



Empowering e-fleets for business and private purposes in cities

Programme: STEER
Project number: IEE/12/713/SI2.644746

e-Mobility Fleet Schemes and Market Potentials in Italy

Date: 07/04/14

Main author(s): Carla Piñeiro – INOVA
e-mail: c.pineiro@inovaportal.com
Teresa Borgonovo – FLI
e-mail: t.borgonovo@legambiente.org

Project coordinator: Aida Abdulah – CHOICE
e-mail: abdulah@choice.de

Table of contents

1. Executive Summary.....	4
2. Introduction	5
2.1 The eBRIDGE Project	5
2.2 Scope of the report.....	6
2.3 Methodology.....	6
3. Electric Mobility in Italy	7
3.1 Starting Point.....	7
3.2 General Aspects of Mobility	8
Demography	8
Mobility patterns.....	9
3.3 The Italian Carpool.....	10
Vehicle Figures	10
Environment.....	12
3.4 Italian Fleet Hot Spots	14
Main Locations for Car Sharing	14
free Flow Car Sharing Operators.....	15
Business EV Car Sharing Operators	15
3.5 Research & Development	16
Key Running R&D Projects on Electric Vehicles.....	16
Demonstrative e-Fleet Projects	16
4. Market Potentials	18
4.1 Main Drivers and Constraints.....	18
5. Local Assessment.....	19
5.1 Starting Point.....	19
5.2 General Aspects of Mobility	20
Demography	20
Mobility patterns.....	21
5.3 The Milan Carpool.....	22
Total vehicles.....	22
6. References	23

Index of figures

Figure 1 Time Plan Methodology.....	6
Figure 2 Demographic trends	8
Figure 3 Share of cities by size class	8
Figure 4 Modal share 2010.....	9
Figure 5 Modal share 2012.....	9
Figure 6 Reasons for travel 2012	10
Figure 7 Total vehicles registered 2008 - 2012	11
Figure 8 Passenger vehicles powertrain type 2008 - 2012	11
Figure 9 Selection of most sold EVs 2013 (first semester)	12
Figure 10 Greenhouse gas emissions from transport 2008 - 2011	13
Figure 11 CO ₂ emissions per kWh from electricity generation 2008 - 2010	13
Figure 12 Demographic trends	21
Figure 13 Modal share 2008 and 2012	21
Figure 14 Total vehicles registered 2008 - 2012	22

Index of figures

Table 1 Main locations for car sharing	14
Table 2 Free flow car sharing operators in Italy	15
Table 3 Main business car sharing operators	15
Table 4 Key running R&D projects on electric vehicles	16
Table 5 Demonstrative e-fleet projects.....	16

1. Executive Summary

Electric mobility is a highly promising technology that can help address severe global challenges such as climate change and fossil fuel dependency; it can contribute to cutting local CO₂ emissions and noise pollution coming from transport and enable synergies with smart grids and so favour a greater percentage of renewable energies production.¹

The large potential of electric vehicles in urban fleets includes (a) improving electric mobility markets through niche development, thus accelerating mass market adoption of electric vehicles; (b) supporting the achievement of energy and climate protection goals; and (c) contributing to tackling global recession by revitalising the industrial fabric and fostering innovation, growth and job creation.

Italian gross domestic product (GDP) of 1,580 billion EUR in 2011 represents 12.50% of EU 27 GDP². With a population of 59 million (2012), Italy represents 11.87% of total European population (500.35 million)³ and 93.57% of this population lives in cities that have between 50,000 and 300,000 inhabitants. With 40 million vehicles in 2011, Italy has the second largest European carpool representing 15.30% of the total EU fleet.⁴

Italy has about 3,500 enterprises in the automotive sector, employing about 1.2 million direct and indirect workers. The automotive industry invests more than 2 billion EUR in R&D per year. In 2010, a periodic survey by the Italian Electric Road Vehicle Association (CIVES) confirmed that around 50 producers, assemblers, and importers in the country are able to manufacture or supply HEVs and EVs. The components industries have become more active with new commitments on advanced batteries and charging stations, while the producers of power electronics, complete electric and hybrid drivetrains, and electric motors are improving their products.

Regarding charging infrastructure, a growing number of initiatives are being carrying out to develop and promote their implementation. These initiatives are mainly related to three areas: development of new plugs and charging stations, financial support to create local infrastructure and validation of electric infrastructure technologies and business models through pilot actions.

Italy has seen some successful stories of EVs in public fleets. The Municipality of Reggio Emilia (170,000 inhabitants) has been committed to electric mobility since 2001. The project “Electric Car in Reggio Emilia” has provided public and private companies with about 250 EVs for daily use. Within the EU-funded project REZIPE, the municipality has recently installed a charging station powered by photovoltaic panels (3.7 kWp). Users can charge and test 5 e-Piaggio Porter vans, as part of the integrated action plan of the municipality to promote sustainable mobility at urban level. Another interesting case study is the Poste Italiane Spa, the public company providing the main part of postal services in Italy. Its fleet consists of 37,600 vehicles: 3,000 of them are EVs or bi-fuel (methan/gasoline). Poste Italiane has got the brightest EV fleet in Italy, with 1,000 “Free Duck” vehicles, produced by Ducati Energia and used for delivering in the city centres. The “Free Duck” vehicle concept has been developed through two different co-funded projects, the “Green Post” project (EU funding) and the “Postal ZEV” project (funded by the Italian Ministry of Environment).

¹ Council of the European Union. 2010.

² Eurostat, (2013a). GDP at current market prices.

³ Eurostat, (2013b). Population on 1 January.

⁴ European Automobile Manufacturers' Association (ACEA). Pocket guide 2013.

2. Introduction

2.1 The eBRIDGE Project

eBRIDGE is a co-funded EU project to promote electric fleets for urban travel in European cities. The project aims to bring innovation and new technologies to make today's mobility cleaner, more efficient and sustainable.

During eBRIDGE, alternatives to current mobility patterns will be explored in order to analyze whether electric mobility is a feasible option to make cities cleaner and more sustainable.

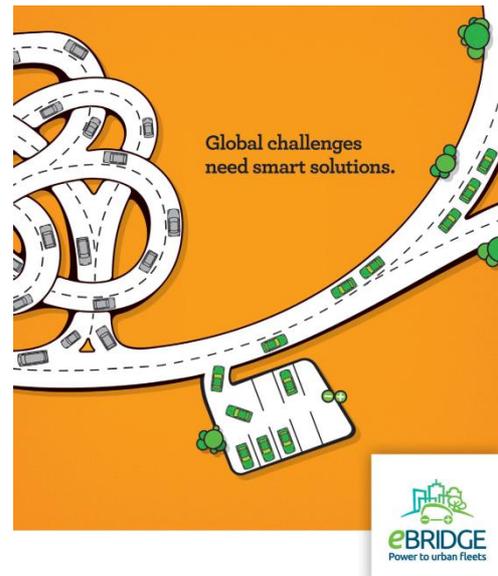
Although electric vehicles fulfil all the requirements to be among the most important players in urban transport systems of the near future – they are clean, efficient, silent, and incur low running costs – significant barriers to a wider diffusion and use of electric vehicles remain to be addressed, including low user acceptance and higher purchase costs compared to conventional cars.

On this backdrop, eBRIDGE aims to demonstrate how the introduction of electric vehicles in fleets for business and private urban travel can efficiently contribute to the improvement of market conditions for the electric mobility sector.

Seven case studies with heterogeneous starting conditions assure a broad-spectrum outcome. Berlin (Germany), Milan (Italy), Lisbon (Portugal), Vigo (Spain), Valencia (Spain), a selection of Austrian municipalities and Carmarthen (Wales) are developing actions to optimise operational fleet performance, test and launch solutions to increase the convenience and ease of use of car sharing offers and finally, raise awareness among the target groups and further relevant stakeholders through engaging marketing approaches on the suitability of electric mobility for urban transport and commuting.

The eBRIDGE team involves technical experts, academics, associations, public administrations, mobility providers and public transport and car sharing operators:

- choice GmbH (Coord.), Germany
- DB FuhrparkService GmbH, Germany
- Allmenda Social Business e.G., Austria
- Forschungsgesellschaft Mobilität – Austrian Mobility Research gem. GmbH, Austria
- I Nova Consultores en Excelencia e Innovación Estratégica, S.L., Spain
- Galician Cluster of Automotive Companies, Spain
- Movilidad Urbana Sostenible S.L., Spain
- Comunitat Autònoma de les Illes Balears, Spain
- Fondazione Legambiente Innovazione, Italy
- Azienda Trasporti Milanese S.p.A, Italy
- Occam, Portugal
- Câmara Municipal de Lisboa, Portugal
- Cardiff University, United Kingdom



2.2 Scope of the report

The goal of the “Work Package 2: Market Analysis”, is to analyse the current situation and trends of electric fleets in the eBRIDGE targeted regions by assessing information about all context relevant issues such as market overview, best practice, legal framework, policy, and environmental impacts. The work package will also assess the market potential of electric mobility, mainly for fleets.

The present report “e-Mobility Fleet Schemes and Market Potentials – ITALY”, gathered this information for Italy and particularly Milan, the Italian case study site.

2.3 Methodology

In the course of this work package, data from Germany, Austria, Spain, Italy, Portugal and United Kingdom have been gathered and analysed for the period 2008-2012.

The overall goal has been to establish the current state of play on electric urban fleets for every participant country. A factsheet on transferability at a European scale will be based on this report series.

Relevant data regarding national carpools such as registrations, power train type, sales figures, as well as information about car sharing hot spots and main charging operators have been collected and analysed.

Additionally, a brief assessment of the market potential of electric vehicles including identified national barriers and drivers is provided.

Finally, the assessment of the Milan case study facilitates the comparison of the local and national levels, showing to what extent the Italian energy and climate targets are on track.

The methodology is based on four steps as shown in Figure 1. First, the relevant aspects of urban mobility and electric fleets were defined in the data collection template. The contents of the report were likewise defined and main timelines drafted. Finally, the results of the data analysis and complementary sources were added, and presented in the present report.

Figure 1 Time Plan Methodology



Source: Own diagram

3. Electric Mobility in Italy

3.1 Starting Point

The introduction of EVs in Italy has been driven by a series of temporary environmental control actions and the increasing share of renewable energy sources within a heterogeneous energy mix.

The governmental bodies are formally committed to the European Union targets for CO₂ emission reductions and increased use of alternative fuels and are currently proposing and discussing new legislation, regulations, and supporting measures to significantly reduce the environmental and energy impact of the transport sector, which still accounts for about 27% of the overall end use of energy and about 30% of the overall greenhouse gas emissions.

At European level, automotive industries have the mandatory goal to keep the emissions of new cars under 95gCO₂/km by 2020. Technology applied to conventional vehicles will allow them to emit, in average, 103-104 gCO₂/km. To reach the goal, it's necessary to introduce electric cars. That's why several car producers (Renault, Toyota, BMW ...) are investing to be on the market with EVs for urban contexts.

CIVES⁵ estimates that in Italy the number of EVs (BEVs, PHEVs and HEVs) might be of 6 out of 700,000 conventional vehicles, from now until 2020 (10-12% of year market). According to another Enel⁶, potential market penetration of EVs and PHEVs might be of 850,000-3,800,000 (depending on the regulatory conditions).

At national level, the Authority for Electric Energy and Gas has released the “Piano Nazionale infrastrutturale per la ricarica dei veicoli alimentanti ad energia elettrica (National infrastructural Plan for charge of electric vehicles)”. This plan was foreseen by the 134/2012 national law; it provides specific guidelines to promote an homogeneous development of recharging services and it states that the starting point has to be identified in the urban areas.

The same law set up incentives for all low carbon emissions vehicles; not only EVs, but also vehicles powered by biofuel, methane and GPL, as well as the hybrid ones. The budget allocated and at disposal only for the year 2013 has been 40 million EUR, 5 of which were allocated to be used by Italian Regions for: sustainable mobility in urban / metropolitan areas, public and private fleets, fuel distribution systems and two-wheeled vehicles (motorcycles). On September 2013, as per the Ministry of Infrastructure and Transport, 31 projects were submitted to request these funds.

A condition for the implementation of EV operational systems is the standardisation and the regulation of the safety systems. In Italy, this condition is fulfilled.

In Italy, to achieve the emission reduction goals it will be important to discourage the private ownership of vehicles: throughout Europe, Italy has one of the highest density of cars – ranked only after Luxembourg and Iceland - with 61 cars per 100 inhabitants in 2012⁷.

⁵ CIVES is the acronym for Commissione Italiana Veicoli Elettrici Stradali (Italian Commission for Electric Road Vehicles). It's the Italian section of the European Association for Battery, Hybrid and Fuel Cell Electric Vehicles.

⁶ Enel – Energy vendor, Associazione Nazionale delle Imprese Elettriche (ASSOELETRICA) - National Association of Electric Companies.

⁷ Osservatorio Autopromotec – Autopromotec Observatory.

3.2 General Aspects of Mobility

DEMOGRAPHY

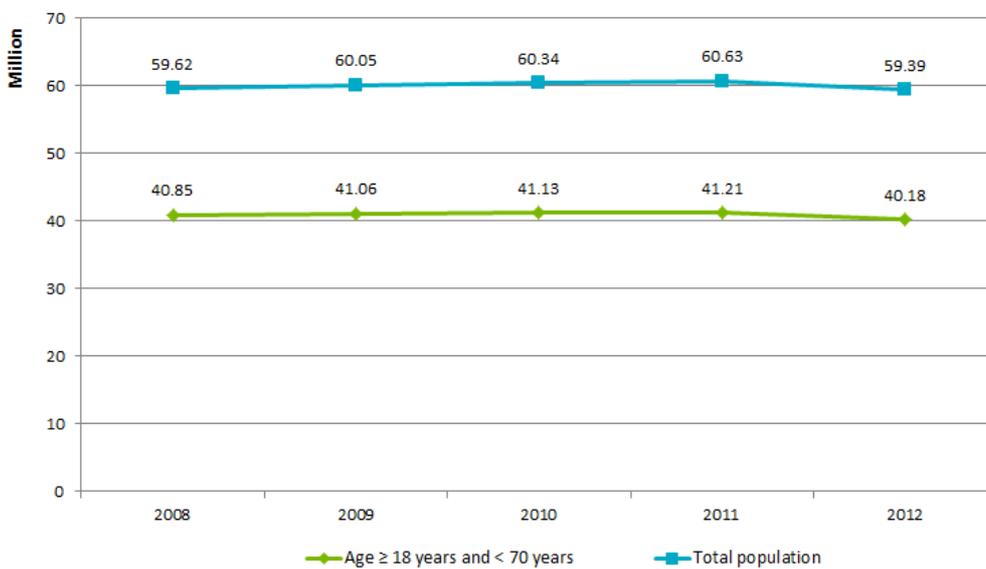
Italy recorded a total population of 59.39 million inhabitants in 2012. The median age of population has been steadily increasing in the last decades, being 43.8 in 2012 and the second oldest in EU-27.⁸

Figure 2 classifies Italy’s population for the period 2008-2012 in two categories: total population and working population (aged between 18 and 70 years).

In 2012, more than two thirds of the total population was working population (67.65%), able to hold or obtain a driving license.

From 2008 to 2012, total population has decreased a 0.38% and working population 1.65%.

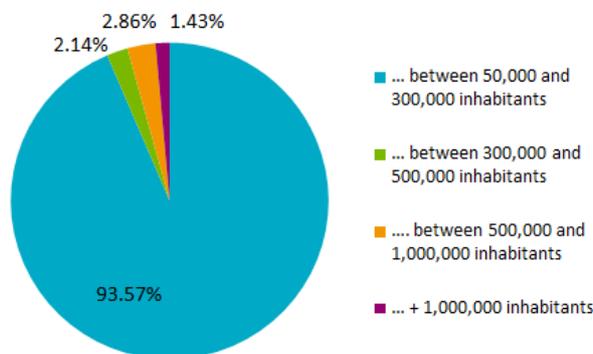
Figure 2 Demographic trends



Source: Own graphic based on Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office. (2013)

The country’s population is distributed as shown in Figure 3. In 2013, 93.57% of cities have between 50,000 and 300,000 citizens.

Figure 3 Share of cities by size class



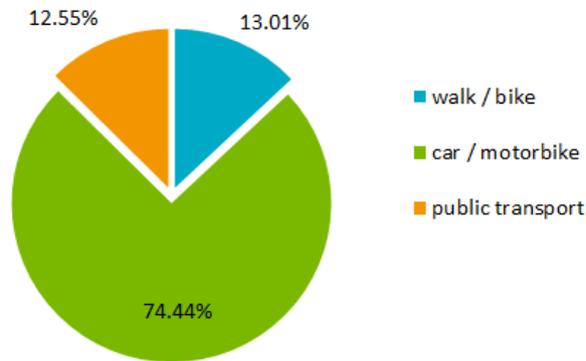
Source: Own graphic based on Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office. (01.01.2013)

⁸ Eurostat (2013c) Population structure and Age.

MOBILITY PATTERNS

Mostly of the commuting trips (going to work) in 2010 were done by private cars (70.82%); 12.55% by public transport; 9.94% walked, 3.62% used motorcycle and 3.07% by bike.

Figure 4 Modal share 2010

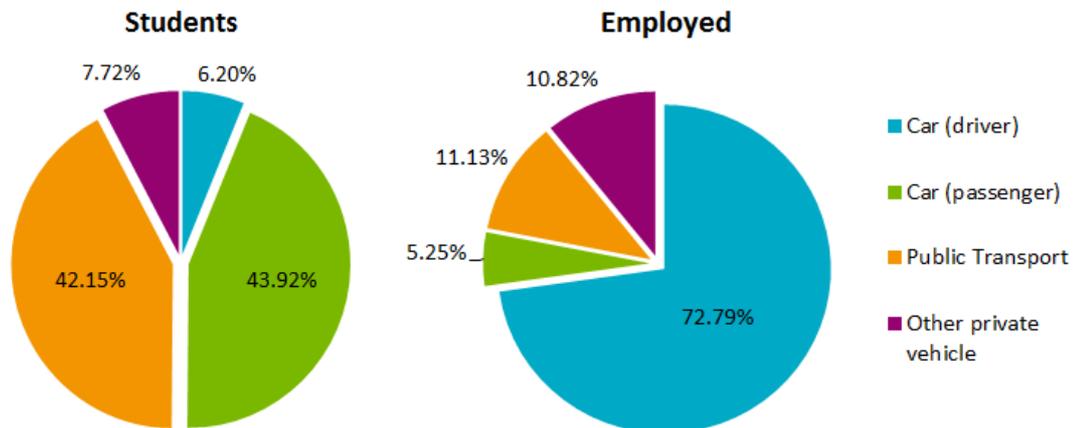


Source: Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office, Italia in cifre (2010)

Data of 2012 show that almost two thirds (65.38%) of the trips are made by car (42.59% being driver and 22.79% being passenger). A quarter of the trips are made by public transport and the remaining 9.41% by other private means.⁹

Differences between students and employed are significant. While employed people drive their own car (72.79%), students are mainly passengers of private cars (43.92%) or use the public transport (42.15%).

Figure 5 Modal share 2012

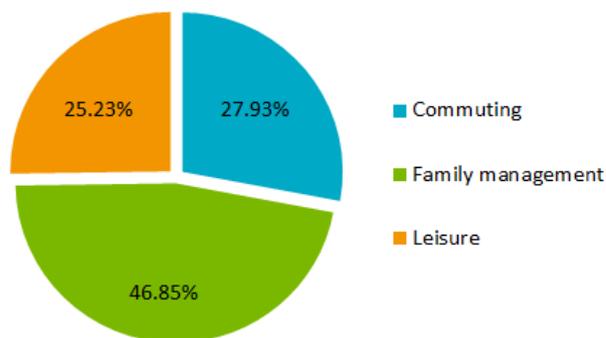


Source: Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office (2013)

In 2012, trip purpose in urban areas was as following: commuting 27.9% (a.v.: 9 million, 1.4 of which are students trips); family management 46.8% (a.v.15.1 million); leisure 25.2% (a.v.8.1 million).

⁹ No data for walking/cycling.

Figure Trip purpose 2012



Source: Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office (2013)

There is a decreasing trend of commuting due to the economic crisis: from 128 million trips in 2008 to 97.5 in 2011. In 2012, average daily trips were almost 10 million less than in 2011 (-8.5%)¹⁰. The decline in consumption of mobility was caused largely by the collapse of travel for leisure.

The majority of journeys are made in a range of 10 km (70,4%); in a range of 10-50 km are 26,6% and journeys on a long distance(>50 km) cover the 3% of the total.

3.3 The Italian Carpool

VEHICLE FIGURES

Total vehicles registered

The number of passenger cars and light transport vehicles has increased steadily from 39.19 million in 2008 to 40.33 million in 2011¹¹. In this period, the trend of increase is slightly higher in light commercial vehicles (4.20%) than in passenger cars (2.79%).

92.05% of the registered vehicles were passenger cars in this period (2008-2011).

The average age of the passenger cars was 8.6 years in 2011.¹²

In 2012, passenger cars represented 75.37% of the total number of vehicles circulating in Italy (49,193,242)¹³. Electric cars were 1,978 (0.01% of the passenger cars)¹⁴.

¹⁰ Ricerchetrasporti -Decimo rapporto sulla mobilità in Italia (10th Report on mobility in Italy)

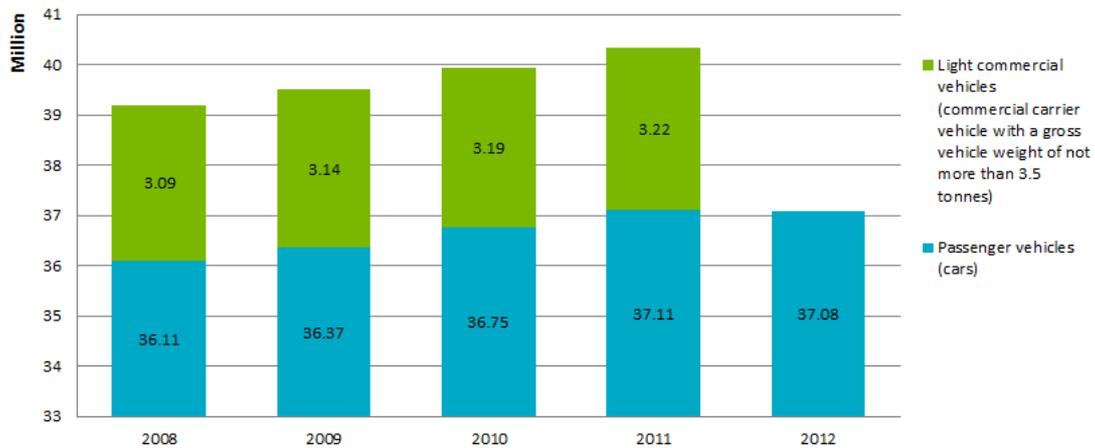
¹¹ No data available for light transport vehicles 2012.

¹² Automobile Club d'Italia (ACI) - Automobile Club of Italy, "Analisi dell'anzianità del parco veicoli in Italia" (2011)

¹³ Automobile Club d'Italia (ACI) - Automobile Club of Italy, "Annuario statistic 2013"

¹⁴ Report "Analisi dell'Osservatorio Airp sulla Mobilità Sostenibile" (2013)

Figure 7 Total vehicles registered 2008 - 2012



Source: Own graphic based on Automobile Club d'Italia (ACI) - Automobile Club of Italy (2013)

Vehicle powertrain type

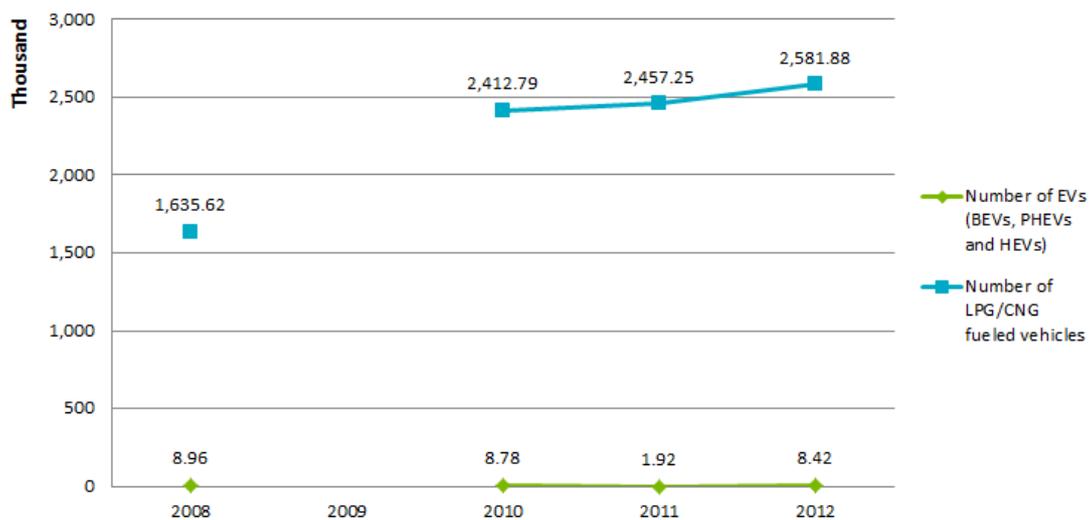
In 2012, 6.99% of the passenger vehicles were alternative powered vehicles, being 93.01% conventional fuelled vehicles.

Among the alternative fuelled vehicles, almost all - 99.68% (6.96% of the total) - are liquefied petroleum gas (LPG) or compressed natural gas (CNG) fuelled. 0.32% (0.02% of the total) are battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV) and hybrid electric vehicles (HEV).

The total amount of LPG and CNG registered vehicles has significantly increased by 57.85% between 2008 and 2012.

In the same period, BEVs, PHEVs and HEVs have decreased by 6.00%.

Figure 8 Passenger vehicles powertrain type 2008 - 2012¹⁵



Source: Own graphic based on Automobile Club d'Italia (ACI) - Automobile Club of Italy (2013)

¹⁵ No data available for 2009.

Selection of most sold EVs per supplier & model

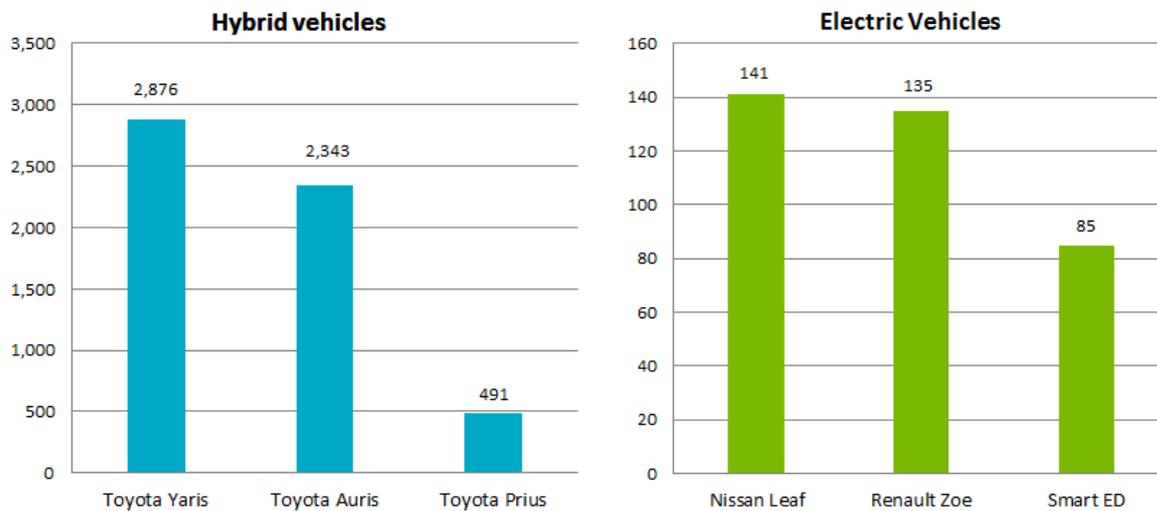
Final figures of the first five months of 2013 recorded a fall of 11.25% of the car market. Nevertheless, hybrid vehicles scored a record (+166.06%), while electric vehicles registered a more moderate growth: +32.80% for a total of 251 units.

The final figures related to the first semester 2013 show about 6,800 new registrations of hybrid vehicles and about 500 new battery electric vehicles.

Figure 9 shows a selection of the most sold EVs with Toyota leading the market of hybrid vehicles with its models Yaris, Auris and Prius.

The market of battery electric vehicles is more distributed, being the top three models Nissan Leaf, Renault Zoe and Smart ED.

Figure 9 Selection of most sold EVs 2013 (first semester)



Source: *Unione Nazionale Rappresentanti Autoveicoli Esteri (UNRAE) – National Union Representatives of Foreign Vehicles (2013)*

ENVIRONMENT

The EU has called for the need to drastically reduce world greenhouse gas (GHG) emissions, with the goal of limiting climate change below 2°C. Overall, the EU needs to reduce emissions by 80–95% below 1990 levels by 2050, in the context of the necessary reductions of the developed countries as a group, in order to reach this goal.

European Commission analysis shows that while deeper cuts can be achieved in other sectors of the economy, a reduction of at least 60% of GHGs by 2050 with respect to 1990 levels is required from the transport sector, which is a significant and still growing source of GHGs. By 2030, the goal for transport will be to reduce GHG emissions to around 20% below their 2008 level.

Accordingly, the White Paper on Transport (2011) establishes as first goal to halve the use of conventionally fuelled cars in urban transport by 2030; phase them out in cities by 2050; achieving essentially CO₂-free city logistics in major urban centres by 2030.¹⁶

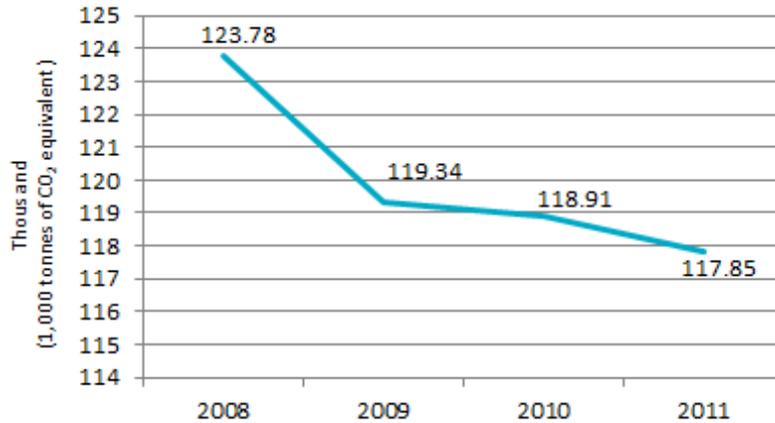
¹⁶ European Commission (2011a) WHITE PAPER - Roadmap to a Single European Transport Area: Towards a competitive and resource efficient transport system (2011) COM/2011/0144.

Moreover, the European Union’s ten-year growth strategy, Europe 2020, established a set of targets including climate, energy and sustainability targets. The EU targets are translated into national targets in each EU country.

In the specific case of Italy, the national target related GHG for 2020 is to reduce the GHG 13% with respect to 2005.¹⁷

The total GHG emissions transport in MT CO₂ units¹⁸ shows, after a great drop between 2008 and 2009 (3.59 %), that the trend of decreasing continues steadily, being the average drop rate of 4.79% from 2008 to 2011.

Figure 10 Greenhouse gas emissions from transport 2008 - 2011



Sources: Own graphic based on Eurostat (2013d) Indicators Theme 6 Climate Change and Energy

Regarding electricity generation, CO₂ emissions per kWh, data from 2008 to 2010 shows a decreasing trend, being the average decline rate of 10.18%, with a great drop between 2008 and 2009 (9.07%).

This can be considered a positive development with regards to electric mobility.

Figure 11 CO₂ emissions per kWh from electricity generation 2008 - 2010



Source: Own graphic based on CO₂ Emissions from Fuel Combustion Highlights, IEA (2012)

¹⁷ European Commission (2011b) Europe 2020 Targets.

¹⁸ This indicator shows trends in the emissions from transport (road, rail, inland navigation and domestic aviation) of the greenhouse gases regulated by the Kyoto Protocol.

3.4 Italian Fleet Hot Spots

MAIN LOCATIONS FOR CAR SHARING

After some pilot trials and a brief running-in period, station-based car sharing is by now a tried and tested reality, fully operational in 14 cities and in expansion all over the country. 12 of these cities are within the National Circuit ICS, while the Bolzano and Naples operators are not part of this circuit.

In addition, as we will describe in the next paragraph, new free-floating car sharing services are now catching on in the Italian cities, starting from Milan.

The main car sharing locations, which we can consider due to the number of cars, users and parking spots are the following.

	Star date	Number of cars	Number of users	Number of parkings
Bologna	2002 (ICS)	49	1.136	40
Brescia	2010 (ICS)	6	161	6
Florence	2005 (ICS)	19	636	18
Genoa Savona	2004 (Genoa, ICS) 2009 (Savona, ICS)	57	2,722	49
Milan	2001 (ICS-GuidaMI) 2004 (e-vai) 2013 (Car2Go, Enjoy and EQsharing)	1,386	138,484	104
Padua	2011 (ICS)	10	129	10
Palermo	2009 (ICS)	36	700	36
Parma	2007 (ICS)	19	416	13
Rome	2005 (ICS)	124	3,064	85
Turin	2002 (ICS)	139	2,417	79
Venice	2002 (ICS)	60	3,977	21

Source: Own table based on *Iniziativa Car Sharing (ICS) - Car Sharing Initiative (2013)*, press info on Car2Go and Enjoy services in Milan, AMAT info on EQsharing service and e-vai info on e-vai service.

Up to date, the ICS national circuit of Car Sharing in Italy has a total of circa 23,000 customers with 670 vehicles available and 437 reserved parking places. The subscriptions are increasing with an average monthly rate of 135%, while the journeys made every month are between 13,000 and 15,000, for a total of around 600,000 Km.

FREE FLOATING CAR SHARING OPERATORS

Since August 2013, free-floating (or free-flow) car sharing is also present in Italy. The City of Milan, via call for tender, has opened the market to private operators. The initiative was created to regulate the entry of Car2Go, since it was months that it declared to be ready to invest and provide its services in Italy. The public call for tender is mainly intended to encourage the launch and development of the free-floating car sharing schemes, nowadays considered the most effective ways to respond to the needs of the city. On the contrary, the traditional car sharing scheme, the so called “station-based”, is assigned to ATM, the municipal transport company (as part of the public transport services general contract signed by the City of Milan and ATM itself).

Up to date, beginning of 2014, two private companies have launched their free-floating car sharing services in Milan: Car2Go and Enjoy (ENI, the national energy and oil company + Trenitalia + FIAT). It has been announced the early entry of some more operators: DriveNow and another less well-known local operator.

	City	Number of cars	Number of users	EV's
<u>CAR2GO</u>	Milan (opening soon in Rome)	600	60.000	No
<u>ENJOY</u>	Milan	450	55.00	No

Source: Own table based on data by CAR2GO, ENJOY (2013)

Both Car2Go and Enjoy have stated that, by 2014, they will bring their services to Rome, Bologna, Florence and Turin.

BUSINESS EV CAR SHARING OPERATORS

Operator	Fleet			Technological key aspects				Locations
	Operator	Total fleet	No. of EVs	Booking	Access	System	Payment	
<u>E-VAI</u>	SEMS (private company)	130	75	Yes	Card	Station-based	Credit card	Milan, Lombardy small cities
<u>EQ SHARING MILANO</u>	NHP ESCO (private company)	120	120	Yes	Card	Station-based	Credit card	Milan city center
<u>BEE</u>	NHP ESCO (private company)	40	40	Yes	Card	Station-based	Credit card	Naples
<u>ROME CAR SHARING</u>	Roma Servizi per la Mobilità S.r.L. (ICS)	124	10	Yes	Card	Station-based	Credit card	Rome,
<u>GUIDAMI</u>	ATM Servizi (private company)	151	2	Yes	Card	Station-based	Credit card	Milan
<u>CI.RO</u>	Smart City Naples (public company)	11	11	Yes	Card	Station-based	Credit card	Naples

Source: Own table based on data by E-VAI, EQ SHARING MILANO, BEE, ROME CAR SHARING, GUIDAMI, CI.RO (2013)

3.5 Research & Development

KEY R&D PROJECTS ON ELECTRIC VEHICLES

Title	Key areas covered	Coordinator	Partners	Budget	Funding
<u>ZERO REGIO</u> (2004 – 2009)	<p>Use of hydrogen as an alternative motor fuel.</p> <p>Develop infrastructure systems for hydrogen consisting of hydrogen production, compression, storage and distribution</p> <p>equipment and integration of these in conventional refueling stations</p> <p>Adaptation and demonstration of 700 bar refuelling technology for hydrogen</p> <p>Demonstrate of hydrogen as an alternative fuel via automobile-fleet field tests at two locations: Rhein-Main (Germany), and Lombardia, (Italy).</p> <p>Show ways and prospects for faster penetration of hydrogen as alternative motor fuel.</p>	Infraserv Gmbh & Co. Höchst Kg (Germany)	16	18.68 million EUR	FP6 European Commission

Source: Own table based on project web pages (2013)

DEMONSTRATIVE E-FLEET PROJECTS

Since 2011, the Italian AEEG Authority (Authority for Electric Energy and Gas) has been supporting projects on electric vehicles, charging infrastructures and market & managing systems, some of them directly connected to the above mentioned projects:

Project	Key areas covered	Years	N° of EVs	N° of partners	Coordinator
<u>E-Mobility Project</u>	Installation of a large charging infrastructure (more than 400 charging points in three Italian cities) and an adequate fleet (100 EV Smart cars available for rental) in three cities of different size and traffic conditions: Milan, Pisa, and Rome.	2008 - 2013	100	2	Enel S.p.A. (Italy)
<u>E-Moving</u>	Build up a recharging infrastructure for electric cars in Milan and Brescia with a total of 270 recharging points, while Renault will supply 47 vehicles (saloon cars and vans) available from its Zero Emission range, equipped with latest generation lithium-ion batteries.	2010 - 2015	47	>4	A2A S.p.A. (Italy)

ENEL Distribution S.p.A. (and HERA S.p.A.) project	Involves six territorial contexts: cities in the Milan province, Pisa, Genoa, Bari, Perugia and the main cities in the Emilia Romagna region. The project plan foresees to install 310 charging infrastructures distributed as follows: 270 by Enel Distribution and an additional of 40 (20 in Modena and 20 in Imola) by Hera.	2013 - 2015	>140	2	Enel Distribution S.p.A. (Italy)
Class onlus project (Green Land Mobility)	Involves nine Italian provinces: Milan, Rome, Genoa, Bologna, Naples, Bari, Catania, Varese, Monza - Brianza, for a total of about seventy cities. The project plan foresees to install 150 charging points in 107 big shopping centers and outlets and other 43 ones in all the Monza and Brianza province territory.	2012 - 2015	35	12	Class Onlus non profit association (Italy)
ENEL Energy S.p.A. project	The project plan foresees to install 26 charging infrastructures in Rome, Milan and other three cities in the Milan province. Within this project, it will also be studied in deep the possible installation of two fast charging infrastructures (1 in Rome and 1 in Milan). The choice of the infrastructure location takes into account the density of traffic flows in the selected cities.	2011 - 2014	60	3	Enel Energia S.p.A. (Italy)

Source: Own table based on project web page and Italian AEEG Authority (2013)

A new interesting project is the “**GREEN LINE – sviluppo della mobilità sostenibile**” project, a partnership between the Politecnico di Milano and Villa di Serio, Nembro, Alzano Lombardo, Albino, Ranica, Pradalunga and Gorle Municipalities (in the Bergamo province).

The idea is to design and create a sort of “green line” to connect the 7 small cities, setting up 61 electric charging stations and 122 dedicated green parking slots.

During the project life, public events, conferences and technical workshop will be organized to directly engage citizens, logistic companies and the Public Procurement Offices of the Municipalities involved.

4. Market Potentials

4.1 Main Drivers and Constraints

In general terms and at European level, the main market barriers for the successful integration of electric mobility into European transport systems include technological, infrastructural and cost-related aspects. Finding integrative solutions to overcoming the current challenges concerning battery technology, standardisation of the recharging infrastructure, interaction with electricity generation systems and cost and business case of large scale introduction is crucial for the development of the electric mobility market in the short and long term. The increased demand for EVs, along with the sharing of best practice and extensive public and organisational awareness-raising activities, will help encourage infrastructure and technological investments and reduce costs.

In 2010, GfK Eurisko managed a survey for Renault titled "The Italian and electric mobility: expectations and potential".

This survey produced a first potential user profile, taking into account two target groups: the "young people" group and the "adults" group.

Considering the target "young people" (49 cases), females (57%) are more prone to the usage of electric vehicles than males. The age between 18-20 years (57%) is more prone to EVs than the age between 16-17 years (43%).

Taking into account the target "adults" (159 cases), males (60%) are more prone to EVs.

The Study Centre of Direct Line (online-insurances company) has carried out a survey on a sample of 1,000 Italians aged 18 to 65 years old. The objective of the survey was to understand what Italians think about "green" cars (bi-fuel, electric, hybrid).

These are the most noticeable findings: 98% locates the lowest price of the car ownership tax as one of the greatest advantages of having an electric car. Following this, the possibility to move without constraints (97%) and free parking places in the Italian major cities (96%), a modern design (90%) and the characteristic that engine is extremely quiet (90%).

Regarding the problematic issues coming out from the survey: according to the 89% of people, the lack of charging stations throughout the country is the main barrier, together with the difficulty to know where to find the already available charging points (88%); it follows the fact that market prices are still too high compared to the less modern and less technological conventional gasoline-powered cars (86%); then it comes the impossibility to get a self-service recharging (84%).

5. Local Assessment

5.1 Starting Point

Milan is the second-most populous city in Italy and the capital of Lombardy. The city has a population of about 1.4 million (2012), while its urban area is the 5th largest in the EU with an estimated population of about 5,248,000.

Milan is the main industrial, commercial and financial centre of Italy and a leading global city. It attracts more than 2 million annual visitors. It hosts numerous cultural institutions and universities, with 185,000 enrolled students in 2011. The city is also well known for several international events and fairs, including Milan Fashion Week and the Milan Furniture Fair, the largest of its kind in the world, and will host the 2015 Universal Exposition.

Milan is an important transport hub divided into four modes of transport, managed by ATM (the Transportation Company of the City of Milan): underground, bus, tram and trolley bus.

The surface network is used in a widespread manner throughout the city of Milan, the municipalities of the urban area and a part of the territory of the Province.

Both transport networks are integrated to the railway line Trenord completion of an intermodal system that allows the customer to move easily with public transport.

The ATM product range includes light rail, car sharing *GuidaMi* and bike sharing *BikeMi*.

ATM also manages 21 car parks matching, the parking system “SostaMilano”, with the control of parking areas and all payment systems in the city.

The city has been active in promoting public transport and cycling, and should continue strengthening efforts in this direction.

Since November 2012 the City Council started the process of drafting the PUMS (Urban Plan of Sustainable Mobility), which provides a path of participation open to the city and to the institutional and non-institutional actors involved and interested. The "Guidelines for the Urban Mobility Plan" have been approved by the City Council with 10 points to follow to build the Milan of the future:

1. Set a metropolitan vision system.
2. Develop the infrastructure for public transport.
3. Enhance rail service.
4. Make sustainable accessibility to new areas of urban transformation.
5. Increase the security levels, spreading the pedestrian areas and the islands environmental.
6. Facilitate and support the cycling.
7. Rationalize the use of motor vehicles (Area C systems, sharing solutions and smart).
8. Make efficient parking system.
9. Promote the development of a new urban freight logistics.
10. Overcome barriers and make the city more accessible for everyone.

One of the most impactful actions, in a positive way, on the urban mobility of these years has been the introduction of **Area C**. This is the Congestion Charge regulating access into the

restricted traffic zone in the Milan city centre. It is active on Mondays, Tuesdays, Wednesdays and Fridays (weekdays), from 7.30 to 19.30, and Thursday from 7.30 to 18, with these restrictions:

- 3 free accesses for electric vehicles, mopeds and motor vehicles (motorcycles, tricycles and quadricycles) and hybrid and bi-fuel vehicles (methane and liquid gas powered).
- 2 toll accesses for petrol powered vehicles Euro 1 and more advanced ones and petrol/diesel powered vehicles Euro 4 and more advanced ones, without particulate filter.
- 3 bans to access and transit: diesel powered vehicles Euro 0, 1, 2 and 3, petrol powered vehicles Euro 0(except waived) and vehicles or combinations of vehicles with a length exceeding 7.50 meters (except waived)

The implementations of Area C aim to improve the conditions of life for those who live, work, study and visit the city. Its objectives are:

- Reduce traffic into the Congestion Charge area;
- Implement a more effective public transport network and encourage the use of it;
- Reinforce the right of individual mobility;
- Find resources for investing on sustainable mobility for pedestrian, cycling and traffic at moderate speeds;
- Improve the quality of urban life by reducing the number of accidents, the wild park, noise pollution and air pollution.

5.2 General Aspects of Mobility

DEMOGRAPHY

Milan recorded a total population of 1,262,101 inhabitants in 2012. The median age of population in 2011 was 45.1, quite older than national average age for the same year (43.5) and the EU-27 (41.2).¹⁹

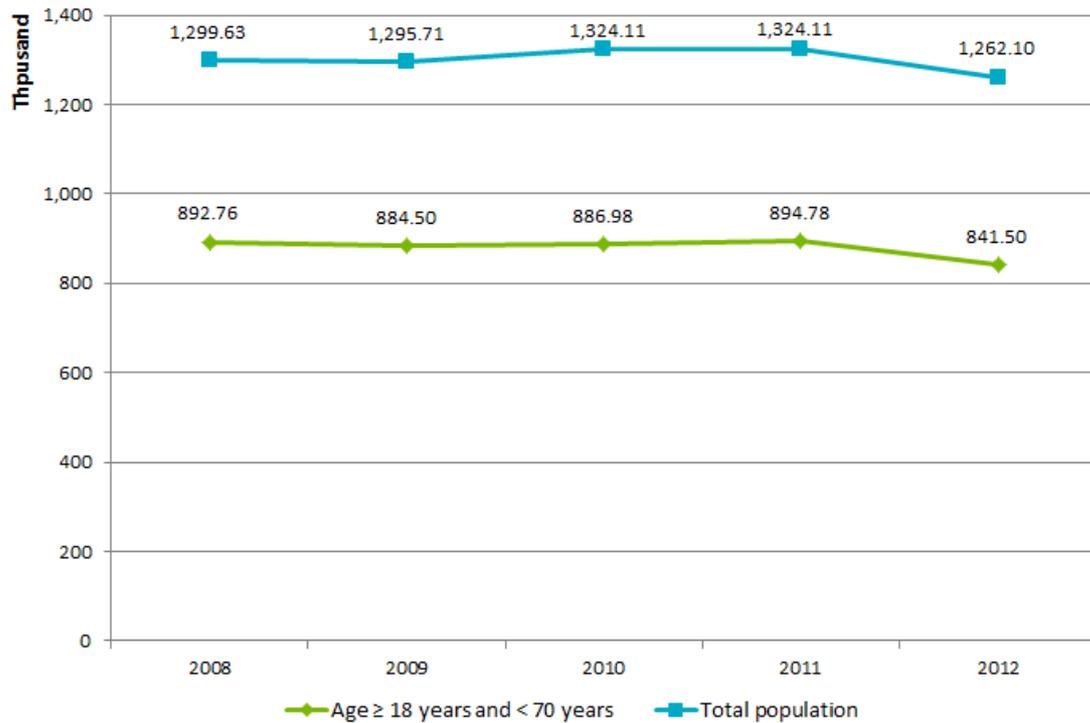
In Figure 12 Milan's population is classified between 2008 and 2012 in two categories: total population and population aged between 18 and 70 years (old enough to get a driving license).

In 2012, two thirds of total population was working population (66.67%), able to hold or obtain a driving license. This percentage is similar in previous years, being the average for period 2008-2012 of 67.64%.

From 2008 to 2012, Milan's total population have decreased 2.89% and population aged between 18 and 70 years has dropped 5.74%.

¹⁹ Eurostat (2013c) Population structure and Age.

Figure 12 Demographic trends



Source: Own graphic based on Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office (2013)

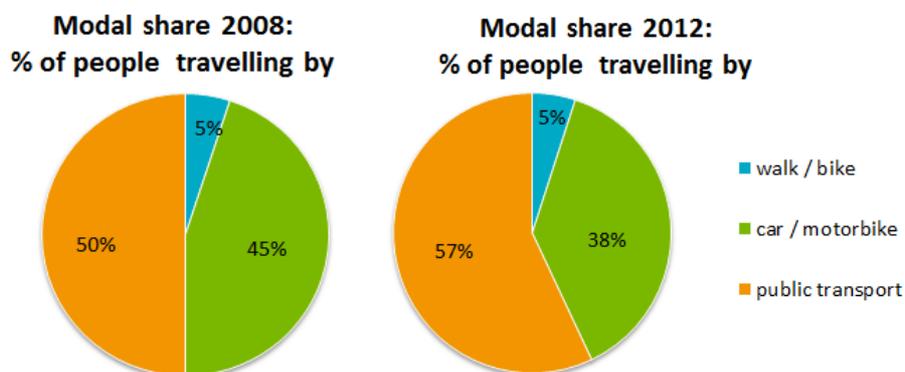
MOBILITY PATTERNS

In 2008, 50% of the trips was done by public transport, 45% by own vehicle (car/motorbike) and the remaining 5% by soft modes (walking or cycling). The small ratio of walking/cycling contrasts with the national figures (13.01% of the trips), this is due to the high quality of the public transport services of Milan, being the best of the country.

In 2012, the share of walking and cycling remained stable but 7% of trips changed, being done by public transport instead of using own vehicle.

The number of average trips per person and day for these years was 2.70 and the average distance per trip was 3.50 km.

Figure 13 Modal share 2008 and 2012



Source: Own graphic based on Agenzia Mobilità Ambiente Territorio (AMAT) - Mobility Agency of Milan (2013)

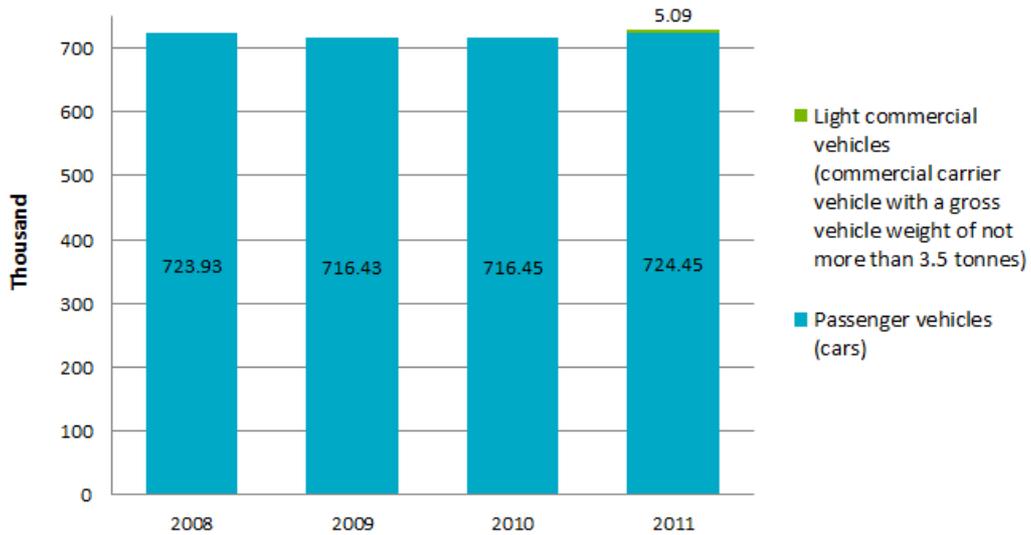
5.3 The Milan Carpool

TOTAL VEHICLES

The number of passenger cars has almost remained stable from 2008 to 2011, increasing 0.07%, from 723.93 thousand in 2009 to 724.45 thousand in 2011.²⁰

The average age for these cars in 2011 was 7.0 years.

Figure 14 Total vehicles registered 2008 - 2012



Source: Own graphic based on Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office (2013)

²⁰ No data available for light transport vehicles from 2008 to 2010. No data available for year 2012. The data of this section correspond to conventional fueled vehicles (ICEVs), no available data for other powertrain type.

6. References

- Agenzia Mobilità Ambiente Territorio (AMAT) - Mobility Agency of Milan
www.amat-mi.it/it/
- Associazione Italiana Ricostruttori Pneumatici (AIRP) - Italian Association of Tyre Retreaders
<http://www.asso-airp.it/>
 - Report “Analisi dell’Osservatorio Airp sulla Mobilità Sostenibile” (2013)
http://www.asso-airp.it/ew/ew_news2/press/2013-07ParcoAutoEcologicheITALIA.pdf
- Associazione Nazionale delle Imprese Elettriche (ASSOELETRICA) - National Association of Electric Companies
www.assoelettrica.it/
www.assoelettrica.it/wp-content/uploads/.../Enel-Mobilità-elettrica.pdf
- Automobile Club d’Italia (ACI) - Automobile Club of Italy
www.aci.it/
 - Report “Analisi dell’anzianità del parco veicoli in Italia” (2011)
http://www.aci.it/fileadmin/documenti/studi_e_ricerche/dati_statistiche/Anzianita/Introduzione.pdf
 - Report “Annuario statistic 2013”
<http://www.aci.it/laci/studi-e-ricerche/dati-e-statistiche/annuario-statistico.html>
- Business car sharing operators.
- City Council of Milan, Piano Urbano Della Mobilità - Urban Plan of Sustainable Mobility (PUMS), (2012).
- Commissione Italiana Veicoli Elettrici Stradali (CIVES) - Italian Commission for Electric Road Vehicles
<http://www.ceiweb.it/>
- Council of the European Union (2010). Conclusions on clean and energy-efficient vehicles for a competitive automotive industry and decarbonised road transport. Brussels, 2010.
http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/intm/114617.pdf
- Enel Spa – Energy vendor
<http://www.enel.it/>
- European Commission (2011a) WHITE PAPER - Roadmap to a Single European Transport Area: Towards a competitive and resource efficient transport system (2011) COM/2011/0144 final.
- European Commission (2011b) Europe 2020 Targets
http://ec.europa.eu/europe2020/pdf/targets_en.pdf
- Eurostat (2013a) GDP at current market prices (accessed October 2013).
http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/National_accounts_%E2%80%93_GDP

- Eurostat (2013b) Population on 1 January. (accessed October 2013)
<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=tps00001&tableSelection=1&footnotes=yes&labeling=labels&plugin=1>
- Eurostat (2013c) Population structure and Age (accessed October 2013)
http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Population_structure_and_ageing
- Eurostat (2013d) Indicators Theme 6 Climate Change and Energy (accessed October 2013)
<http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators/theme6>
- Eurostat (2013e) Indicators Theme 7 Transport (accessed October 2013)
<http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators/theme7>
- European Automobile Manufacturers' Association (ACEA). Pocket guide 2013.
http://www.acea.be/images/uploads/files/POCKET_GUIDE_13.pdf
- GfK Eurisko and Renault (2010) "The Italian and electric mobility: expectations and potential".
- Hybrid & Electric Vehicle Implementing Agreement (IA-HEV), Italy
<http://www.ieahev.org/by-country/italy/>
- Iniziativa Car Sharing (ICS) - Car Sharing Initiative
<http://www.icscarsharing.it/>
- International Energy Agency (2013 a) Electric Vehicle Sales and Government Targets 2013
<http://www.iea.org/etp/tracking/electric-vehicles/>
- IEA (2013 b) Tracking Clean Energy Progress 2013
http://www.iea.org/publications/TCEP_web.pdf
- IEA (2011) CO₂ Emissions from fuel combustion 2011. Highlights.
<http://www.iea.org/media/statistics/CO2highlights.pdf>
- Istituto Nazionale di Statistica (ISTAT) - Italian Statistical Office
www.istat.it/
- Osservatorio Autopromotec – Autopromotec Observatory.
<http://www.autopromotec.com>
- Ricerchetrasporti -Decimo rapporto sulla mobilità in Italia (10th Report on mobility in Italy)
<http://www.ricerchetrasporti.it/tag/motivi-dello-spostamento/>
- Unione Nazionale Rappresentanti Autoveicoli Esteri (UNRAE) – National Union Representatives of Foreign Vehicles
www.unrae.it/



eBRIDGE: Empowering e-fleets for business and private purposes in cities

The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.

ebridge-project.eu



Co-funded by the Intelligent Energy Europe Programme of the European Union

