NABU conference "Greening Ports"

Port Emissions and the Air Quality Package:

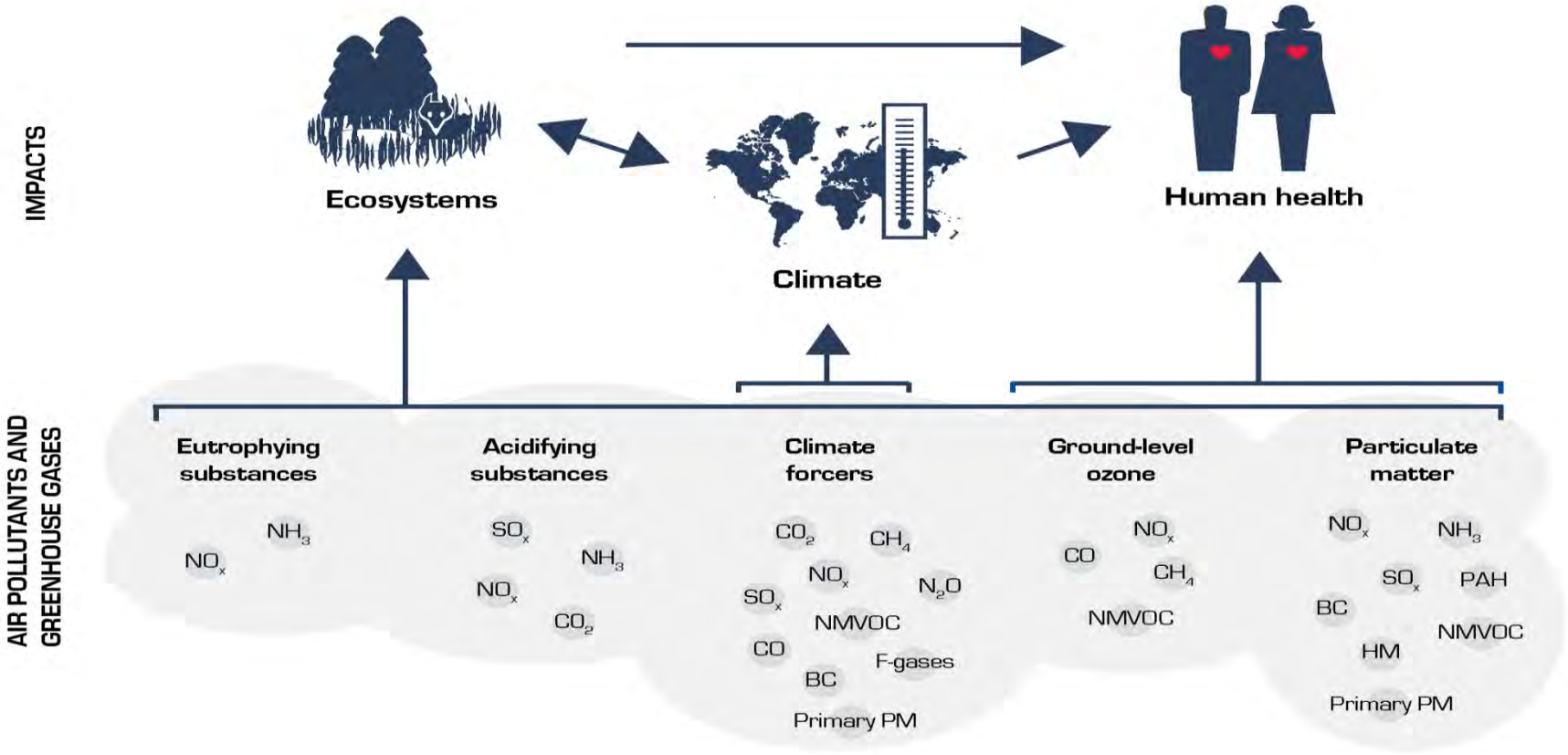
Health Risks and Costs for European Citizens and Policy Responses

Hamburg, 1 June 2015

Guido de Wilt
DG ENV C3 Air
European Commission

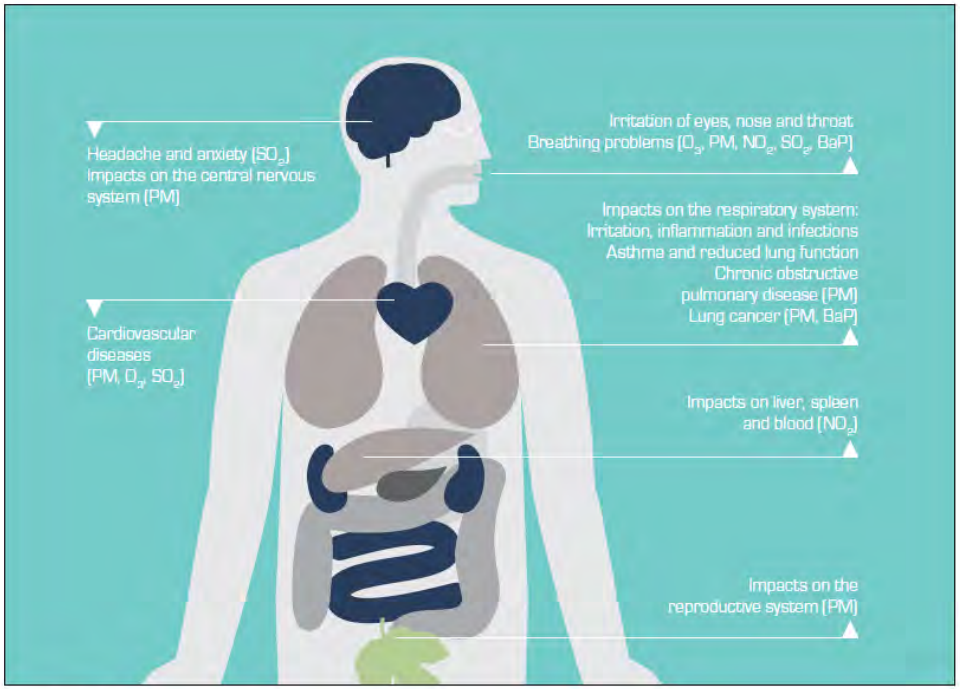
Why care about air pollution?

Ecosystems, climate, health, economy

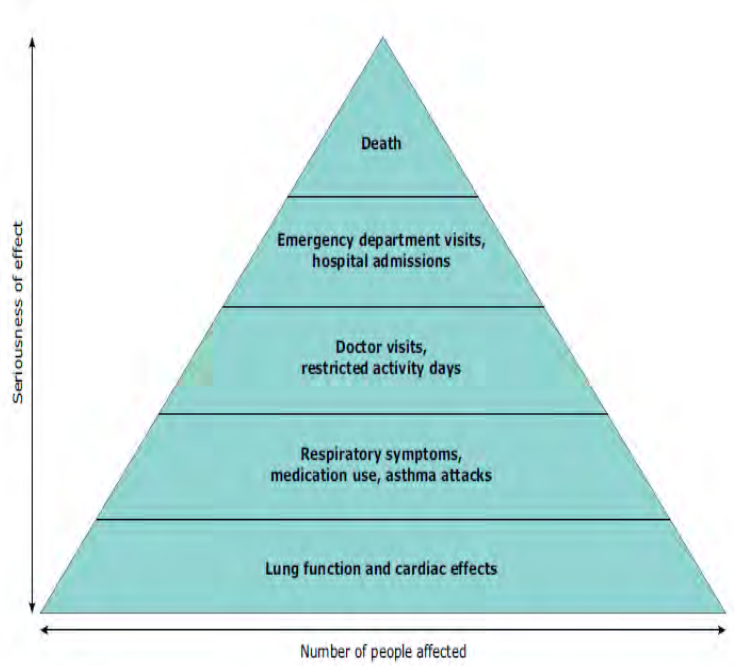


Source: EEA

Why care about air pollution?



Source: EEA, 2013f.



Source: Based on US EPA.

Air pollution formally declared carcinogenic by WHO since 2013

Source: EEA

Air pollution & health

Particulate Matter (PM)

cardiovascular and respiratory diseases

carcinogenic

close, quantitative relationship between exposure and increased mortality or morbidity,

Nitrogen dioxide (NO2)

Increased inflammation of the airways

Reduced lung function

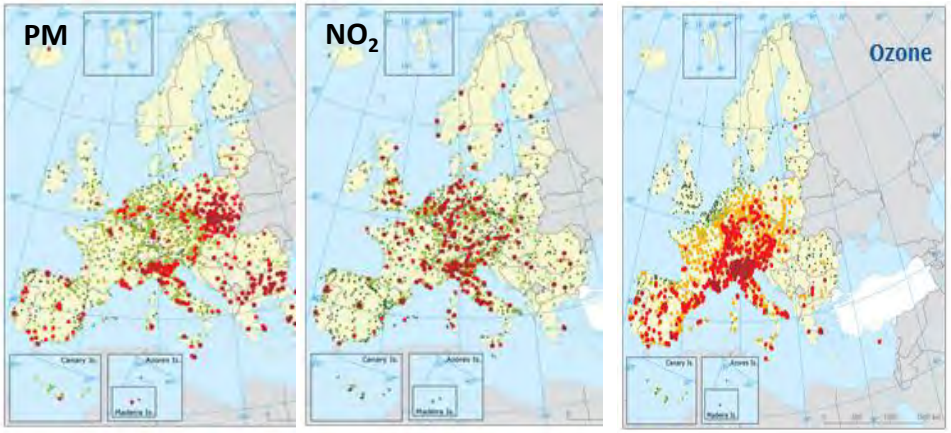
Increased asthma attacks

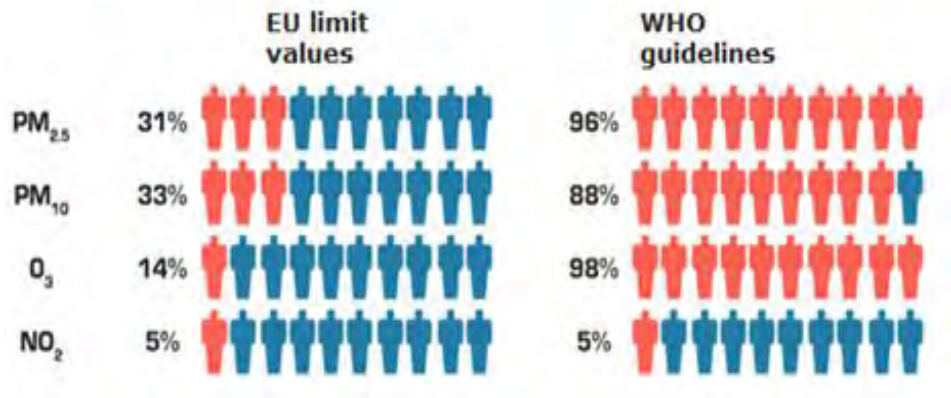
Increased susceptibility to respiratory infection, such as influenza

Source: Oberdörster; University of Rochester Medical Center

Air quality today in the EU

significant remaining challenges to resolve





- Health & Environment Impacts
  - > 400.000 premature deaths each year
    (10 times the amount of people dying prematurely in traffic)
  - > 30% EU citizens exposed to air pollutant levels above EU standards
  - > 90% EU citizens exposed to air pollutant levels above WHO guidelines
- Socio-Economic Impacts
  - External costs: €300-900 billion
  - 436 million restricted activity days
    (incl. 121 million lost workdays)
  - Direct economic costs: €23 billion
    (€15bn lost workdays, €4bn healthcare costs, €3bn crop yield loss and €1bn damage to buildings).

Source: EEA

EU air quality

Bad air quality in the EU remains a concern:

theguardian
Winner of the Pulitzer prize 2014

Air pollution will kill thousands in Europe, EEA warns

EU environment watchdog blames governments for failing to act on air pollution warnings saying it will lead to premature deaths across the countries

A signpost warns of smog in Brussels, Belgium. A new report states diesel vehicles are spewing more pollutants leading to breathing difficulties among vulnerable people, especially children and the elderly. Photograph: Julien Warnand/EPA

Guardian: 3 March 2015

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Science & Environment

Longer-term thinking 'needed' on air pollution

David Shukman
Science editor

9 April 2015 | Science & Environment

BBC: 9 April 2015

TIME

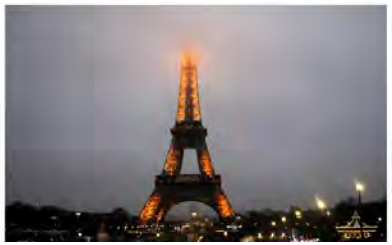
WORLD EUROPE

Huge Numbers of Europeans Will Die From Air Pollution in the Next 20 Years

Sabrina Toppa @SabrinaToppa March 3, 2015

Europe is failing on a range of environmental indicators from air to water and biodiversity

Hundreds of thousands of people in the E.U. — perhaps millions, if present trends continue — will suffer premature death in the next two decades because of toxic air, a new report says.



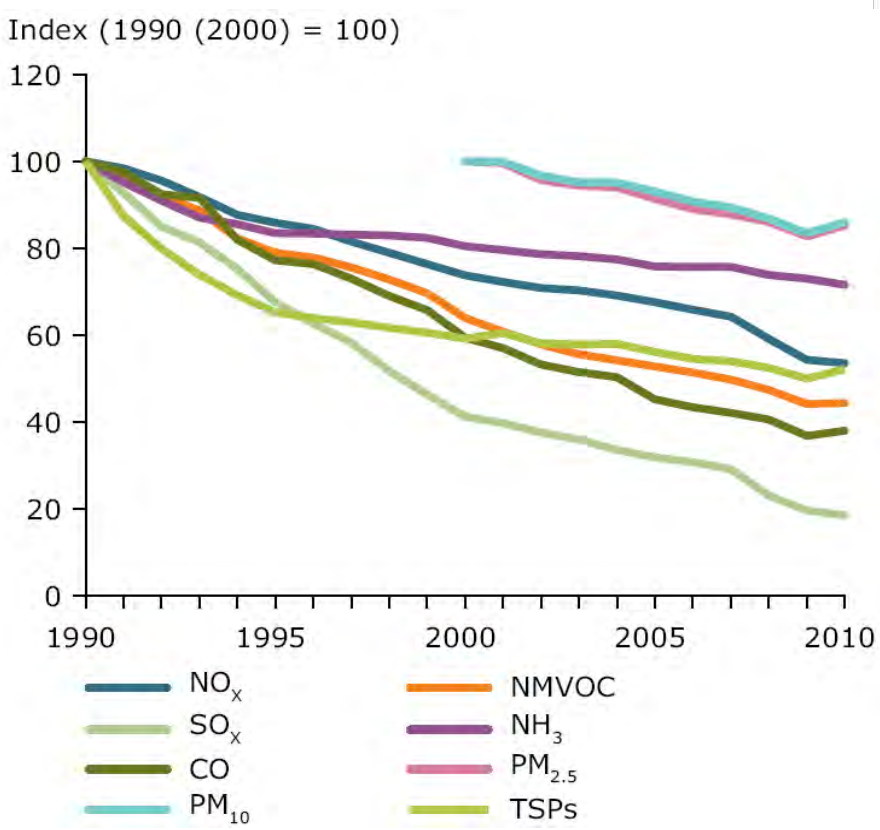
Time Magazine: 3 March 2015

How air pollution was addressed to date in the EU

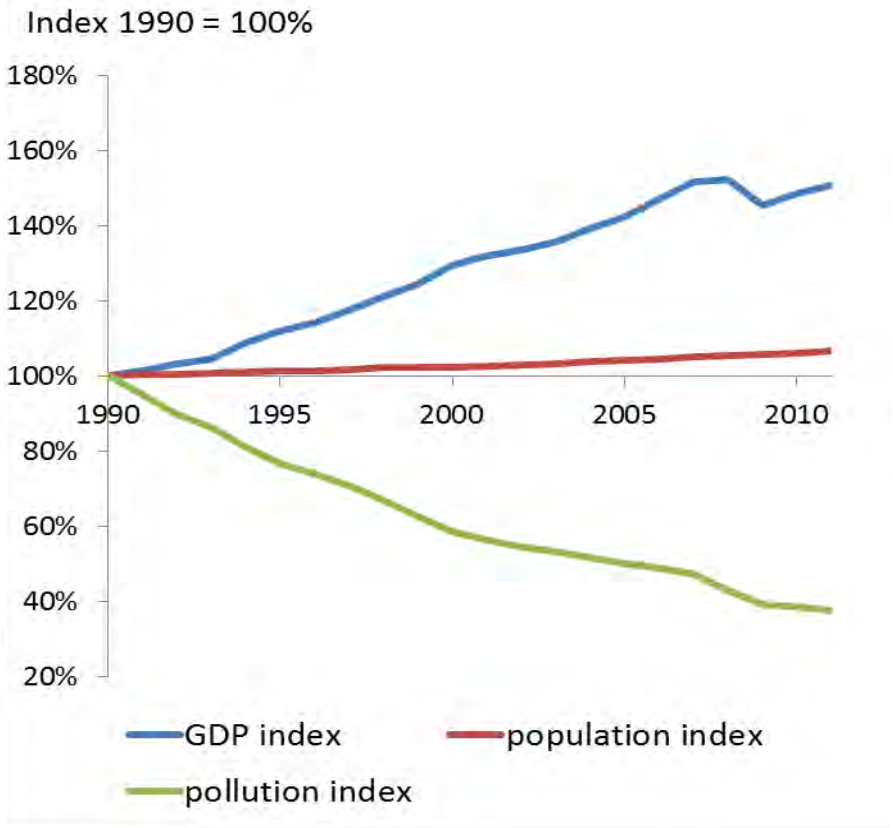
- **Ambient Air Quality Directives** (AAQD): Maximum concentrations to be attained across the EU (SO_2, NO_2, PM_{10}, benzene, lead, CO, O_3, arsenic, cadmium, nickel, $PM_{2.5}$ and BaP)
- **Member States' policies, plans and programmes**: national emission performance standards, industrial permitting , (green) taxes and subsidies, low emission zones, etc.
- **EU source-specific performance standards**: vehicle, engine, and fuels, industrial processes, energy using products, etc.
- **National Emission Ceilings Directive** (NECD): National emission inventories and caps to limit transboundary pollution (SO_x, NO_x, NMVOC, and NH_3)
- **UN ECE Convention on Long-Range Transboundary Air Pollution** (CLRTAP) and its Protocols (e.g. the Gothenburg Protocol with national emission ceilings for 2020)
- Thematic Strategy on Air Pollution (TSAP): Strategic health and environment impact reduction objectives and action areas up to 2020

Past and present air emissions in the EU

Reductions 1990-2012:
SO_x: 84% NMVOC: 60% NO_x: 51%
PM (TSP): 55% NH_3: 28% …



… also allowing to demonstrate decoupling of growth and pollution is possible

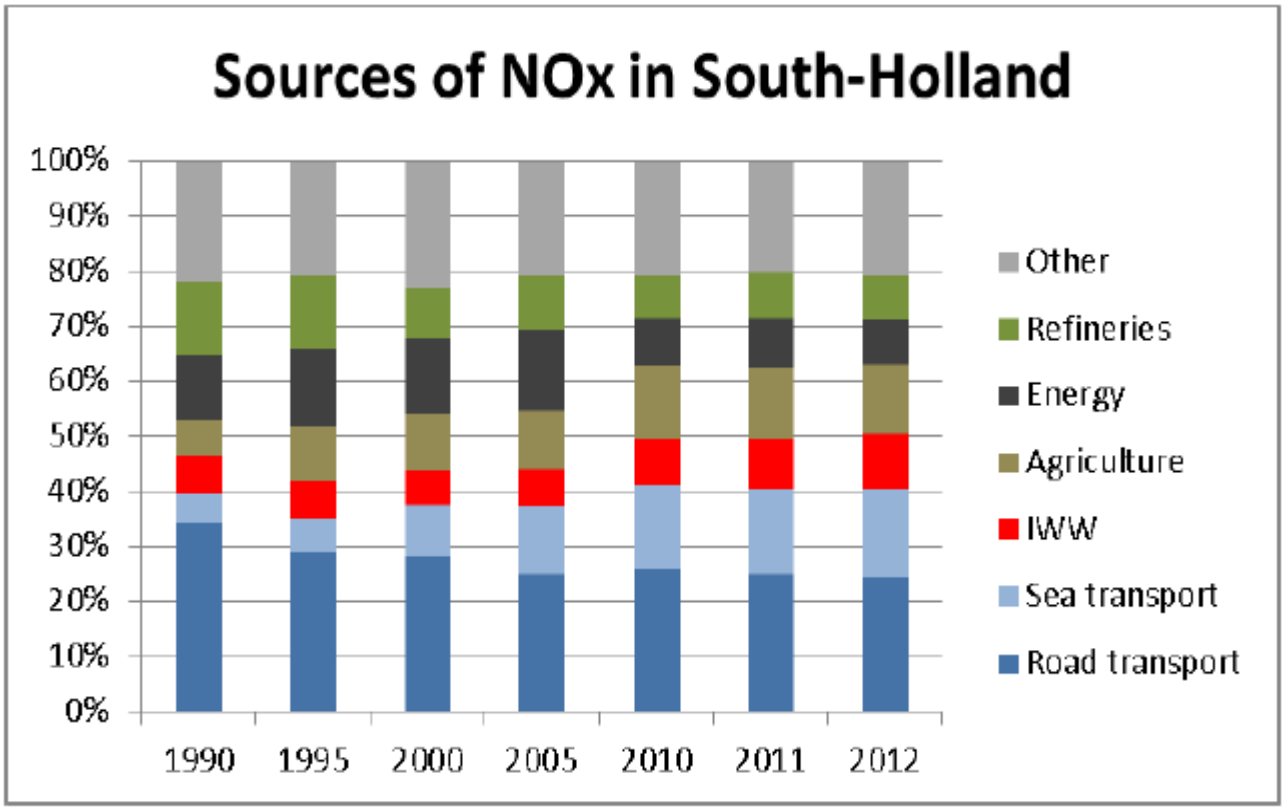


Source: EEA

European Commission

The Current EU Ambient Air Quality Standards								
Pollutant / Standard type[1]	**Max. Conc.**		**Measurement Periods**	**Max. Exceed.**	**Compl. Date.**	**T.E.N.**	**Compl. Status**	**Outlook (2020)**
Dir. 2008/50/EC								
SO2 (1999/30/EC)	350µg/m3 125µg/m3	LV LV	Hourly Avg. Daily Avg.	24 hrs/yr 3 d/yr	2005 2005		😐	🙂
PM10 (1999/30/EC)	50 µg/m3 40 µg/m3	LV	Daily Avg. Annual Avg.	35 d/yr	2005 2005	06.11 06.11	☹	😐
Pb (2008/50/EC)	0.5µg/m3	LV	Annual Avg.		2005[2]		🙂	🙂
CO (2000/60/EC)	10mg/m3	LV	8h running avg.		2005		🙂	🙂
NO2 (1999/30/EC)	200µg/m3 40µg/m3	LV	Hourly Avg. Annual Avg.	18 hrs/yr	2010 2010	12.14 12.14	☹	😐
Benzene (2000/60/EC)	5µg/m3	LV	Annual Avg.		2010	06.11	🙂	🙂
Ozone (2002/3/EC)	120µg/m3 120µg/m3	TV LTO	Max daily 8h mn Max daily 8h mn	25 days/yr[3] --	2010 --		☹	☹
PM2.5	25µg/m3 25µg/m3 20µg/m3	TV LV ILV	Annual Avg. Annual Avg. Annual Avg.	-- -- --	2010 2015 2020		😐	🙂
	20µg/m3 18µg/m3	AEI AEI	3-yr run. a.m. 3-yr run. a.m.	-- --	2016 2021		😐	🙂
Dir. 2004/107/EC								
Arsenic	6ng/m3	TV	Annual Avg.	--	2013		🙂	🙂
Cadmium	5ng/m3	TV	Annual Avg.	--	2013		🙂	🙂
Nickel	20ng/m3	TV	Annual Avg.	--	2013		🙂	🙂
BaP	1ng/m3	TV	Annual Avg.	--	2013		☹	☹

Example of emissions from ports: Dutch region with the port of Rotterdam



Local emission share of shipping of transport sources

Düsseldorf	***Cologne***
41% *of NO_x*	***25%*** *NO_x*
14% *of PM10*	***17%*** *PM10*

Examples of air quality legislation impacting ports and port cities

- Clean Air Package with NEC proposal and MCP proposal
- Improved EURO legislation for vehicles
- Sulphur Directive for sea vessels
- Non Road Mobile Machinery Regulation

The Clean Air Package and NEC Proposal

National AQ monitoring and reporting

Climate & Energy Policies, …

National Air Pollution Reduction Plans

Local AQ plans and programmes

National Air Pollution Emission Inventories [and projections]

Air Quality Standards Dir. 2008/50/EC

EU Emission Performance Standards (e.g. vehicles, industrial processes, non-road mobile machineries, …)

National Emission Ceilings Directive 2001/81/EC (& UNECE Gothenburg Protocol)

… (Re)connecting people through smart regulation

What is needed to reach compliance with existing air quality standards (2020 focus)

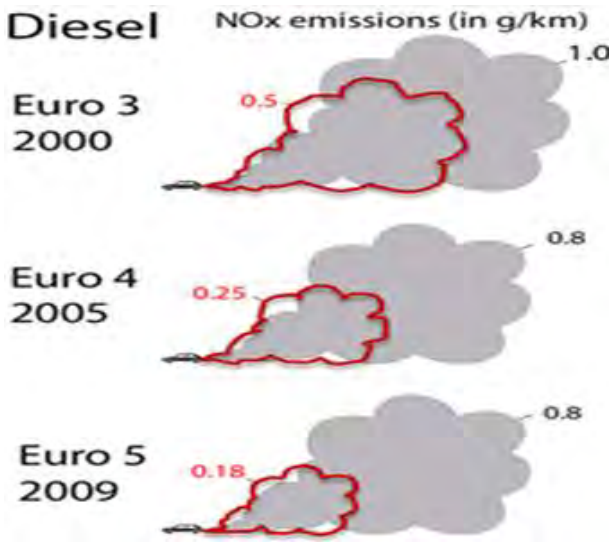
full implementation and compliance of existing policy

PM

EU and national air quality policies, including national emission ceilings for 2020 (already agreed Gothenburg Protocol and transposed 1 to 1 in NECD)

Enhanced support to (rebuild) national and local air quality management capabilities

NO2 /NOx

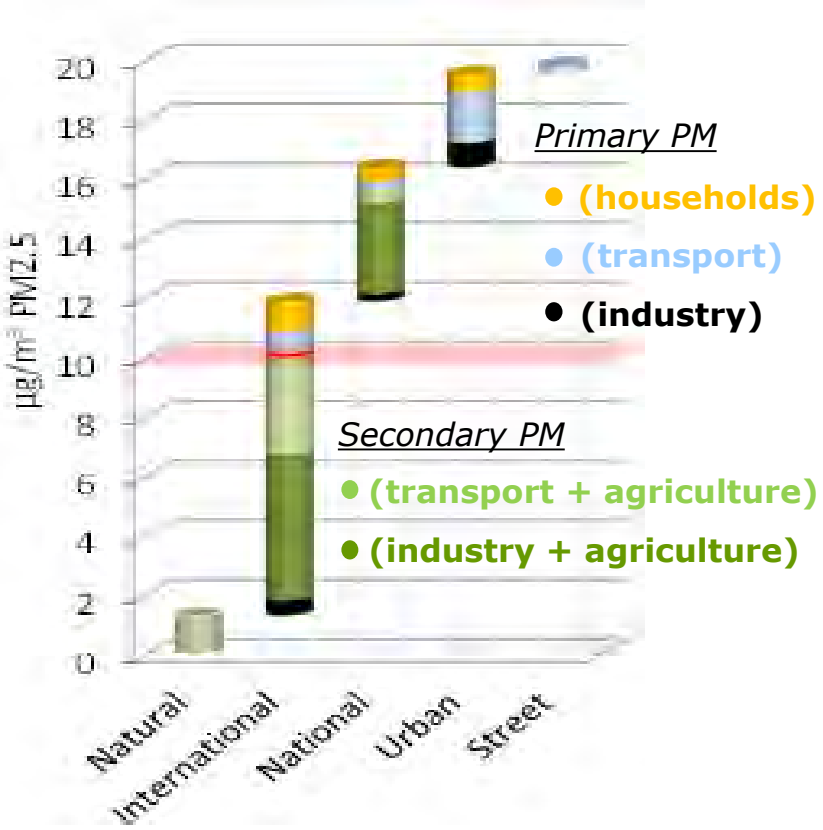


Euro 6 2014…

+ Record & Report "Real World Emissions"
+ Max margin of tolerance of 50% (2017) instead of average 700% (!) today
+ …

What is needed to improve (urban) air quality towards WHO guidelines (2030 focus)

Present (urban) $PM_{2.5}$ concentrations



Proposed air pollution measures

- Updating transboundary air pollution standards (notably for ammonia)

  (NECD Art 4, 5, Annex II,…)
- Aligning local and national air pollution policies and measures

  (NECD Art.6, 7)
- Addressing medium combustion plants (MCP)
- Supporting early implementation and promoting best practice

  (New Clean Air Programme for Europe)

What are the main features of the NEC proposal?

Emission reduction targets vs. 2005

(NECD Art.4, Annex II & Art.5 Flexibilities)

	2020*	2030**	Δ '20-'30
SO2	59%	81%	22%
NOx	42%	69%	27%
NMVOC	28%	50%	22%
NH3	6%	27%	21%
PM2.5	22%	51%	29%
CH4	--%	33%	33%

* Transposed from UNECE Gothenburg Protocol already agreed in 2012

** Recalculations undertaken by IIASA based on most recent MS data revisions

What are the main features of the NEC proposal?

New and additional flexibilities compared to current NEC Directive

- *Relative targets (vs. absolute emission ceilings)*
- *Emission inventory adjustment procedure (up to 2020)*
- *Maritime off-setting (for NECA etc…)*
- *[Domestic pollutant swapping capped to ca. a 10% PM equivalent]*

Better streamlined air quality governance

- *National Air Pollution Control Programme*
- *To better connect national and local air pollution action*

Better synergies with Climate and Energy policies

- *Prioritizing action on "short-lived climate pollutants"*
- *e.g. black carbon (when taking PM reduction action)*
- *E.g. ozone (by including methane ceiling)*

What are the main features of the MCP Proposal?

Addresses main gap in policy framework (1-50 MWt)

- *Above Ecodesign Directive*
- *Below Industrial Emissions Directive*
- *Increasingly important segment (in view of energy market trends)*

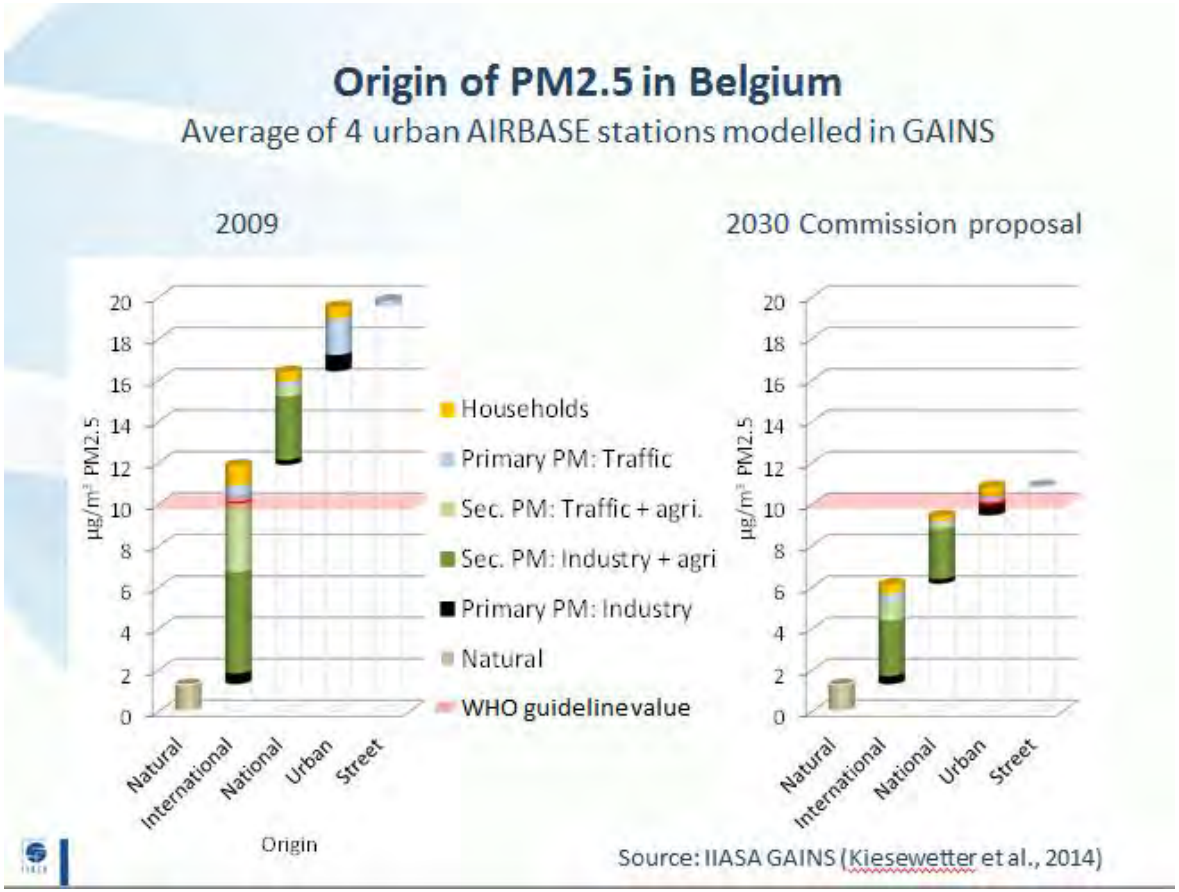
Sets fuel-specific emission limit values and contributes to national emission reduction needs for:

- *SO2, NOx and PM*
- *New plants (from entry into force date + 2.5 years)*
- *Existing plants (from 2025 or 2030)*
- *Hotspot zones (benchmarks)*

Keeps admin burden low (registration not permitting)

Helping MS to meet new NEC proposal

What will the NEC proposal bring?



What will the NEC proposal bring?

52% Health Impact Reductions (2030 vs. 2005)

- 200.000 avoided premature deaths/yr (from ca. 400.000)
  (Circa 60.000 more avoided deaths compared to business as usual)
- 140 mln less restricted activity days/yr (from ca. 400-450 mln)
- 5 mln less minor restricted activity days/yr (from ca. 80.000)

Significant Environmental Impact Reductions (2030 vs. 2005)

- Eutrophication: 35% (NOx, NH3)
- Acidification: 85% (SOx, NH3)

What will the NEC proposal bring?

External cost savings (health only): €44 -140 bn/year

Financial cost savings (health only): €3 bn/year

- Higher productivity of the work force: €1850 m
- Lower health care costs: min. €650 m
- Higher crop yields due to lower ozone levels: min. €220 m
- Less damage to buildings: min. €120 m

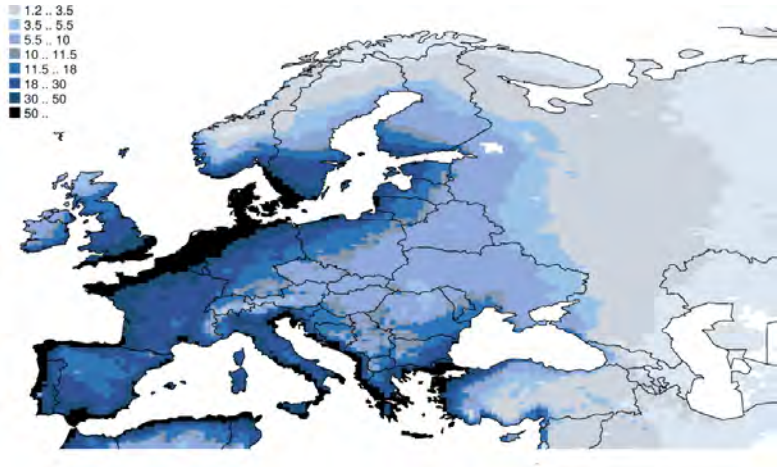
Implementation costs: € 2.2 bn / year

- [Latest downward revision after Member States' additional scrutiny in 2014]
- Ca. €1 bn/year cheaper if jointly implemented with Climate & Energy Package
- Positive overall impact on employment
- Positive overall impact on clean technology sector and related investments
- Positive overall impact on GDP growth
- No significant competitiveness impacts

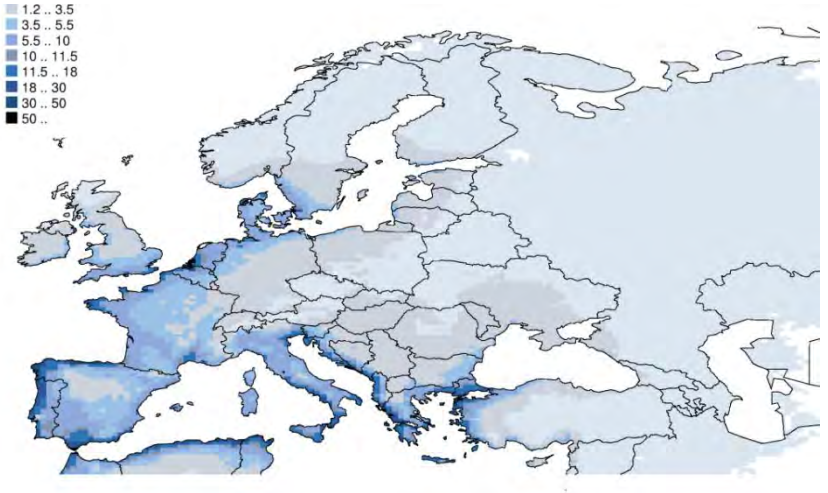
Contribution of shipping to EU air quality

Monitoring the projected environmental and health benefits of the Sulphur Directive on better air quality on land

- Commission intends to develop better national **ship emission inventories and projections** for EEZ's and territorial seas of Member States to:
  - Better assess impact of switch to low sulphur bunker fuels on overall EU air quality
  - Extending scope also to other pollutants (NOx, PM2,5)



Sulphur deposition from shipping sources in **2005**, mg/m2/year



Baseline scenario **2030 (Vito for Commission 2013)**

Robust enforcement of the Sulphur Directive

General

- Previous experience with implementation of the Directive has shown a **need for a stronger monitoring and enforcement regime**.

- A **cost-efficient and coherent enforcement** of the Sulphur Directive by all EU Member States is of high priority to ensure:
  - **Projected environmental and health benefits are met**
  - **Level-playing-field for operators and ports**
  - **Balanced enforcement efforts among EU Member States**

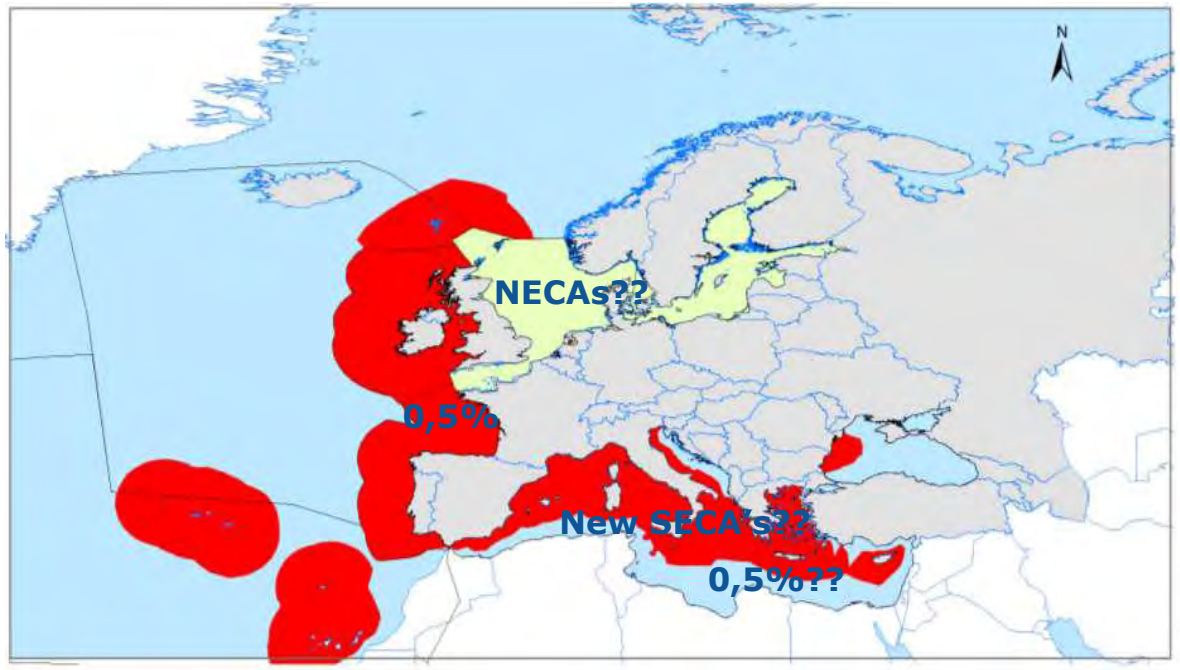
- EU Member States are responsible for enforcement, but the **Commission checks correct transposition and application by Member States** (e.g. by conformity studies, inspection visits by EMSA, possible infringements, emission inventories)

- To ensure a robust enforcement, the Commission adopted on 16 February 2015 **Commission Implementing Decision 2015/253 laying down EU rules concerning fuel sampling and reporting**

Forward looking

- ✓ Regardless of IMO deliberations, as of **2020** the Sulphur Directive **requires 0,50% max. sulphur content** for all EU waters outside the SECAs
- ✓ Commission closely follows IMO discussions regarding **availability** of low-sulphur fuel
- ✓ Commission intends to **extend the scope + duration of the ESSF** (Implementation sub-group) to other shipping pollutants (e.g. NOx) + emission abatement methods (EGR, SCRs?)

Situation in 2020??



NRMM share of total EU emissions

5%

PM

15%

NOx

New NRMM proposal

New scope of application

Land-based NRMM

SI – Spark-ignited (gasoline)

SI 0-19kW	SI 19-56kW	56-130kW	130-560kW	>560kW

Gen-Sets >560kW

CI 0-8kW	CI 8-19kW	CI 19-37kW	CI 37-56kW

CI – Compression-ignited (diesel)

Rail - Locomotives

>0kW

Rail - Railcars

>0kW

Inland Waterway Vessels (IWV)

37-75kW	75-130kW	130-300kW	300-1000kW	≥1000kW
			Auxiliaries 560-1000kW	Auxiliaries ≥1000kW

Snowmobiles

>0kW

All Terrain & Side-by-Side Vehicles

>0kW

Internal market, Industry, Entrepreneurship and SMEs

Scope of Directive 97/68/EC

Scope extensions new NRMM proposal

What is the situation for ports ? (1)

EU level: DGs involved and some key initiatives

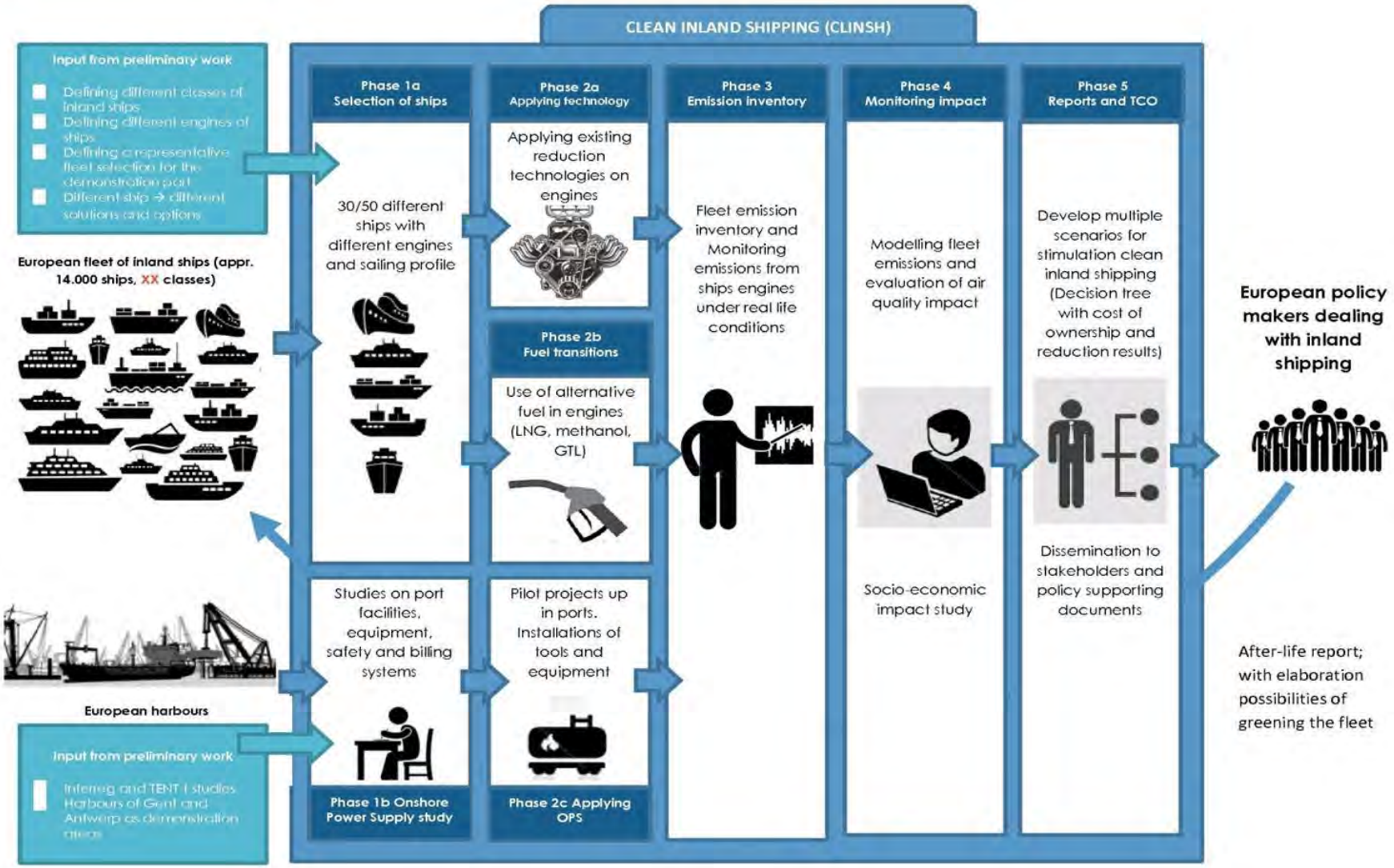
- MOVE: NAIADES II, TEN-T, PLATINA
- GROW: EURO standards for vehicles, NRMM, ESO, SME
- ENV: Air Quality, Noise, LIFE
- REGIO: Structural Funds, Interreg
- ENER: Energy Efficiency Directive, Ecodesign
- RTD: Horizon 2020 (e.g. topic 4.4 IWT 6M€)
- JRC: research (e.g. engine technology, AQ modelling)

- Inland Waterways Funds ("Green Funds for barges")

What is the situation for ports ? (2)

Funding of Air Quality

- Structural Funds (e.g. Operational Programmes)
- LIFE projects (e.g. CLINSH, see next slide for details)
- INTERREG projects
  (e.g. LNG in IWT; CNSS: http://cnss.no/final-conference/)
- Local/Regional/National initiatives (e.g. retrofitting)
  (but transregional effects)


European Commission
CLEAN INLAND SHIPPING (CLINSH)
Input from preliminary work
Defining different classes of inland ships
Defining different engines of ships
Defining a representative fleet selection for the demonstration part
Different ship → different solutions and options
European fleet of inland ships (appr. 14.000 ships, XX classes)
European harbours
Input from preliminary work
Interreg and TENT-t studies Harbours of Gent and Antwerp as demonstration cases
Phase 1a Selection of ships
30/50 different ships with different engines and sailing profile
Phase 1b Onshore Power Supply study
Studies on port facilities, equipment, safety and billing systems
Phase 2a Applying technology
Applying existing reduction technologies on engines
Phase 2b Fuel transitions
Use of alternative fuel in engines (LNG, methanol, GTL)
Phase 2c Applying OPS
Pilot projects up in ports. Installations of tools and equipment
Phase 3 Emission inventory
Fleet emission inventory and Monitoring emissions from ships engines under real life conditions
Phase 4 Monitoring impact
Modelling fleet emissions and evaluation of air quality impact
Socio-economic impact study
Phase 5 Reports and TCO
Develop multiple scenarios for stimulation clean inland shipping (Decision tree with cost of ownership and reduction results)
Dissemination to stakeholders and policy supporting documents
European policy makers dealing with inland shipping
After-life report; with elaboration possibilities of greening the fleet

More information

http://ec.europa.eu/environment/air/clean_air_policy.htm

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Thank You