicator 2.1 “Number of new cards activated with at least 2 subscriptions” was considered useful to evaluate a first attitude of citizens to the intermodal transport. Actually, the P&R service wasn't activated within the end of Civitas project, as the interchange parking will be opened in the occasion of the metro start up by 2013. It was possible to collect information about the number of new Omnibus card with at least 2 active season tickets.
- By the results analysis emerged a promising tendency to the intermodal attitude by the number of cards with LPT +bike sharing both active season tickets: as a matter of fact, the interchange between LPT and bike sharing at the moment is the only one possible - as both these means of transport are available and spread in the city (the first through lines and bus stops, the second through the bike sharing stations).

Indicator 3.1 "Number of potential P&R users per day (simulation)",

Several considerations can be done in relation to potential P&R users:

- the first is related to the assumption the average occupancy of the vehicles was considered 1 user/car, therefore the number users is estimated as minimum;
- the second considers the maximum occupancy of the P&R Parking at 90%;
- the third is that the turnover foreseen for parking is low (1.2), as P&R action in systematic mobility is usually related to long lasting period
- The fourth is related to the P&R parking location. Prealpino parking is located in the Northern part of the city and it catches the users coming from the low Valtrompia valley suburbs. Poliambulanza parking is located just outside the “Brescia centro” highway exit. S. Eufemia is located in the South-Eastern part of the city and it catches the user coming from the Garda Lake direction.

## C2.5 Society

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

Indicator	Before	After	B-a-U (2012)	Difference: After – Before	Difference: After – B- a-U
4. Awareness level	(test survey June 2011): 59%	(test survey April 2012): 55,5%	59%	- 3,5	- 3,5
	(customer satisfaction survey May 2011): 5,1%	(customer satisfaction survey November 2011): 44,3%	5,1%	+ 39,2	+ 39,2
5. Acceptance level	(test survey June 2011): 91% (use multi- service card)	(test survey April 2012): 66,5% (use multi- service card)	91%	- 24,5	- 24,5
	(test survey June 2011): 81% (pay	(test survey April 2012):	81%	- 25,5	- 25,5

Indicator	Before	After	B-a-U (2012)	Difference: After – Before	Difference: After – B- a-U
	5€)	55,5% (pay 5€)			
	(customer satisfaction survey May 2011): 26% (use multi- service card)	(customer satisfaction survey November 2011): 22,6% (use multi- service card)	26%	- 3,4	- 3,4
	(customer satisfaction survey May 2011): 22% (pay 5€)	(customer satisfaction survey November 2011): 88,9% (pay 5€)	22%	+ 66,9	+ 66,9

The comparison of the data collected by the specific questions in the customer satisfaction survey, carried out among potential and actual systematic users in Brescia, showed a substantial increase of the awareness and the acceptance about the new Omnibus card distributed. These results are considered important most of all in the view of the next metro and the interchange parking start up by 2013.

### C3 Achievement of quantifiable targets and objectives

No.	Target	Rating
1	Development of a new SW functionality for the Automatic Fare Collection (AFC) management system to treat Park & Ride services; <i>The SW able to manage the P&amp;R system has been developed. The test phase has been carried out in September 2011; therefore this objective can be considered almost achieved in full.</i>	**
2	Development of a new HW platform for Park & Ride gates and ticketing machines <i>The upgrade of the existing HW platform for Park &amp; Ride has been reached in terms of technology development (Omnibus cards, double face tickets); even if the actual Interchange parking won't be built within Civitas. Therefore, this objective can be considered almost achieved in full.</i>	**
3	Creation of interoperability between public transport services and parking services <i>During the Civitas project, in addition to the new designed and realized Omnibus Card, it was possible to update the ticketing system for the parking users and to test a new integrated technology (SW and hw), with new double face tickets for occasional parking users. As a matter of fact, the interoperability between parking and LPT is possible, not only thanks to the new Omnibus card, which collects several services (parking, LPT, bike sharing), but also to the double face tickets (if the user take the LPT, there will be a reduced fare), which were prototyped and internal tested by Brescia Mobilità.</i>	**
4	The purchase/distribution of at least 1.000 new card (Mifare 1K or Mifare 4K) supporting also the new P&R service	***

	<i>Over 7000 4k Mifare cards have been distributed up to now to parking, bike sharing and LPT users.</i>	
<b>5</b>	The definition of new typologies of fares for Park & Ride services <i>At the moment the discussion among the involved partners is on going about the P&amp;R fares and it seems to be difficult to reach an agreement within the end of Civitas.</i>	<b>O</b>
<b>NA = Not Assessed    O = Not Achieved    * = Substantially achieved (at least 50%)</b> <b>** = Achieved in full    *** = Exceeded</b>		

### C4 Up-scaling of results

The measure is already extended to the entire city and its suburbs served by PT network therefore no up scaling is possible.

### C5 Appraisal of evaluation approach

The evaluation approach was based on the project’s objective as expressed explicitly in the Evaluation Plan. From the evaluation point of view, this measure consisted mainly in research and demonstration activities, related to the technological development of ticket machines and double face tickets to be used by occasional users for P&R. Therefore the indicators belonging to “Transport” and “Society” categories should be considered as complementary indicators in order to evaluate the potentiality of P&R implementation in Brescia.

- Indicator 1 ("Percentage of cards validation per year") monitored the systematic (season) users of parking.

- indicator 2.1 ("Number of new cards activated with at least 2 season tickets"), provided an initial evaluation of the citizens attitude to intermodality, monitoring Omnibus card users of Bike Sharing/Parking and/or of Bike Sharing/buses and/or of Parking/buses.

- Indicator 3.1 "Number of potential P&R users per day (simulation) was based on a simulation model (CUBE), taking into account the future metro line and the location of the interchange parking.

Simulation activities took into consideration parking capacity that is strictly related to an effective Park & Ride implementation.

The indicators of the "Society" category were chosen to monitor the awareness and the acceptance of systematic users toward Omnibus card distribution that manages also Parking subscribers.

### C6 Summary of evaluation results

The key results are as follows:

- **Key result 1** – The development of a new SW functionality for the Automatic Fare Collection (AFC) management system to treat Park & Ride services and a new HW platform for Park & Ride gates and ticketing machines are two complementary and fundamental achieved goals for the city of Brescia. In fact, for occasional users the interchange between private and public transport would be possible using only one integrated ticket. Furthermore also systematic users can count on the availability of Omnibus card (i.e. integrated PT transport card, e-ticketing, developed in M. 02.03 "Development and upgrade of e-ticketing system in Brescia").
- **Key result 2** – The upgrade of the HW and SW able to read double face tickets for P&R services was prototyped and tested during Civitas project. The actual use of these tickets will begin with the start up of the Metrobus by 2013,

- **Key result 3** - New ticket machines to be installed in interchange parking have already been ordered by Brescia Mobilità. From the test phase results, the service was considered completely reliable because no breakings or system errors were experienced in that period of time.

### **C7 Future activities relating to the measure**

All the SW and HW of the parking machines of the city will be equipped to read double face tickets.

Info updated after the final submission of the MERT in October 2012 and already reported in the Annex A of the measure (POINTER revision received on December 2013):

The introduction of P&R led to an integration of fares. In order to define the fares, several parking/public transport fare systems applied in a number of European cities were analysed. A first fares hypothesis was explored in November 2012, as before it was necessary to define how much “virtual space” was necessary to store all the information needed to apply the fares themselves (for LPT or for LPT+parking).

At the beginning of December 2012 several fares for P&R facilities were submitted to the Municipality of Brescia, for the approval.

STANDARD PARKING FEES – <b>ONLY PARKING</b> (applicable when the Metrobus is not used)		INTEGRATED FARE <b>PARKING + METROBUS</b> (applicable when Metrobus is used)			
		Concession <b>PARKING</b> fee		METROBUS Parking fee	
<i>hourly parking fee (occasional users)</i>		<i>hourly parking fee (occasional users)</i>		<i>Metrobus ticket fare</i>	
From 1 <sup>st</sup> to 4 <sup>th</sup> hour or part thereof	€ 1.00/hour	from 1 <sup>st</sup> to 4 <sup>th</sup> hour or part thereof	€ 0.30/hour	Single journey up to 75 minutes	€ 1.20
5 <sup>th</sup> and 6 <sup>th</sup> hour or part thereof	€ 0.80/hour	Flat rate from 4 <sup>th</sup> to 24 <sup>th</sup> hour (max daily fee)	€ 1.60		
Flat rate from 6 <sup>th</sup> to 24 <sup>th</sup> hour (max daily fee)	€ 6.00				
<i>parking season tickets</i>		<i>parking season tickets</i>		<i>Metrobus season ticket</i>	
24/24	€ 50.00/month				
24/24	€ 500.00/year				
Daily	€ 30.00/month	Daily	€ 15.00/month	unlimited travel	€ 32.00/month
Daily	€ 75.00/quarter	Daily	€ 40.00/quarter	unlimited travel	€ 93.00/quarter
Daily	€ 300.00/year	Daily	€ 160.00/year	unlimited travel	€ 276.00/year
<b>P&amp;R integrated fares</b>					

Parking stay	Parking fee	<u>Integrated</u> fare parking + 1 METROBUS JOURNEY (€ 1.20)	<u>Integrated</u> fare PARKING + 2 METROBUS JOURNEYS (€ 2.40)	Integrated fare PARKING + 3 METROBUS JOURNEYS (€ 3.60)
1 hour	€ 0.30	€ 1.50	€ 2.70	€ 3.90
2 hours	€ 0.60	€ 1.80	€ 3.00	€ 4.20
3 hours	€ 0.90	€ 2.10	€ 3.30	€ 4.50
4 hours	€ 1.20	€ 2.40	€ 3.60	€ 4.80
From 5 to 24 h	€ 1.60	€ 2.80	€ 4.00	€ 5.20
<b>P&amp;R integrated fares and journeys</b>				

## D. Process Evaluation Findings

### D.0 Focused measure

This measure is not a focused one.

### D1 Deviations from the original plan

- **Test phase replaced the demo activity for double face tickets** - at the beginning of Civitas project, it was proposed to experiment the interoperability of the new double face tickets (realized for occasional users to use P&R service) in a demo area; in particular, a parking and a bus line (existing or specially organized) had to be pointed out and the new HW-SW supports of parking small columns had to be installed. The demonstration wasn't done, because of some problems related to the new technology development. Therefore, the end of the measure was extended in order to finalize an internal test phase. The test was successfully carried out by Brescia Mobilità together with the HW provider and the functioning of the new supports was also monitored.

### D2 Barriers and drivers

#### D2.1 Barriers

.In the sequel main barriers, which have been experienced during the measure implementation, are pointed out:

##### Preparation phase

- **Organizational barrier** - some problems emerged during the first phase of the measure implementation, due to a lack of communication among Brescia Mobilità, tickets supplier and the stamping system supplier of the parking. As a matter of fact suppliers didn't want to upgrade the ticketing system that was needed by the city to reach an effective and integrated public transport.

##### Implementation phase

- **Technical barrier** - there was a technological problem concerning the machines which had to read and punch the new double face ticket developed for occasional users (P&R).

The readability problem was caused by the presence of two different kinds of ticket reader machines (one for parking and the other for LPT). The new ticket has a thermal paper on one side for the parking service and a magnetic stripe on the other for the public transport. This solution allowed the P&R using only one ticket, with acceptable costs for the citizens. This kind of problem didn't regard the new contactless Omnibus Card.

**Technical barrier** - Another problem related to the use of a single ticket was the computation of different fares applied for parking and LPT (Rides). Therefore special attention was paid to the system configuration for the management of different fares and for the computation of the



effective amount due to the customer (a single card deals services managed by different companies).

### **Operational phase**

**Political/strategic barrier** - some problems had been encountered as regards the definition of the new kind of fares, linked with the use/non use of P&R service. This step had to be shared between Brescia Municipality, Brescia Mobilità (representing LPT) and Sintesi (representing parking). While the technical aspect seem to be solved, the final fares to be applied have not been decided yet.

## **D2.2 Drivers**

In the sequel main drivers, which have been picked out during the measure implementation, are pointed out:

### **Preparation phase**

- **Financial driver** - considering that the city of Brescia had been traditionally a mono-modal transport city, the availability of Civitas funds allowed the city of Brescia to promote more intermodal attitude of the citizens, integrating the LPT service (metrobus – start up by 2013 - and buses) with the interchange parking built to catch potential Metrobus users through not only the new contactless Omnibus Card for systematic users, but also a new double face ticketing system for occasional ones.

## **D2.3 Activities**

### **Implementation phase**

- **Collaboration to solve technological problems** - The activity consisted in the promotion by Brescia Mobilità of a strict collaboration with the provider of double face tickets and of the parking punching machines provider, in order to create the HW and SW to support double face tickets developed for occasional P&R users
- **Target group organization** - The activity consisted in the organization of the Target Group, involving the Measure Leaders, responsible for measures which were part of the Metro Package (M02.02 "Intermodality with PT in Brescia", M02.03 "Development and upgrade of the e-ticketing system in Brescia", M08.05 "Brescia Mobile Channel"), in order to share information on
  - The new Omnibus card outputs crosswise
  - The kind of season ticket loaded on the cards
  - The use subscribers made of it and
  - The number of potential Park & Ride users.

Thanks to the Target group, it was also possible to deepen hypothesis related to the "metro package" and to the future mobility asset of the city in general.

### **Operational phase**

- **Definition of new fares** - The activity consisted in the promotion of a strict collaboration among Municipality of Brescia, Brescia Mobilità and Sintesi, in order to share information and decision about the fares to be applied for P&R using Omnibus card and double face tickets.

## **D3 Participation**

### **D.3.1 Measure partners**

- **Municipality of Brescia** - the partnership was important in order to choose the kind of technological support, able to manage information about the different codes, each one associated to a particular kind of fares.
- **Sintesi s.p.a** - the society, which manage the parking in Brescia, was an important partner, as it collaborated to the update and test phase of the new HW and SW both for new contactless Omnibus card and double face tickets.

### **D.3.2 Stakeholders**

- **Parking users** - were involved in a questionnaire in April 2012 on future P&R service and the new Omnibus card.
- **HW and SW system suppliers both of new contactless Omnibus Card and of new double face tickets** - the suppliers were involved in the upgrade of the new parking HW and SW system. Their collaboration was considered fundamental to solve all problems related to compatibility of different kind of technologies used by each supplier.

## **D4 Recommendations**

### **D.4.1 Recommendations: measure replication**

- **Collaboration among suppliers** - a strict collaboration among the supplier of different technological supports is necessary, when you want to integrate different technological systems. As a matter of fact, HW design must keep pace with SW realization.
- **Upgrade parking system for P&R** –The system update need to be able to manage both occasional and systematic users, in order to better implement the P&R service.
- **Importance of test phase** – foresee internal testing phases while developing a new technology. This allows controlling the possible breaks or SW/HW problems.

### **D.4.2 Recommendations: process**

- **Recommendation 1** – the collaboration among partners is important, also to choose the most suitable technology for the P&R needs of the city. As a matter of fact, the information management requires technological development and support (as Omnibus card or double face card) but also political choices related to the fares definition. As a matter of fact a wrong fare definition could affect the success of P&R action.

## Annex 1: Historical data series for the BaU calculation

- Indicator 1** (*Percentage of cards validation per year*) – The existing P&R system users can be divided into two categories: season tickets holders (who use a contactless card) and occasional users (who use a bar code ticket). The calculation of this indicator can be made dividing the total number of season tickets validations in regulated car parking by the total number of valid season tickets. The ex ante situation is referred to the period previous to the new contactless card distribution (Mifare cards) scheduled in September 2011, according to the progress in the implementation of the measure 02.03 (e-ticketing). Data are provided by the company “SINTESI S.p.A.” that manages the parking system in Brescia.

### Historical data series:

Month	A Number of season tickets validation	B Number of active contactless season tickets	Indicator 1 (A/B)
jan-08	63699	2667	23,9
feb-08	61287	2680	22,9
mar-08	61042	2672	22,8
apr-08	63557	2699	23,5
may-08	64528	2696	23,9
jun-08	57112	2595	22,0
jul-08	58121	2740	21,2
aug-08	39377	2666	14,8
sep-08	61143	2760	22,2
oct-08	67538	2821	23,9
nov-08	61243	2851	21,5
dec-08	56581	2921	19,4
jan-09	40956	1864	22,0
feb-09	59119	2940	20,1
mar-09	63276	2950	21,4
apr-09	60385	2920	20,7
may-09	58584	2912	20,1
jun-09	56575	2864	19,8
jul-09	55942	2835	19,7
aug-09	39110	2691	14,5
sep-09	59842	2759	21,7
oct-09	64248	2959	21,7
nov-09	62987	2922	21,6
dec-09	56849	2928	19,4
jan-10	57187	2926	19,5
feb-10	58761	2958	19,9

mar-10	68609	2936	23,4
apr-10	62363	2984	20,9
may-10	62936	2961	21,3
jun-10	59553	2944	20,2
jul-10	56690	2899	19,6
aug-10	42549	2863	14,9
sep-10	62872	2867	21,9
oct-10	65644	3003	21,9
nov-10	65740	3076	21,4
dec-10	62607	3113	20,1
jan-11	59740	3049	19,6
feb-11	58650	3023	19,4
mar-11	67706	3029	22,4
apr-11	60698	2994	20,3
may-11	65695	3003	21,9
jun-11	59705	2970	20,1
jul-11	54965	2631	20,9
A = Number of validations of contactless season tickets B = Number of active contactless season tickets			

Tab.A1.1: Percentage of cards validation per year: historical series

- **Indicator 4 (Awareness level)** According to the progress in the implementation of the measure 02.03 (e-ticketing), a consistent number of new cards will be distributed in September 2011.

By the end of April 2011 a Focus Group has been arranged to better understand the interest towards P&R solutions in Brescia and towards its awareness in relation to the potential offered by the integration of transport fare system. In particular, the situation concerning the increasing number of multi-service cards and their potentials in mobility applications will be presented. The meeting has been an occasion to prepare the questionnaire to be administered to P&R potential users in order to collect this indicator after the new cards distribution (foreseen in September 2011).

	YES	NO	Totals
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be soon introduced?"	59%	41%	100%
With such a card, would you be more disposed to make the best use of P&R service (intermodality Parking – Local Public Transport)?	91%	9%	100%
Do you have knowledge of other cities which introduced similar cards?	19%	81%	100%
Would you be disposed to pay a symbolic key money (5€) for this new card?	81%	19%	100%

Tab.A1.2: Awareness level

The question of the questionnaire able to express the indicator n.4 is the first one, namely:

	YES	NO	Totals
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be soon introduced?"	59%	41%	100%

Tab.A1.3: Awareness level

From Measure 02.03:

(*Awareness level-Indicator 6 (May 2011)*) -

**EX ANTE SITUATION**

	YES	NO	Totals
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be distributed soon in Brescia?"	5,1%	94,9%	100%

Tab.A1.4: Awareness level

- **Indicator 5 (Acceptance level)** - Taking as reference the same methodology/details described for the indicator n.4, the level of acceptance can be expressed by the questions n. 2 and 4, namely:

	YES	NO	Totals
With such a card, would you be more disposed to make the best use of P&R service (intermodality Parking – Local Public Transport)?	91%	9%	100%
Would you be disposed to pay a symbolic key money (5€) for this new card?	81%	19%	100%

Tab.A1.5: Acceptance level

From Measure 02.03:

**EX ANTE SITUATION** is referred to the period previous to the cards distribution, therefore, during the May 2011 survey, a specific question for the collection of this indicator has been inserted, namely:

	YES	NO	Totals
Would you be interested in a multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be distributed soon?	26%	74%	100%
Would you be favourably disposed towards the payment of a symbolic 5€ key money?	22,1%	77,9%	100%

Tab.A1.6: Acceptance level

## Annex 2: Ex ante and Ex Post data collection

- **Indicator 1** (*Percentage of cards validation per year*) – The existing P&R system users can be divided into two categories: season tickets holders (who use a contactless card) and occasional users (who use a bar code ticket). The calculation of this indicator can be made dividing the total number of season tickets validations in regulated car parking by the total number of valid season tickets. The ex ante situation is referred to the period previous to the new contactless card distribution (Mifare cards) scheduled in September 2011, according to the progress in the implementation of the measure 02.03 (e-ticketing). Data are provided by the company “SINTESI S.p.A.” that manages the parking system in Brescia.

### Ex ante situation (April 2011)

A = Number of validations of contactless season tickets = 60.698

B = Number of active contactless season tickets = 2.994

**Indicator 1 = A/B = 20,3**

### Ex post situation

Month	A Number of season tickets validation	B Number of active contactless season tickets	Indicator 1 (A/B)
nov-11	56.662	2.612	21,69
dec-11	50.374	2.601	19,36
jan-12	51.970	2.574	20,19
feb-12	50.576	2.569	19,68
mar-12	53.586	2.574	20,81
Apr-12	62.506	2.607	23,98
Mag-12	68.463	2.996	22,85
Giu-12	67.920	2.934	23,15
Lug-12	65.012	2.866	22,68
Ago-12	49.098	2.785	17,63
A = Number of validations of contactless season tickets B = Number of active contactless season tickets			

Tab.A2.1: Percentage of cards validation per year

- **Indicator 2.1** (*Number of new cards activated with at least 2 season tickets*)

Month	Number of cards with LPT+bike sharing both active season tickets	Number of cards with parking+bike sharing both active season tickets	Number of cards with LPT+parking active season tickets

mar-12	351	13	2
apr-12	366	14	2
may-12	389	14	2
jun-12	416	14	2
jul-12	416	14	2
aug-12	416	14	2
sep-12	416	14	2

Tab.A2.2: Number of new cards activated with at least 2 season tickets

- **Indicator 3** (Number of interchanges per km of trip) **NO MORE COLLECTED**
- **Indicator 3.1** (*Number of potential P&R users per day (simulation)*) - P&R structures won't be ready before the Metro start up, therefore this indicator is calculated basing on a simulation model (CUBE). The scenario takes into account the future metro line and the location of the interchange parking (that have already been designed). Simulation activities take into consideration also the parking capacity that is strictly related to the selected area. Indicator values have been taken from the simulation activity carried out during the Civitas measure implementation M02.02 ("Intermodality with public transport in Brescia"). The scenarios aimed to reorganize the potential P&R users in the view of the metro start up (2013),
- 1<sup>th</sup> data collection referred to scenarios developed in M02.02 (data collection in February 2012):

	Parking spaces foreseen	Maximum occupancy (%)	Turnover index	Users per day	Peak hour users
Prealpino	435	90%	1,2	522	261
Poliambulanza	266	90%	1,2	319	160
S.Eufemia	500	90%	1,2	600	300
Indicator 3.1	1.441 potential park and ride users per day				

Tab.A2.3: Number of potential P&R interchanges per km of trip (simulation among different scenarios)

- **Indicator 4** (*Awareness level*) According to the progress in the implementation of the measure 02.03 (e-ticketing), a consistent number of new cards has been distributed in September 2011.

In order to have an idea of the ex ante situation, a questionnaire has been administered in June 2011 (before the new cards distribution) as "test survey" to a total of 32 people.

The ex post situation could be collected since one month after the new cards distribution, but in order to obtain more consistent results, probably, questionnaires will be administered after October 2011 to the Parking service season tickets subscribers.

An interesting source of information about the aptitude towards the multi service cards introduction and the integration of different transport solutions can also derive from the specific question inserted in the customer satisfaction in occasion of the collection of some M02.03 indicators. The specific question is the following:

“Would you be interested in a multi-service card able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro?”

**EX ANTE SITUATION (Test survey June 2011)**

	YES	NO	Totals
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be soon introduced?”	19	13	32
	59%	41%	100%
With such a card, would you be more disposed to make the best use of P&R service (intermodality Parking – Local Public Transport)?	29	3	32
	91%	9%	100%
Do you have knowledge of other cities which introduced similar cards?	6	26	32
	19%	81%	100%
Would you be disposed to pay a symbolic key money (5€) for this new card?	26	6	32
	81%	19%	100%

Tab.A2.4: awareness level

The question of the questionnaire (test survey) able to express the indicator n.4 is the first one, namely:

	YES	NO	Totals
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be soon introduced?”	19	13	32
	59%	41%	100%

Tab.A2.5: awareness level

**EX ANTE SITUATION:** the data comes from the Customer satisfaction survey carried out in May 2011 for the Measure 02.03 (“Development and upgrade of the e-ticketing system in Brescia”)

	YES	NO	Totals
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be distributed soon in Brescia?”	5,1%	94,9%	100%
“Would you be interested in a multi-service card able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro?”	26,0%	74,0%	100%

Tab.A2.6: awareness level

**AFTER SITUATION (Test survey results April 2012): 155 questionnaires**

	YES	NO	Total (also considering the not answered questions)
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) has been introduced?”	86	68	155
	55,5%	43,8%	
With such a card, would you be more disposed to make the best use of	103	46	155



P&R service (intermodality Parking – Local Public Transport)?	66,5%	29,7%	
Do you have knowledge of other cities which introduced similar cards?	26	127	155
	16,8%	82%	
Would you be disposed to pay a symbolic key money (5€) for this new card?	86	61	155
	55,5%	39,4%	

Tab.A2.7: awareness level

**AFTER SITUATION:** the data comes from the Customer satisfaction survey carried out in November 2011 for the Measure 02.03 (“Development and upgrade of the e-ticketing system in Brescia”)

	YES	NO	Totals
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is available in Brescia?”	44,3%	55,7%	100%
“Would you be interested in a multi-service card able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro?”	22,6%	77,4%	100%

Tab.A2.8: awareness level

- **Indicator 5 (Acceptance level)** - Taking as reference the same methodology/details described for the indicator n.4, the level of acceptance can be expressed by the questions n. 2 and 4 (test survey June 2011), namely:

EX ANTE SITUATION (Test survey June 2011)

	YES	NO	Totals
With such a card, would you be more disposed to make the best use of P&R service (intermodality Parking – Local Public Transport)?	29	3	32
	91%	9%	100%
Would you be disposed to pay a symbolic key money (5€) for this new card?	26	6	32
	81%	19%	100%

Tab.A2.9: acceptance level

**EX ANTE SITUATION:** the data comes from the Customer satisfaction survey carried out in May 2011 for the Measure 02.03 (“Development and upgrade of the e-ticketing system in Brescia”)

	YES	NO	Totals

Would you be interested in a multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be distributed soon?	26%	74%	100%
Would you be favourably disposed towards the payment of a symbolic 5€ key money?	22,1%	77,9%	100%

Tab.A2.10: acceptance level

**AFTER SITUATION** (Test survey results April 2012): 155 questionnaires

	YES	NO	Total (also considering the not answered questions)
Do you know that in Brescia a new multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) has been introduced?"	86 55,5%	68 43,8%	155
Would you be disposed to pay a symbolic key money (5€) for this new card?	86 55,5%	61 39,4%	155


Tab.A2.11: acceptance level

**AFTER SITUATION:** the data comes from the Customer satisfaction survey carried out in November 2011 for the Measure 02.03 ("Development and upgrade of the e-ticketing system in Brescia")


	YES	NO	Totals
Would you be interested in a multi-service card (able to manage, beside LPT season tickets, many other services such as Bike Sharing, Parking and the future Metro) is going to be distributed soon?	22,6%	77,4%	100%
Would you be favourably disposed towards the payment of a symbolic 5€ key money?	88,9%	11,1%	100%

Tab.A2.12: acceptance level


## Annex 3: Focus Group Activities

	Brescia University	<b>FOCUS GROUP ACTIVITIES</b>	<b>CIVITAS MODERN</b>
<b>Title</b>	<b>Impostazione dei Focus Group</b>		
<b>Metro Package measures</b>	M02.02 Intermodality with public transport M02.03 Development and upgrade of the e-ticketing system M03.03 P&R facilities for underground and public transport system M08.05 Brescia Mobile Channel		
<b>Other stakeholders</b>	- Brescia Municipality - Sutera - Verità		
<b>STEP 1</b>	<b>Accoglienza e riscaldamento (circa 10 minuti)</b>		
	1) Presentazione degli invitati al gruppo di discussione.		
	2) Presentazione dei ricercatori.		
<b>STEP 2</b>	<b>Introduzione al tema della discussione (circa 10 minuti)</b>		
	3) Motivazione e condizioni (fasi e tempi) dell'incontro di gruppo in data _____		
	- Metro Package (MP); - lighthouse measures; - indicatori.		
	4) Gli obiettivi dell'incontro sono:		
	- condivisione metodologia per lo svolgimento del Focus Group; - attuazione del Focus Group.		
<b>STEP 3</b>	<b>Fasi della ricerca: descrittiva, riflessiva e propositiva</b>		
	<b>TEMA</b>	<b>MISURA</b>	<b>METROPACKAGE</b>
	Azzeramento della conoscenza e condivisione degli input (ipotesi scenari)		
	Potere decisionale in relazione al tipo di scelta da attuare		
	Percezione di rischi/problematiche oltre Civitas (ad esempio, entrata in esercizio della metro)		
	Ruolo di ciascun intervento per il funzionamento del MP: - bike sharing; - parcheggi; - BMC; - intermodalità; - e-ticketing; - politiche di tariffazione; - gestione della mobilità.		
<b>STEP 4</b>	<b>Verifica di fattibilità e scelta finale</b>		
<b>STEP 5</b>	<b>Assegnazione dei ruoli</b>		
<b>STEP 6</b>	<b>Sintesi dei risultati:</b>		
	- per singola misura; - per Metro Package		

Tab.A3.1: General structure of the Focus Group activities

	Brescia University	<b>FOCUS GROUP ACTIVITIES</b>	<b>CIVITAS MODERN</b>
<b>Title</b>	<b>Impostazione dei Focus Group</b>		
<b>Metro Package measures</b>	M02.02 Intermodality with public transport M02.03 Development and upgrade of the e-ticketing system M03.03 P&R facilities for underground and public transport system M08.05 Brescia Mobile Channel		
<b>Other stakeholders</b>	- Brescia Municipality - Sutera - Verità		
<b>MEETINGS</b>	<b>Partner</b>	<b>PRESENCE</b>	
<b>Date: 15 november 2011</b>	Brescia University	Bulferetti, Cadei, Ferrari	
	BSM	Sbardella, Gussago, Ragnoli, Pace	
	BST	Sutera	
	CBS	Bresciani	
	BICIMIA	Verità	
<b>Main topics</b>	1) Scambio ERT tra i vari Partner per condividere le attività previste nelle diverse misure; 2) Rivedere i contenuti insieme, in modo da avere COERENZA nella descrizione delle misure; 3) Prevedere un rimando corretto e concordato in tutte le misure collegate (es. 02.02 e 02.03); 4) Coinvolgimento Bicimia (geom. Verità) per testare l'efficacia della distribuzione delle tessere OMNIBUS e il loro funzionamento per gestione P&R (verificare tracciabilità dei dati) e scegliere un Parcheggio + BICIMIA (x es. in centro), dove si hanno dati e uso della OMNIBUS 5) considerare solo timbrature e uso delle OMNIBUS (no altre carte!!!) 6) necessità di ricevere (dal CBS??) una tavola con la localizzazione dei Parcheggi per la Metropolitana e il numero degli stalli (deve essere base condivisa!!!) 7) usare modello di BSM come previsto nella M02.02 8) concentrarsi anche solo su uno scenario, Parcheggio e analizzarlo benissimo!! 9) portare dati e info al prossimo incontro (15 dicembre) 10) rendicontare questa attività nel Process Evaluation Form (Focus, coordinamento e condivisione) 11) vedere indicatori delle misure, in particolare quelli legati alla simulazione metropolitana e collaborare per la raccolta (usare modello della M02.02)		
	Prossimo incontro fissato per il 19 Dicembre 2011 a Brescia Mobilità		

Tab.A3.1: Focus Group activities – Convocation of the 1th meeting (15 November 2011)

		Brescia University	<b>FOCUS GROUP ACTIVITIES</b>	<b>CIVITAS MODERN</b>
<b>Title</b>		<b>Impostazione dei Focus Group</b>		
<b>Metro Package measures</b>		M02.02 Intermodality with public transport M02.03 Development and upgrade of the e-ticketing system M03.03 P&R facilities for underground and public transport system M08.05 Brescia Mobile Channel		
<b>Other stakeholders</b>		- Brescia Municipality - Sutura - Verità		
<b>MEETINGS</b>	<b>Partner</b>	<b>PRESENCE</b>		
<b>Date: 19 dicembre 2011</b>	Brescia University	Bulferetti, Cadei, Ferrari		
	BSM	Sbardella, Gussago, Ragnoli, Pace		
	CBS	Bresciani		
<b>Main topics</b>	1) Verifica dello scambio dei dati di input per la coerenza degli scenari per i parcheggi; 2) inquadramento delle misure M02.03 e M08.05 (in qualità di possibili lighthouse measures) all'interno del Metro Package; 3) cronogramma della M02.03; 4) soluzioni trovate per la registrazione dell'utilizzo del servizio P&R per gli utenti occasionali (sistemi, fornitura, test); 5) determinazione e consapevolezza della capacità decisionale che il ML ha come responsabile della misura; 6) analisi della percezione di rischi/problematiche oltre Civitas; 7) definizione del ruolo del Mobility Manager all'interno del Focus Group 8) proposta dell'organizzazione di un Focus Group aperto al pubblico (individuando persone da coinvolgere) per avere opinioni e aspettative da parte dell'utenza in merito a bike sharing, parcheggi, BMC, ecc., da considerarsi come azione di dissemination			
	Prossimo incontro possibile: prima della riunione tecnica di febbraio			

Tab.A3.1: Focus Group activities – Convocation of the 2<sup>nd</sup> meeting (19 December 2011)