



---

**Thematic Strategy on Air Pollution**  
**COM(2005) 446 & SEC(2005) 1132 and 1133**

**&**

**Role of Maritime Emissions**

*Duncan Johnstone*  
*ENV C3, DG Environment, European Commission*

---



# Thematic Strategy on Air Pollution

---

- In September 2005, the European Commission adopted a new strategy to combat the adverse impacts of air pollution in the European Union
  - 6<sup>th</sup> EAP- Decision of Council & EP of July 2002:
    - *‘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)
    - Integrated approach; consistency with other environmental policies; exploit synergies;
  - Strategy based upon the scientific and technical work of the Clean Air for Europe Programme (CAFE)
-



# Objectives of Clean Air for Europe (CAFE) Programme

---

- **Best available science & transparency**
    - Peer reviewed models and methodologies
    - Public consultation and 100+ stakeholder meetings
  - **Benchmark current and future air pollution**
  - **Identify what improvement is technically feasible beyond current policies**
  - **Define interim objectives for 2020 based on economic analysis**
-



# Impacts addressed by the Strategy

---

- **Health: Fine Particles (PM<sub>2.5</sub>) & Ozone(NO<sub>x</sub> and VOCs)**
    - Range of problems from minor respiratory effects to premature death; also cardiovascular effects. No known thresholds for effects
  - **Acid rain (SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>)**
    - Affects freshwaters and terrestrial ecosystems leads to loss of flora & fauna; reduced growth of forests, leaching of toxic metals into soil solution
  - **Eutrophication (NO<sub>x</sub>, NH<sub>3</sub>)**
    - Excess nutrient nitrogen causes species composition change & loss of biodiversity. Increases susceptibility to other stresses such as drought
  - **Ozone (non-health, NO<sub>x</sub> and VOCs)**
    - Damages trees and plants including agricultural crops; damages buildings/materials
-



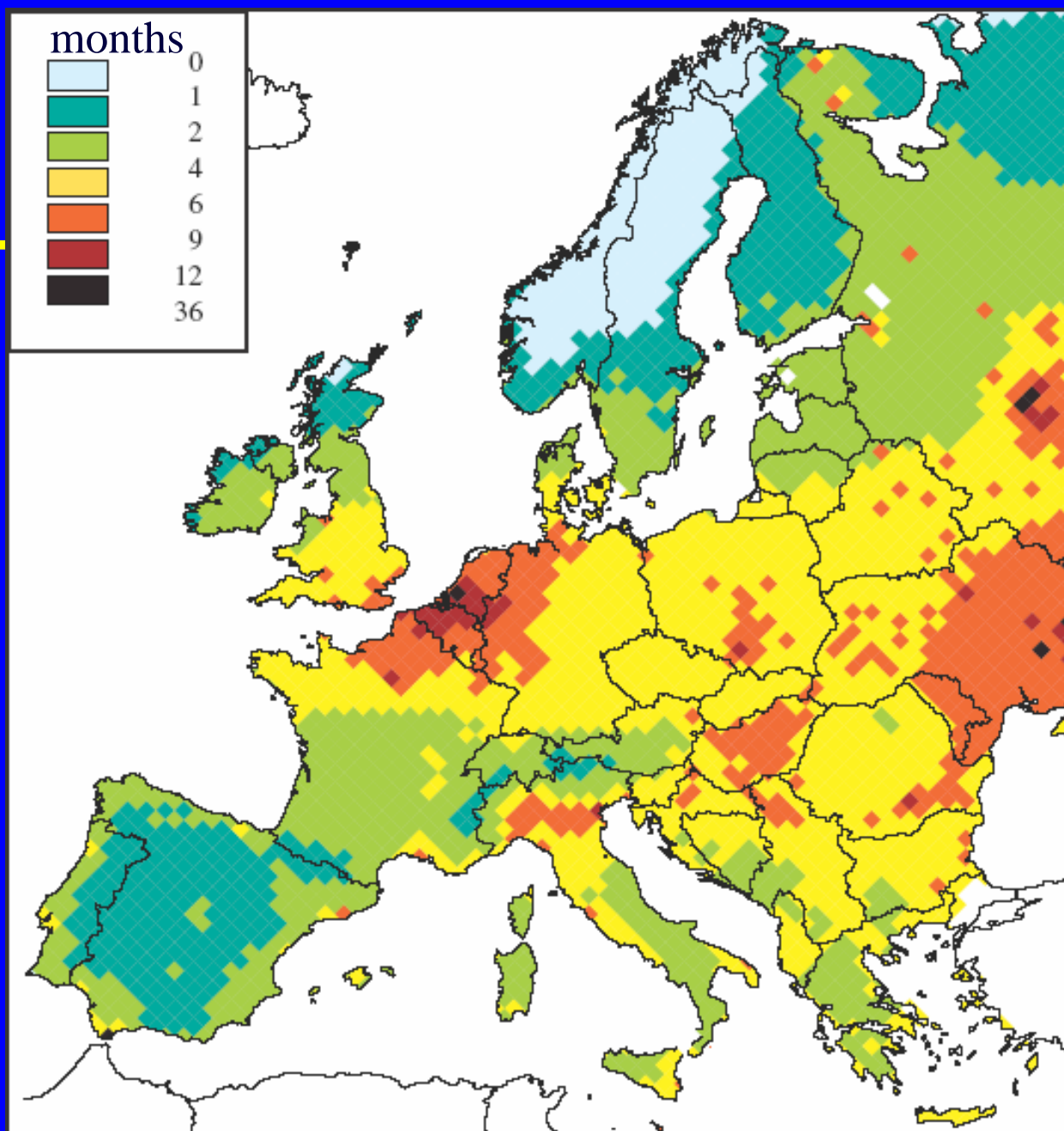
**Fine particles  $PM_{2.5}$**

**Life expectancy:  
8.1 months in 2000,  
5.5 months in 2020**

**Life years lost:  
3.6M in 2000  
2.5M in 2020**

**Premature deaths  
350,000 in 2000  
272,000 in 2020**

*1997 Met. year*



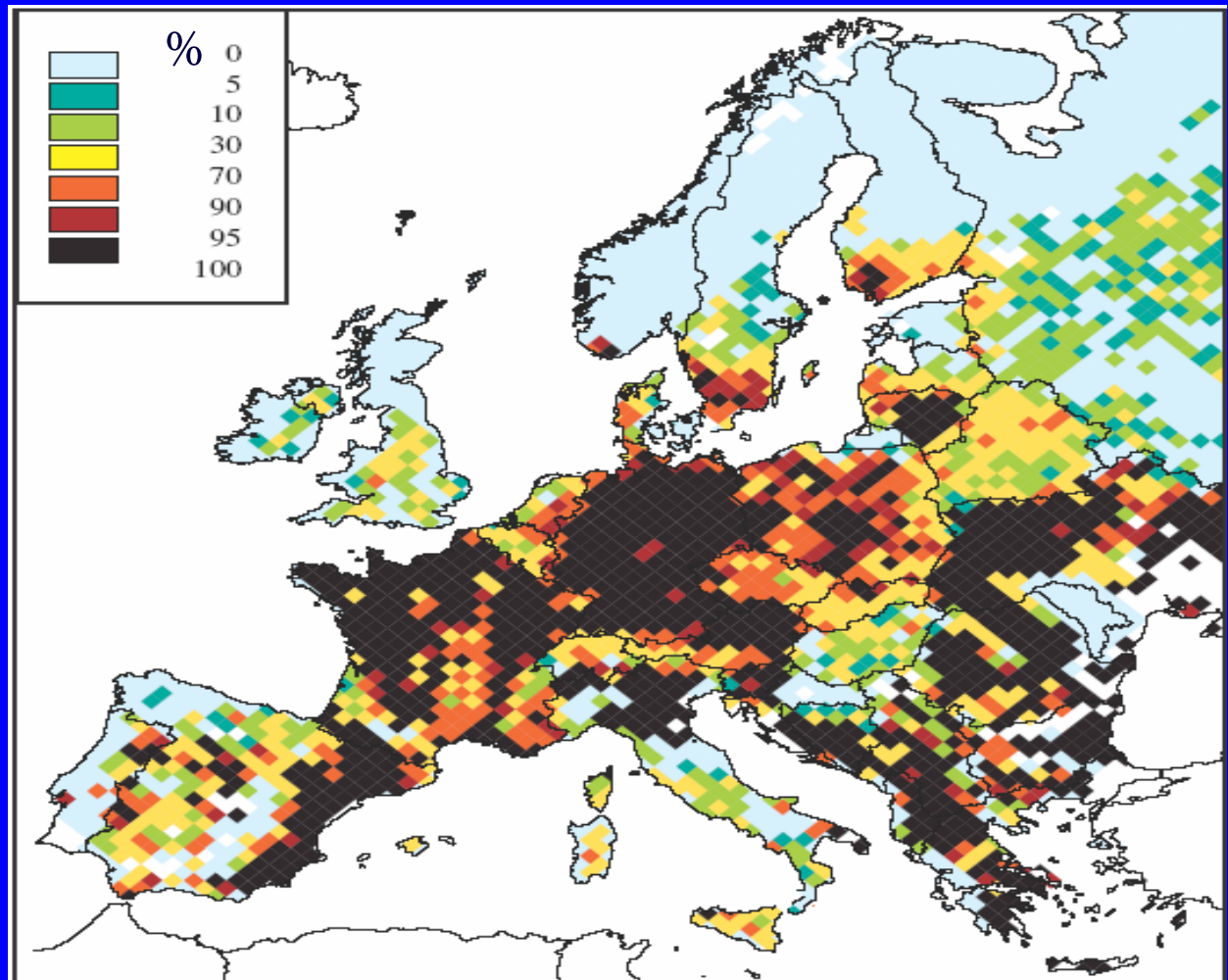


## Percentage of ecosystem area in each model grid cell with nitrogen deposition above “safe level”

**Problem of too much nitrogen deposited to ecosystems in 2020**

**Total Ecosystem area exceeded from eutrophication  
590 000 km<sup>2</sup>**

*1997 met. year*





# Summary of “Business as Usual” (includes current ship measures)

- Emissions continue to decline
- But in 2020
  - Premature deaths related to fine particulates still 270,000
  - Loss of statistical average life still 5 months in the EU
  - Ozone premature mortality equal to 20,800 cases
  - 119,000 km<sup>2</sup> of forest at risk from acid rain
  - 590,000 km<sup>2</sup> of ecosystems at risk from nutrient Nitrogen
  - 760,000 km<sup>2</sup> of forest at risk from ozone
- Cost-effective improvements are possible

Emissions			
<i>kT/annum</i>	2000	2020	%
SO <sub>2</sub>	8736	2806	<b>-68%</b>
NO <sub>x</sub>	11583	5889	<b>-49%</b>
VOCs	10661	5918	<b>-44%</b>
PM <sub>2.5</sub>	1749	971	<b>-44%</b>
NH <sub>3</sub>	3824	3686	<b>-4%</b>

**Ships will represent 125%  
and 101% of land based SO<sub>2</sub>  
and NO<sub>x</sub> emissions in 2020.**



# Summary of Strategy – Costs & Benefits

Ambition level	Benefits								Costs per annum (€bn)
	Human health			Natural environment					
	Life Years Lost (million) PM <sub>2.5</sub>	Premature deaths (000s) PM <sub>2.5</sub> and ozone	Range in monetised health benefits per annum (€bn)	Ecosystem area exceeded acidification (000 km <sup>2</sup> )			Ecosystem area exceeded eutro- phication (000 km <sup>2</sup> )	Forest area exceeded ozone (000 km <sup>2</sup> )	
				Forests	Semi-natural	Fresh-water			
2000	3.62	370	-	243	24	31	733	827	-
Baseline 2020	2.47	293	-	119	8	22	590	764	-
Strategy	1.91	230	42 – 135	63	3	19	416	699	7.1
MTFR	1.72	208	56 – 181	36	1	11	193	381	39.7





# Objectives of the Strategy

---

<i>Improvements by 2020 relative to 2000</i>	
<b>Life Years lost from particulate matter (million)</b>	<b>47%</b>
<b>Acute mortality from ozone</b>	<b>10%</b>
<b>Ecosystem forest area exceeded from acidification</b>	<b>74%</b>
<b>Ecosystem freshwaters area exceeded from acidification</b>	<b>39%</b>
<b>Ecosystem area exceeded from eutrophication</b>	<b>43%</b>
<b>Forest area exceeded by ozone</b>	<b>15%</b>

---



# Measures following the Strategy

---

- **Euro 5 for cars and vans**
  - **Euro 6 for Heavy Duty Engines**
  - **Revision of the NECD consistent with objectives identified in the Strategy**
  - **Small scale combustion**
    - Review of IPPC directive for larger sources
    - Energy using Products directive for small sources
  - **Agriculture (NH<sub>3</sub>)**
    - N content of feedstuffs following new study??
    - Review of IPPC directive for intensive agriculture
  - **Revise Air quality legislation**
  - **Ship NOx engine standards (IMO or Community)**
-



# Air Pollution from Ships

---

- **Many measures taken on land based sources to reduce polluting emissions**  
*(Large Combustion Plant, road vehicles, fuels etc.)*
  - **Community Marine Emissions Strategy of 2002 lead to the adoption of Directive 2005/33/EC on the sulphur content of marine fuels**
    - SO<sub>x</sub> emission control areas – 1.5% S fuels
    - Marine gas oils used at berth from 2010 (0.1%)
  - **This has already been factored into Commission's analyses for the Thematic Strategy**
-



# Mandate to do more on NOx emissions from ships (1)

---

- **European Parliament response to the Marine emissions strategy of 2002**
    - *“Notes the Commission's intention to bring forward a proposal to reduce NOx emissions from seagoing vessels ..... but is concerned that the Commission links this action to future developments in the IMO, i.e. the Commission will only take this action if by the end 2006 the IMO has not proposed tighter international NOx standards*
    - *Calls on the Commission to - before the end of 2004 - come forward with a proposal for NOx emission standards for ships which is based on the use of best available techniques (BAT), and which aims at reducing NOx-emissions from ship engines, and to pursue such BAT-based NOx-emission standards to be accepted also by the IMO;”*
-



## Mandate to do more on NOx emissions from ships (2)

---

- **Council Conclusions on the marine emissions strategy of 2002**

Para 12. *“Considers that it is essential to reinforce the consideration of EU MS’ positions at IMO negotiations in particular to PROMOTE, in the revision phases of Annex VI, the adoption of more ambitious measures as regards a tighter global sulphur cap for heavy fuel oils burned by ships and tighter nitrogen dioxide emission standards for engines used in ships”*

Para 15. *“RECOGNISES that progress within IMO depends on the input of IMO member states and therefore URGES the EU Member States to submit concrete proposals on tighter NOx standards under MARPOL Annex VI and on the different aspects of the IMO GHG Strategy.*

Para 16. *“RECOGNISES the need to investigate specific EU actions with respect to the reduction of NOx and GHG emissions by marine transportation; INVITES the Commission to consider a proposal for tighter NOx standards by the end of 2006 if IMO has not made any proposals for tighter standards by that date”*

---



## **Mandate to do more on emissions from ships (3)**

---

- **EP Resolution on the Air Thematic Strategy (Sept 2006)**
    - **Establish NO<sub>x</sub> emission standards for ships using EU Ports**
    - **Designate the Mediterranean Sea and North East Atlantic as SECAs**
    - **Lower sulphur content of marine fuels used in SECAs to 0.5%**
    - **Introduce financial instruments such as SO<sub>x</sub> and NO<sub>x</sub> taxes**
    - **Encourage differentiated port and fairway charges favouring low emission operation**
    - **Encourage use of shore-side electricity by ships in ports.**
    - **Proposal on marine fuel quality in the EU**
    - **Calls on the Commission to propose coordinate action to ensure a level playing field and to insist on action within the IMO; is convinced that a better balance between the costs of reducing emissions from ships and land-based sources is needed.**
  - **Council Conclusions of March 2006 called on the Commission to continue its efforts to reduce ships' emissions**
-



## **Ships emissions & impacts**

---

- **Ships emissions have been estimated in a series of studies funded by the Commission**
    - **Routes, flags, abatement techniques, costs**
  - **Impacts of ships emissions estimated using peer-reviewed scientific models used within the UN ECE Convention on Long Range Transboundary Air Pollution**
  - **Latest work has investigated cost-effectiveness of further ship emission reductions relative to land-based sources**
-



## **Ships emissions & impacts (2)**

---

- **INF Paper presented to the BLG Inter-sessional meeting in Oslo (November)**
  - **Based upon report from Commission's contractor**  
[http://forum.europa.eu.int/Public/irc/env/cafe\\_baseline/library?l=/thematic\\_strategy/contract\\_emissions&vm=detailed&sb=Title](http://forum.europa.eu.int/Public/irc/env/cafe_baseline/library?l=/thematic_strategy/contract_emissions&vm=detailed&sb=Title)
    - ❑ 20% of ship emissions released with 12-mile limit
    - ❑ 45% in EU sea regions from EU flagged vessels
    - ❑ Ship emissions of NO<sub>x</sub> and SO<sub>x</sub> same as EU land based sources in 2020
    - ❑ Ships responsible for 10-20% of sulphur deposition in coastal areas; expected to rise to 30% by 2020.
    - ❑ Ship contribution to aerosol up to 20% for some countries
    - ❑ 56% cargo vessels, 30% bulk carriers over 20 years old
    - ❑ Ship emissions jeopardise attainment of Strategy's objectives for 2020.
    - ❑ Measures on ships are substantially more cost-effective than measures tackling land-based emissions
  - **More information in the background paper prepared for this meeting**
-

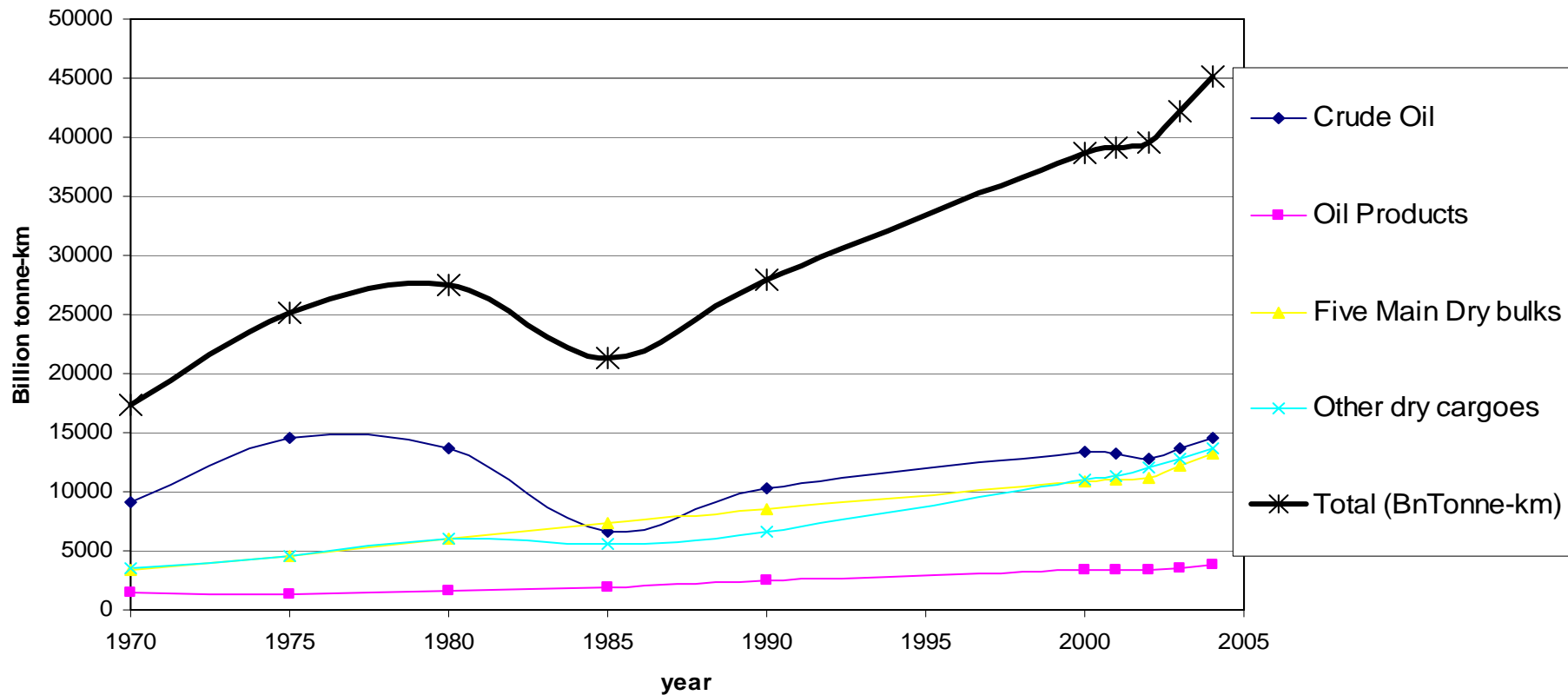




# Challenges

## Growth in trade 160% (1970-2004)

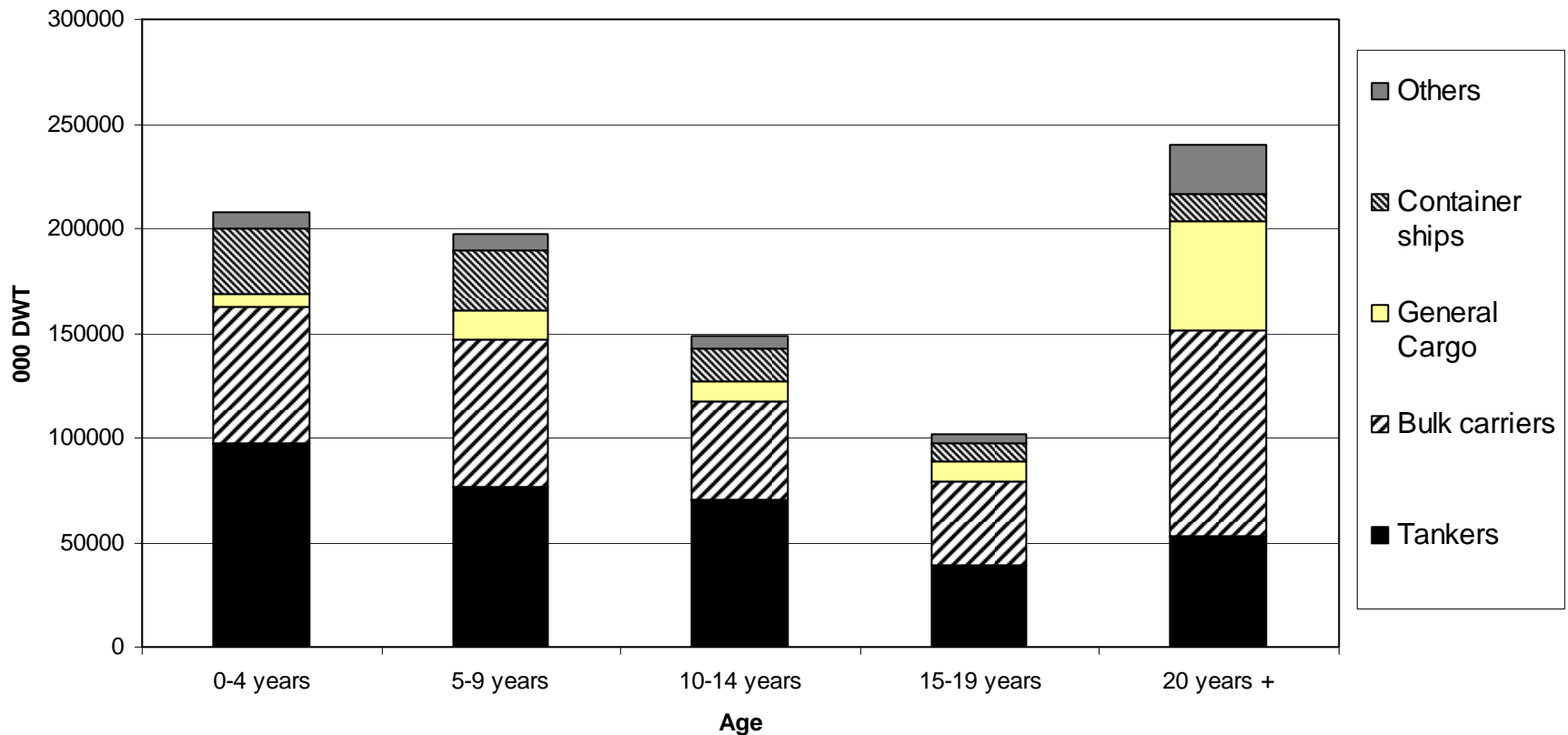
World Seaborne trade in metric tonne-km





Challenges: 56% general cargo & 30% bulk carriers over 20 years old. Some last up to 50 years.

**World Gross Tonnage broken down by age of vessel (000 dwt)**





# Challenges

---

- **Increased awareness and attention on ship emissions - disparity between land based sources and ship fuels, technologies and emissions**
  - **Increased likelihood for “local measures” unless meaningful international action taken**
  - **US active and has proposed**
    - **NO<sub>x</sub> (New and existing engines); Tier 2 & 3 limits**
    - **SO<sub>x</sub> 0.1% S fuels in coastal regions (or scrubbers)**
    - **PM performance limits in coastal regions**
-



# What next?

---

- **BLG : 16 -20 April 2007**
  - **MEPC 56: 9-13 July 2007**
  - **Commission to take stock of progress**
    - **Review of Directive 1999/32/EC on the sulphur content of fuels & marine fuels – 2008**
    - **Scope for Community measures to reduce ship emissions pursuant to Council's conclusions - 2008**
-



## Further information

---

- **Ship emissions policy and technical studies**  
<http://ec.europa.eu/environment/air/transport.htm>
- **Thematic Strategy on air pollution & CAFE**  
<http://ec.europa.eu/environment/air/cafe/index.htm>
- **National emissions ceilings directive**  
<http://ec.europa.eu/environment/air/ceilings.htm>

**Thank you for your attention**

---