Windsor Workshop®
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Session 4C: Reducing Pollution in Urban Areas — Case Studies on Programs and Policies

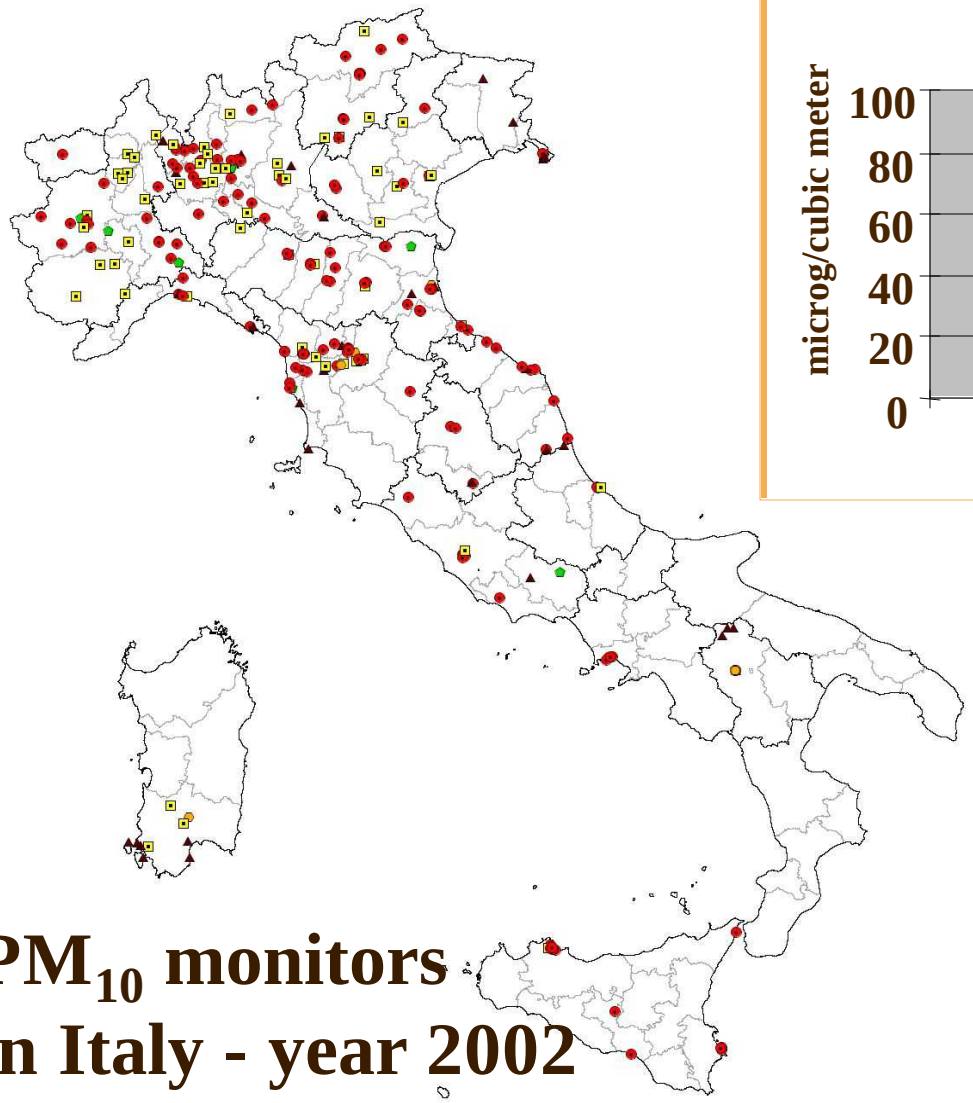
Air Pollution in Cities and Transportation Policies : Italian Case Studies

*M. C. Cirillo *, S. Brini *, P. Villani **, M. A. Alessandro *, A. Cataldo *, D. Ceremigna *, F. Falcioni **

* APAT (Italian National Agency for Environmental Protection and Technical Services)
** APAT consultant

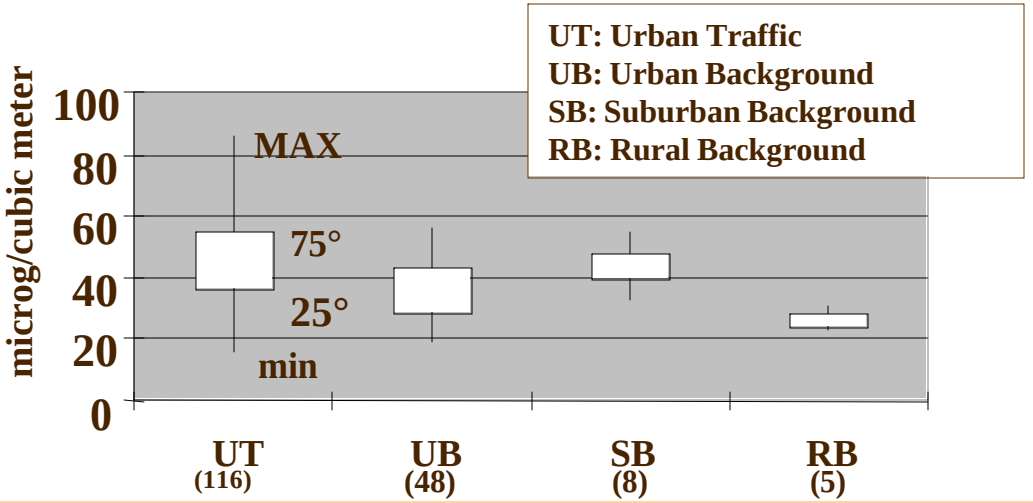
APAT
National Agency for Environmental Protection and Technical Services

PM_{10} monitors in Italy



PM_{10} monitors in Italy - year 2002 (tot. 251)

Annual PM_{10} concentrations in Italy (1995-2001) per type of station (number of measurements in parenthesis)

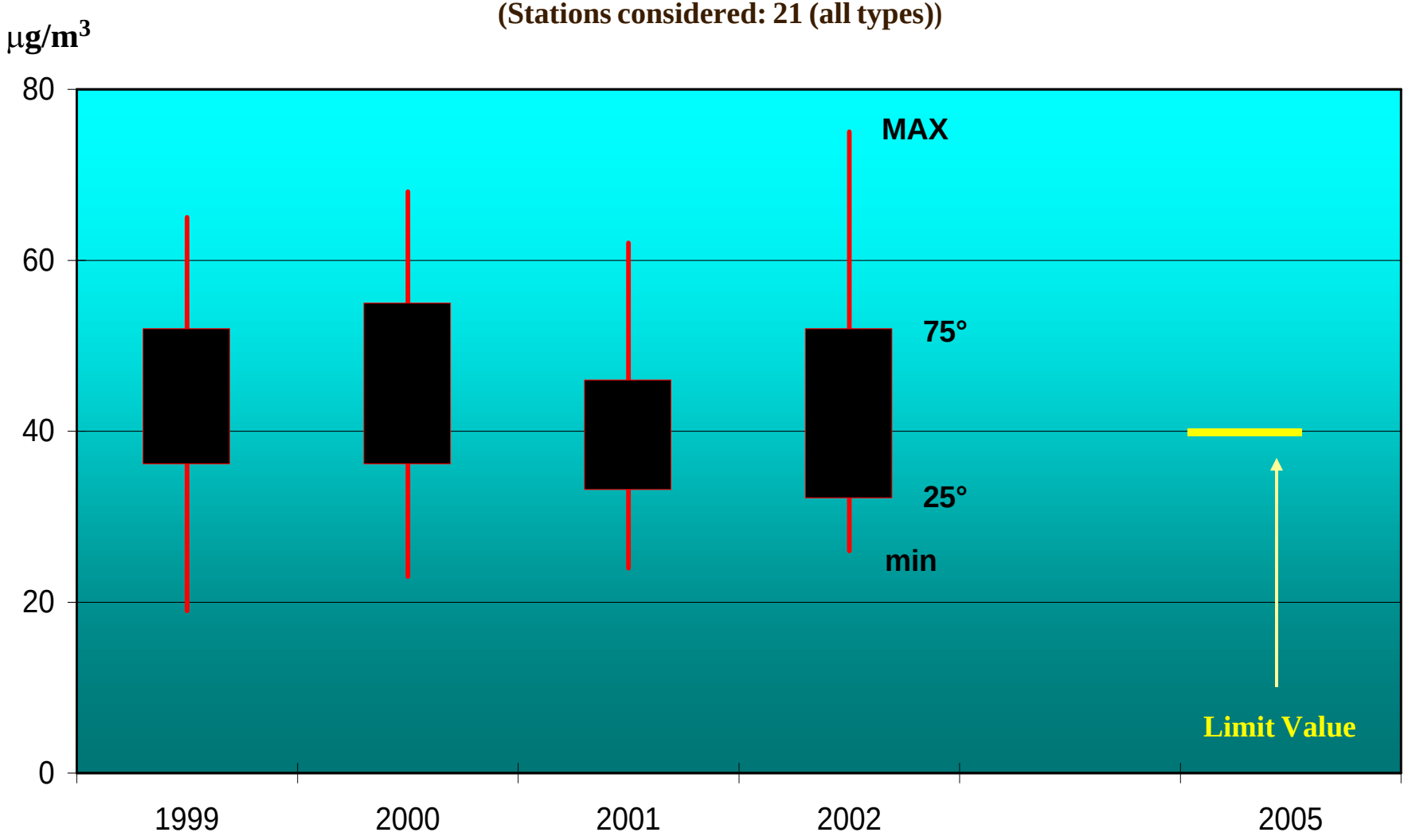


- **Urban/Suburban Traffic (143)**
- **Urban/Suburban Background (58)**
- **Urban/Suburban Industrial (37)**
- **Rural Industrial (6)**
- **Rural Background (7)**

PM_{10} AIR CONCENTRATIONS IN ITALY – ANNUAL AVERAGE

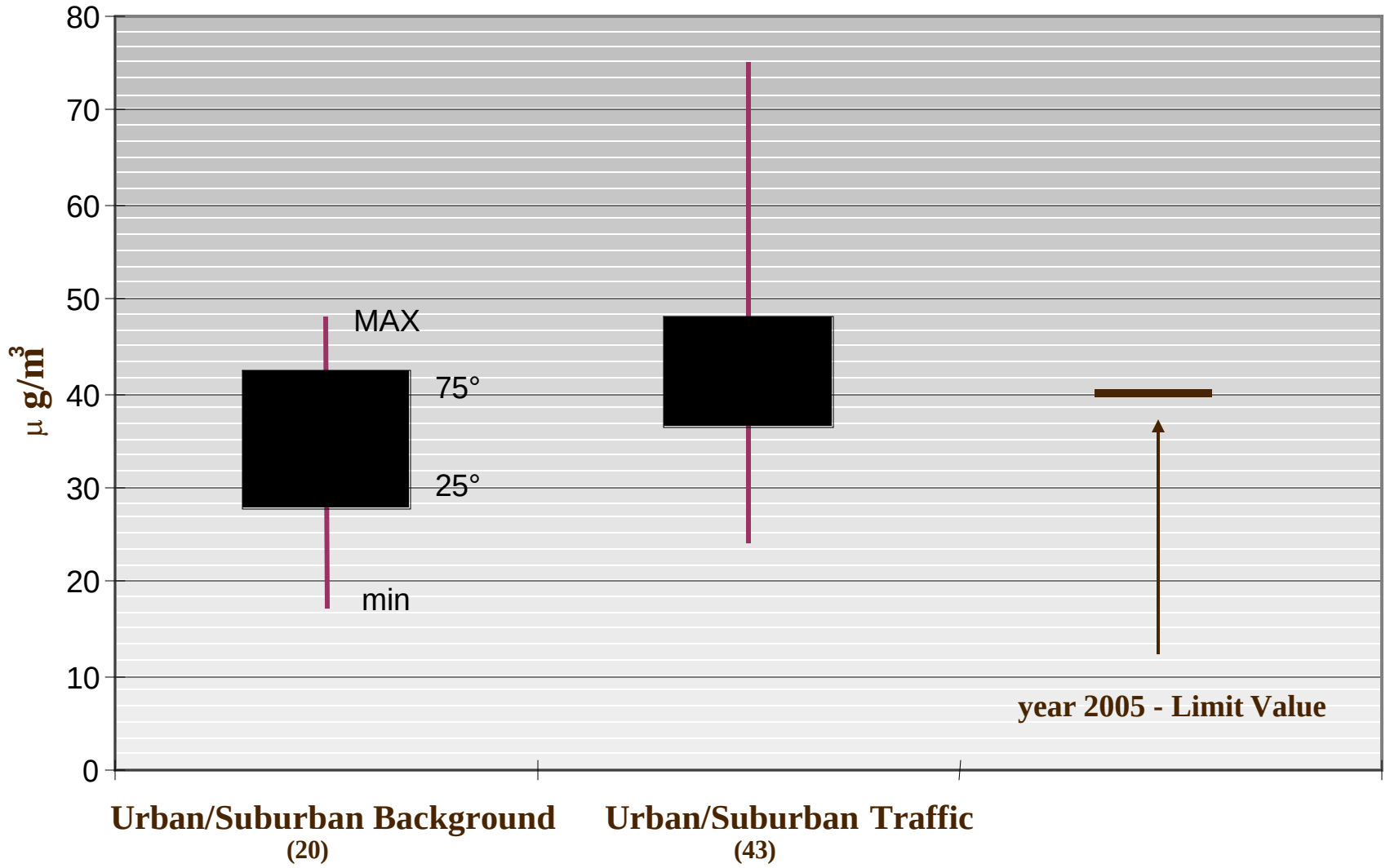
MAX, min, 25° e 75° percentile

(Stations considered: 21 (all types))



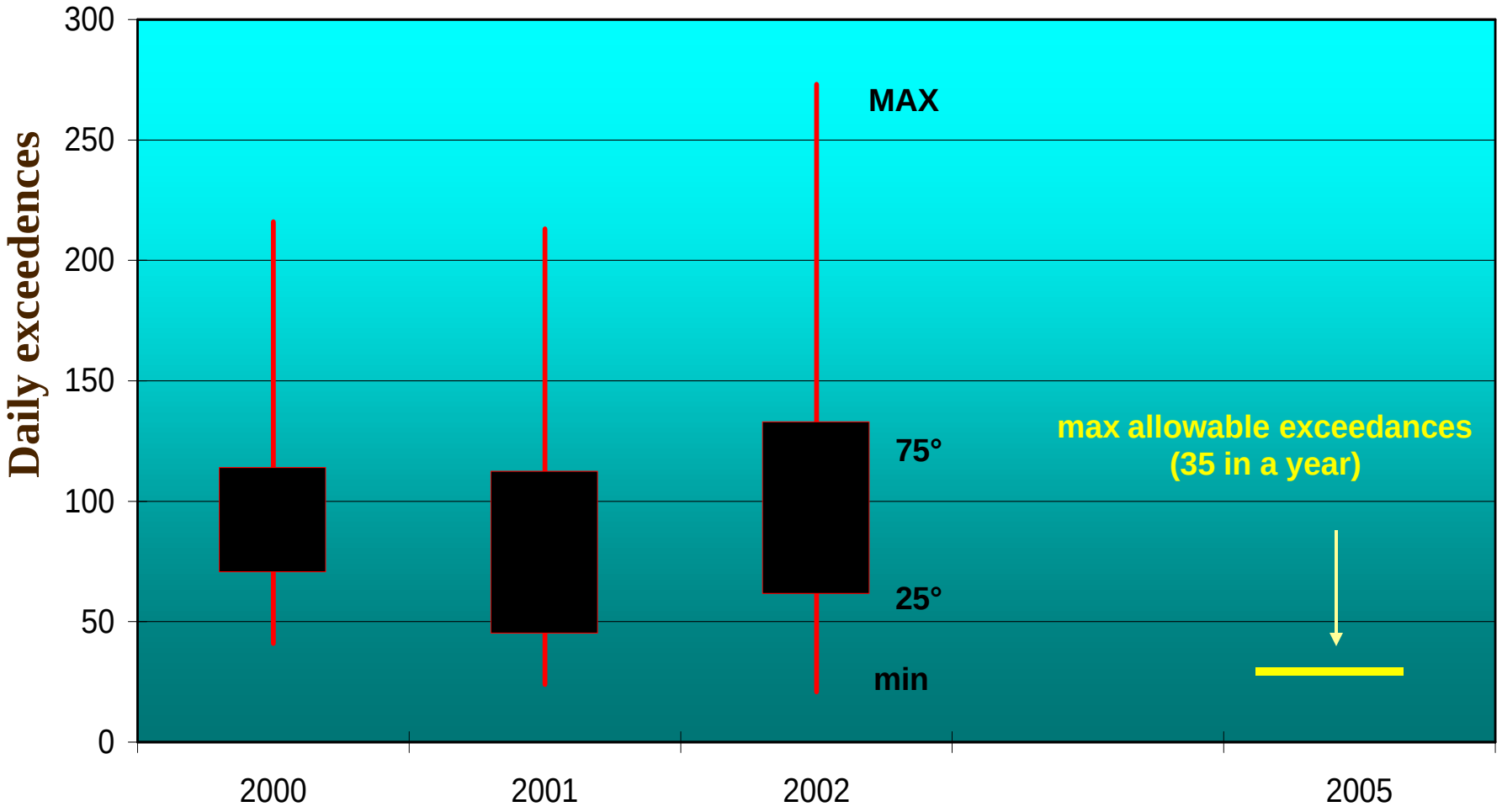
PM_{10} CONCENTRATIONS IN ITALY – ANNUAL AVERAGES

Urban/Suburban Background (26) and Urban/Subarban Traffic (43) year 2002



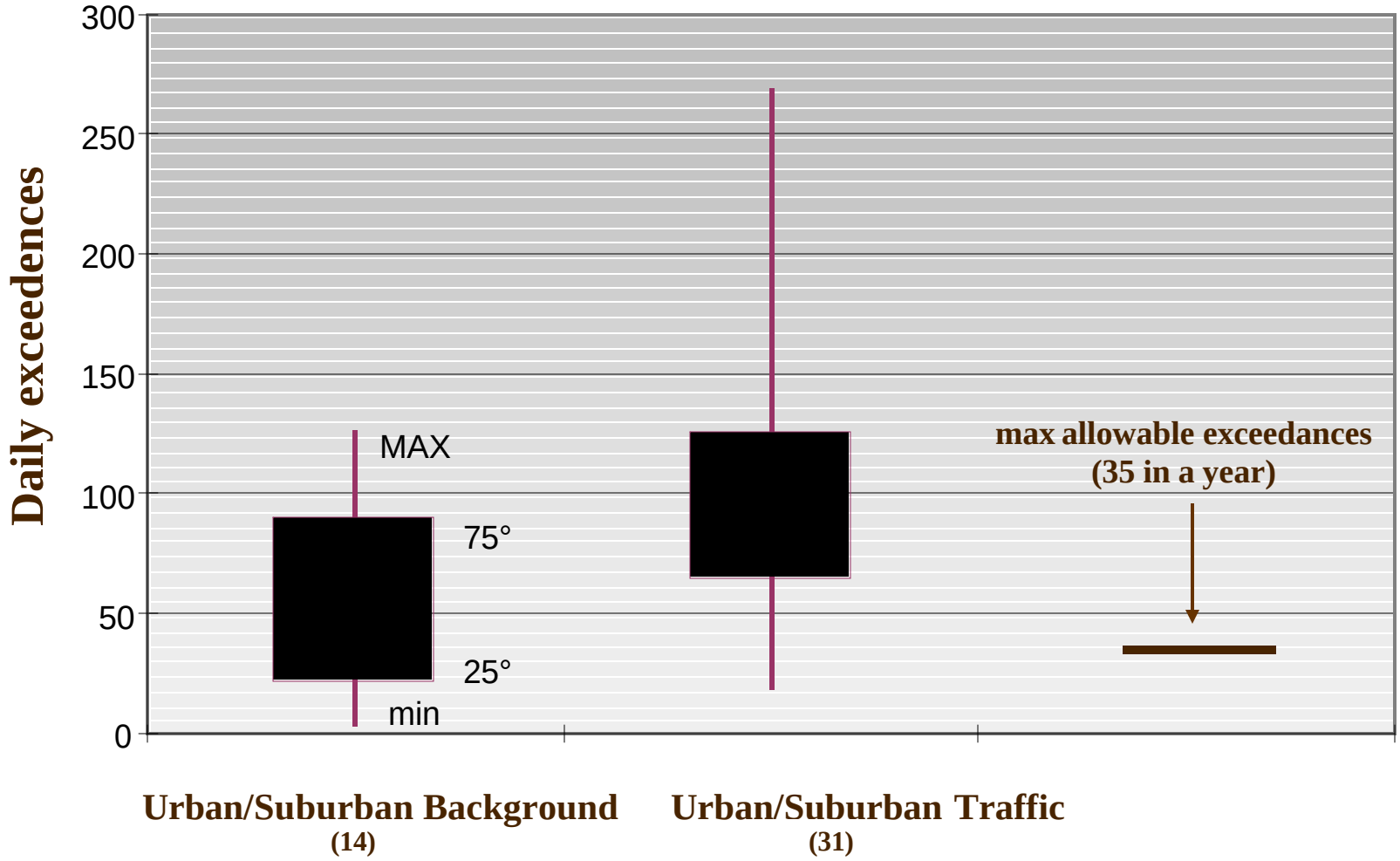
PM_{10} CONCENTRATIONS IN ITALY – DAILY AVERAGES

Number of daily exceedences of the forthcoming limit value (50 mg/m^3)
MAX, min, 25° e 75° percentile
Stations considered: 21 (all types)

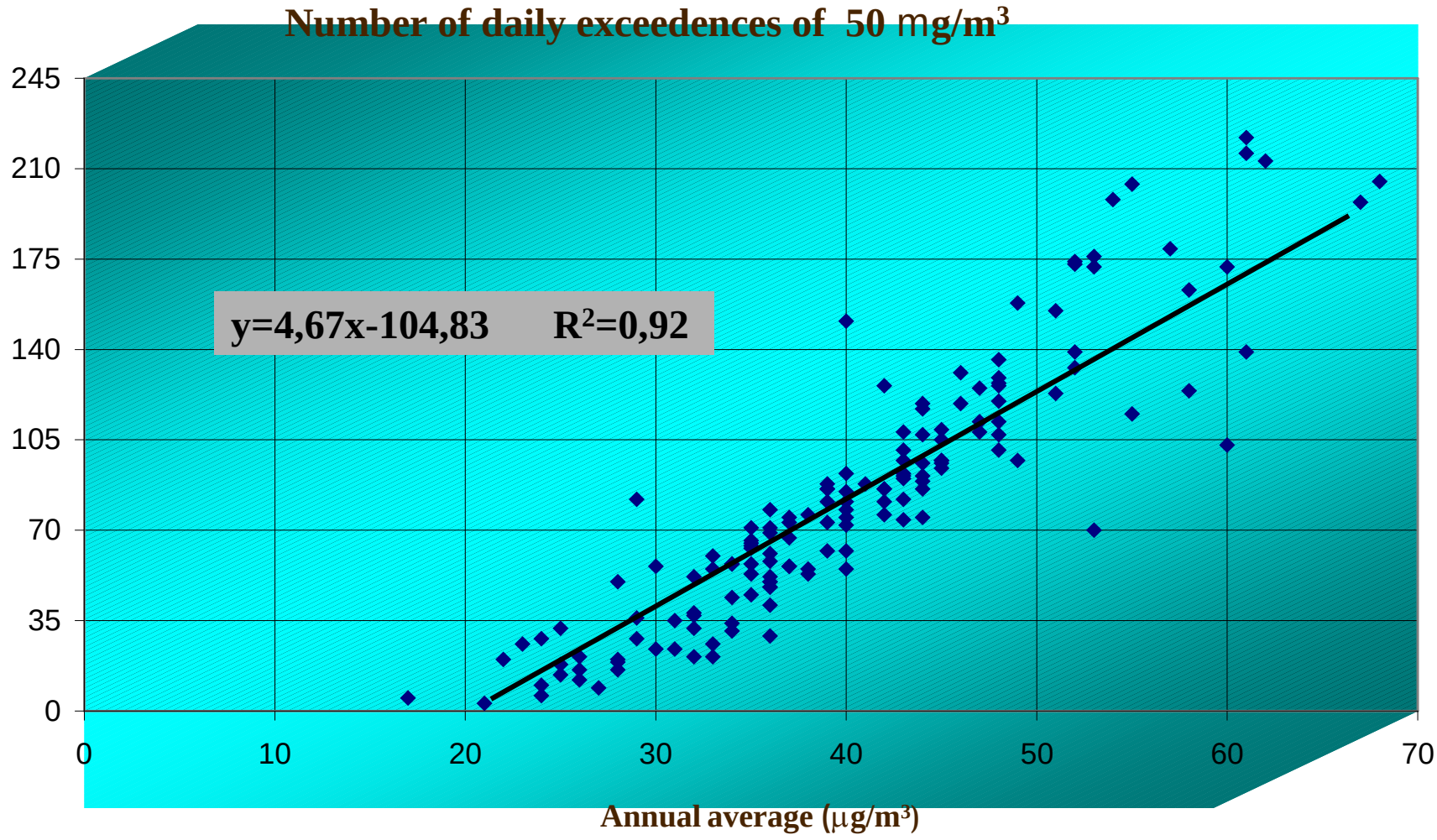


PM_{10} CONCENTRATIONS IN ITALY – DAILY AVERAGES

Urban/Suburban Traffic year 2002
Number of daily exceedences of the forthcoming limit value (50 mg/m^3)
MAX, min, 25° e 75° percentile



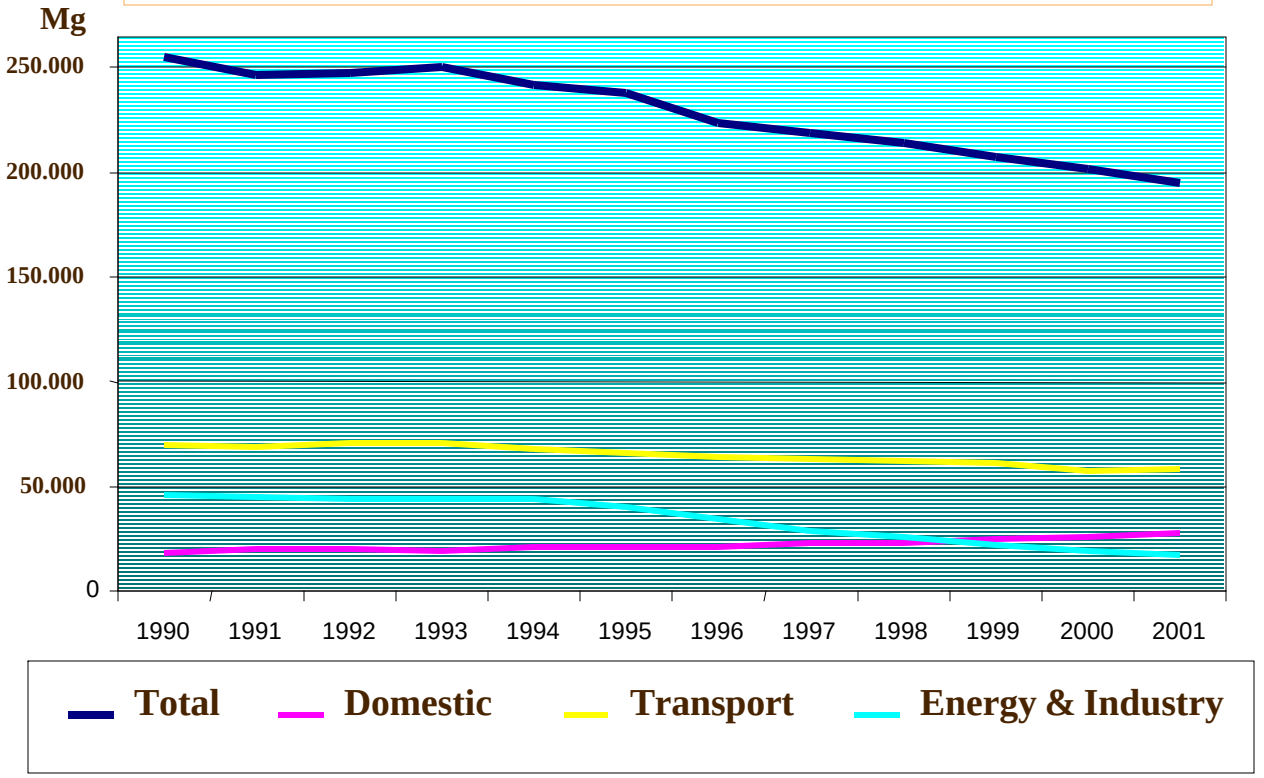
PM_{10} CONCENTRATIONS IN ITALY (1998- 2002)



Air pollution in italian cities

PM_{10} (particulate matter with dimension less than 10 micrometer) **together with ozone constitutes the main air pollution problem in Italy**, especially in urban and metropolitan areas.

Italian emissions of primary PM10 decreased of about 25% between 1990 and 2001.



Air pollution in italian cities

Also emissions of almost all PM10 precursors decreased in Italy during the last decade

In these areas road transport is one of the leading environmental pressures concerning:

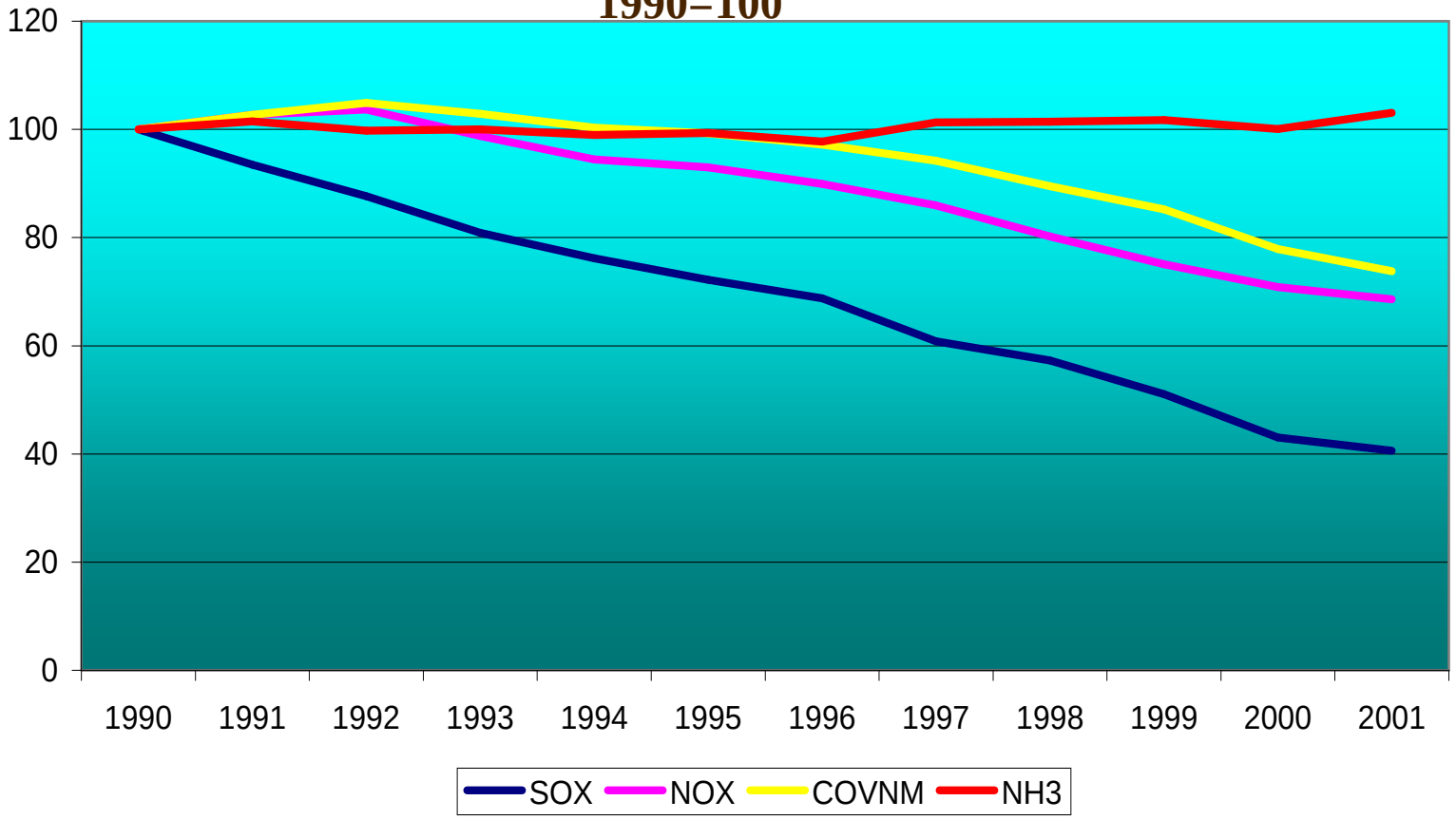
. air pollutant emissions - at urban level, **the greatest share of PM_{10}, NO_x** (nitrogen oxides), **VOC** (volatile organic compounds) and **CO** (carbon monoxide) is emitted by road vehicles;

. noise;

. land use.

Moreover safety and congestion issues due to road traffic must be considered.

NATIONAL ITALIAN EMISSIONS OF PM PRECURSORS (NO_X, SO_X, COVNM and NH_3) 1990=100



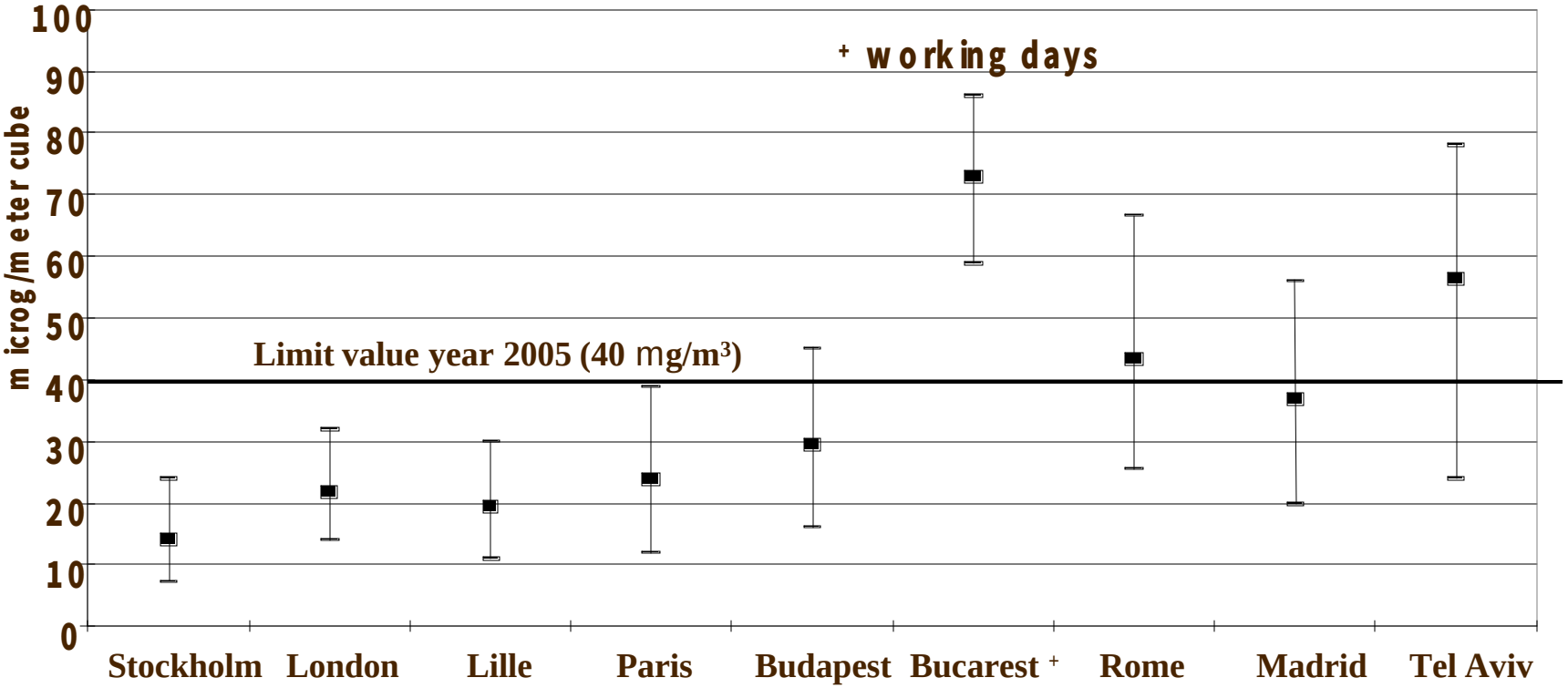
Air pollution in cities

It is necessary to consider particular meteo-climatic conditions characterizing the different Member States with an approach analogous to the natural sources

Air pollution in cities

ANNUAL CONCENTRATIONS PM_{10} SOME CITIES > 1.000.000 INHABITANTS

(years 1996 - 2000 - MAX, min, 10° e 90° percentile)



Elaborazione APAT su dati APHEIS, 2002

Air pollution in italian cities

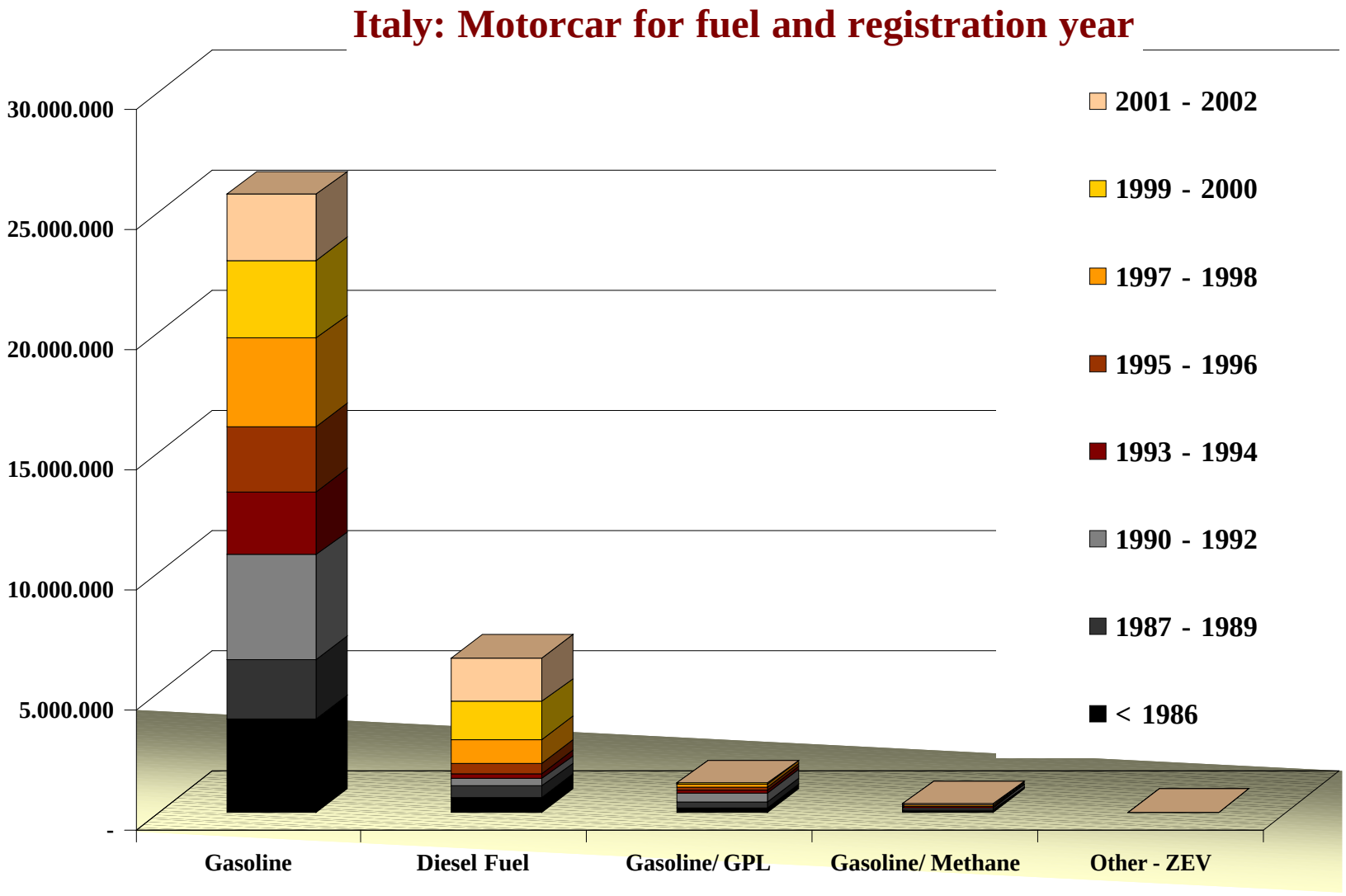
Concerning $PM_{2,5}$ levels in Italy:

. annual concentrations in Milan urban site is 42 mg/m^3 in 2002;

. in a rural area of Piemonte the 8-months (jan-aug) average concentration in 2003 is 29 mg/m^3

. annual concentration in Bologna urban background site is 36 mg/m^3.

Motorcar fleet: composition for fuel in Italy



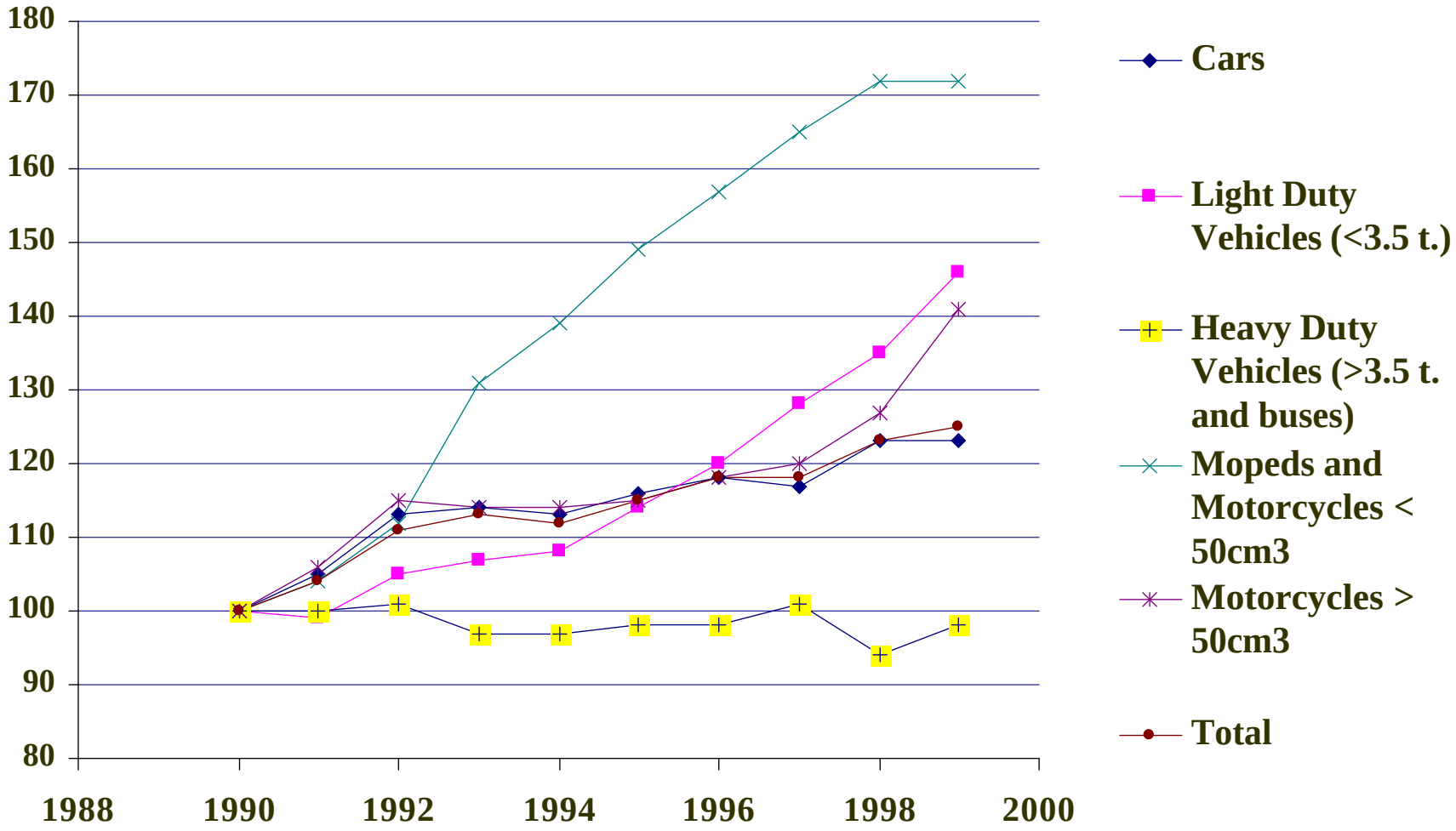
Percent increase in vehicle-km travelled in Italy

Percent increase in vehicle-km travelled in the years 1990-1999 in Italy (base year 1990 = 100)

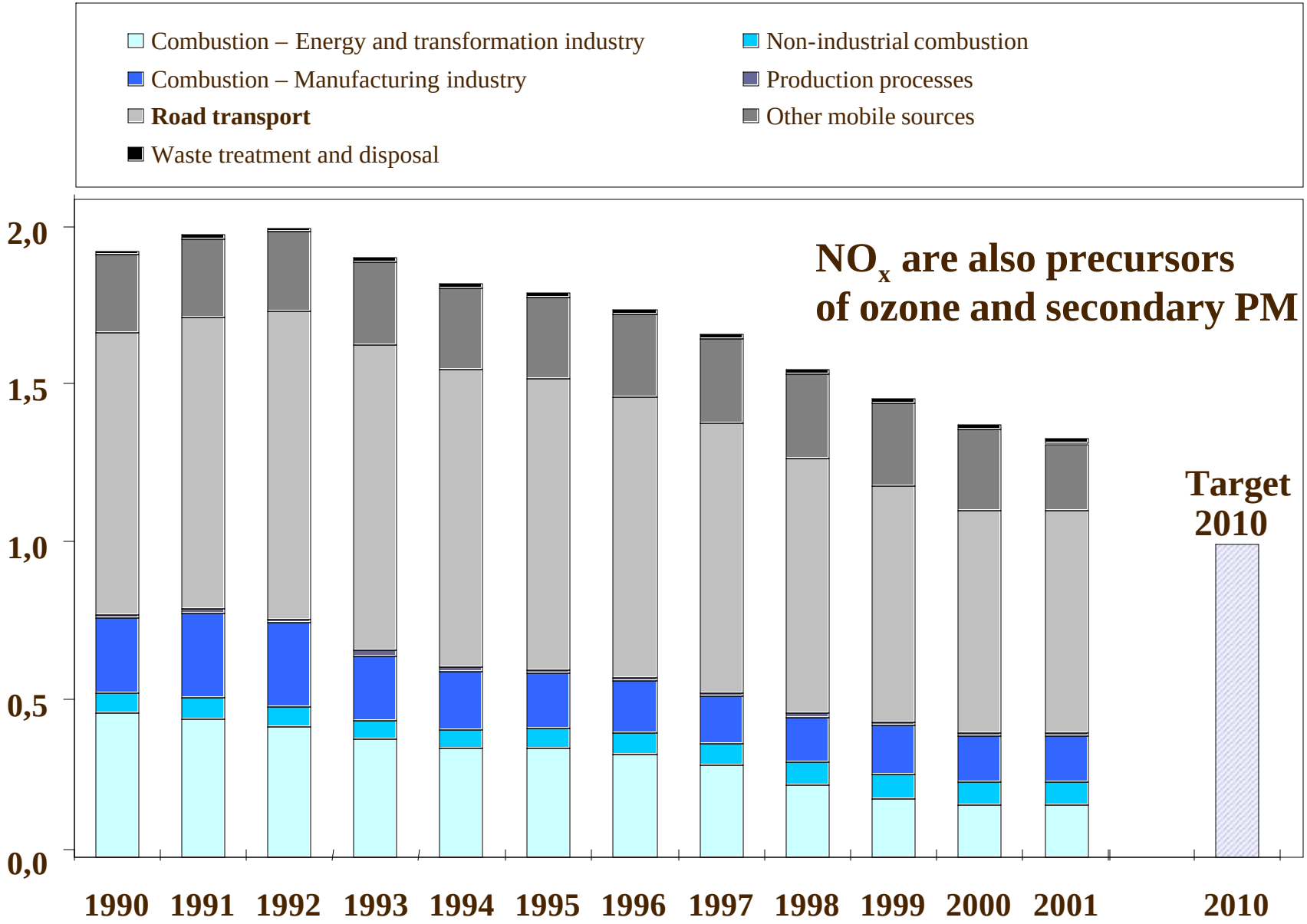
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Cars	100	105	113	114	113	116	118	117	123	123
Light duty vehicles (< 3.5 t)	100	99	105	107	108	114	120	128	135	146
Heavy duty vehicles (> 3.5 t) and buses	100	100	101	97	97	98	98	101	94	98
Mopeds and Motorcycles < 50 cm^3	100	104	112	131	139	149	157	165	172	172
Motorcycles > 50 cm^3	100	106	115	114	114	115	118	120	127	141
Total	**100**	**104**	**111**	**113**	**112**	**115**	**118**	**118**	**123**	**125**

Percent increase in vehicle-km travelled in Italy

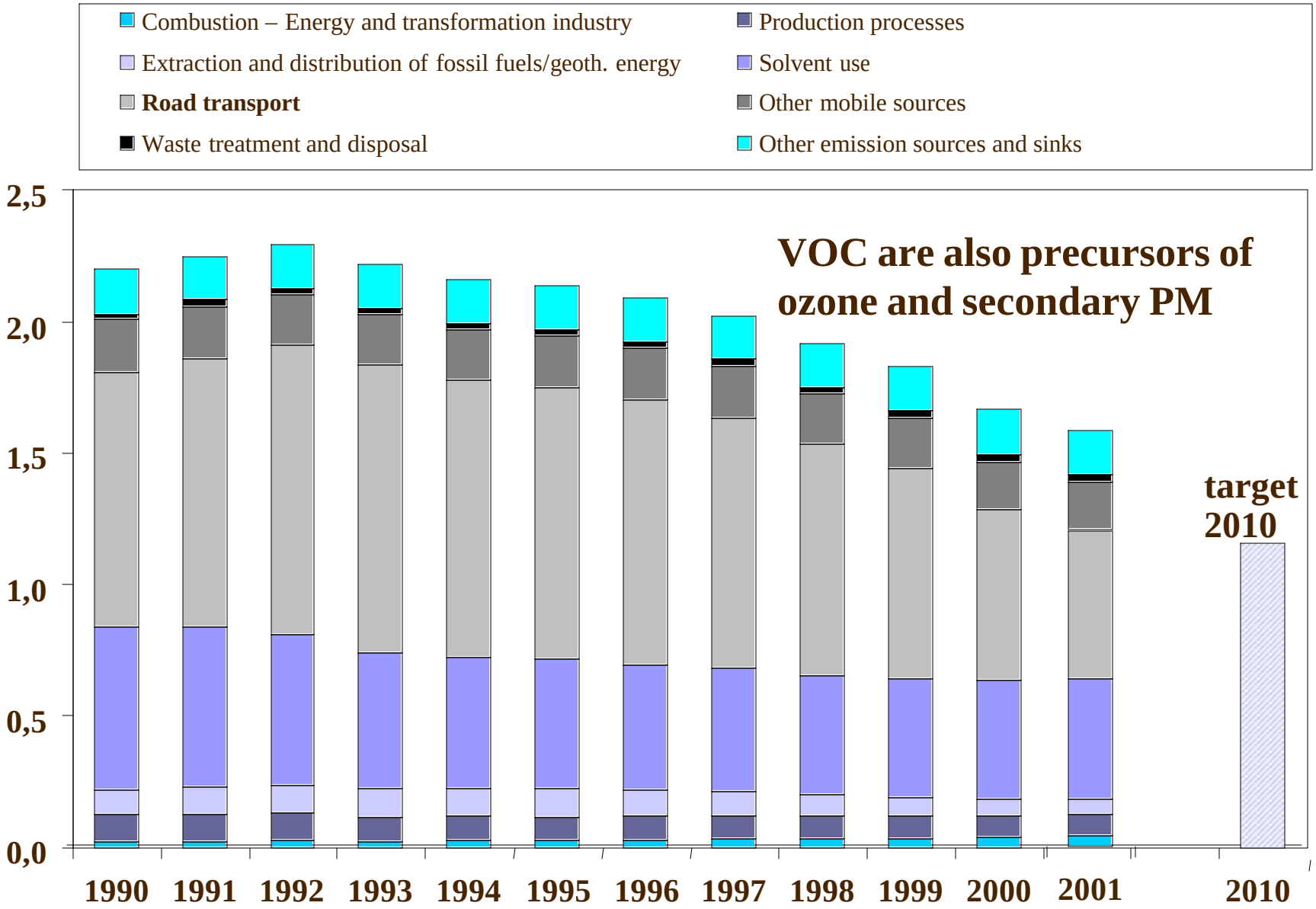
Percent increase in vehicle-km travelled in the years 1990-1999 in Italy (base year 1990 = 100)



NO_x emissions in Italy (Mt) 1990-2000



VOC emissions in Italy (Mt) 1990-2000



Review of transport policies in italian urban areas

Here are some elements derived from a critical review of projects concerning mobility that are adopted and implemented in the main Italian cities for improving air quality.

MAIN PURPOSES OF THE REVIEW:

· Make a national inventory of the ongoing projects

· Evaluate how project aims and contents are presented to stakeholders

· **Assess environmental performance of analyzed projects**

· **Analyse people level of information, communication and feedback**

· **Check – where possible – transferability of experiences in different urban contexts**

ACTIVITIES:

· **Analysis of the projects adopted in Italian cities**

· In order to frame Italian experiences, analysis of the projects of European Countries performed in the Framework Programs of the European Union

SOURCES OF INFORMATION:

· *Documents from Italian local authorities (Municipal reports on air quality, Urban Traffic Plans, etc.)*

· *Final reports of projects of the European Framework Programs*

· *Web pages of Italian Municipalities, Italian Local Environmental Protection Agencies, European Union, Information Service on Local Mobility of the European Union.*

· *Italian and European Statistical data*

SUMMARY OF THE RESULTS

Information about 4 representative Italian cities are organized as follows:

Thematic area of intervention | **Description of measures adopted** | **Indicators**

Type	*Description*	*Dim*	*State*	*Perf*
Infrastructures Intervention	***"Transit point"*** *City-oriented Freight Platform and client supply through ZEV/LEV Scheme*	😐	☺	😐

☺	***High impact*** *intervention on urban territory and/or local mobility system*	***Dimension***
😐	***Medium impact*** *intervention on urban territory and/or local mobility system*	
☹	***Low impact*** *intervention on urban territory and/or local mobility system*	
☺	***Fulfilled*** *and activated intervention*	***State***
😐	***Partially*** *activated intervention*	
☹	***Not activated*** *intervention*	
☺	***Fully satisfactory*** *, excellent user consciousness*	***Performance and environmental effectiveness***
😐	***Satisfactory even though lower than predicted effect***	
☹	*Very low positive effect, poor user participation and/or project abortion*	

Torino

Population : ***1,102,180***

Area: ***130 km²***

Density: ***8,474 ab/km²***

Total cars: ***589,733***

Car/inhabitant ratio: ***0.54***

Type	*Description*	*Dim*	*State*	*Perf*
Infrastructures intervention	***"Sistema 5T"*** *Traffic Remote Control and Mobility Management Scheme*	☺	😐	☹
Technological measures	*Methane -running Buses Operating Service (10% of entire fleet)*	😐	☺	☺
	(Gecam) Diesel –water emulsion running Buses Operating Service (90% of entire fleet)	☺	☺	☺
	Hydrogen -running Buses Experimental Operating Service	☹	☺	☹
Regulatory and fiscal measures	*Restricted Access Areas and on -street Parking Policies*	😐	☺	☺
	Car Sharing System	😐	☺	😐
Sustainable Mobility and Communication	***"Ruotò"*** *Electric Bycicle and Scooter Rental Scheme, Mobility Management, Pop-Bus*	☺	☺	☺

Milano

Population : ***1,302,619***

Area: ***182 km²***

Density: ***7,157 ab/km²***

Total cars: ***883,941***

Car/inhabitant ratio: ***0.68***

Type	Description	Dim	State	Perf
Infrastructures Intervention	*Traffic Lights and Traffic Control System*	😐	☺	😐
Technological measures	*Implementation of Public -Transport fleet according to EURO III Standards*	☹	😐	😐
	(Gecam) Diesel –water emulsion running Buses Operating Service	☺	☺	☺
Regulatory and fiscal measures	*Restricted Access Areas and on -street Parking Policies*	☺	😐	😐
	Short-range freight delivery	☺	☺	😐
	Park + Ride Scheme	☺	☺	☹
	Remote/Electronic Vehicle Access Control System	☺	😐	☺
Sustainable Mobility and Communication	*Mobility Management*	☺	😐	😐
	"Radio Bus" Door-to-door on request Public Transport Operating Service	😐	☺	☹
	Car Pooling Scheme	☹	☹	😐

Bologna

Population : ***427,272***

Area: ***140 km²***

Density: ***3,052 inh/km²***

Total cars: ***265,167***

Car/inhabitant ratio: ***0.62***

Type	Description	Dim	State	Perf
Infrastructures Intervention	***"Transit point"*** *City-oriented Freight Platform and client supply through ZEV/LEV Scheme*	☺	☺	😐
Technological measures	*Innovative Buses (Hybrid and running on Biogas and Methane) Experimental Operating Service*	☺	☺	😐
	(Gecam) White Diesel-running Buses Experimental Operating Service	😐	😐	☹
Regulatory and fiscal policies	***"Sirio"*** *Remote/Electronic Vehicle Access Control System*	☺	😐	☹
	Park + Ride Scheme	☺	☺	😐
	Restricted Access Areas and on-street Parking Policies	☺	😐	😐
Sustainable Mobility and Communication	*Car Sharing System*	😐	☺	☺
	"Hello Bus" *Real-time Informative System on Public Transport -scheduling via sms*	😐	☺	😐
	Mobility Management Scheme for commuters	☺	☺	☺
	"Pronto Bus" *Medium-range Bus Service on request*	☹	☺	😐

Roma

Population : *2,816,474*

Area: *1,508 km²*

Density: *1,868 ab/km²*

Total cars: *1,627,596*

Car/inhabitant ratio: *0.58*

Type	Description	Dim	State	Perf
Infrastructures Intervention	***"La cura del ferro"*** *Light Rail Network Improvement: new tramway and underground lines construction*	☺	☺	☺
Technological Application	*Electric vehicles public fleet enlargement*	😐	☺	😐
	Public-Transport fleet implementation according to EURO III Standards	😐	😐	😐
Regulatory and fiscal policies	*On-street Parking Policy*	☺	☺	😐
	Park + Ride Scheme	☺	😐	☹
	"Iride" *Remote/Electronic Vehicle Access Control System*	☺	☺	😐
Sustainable Mobility and Communication	*Car Pooling Scheme*	☹	☹	☹
	"Multiplo" *Collective Taxi Scheme*	☹	😐	☹
	"Assi verdi di circolazione" *Small-area Road and Traffic Management by means of physical measures*	😐	☺	😐
	Mobility Management Scheme for commuters	☹	☹	☹

Intercomparison of transport policies

To overall assess the mobility/environment projects in the Italian cities > 250,000 inhabitants, a **global rating index** is considered encompassing dimension, state and environmental performance (including public information, consciousness and feedback). To determine the index for each thematic area of intervention, best available knowledge concerning the city under scrutiny is taken into account. For the sake of intercomparison, other Italian/European contexts are also considered.

Global rating index

↗	**Active and effective intervention; coherent and integrated measure planning; good user consciousness**
→	**Intervention of partial effectiveness; presence of measure planning; moderate user perception**
↘	**Low and uneffective impact intervention; lack of planning; poor user participation**

	Bari	Bologna	Catania	Firenze	Genova	Messina	Milano	Napoli	Palermo	Roma	Torino	Venezia	Verona
													
Infrastructural Intervention	↘	↗	↘	→	→	→	→	→	↘	↗	↗	→	→
New Technologies Application	→	↗	↘	↗	↗	↘	→	↘	→	→	↗	↘	↘
Regulatory and Fiscal Policies	↘	↗	↘	↗	↗	↘	↗	↗	↘	↗	↗	→	↘
Sustainable Mobility and Communication	↘	↗	↘	→	↗	↘	→	↗	→	→	↗	↗	→

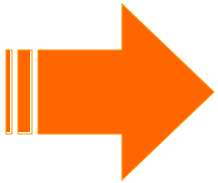
Conclusions

Urban air pollution is one of the main environmental issues in Italy.

Transport is the principal driving force in terms of air pollutant emissions: it accounts for the majority of PM_{10}, NO_x, COV and CO emissions.

Among the assessed measures, those concerned with sustainable mobility (car pooling, car sharing, mobility management) are generally of low-medium dimension in terms of impact on urban territory and local mobility system.

Also problematic is often the communication to the users and the efficient accounting of feedbacks.



• In the analysis, difficulties arise in the evaluation of projects:

✓the quantification of environmental benefits is often missing and/or impossible to estimate;

✓the proper consideration of second-order effects on environment and mobility is very often neglected;

✓Inter-comparison with (more or less) similar projects, and assessment of the transferability of a project in different urban contexts are not systematically accounted.

WHAT IS NEEDED

• To fit integrated, coherent and long-term mobility planning to peculiar characters and dweller behaviour of urban areas.

• To improve feedback control on the whole intervention process.

• To pay adequate attention (also in terms of resources) to "ex-post" evaluations.

• To enhance user awareness on alternative and sustainable modes of transport.