Name: Silvia Moroni

Organization: Mobility, Environment and Land Agency in Milan

Title/Position: Environmental Engineer, PhD

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Mrs. Moroni achieved her PhD in Environmental Engineering at Politecnico di Milano in 2002 with a thesis titled 'Vehicular Traffic emissions and Air quality: elements for the management in a large urban area' concerning the City of Milan case study. She has been employed for over a decade by the Milan Local Agency for Mobility, Environment and Land Use Planning as Responsible for the Air quality Planning Sector, part of the Environment and Energy Department.Mrs. Moroni manages the development of several research projects about air quality assessment with special focus on environmental effects of planned measures or new technologies, air pollution monitoring and emissions inventory with particular reference to vehicular emissions, theme on which she has also collaborated for several years with specialized Research Centers. In recent years, hers interest and researches focus on health effects related to air pollution. Mrs. Moroni is author of several papers and presentations held at national and international conferences and experienced in teaching at University Master Courses and at the Training Courses organized by the Venice International University - TEN (Thematic Environmental Networks) Center in cooperation with the Municipality of Beijing, the Italian Ministry of Environment and the Chinese Environmental Protection Bureau.

Eco-Zone in Milan: Policy design, enforcement and impacts

Silvia Moroni

AMAT
Mobility, Environment and Land Agency

Energy and Environment Department

International Forum on Economic Policies for Traffic Congestion and Tailpipe Emissions

December 12th-13th, 2013
Hangzhou, Zhejiang Province, China

Foto: S.Moroni

Milano

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SOCIETA' ITALIANA DI MEDICINA GENERALE

AGENZIA MOBILITÀ AMBIENTE TERRITORIO

Summary

1. Traffic and Air quality issues in Milan
2. Area C: the Congestion Charge scheme in Milan

2.1 Policy design

2.2 Enforcement

2.3 Impacts on Traffic issues

2.4 Impacts on Vehicular Emissions

2.5 Impact on Air quality:

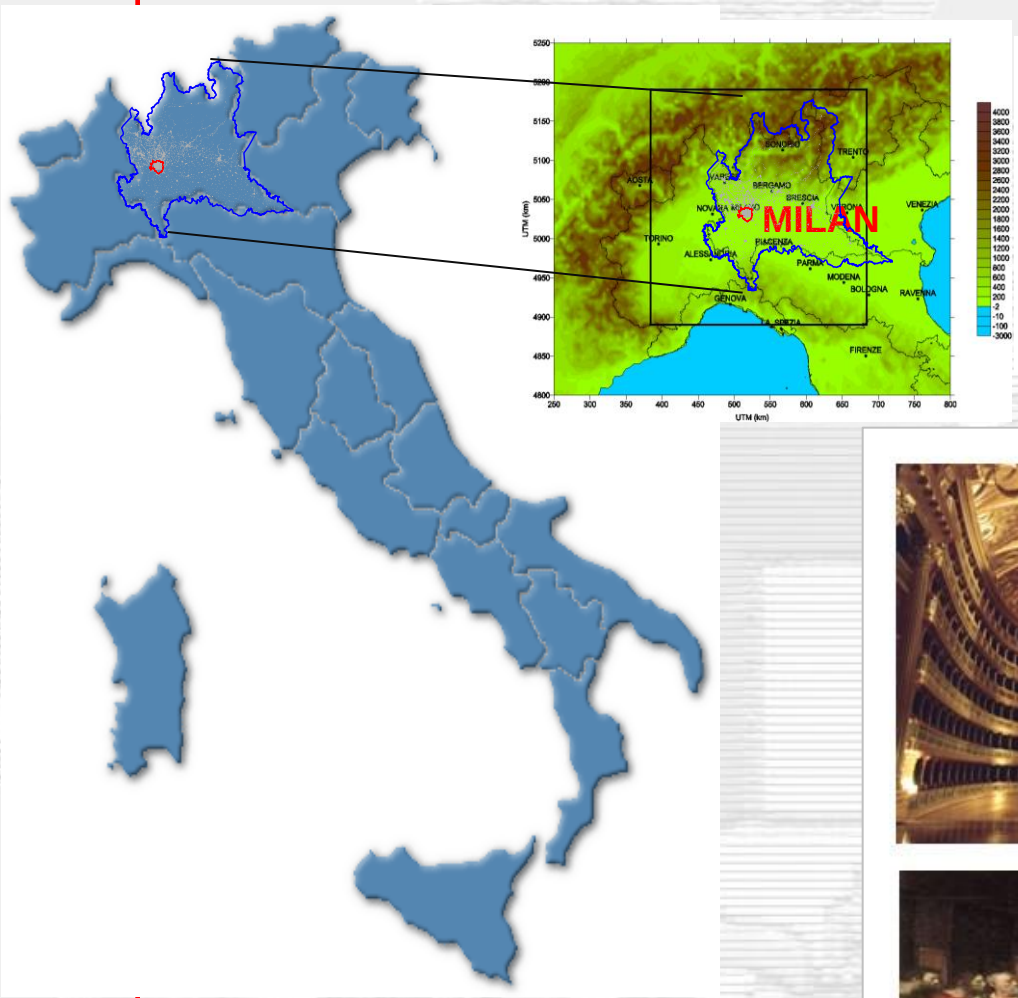
Airborne Black Carbon Monitoring Project

2.6 From the experimental phase to a stable measure

Adopting Black Carbon as a tool in Mobility Planning

3. Lessons Learnt
4. Conclusions

The City of Milan - General Information



- Milan is the 2nd largest city in Italy
- Area: 181.76 km² (70.18 sq mi)
- Milan city inhabitants: ~ 1.3 M
- (Metropolitan area inhabitants : ~ 3.3 M)
- (Lombardy Region inhabitants : ~ 9.6 M)
- Daily City Users: ~ 1 M

Milano

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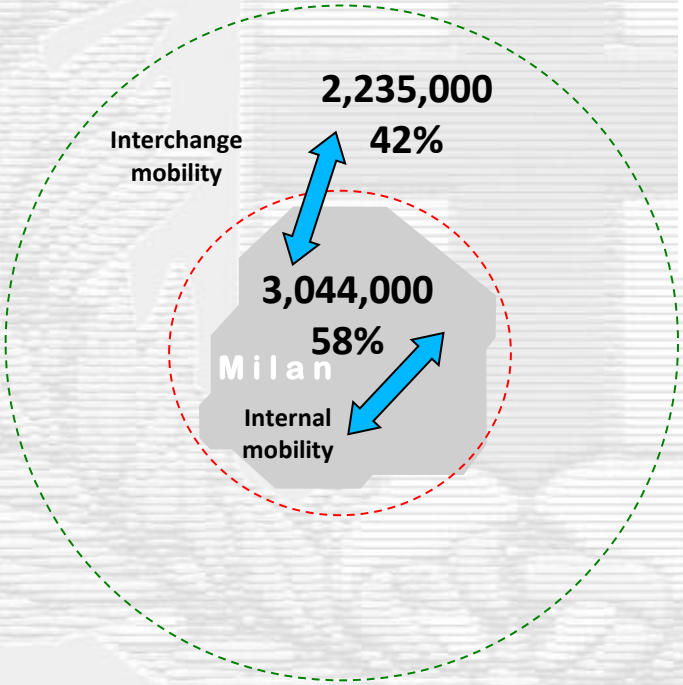
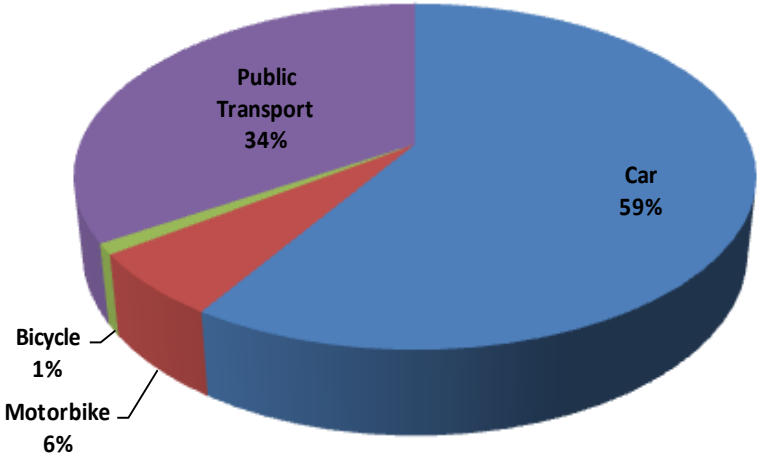
AGENZIA MOBILITÀ AMBIENTE TERRITORIO

Milan - Travel, Trips and Modal split

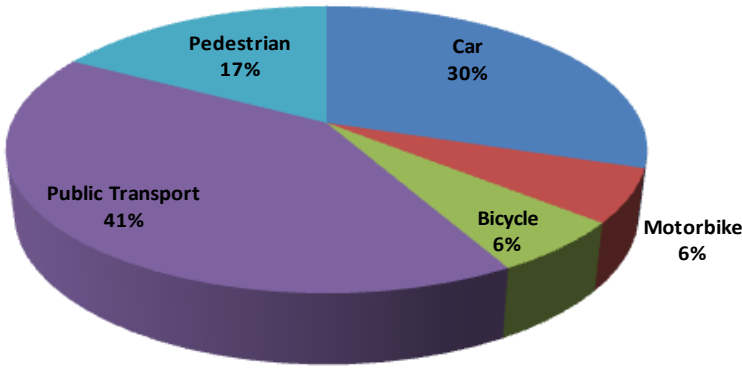
Overall mobility
(Trips per day)
5,279,000



Travel between Milan and the metropolitan area - Modal Split



Travel in Milan city - Modal Split



Milano

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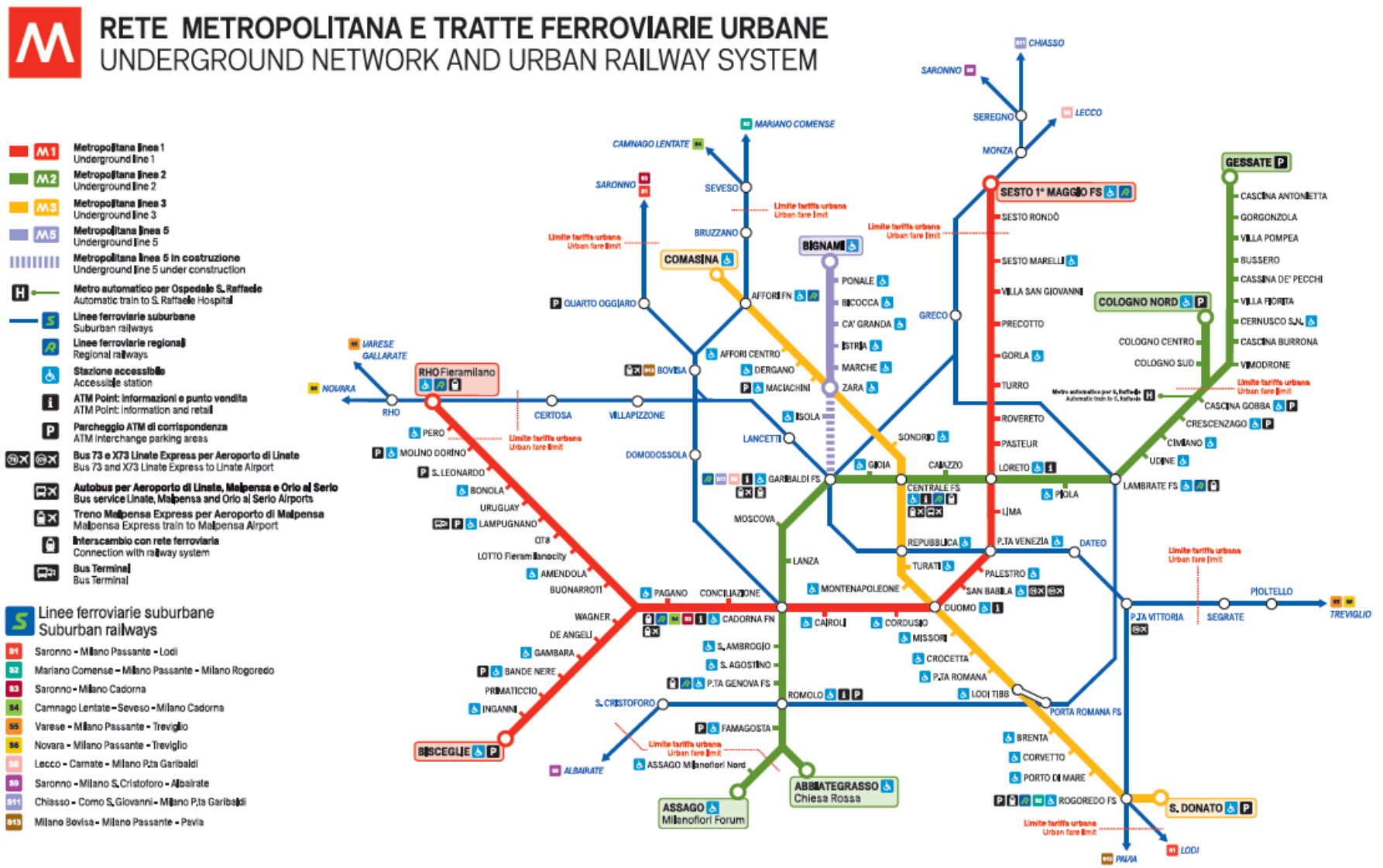
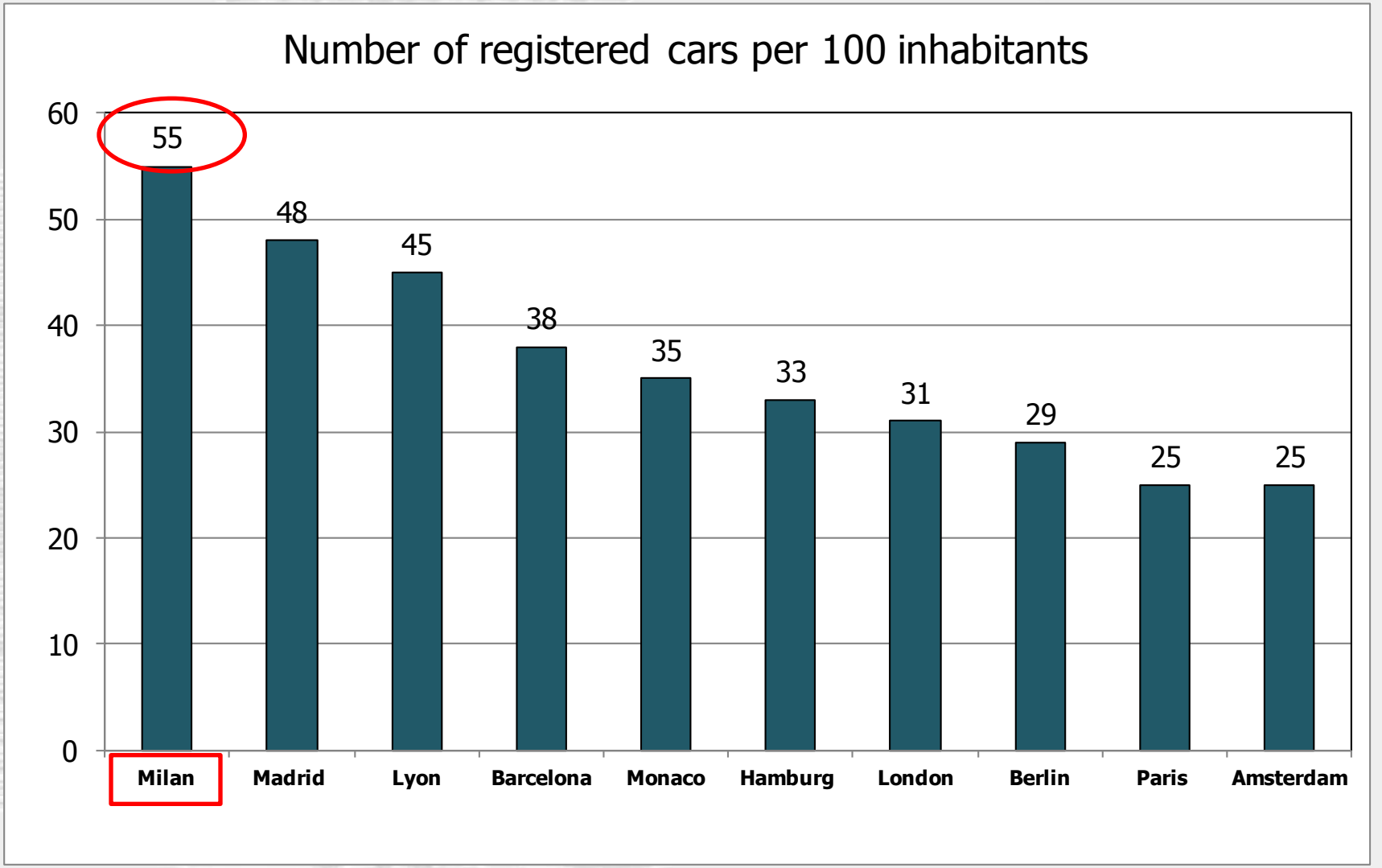
Local Public Transport Network



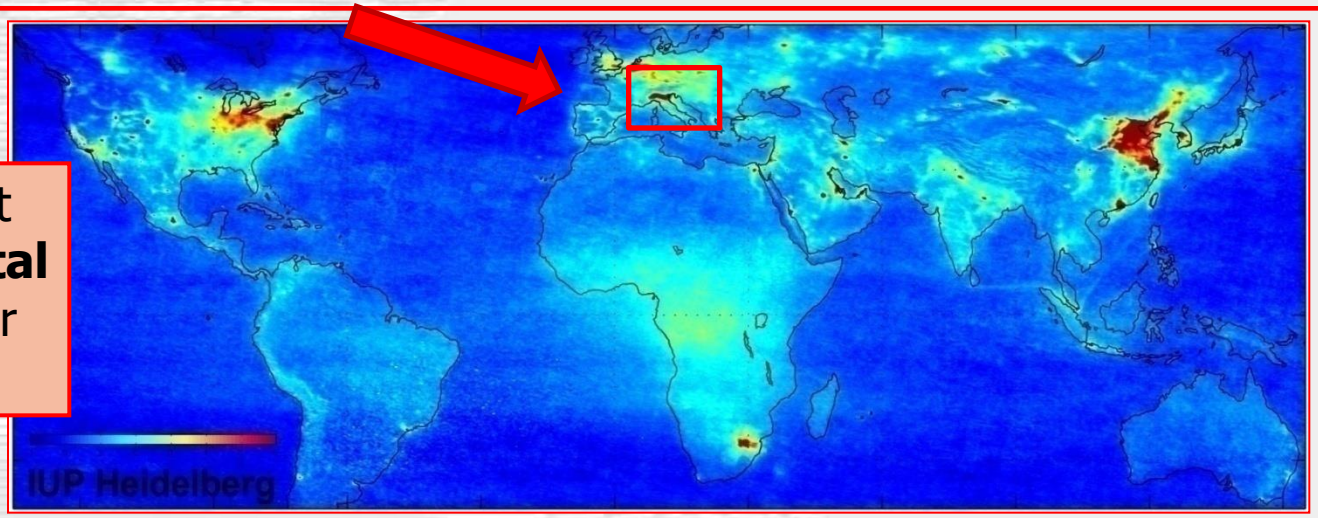
Mobility in Milan and in Europe: motorization rate



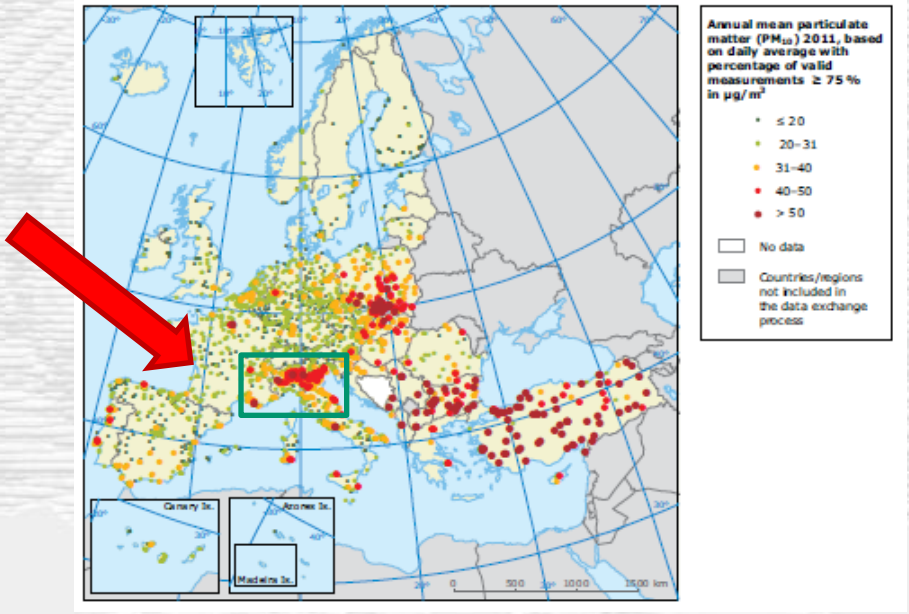
Source: Eurostat, Urban Audit 2012

Air quality in Milan - Background

Air quality is the most important **environmental** and **health** problem for the city of Milan



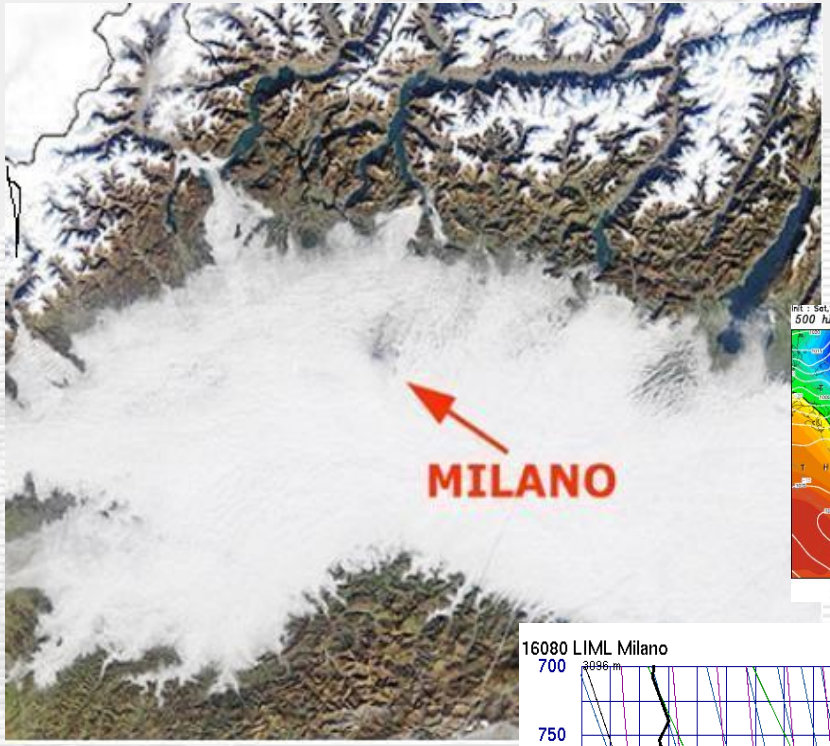
Source: ESA, European Space Agency, October 2004

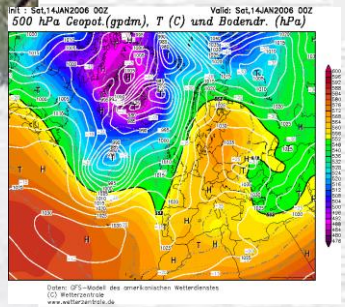


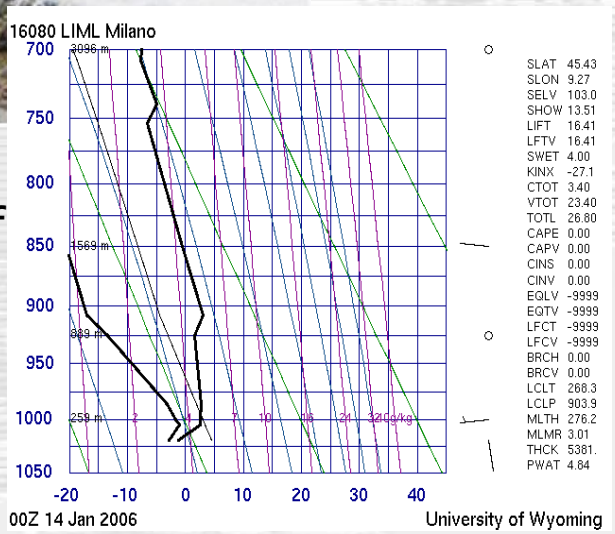
Source: EEA, Air Quality in Europe - 2013 report, No. 9/2013

The challenge of Milan's local government to control air pollution is particularly difficult, taking into consideration the **very unfavourable meteorological conditions**

Air Pollution and Meteorology in the Po Valley







The city of Milan is situated in the centre of the Po Valley, **surrounded by Alpes and Appenine chains** that block low pressure fronts.

Milan wheather is characterized by **high frequency and persistent stable atmosphere episods**, especially in **winter** season - the most critical season for air quality - with very low mixing layer due to temperature inversions, banks of fog and calm winds.

In **summer** intense solar radiation and high humidity produce particularly muggy days in which photochemical activity is high.

Milano

Comune di Milano

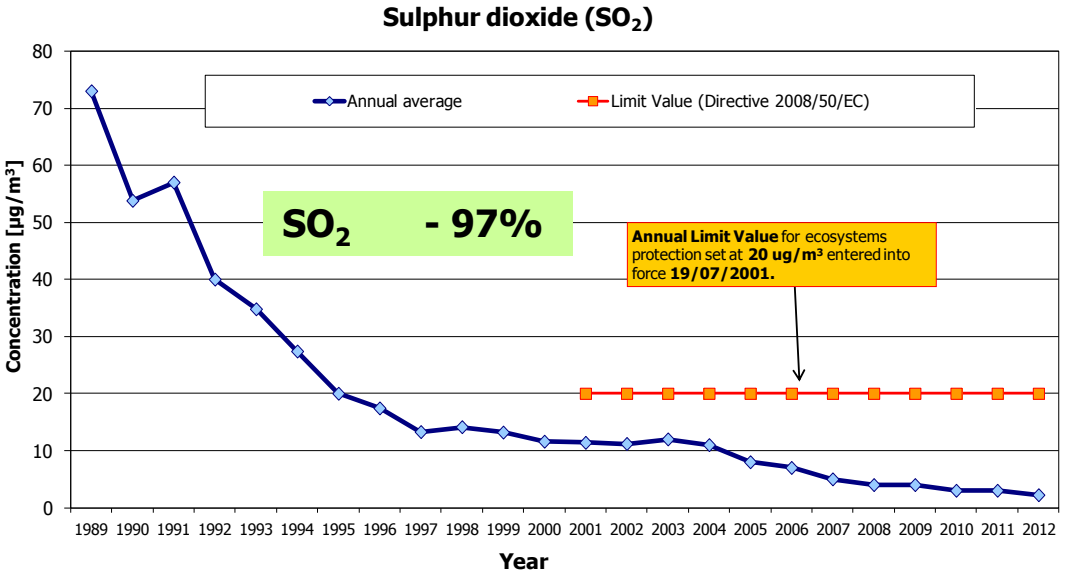
AGENZIA MOBILITÀ AMBIENTE TERRITORIO

Air Quality trends in Milan over the last 20 years

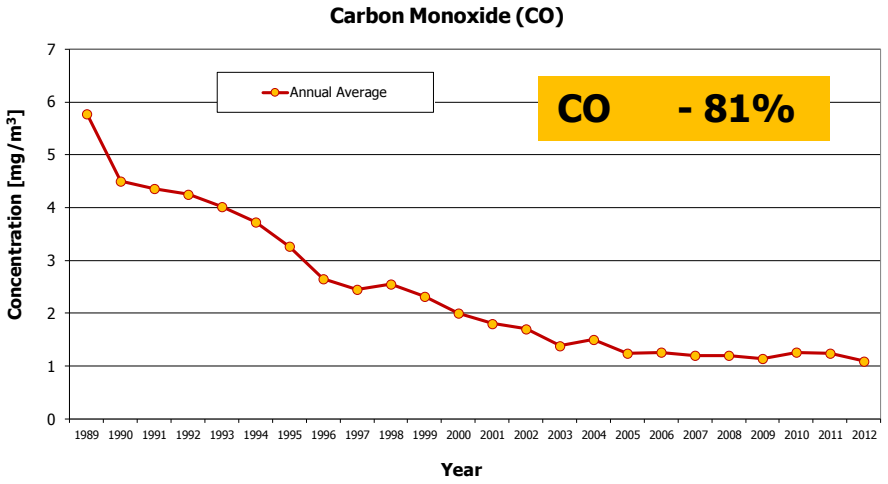
Air quality in Milan has clearly and progressively improved over the past decades in terms of the main pollutants (CO, SO_2, NO_2, TSP and benzene) thanks to:

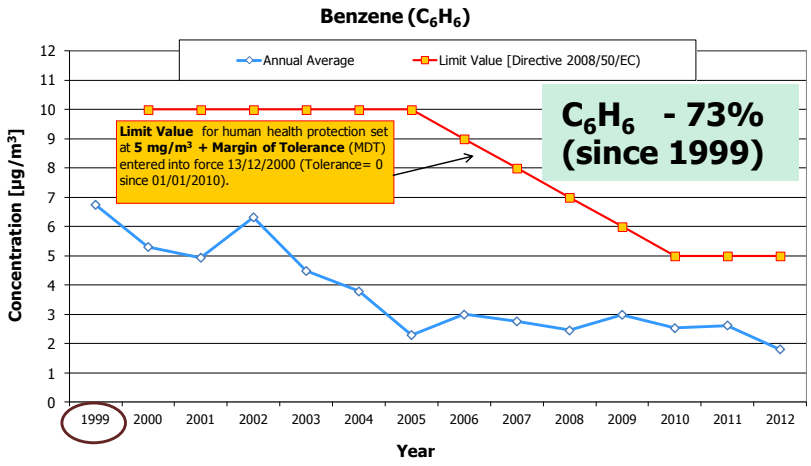
✓ the renewal of the vehicular fleet with lower emission vehicles

✓the improvement of fuels quality both in mobile and in fixed sources.



Source: ARPA Lombardia; 2012 AMAT processing ARPA Lombardia hourly data





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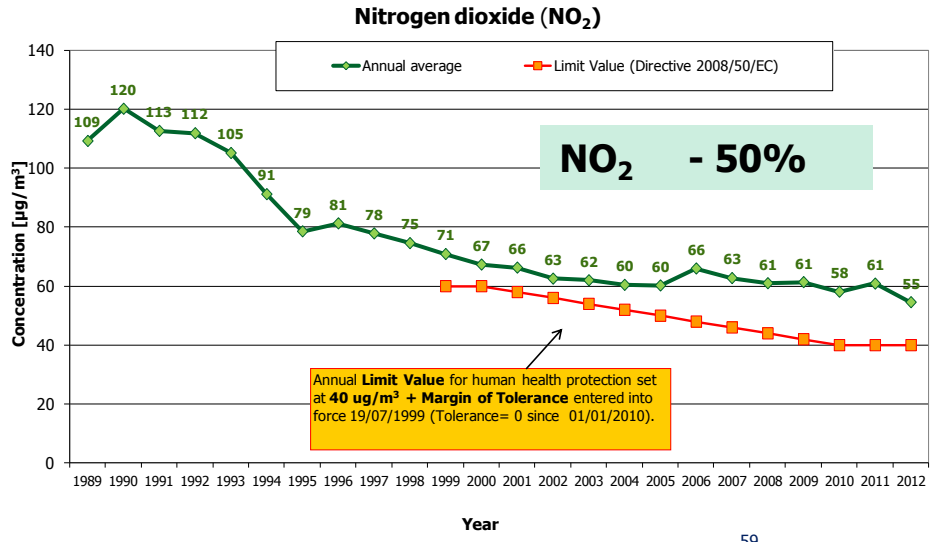
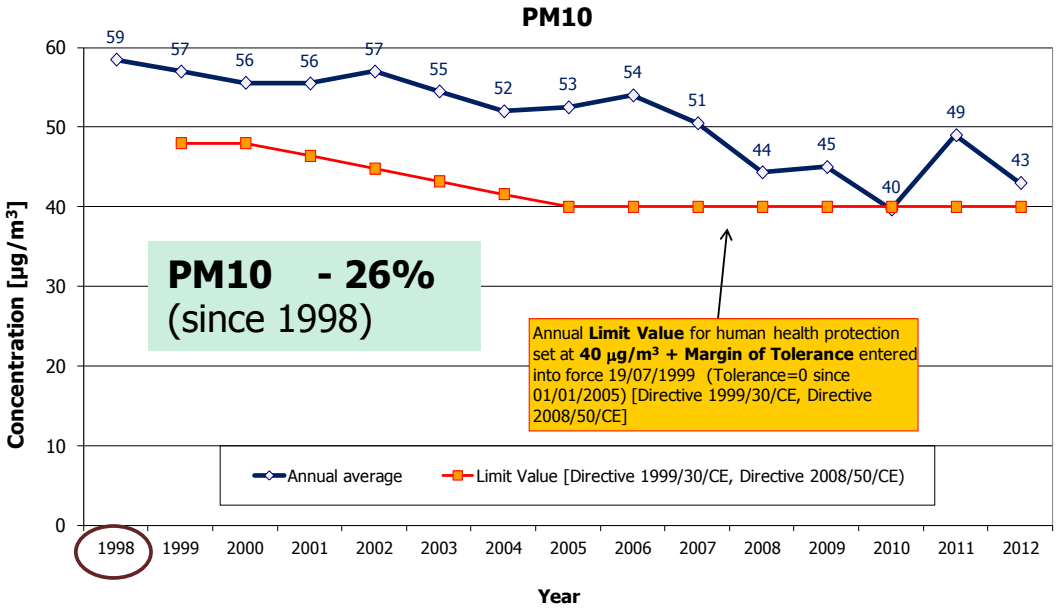
NO_2 and PM10 - Annual mean concentrations



Starting from year 2005 stable **NO_2** concentrations have been measured linked to the increase of **diesel vehicles** in the cars fleet and the increase of **NO_2/NO ratio** in gaseous exhausts of new generation vehicles.

PM10
annual mean concentration
still exceeding
the health protection
Limit Value

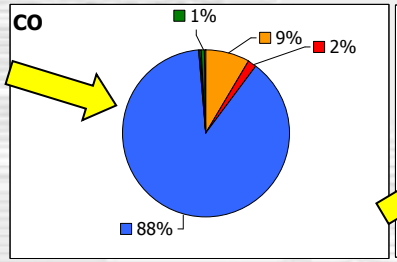


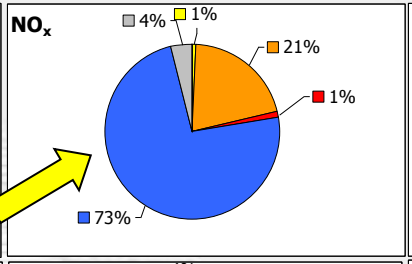
Source: ARPA Lombardia;
2012 AMAT processing ARPA Lombardia hourly data

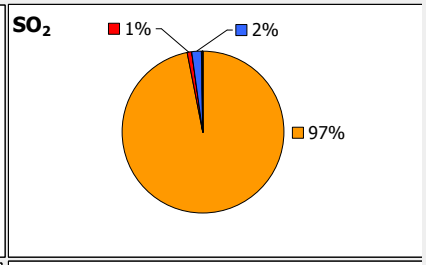
Road traffic and Air Pollution in Milan

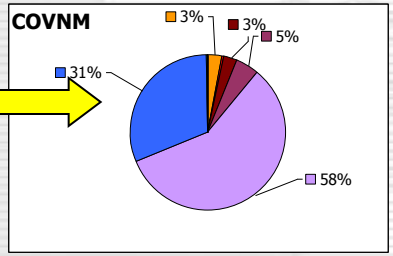
Milan annual emissions, year 2005

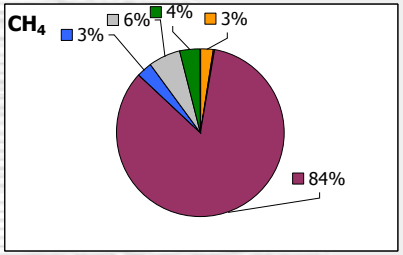
(Road traffic contribution in blue)

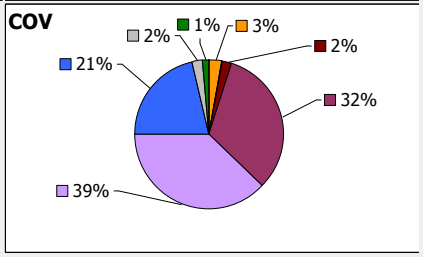


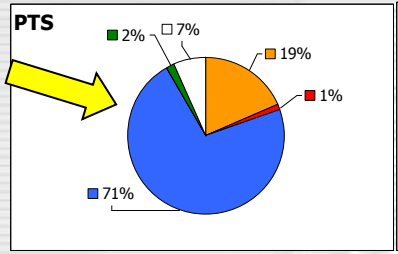


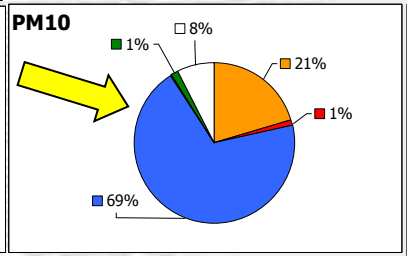


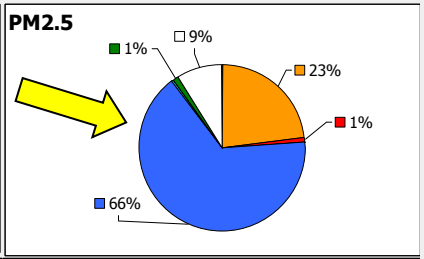


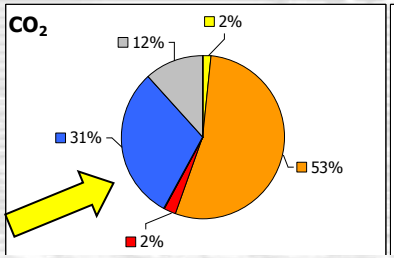


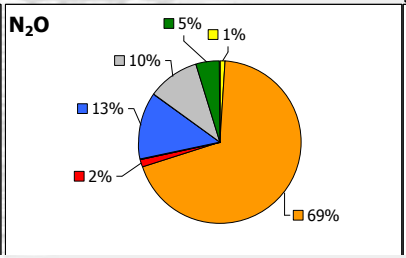


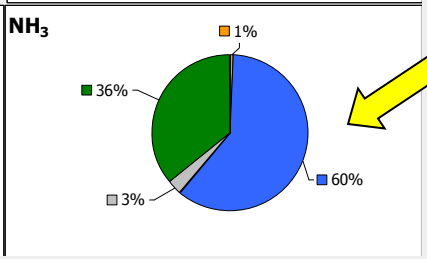












Source: AMAT - Report on the State of the Environment in Milan, 2007

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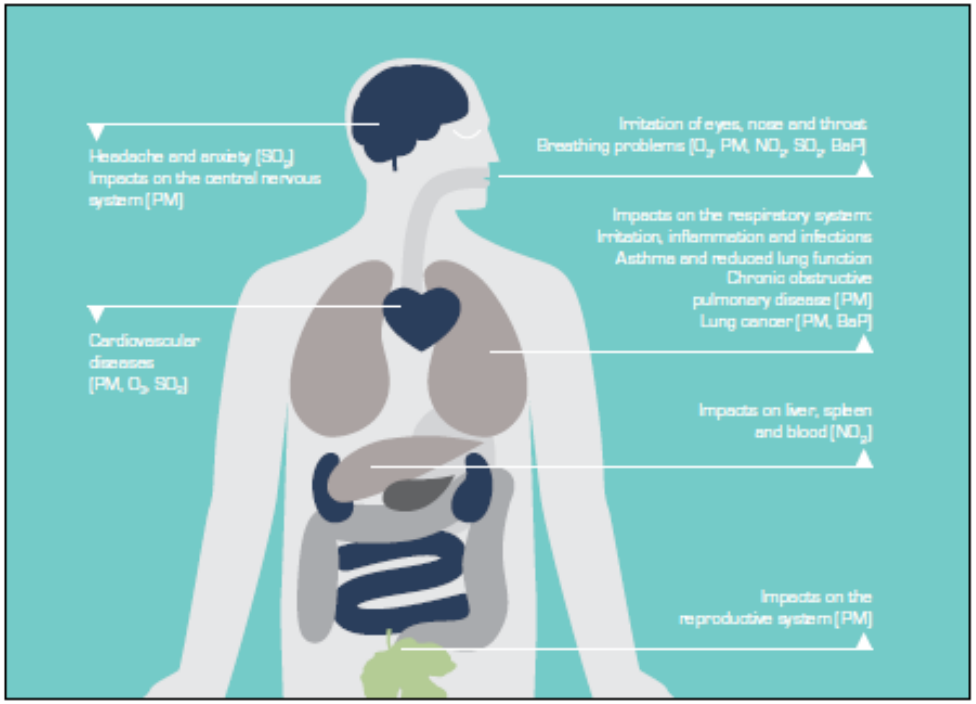
AGENZIA MOBILITÀ AMBIENTE TERRITORIO

Mobility, Environment and Health in Milan



Source: EEA, 2013f.

- According with MISA-2 study (Meta-analysis on air pollution and health deseases) **700-800 death/year were due to air pollution in the City of Milan** over the **1996-2002** period.
- Most recent published data, referred to the period **2006-2010**, indicate **134 death/year** due to air pollution (EpiAir2, 2013).

- In **Milan traffic** emissions, noise, accidents and congestion give **esternal costs for more than 5 billions euro**, for related health and life quality problems, material damages for buildings and artistic patrimony, global climate change and time loose in transport

Outdoor Air Pollution is carcinogenic to humans

International Agency for Research on Cancer

World Health Organization

PRESS RELEASE
N° 221

17 October 2013

IARC: Outdoor air pollution a leading environmental cause of cancer deaths

Lyon/Geneva, 17 October 2013 – The specialized cancer agency of the World Health Organization, the International Agency for Research on Cancer (IARC), announced today that it has classified outdoor air pollution as *carcinogenic to humans* (Group 1).

After thoroughly reviewing the latest available scientific literature, the world's leading experts convened by the IARC Monographs Programme concluded that there is *sufficient evidence* that exposure to outdoor air pollution causes lung cancer (Group 1). They also noted a positive association with an increased risk of bladder cancer.

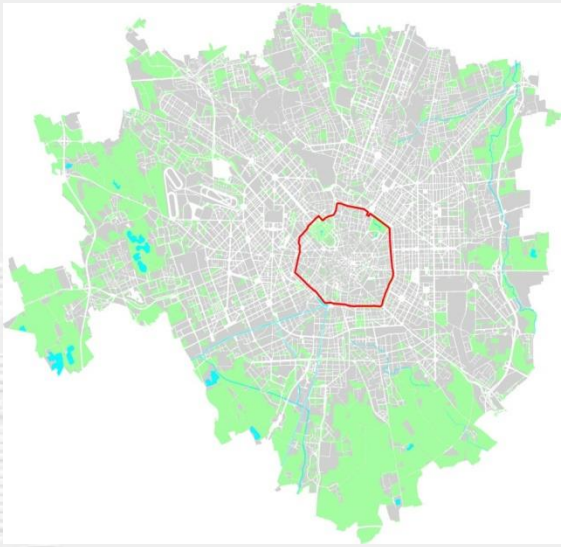
Particulate matter, a major component of outdoor air pollution, was evaluated separately and was also classified as *carcinogenic to humans* (Group 1).

The IARC evaluation showed an increasing risk of lung cancer with increasing levels of exposure to particulate matter and air pollution. Although the composition of air pollution and levels of exposure can vary dramatically between locations, the conclusions of the Working Group apply to all regions of the world.

Source: IARC - International Agency Research on Cancer, WHO, 2013

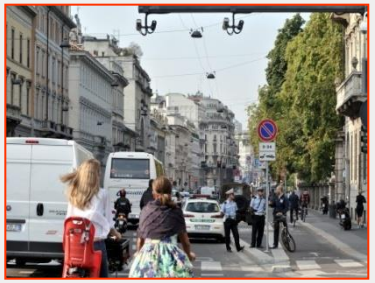
'Area C': Milan Congestion Charge

• By **January 16th 2012** the Milan Municipality implemented a new private traffic restriction scheme called **'Area C', ('C' is for 'Congestion Charge'**), that combine a Road Pricing Scheme with the banning of some most polluting vehicles in the central part



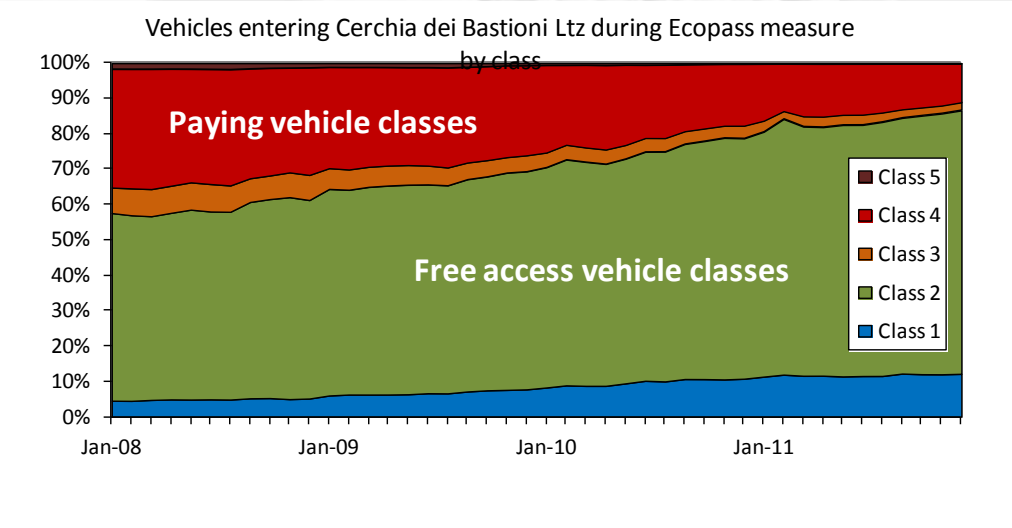
•The area subject to the congestion charge is called **'Cerchia dei Bastioni = 8.2 km² (4.5% of the whole territory of the Municipality of Milan)**

'Area C': Motivations



• This Limited Traffic Zone (LTZ) was introduced **in observance to the results** of a **Public referendum** indicating that the vast majority (**79%**) of **Milan citizens wanted** to **potentiate public transports** and to **limit traffic-related pollution**

• **Previously** City Administration adopted (**from 2008 to 2011**) a **Pollution Charge Scheme** called **'Ecopass'**, with fares based on pollution class of the vehicles. **The results** of this measure **in term of traffic congestion progressively decreased**, due to the **renewal of the fleet** with more environmental friendly vehicles, paying lower fees



'Area C': Fares and Rules

- **All vehicles**: **5 €**
- **Residents**: **free** the first 40 accesses (every year)
  41st access onward: **2 €**
- Two different fees apply to **duty vehicles**:
  - **5 €** for the daily access + 2 hours of free parking on the designated blue lines
  - **3 €** for the daily access only
- **3 €** for **vehicles parked in the garages** located in Area C, which have signed an agreement with the Administration (for a period of more than 1 consecutive hours)

Access forbidden
- Euro 0-3,4* Diesel vehicles
- Euro 0 Gasoline vehicles
- Trucks over 7.5 mts

** After December 31, 2016*

Access with payment
- Euro 4*,5&on Diesel vehicles
- Euro 1&on Gasoline vehicles

** Until December 31, 2016*

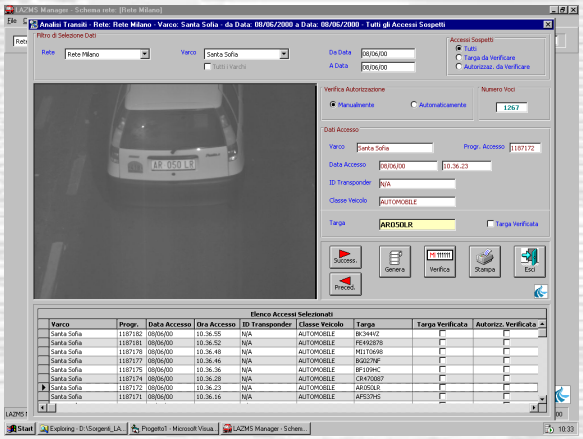
Free Access
- electric, hybrid*,
- LPG* and natural gas vehicles*,
- mopeds & motorcycles

** Until December 31, 2016*

OPERATING TIMES
Workdays from 7:30 am to 7:30 pm
(on Thursday is 7:30 am - 6:00 pm)

‘Area C’: the Control System

Cameras at each entry gate

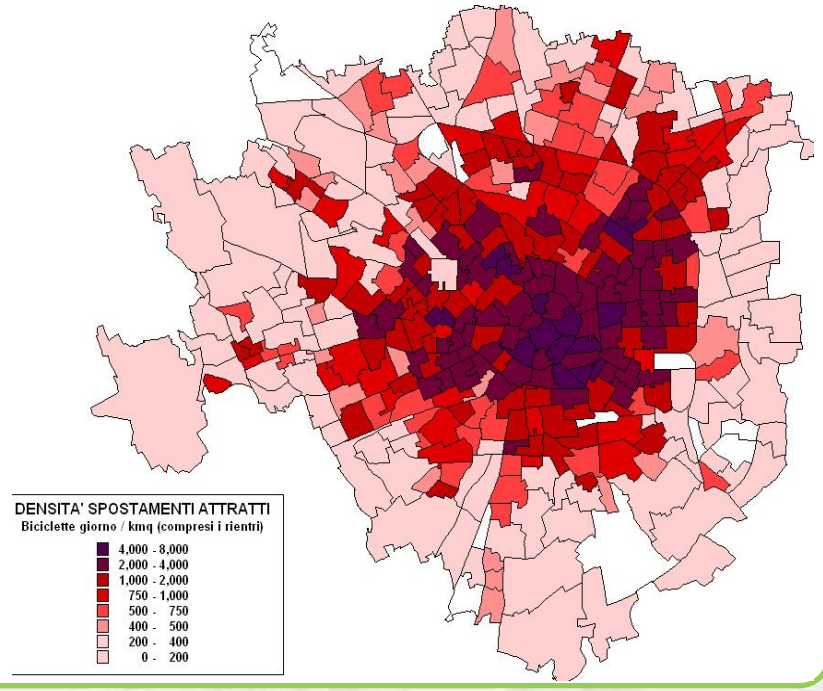


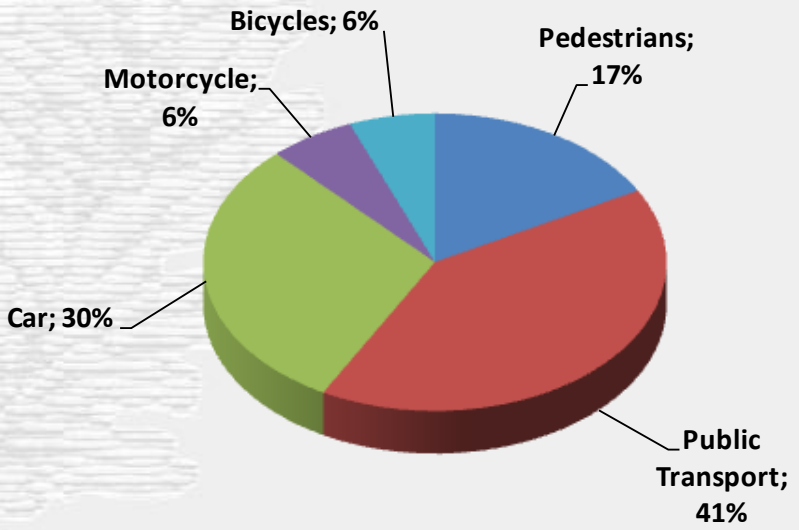
Video license linked to records

43 entry gates,
7 reserved to Public Transport

'Area C': the Charging Zone

- 77,950 residents (6%) - 42,300 families
- almost 25% of businesses in Milan
- 39,000 persons/km² (daylight hours - in average)
- 140,000 persons/km² (daylight hours - picks within the historical center)





Milano

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AGENZIA MOBILITÀ AMBIENTE TERRITORIO

'Area C': AIMS and RESULTS (Traffic issues)

✓**Decreasing vehicular access to the Area C:**

-39,864 vehicles daily entering Area C

therefore

✓ **Decreasing traffic congestion: - 30,2%**

✓ **Improving public transport speed:**

+9,3% buses, +5,4% tram

(during peak hours)

✓ **Reducing road accidents: - 23.8% road accidents**

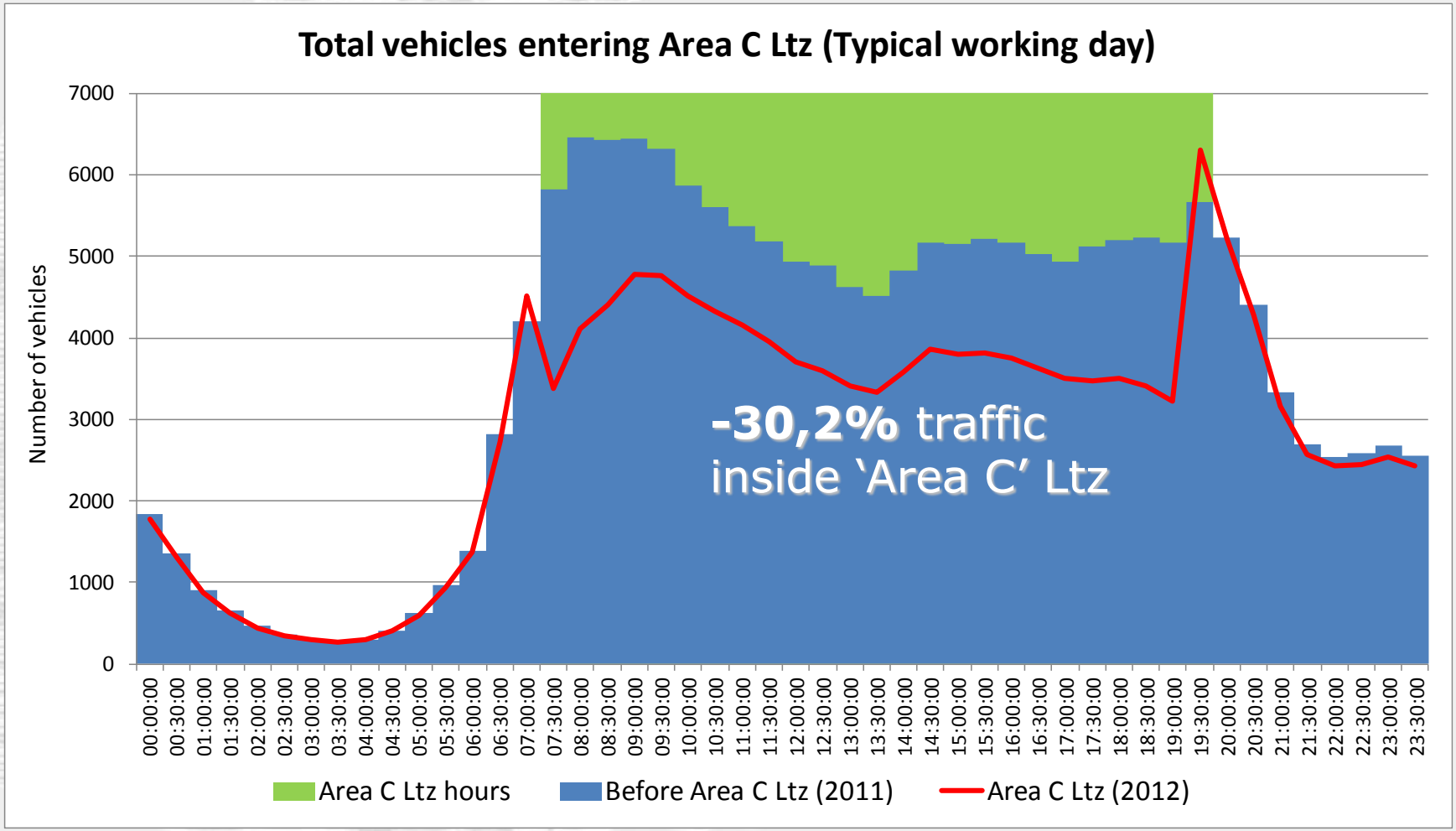
(-26.3% with injured;

Out of Area C: -11%)

✓**Decreasing the occupation of on-street parking:**

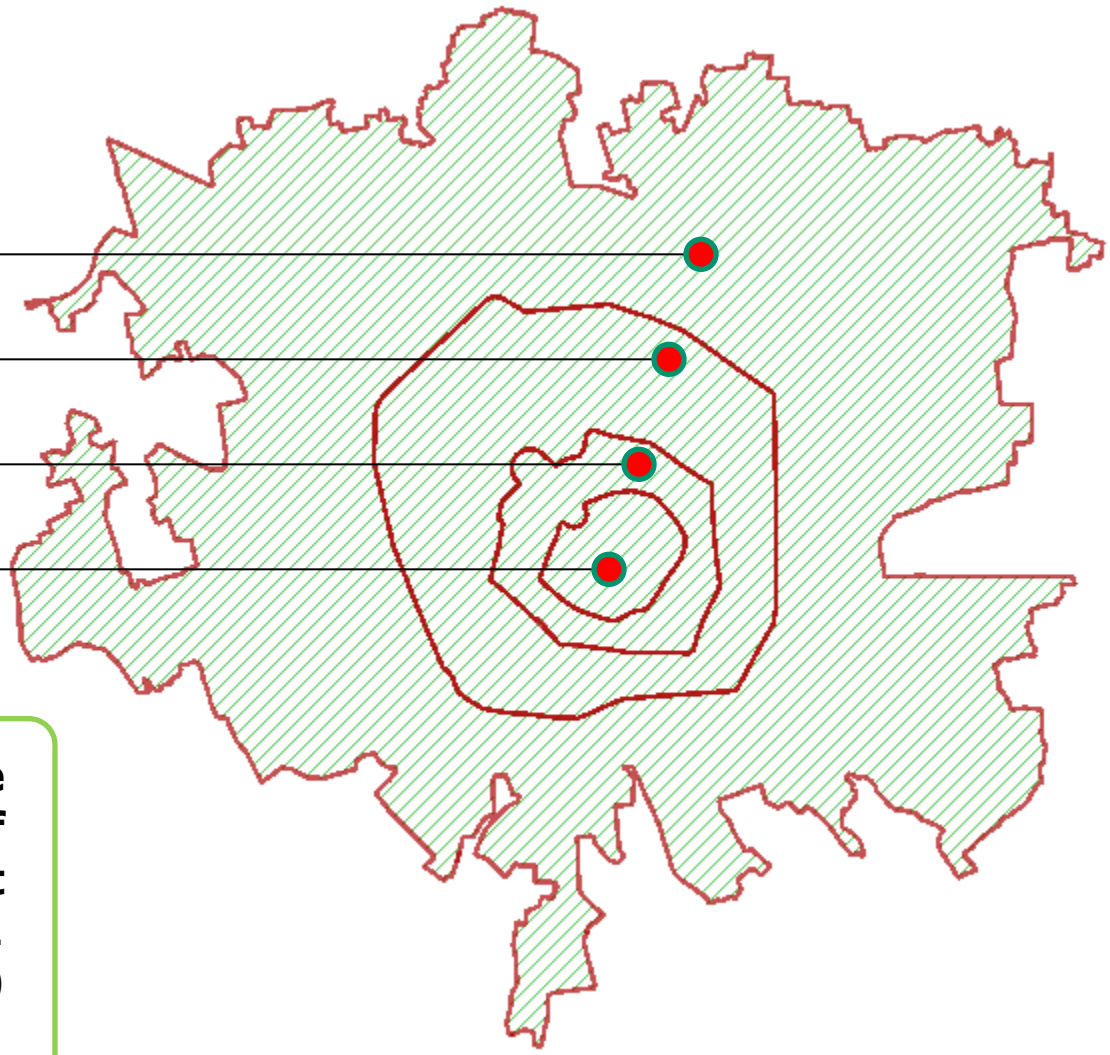
(more public space available) **-10%**

'Area C': RESULTS (Traffic issues)



'Area C': RESULTS (Traffic issues)

Bus	Tram
+1,7%	+5,3%
+2,8%	+5,4%
+2,9%	+5,3%
+6,8%	+4,6%



Average increase commercial speed of Local Public Transport compared with 2011
(From 6:00 to 22:00)

Milano

AGENZIA MOBILITÀ AMBIENTE TERRITORIO

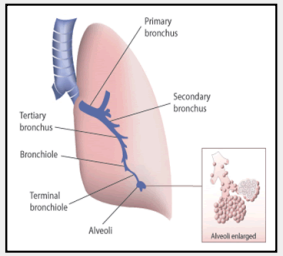
'Area C': AIMS (Environmental issues)

Decreasing vehicular access to the Area C

therefore:

- ✓ **Reducing pollutant emissions caused by traffic;**
- ✓ **Increasing the share of sustainable modes of travel;**

- ✓ **Reducing health risks related to air pollution;**



- ✓ **Improving urban center life quality and attractiveness**

'Area C': RESULTS (Environmental issues)

✓ **Less Pollutant Vehicles entering Area C: - 49%**

(-2.400 pollutant vehicles entering every day the Area C)

✓ **More Cleaner Vehicles: + 6,1 %**

(from 9,6% to 16,6% of the total vehicles)

✓ **Less Vehicular Traffic Emissions:**

Total PM10 -18% ; Exhaust PM10 -10%;
Ammonia -42%; Nitrogen Oxides -18%; Carbon Dioxide -35%

✓**Less Airborne Black Carbon:** see better in the following

1) Black Carbon Monitoring Project

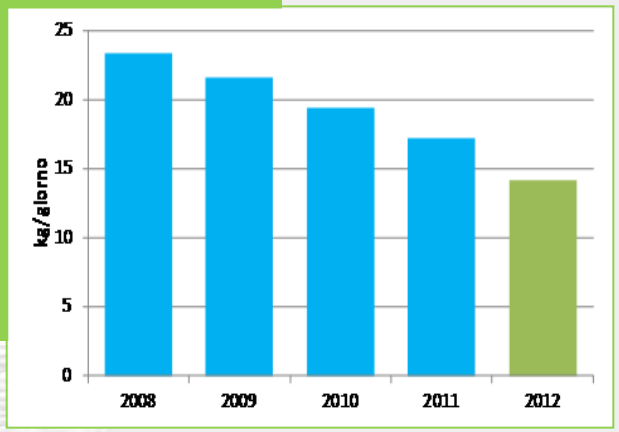
2)Assessment of Black Carbon traffic emissions population exposure

'Area C': Reduction of vehicular traffic emissions

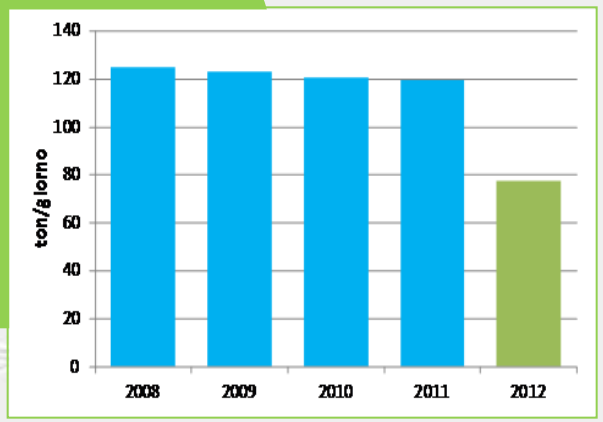
Reduction of vehicular traffic emissions with Area C enforcement

Compared to:	2011	2008
PM10 (exhaust) :	-10%	-58%
PM10 (total*) :	-18%	-39%
Ammonia :	-42%	-71%
Total Nitrogen oxides:	-18%	-43%
Nitrogen dioxides:	-25%	-45%
Carbon dioxides:	-35%	-38%

The introduction of Area C maintained the trend of Total PM10 emission reductions.



The CO_2 emissions had a sharp decline after 4 years in which there were no rilevant changes.



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* Total : Exhausts + Frictions

AGENZIA MOBILITÀ AMBIENTE TERRITORIO

Black Carbon as a new Air Quality metric?

"*Black carbon particles are a **valuable additional air quality metric** to evaluate the **health risks of primary combustion particles from traffic including organics**, not fully taken into account with PM2.5 mass*"

'REVIHAAP. Technical Report' [World Health Organization, 2013]

[UNECE-CLRTAP, 2012; US-EPA, 2011; HEI, 2010]

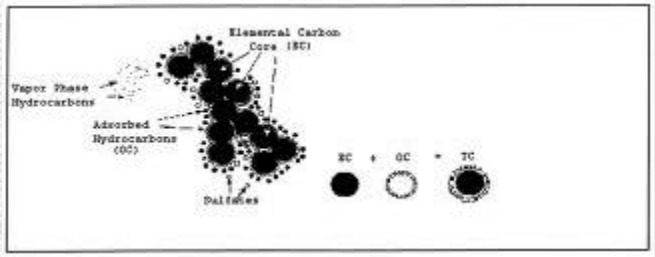
Aims of 'Area C' Black Carbon Monitoring Project

1) To evaluate **Black Carbon** (BC), **PM10** and **PM2.5** concentrations **inside and outside 'Area C' Limited Traffic Zone (Ltz)** in **different traffic-proximity exposure conditions**

2) To assess **effectiveness of Black Carbon** as a **new indicator** for **environmental** and **health effects** of traffic generated nanoparticles in **local traffic restriction interventions for Milan** (48% diesel cars)

Black Carbon and Health Effects

As reported by the recent WHO report (WHO, 2012), Black Carbon is harmful to the health both for its physical nature of **nanoparticle** both for the fact that its **high specific surface** is able to convey inside the human organism **toxic** and **carcinogenic** substances, such as **polycyclic aromatic hydrocarbons (PAH)** or **metals**.



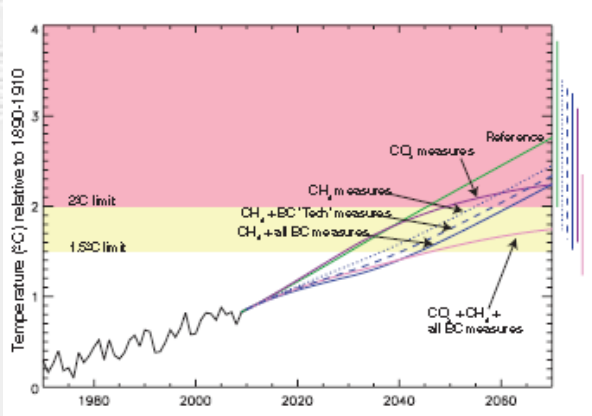
The **Black Carbon**, consisting mainly of particles of **elemental carbon**, is a **primary pollutant** emitted during the incomplete combustion of **fossil fuels** and **biomass**, and in urban areas can be taken as a **tracer of emissions from internal combustion engines** and the **wide range of chemical species of varying toxicity present in them** - as evidenced by the Environmental Protection Agency (U.S. EPA, 2011).

Black Carbon - New metric for Air quality,

Health Effects...and Climate Change

The measurement of Black Carbon in the atmosphere **has been recently introduced by the European Union** (30th meeting of the Convention LRTAP - *Long-range Transboundary Air Pollution* - Geneva, April 30-May 4, 2012), as part of the **Gothenburg Protocol** - the agreement regulating the emission limits for transboundary air pollution - both for its already known characteristics of warming potential, that for the health effects associated with it.

Policies to reduce Black Carbon emissions are considered by the scientific community a ***'win-win strategy'***, since recent studies demonstrated (Shindell *et al.*, 2012; Anenberg *et al.*, 2012) that in the face of measures designed to control Black Carbon and methane emissions, in addition to those aimed at the limitation of CO_2, significant benefits are obtained as well as a **slowing of climate change processes** and in terms of **air quality and health effects** associated with it, which are measurable in **millions of premature deaths avoided by 2030 worldwide**.



'Area C' Black Carbon Monitoring Project

The project has been developed by **AMAT** (**City of Milan Mobility Environment and Land Agency**) in collaboration with **SIMG** (**Italian College GPs**) through its own testing laboratories.

In the monitoring Protocol and the validation of final results are involved experts **Prof. Constantinos Sioutas** (**University of Southern California, Los Angeles**) and **Prof. Dane Westerdahl** (**Cornell University**, **Ithaca**, **NY**; **City University of Hong Kong**)

Method and Instruments

Two couple of fixed monitoring sites (kerbside, 3rd floor level residential) in/out Area C LEZ for **four different seasons campaigns**

- **Black Carbon** measured with MicroAethalometer™ (AE51, Magee Scientific).

- **PM10 and PM2.5** measured with Optical Particle Counters (Aerocet 531 - MetOne Instruments Inc.; DustMonitor - Contec Eng.)

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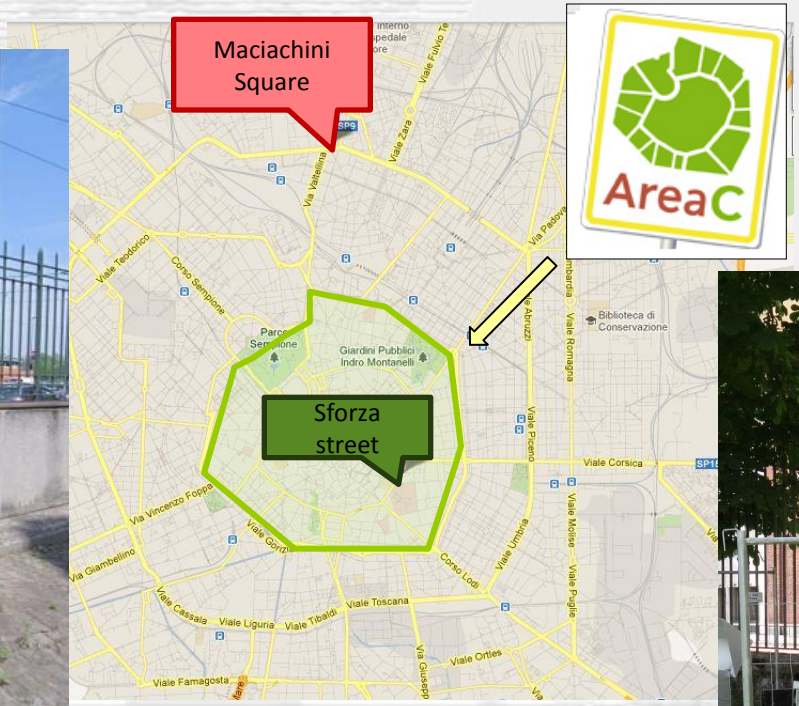
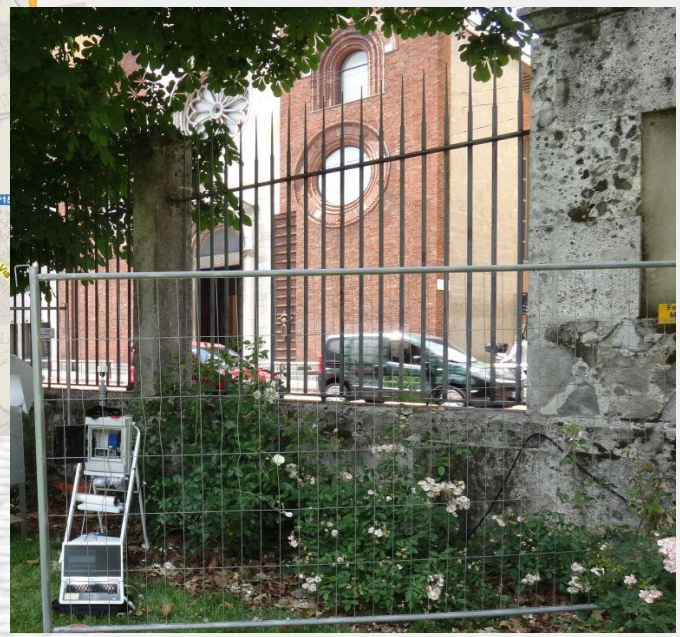
Kerbside sites, in/out 'Area C' Ltz

Maciachini Square





Sforza Street

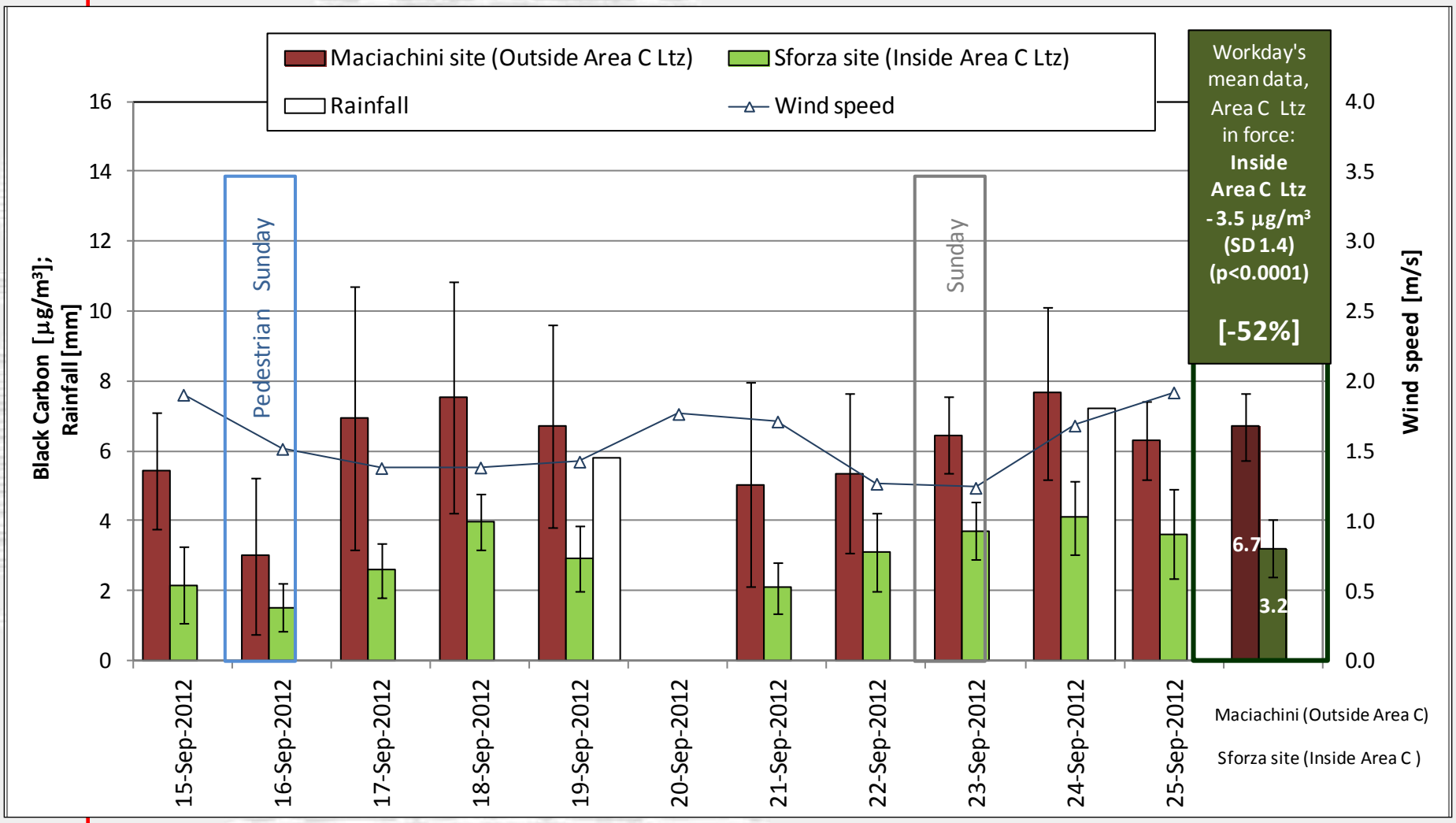
Spring campaign
(May 20th-29th 2012)

Summer campaign
(Sept 15th-25th 2012)

- ✓ Less than 10 m from the center of the roadway
- ✓ Near crossroad with traffic light

Summer campaign, Kerbside sites, in/out 'Area C' Ltz

24 h average BLACK CARBON concentrations (*September 15th-25th 2012*)



-52% Black Carbon inside Area C Ltz, at kerbside sides in summer

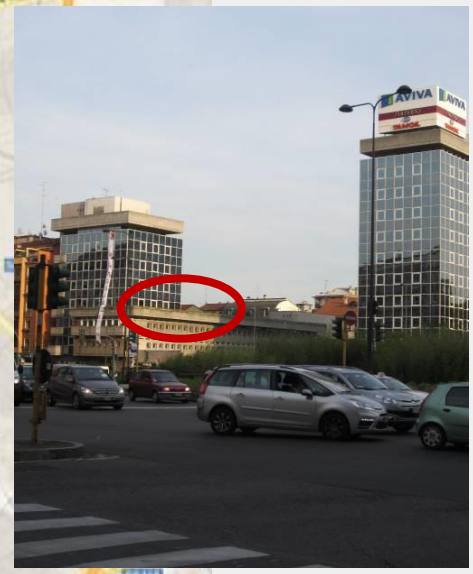
‘Car-free day’ effect on Air quality: ‘DomenicAspasso’

At kerbside sites, during the **‘Pedestrian Sunday’** initiatives (Car-free days) **Black Carbon** mean concentrations were measured **75-78% lower**, in mean of both sites, **compared to the nearest Sundays without traffic restrictions.**

These results are in a perfect **agreement** with **traffic measurements** which reports a **72% reduction** in relation to a typical Sunday circulation.

3rd floor level residential roadside sites, in/out 'Area C' Ltz

Beccaria Street



Porpora Street

Porpora Street

Beccaria Street

Milano

Winter campaign
(February 1st-26th 2012)

Autumn campaign
(October 1st-28th 2012)

- ✓ On third floor level terraces, open to wind dispersion
- ✓ Large squares, on which different important streets meet

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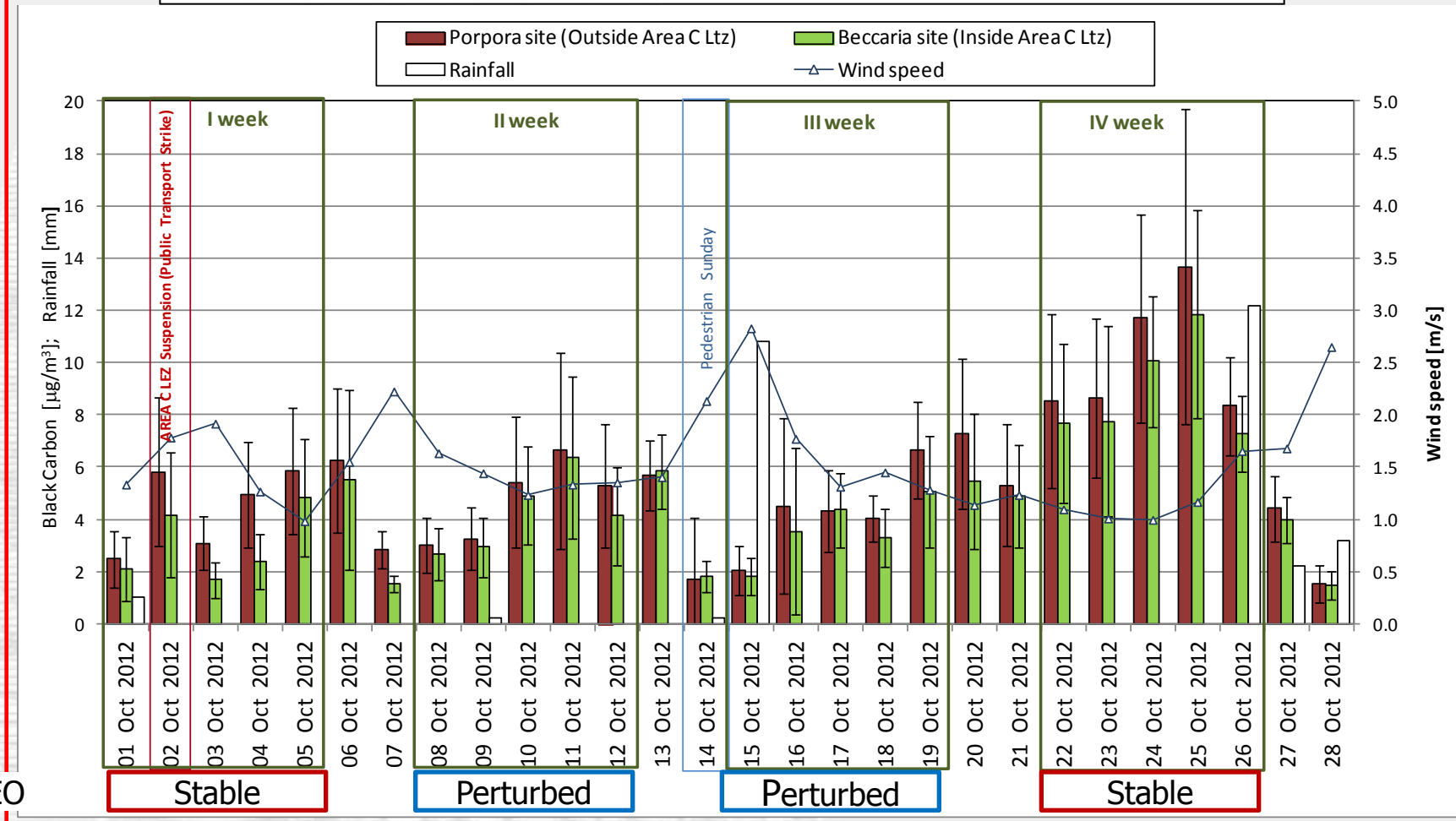
Autumn campaign, 3rd floor residential roadside sites, in/out Area C Ltz

24 h average BLACK CARBON concentrations (October 1st-28th 2012)



I week: **-32% BC** inside Area C Ltz
Domestic heating turned off
Stable meteo conditions

IV week: **-12% BC** inside Area C Ltz
Domestic heating turned on
Persistent stable meteo conditions

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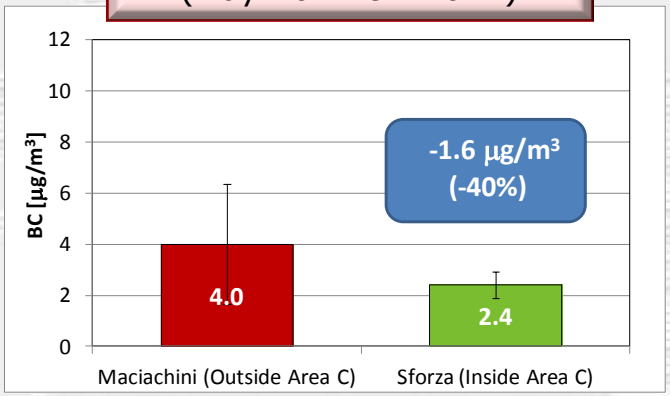
Results of First Year Area C Ltz Monitoring Campaign Summary

BLACK CARBON concentrations

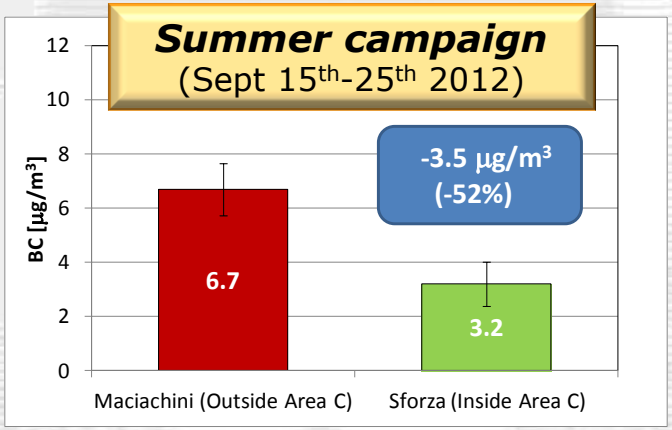
Kerbside sites

3rd floor level residential sites

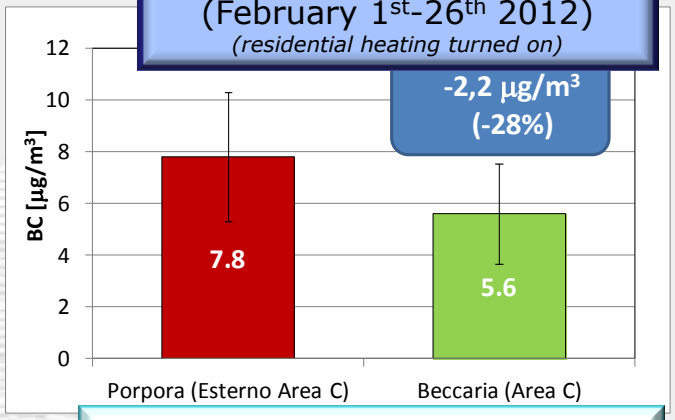
Spring campaign
(May 20th-29th 2012)



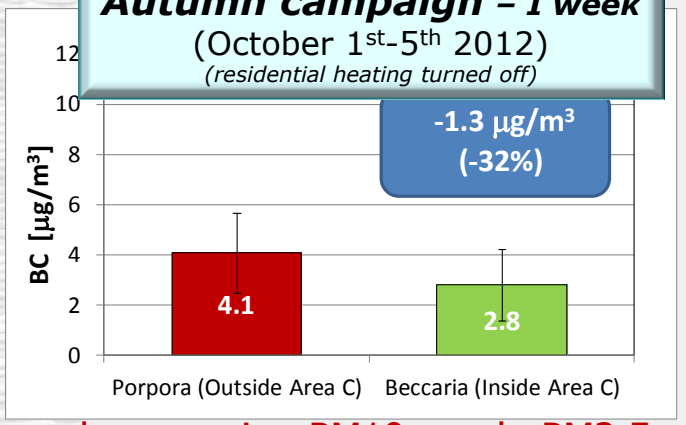
Summer campaign
(Sept 15th-25th 2012)



Winter campaign
(February 1st-26th 2012)
(residential heating turned on)

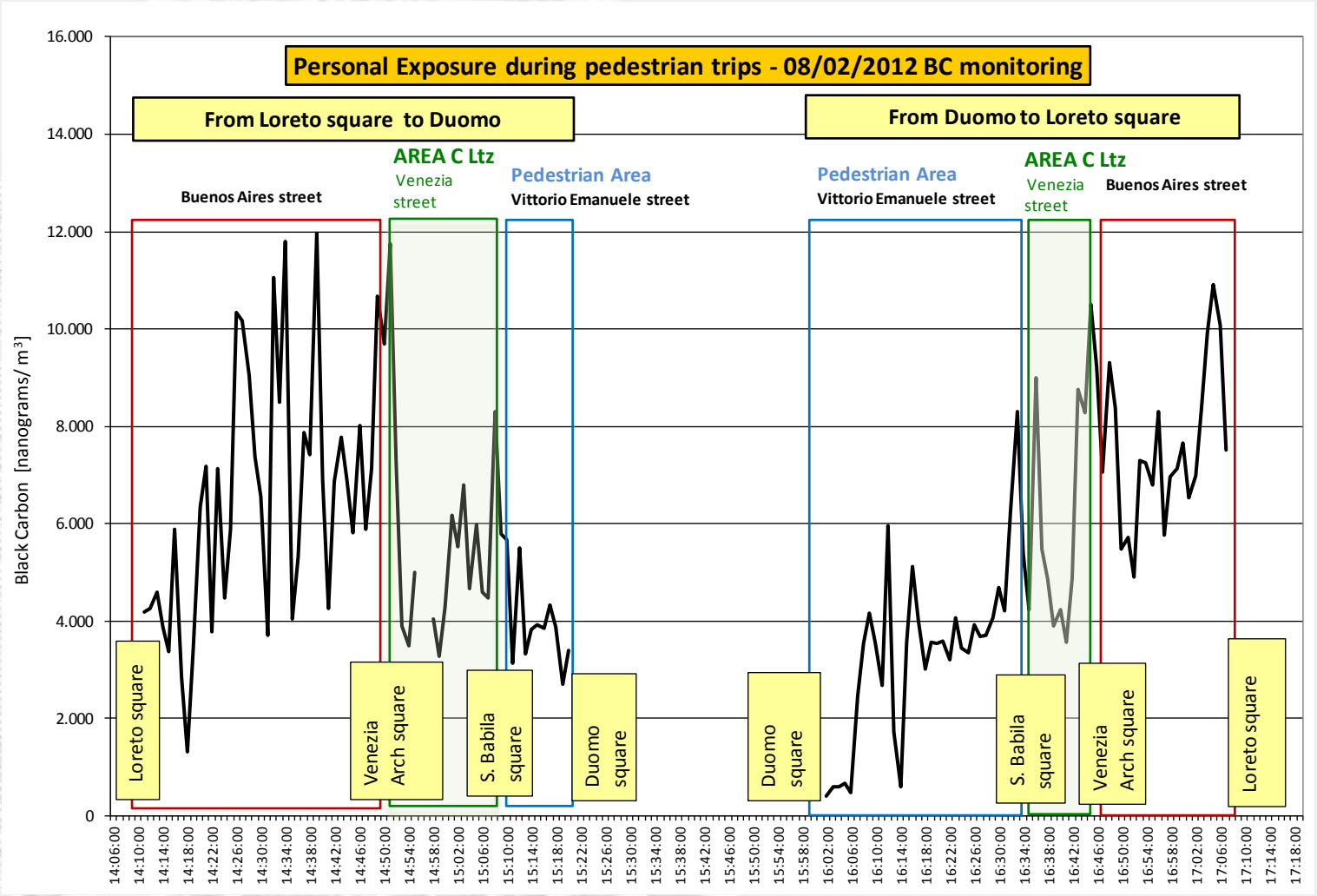


Autumn campaign – I week
(October 1st-5th 2012)
(residential heating turned off)



- ✓ Statistically significant changes in BC, despite no changes in PM10 and PM2.5 concentrations between the inside and the outside site
- ✓ Results in agreement a previous kerbside summer study on the same area (Invernizzi *et al.*, 2011) and with literature for similar sites in other cities: **Berlin** (Brukmann and Lutz, 2012), **London** (TfL, 2010), **Barcelona** (Reche *et al.*, 2011), **Munich** (Quadir *et al.*, 2013), etc.

Personal exposure during Pedestrian routes, in/out Area C

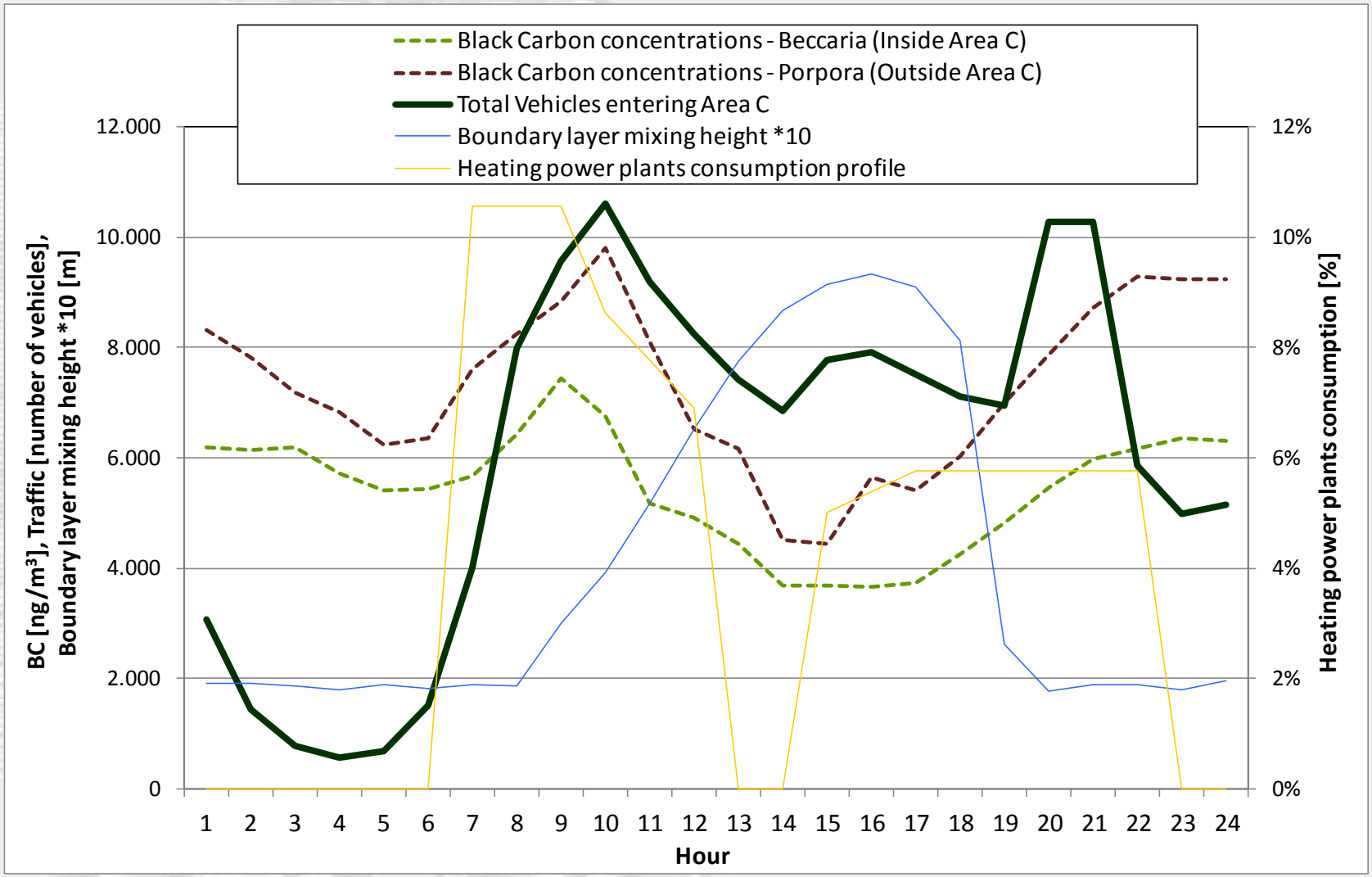


BLACK CARBON up to -43% inside Area C Ltz, up to -59% in Pedestrian Area

BC/PM10 up to -46% in Area C Ltz, up to -63% in Pedestrian Area

BC - Winter campaign, residential roadside sites, in/out Area C

Hourly proliles (typical 'Working Day')



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Conclusions of Black Carbon Monitoring Project

- A statistically significant difference ($p<0.0001$) was found in BC concentrations **inside 'Area C' Limited Traffic Zone**, both at **kerbside** and **residential roadside** sites, with an **improvement** of **one to three BC epidemiological 'change units'** (Janssen *et al.*, 2011)

- **Local interventions on traffic circulation**
(e.g. Congestion Charge Areas, Low Emission Zones, Pedestrian Areas, Car Free days or Pedestrian Sundays)
can **reduce health effects linked to toxic traffic-related pollutants exposure** for population and city users

- **High sensitivity of BC** to changes in **traffic flows** has been observed

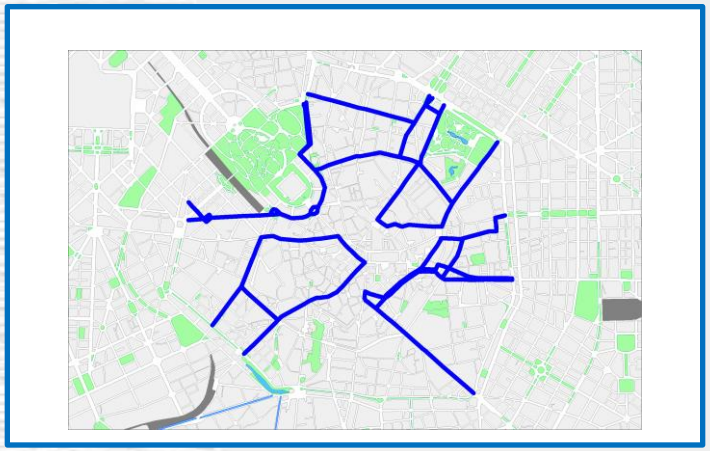
- **Black Carbon** can be considered a **very effective indicator of environmental and health effects** deriving by **traffic circulation**

'Area C' in the Urban Traffic Plan

- **Area C 'Road pricing' has been included in the <u>Urban Traffic Plan (PGTU</u>)**, last months in an updating phase, as a structural measure, complementary to the others (as 30 km/h Zones, Cycling network, etc..) and in comparison with <u>alternatives ones</u> (e.g. 'Loop circulation' scheme inside Cerchia dei Bastioni ring)

<u>'Road pricing' scheme</u>

to access Bastioni Ring Area



Alternative evaluated solution:

<u>'Loop' circulation scheme</u>

within Bastioni Ring Area

- **Area C** has been assessed (by a Sustainable Environmental Assessment - **<u>SEA procedure</u>**) as a measure with **positive impact on main environmental aspects** and coherent with the aim to **reduce traffic congestion**.

Adopting BLACK CARBON as a Tool in Mobility Plans

SEA for the Urban Traffic Plan (PGTU) of MILAN

- Basing on the experience with the Black Carbon monitoring Project measurement for Area C, AMAT adopted **Black Carbon** among **quantitative indicators** as a tool to estimate interventions on mobility in terms of **health effects on population**.

- Being the **carbonaceous nanoparticles** such as Black Carbon, a sensitive indicator of the spatial variation of road traffic emissions (**'traffic proximity' indicator**) it was possible to adopt the emissions of EC (Elemental Carbon), pollutant closely related to the BC (Black Carbon), as tracers of the population exposure.

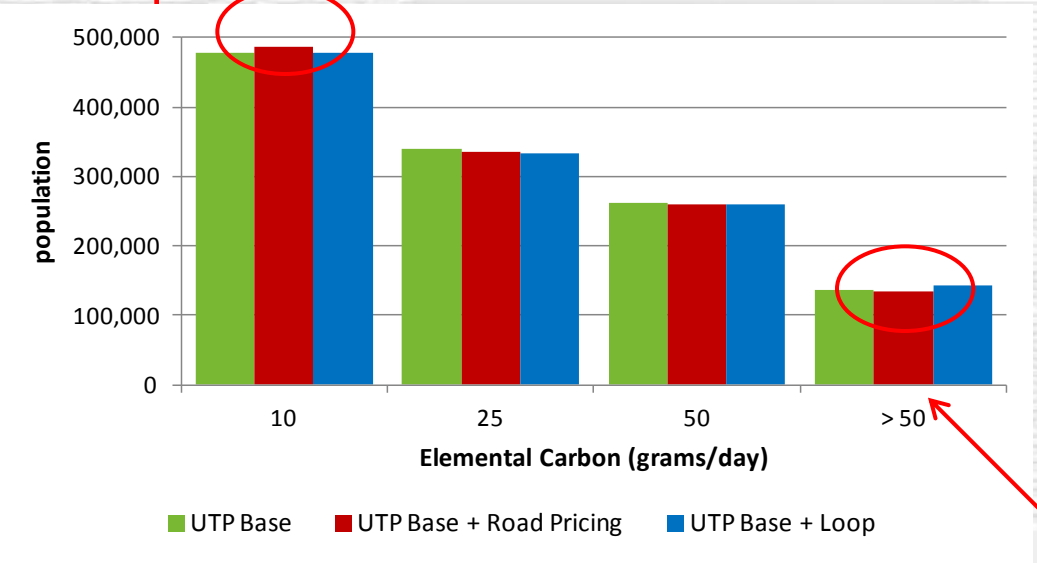
- According to the literature has been **identified a critical distance from the vehicular traffic source** to which refer evaluations of some health effects that have 'sufficient evidence' (in. **asthma**).

Air pollution exposure scenarios

'Base+Road Pricing' and 'Base+Loop' vs 'Base PGTU' scenario

Averaged on population Working day mean Vehicular exhaust Emissions of Elemental Carbon (grams) emitted < 75 meters * from residences

Elemental Carbon traffic emissions [grams/day] released within 75 meters from residences	UTP Base	UTP Base + Road Pricing	%	UTP Base + Loop	%
Milan (whole city)	21.8	21.5	-1%	22.1	+1%
Inside Bastioni ring	20.8	18.3	-12%	19.2	-8%
Between Bastioni ring and Filoviaria ring	29.5	29.3	-1%	30.6	+4%
Between Filoviaria ring and city boundaries	19.2	19.1	-1%	19.5	+2%



* : **The residence at a distance <75 m from major roads increases of about 30%** the chance of receiving a diagnosis of **asthma** and by about 40% -50% to be on medication for asthma or have had recent acute episodes **in children** (Mc Connell *et al.*, 2006; L. Perez, 2012; Brugge *et al.*, 2007)

'Road pricing' scenario at 2015 leads to a **decrease of about 9,000 inhabitants exposed to highest EC traffic emission levels (>50 grams/day)** respect to the 'Loop' circulation scheme, with an important benefit for public health.

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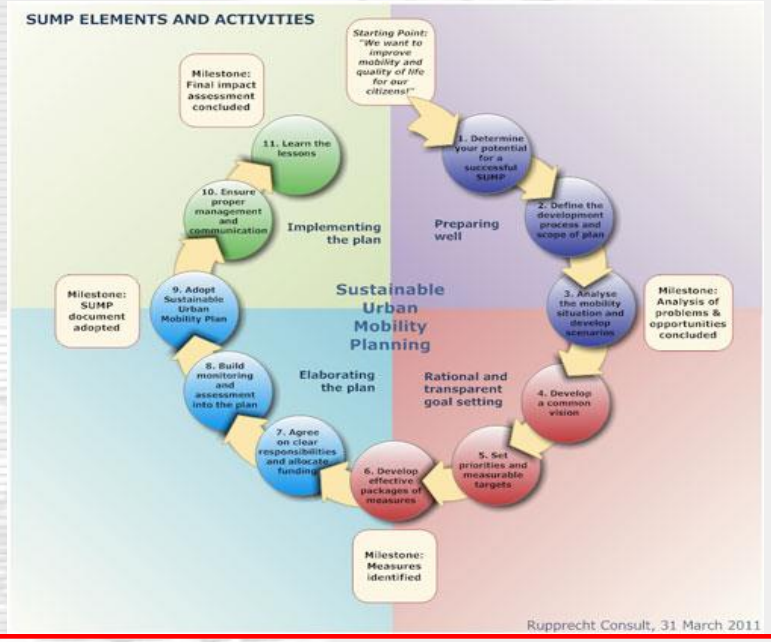
'Area C' as a Structural Measure

- After <u>one year of experimental phase</u>

  and taking into consideration the <u>PGTU SEA results</u>

  in *March 2013* the Local Council approved PGTU updating: the Municipal Board has confirmed **AREA C as a permanent and strategic measure**

- Possible **perspectives** of road pricing schemes are going to be discussed in the **<u>Sustainable Urban Mobility Plan (SUMP)</u>** process, just started.



'Area C': LESSON LEARNT (1/2)

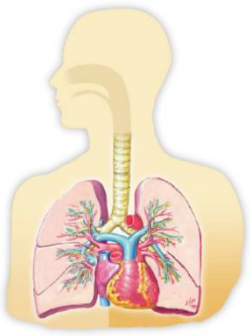
- **One out of three cars was left at home** and **traffic pressure, accidents, pollutant emissions have dropped**

- After a year, there have been **significant changes in citizen's travel behaviours**: they seem to have fully understood the objectives of the Area C measure, **shifting towards cleaner modes of transport**

'Area C': LESSON LEARNT (2/2)

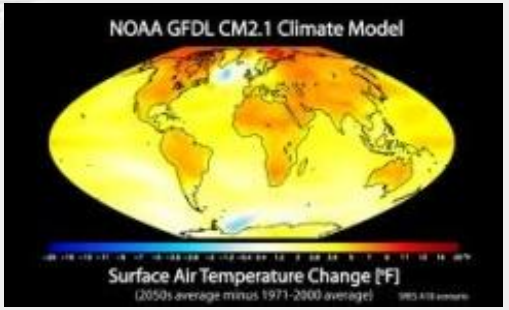
- **Black Carbon**, primary pollutant and **excellent tracer of 'traffic proximity' exposure**, offers the possibility to verify the **effectiveness of mobility policies (Congestion Charge, Urban Traffic Plan, Sustainable Mobility Urban Plan,** etc) with regard:

a. the **health effects** on ***'local' scale***;



b. for the city's contribution on ***'global' scale***

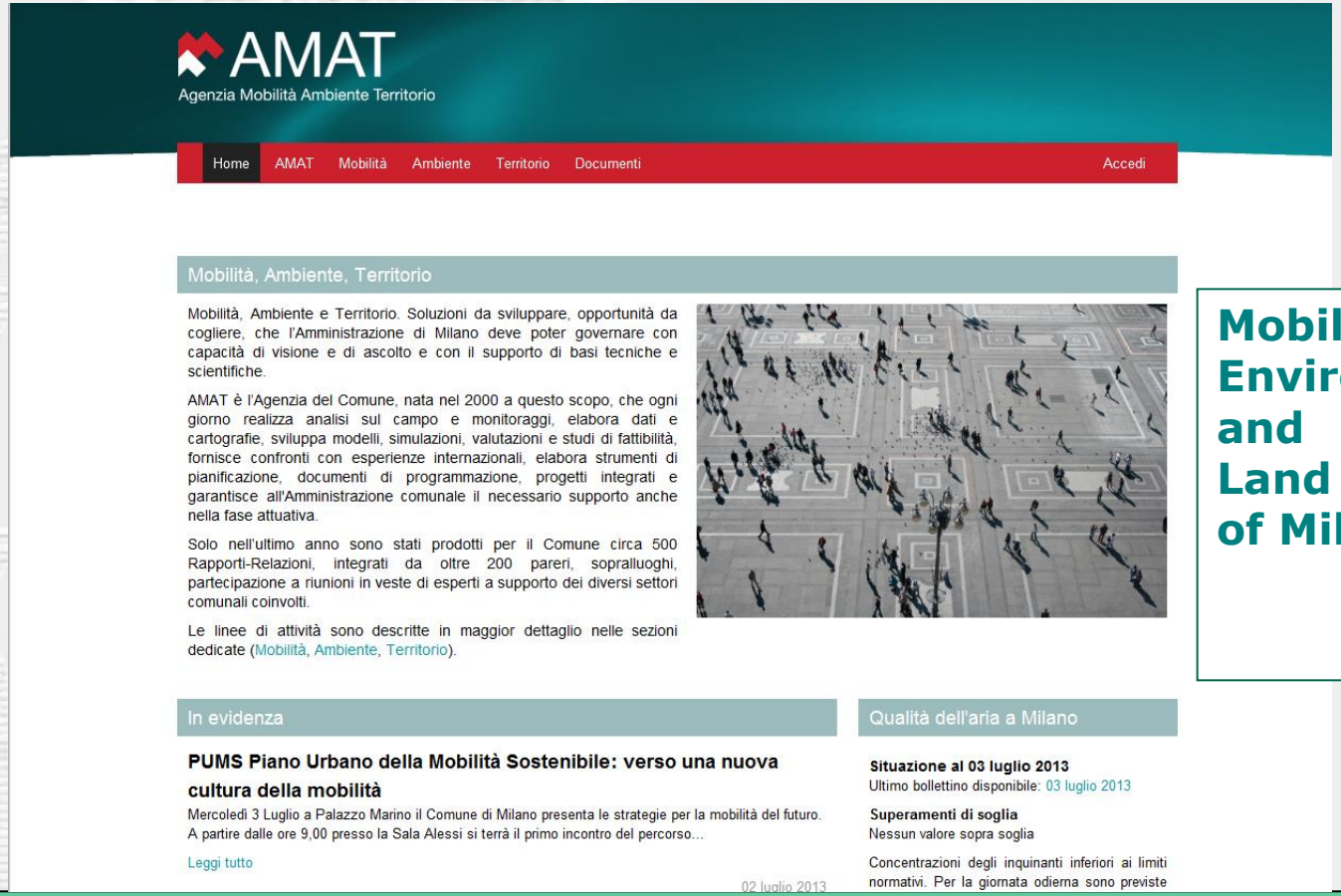
to **climate change effects**.



'Area C': Reports on Traffic and Environmental monitoring

- ✓ The first and the second reports are at disposal at the web site: ***www.areac.it***, '*Risultati attesi e monitoraggio*'

'Area C': Reports on Black Carbon monitoring



Mobility, Environment and Land Agency of Milan

http://www.amat-mi.it

http://www.amat-mi.it/it/ambiente/qualita-aria/il-progetto-di-monitoraggio-del-black-carbon/

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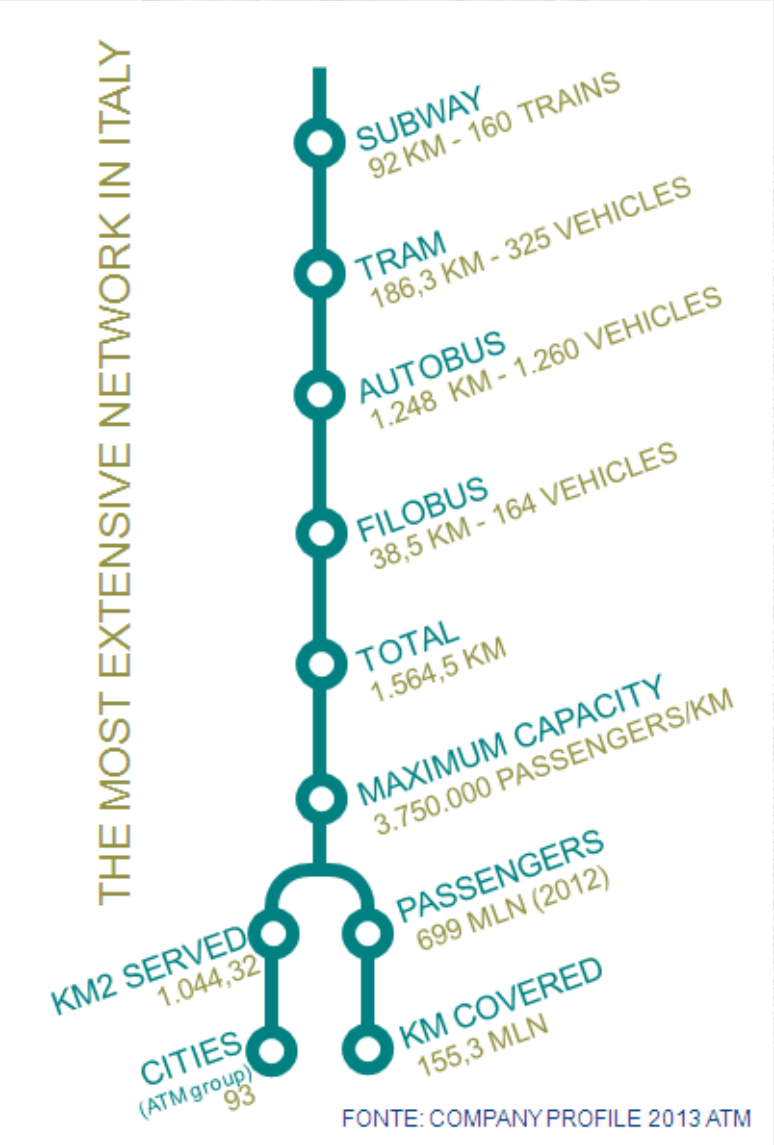
Thank you for your attention!

silvia.moroni@amat-mi.it

Local Public Transport Network



Public Transport in Milan is the more extensive network in Italy

Extension of Milan Subway = Rome + Naples + Turin +Brescia+Genoa + Catania Subways