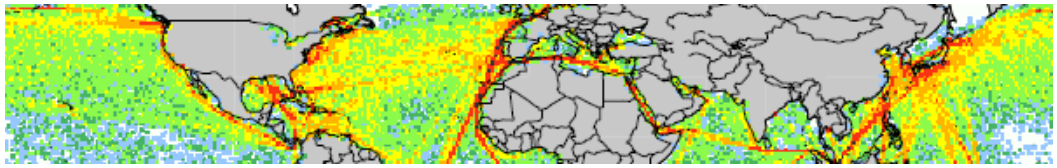
Emission Reduction Scheme and Fund Proposal

Working Details for Country Review

June 2007



MEPC 56/4/9 - Discussion slides

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G8 – Need for action agreed

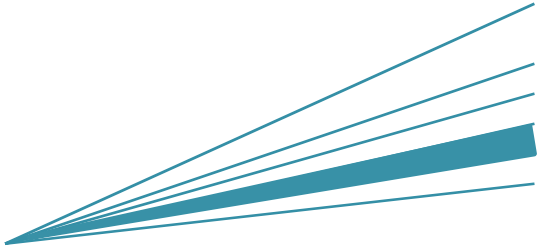
- "We are therefore committed to taking strong and early action to tackle climate change in order to stabilise greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system.
- Taking into account the scientific knowledge as represented in the recent IPCC reports, global greenhouse gas emissions must stop rising, followed by substantial global emission reductions.
- In setting a global goal for emissions reductions in the process we have agreed today involving all major emitters, we will consider seriously the decisions made by the European Union, Canada and Japan which include at least a halving of global emissions by 2050.
- It is vital that major economies [...] agree on a detailed contribution for a new global framework by the **end of 2008** which would contribute to a global agreement under the UNFCCC by 2009."

G8 Leaders

Conclusion:

Science is clear – action is needed ... not more clarity.

Difficulties of tackling maritime CO_2 emissions*



Context:
A set of “wedges” to fight climate change is **needed**, including **a maritime CO_2 emission reduction “wedge”**

- Shipping: global and complex character
  - Nearly impossible to allocate emissions to countries, flags, routes, …
- Lack and difficulty of establishing a reliable emission baseline
- Long lifetime of ships and engines
  - Dramatic step reductions are decades away
- Scale
  - To avoid competitive distortions more than 30,000 ships need to be included
- Motivational:
  - Benefits to industry must be clear
  - Developing countries participation must be encouraged

*International maritime CO_2 emissions account only for about 1.8% of total emissions from the fossil fuels. However, they are **#12 if compared with the largest emitting nations**.

MEPC 56/4/9 (Norway) – Proposes a global emission reduction scheme with a Fund

- No allocation of emissions (UNFCCC SBSTA option 1)
- Hybrid economic instrument based on harmonized charges
  - Using a carbon price established by the large emitting industries
  - Delivering quantity target through a "clearing house" approach
- Reduction of GHG impact by near-term technical and operational improvements and accelerating long-term step changes
  - Addition of mitigation outside the sector to optimize cost efficiency
- Key elements:
  - An aggregated emission cap (goal) to achieve net reductions
  - Centralized emission data collection and billing
  - Establishment of a maritime improvement and climate fund to invest in:
    - Ships' GHG emission reduction projects
      - To include infrastructure improvements like the Marine Electronic Highway project in the Straits of Malacca and Singapore
    - Mitigation outside the sector (CO_2 credits purchase, including CDM)
    - Adaptation to climate change in developing countries (hit hardest as per IPCC)

International Maritime Emission Reduction Scheme
Key Elements and Ambition

Maritime CO_2

International Maritime Governance

Data and Charges Collection

Fuel data submissions

Charge = Emissions x Unit charge

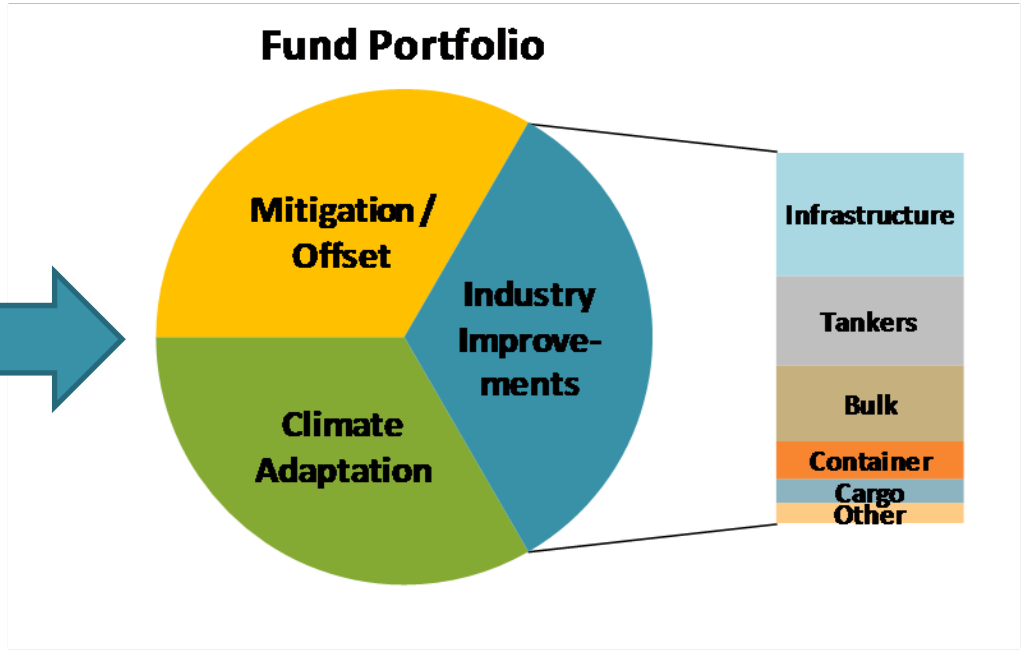
Example: Unit charge in 2010 = \$10/tCO_2

Shipping price impact: 3%

International emissions = 0.5 $GtCO_2$

80% initial coverage (30 thousand ships)

Significant global funds raised



Ambition:

- **Halve maritime GHG growth impact**
- Contribute notably to adaptation to climate change in developing countries
- Implement within the next 2 years

Unit charge depends on emissions growth above the cap/goal and the forward market price for CO_2 (assumed as \$25/tCO_2 for the sample figures that follow). Unit maritime emissions charge for 2010 is estimated at \$10/tCO2. Recovered through increased shipping charges of around 3% (end customer impact: 0.1%). Total funds raised will exceed \$3bn per annum.

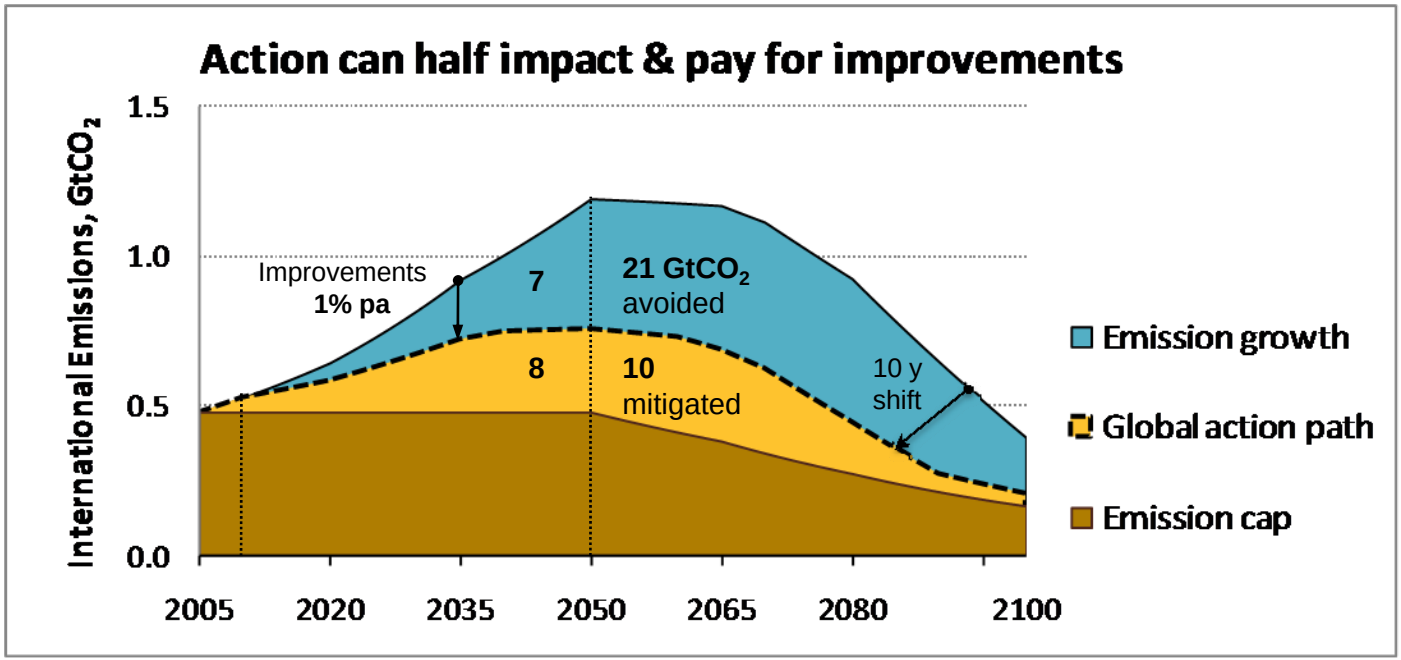
How it could work

- IMO (or another UN body) owns the governance and decides on:
  - Portfolio split every few years (% of funds allocated to each goal)
  - Level of charges, annually
    - To be constant for a year and set 1 year in advance to allow easy passing of the charges through increased shipping prices
      - Estimated at under 3%, equivalent to around 0.1% increase in end user prices; always related to emission growth; reducing emission growth leads to lower charges
- Ships report fuel used to a single organisation electronically
  - Proposed monthly, together with the voyage distance and work done data
- Emissions are calculated and validated based on the fuel data
- Ship operators receive emission bills few months later
- Compliance with emission reporting and payments checked at ports

Case for action

Quantifying the mission reduction "wedge"
= Environmental benefits of the scheme

- Achieving 1% annual industry improvements and bringing forward the step changes by 10 years will more than halve the total shipping emission above the "cap"/aspirational goal
  - Avoided emission: 7GtCO_2 by 2050 alone*
  - Emission mitigated outside the maritime sector: 8GtCO_2 by 2050 (offset)
  - TOTAL: **15 GtCO_2 before 2050**, and 31 GtCO_2 after 2050



*Note: there is no trade-off with SO_2 emissions; they will also be reduced through the increased fuel efficiency.

Benefits to ship owners and operators

- Increased cash flow as a result of improved operations and reduced fuel
  - EBIDTA increase estimated at 0.4% pa
  - Improved maritime infrastructure through projects similar to the Marine Electronic Highway in the Straits of Malacca and Singapore
- No impact on international competitiveness
  - Level playing due to global implementation
- Hassle free solution for CO_2 emissions without administration costs
  - No allowances to manage, no individual cap to comply with, services provided
- Free access to own data and industry benchmarks could further improve profits
- Compliance easily verifiable
  - Via fuel and voyage data, and analytical tools
- No set-up costs
- Reduced regulatory and reputation risks

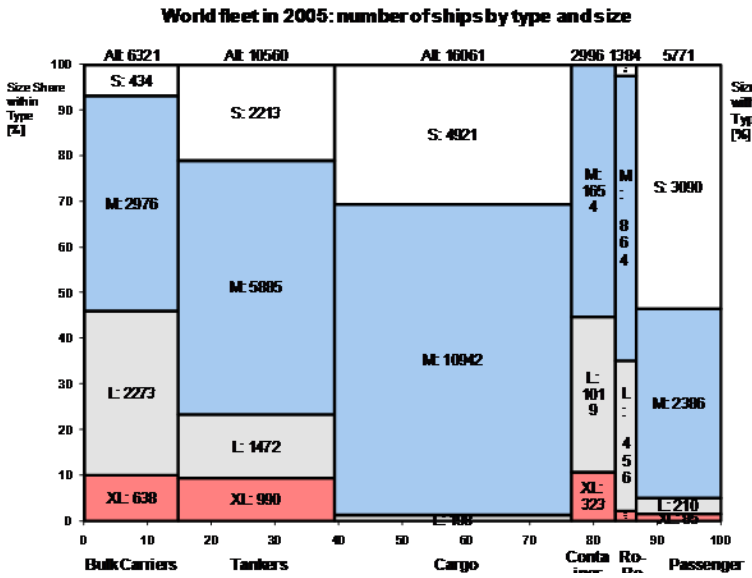
Climate change action makes a good business sense

Potential number of ships within the scheme

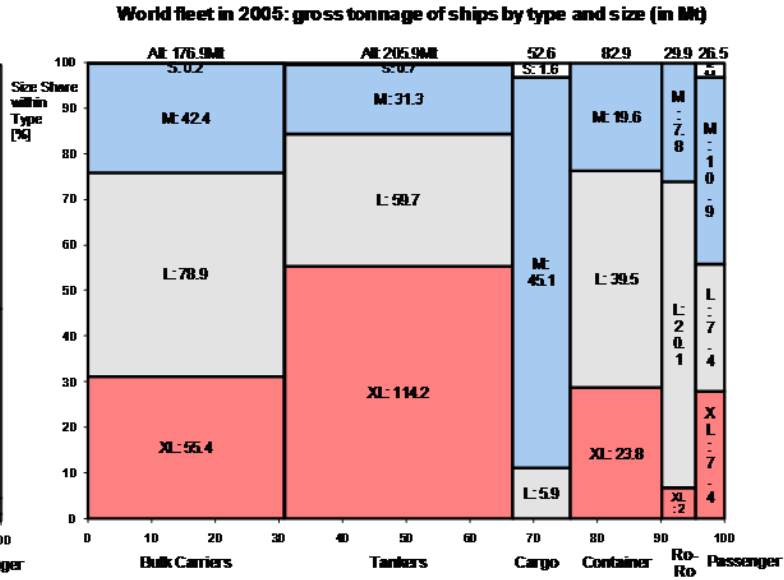
- The scheme proposes to initially ignore the smallest ships (<500 GT, or similar)
- The scheme coverage will be:
  - 75% by number of ships (32 thousands of ships)
  - 99% by tonnage of ships (570 millions GT); around 95% by emissions
    - Relevant statistics for ship number and tonnage are aggregated below
    - Offshore vessels, service ships, tugs and leisure vessels are excluded for their domestic character
    - Alternatively, a mixed threshold could reduce the number of ships by 1/3: M for Cargo & passenger ships, L for all others. It would cover 49% of ships (21k) by number and 82% by tonnage (470 millions GT).

Distribution of fleet in 2005 by type and size:

1. NUMBER of ships (Total ships = 43,093)



2. TONNAGE of ships (Total tonnage= 574.7 Mt)



Ship sizes & GT thresholds

S (small):	**GT< 500**
M (medium):	500 - 25,000
L (large):	25,000 - 60,000
XL (very large):	GT>60,000

Based on source data from: Equasis, 2007

Ship Types: Bulk Carriers | Tankers | Cargo | Container | Ro-Ro | Passenger

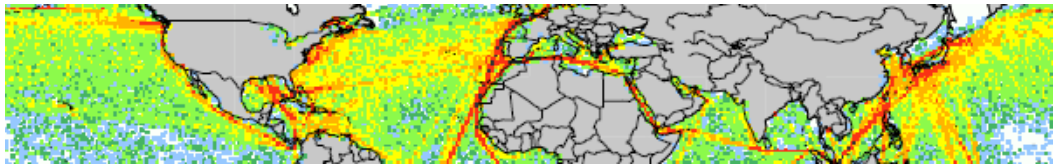
Discussion

- A flexible, non-prescriptive approach stimulating improvements and contributing funding to tackle climate change
  - Maximum efficiency (a global approach) with minimum costs
  - Approach well grounded in economics; sound details available

- **The hurdle**: political support from key parties is needed
  - If a global approach is not found complex solutions are likely to emerge
    - Such as including shipping in a regional trading scheme
    - Local funds might go to priorities different than climate change and shipping improvements

- Should we support this or a similar global approach at MEPC?
  - If not, what should be changed to make it acceptable
    - Imperative to act on climate change is no longer disputed

Back-up slides



International emission forecast & potential cap/goal

2005 baseline:
477 $MtCO_2$

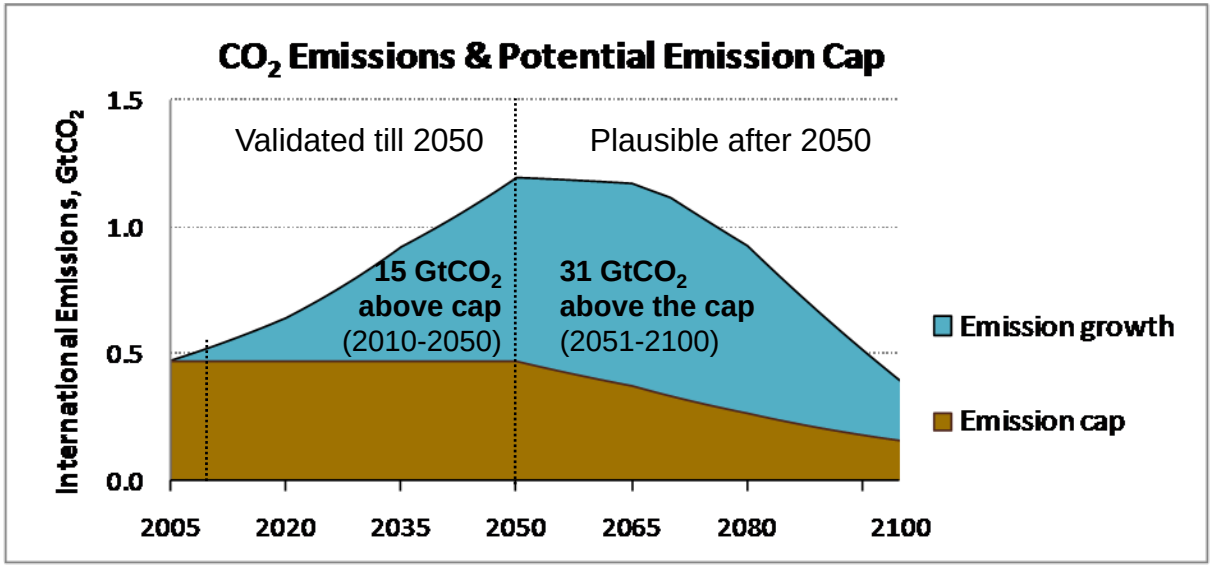


Table A2 – Regional emission growth factors used and derived global values.

Annual Emission Growth International Maritime Transport	2005 – 2020	2012 – 2035	2036 – 2050	2051 – 2065	2066 – 2080	2081 – 2100
Annex 1 countries	1.8%	2.2%	1.5%	0.5%	-0.3%	-0.5%
Non Annex 1	2.2%	2.6%	1.9%	0.5%	-0.3%	-0.5%
Implied global values:						
Average emission growth (global)	2.0%	2.4%	1.7%	0.5%	-0.3%	-0.5%
Emission multiple: end year/2005	1.3	1.9	2.5	Depends on step changes		

Table A3 – Step change assumptions.

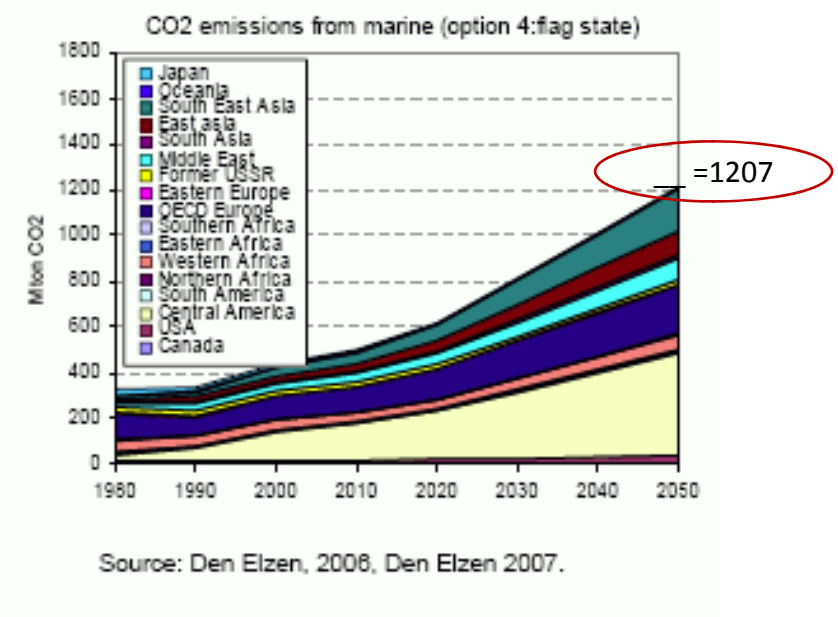
Step change	Emission reduction	Fleet affected	Switch-over period
1	40%	30%	2050 – 2070
2	95%	40%	2070 – 2100
3	97%	30%	2080 – 2120

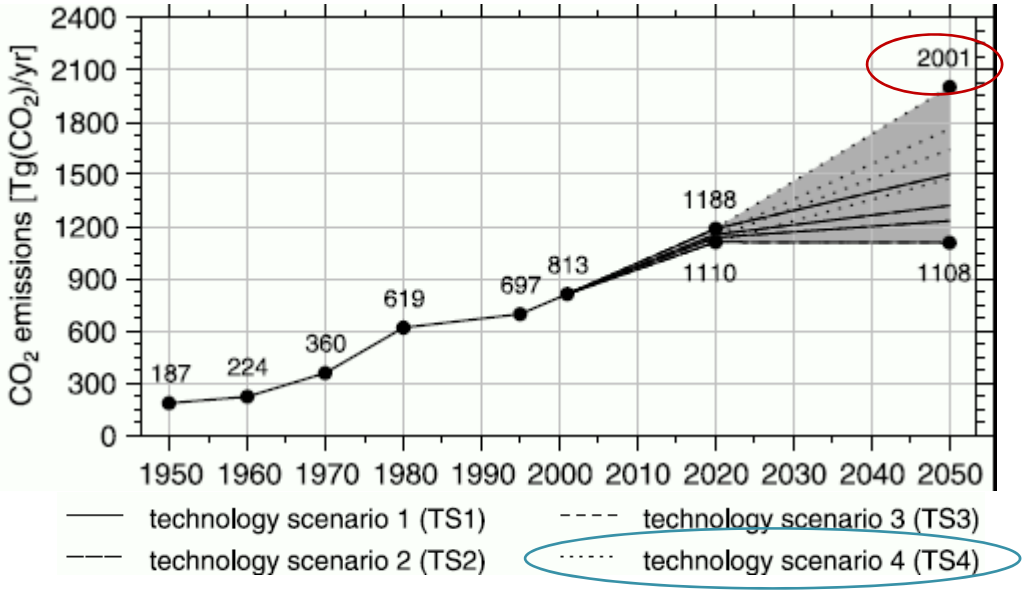
Credibility of the model and forecast

- **Normalized results within 3%** range of comprehensive & respected forecasts:
  - IMO, 2000 (average of two scenarios: 1.5% and 3% annual fleet growth)
  - Eyring, 2007: 2.2% emission growth from 2000 to 2030 (A2 scenario)
  - Eyring, 2005 and den Elzen, 2006 – bottom up models (shown below)
    - Different baselines and absolute values but growth rates very similar and therefore used

Source for mutliple	2005	2020	2035	2050
IMO, 2000	1	1.36	-	-
Eyring, 2005	1	1.35	1.88	2.42
den Elzen, 2006	1	1.32	1.97	2.58
Eyring, 2007	1	1.39	1.92	-
This Model (ERS)	**1**	**1.35**	**1.93**	**2.50**

All within 3%





Emission cap/goal details

- Proposed at the level of 2005 emissions by noticing:
  - Global emissions, with climate change action, are likely to come down to the current level around 2050 (IEA 2050 outlook)
  - After 2050 the cap/goal declines to follow the contract and convergence scenario for 550ppm stabilization
    - By 1.5%, 2.2% and 2.5% for 2051-2065, 2066-2080 and 2081-2100, respectively
      - In reality the cap/goal will be adjusted as information becomes available(the above is used to quantify impact)

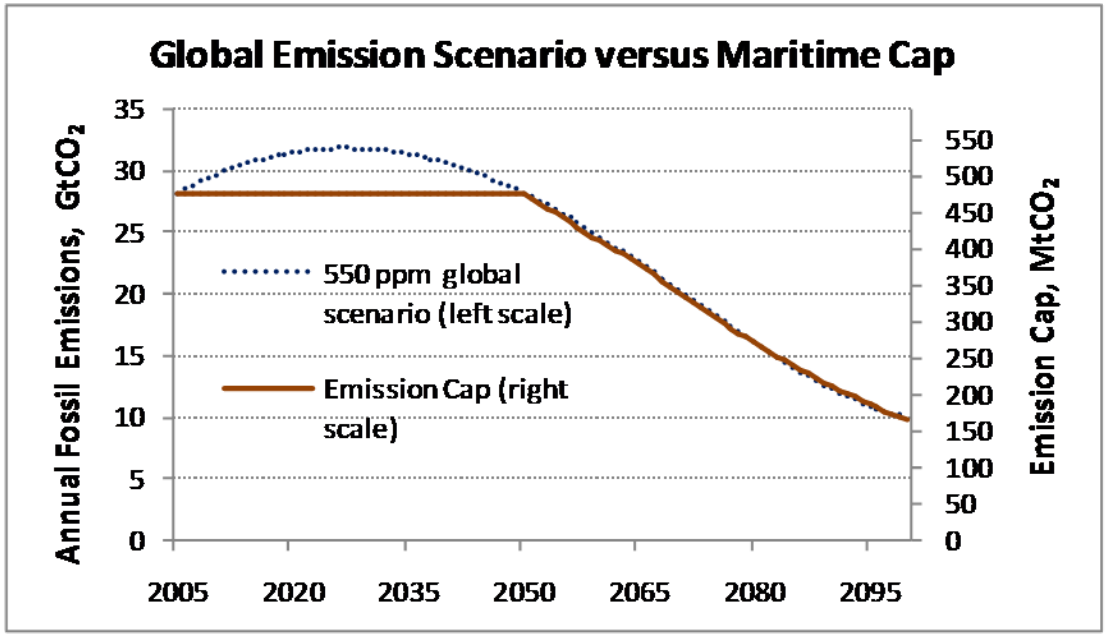
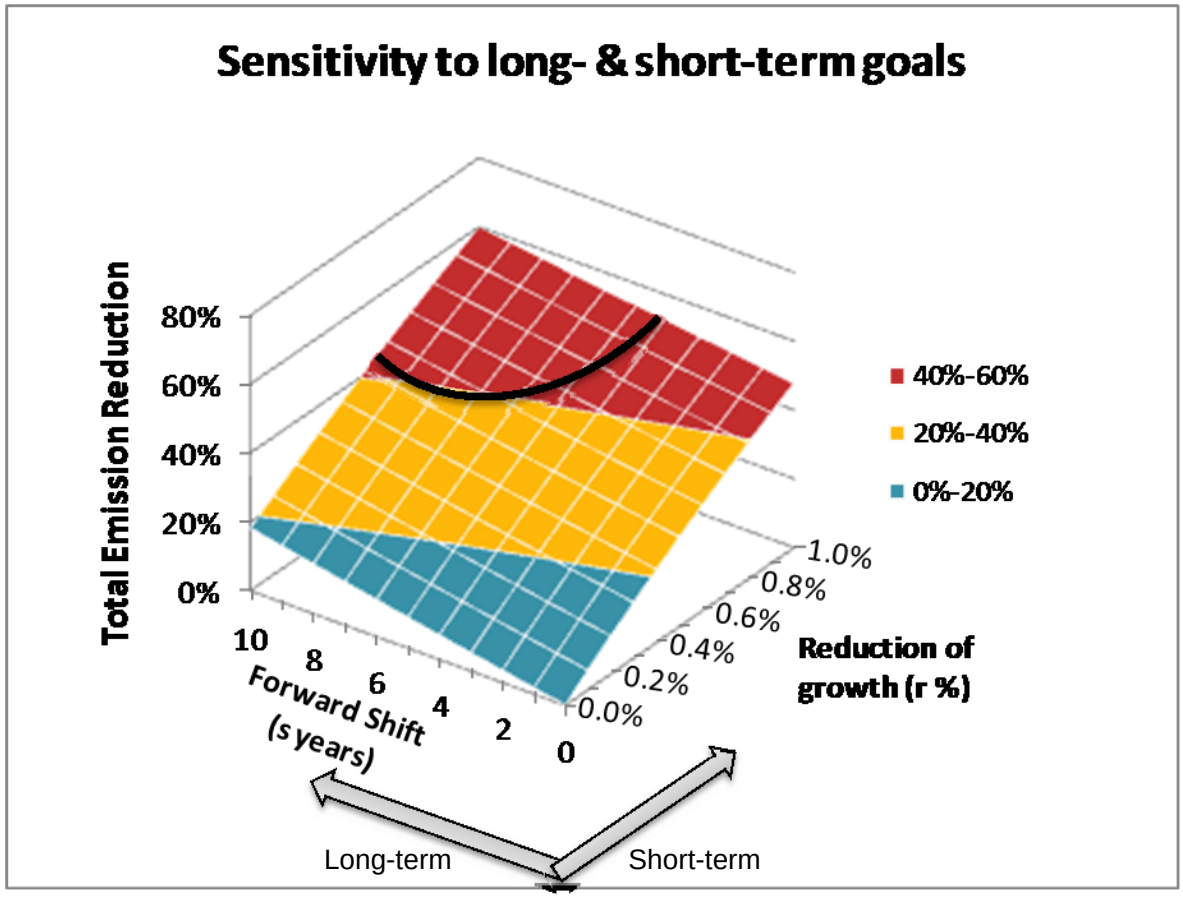


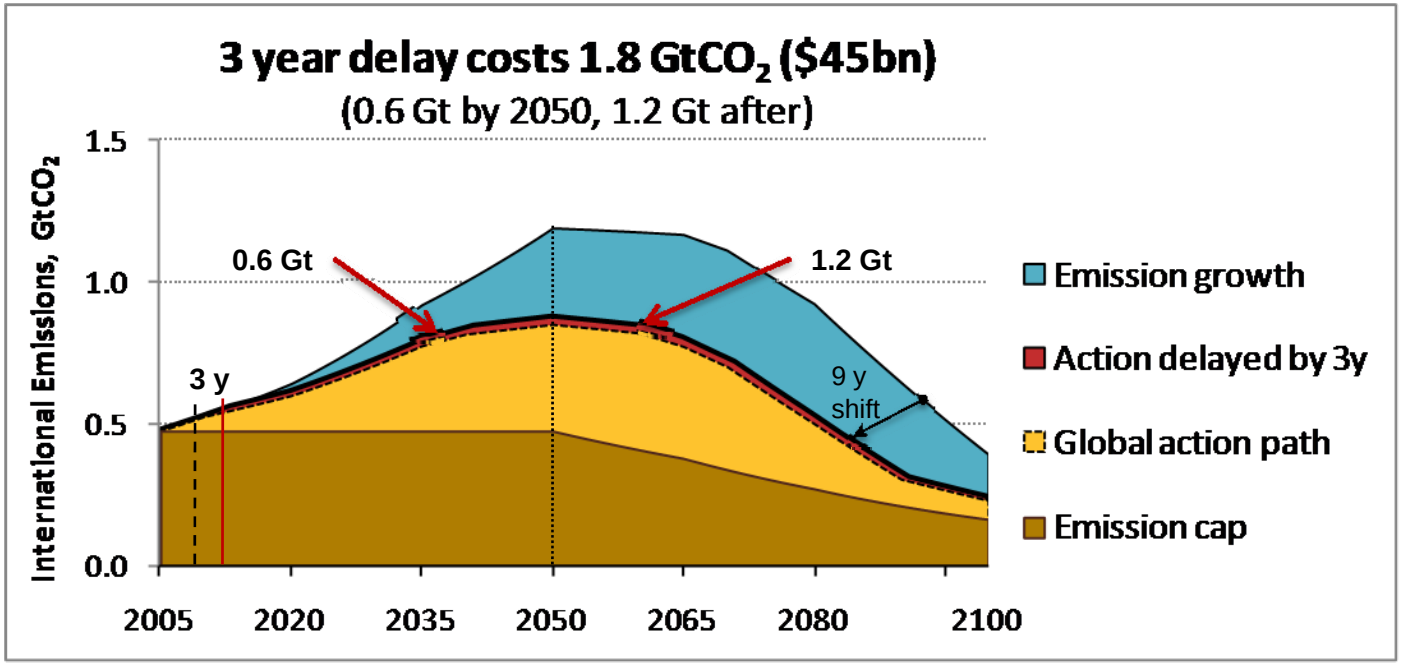
Fig. A1 – Maritime CO_2 emission cap function created.

Sensitivity analysis for total emission reduction for short- & long-term actions



Cost of 3 years delay

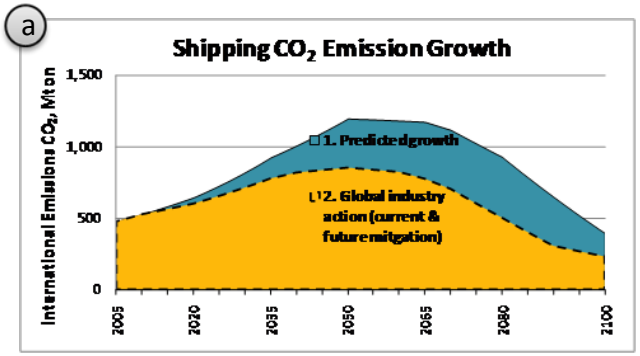
- Delay causes:
  - Improvements started 3 years later
  - Bringing forward step changes is reduced by 1 year (from 10 to 9)



  - Calculations for case 1: 0.7% annual improvement (conservative scenario)
    - » Cost of delay when 1% improvement pa is achievable is greater and shifted forward; delay cost by 2050 alone would be 0.8 $GtCO_2$ ($20bn)

Share of emissions for business as usual (solid line) **and industry taking action** (dashed line) **for two scenarios**

a



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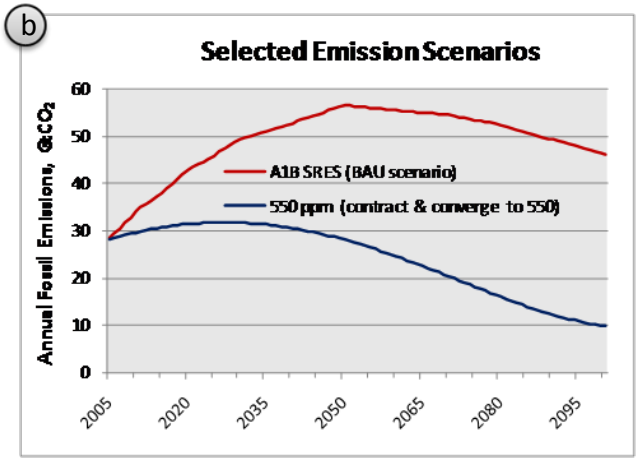

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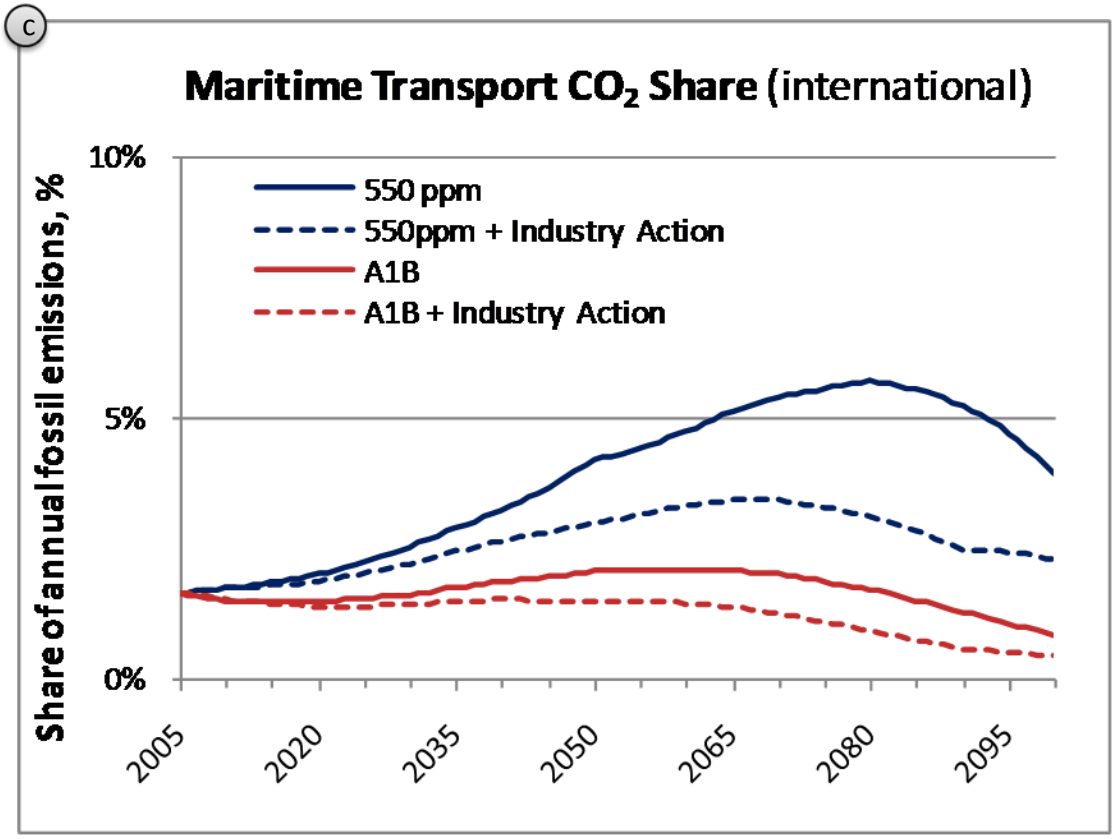

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