

WHO AQGL e la proposta di  
direttiva della commissione EU  
sulla qualità dell'aria.  
Obiettivi raggiungibili?

**Carla Ancona**

Presidente Associazione Italiana di Epidemiologia



No c.o.i.



## Associazione Italiana di Epidemiologia

### Air pollution and public health in Italy: a discussion about the Proposed Ambient Air Quality Directive

June 16, 2023 12h00 – 13h30

The International Society of Environmental Epidemiology (ISEE) and the European Respiratory Society (ERS) have organized a series of seminars on Air Pollution and Health in May, in view of the approval of the new EU directive on air quality (AAQD). These seminars concluded with a meeting in Brussels on May 24th (<https://www.healtheffects.org/announcements/brussels-meeting-air-pollution-and-health>). The aim of these initiatives, promoted by the ISEE and ERS EU Chapters, is to define key messages and inform experts involved in the study of air pollution and its impact on the environment and public health in various EU countries. The Italian Epidemiology Association intends to participate in this discussion with the goal of informing, communicating, and building alliances among all stakeholders in our country.

#### WEBINAR AGENDA:

**12:00 Welcome** *Carla Ancona, AIE President*

**12:05 "The Italian scenario of pollution and infractions"** *Giorgio Cattani, Italian Institute for Environmental Protection and Research (ISPRA)*

**12:20 "The impact on health: PM2.5, PM10, NO2 in Italy, the Po Valley, and major cities"** *Massimo Stafoggia, Department of Epidemiology, Lazio Region Health Service/ASL Roma 1*

**12:35 "The EU context: the proposed Directive, its critical aspects, and elements of opposition - not only in Italy"** *Barbara Hoffmann, Head of the Environmental Epidemiology Department, Professor of Environmental Epidemiology, Heinrich Heine University Düsseldorf*

**12:50 "What is the role of NGOs, what are the main issues in Brussels?"** *Margherita Tolotto, NGOs Coordination in the EU*

**13:05 Discussion** *Andrea Ranzi, AIE Environmental Epidemiology Group*

*Pasqualino Rossi, Ministry of Health; Marco Martuzzi, Italian National Institute of Health (ISS); Giuseppe Bortone, National System Environmental Protection (SNPA)*

**13:20 Q&A**

**13:30 Closing remarks** *Michele Carugno, AIE Directorial Board*



- **New annual limit values of 10  $\mu\text{g}/\text{m}^3$  for PM<sub>2.5</sub> and 20  $\mu\text{g}/\text{m}^3$  for NO<sub>2</sub> across the EU by 2030**
- **However, the proposals fails to include a clear path to reducing annual mean concentrations to below 5  $\mu\text{g}/\text{m}^3$  for PM<sub>2.5</sub> and 10  $\mu\text{g}/\text{m}^3$  for NO<sub>2</sub>, in line with the latest WHO health-based Air Quality Guidelines.**

## Disegno di legge n. 870 (d-l 121/2023 qualità dell'aria e limitazioni della circolazione stradale)

- **10 novembre 2020.** la Corte di giustizia ha condannato l'Italia per aver superato, in maniera sistematica e continuata, i valori limite applicabili alle concentrazioni di particelle PM10 posti dalla direttiva 2008/50/CE del Parlamento europeo e del Consiglio, del 21 maggio 2008, relativa alla qualità dell'aria ambiente e per un'aria più pulita in Europa.
- **12 maggio 2022.** Qualità dell'aria: l'Italia condannata dalla Corte Ue per il mancato rispetto dei limiti del biossido d'azoto
- *Mancato rispetto, "sistematico e continuativo", del valore limite annuale fissato per il biossido d'azoto (NO2) in varie città e nessuna misura per rispettarlo. È questa la motivazione con cui la Corte di Giustizia Ue, accogliendo un ricorso della Commissione Europea nell'ambito di una procedura d'infrazione, ha stabilito che l'Italia è venuta meno agli obblighi previsti dalla direttiva Ue sulla qualità dell'aria*

Document 62019CJ0573



● Sentenza della Corte (Settima Sezione) del 12 maggio 2022.

Commissione europea contro Repubblica italiana.

Inadempimento di uno Stato – Ambiente – Direttiva 2008/50/CE – Qualità dell'aria ambiente – Articolo 13, paragrafo 1, e allegato XI –

Superamento sistematico e continuato dei valori limite fissati per il biossido di azoto (NO2) in alcune zone ed in alcuni agglomerati italiani

– Articolo 23, paragrafo 1 – Allegato XV – Periodo di superamento “il più breve possibile” – Misure appropriate.

Causa C-573/19.

ECLI identifier: ECLI:EU:C:2022:380



## Diesel Euro 5: il dieselgate (veicoli mai richiamati in Italia)

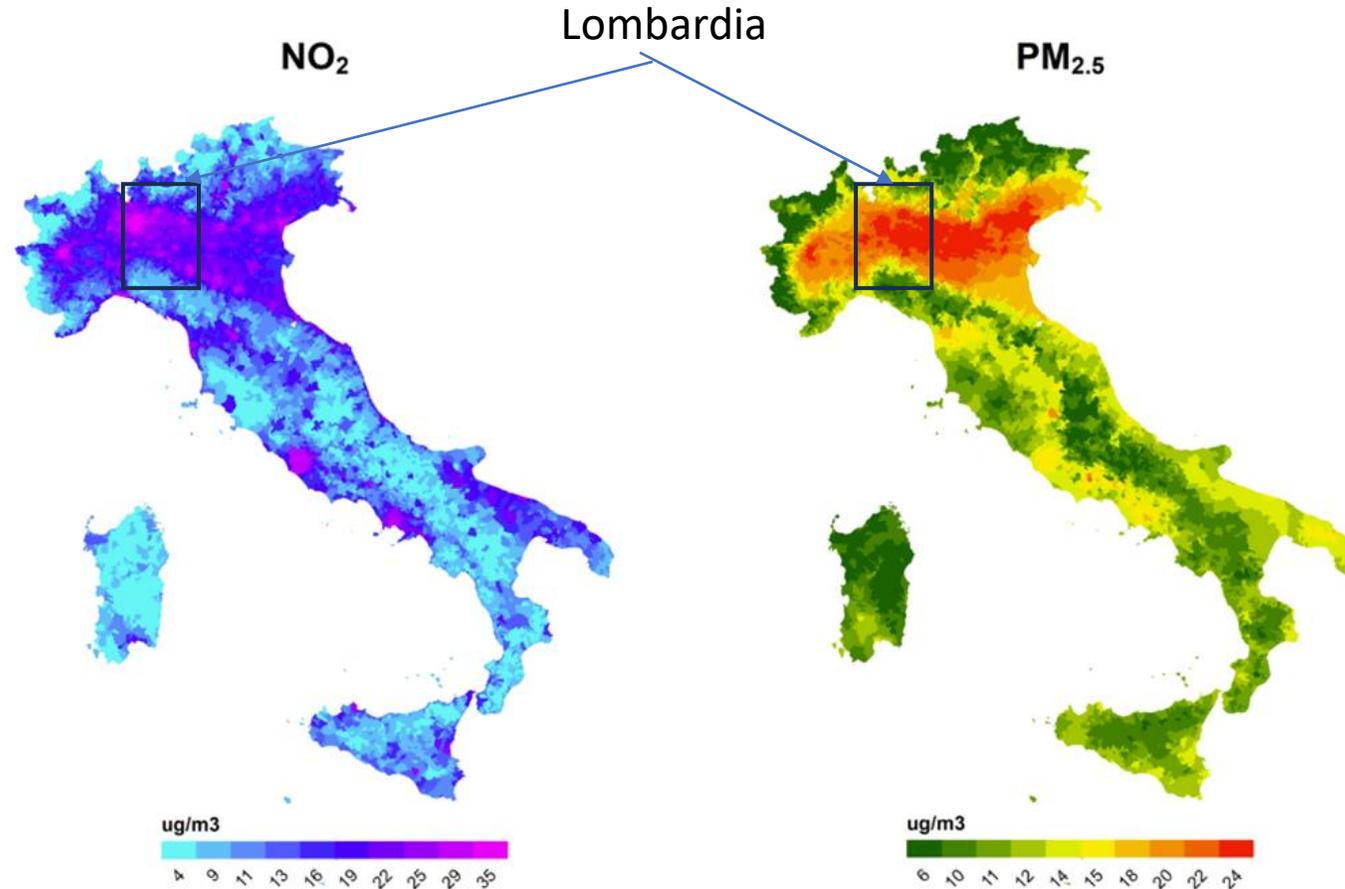


Emissioni di ossido d'azoto (NOx) misurate su strada, per costruttore e cilindrata<sup>[26]</sup>

■ Emissioni medie di NOx (g/km)

■ Limite di emissioni di NOx previsto dalla norma Euro VI NOx (g/km)

# L'inquinamento da PM<sub>2.5</sub> e NO<sub>2</sub> in Italia



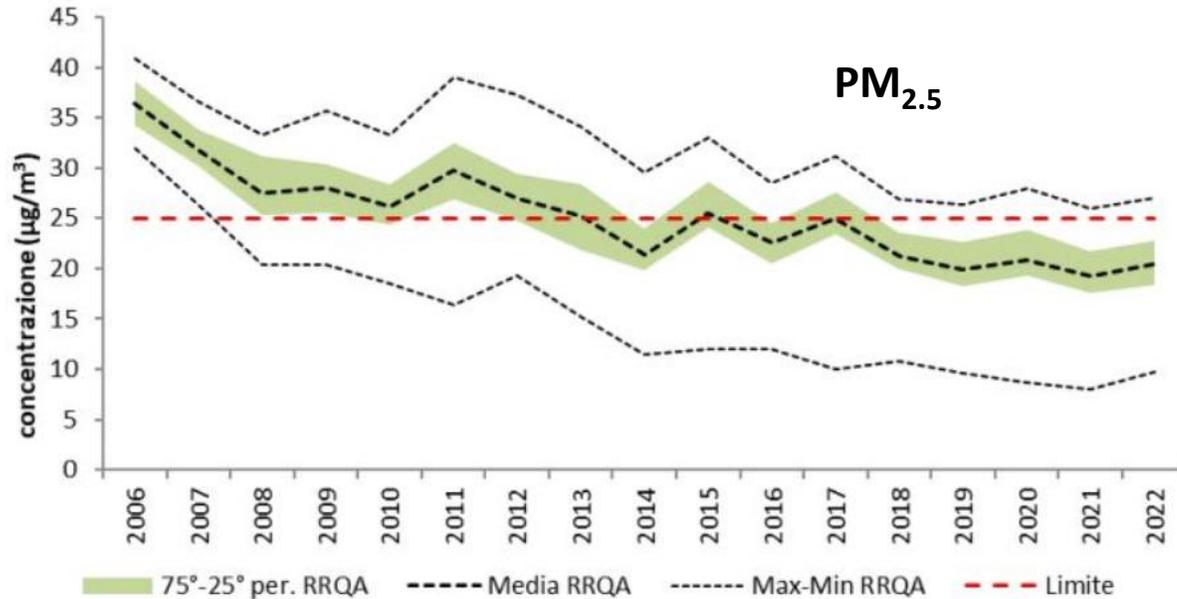
**Figure 1.** Annual average concentrations of PM<sub>2.5</sub> and NO<sub>2</sub>. Italy, 2016-2019.  
**Figura 1.** Media annuale delle concentrazioni di PM<sub>2.5</sub> e NO<sub>2</sub>. Italia, 2016-2019.

**Stafoggia et al. Health impact of air pollution and air temperature in Italy: evidence for policy actions. Epidemiologia & Prevenzione, 2023**

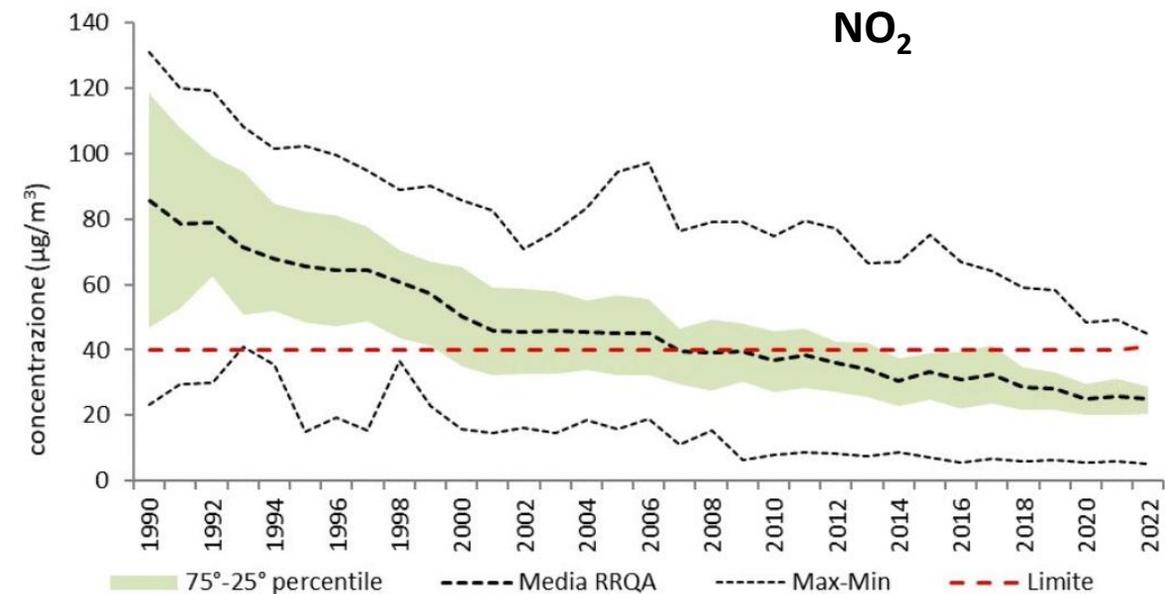
Model data using

- 500 monitoring stations
- Satellite-based data on Aerosol Optical Depth (AOD)
- Spatio-temporal data on land use

# Andamento temporale del PM2.5 e NO2 nella regione Lombardia



l'inquinamento atmosferico è calato negli ultimi 20 anni, ma a un ritmo troppo lento specie nell'ultimo periodo



PM2.5- Trend delle medie annue in Regione Lombardia

NO2- Trend delle medie annue in Regione Lombardia

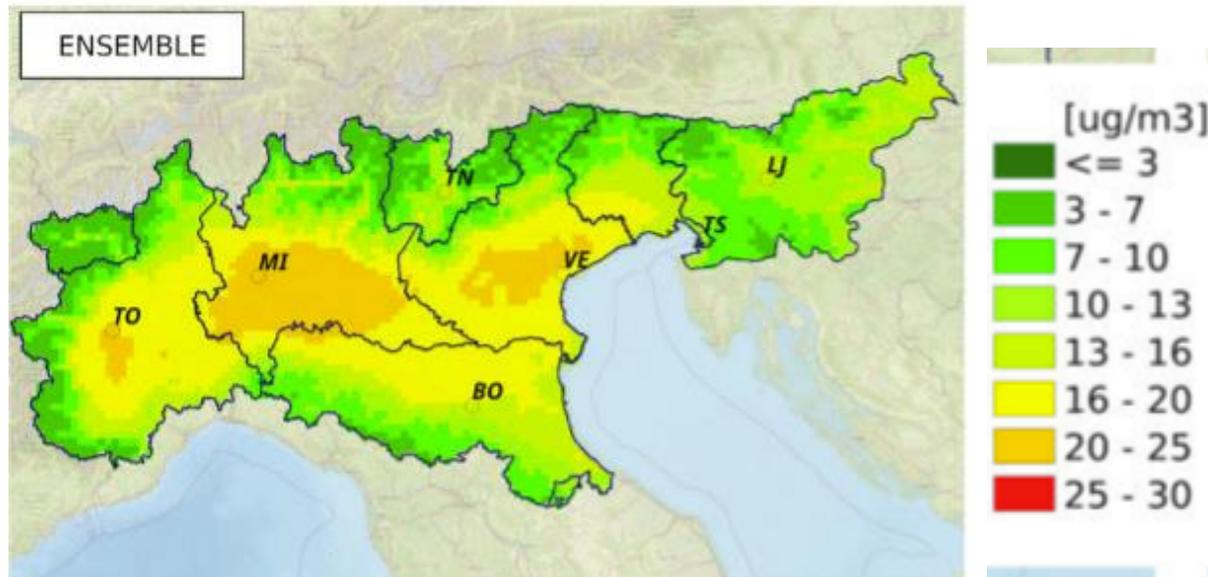
# Medie annuali 2022: progetto PrepAir



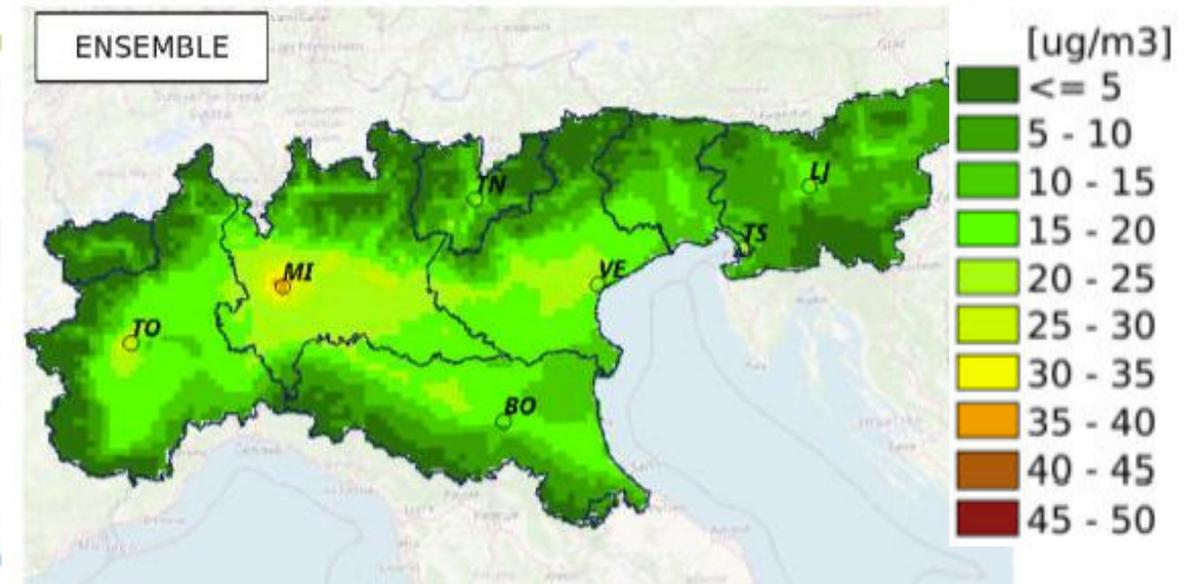
With the contribution  
of the LIFE Programme  
of the European Union



## AIR QUALITY ASSESSMENT 2022



PM25, 2022 annual mean



NO2, 2022 annual mean

# The main reasons for air pollution in the Po Valley



- Recent studies conducted as part of the Life-Prepair project confirm that three factors are responsible for fine particle pollution in the Po Valley:
  - - the combustion of fossil fuels for heating (especially wood and pellets),
  - - road transport (with emissions of NO<sub>x</sub>, precursors of particulate matter),
  - - agriculture and intensive livestock farming (emissions of ammonia, precursors of particulate matter).

# Atmospheric Emission Sources in the Po-Basin from the LIFE-IP PREPAIR Project

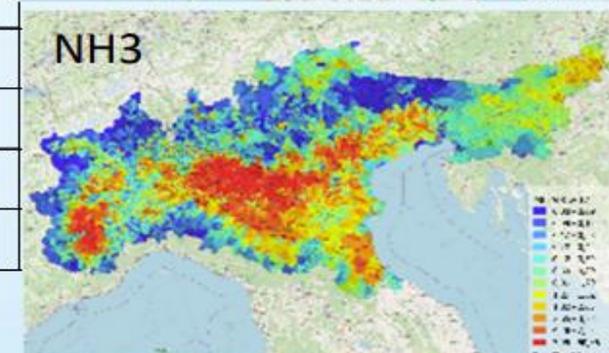
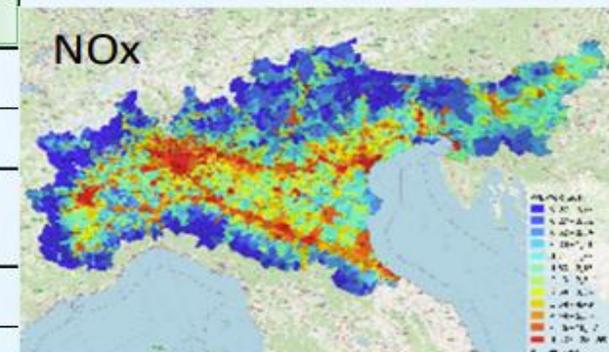
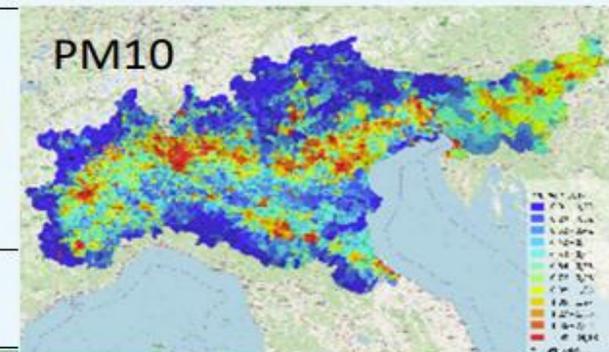
## Emissions share on year 2017 for Po-Basin



Alessandro Marongiu\*, Elisabetta Angelino, Marco Moretti, Giulia Malvestiti, Giuseppe Fossati

Environmental Protection Agency of Lombardia Region, Air Quality Modeling and Inventory Unit, Monitoring Sector ARPA,  
Milano, Italy  
Email: \*a.marongiu@arpalombardia.it

Macrosectors	NH3	NMVOC	NMVOC without mac 10 and 11	NOx	PM10
1-Combustion in energy and transformation industries	0%	0%	0%	7%	1%
2-Non-industrial combustion plants	1%	5%	11%	11%	56%
3-Combustion in manufacturing industry	0%	1%	2%	15%	4%
4-Production processes	0%	4%	10%	3%	3%
5-Extraction and distribution of fossil fuels and geothermal energy	0%	3%	6%	0%	0%
6-Solvent and other product use	0%	23%	55%	0%	3%
7-Road transport	1%	6%	13%	48%	19%
8-Other mobile sources and machinery	0%	1%	2%	14%	3%
9-Waste treatment and disposal	1%	0%	0%	1%	0%
10-Agriculture	97%	24%		1%	5%
11-Other sources and sinks	0%	34%		0%	5%

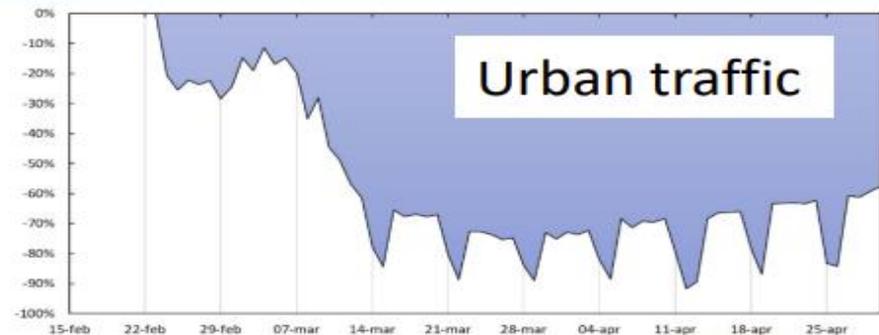




LIFE 15 IPE IT 013

# The effects of «lockdown» - emissions

## The lesson learned



### TRAFFIC:

Urban: -80 – 90%

Highways: -60%

Flights: > -90%

### INDUSTRY: -20 -30 %

(from Energy Consumption: Terna [https://www.terna.it/it/sistema\\_elettrico/transparency-report/total-load](https://www.terna.it/it/sistema_elettrico/transparency-report/total-load)

Natural gas in industry: SNAM [https://www.snam.it/it/trasporto/dati-operativibusiness/2\\_Andamento\\_dal\\_2005/?formindex=1&archive\\_year=2020](https://www.snam.it/it/trasporto/dati-operativibusiness/2_Andamento_dal_2005/?formindex=1&archive_year=2020)

### HEATING:

Domestic: +3% +6%

Commercial: -70% -80%

### AGRICULTURE

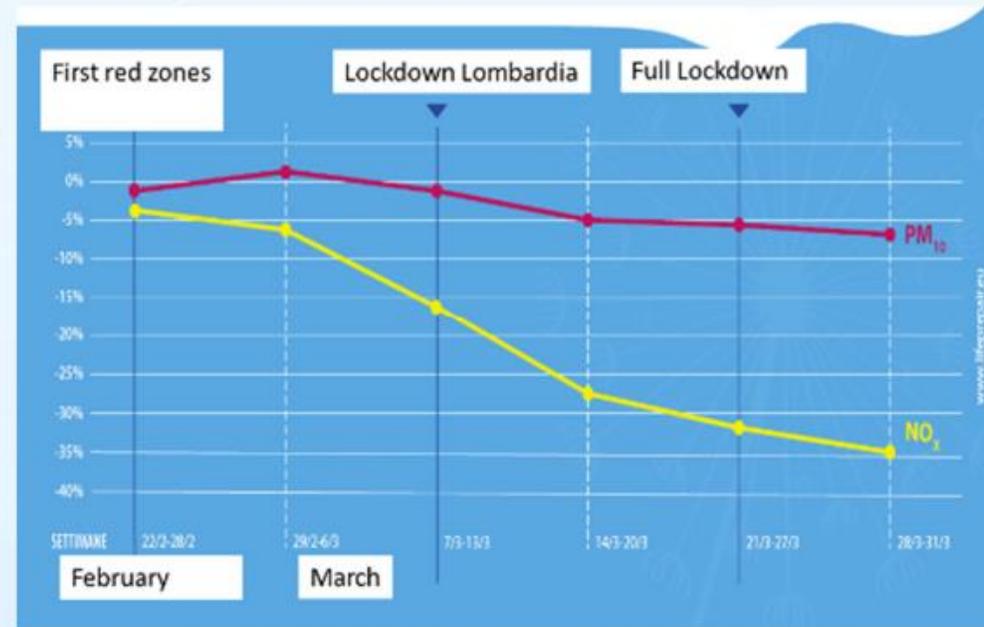
-1%

The reduction of emissions in the stricter lockdown phase was estimated in:

Around 30% – 40% for NO<sub>x</sub>

Around -7% - 14% for primary PM<sub>10</sub>

Ammonia emissions are not substantially reduced



# La mortalità prematura attribuibile al PM<sub>2.5</sub> in Italia- valori annuali



Area	Population 30+ years	Weighted Exposure	Threshold: 5 µg/m <sup>3</sup>		
			No.	µg/m <sup>3</sup>	AD
<b>Natural causes</b>					
Italy	42,952,673	16.5	72,083	(38,974-102,888)	11.7
North	20,095,926	20.2	43,931	(23,932-62,247)	15.2
Central	8,664,082	14.2	12,137	(6,501-17,482)	9.6
South	14,192,665	12.6	16,014	(8,542-23,159)	8.0
Po Valley	17,204,657	21.2	39,628	(21,626-56,052)	16.2
6 largest cities	5,242,576	18.1	10,336	(5,588-14,752)	13.6
<b>Cardiovascular diseases</b>					
Italy	42,952,673	16.5	24,038	(20,079-29,680)	3.9
North	20,095,926	20.2	14,076	(11,790-17,312)	4.9
Central	8,664,082	14.2	4,139	(3,447-5,133)	3.3
South	14,192,665	12.6	5,822	(4,842-7,235)	2.9
<b>Respiratory diseases</b>					
Italy	42,952,673	16.5	4,638	(1,502-7,701)	0.7
North	20,095,926	20.2	2,901	(948-4,772)	1.0
Central	8,664,082	14.2	799	(256-1,344)	0.6
South	14,192,665	12.6	938	(298-1,585)	0.5

Stafoggia et al. Health impact of air pollution and air temperature in Italy: evidence for policy actions. *Epidemiologia & Prevenzione*, 2023

**Table 3.** Annual deaths (AD) and fractions (AF) attributable to long-term exposure to PM<sub>2.5</sub> exceeding WHO AQGs, Italy (2016-2019): results for the entire country, for geographic macroareas, and for the 6 largest metropolitan areas.

# La mortalità prematura attribuibile al NO<sub>2</sub> in Italia- valori annuali



Area	Population 30+ years No.	Weighted Exposure µg/m <sup>3</sup>	Threshold: 40 µg/m <sup>3</sup>			Threshold: 10 µg/m <sup>3</sup>		
			AD	(95%CI)	AF (%)	AD	(95%CI)	AF (%)
<b>Natural causes</b>								
Italy	42,952,673	30.7	642	(376-914)	0.1%	30,661	(18,187-43,109)	5.0
North	20,095,926	36.0	642	(376-914)	0.2%	18,926	(11,245-26,563)	6.5
Central	8,664,082	29.1	0	(0-0)	0.0%	5,777	(3,423-8,130)	4.6
South	14,192,665	24.3	0	(0-0)	0.0%	5,959	(3,518-8,416)	3.0
Po Valley	17,204,657	26.9	635	(372-904)	0.3%	15,662	(9,312-21,967)	6.4
6 largest cities	5,242,576	36.5	578	(329-822)	0.8%	8,364	(4,995-11,676)	11.0
<b>Respiratory diseases</b>								
Italy	42,952,673	30.7	37	(13-61)	0.0%	1,587	(544-2,572)	0.3
North	20,095,926	36.0	37	(13-61)	0.0%	1,018	(350-1,647)	0.3
Central	8,664,082	29.1	0	(0-0)	0.0%	306	(105-497)	0.2
South	14,192,665	24.3	0	(0-0)	0.0%	263	(90-428)	0.1

**Table 4.** Annual deaths (AD) and fractions (AF) attributable to long-term exposure to NO<sub>2</sub> exceeding WHO AQGs, Italy (2016-2019): results for the entire country, for geographic macroareas, and for the 6 largest metropolitan areas.

**Tabella 4.** Morti per anno (AD) e loro frazione (AF) attribuibile all'esposizione a lungo termine a NO<sub>2</sub> con livelli superiore a quelli delle linee guida WHO (2016-2019): risultati per l'intero Paese, per macroarea geografica e per le 6 città metropolitane.

## GENERAL PUBLICATIONS

# Proposal for a revision of the Ambient Air Quality Directives

## Details

**Publication date**

26 October 2022

**Author**

[Directorate-General for Environment](#)

Approved by the EU Parliament on September 13, 2023

## Concern

It is not feasible to reach WHO AQG values by 2050, let alone 2030

### FEASIBILITY (PM2.5 scenarios)

Maximum Technically Feasible Reduction  
from **EU Impact Assessment** (2030)

*MTFR 2030*

vs. **LIFE Prepair** (-80% emissions)

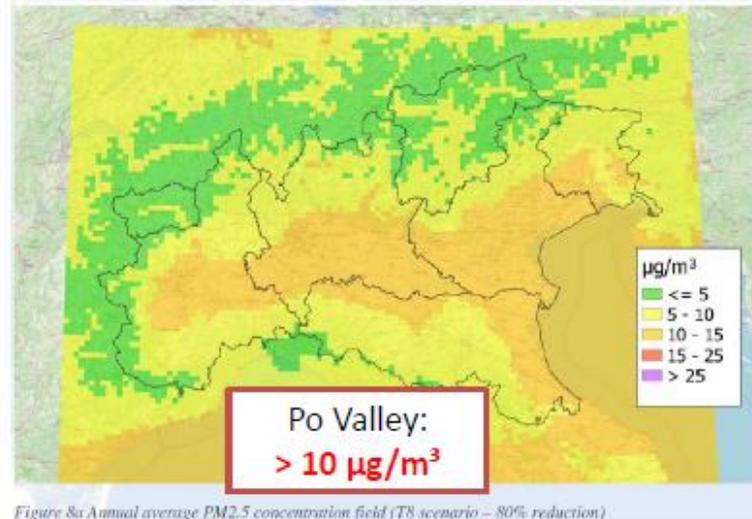
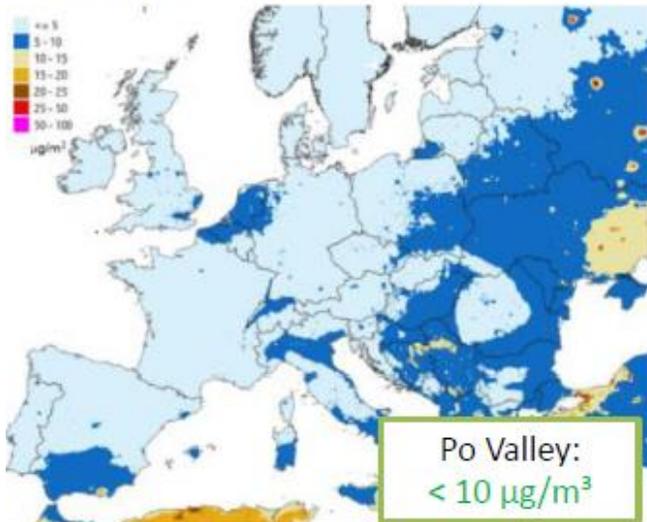


Figure 8a Annual average PM2.5 concentration field (TS scenario - 80% reduction)

## Response:

The feasibility study (MTFR scenario) does not include many potential interventions

Lifestyle changes, Low emission zones, new fuels, future modal shifts in transportation are not included

“Feasibility” is very much related to political will

The Netherlands achieved a reduction from 17 to 10 µg/m³ of mean measured concentrations in 10 years.

## Concern

**We cannot put any more burden on the economy- they are already struggling**

## Response

**Costs of air pollution are high (940 bill per year).  
Economic gains are large and are to be expected  
in several economic sectors.**

**Air pollution causes annual costs at**

€231-853 bn in health impacts,  
€8 bn in lost workdays,  
€4-12 bn in ecosystems damage,  
€11 bn in crop yield loss,  
€19 bn in forest damage,  
€1 bn in damage to buildings

- Net gross domestic product (GDP) gains by 2030 are expected for all policy options, in the range of 0.26% to 0.44%.
- Economic gains due to reduction of healthcare costs, crop yield losses, absence from work due to illness (including of dependent children) and lower productivity at work
- CBA shows that there is a net benefit and it is largest for full alignment with WHO AQG
- Annual costs for full alignment: €7 billion

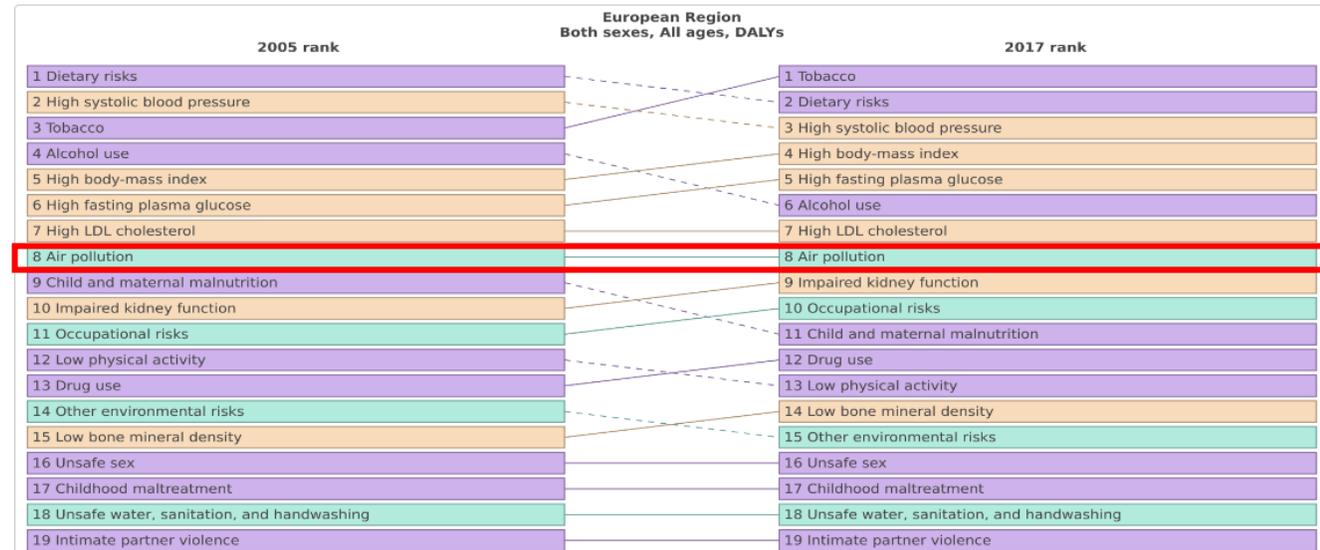
# Concern

Air pollution has already improved so much, other issues are more important

# Response

Despite reductions in concentrations, it still ranks number 8 of risk factors in Europe, causing a disease burden similar to overweight and obesity.

Tackling air pollution can have multiple co-benefits that will address other important issues (e.g. promote physical activity, social interaction, exposure to greenspace, will reduce environment-related health inequities)



Appr. 400.000 deaths plus millions of asthma cases, heart attacks, strokes, dementia and diabetes cases are a huge burden on individual families and on society

# Raccomandazioni a tutela della salute pubblica

- Provvedimento insufficiente per il rientro nei limiti, che non risponde appieno alle richieste della Corte di Giustizia
- La programmazione dovrebbe essere strategica di medio-lungo periodo
- E' auspicabile che la programmazione regionale fin da subito tenga conto dei limiti stringenti della qualità dell'aria previsti dalla prossima Direttiva Europea
- E' importante che la programmazione strategica preveda:
  - Potenziamento di infrastrutture/opzioni di trasporto che consentano ai cittadini di abbandonare naturalmente l'auto privata
  - Potenziamento di infrastrutture /opzioni di trasporto che consentano il trasporto su ferro e non su gomma
  - Interventi risolutivi per abbandonare l'uso di legna e pellet per il riscaldamento
  - Interventi risolutivi in agricoltura/allevamento per limitare le emissioni di ammoniaca

# Supersiti

- istituire un certo numero di “supersiti” ovvero dei punti di misura dove, accanto agli inquinanti monitorati di routine, si eseguano determinazioni della composizione chimica del particolato, della distribuzione dimensionale e della concentrazione in numero delle particelle ultrafini, del black carbon, del potenziale ossidativo del materiale particolato, della concentrazione di ammoniaca, di numerosi idrocarburi policiclici aromatici.
- L'introduzione della misura strutturata di nuovi parametri appare particolarmente rilevante sia per comprendere meglio le caratteristiche degli inquinanti e indirizzare le azioni di risanamento, sia per approfondire gli studi relativi agli impatti sanitari delle diverse sostanze presenti in atmosfera

# Piani di risanamento qualità dell'aria

- L'obiettivo è di mettere in campo al più presto le misure necessarie per ridurre l'inquinamento atmosferico al di sotto dei limiti proposti, o almeno a ridurre al minimo il periodo di superamento, con la prospettiva di raggiungere il loro rispetto su tutto il territorio entro il 2030.
- I piani dovranno inoltre essere monitorati costantemente per verificarne l'effettiva implementazione e aggiornati regolarmente qualora per tre anni consecutivi persista il superamento dei limiti.
- Comunicazione: air quality index nazionale.

# List of references



- Marongiu, A., Angelino, E., Moretti, M., Malvestiti, G. and Fossati, G. (2022) Atmospheric Emission Sources in the Po-Basin from the LIFE-IP PREPAIR Project. *Open Journal of Air Pollution*, 11, 70-83. <https://doi.org/10.4236/ojap.2022.113006>
- Hoffmann B, Brunekreef B, Andersen ZJ, Forastiere F, Boogaard H. Benefits of future clean air policies in Europe: Proposed analyses of the mortality impacts of PM<sub>2.5</sub> and NO<sub>2</sub>. *Environ Epidemiol*. 2022 Aug 31;6(5).
- Stafoggia M, De' Donato F, Ancona C, Ranzi A, Michelozzi P. Health impact of air pollution and air temperature in Italy: evidence for policy actions. *Epidemiol Prev*. 2023 May-Jun;47(3):22-31.
- Veratti, G.; Stortini, M.; Amorati, R.; Bressan, L.; Giovannini, G.; Bande, S.; Bissardella, F.; Ghigo, S.; Angelino, E.; Colombo, L.; et al. Impact of NO<sub>x</sub> and NH<sub>3</sub> Emission Reduction on Particulate Matter across Po Valley: A LIFE-IP-PREPAIR