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# EU ambient air quality legislation - present and future

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## 2002: 6th Environmental Action Programme

*‘achieving levels of air quality that do not give rise to significant negative impacts on and risks to human health and the environment’;*  
(Art 7.1. of 6th EAP)



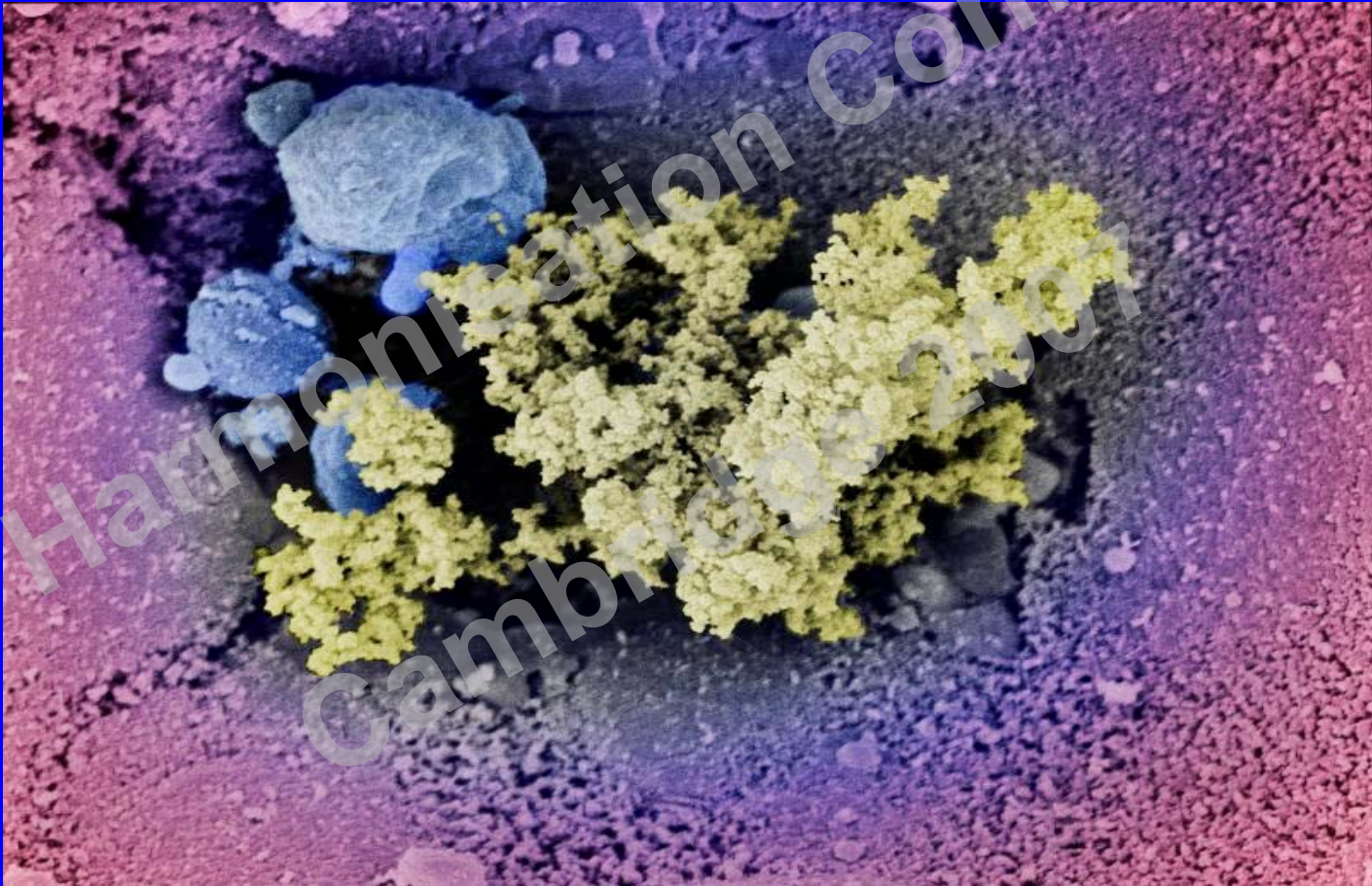
# Content

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- 1 **Historical perspective**
- 1 **Framework and daughters**
  - m **Implementation experience**
- 1 **New ambient air quality directive (AQD)**
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  - m **Co-decision, state of play**
- 1 **Modelling and AQD**
  - m **New opportunities**
  - m **Streamlining efforts: FP, COST, EEA, JRC, ENV, GMES**



# Know your enemy

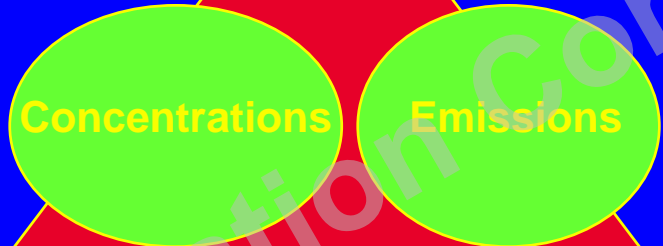




# Historical Perspective

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- 1 **Serious impacts of air pollution first recognised in EC environment programmes of the 1970s and 1980s**
- 1 **Patchwork of measures**
  - m **Car emission controls in 1970s**
  - m **Automotive fuel quality unleaded petrol (1980s)**
  - m **Air Quality standards for SO<sub>2</sub>, NO<sub>2</sub> and suspended particles (1980s)**
  - m **First legislation on permitting industrial installations (1980s)**
  - m **EC became party to the UN ECE Convention on Long Range Transboundary Air Pollution in 1981**



Framework Directive

1<sup>st</sup> Daughter

2<sup>nd</sup> Daughter

3<sup>rd</sup> Daughter

4<sup>th</sup> Daughter

Exchange Information

National emissions ceilings

Stationary sources

Mobile Sources

IPPC

LCP's

Incineration

VOC's

Non-road

Fuels Quality

Road

11th Harmonisation Conference Cambridge 2007



# The Situation Now

## 1 Comprehensive framework

### m EU air quality Framework and daughter directives

- r harmonised approach to the assessment and management of air quality

### m Many polluting sources covered by Community legislation

- r Adopted Stage 5 & 6 – car emissions limits
- r Preparation of Stage 6 for trucks' emissions
- r Off-road emissions legislated
- r Comprehensive industrial emissions framework –application of Best Available Techniques and specific limits for certain sectors such as large combustion plant and waste incinerators
- r Fuel quality, solvents, paints, varnishes all legislated

### m National emission ceilings for each Member State for several pollutants by 2010 (NO<sub>x</sub>, SO<sub>x</sub>, VOCs, NH<sub>3</sub>) based on emissions, impacts, meteorology and cost-effectiveness.



# Air Quality Assessment and management

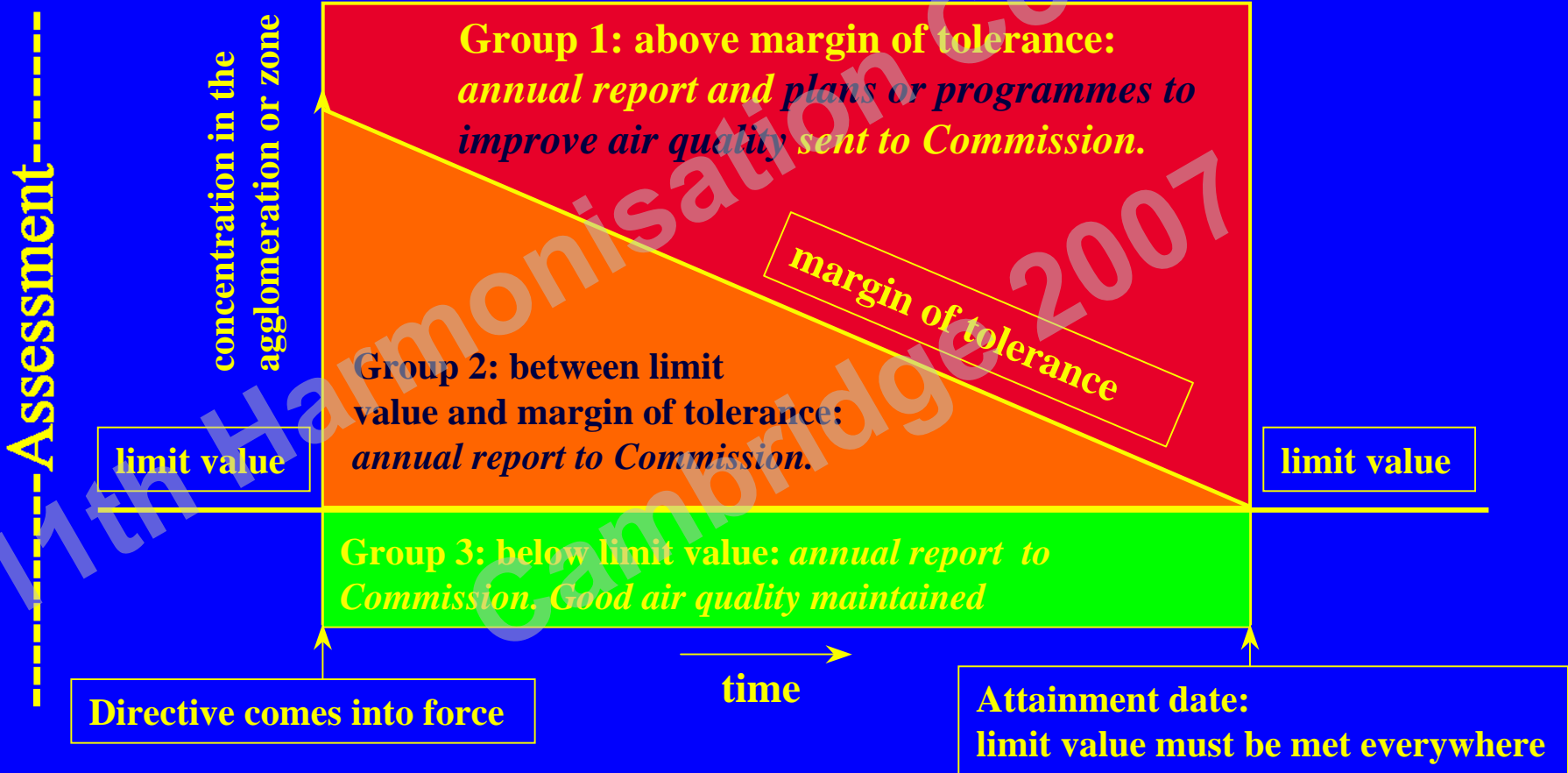
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- 1 **Air Quality Framework directive established principles & techniques**
  - m **Well defined air quality management zones**
  - m **Assessment of 12+ pollutant concentrations using monitoring and modelling**
  - m **Plans & Programmes mandatory to meet air quality limits before entry into force**
  - m **Legal sanctions before the Court of Justice for non-compliance after limits in force.**



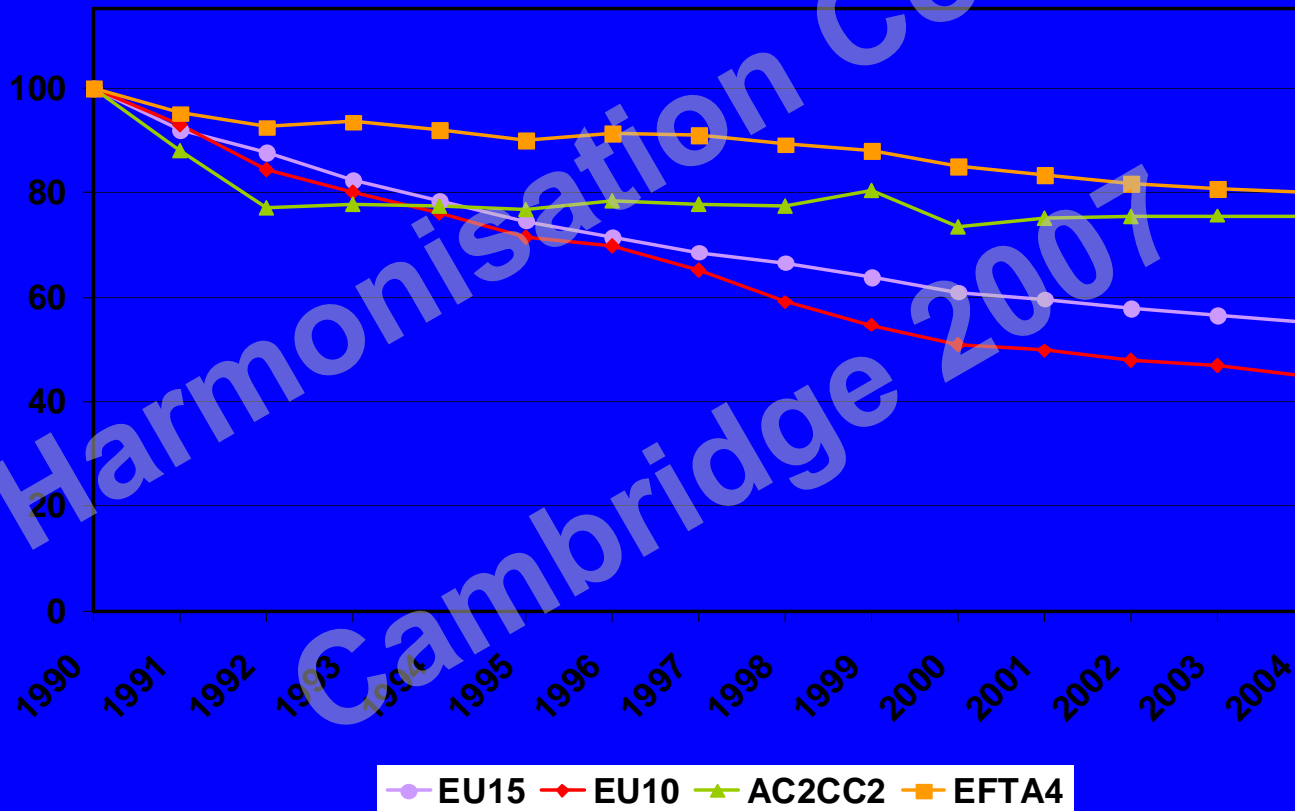


# Attainment scheme





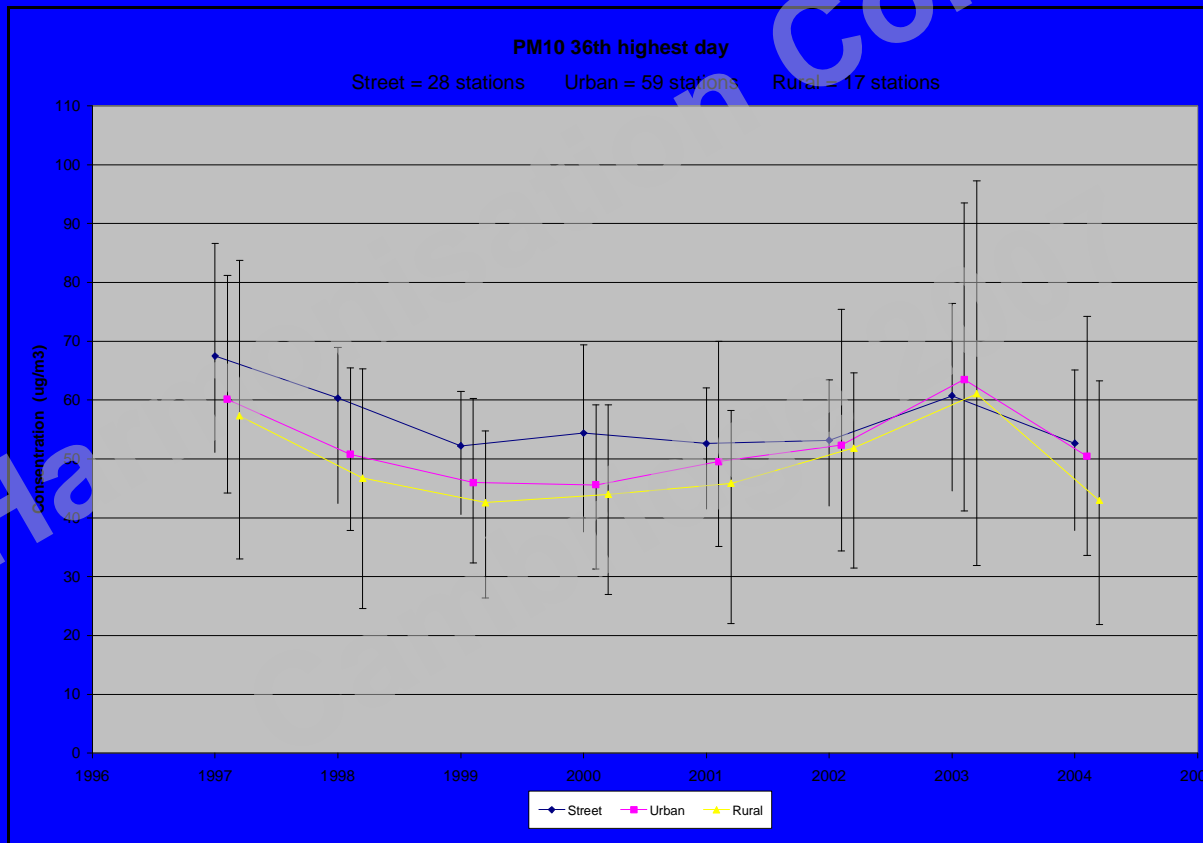
# Emissions of particulate matter



Source EEA 2007



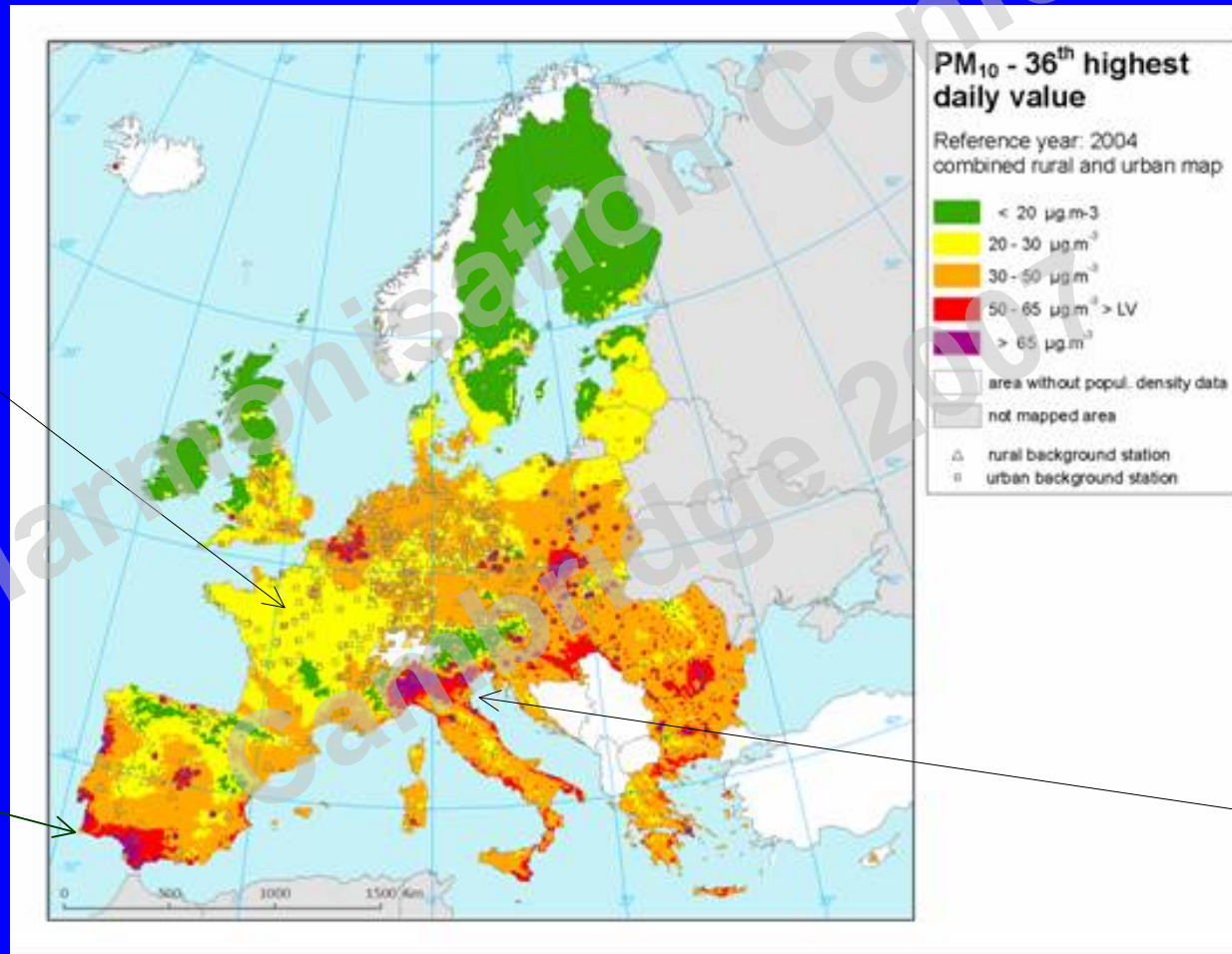
# PM10 concentrations (I)



Source EEA 2007



# PM10 concentrations (II)



Source EEA 2007



# Exceedances

- 1 **PM10: Zone exceedance daily 39%, annual 17 %**
  - m Exceedances in all Member States (MS) that reported except IE,
    - r 9 MS exceedances in more than 90% of their zones
    - r 15 exceedance in ALL their agglomerations,  
DE > 54%, UK 68 %
  - m Can be misleading for policy purposes
    - r **Only very small area in a zone may be in exceedance**
- 1 **NO2 : Exceeding LV+MoT**
  - m UK 81%, AT 55%, DE 29%, IT 38%, FR 14%



# Response I

- 1 Plan required when limit value + margin of tolerance exceeded
  - m Margin of Tolerance 'tool' did not take into account air quality trends after 2000
  - m Precious time to develop and implement measures was lost!
- 1 Plans : response very late!
  - m At time, infringements against 9 countries
  - m Commission support could be only limited - only 3 official plans at time of Workshop organised in 2004
- 1 Current status
  - m cca 200 plans communicated to Commission
  - m Missing plans from some new Member States
  - m Not all zones in exceedance covered



# Response II

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## 1 Plans and programmes

### m UBA AT report 2007: assessment of P&P

- r Plans late or very late
- r Often not all possible measures are explored, only limited chosen
- r Assessment of effects of measures limited
- r Sound and timely planning required for efficient measures
- r Role of modellers not systematically assessed

### m Cooperation across levels of governance, across borders and across policies (i.e. climate change) provide more cost-effective response

## 1 Community measures



# Response III

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## 1 Short term action plans

- m Sometimes aversion created following cases of misunderstanding and bizarre implementation

## 1 Short term action implementation tips

- m Short term limit value can/must also be addressed through structural measures
- m Measures need to be planned in advance
- m Perhaps 2<sup>nd</sup> day of exceedance is more easy to avoid as the 36<sup>th</sup>





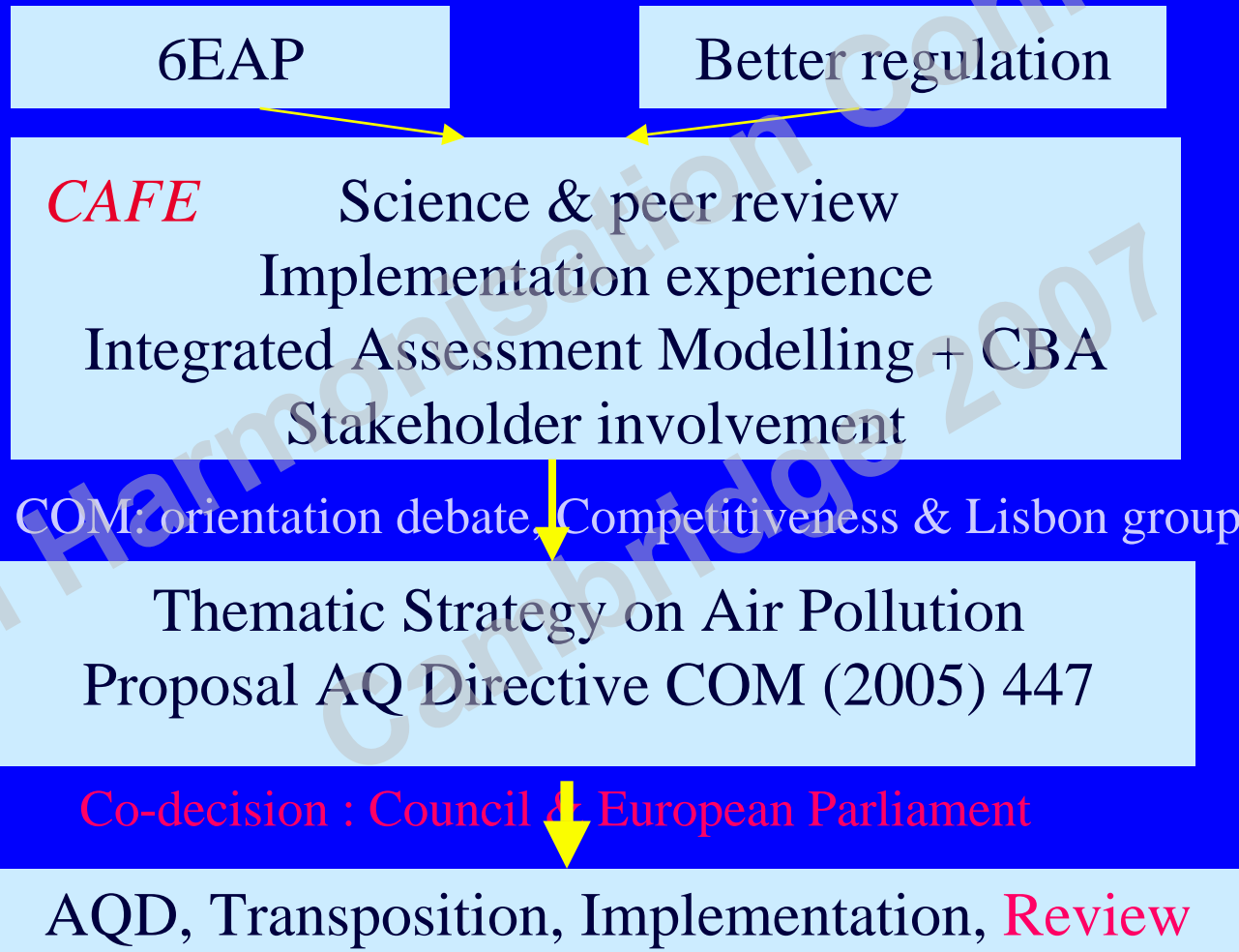
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## 2002: 6th Environmental Action Programme

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# The CAFE Process





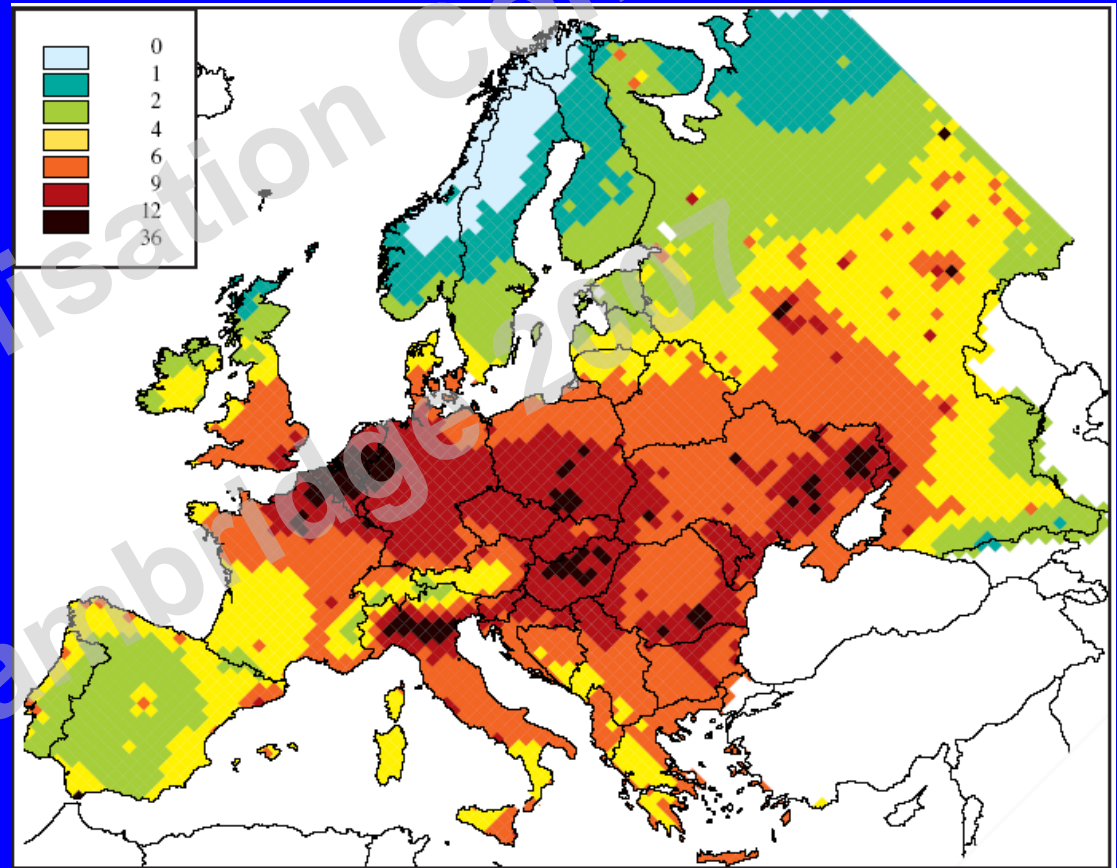
# Fine particles serious health issue

**CAFE  
2000**

**Loss in life  
expectancy due to  
fine particles**

**(in months)**

**350,000 premature  
deaths annually**





## CAFE Baseline

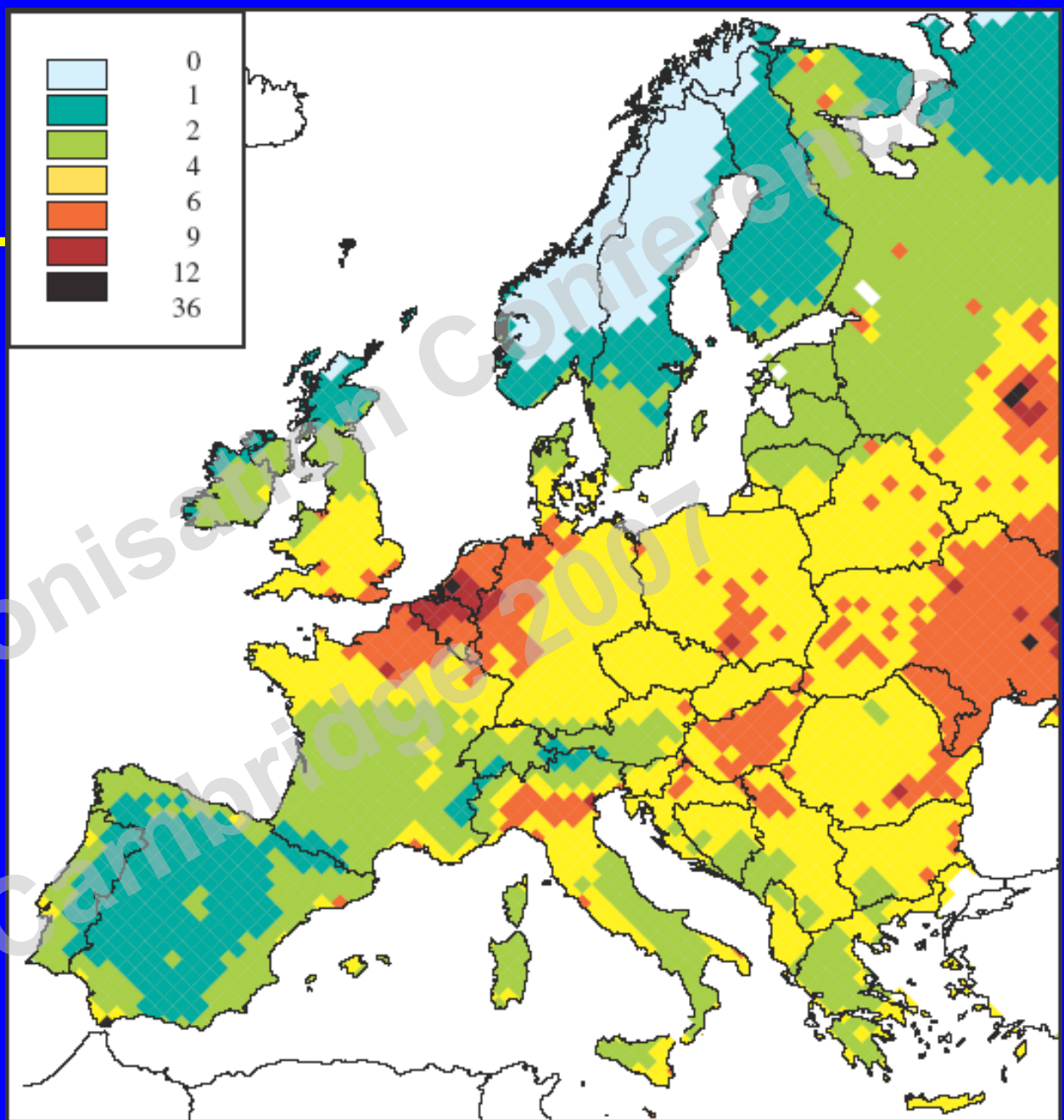
2020

under current  
legislation

Loss in life  
expectancy due to  
fine particles

(in months)

270,000 premature  
deaths annually





# Thematic strategy on Air Pollution

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- 1 **>370.000 people in Europe prematurely die due to air pollution**
  - m **350.000 due to fine particles PM2.5**
  - m **Shortens life expectancy in average by more than 8 months**
- 1 **Strategy sets interim env. objectives in 2020**
- 1 **CBA**
  - m **Costs : 7.1 billion euro**
  - m **Monetized benefits : 42-135 billion euro**



# Clean Air for Europe

- 1 **Even in 2020 significant health and environmental problems. More efforts are needed.**
- 1 **Air Pollution Strategy : a coherent response endorsed by Council & Parliament**
- 1 **By far most health benefits expected from reduced public exposure to fine particles  $PM_{2.5}$**
- 1 **Measures include**
  - m **New Air Quality directive with standards for fine particles ( $PM_{2.5}$ )**
  - m **New emissions ceilings for each Member State to be attained by 2020 ( $SO_x$ ,  $NO_x$ ,  $NH_3$ ,  $VOCs$ ,  $PPM_{2.5}$ )**
  - m **New Source-based measures (ships, domestic boilers, small industrial combustion plant, agriculture) & review of the directive on Integrated Pollution Prevention & Control**



# AQD revision

## **Maintain existing provisions!**

**unrealistic to confirm PM10 level II limit values**

### **A. Respond to updated health advice**

⇒ **environmental objectives for PM<sub>2,5</sub>**

### **B. Address current compliance problems**

⇒ **flexibility of attainment date**

### **C. Only man-made sources can be addressed**

⇒ **deduction of natural sources (for compliance)**

### **D. Modernize system for information exchange, merge and streamline**



# What's new (1)

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## Twin environmental objectives for PM<sub>2.5</sub>

### 1) Concentration cap (limit value)

- 1 Concentration cap of 25µg/m<sup>3</sup> annual average to apply everywhere  
Robust monitoring of PM<sub>2.5</sub> concentrations

### 2) Exposure reduction target

- 1 Target to reduce national average measured urban background concentration by 20% between 2010 and 2020 subject to later review where differentiated MS legal objectives to be proposed

**Exposure reduction target should drive measures to deliver the objectives of the Thematic Strategy**





## What's new (2)

### Addressing compliance problems (Article 20)

- **Attainment date not yet arrived (NO<sub>2</sub>)**
- **Attainment data already passed (PM<sub>10</sub>)**
  - **Only if rationale can be given**
    - unfavourable climatic conditions, large trans-boundary contribution...
  - Time extension once, up to 5 years, subject to conditions
  - **Conditions** : amended plan which obligatory had to at least consider a list of measures (Annex to the Directive)
  - **LV in force, but at LV+MoT level**



# Co-decision : State of play

- 1 **Commission Proposal September 2005**
- 1 **Common position 25 June 2007**
  - m **Commission supports common position**
- 1 **2<sup>nd</sup> reading : 2<sup>nd</sup> half 2007, entry into force : 2008**
  
- 1 **Current differences between EP and Council**
  - m **EP to weaken daily PM10, tighten annual PM10 limit value**
  - m **EP to weaken PM2.5 exposure reduction target, strengthen PM2.5 annual limit value**
  - m **EP to double prolongation of limit value attainment dates**
    - r **PM10 : Commission 2010, Council 2011, EP 2014**



## QA/QC of monitoring (...)

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### **What is new : QA/QC+ NRL**

- **Traceability (as defined in 17025) for all measurements**
- **QA/QC explicitly for data collection/reporting**
- **More defined role of National Reference Labs (NRLs)**
  - **By 2010, accreditation of NRLs for the reference methods**



## QA/QC of monitoring (...)

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### **What is new : Reference methods, equivalence**

- **Explicit reference to new EN standards**
  - **Include type approval, QA/QC procedures, uncertainty calc.**
- **NRL coordinate national realization**
- **Mutual recognition of data**
  - **Competent authorities shall accept test reports issued by accredited labs in other Member States**
- **Strengthened equivalence provisions**



# Modelling – what's new

- **The uncertainty (expressed at a 95 % confidence level) of the assessment methods will be evaluated in accordance with the principles of the CEN Guide to the Expression of Uncertainty in Measurement (ENV 13005-1999), the methodology of ISO 5725:1994 and the guidance provided in the CEN report "Air Quality – Approach to Uncertainty Estimation for Ambient Air Reference Measurement Methods" (CR 14377:2002E). The percentages for uncertainty in the above table are given for individual measurements averaged over the period considered by the limit value (or target value in the case of ozone), for a 95 % confidence interval. The uncertainty for the fixed measurements shall be interpreted as being applicable in the region of the appropriate limit value (or target value in the case of ozone).**
- **The uncertainty for modelling is defined as the maximum deviation of the measured and calculated concentration levels for 90 % of individual monitoring points, over the period considered, by the limit value (or target value in the case of ozone), without taking into account the timing of the events. The uncertainty for modelling shall be interpreted as being applicable in the region of the appropriate limit value (or target value in the case of ozone). The fixed measurements that have to be selected for comparison with modelling results shall be representative of the scale covered by the model.**
- **The uncertainty for objective estimation is defined as the maximum deviation of the measured and calculated concentration levels, over the period considered, by the limit value (or target value in the case of ozone), without taking into account the timing of the events.**



## Basic assessment provisions remain the same, but...

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- **Natural contributions, winter sanding**
- **Time extension conditions**
  - **Demonstrate effect of climatological conditions, transboundary contributions**
  - **Comprehensive assessment of impact of measures**
- **Air quality plans**
  - **Continuous requirement when in exceedance**
- **Exposure assessment**
- **New reporting provisions**
  - **Work of Data Exchange Group (DEG)**

**... Encourage use of models!**



# Implementation

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- **Transition**
  - **Important role : Committee under the new Directive**
- **Guidance (5x)**
- **Implementing Provisions on Reporting**
- **Integrated QA/QC programme**
  - **Streamlining**
- **Link to Community action**
  - **Shared Environmental Information System (SEIS) - concept**
  - **GMES – operational services**
  - **INSPIRE – spatial data infrastructure**



# Role of institutions

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- **DG ENV**
  - Policy development : Strategy, AQD, Implementing provisions
  - Implementation / comitology, infringements etc.
  - Working groups, studies
- **DG ENTR : GMES bureau; GMES Atmosphere Service**
- **EEA – Air data centre**
  - Data collection, including QA/QC
  - Dissemination
  - Assessments, ETC coordination
  - EIONET
- **JRC**
  - Integrated QA/QC
  - Expert networking : AQUILA, FAIRMOD
  - New methods, link to research
- **Other : CEN, DG RTD, WHO, CLRTAP, Member States**

Necessary to streamline efforts – common implementation, single modelling network





# Modelling – more work needed

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- **Facilitate/promote use in assessment under AQD**
  - Guidance, Reporting
- **Optimize development/implementation**
  - Air quality plans, operational programs, SEA and EIA
- **Improve model validation, including dynamic validation**
- **Foster further development of models :**
  - Improve data assimilation techniques (monitoring, remote)
  - Improve & reconcile model inputs
  - Nesting over scales
- **Harmonize, standardize**
- **Support review in 2010-2012**
  - Exposure, attainability, differentiated targets...
- **Prepare for change in assessment requirements in 2012**
  - Based on new ‘standards’, operational services at EU scale



# Final messages

- 1 **Implementation : Effective air quality plans require**
  - m good coordination between neighbours and between levels of governance
  - m Proper assessment of sources and exposure
  - m Appreciation of local conditions
  - m Careful planning and timely implementation
  - m Interlinkages with other policies (climate change, transport)
- 1 **New AQD : Review in 2011-13 is important**
  - m Include new data and research on PM<sub>2.5</sub>
  - m Make exposure reduction obligatory
  - m By the time, main Community measures will be already adopted
- m **Modelling : streamline activities & network**



# Summary

- 
- 1 **Achieved a lot but significant air pollution problems persist.**
  - 1 **New Air Strategy aims to make progress in solving these problems – timescale 2020.**
  - 1 **New air quality directive will help to address PM<sub>2.5</sub>**
  - 1 **New source based measures under preparation or adopted already at EU level, but**
  - 1 **Member States at all levels of governance have to play their part**
  - 1 **Modelling has integral role in implementation**



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Thank you

<http://ec.europa.eu/environment/air/index.htm>

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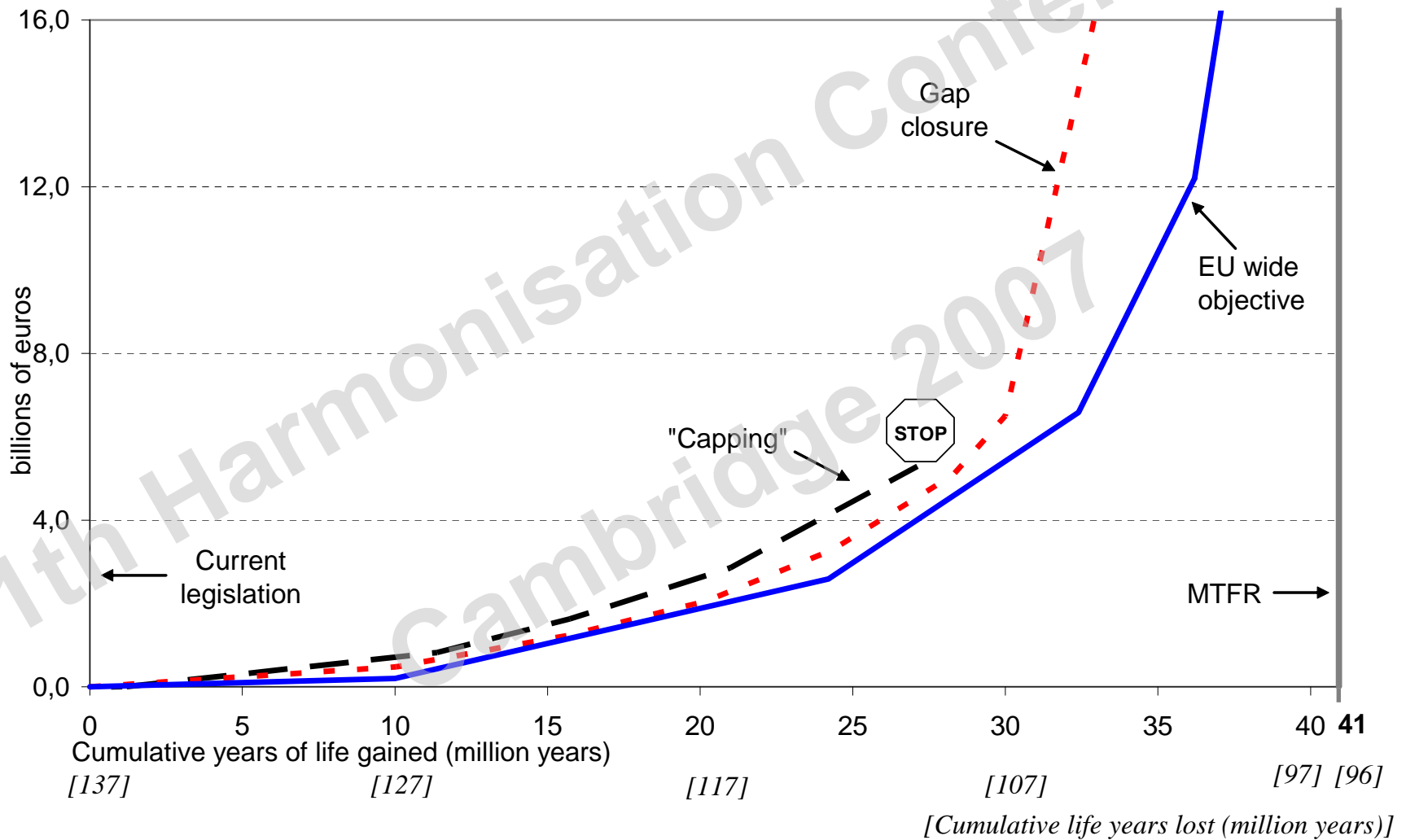
# When improving air quality, consider...

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- 1 **Improving air quality is interlinked with other Community policies**
  - m **Climate Change/Energy/Transport**
  - m **Strategy on Urban Environment**
- 1 **Important to identify **win/win measures** and trade-offs**
- 1 **Air standards blunt instrument**
  - m **Understanding required for efficient measures**
    - r Health/public exposure
    - r Source apportionment, scenarios - future projections
- 1 **Joint efforts national/regional/local measures, efficient use of Community measures**
- 1 **Efforts facilitated by Community funds and the Community level 'services'...**

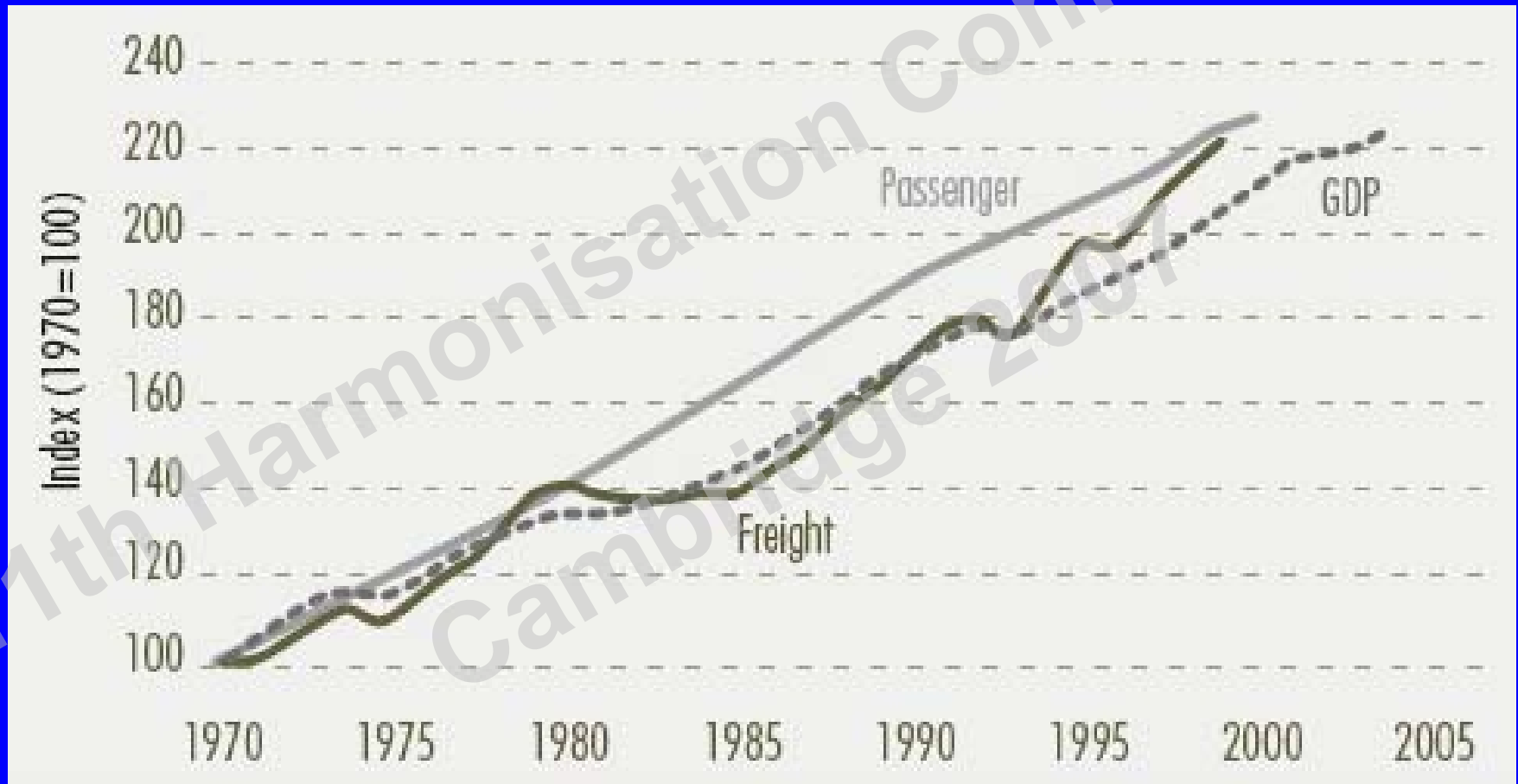


# Target setting





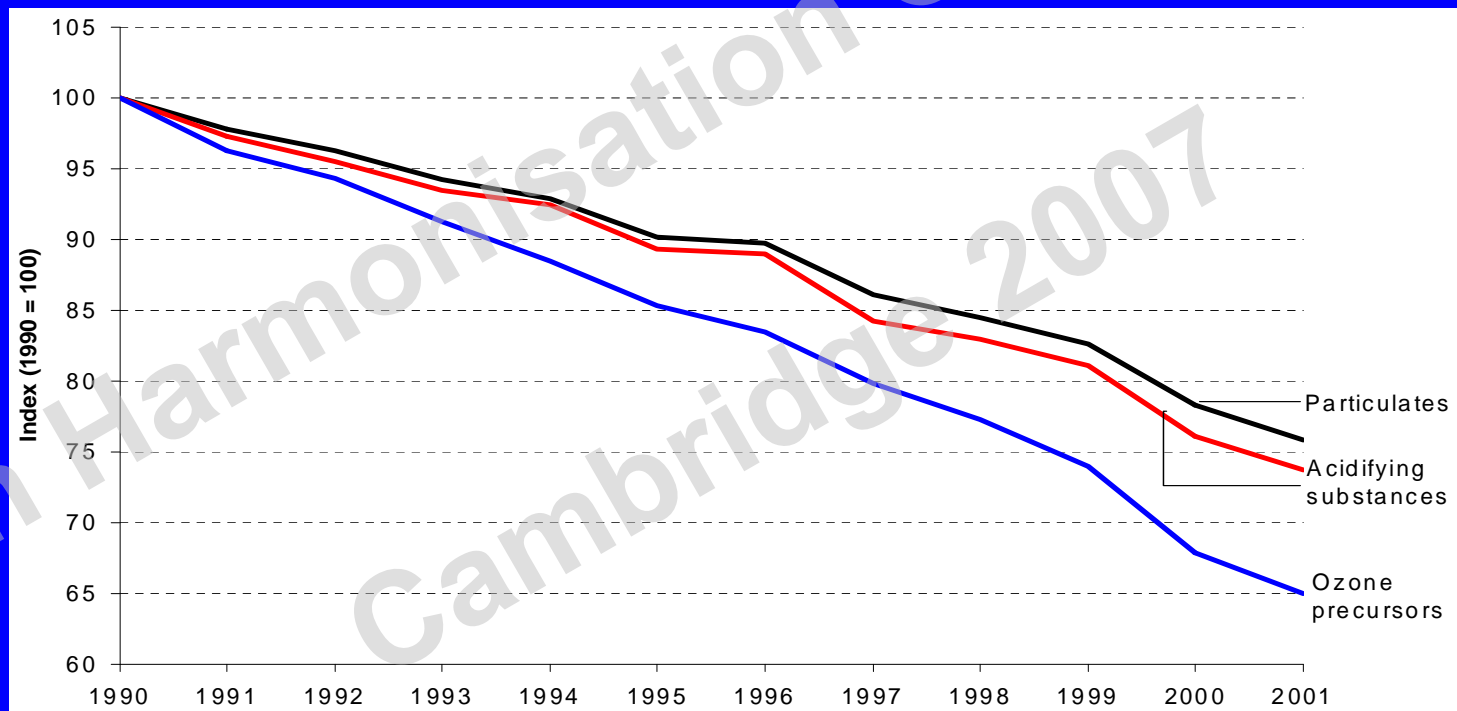
# Why are we doing it? (The transport example)





# It works.

## Transport emissions of air pollutants for EEA 31 (acidifying substances, ozone precursors and particulates), 1990-2001



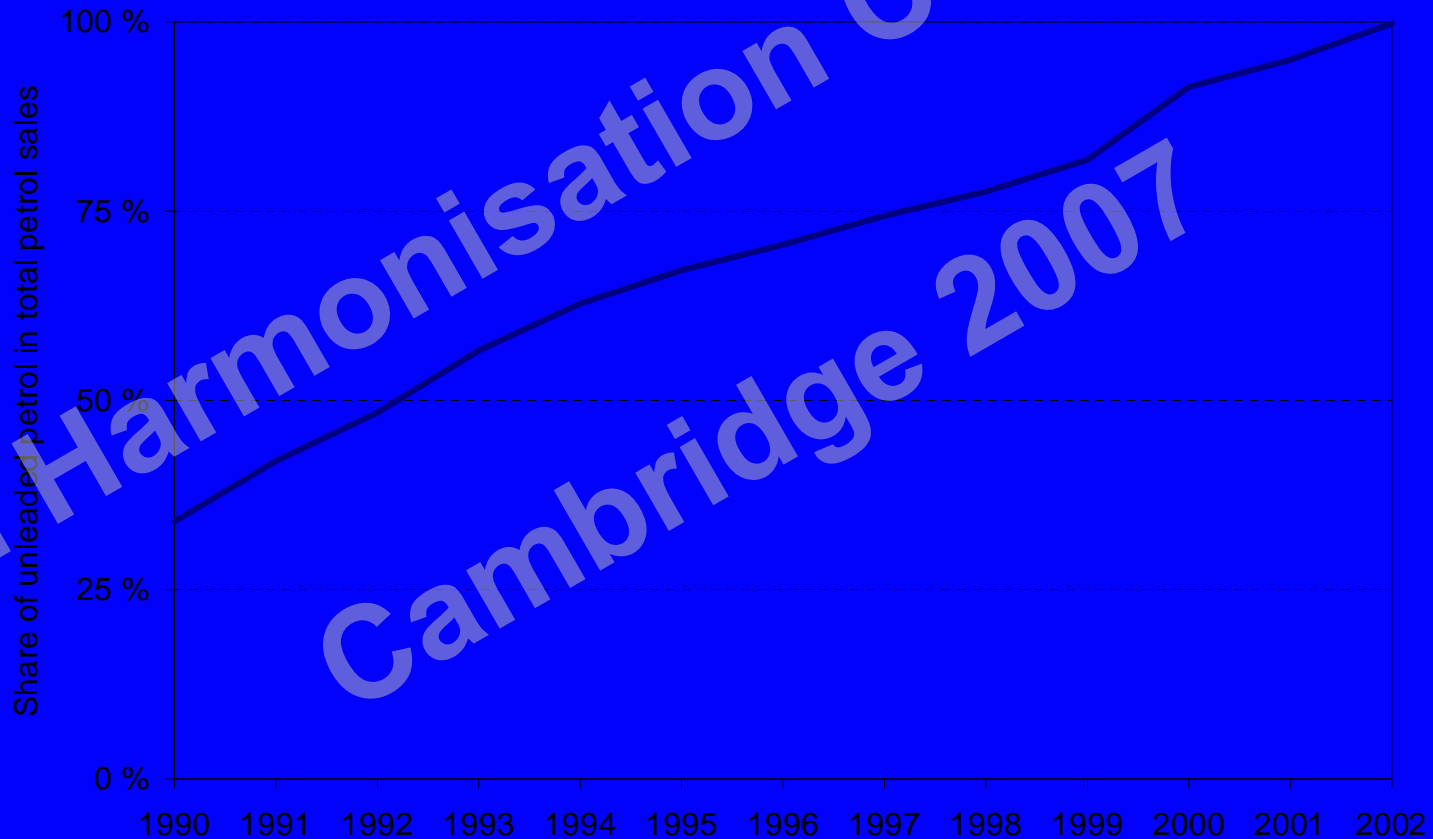
NB: The transport emissions data include all of 'road transport' and 'other transport/mobile sources', less the memo items, which include international aviation (LTO (Landing and TakeOff) and cruise) and international marine (international sea traffic - bunkers). These are reported separately to EMEP for information.  
Source: EEA-ETC/ACC, 2003





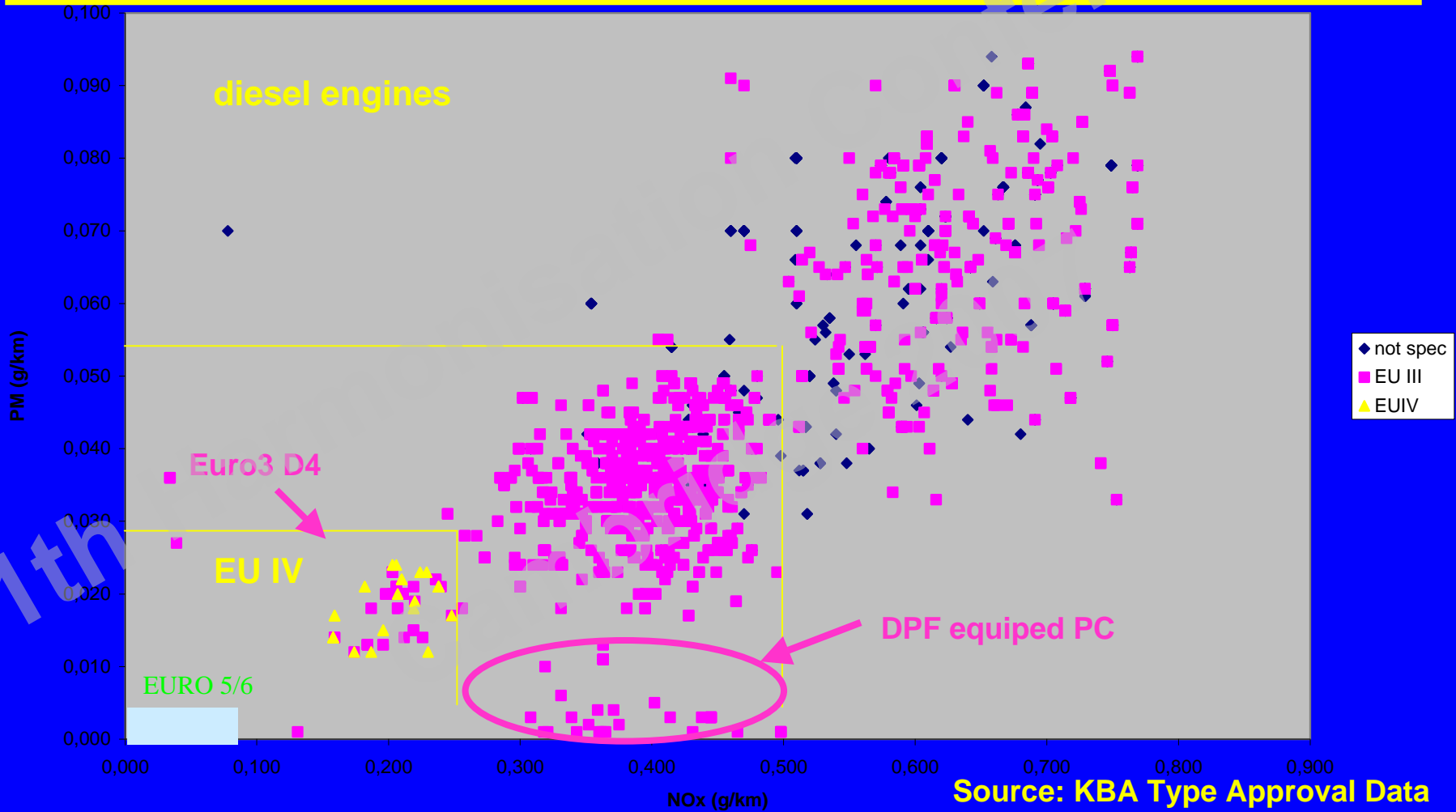
# Reason 1 : Fuel Quality

Unleaded fuel use in the EU-15, 1990-2002





# Reason 2 : EURO standards



Source: KBA Type Approval Data status November 2003