



# SKEMA

INTERACTIVE KNOWLEDGE PLATFORM  
FOR MARITIME TRANSPORT AND LOGISTICS

## Impact Study on Annex VI of the MARPOL Convention on Short Sea Shipping



# Origination of Study

- DG-TREN FP7 Project: SKEMA (2008-2011)
- SKEMA will establish a Sustainable Knowledge Platform to be used by policy makers and stakeholder groups in the European maritime and logistics industry.
- As part of the SKEMA Project approximately 10 studies will be carried out that will address specific areas of interest to DGTREN.



# Objective of Study

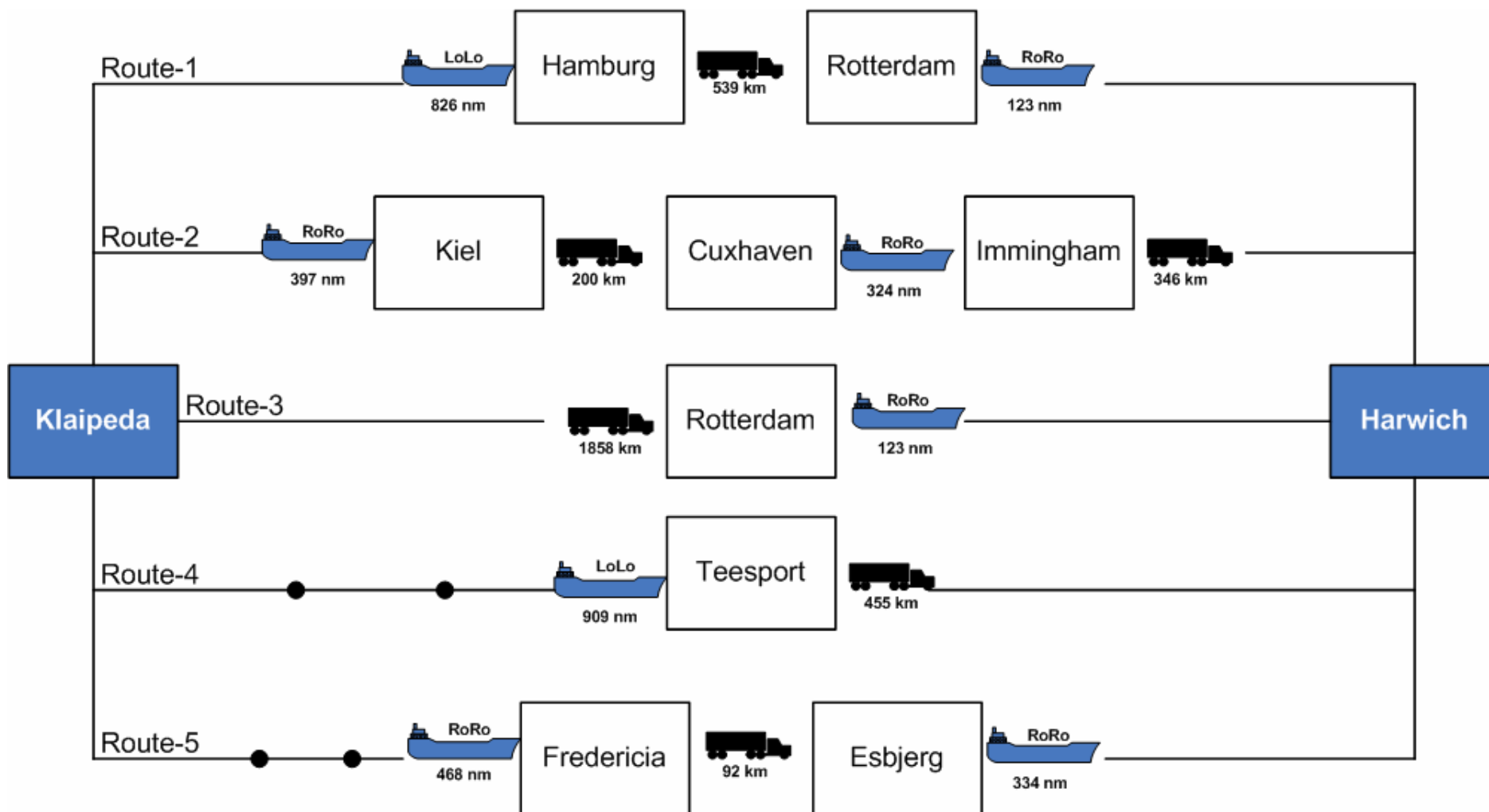
## Overall Objective:

- Determine impact of MARPOL Annex VI on the relative competitiveness between SSS and road haulage.

## Sub Objectives:

- Assess the impact of MARPOL Annex VI through the modelling of selected services in the Baltic and North Sea ECA (Emissions Control Area).
- Determine the cost impact of utilising sulphur emissions abatement technologies (scrubbers).
- Determine the cost impact of the Eurovignette Directive, incorporating EURO VI standards.

# Study Limited to Following Routes & Modal Combinations



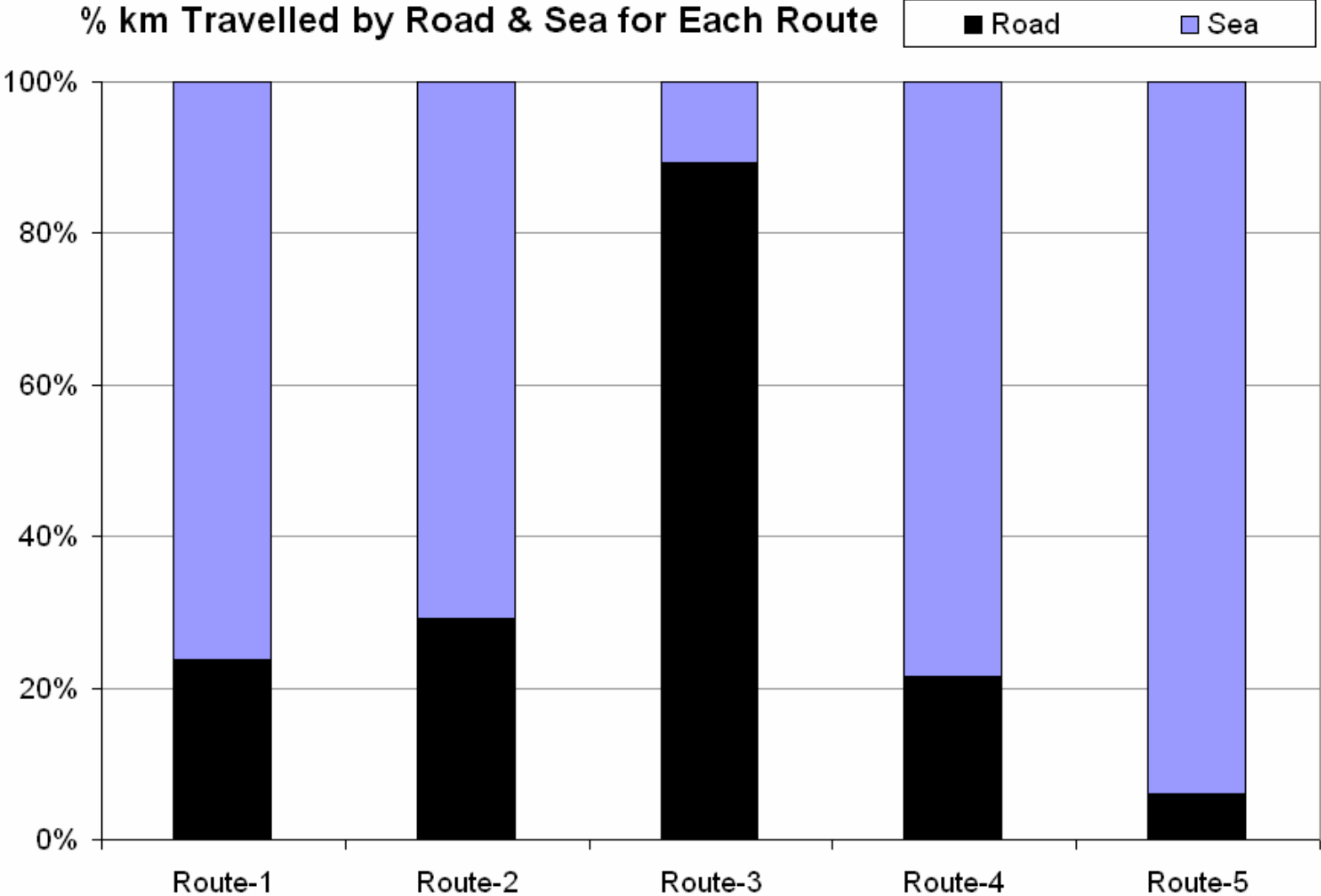
19<sup>th</sup> January 2010

BPO Seminar  
Impact of New IMO Fuel Regulations



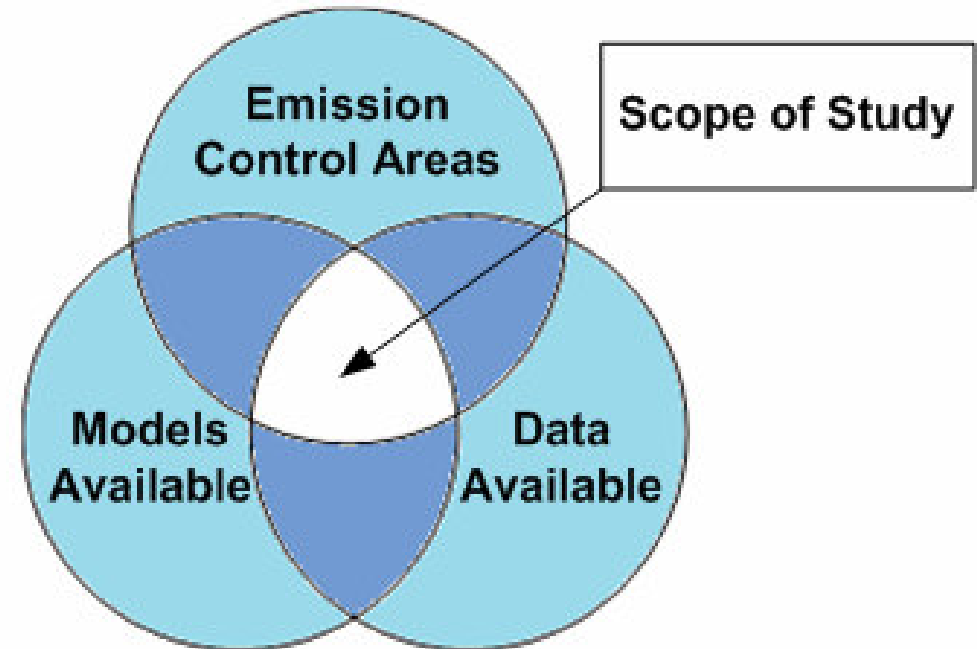
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# Relative Modal Split on Modelled Routes



# Models Used for Study

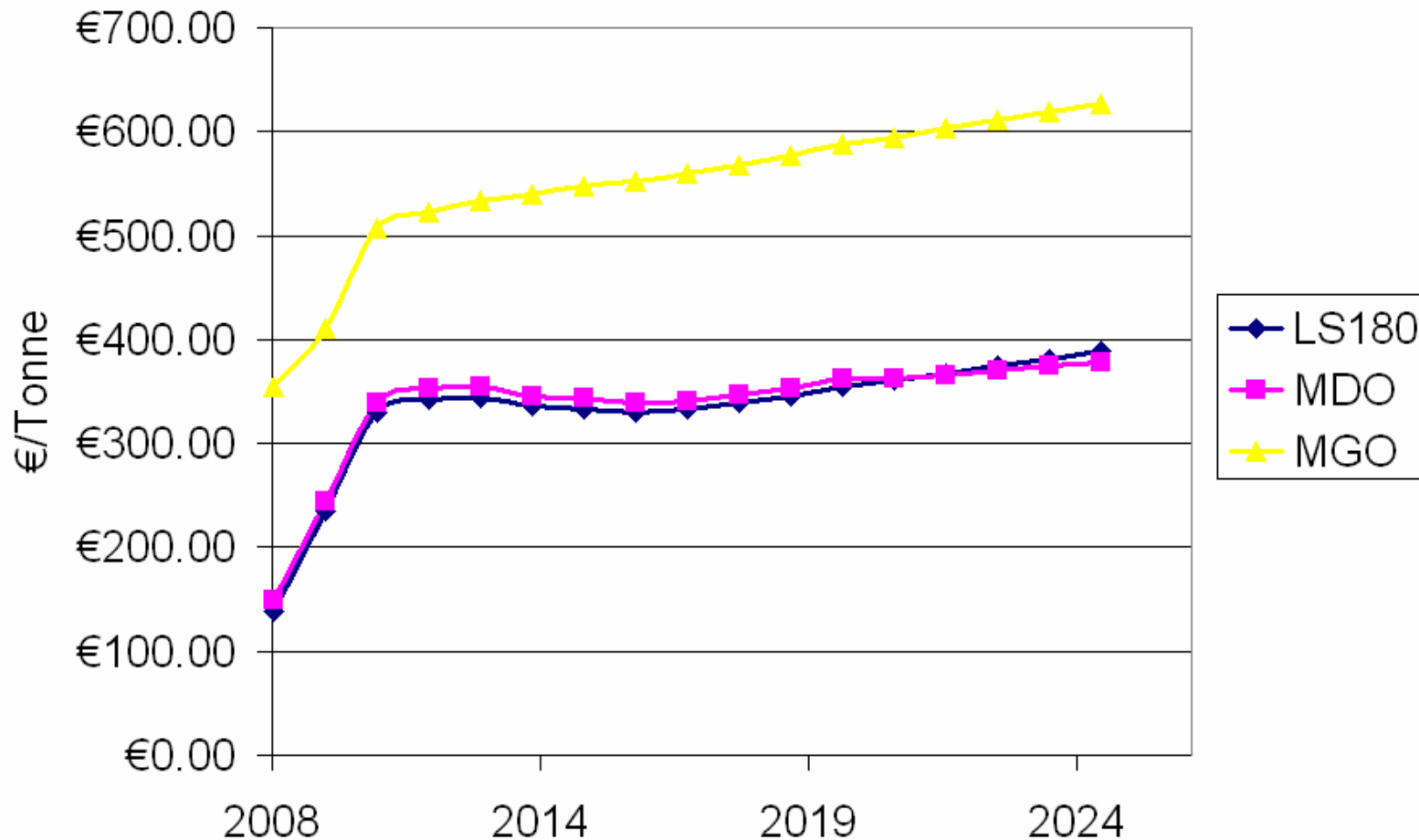
- Nineteen transport modelling approaches and models were examined.
- The TAPAS (Transportation And Production Agent-based Simulation) model & NECL's Cost model were selected.



# Primary Modelling Variables

- Fuel price: (Purvin & Gertz Study)
  - Fuel Types (LS180, MDO, MGO)
- Eurovignette:
  - Infrastructural toll (2010 = 50%, +2015 = 100%)
  - Environmental toll (2010 = 0%, +2015 = 100%)
- Exhaust Scrubber:
  - Installed or not

# Modelling Variable: Fuel Prices



# Modelling Variable: Eurovignette

- Eurovignette currently provides a framework for charging road users for infrastructural costs.
- It is proposed to introduce a framework for charging road users for environmental costs. No date has been set for this introduction.

## Infrastructural Tolls

Truck Classification	Average Charge (€/vkm)
EURO 0	€0.015
EURO I	€0.013
EURO II	€0.011
EURO III	€0.010
EURO IV	€0.009
EURO V	€0.009

## Environmental Tolls

Truck Classification	Average Charge (€/vkm)
EURO 0	€0.146
EURO I	€0.096
EURO II	€0.094
EURO III	€0.074
EURO IV	€0.053
EURO V	€0.034

# Modelling Variable: Low Sulphur Fuel



**Conversion to low sulphur fuel has both positive and negative cost impacts for ship operation:**

## **At 0.1% sulphur**

- fuel will not require pre-heating or centrifugation
- There will be no sludge to be stored or disposed
- Reduced corrosion within the engine due to sulphuric acid
- A single fuel removes the need for fuel changeovers.
- Lubrication of injectors can be a problem.

**Concentrations of 0.1% sulphur content fuel cannot be reached through blending therefore, given present technologies, MGO (marine gas oil) is the only feasible alternative.**

- MGO is approximately 5% more efficient than HFO



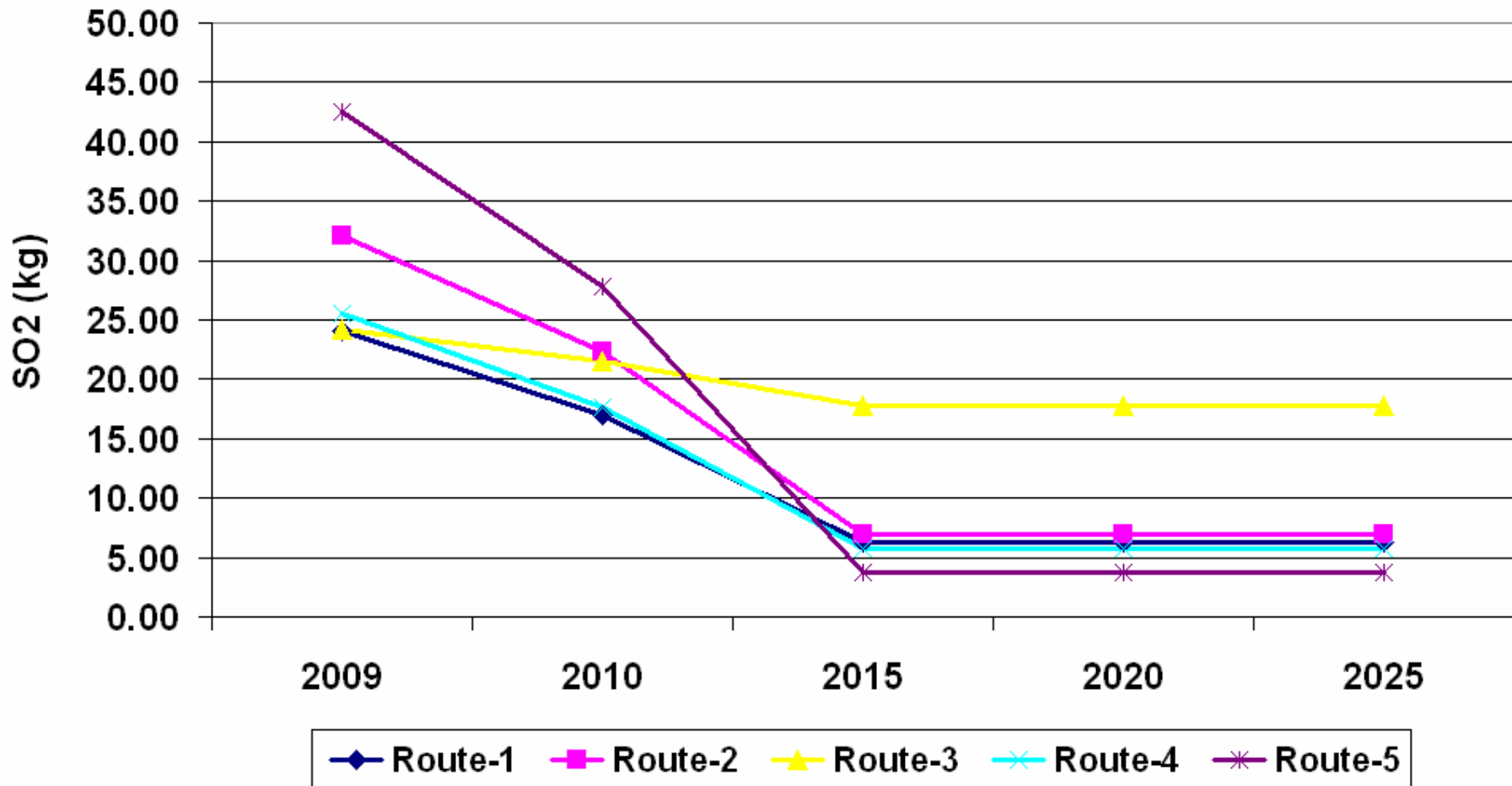
# Modelling Variable: Scrubbers

**MARPOL** provides for the use of abatement technologies such as Scrubbers to remove Sulphur from engine exhausts, thereby allowing the use of higher sulphur fuels.

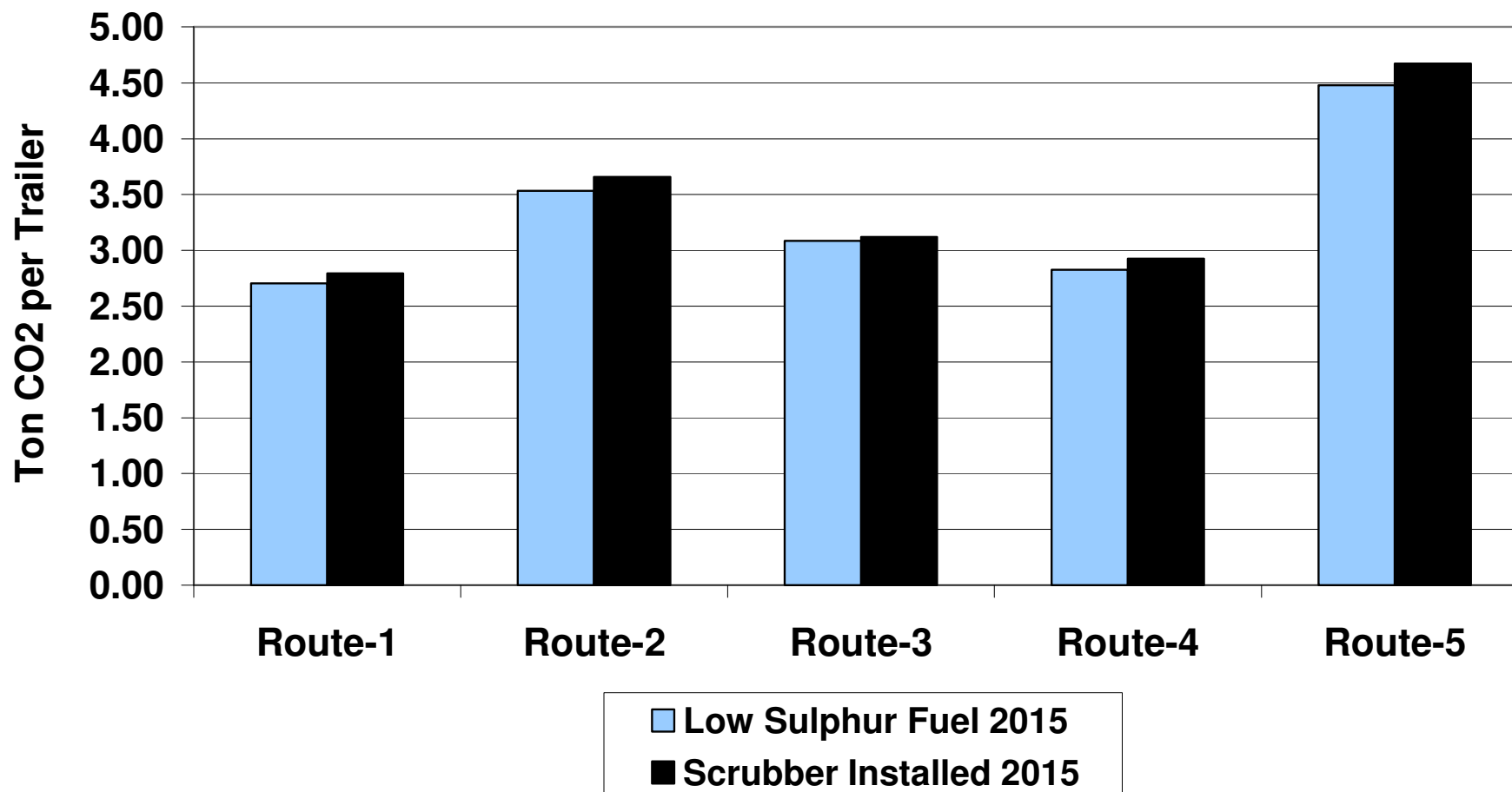
## Scrubber costs:

- Retro fitting into constrained locations
- Pumping costs
- Acid neutralisation costs
- Corrosion within exhaust stack
- Waste disposal costs for closed systems.

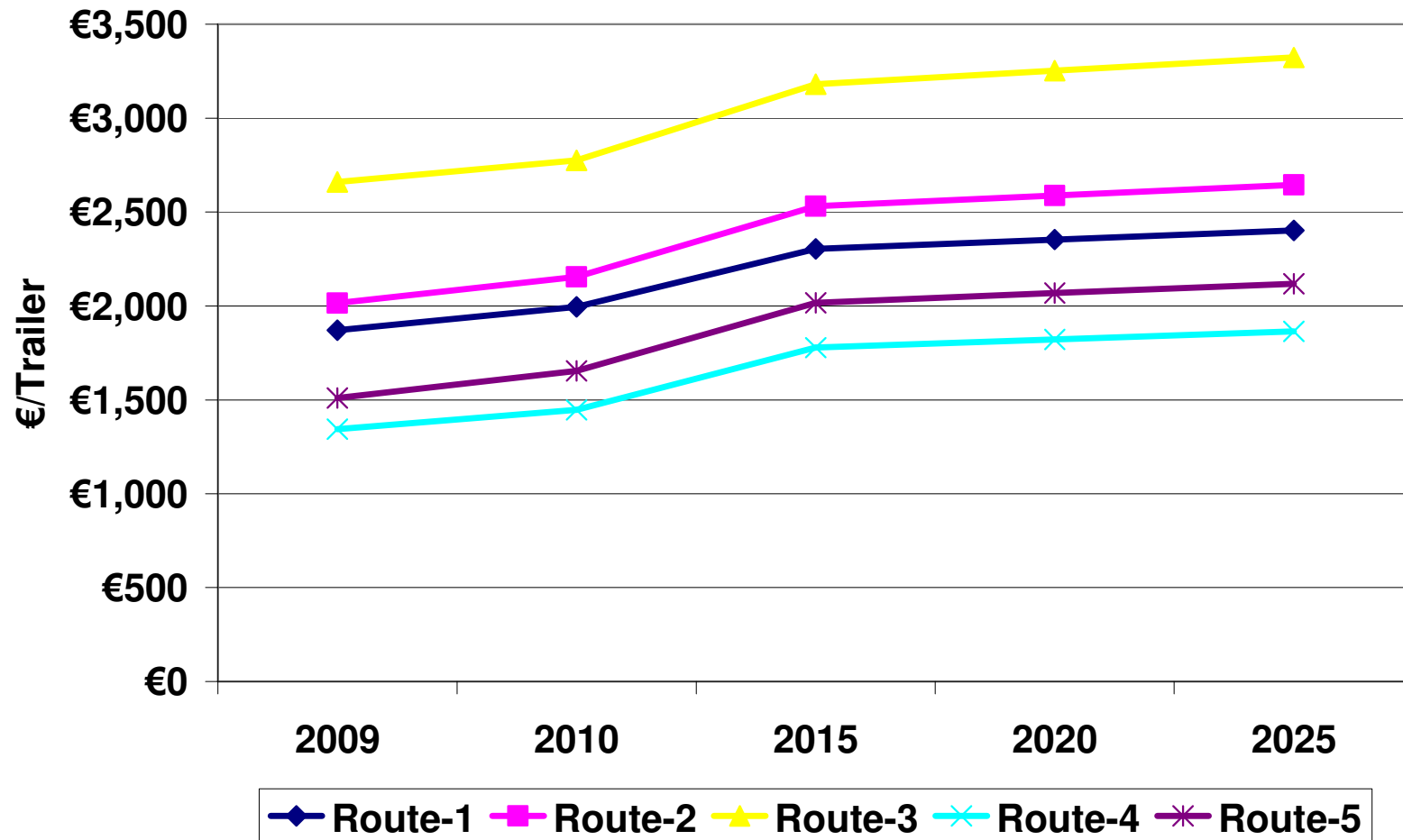
# Results: Sulphur Emissions per Trailer for Low Sulphur Fuel Option



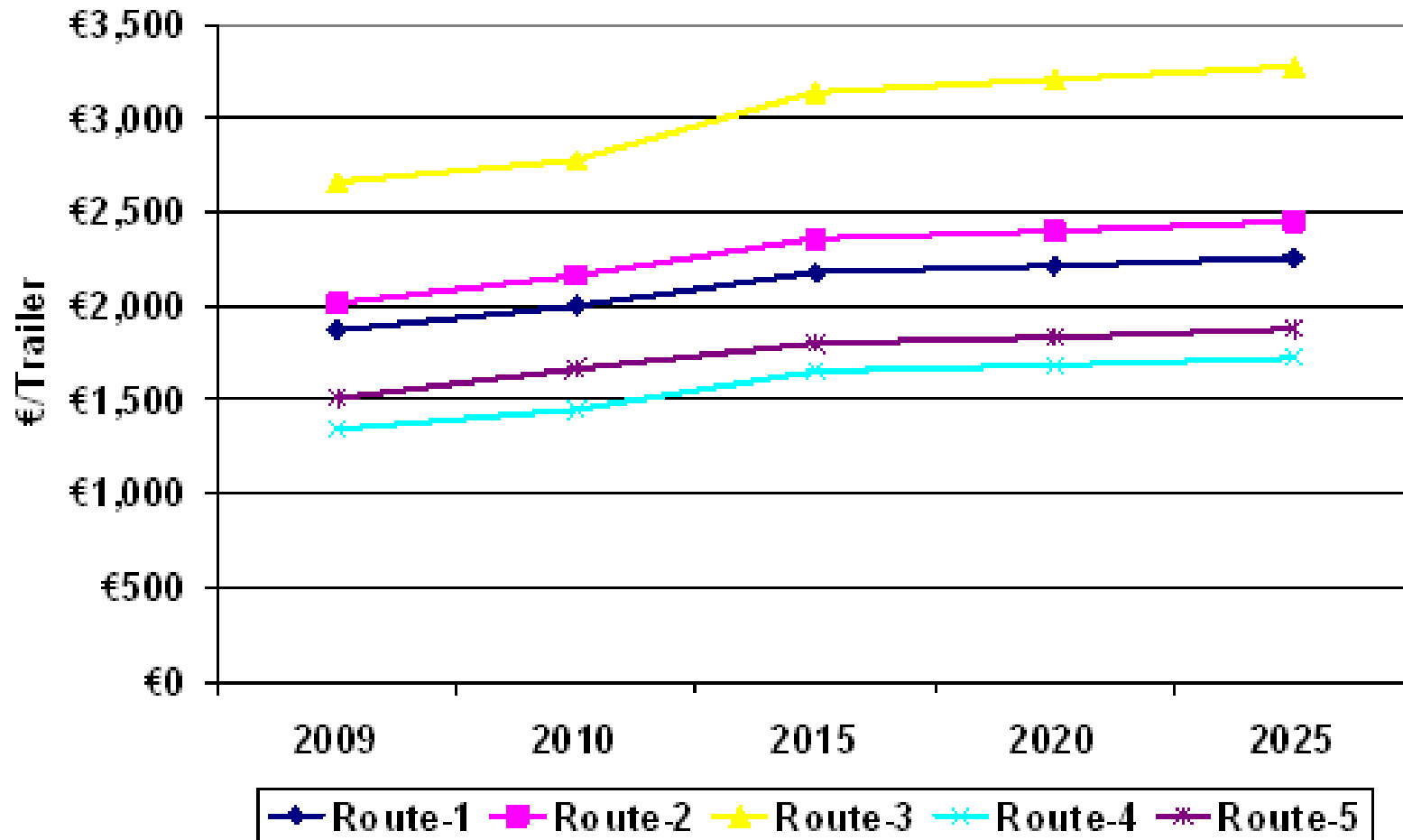
# Results: Tonnes of CO2 per Trailer for 2009



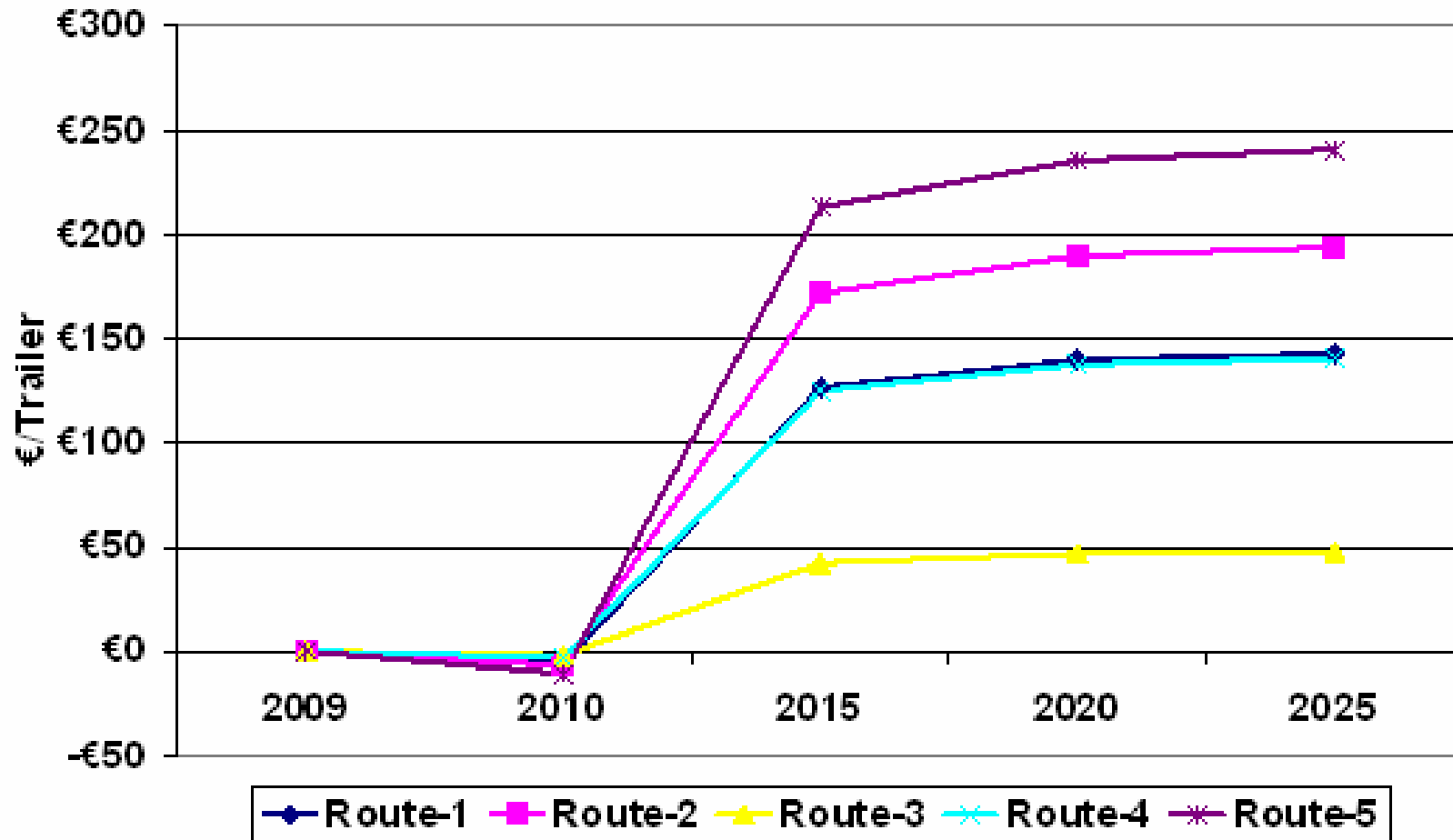
# Results: Costs per Trailer for Low Sulphur Fuel Option



# Results: Costs per Trailer for Scrubber Installed Option



# Results: Savings Achievable per Trailer for Scrubber Installed Option



# What does this mean for SSS within the Baltic?

- For the modelled scenario a large change in the current modal-split is not expected.
- If wide scale adoption of scrubbers becomes a reality ships using scrubbers will require receiving facilities.
  - Storage & dispensing of caustic for neutralisation reaction within scrubber.
  - Receipt of and disposal of waste salts & slurries from closed system scrubbers (more probably in Baltic due to brackish nature of sea).
- New dry scrubbers are also currently being developed, but are still at the early stages of development.

# Work Yet to be Completed

- Determine impact of MARPOL Annex VI on:
  - NOx Emissions per Trailer
  - Particulate Material Emissions per Trailer
- Include proposed Future Ballast Water Requirements.
- Isolate & Quantify Impact of Eurovignette.
- Determine impact of applying a Sulphur limit of 0.5% in 2015 instead of a 0.1% Sulphur limit.
- Review potential Impact of Proposed EC Led Mitigation Actions.

# Potential Mitigation Actions

1. Create a demand stimulus to promote Motorways of the Sea and Short Sea Shipping.
2. Improving access to finance for investment in ‘healthy’ shipping or port services.
3. Investments in port development and hinterland connections.
4. Scrapping scheme to address overcapacity and to counter the absence of new shipbuilding contracts.
5. Incentives for ordering/purchasing more environmentally friendly vessels /vessel equipment.

# Potential Mitigation Actions

6. A dedicated research program for developing a ‘new generation’ of clean ships.
7. Stimulate rethinking on new technologies and ways of organizing logistic chains.
8. Prevent proliferation of substandard shipping.
9. Exploit newly available maritime statistical data to assess trends/length for hauls between EU ports.

# New DG-ENV MARPOL Study



## Title: Analysis Of The Competitiveness Of European Short Sea Shipping Compared To Road And Rail Transport

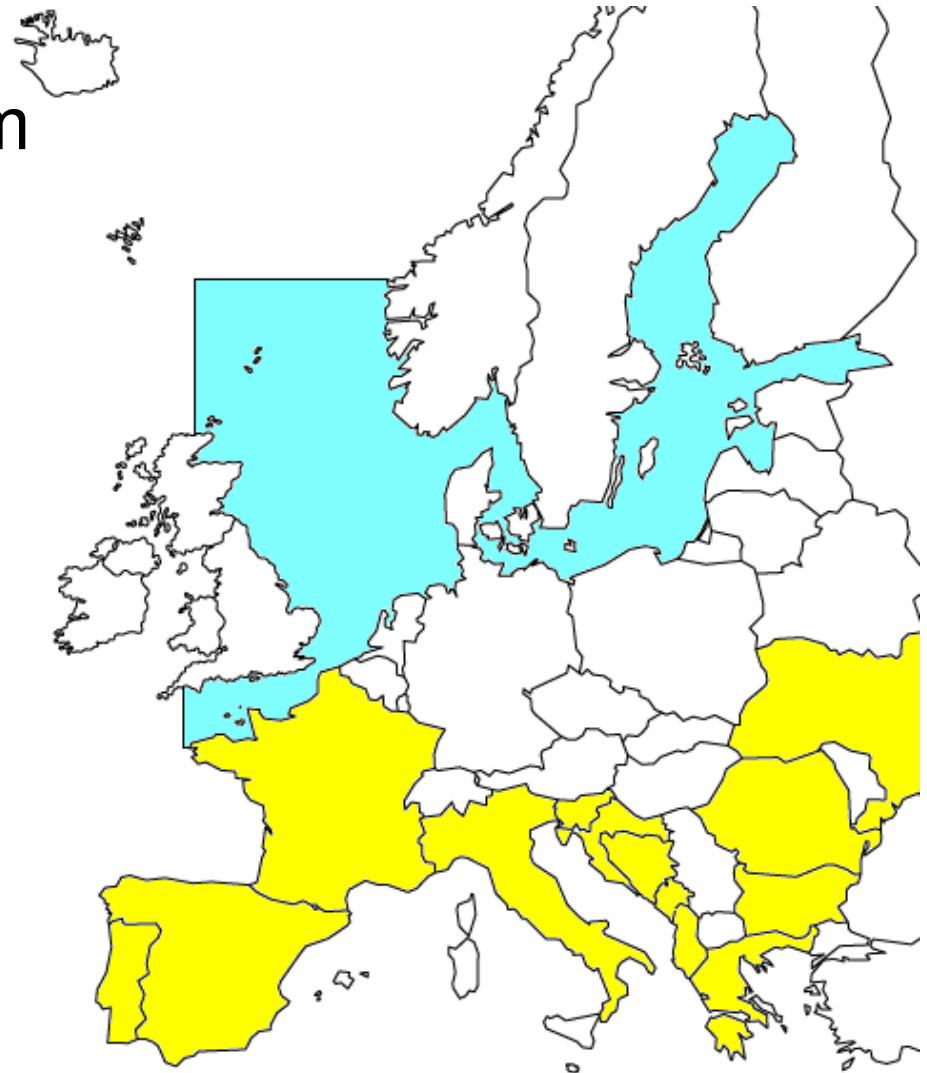
This is a 6 Month Study which commenced in Dec'09 and is led by Transport & Mobility Leuven (TML). The outcome of this study will be threefold:

1. A **quantitative assessment** of the likely evolution of the **relative competitive** situation of SSS and road/rail.
2. A **qualitative assessment** of the likely evolution of the **relative competitive** situation of SSS and road/rail.
3. An **assessment of the potential impact** on European imports and exports (especially regarding to trade in low value goods), by adding international trade considerations – probably medium to long term – to the results of 1. and 2.



# Other Considerations of Note for BPO

- Shift of freight traffic from Northern to Southern Ports.
- Adoption by US of 0.1% or 0.5% Sulphur limit in 2011.
- Opening of Northern Routes.
- Degree of compliance & enforcement.



# Thank you for your attention

19<sup>th</sup> January 2010

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