

CiViTAS
Cleaner and better transport in cities

MIMOSA

BOLOGNA • FUNCHAL • GDAŃSK • TALLINN • UTRECHT

Measure Evaluation Results

BOL 4.1 Mobility Managers

Valentino Zanin

Giorgia De Chiara

Davide Rossi

(TeMA Territorio Mobilità Ambiente S.r.l., municipality of Bologna consultant for the measure evaluation)

Date: February 2013



THE CIVITAS INITIATIVE
IS CO-FINANCED BY THE
EUROPEAN UNION

Executive Summary

Mobility Management tries to rationalize mobility habits in order to reduce the use of individual private means of transport and improve the organization of transport demand. Italian legislation (the “Ronchi Decree”) has made it mandatory for companies with more than 300 employees to appoint a Mobility Manager to reduce their employees’ car dependency. The exact nature of Mobility Management actions were not specified and left for the companies and public administrations to determine. Therefore, before the start of CIVITAS MIMOSA project, the Municipality of Bologna set up a Mobility Management office for its urban area as required by this law. An integrated approach was necessary in order to achieve the expected results.

The MIMOSA measure ‘Mobility Managers’ aimed at strengthening and improving the efficiency of the already implemented Mobility Management structure which included an increase in the number of workers to efficiently implement the national policy and to provide companies better support. Additionally, the incorporation of smaller companies (those with fewer than 300 employees) was the strength of the MIMOSA measure. The other specific objectives are to increase the public transport users’ fidelity and to optimize daily commuters’ journey.

The present measure is strongly interdependent with three other MIMOSA measures in Bologna which shared the same high level objective of improving air quality. The four measures were identified as bundled measures: BOL 1.2 ‘Cleaner Private Vehicles’, BOL 3.1 ‘Road Pricing Policies’, BOL 4.1 ‘Mobility Managers’ and BOL 7.1 ‘City Freight Delivery Plan’.

As part of this measure the Municipality of Bologna carried out fund raising and management activities to coordinate and introduce many Mobility Management activities, with the aim of increasing the number of participants. The measure was thus conducted in several stages:

Stage 1: Promoting new agreements between stakeholders and transport companies (2009 - 2012) Agreements between public administration in charge of the enforcement of Mobility policies and public transport and railway companies were committed to guarantee benefits and incentives for Mobility Management practices.

Stage 2: Assistance for companies involved in Mobility Management practices (2008 - 2011) The on-line applications to buy monthly or annual discounted travel passes were improved and made available to companies applying Mobility Management policies. Additionally the Municipality website and software was updated, improved and made available for companies to manage data on employees’ mobility and provide online home-to-work questionnaires. The collected data was also used by the Municipality technicians to monitor the evolution of the measure.

Stage 3: Involving new companies in mobility management agreements and actions (2008 - 2012) Financial support from MIMOSA measure and from the Emilia Romagna Region were allocated to promote Mobility Management practices in the frame of the “Area Fiera” project introduced in 2009. This project was addressed to companies located in the historical centre of Bologna or in specific focused areas. Meetings were organized by the Municipality of Bologna and by the Region to strengthen Mobility Management policy and encourage companies to participate.

Stage 4: Awareness and training activities on Mobility management issues (2008 - 2012) Targeted communication activities have been carried out during four European Mobility weeks (2009-2010-2011-2012). Training was organized for new company Mobility

Managers in order to introduce efficient working tools, and conferences were held on Mobility Management topics at local, national and international level.

An impact evaluation and a process evaluation were conducted. The impact evaluation for the measure focused on the changes in mobility behaviour. Therefore the selected indicators measured the impact of reduced car usage as a result of Mobility Management agreements, in terms of 'modal split'. Considering that the high level objective of the measure was to improve air quality, great importance was placed on evaluating the environmental impact of both the measure itself and the other interrelated measures. The selected bundled indicator was the level of particulate 10 and particulate 2.5 emissions recorded throughout the Municipality. Changes in pollutant emissions could be considered strictly connected to traffic conditions and changes in driver behaviour.

Three key results show the positive effects of the measure in terms of pollution emissions and a shift from private vehicle to public transport. The share of travellers using public transport (buses and trains) increased between 2003 and 2010 by 3.4%. During MIMOSA, PT subscriptions sold under the Mobility Management agreements increased by 50% (7.603 units were sold in 2007, 11,413 in 2011). This means 4,000 users refrained from using their own private car, which is an impressive result from a single measure. As a result, emissions reduced by 35% compared to 2008 (average value of all pollutant types).

The lack of interest among stakeholders was the main **barrier** encountered throughout all measure phases. Mobility Management actions were often considered less important than other public authority initiatives, both by companies and employees as a whole and by institutions. In addition, there are no sanctions in Italy for companies which do not comply with the requirements for Mobility managers. One of the **drivers** observed during the implementation of the measure was the large communication strategy applied since the earliest phases of the process. The Municipality of Bologna gave a special importance in communication and supporting actions in order to attract and involve as many companies as possible.

Cities interested in similar measures should be aware of the challenges that the enforcement of public policies which affect individual mobility behaviours can raise. It is recommended to apply an intense communication prior to the measure and while it is in force, in order to share the political commitments and objectives with the general public. In the context of Bologna, widespread participation in Mobility Management actions helps spread awareness of good/sustainable mobility and change mobility habits

This MIMOSA measure contributed to efficiently implement the national Mobility Management policy between 2008 and 2012. The Municipality took the decision to enlarge the frame of the initiative to targeted companies with fewer than 300 employees located in the historic centre or other strategic areas. Indeed, most of the companies in Bologna are not large-scale and have fewer workers than the threshold set out in Italian law. This policy extension was possible thanks to the frame of the MIMOSA project.

A Introduction

A1 Objectives

The Measure objectives were:

- (A) High level objectives
 - (1) To improve air quality and reduce pollutant emissions in the urban area
- (B) Strategic level objectives
 - (1) To implement sustainable mobility through Mobility Management policies
 - (2) To promote PT, bicycle and pedestrian usage;
 - (3) To reduce the use of private vehicles and individual private means;
 - (4) To encourage car pooling and shared transport;
 - (5) To increase companies' involvement in the management and organization of employees' transport demand.
- (C) Specific measure objectives
 - (1) To increase the range of workers involved in Mobility Management policy
 - (2) To increase PT user-fidelity
 - (3) To better investigate and influence commuters' journeys
 - (4) To enable Administration technicians to provide companies with better support for their Mobility Management activity.

A2 Description

Mobility Management (MM) is the management and rationalization of mobility habits, in order to reduce the use of individual private means and improve the organization of transport demand. MM has been shown to be a promising tool. The Municipality of Bologna wanted to support it further and see increased take-up.

Italian legislation (the 'Ronchi Decree') has made it mandatory for companies with more than 300 employees to appoint a Mobility Manager to reduce their employees' car dependency. Therefore, before the start of CIVITAS MIMOSA, the Municipality of Bologna set up a Mobility Management office for its urban area as required by law. All company Mobility Managers are required to refer to and liaise with this office, which coordinates all private initiatives in an organic plan.

Thanks to Measure 4.1, the Municipality's office carried out fund raising and management actions based on a set pattern; the aim was to coordinate and introduce widespread MM initiatives, increasing the stakeholders.

Therefore, several activities were carried out in order to promote the Mobility Manager function and make his/her work easier. These included:

- widening the target users for mobility actions by increasing the number of companies adopting MM policy,
- sourcing new funds at local, national and European level to implement MM activities,
- extending the project to companies outside the parameters indicated by Italian law, i.e. companies with fewer than 300 employees and located in historic centres or more relevant areas. These companies could profit from an area mobility manager,

- promoting new agreements between stakeholders and transport companies, in order to extend the set of travel opportunities available to workers,
- improving support for companies which promote cycling, car sharing and car pooling, encouraging them to replace some company cars with cleaner vehicles and integrate public and private transport (cycles, bikes, etc),
- introducing awareness campaigns on mobility management topics and training for mobility managers.

B Measure Implementation

B1 Innovative Aspects

The innovative aspects of the Measure were:

- **New conceptual approach** – setting-up coordinated initiatives to publicise Mobility Management issues among all stakeholders involved: Public administrations, companies, mobility managers, the general public.
- **New organisational arrangements or relationships** - involving companies with fewer than 300 employees and located in key areas in MM topics: for *each area involved* these companies could use the common figure of an 'Area mobility manager' without having to appoint one privately.

B2 Research and Technology Development

The RTD activity consisted of analyzing the scenario as regards different MM policies and interventions and existing agreements, in order to observe the current pattern of events – the basis for further informed decisions. These included:

- the Webmobility program, a project run by the Municipality of Bologna and ATC S.p.A., financed by the Ministry of the Environment. This is a tool for mobility managers which enables them to collect on-line questionnaires and formulate their home-to-work movement plans. The analysis showed that only a small proportion of employees use PT services, even when supply is good. The reason is cultural resistance to changing habits and lifestyles (in Italy the car is still seen as a status symbol, the most comfortable, fastest and easiest mode of transport).

FIGURE B2.1: The Webmobility program

agreements between stakeholders and transport companies. In September 2006 3-year agreements were signed by the City of Bologna and ATC -Trenitalia (the bus and railways companies). The agreements guaranteed a discount on annual season tickets for employees of companies which have a Mobility agreement with the City of Bologna,

agreement for the annual 'Mi Muovo' season ticket for use on specific train routes and buses in Bologna, Imola or Ferrara) and for the new 'EcoTicket' and 'EcoDays' bus tickets for cyclists and car users in particular situations,

meetings throughout Bologna to obtain information on how to organize and optimize home-to-work movements, considering different needs and possible requests (e.g. meetings with trade associations and other citizens' associations),

testing the "Areas Mobility Manager" function in order to increase the number of companies interested in mobility management policies; this referred particularly to critical congestion zones and areas with a limited public transport supply, as well as companies with a large number of employees. The possibility of introducing non-scheduled PT services was also evaluated;

on-line booking for PT season tickets as part of company MM agreements;

an on-line car pool system for the Province of Bologna, developed with the Provincial Administration.

The scenario analysis showed how the cultural resistance to change represented the main barrier to overcome in order to rationalize habitual mobility. The recommendations to be followed in long term strategy were: i) where car was replaceable (perceived and/or by the existence of a valid alternative) objective benefits of alternative modes of transport (with meetings, informative campaigns, for example) must be found; ii) where car was not replaceable (because there is not the possibility to use PT, or other means of transport, or when the driver is not persuadable) clean transport solutions must be found/disseminated.

B3 Situation before CIVITAS

In 2002 Bologna set up a Mobility Management office for its urban area. Its task was to produce a municipal mobility plan and support companies in mobility management. The city made free software available for managing data on employees' commutes to work. It also provided online questionnaires for collecting information on employees' mobility habits. Based on this data, companies could develop better mobility plans.

Since the introduction of the Mobility Management office, important initial results were obtained in terms of public transport use. These were achieved through agreements both with the railway operator and the local bus operator. All possible further initiatives needed to be set out in a defined pattern under a common strategy.

B4 Actual Implementation of the Measure

The Measure was implemented in the following parts:

Part 1 promoting new agreements between stakeholders and transport companies (ongoing since 2009):

- At the beginning of 2009 agreements were renewed with ATC and Trenitalia for 2010-2012 (discounts on train and bus season tickets) as part of mobility management actions. In order to obtain these incentives, companies must have:

- appointed a mobility manager and introduced him/her to the Municipality of Bologna;
- presented home-to-work movement plans for approval by the Municipality)
- signed the Mobility Management Agreement with the Municipality of Bologna.
- In 2010 the agreement between the Municipality of Bologna, ATC (Bologna's local public transport company) and Trenitalia (national railway company) was renewed, guaranteeing benefits and incentives for employees of companies involved in Mobility Management practice.
- In June 2010 Bologna City Council launched an innovative employee Cycling Scheme. Dedicated bike racks and free electric charging points were made available for council employees. A discount on electric cycles for council employees was also negotiated with a cycle supplier involved in social issues.
- In May 2011 the Municipality published a public notice for pedal-assisted bicycle fleet management addressed to Municipality employees.
- In 2011 the Municipality of Bologna held a meeting with Mobility Managers employed by local companies and public bodies. The focus of the meeting was to update Mobility Managers on mobility management activities and services available in the city, and to proceed with the project financed and approved by the Italian Ministry of the Environment in 2010. The meeting was attended by more than 30 Mobility Managers.

Part 2 assistance for companies involved in MM practices (2008-2011):

- The Municipality of Bologna's Area Mobility Manager office carried out technical activities to support and supervise the work of company Mobility Managers (2009)
- The on-line procedure which Municipality of Bologna employees use to purchase monthly or annual discounted travel passes was improved (2010). The procedure was also made available to other companies using Mobility Management policies;
- The improved, updated website and software was made available to companies free of charge (2011). These tools were used by companies to manage data on workers' movements and provide online home-to-work questionnaires, but they were used also by Municipality technicians to monitor the evolution of the scenario.

Part 3 Involving new companies in mobility management agreements and actions (2008-end of the Measure):

- A project was introduced in 2009 (the "Area Fiera" project) to promote Mobility Management practices and favour co-operation between companies involved in a specific area of Bologna (the exhibition district). The project was headed by the Emilia Romagna Region under the Municipality's supervision, and several big and small companies were involved. The MIMOSA project helped fund the personnel costs for the "Area Fiera" Project.
- In 2011 the Municipality of Bologna signed an agreement with Emilia-Romagna Region as part of the "Area Fiera" project. The Emilia-Romagna Region was given 56,000 Euros to manage the project.
- In 2011 the Municipality of Bologna organized a meeting with Mobility Managers. The aim was to update the local scenario on Mobility Management in Bologna and launch the procedure for companies wishing to apply for new funding. A meeting was also held by the Emilia Romagna Region to present the first steps in its mobility management project for Bologna's "Area Fiera" district.

Part 4 Awareness and training activities on Mobility management issues (from 2008 to end of the Measure)

- As part of European Mobility Weeks 2009-2010-2011-2012, several initiatives were designed to improve home-to-work movements (mainly for cyclists) and increase employees' environmental awareness. The latter included an information service helping people to choose the best home-school or home-work route by bicycle; a two-day initiative for employees of Bologna City Council and the Emilia Romagna Region who cycle to work, with repair workshops for commuters' bicycles;
- Information and promotions regarding Mobility Management practice were posted on the Municipality website; marketing material (i.e.: leaflets and panels) was also produced. The Mobility Managers mailing list was used to provide news and information on solutions and opportunities for sustainable mobility and mobility management; this activity was carried out while the MIMOSA project was in force.
- In 2010 the city of Bologna organised and hosted the 10th National Conference on Mobility Management, in cooperation with Euromobility, the National Association for Mobility Management and the Emilia Romagna Region. The conference was sponsored by the Italian Ministry of the Environment.
- Specific meetings were organised with the five companies which completed a Home-to-Work Movement Plan. During these meetings the five companies and others were given information and adequate training on how to formulate the Plan, along with suggestions on good mobility management practices (2010).
- In 2011 the Emilia-Romagna Region (RER) organized an international conference, "Mobility Management. From European projects to regional actions" for professionals in the field and local and regional politicians. In his speech, RER's Urban Mobility and LTP director focused on "MI Nuovo Elettrico", the electric mobility project linked to MIMOSA, and Mobility Management measures taken in the exhibition district. This event was attended by 60 professionals.
- At the end of March 2012 a meeting was held for Mobility Managers in order to plan the "Giretto d'Italia" event ("Little Tour of Italy") in association with FIAB and Legambiente. The event was a competition for companies with Mobility Managers; 12 companies took part and the winner was the Bologna District (May 2012).

B5 Inter-Relationships with Other Measures

Following guidelines agreed with companies and after widespread research on MM activities, the Municipality of Bologna designed and produced a project to develop further mobility management actions and other forms of alternative mobility. This project received approval from the Italian Ministry of the Environment with respect to the MM actions only. It was funded outside the MIMOSA budget:

- 366,000 Euros to establish agreements with companies interested in providing their employees with PT discounts: of the total, 95,229 Euros was given to 10 companies which won the public bid as a contribution towards purchasing discounted PT season tickets for their employees.
- 99,000 Euros for other mobility management actions designed by the various companies: of the total, 96,810 Euros was assigned to 8 companies which won the public bid to develop mobility management projects, specifically related to cycling and online MM systems. These projects will have to be completed within the next few years.

None in particular. The Municipality decided to focus directly on workers who make most of their regular journeys by car. There is no bundling for this measure. The interrelation with Measure 5.2 (parents involved in Mobility Management practices accompanying children to school) does not generate bundling because the field of application of schools involved is low and does not statistically match with figures considered in Measure 4.1.

It should be noted that like Measure 4.1, Measures 3.1 (road pricing policies), 1.2 (Cleaner private vehicles) and 7.1 (city freight delivery plan) also pursued the same high level objective – improving air quality – even though they had their own targets and domain of application. For this reason a bundled indicator for these 4 measures was the level of particulate 10 and particulate 2.5 recorded throughout the Municipality, even where no Mimosa measures were applied. This was an average value based on data collected every day from fixed points.

Obviously this value was influenced by other factors which were not always connected to the Mimosa project. Nonetheless, changes in pollutant emissions could be considered connected to traffic conditions and changes in driver behaviours.

C Impact Evaluation Findings

C1 Measurement Methodology

C1.1 Impacts and Indicators

The Mobility Management policy aimed above all to reduce car usage and encourage other means of transport for home-to-work movements. The selected indicators measured the impact of reduced car usage as a result of Mobility Management agreements, in terms of “modal split” (indicators 5 and 6).

Considering that the high level objective of the measure was to improve air quality, great importance was placed on evaluating the environmental impact directly caused by the Measure (indicators 1 to 4) and other interrelated measures (bundled indicator 8).

Adhesion to mobility management policies, given the number of small companies involved in mobility management practices (indicator n. 7), was evaluated as a result of the Municipality’s activities.

TABLE C1.1.1: 7.1 Common Core Indicators

| No. | Evaluation area | Typology | Impact | Indicator | Source of data |
|-----|-----------------|-------------------|-------------|--|--------------------|
| 1 | Environment | Core Indicator 8 | Emissions | CO2 emissions | COPERT |
| 2 | Environment | Core indicator 9 | Emissions | CO emissions | |
| 3 | Environment | Core Indicator 10 | Emissions | NOx emissions | |
| 4 | Environment | Core Indicator 11 | Emissions | particulate emissions | |
| 5 | Transport | Core indicator 28 | Modal split | Mode of transport for home-to-work movements | Home-to-work plans |

TABLE C1.1.2: Measure Specific indicators

| No. | Evaluation area | Typology | Impact | Indicator | Source of data |
|-----|-----------------|-----------------|-------------|--|---|
| 6 | Transport | Local indicator | Modal split | Number of annual PT Subscriptions | Number of annual PT subscriptions sold under Mobility Management Agreements |
| 7 | Society | Acceptance | Awareness | Adhesion to mobility management policies | See details |

TABLE C1.1.3: Bundled indicator -7.1-3.1-4.1-1.2

| No. | Evaluation area | Typology | Impact | Indicator | Source of data |
|-----|-----------------|------------------|-----------|-----------------------|--|
| 8 | Environment | Core Indicator 7 | Emissions | Particulate emissions | Data recorded at fixed stations in the centre of Bologna |

Detailed description of the indicator methodologies:

Indicator 1 - 4 'emissions'. Based on the COPERT methodology, the impact of emissions was calculated as the consequence of the number of annual bus subscriptions sold under Mobility Management agreements. The hypothesis was that new subscriptions led to fewer km and therefore fewer emissions. Because home-to-work movements were associated with medium and large companies often located outside the city centre, they were normally made by car. Therefore, one more subscription meant one less motorist.

Measurements were taken once a year while the Measure was in force (at the end of the year) to check on the results. The unit was tons; the domain of the analysis is Bologna city.

In order to apply the COPERT methodology, the following assumptions were made:

- Number of subscriptions purchased by people with no alternatives: people who purchased subscriptions before the Mobility management agreements and facilities (see indicator 6, baseline) do not influence emission reductions and are not included in the emissions calculation.
- Working days per year: 240.
- Average people per car (rate): 1.0. The hypothesis was that distances were covered using one car per person;
- Average km covered for a round-trip: 9.6 km/car (1)
- Average speed for an urban trip: 23 Km/h (2)
- Bologna-registered car fleet by fuel type.

Indicator 5 'modal split': percentage of travellers using a particular type of transport.

The indicator measured the modal choice of Bolognese workers whose companies were involved in Mobility Management policies. The indicator measured the modal shift from private vehicles to more sustainable modes of transport.

Measurement was made once before and once after the Measure implementation to check on the results.

Indicator 6 'number of annual PT subscriptions' was measured by the number of annual bus subscription sold under the Mobility Management agreements. The agreements stated that ATC, Trenitalia and Fer (the regional railways operator) would give a discount on annual bus subscription purchased by workers, with a financial contribution from their employers.

The Measure effects were calculated considering:

- the increasing number of season tickets sold after the Measure was in place to workers from companies subscribing to the Mobility Management agreements;
- that each subscription will reduce car usage on home-to-work commutes;
- that subscriptions are sold to workers who make an average of two journeys per day.

Measurements were taken once a year after the Measure was in force to check on the results. The unit is number of annual bus subscriptions; the domain of the analysis was Bologna city.

Indicator 6 was considered a dummy indicator for measuring the modal split and an input for applying COPERT methodology.

Indicator 7 'adhesion to mobility management policies' was deployed by three different indicators as follows:

- 7.1 Number of companies with a Mobility manager;
- 7.2 Number of companies with Mobility managers and a home-to-work movement plan;

- 7.3 Number of companies with Mobility managers and a home-to-work movement plan which adhered to the Mobility management agreement (ATC, FER and Trenitalia).

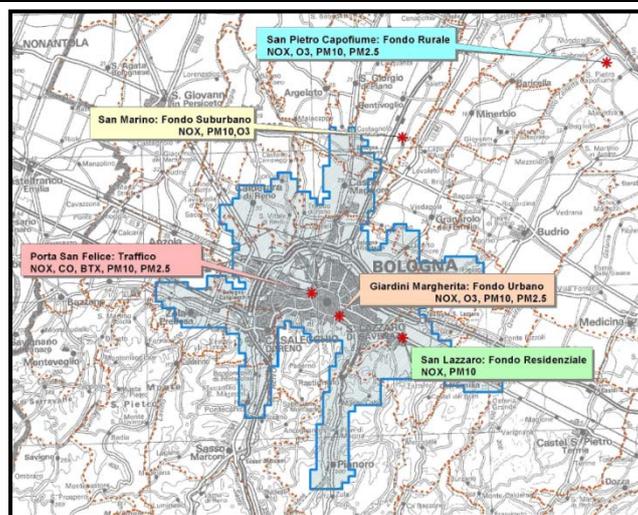
Frequency: measurements were taken once a year while the Measure was in force to check on the results (an annual report was made at the end of the year).

Domain: Bologna city

Indicator 8 'particulate emissions recorded at fixed stations'

Indicator 8 was chosen to monitor and check pollutant emissions throughout the Municipality, in common with Measures 3.1, 1.2 and 7.1. The map below shows the location of the fixed stations (at 2011) and their capacity for recording pollutant emissions. Of these, Porta San Felice was chosen because a historical data trend was available for PM 10 and PM 2.5.

FIGURE C1.1.1: Location of fixed stations in Bologna



Source: ARPA Regional Agency for the Environment

Frequency: data was collected every day. Data included in this document is the average of 365 items of data recorded during one year.

Unit: $\mu\text{g}/\text{m}^3$ (average daily production); domain: data was collected from a fixed station located in the centre of Bologna.

C1.2 Establishing a Baseline

Indicators 1 - 4 'emissions'. The indicators were calculated considering PT subscriptions sold before the Measure was implemented (2008), corresponding to which was a lower number of vehicles on the road (people who purchase PT season tickets use public transport instead of private cars). Other assumptions made in order to apply COPERT were described in the previous paragraph.

Indicator 5 'modal split'. During 2003 a study was carried out on 'home-to-works movements' to investigate the mobility habits of workers whose companies had signed Mobility Management agreements. A random sample of 9.831 workers was included into the analysis (total 29.836 people).

Indicator 6 'number of annual bus subscription' sold under the Mobility Management agreements (ATC/TPER bus operator). The baseline included data from 2004 to 2007.

Before Measure 4.1 was activated, Mobility Management actions were already being implemented. This led to an increase in the purchase of PT season tickets from 2004 onwards.

Indicator 7 ‘adhesion to Mobility Management’. The baseline covered data recorded at the end of 2008.

Indicator 8 ‘particulate emission’ recorded at fixed stations. Values of PM10 and PM2.5 recorded at the Porta San Felice station before Mimosa will be given in the results section. Data is available from 2003 for PM10 and from 2004 for PM2.5.

C1.3 Building the Business-As-Usual Scenario

The before situation showed a good number of companies involved in Mobility Management practices, as required by Italian law. Had this Measure not been applied, there would not have been any extension of mobility management practices. Therefore, the impact evaluation indicators would not have been improved.

Indicators 1 - 4 ‘emissions’. As explained above, indicators 1 - 4 show the level of pollutant emissions saved due to new PT subscriptions (the more subscriptions were sold, the fewer people used their cars in order to get to work. Therefore fewer pollutants were produced). In the BaU case the number of subscriptions would have assumed constant values (about 8.000 units, considering the historical data and the data obtained after the Mimosa Project was implemented).

Following this approach, the level of BaU emissions saved was calculated using the COPERT method, maintaining constant the other hypothesis reported above (see part C.1.1)

The business as usual for **indicator 5 ‘modal split’** was assumed to be equal to the Baseline.

Indicator 6 ‘number of annual bus subscription’. Without Mimosa the subscriptions would have registered a less increase and a trend to reach steady values.

Indicator 7 sub indicators show the level of companies’ involvement in and of approval of the Measure. The effectiveness of the Measure should be calculated in terms of saved home-to-work commutes rather than the number of companies involved. As a consequence, the Business as Usual calculation for these indicators (6.1 to 6.3) did not seem appropriate.

Indicator 8 ‘particulate emission’ recorded at fixed stations: BaU hypothesis for indicator 8 was calculated using the average value of five years (where possible) before the Mimosa project.

C2 Measure Results

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

C2.1 Economy

Not applicable.

C2.2 Energy

Not applicable.

C2.3 Environment

Indicator 1 - 4 'emissions' The following table shows the results of pollutant emissions indicators, applying the COPERT method and the hypothesis described in part C.1. Positive values were recorded for all indicators.

TABLE C2.3.1: Emissions saved [tons] thanks to Mobility Management policies

| Indicator | 2007 | 2008 | 2009 | 2010 | 2011 |
|-----------|-------|-------|-------|-------|--------|
| CO | 71,7 | 80,1 | 81,7 | 85,1 | 109,4 |
| CO2 | 3.966 | 4.421 | 4.519 | 4.616 | 6.079 |
| NoX | 7,728 | 8,594 | 8,806 | 9,111 | 11,693 |
| PM 2.5 | 0,449 | 0,501 | 0,512 | 0,524 | 0,671 |
| PM 10 | 0,611 | 0,684 | 0,696 | 0,718 | 0,930 |

Source: COPERT

TABLE C2.3.2: Emissions saved [tons] – results

| Indicator | Pre Mimosa (baseline 2007) | BAU (2011) | Mimosa (2011) | Mimosa vs Baseline | Mimosa vs BaU |
|-----------|-------------------------------|---------------|------------------|-----------------------|------------------|
| CO | 71,735 | 80,299 | 109,400 | 37,665 | 29,101 |
| CO2 | 3.966 | 4.441 | 6.079 | 2.113 | 1.638 |
| NoX | 7,728 | 8,652 | 11,693 | 3,965 | 3,041 |
| PM 2.5 | 0,449 | 0,501 | 0,671 | 0,222 | 0,170 |
| PM 10 | 0,611 | 0,683 | 0,930 | 0,319 | 0,247 |

Source: TeMA calculations using COPERT data and method

Calculations are strictly linked to number of public transport subscriptions sold as the aim of the measure was in reaching as many employees as possible in the Municipality. Thanks to Mimosa it was possible to invest more resources in the project, enlarging the number of companies/employees involved. Within four years of the introduction of Mimosa there was a significant reduction in pollution (see table 2.3.1). MM activities started in 2004, and a number of good results were already seen in 2007 (see table 2.1.1, year 2007). Mimosa helped to speed up activities (with employees fully dedicated to the project) and extend the target of the Measure. Considering Italian legislation forced MM in all Municipalities for companies bigger than 300 workers, in the MRT the activity has been evaluated in its capacity to group smaller companies too. So the comparison between results has been done between two scenarios both with MM implementation, to stress the benefits brought by an enlarging of the activity. Environmental indicators show how MIMOSA saved more than 50% of the already saved pollution emissions. This is an awesome result, considering the measure was already implemented in the city.

Indicator 7 'particulate emissions' recorded at fixed stations. Concerning the bundled indicator, values of PM 10 and PM 2.5 recorded at the Porta San Felice station are shown in the following table.

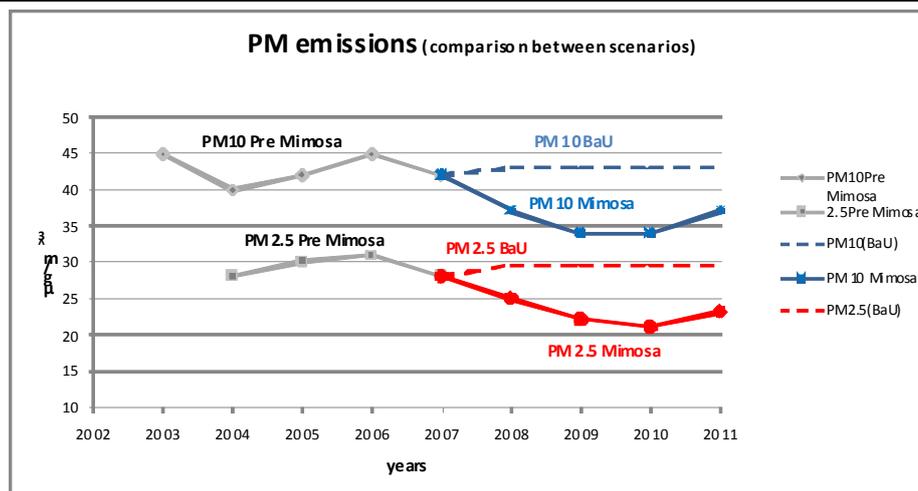
TABLE C2.3.3: Average PMx daily emissions ($\mu\text{g}/\text{m}^3$)

| PORTA SAN FELICE | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|------------------------------------|------|------|------|------|------|------|------|------|------|
| PM 10 ($\mu\text{g}/\text{m}^3$) | 45 | 40 | 42 | 45 | 42 | 37 | 34 | 34 | 37 |
| PM 2.5($\mu\text{g}/\text{m}^3$) | - | 28 | 30 | 31 | 28 | 25 | 22 | 21 | 23,1 |

(*)Threshold Limit Value (PM10): 40 $\mu\text{g}/\text{m}^3$; for PM2.5: 25 $\mu\text{g}/\text{m}^3$ to achieve by 2015 (Decree 155/2010)

Source: ARPA Regional Agency for the Environment

Comparison between 2006-2011 pollution data shows a decreasing trend, with a slight increase during 2011. Data is from the unique fixed station in the centre of Bologna and resume the average daily values registered every day during one year. As the graph below shows, values pre Mimosa wave around 42/43 $\mu\text{g}/\text{m}^3$ that is higher than values during MIMOSA's project where it was around 38 $\mu\text{g}/\text{m}^3$. Considering the analysis is restricted to a single station, it is difficult understand the concrete contribution of MIMOSA to this bundled indicator, nevertheless it can be certainly affirm with Mimosa the air quality improved, probably thanks to the grouping of all the measures implemented.

FIGURE C2.3.1: average PMx daily emissions ($\mu\text{g}/\text{m}^3$)TABLE C2.3.4: PMx emissions, comparison between scenarios ($\mu\text{g}/\text{m}^3$)

| Average daily value ($\mu\text{g}/\text{m}^3$) | Pre Mimosa (baseline 2007) | BaU (average of 3 years before) | Post Mimosa (2011) | Mimosa VS. baseline | | Mimosa VS. BaU | |
|--|----------------------------|---------------------------------|--------------------|---------------------|--------|----------------|------|
| PM 10 | 42 | 43 | 37 | -5 | -12% | -6 | -14% |
| PM 2.5 | 28 | 29,6 | 23,1 | -4,9 | -17,5% | -6,5 | -22% |

Results of bundled indicator underline how the Municipality's Measures helped reduce particulate emissions, as recorded at fixed stations in the centre of the city. The reduction in pollution is more evident during Mimosa. Before the project (2003-2007), the Municipality's actions determined an average annual reduction of 1,7% in PM₁₀ and constant values for PM_{2,5}; after the Mimosa project (2008-2011) PM₁₀ values fell by an average of 3% every year with an annual reduction of 4,4% in PM_{2,5} (Those measured results further underline the calculated reductions from indicator 1-4).

C2.4 Transport

Indicator 5 ‘Modal split’. In 2010 the Municipality investigated the modal split of a random sample of 3.685 workers whose companies participated in Mobility Management policies. The results obtained from the comparison show the effectiveness of MM policies, with an increase in sustainable modes of transport.

TABLE C2.4.1: Indicator 5 results from two surveys (2003 and 2010)

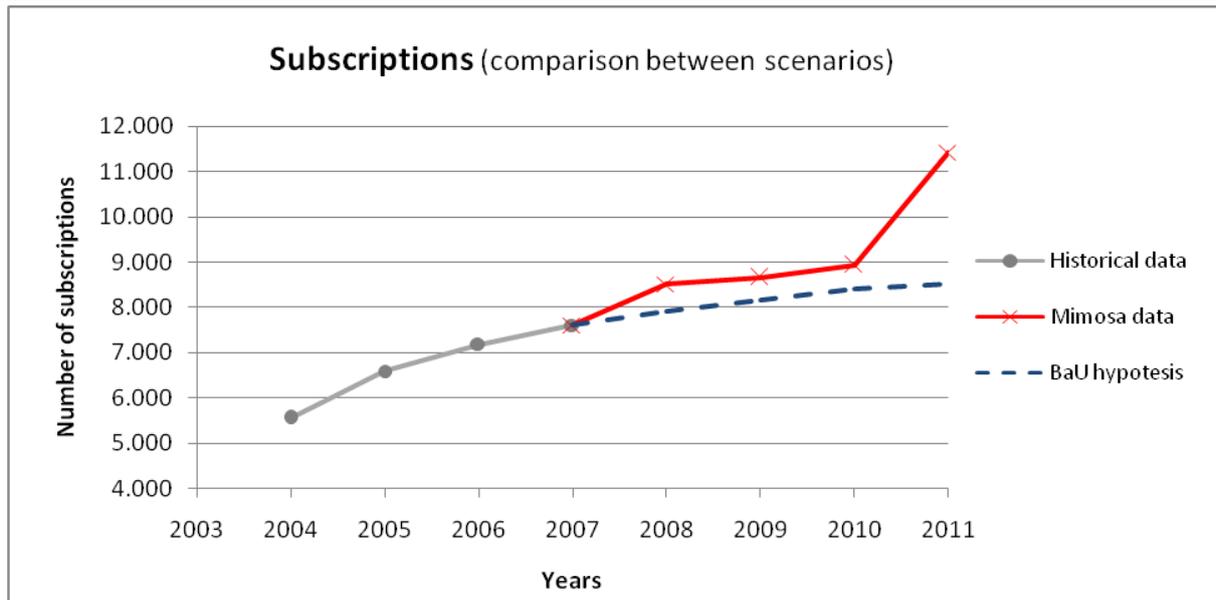
| | Baseline – BaU (2003 ⁽¹⁾) | Mimosa (2010 ⁽²⁾) | Δ Mimosa – BaU/Baseline |
|---|--|----------------------------------|----------------------------|
| Car | 44,90 % | 44,72 % | - 0,18 % |
| Bus | 24,78 % | 27,08 % | + 2,30 % |
| Moped | 11,34 % | 11,99 % | + 0,65 % |
| Bicycle | 7,40 % | 4,42 % | - 2,98 % |
| Train | 5,84 % | 6,95 % | + 1,11 % |
| Walking | 4,80 % | 4,61 % | - 0,19 % |
| Car pooling | 0,94 % | 0,22 % | - 0,72 % |
| Total | 100,00 % | 100,00 % | - |
| ⁽¹⁾ Source: Municipality of Bologna, <i>Piano Straordinario per la qualità dell'aria e la mobilità sostenibile</i> (Quality Air agreement and Sustainable Mobility), 2005. | | | |
| ⁽²⁾ Source: Municipality of Bologna. | | | |

The table above shows data from the Municipality's two different surveys where only the reported results are available. Unfortunately, the two studies did not have a significant and comparable sample. The first survey investigated all companies which joined MM agreements in 2003 (not all of them subscribed to the MM initiative thereafter); the second only included companies which subscribed to the MM initiative in 2010. The samples from the two surveys are unknown and are not representative of all Municipality companies so are not comparable. The surveys are included in the MRT because they provide a rough picture of the situation and allow a qualitative comparison.

Data from the two campaigns shows a growth in public transport usage (+4% for buses and trains) and a very small reduction in private vehicle use (-0.18%). An unexpected effect of the Measure was a reduction in bicycle use. The lower cost of PT season tickets is probably more attractive to employees who use bicycles and they can easily be shifted to other modal choices.

Indicator 6 ‘Number of annual PT subscription sold under the Mobility Management agreements’. Mobility Managers aimed to encourage a modal shift in mobility and accustom people to using public transport for their commute to work. The project promoted PT subscriptions, not individual PT tickets.

FIGURE C2.4.1: Indicator 6 comparisons between scenarios



(before MM actions there were 604 subscriptions: these are not included in the graph)

Source: Municipality of Bologna

Subscriptions were only sold to workers whose companies were participating in the Mobility Management agreement. Considering that the impact of the introduction of Mobility Management policies was particularly high (from 604 subscriptions sold before ministerial funds became available to 5.560 in 2004), we can assume that the incentives caused a change in behaviour.

During the Mimosa project the number of subscriptions increased significantly. The reason was that companies were able to benefit from interventions and incentives. A limitation of the evaluation approach is its inability to show ‘cannibalism’ effects. In the Measure it is not possible to evaluate how many employees had a PT subscription before MM. Considering the significant difference between pre and post project, it is reasonable to think it is a marginal effect. Even by building a business as usual scenario with an increasing rate of subscriptions, the BaU results would not be as good as the ones achieved with Mimosa.

TABLE C2.4.2: Transport results, indicator 6 [number of subscriptions]

| Indicator | Pre Mimosa (baseline 2007) | BAU (2011) | Mimosa (2011) | Mimosa vs Baseline | Mimosa vs BaU |
|---------------|----------------------------|------------|---------------|--------------------|---------------|
| Subscriptions | 7.603 | 8.404 | 11.413 | 3.810 | 3.009 |

Source: Bologna Municipality

C2.5 Society

Indicator 7 ‘Adhesion to mobility management’ Results regarding adhesion show the increase in companies’ involvement, acknowledging the great effort made by the Municipality to promote sustainable mobility.

TABLE C2.5.1 Society results

| Number | Unit | End of 2008 | End of 2009 | End of 2010 | End of 2011 | Δ% 2011/2008 |
|--|--|-------------|-------------|-------------|-------------|--------------|
| 7.1 | Number of companies with a Mobility manager | 37 | 40 | 40 | 42 | 13,5 |
| (of which, those at the limits of the dimensions set out in Italian law) | Number of companies with 280-400 employees | 10 | 10 | 12 | 13 | 30 |
| 7.2 | Number of companies with Mobility managers and with the home to work movements plan | 20 | 22 | 22 | 23 | 15 |
| 7.3 | Number of companies with Mobility managers with the home to work movements plan that subscribed the Mobility management agreement (ATC FER and Trenitalia) | 15 | 20 | 20 | 21 | 40 |

Source: Bologna Municipality

The Municipality used Mimosa funds to extend MM actions to smaller companies, as the table above shows (see 7.1, table C2.5.1). Thanks to the continuous work of Mobility Managers, the Municipality increased its knowledge of employees' needs and adopted a proper solution for every single agreement; this enabled an increase in the number of discounted subscriptions sold (see figure C2.4.1).

C3 Achievement of Quantifiable Targets and Objectives

| No. | Target | Rating |
|--|---|--------|
| 1 | To increase the range of workers involved in Mobility Management policy | ** |
| 2 | To increase PT user-fidelity | * |
| 3 | To better investigate and influence commuters' journeys | * |
| 4 | To enable Administration technicians to provide better support for companies' Mobility Management activities. | ** |
| NA = Not Assessed; O = Not Achieved; * = Substantially achieved (at least 50%) ** = Achieved in full; *** = Exceeded | | |

Considering the results of the impact evaluation, the first objective was achieved in full, with reference to the great effort made by the Municipality both in organising communication events and providing communication tools. The number of companies involved in Mobility Management topics increased during the Measure; this applied to both large and smaller companies (those at the limits of the dimensions set out in Italian law). The first objective represent the main project purposes: increasing the number of employees involved in the MM, the Municipality could shift users to public transport, a more sustainable way of living in the community. As written the objective could be achieved in full, considering the number of subscriptions sold in the 2011 were more than +50% than the last years before Mimosa. This means that more than 1 out of 3 MM subscription users did so because of Mimosa.

With reference to the second objective, increased user fidelity cannot be completely shown by the indicator result. We might argue that the number of subscriptions increased and that the modal split results showed an increase in buses as the main means of transport. PT user fidelity itself could only have been investigated and evaluated if users' opinions had been surveyed during the Measure implementation.

The third objective was also substantially achieved. The home-to-work on-line questionnaire was an important tool provided by the Administration to make company Mobility managers' work easier.

The fourth objective represented another important aim of the Measure, which allowed Municipality Offices to carry out fund raising and management actions to support and publicise mobility management policies.

C4 Up-Scaling of Results

The present Measure already brought about an improvement and up-scaling of existing practices. Large companies were already involved in Mobility Management policies. As regards smaller companies (the majority of companies within the Municipality of Bologna), Mobility Management policies were neither applicable individually, nor were they an efficient investment. On the contrary, a possible up-scaling would be to continue following the Measure objective to involve small companies in mobility management practices, grouping them in 'districts' or common areas.

C5 Appraisal of Evaluation Approach

The evaluation approach made it possible to investigate and compare both pre- and after-Mimosa results. In order to evaluate the contribution of the Measure in terms of influencing commuter journeys, a detailed analysis of commuters' habits would have been a significant improvement. This would have increased the data base for modal split evaluation, but above all made it possible to evaluate the opinion of the workers involved.

It is true that the cannibalism effect cannot be checked in the Measure, and a better approach to evaluation would be to consider this possibility (cannibalism means that people who previously bought a subscription privately now buy via their employers). Any survey done during the MM project must include a question to establish whether the worker already had a PT subscription before MM implementation.

An improvement to the Measure evaluation might be to use a significant sample in the modal shift survey. The number and type of companies polled should be representative of the Municipality context, not only of the MM reality. Moreover it is also important to monitor the effects of the Measure on companies affected by the MM initiatives. It is reasonable to maintain both kinds of surveys.

In addition, at the beginning of the project, the Municipality planned to interrelate this Measure with Measure 5.2, by searching for synergies between parents' (workers) and children's (student's) daily movements. The aim was to involve parents in their children's mobility habits. As reported below ('deviations from the original plan'), considering that parents were not sufficiently interested in compiling on-line questionnaires and that there was a risk of losing the information requested, the Municipality distributed "home-to-school" questionnaires at schools. The result was that information about home-to-school movements were not included with on-line questionnaires when collecting home-to-work movement plans.

C6 Summary of Evaluation Results

The key results are as follows:

Key result 1 – more than 35% emissions saved compared to 2008 values (average value of all pollutant types saved).

Key result 2 – 5 tons per year saved thanks to the Measure.

Key result 3 – 50% more subscriptions sold during the Mimosa project (7.603 units were sold in 2007, 11.413 in 2011).

C7 Future Activities Relating to the Measure

In the future further efforts will be made to source new funds at local, national and European level to implement Mobility Management activities. Additional efforts will be made to renew the agreement between the Municipality of Bologna and public transport companies for ongoing discounts for PT season tickets.

D Process Evaluation Findings

D1 Deviations from the Original Plan

- **The on-line questionnaire for children was not realized** (see Measure 5.2 'Safer road to school'. In the early stages of the project, the Municipality abandoned the idea of integrating information on workers' mobility habits with their children's because many parents were not willing to complete on-line questionnaires. Therefore it was not possible to evaluate the innovative synergy between parents' (workers) and children's (student's) daily movements.

D2 Barriers and Drivers

D2.1 Barriers

Overall barrier

- **Lack of interest among stakeholders:** Mobility Management actions were often considered less important than other public authority initiatives, both by companies and employees as a whole and by institutions. In addition, there are no sanctions in Italy for companies which do not comply with the requirements for Mobility managers.

This barrier was an overlapping and permanent condition. It has been ongoing during all phases of the Measure.

D2.2 Drivers

Overall drivers

- **Trade union pressure on companies** to apply Mobility Management policies, because of the benefits these practices give to employees;
- **Incentives for adopting Mobility Management Policies** – depending on the circumstances, Mobility Management agreements brought several incentives for participating companies: e.g. incentives for renewing company vehicle fleets, parking discounts or permits.
- **Positive impacts of a local election** - after more than a year, the lack of political will in Bologna was solved in spring 2011 with the election of a new Mayor. The Municipality's renewed and extensive commitment towards sustainable mobility had positive impacts on the implementation of all Mimosa measures. Since they were instated, the new Mayor and City Councillor for Mobility have shown great interest in 'sustainable mobility' topics and have actively participated in communication events.

D2.3 Activities

Overall activities

- **Extensive commitment to communication events**, particularly during European Mobility Weeks. These activities were designed to promote a culture and philosophy of Mobility Management, above all to overcome impending cultural circumstances and life style patterns. This activity also made use of the third driver described above.

- **Assistance for companies currently and potentially involved in Mobility Management practices** - technical help and information was given to support companies in their Mobility Management tasks through different kinds of communication tools (e.g. mailing lists, telephone direct consultations). This activity was ‘customized’ to suit the requirements of each company, enabling companies to benefit from all available incentives (e.g. access to public funds to give employees Public Transport discounts).

D3 Participation

D3.1 Measure Partners

- **The Municipality of Bologna** – Municipality of Bologna technicians were involved in all the tasks, supported by Mobility managers employed by different companies. When a company/institution took on the role of leader of a group of companies in a particular area (e.g. the “Fiera” District), the company/institution gave information to all involved (e.g. Emilia Romagna Region in the “Zona Fiera” – exhibition district).

D3.2 Stakeholders

- **Companies.** Mobility Management policies apply to companies with more than 300 employees under Italian law. As presented above, the strategy was to extend mobility policies to companies with fewer than 300 employees, especially those located in particularly close areas.
- **Employees of companies involved in MM policies** who are members of in trades unions can support the implementation of MM policies in their companies, considering the possibility of obtaining personal incentives (e.g. discounted annual bus subscriptions).
- **Commuters** (a proportion of workers) making home-to-work journeys: Mobility Management policies encouraged them to reduce the use of private cars and other individual private means.

D4 Recommendations

D4.1 Recommendations: Measure Replication

To manage the resistance to change – Cities interested in these kinds of measures must evaluate in advance how many difficulties may occur when Municipality decisions interfere with private habits. Widespread communication efforts must be planned prior to and during the Measure to share the administration’s political commitment and objectives with the general public.

An integrated sustainable mobility approach - These kinds of ‘soft measures’ must be included in a context of general sustainable mobility. This was the case in Bologna, where ‘harder measures’ were also implemented and publicised with new technological mobility tools and solutions, offering valid alternatives for home-to-work movements.

D4.2 Recommendations: Process (Related to Barrier-, Driver- and Action Fields)

To find and publicise attractive opportunities – As with many Bologna Municipality measures, cultural resistance to change was the main barrier to rationalizing mobility habits. Mobility management was a good opportunity to benefit from objective incentives (in terms of fleet renewal opportunities and benefits for employees). The Municipality of Bologna's strategy was to invest in communication and supporting efforts, in order to attract and involve as many companies as possible.

E **References**

- (1) and (2) M. Capobianco, G. Zamboni (Università di Genova), “*Valutazione del parco circolante, delle percorrenze urbane e dei fattori emissivi dei veicoli stradali nella città di Genova*”, VII Expert panel Emissioni da Trasporto Stradale, Rome 16 January 2003