# Marine Fuels

Martin Suenson
Lisbon February 2007

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# High Level Views

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

## EUROPIA

Measures should be

- Justified: Quantitative environmental impact.
- Cost-effective measures compared to the alternatives.
- Goal-based and technology-neutral.
  - Let the markets find the optimal solutions to a specified goal.
- Implementable
  - Practically, economically, legally
  - Timing
- Examine for their full impact
  - Environmental
  - socio/economic

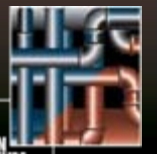
## Current Annex VI, Appendix III

- description of the land and sea areas at risk
- contribution of SOx emissions from ships and their adverse impacts
- relative costs of reducing sulphur depositions from ships when compared with land-based controls.

# Current Annex VI – a solid basis

- Based on principles of sound science, goal-based approach and socio/economic considerations.
- Has led to the implementation of the existing SECAs to address air quality problems.
- Contains provisions to address local air quality problems in the future.

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



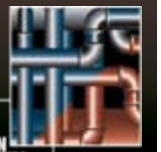
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Annex VI rev. – T.o.R

- "review technology and the need for reduction of SOx, justify and recommend future limits of SOx emission"

- Retain principles of existing Annex VI
  - Justified environmental need
  - Cost-effectiveness
  - Technology-neutral
  - Holistic view on impacts
- Abandoning these principles can lead to measures that
  - Are not environmentally justified
  - Have very large adverse socio/economic impacts

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



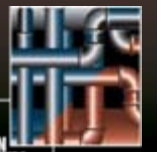
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Outline

Illustrations:

- Perceptions can be misleading
  - Emissions versus impact
- Full impact assessment requires knowledge of affected industries
  - Marine fuels – a refiner's view
- Conclusions
- Recommendations

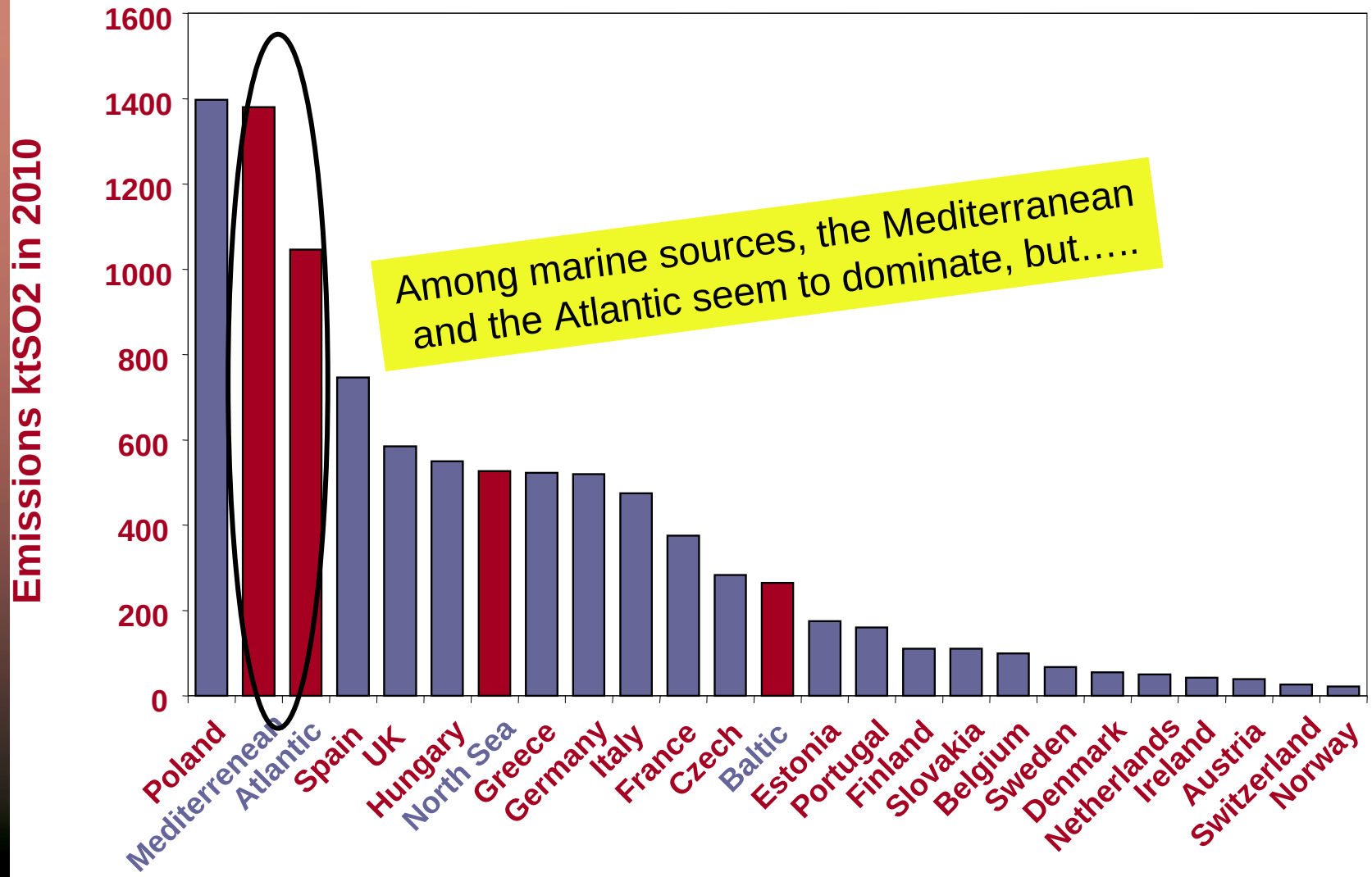
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



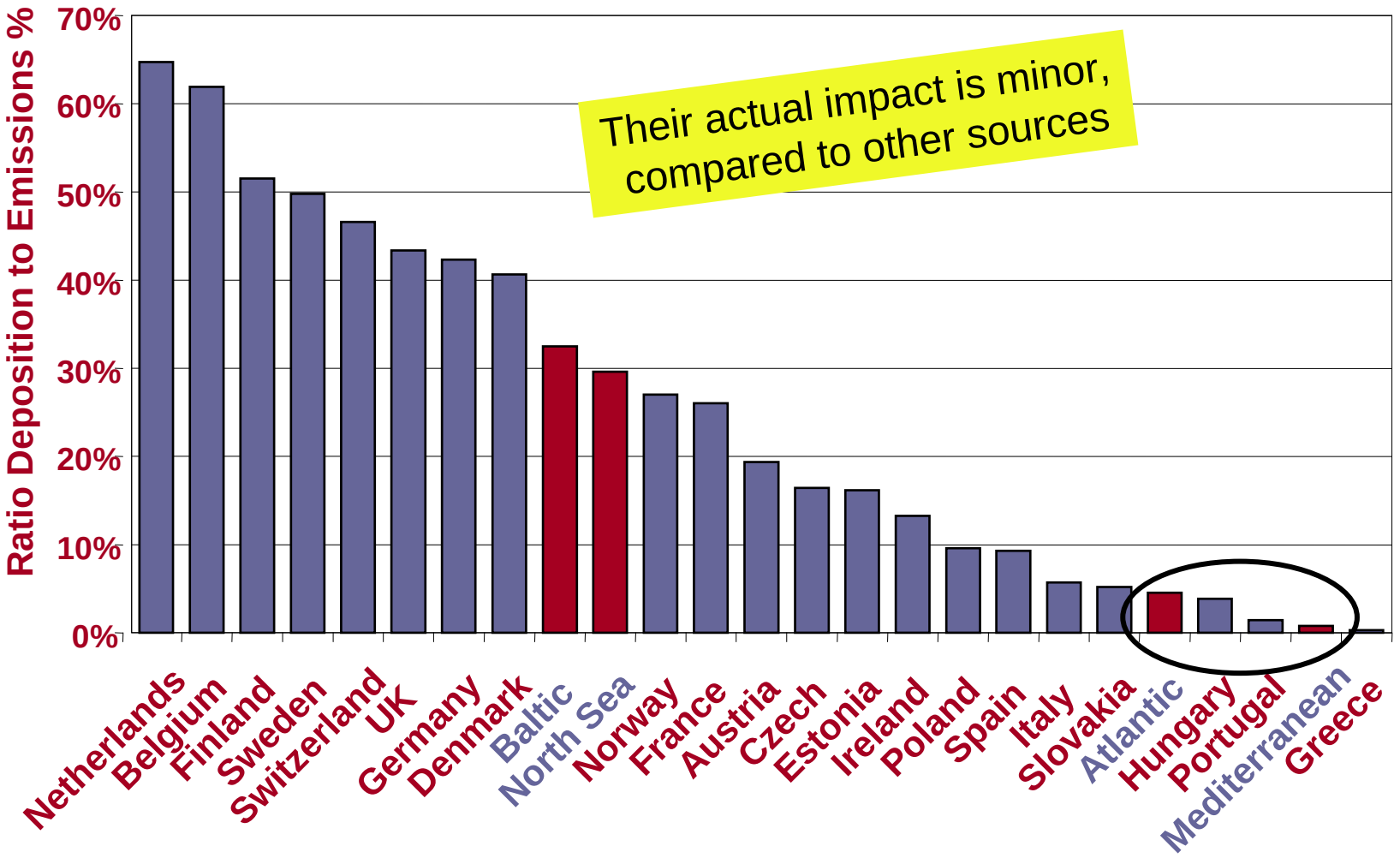
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Source of SO2 Emissions

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



# Source of S deposition on acidification exceedance areas (areas at risk)



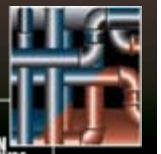

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Conclusion

- Emissions as such should not be the target. Ignoring the impact of the emissions can lead to wrong prioritization.
- World-wide measures are likely to be less effective than local measures
- Informed decisions require knowledge of
  - Emission – deposition relationships
  - Environmental needs in specific deposition areas
  - Cost comparison with other sources

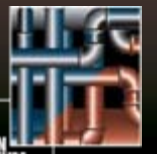
(Appendix III protocol)

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

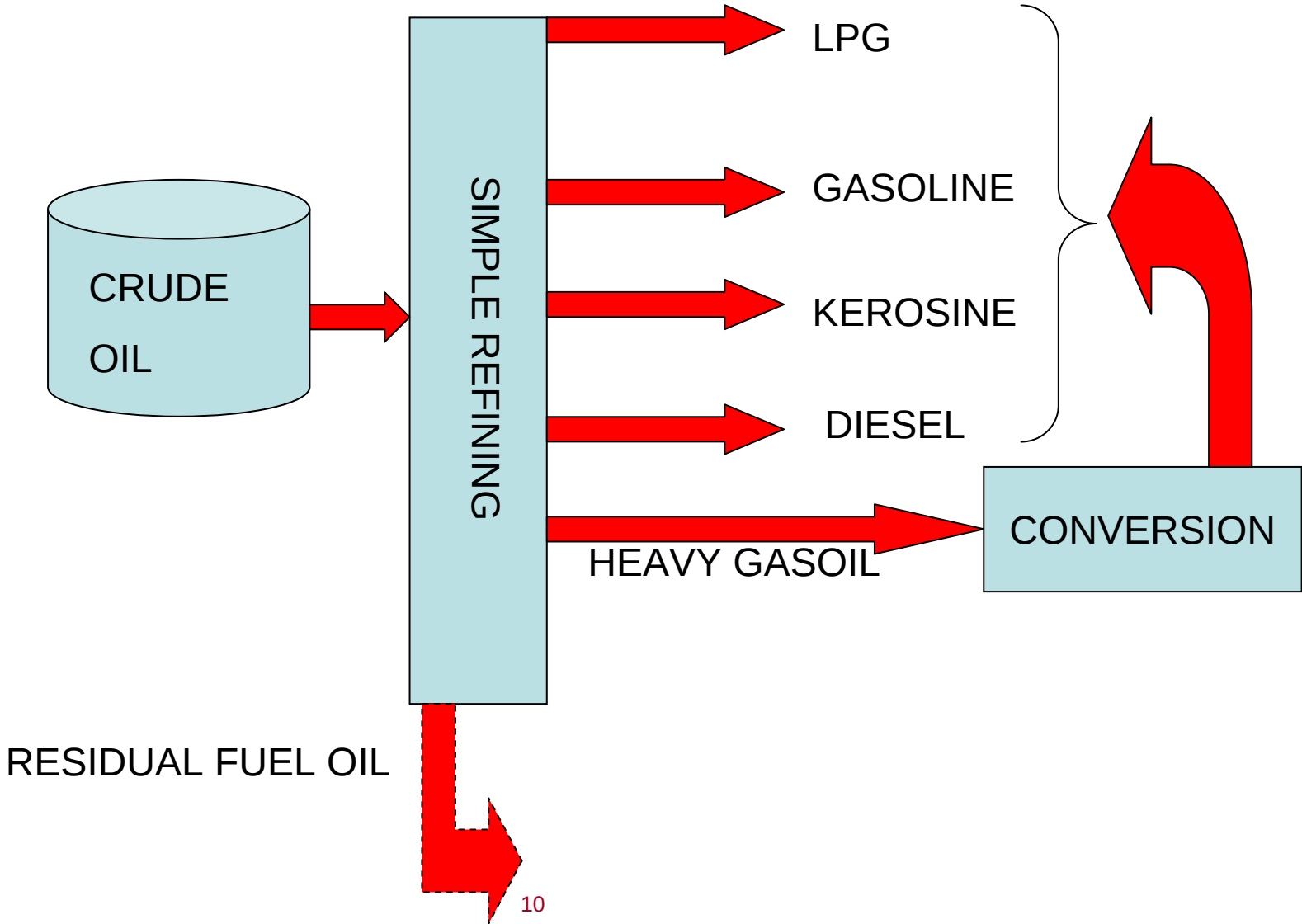
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Marine Fuels– a refiner's view

# Refining




EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Changes in the demand patterns for marine fuels

## Moderate changes (f.ex. existing SECAs)

- Operational Measures
  - Crude Selection
  - Segregation of low sulfur residual fuel streams

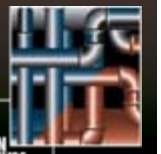
➢ ***Refining Industry could adapt relatively easily and quickly***

## Large scale changes

- Large volumes of low S residual fuel
- Very low S residual fuels
- Distillates

- Operational measures do not suffice
- Requires investment in structural adaptation of the refineries

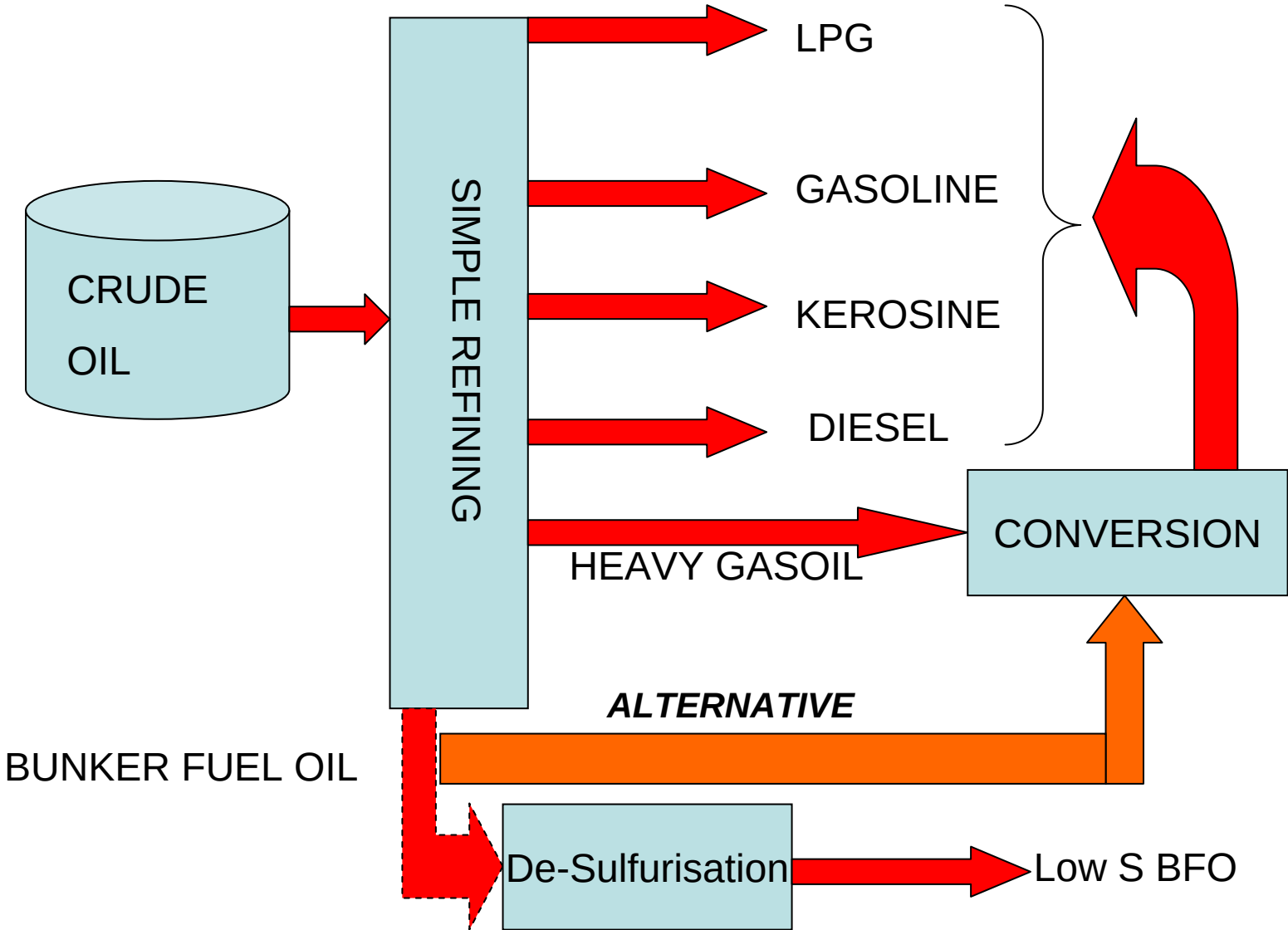
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Refining

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



# Example: An “all distillates world” European response options

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

Large scale change:

- World: 200 mill tpa of additional distillates. 200 mill tpa of distillates require ca. 600 mill tpa of crude (more than annual production of Saudi Arabia)
- Europe: 50 mill tpa of additional distillates
  - Europe currently imports ca. 33 mill tpa of distillates from a.o. Russia

Options

- Invest in refineries
  - Ca. 50 conversion complexes, 30 billion €
  - 20+ years to complete the change
  - 35 million tpa CO2 extra (20 million tpa net)
- Import products from for example Russia or Middle East
  - Not much scope since change is presumed to be global
- Replace distillates in other markets (ex.: heating oil to gas)
- Leave marine fuels markets and seek alternative outlets for residual fuels

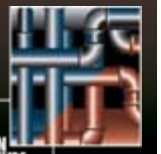
Response would be a combination of these options

# Impacts

Market reactions can only be predicted in qualitative terms. However, some effects are very likely.

- Supply situation would become uncertain
- Cost of marine fuels would more than double
  - –Fuel is dominant part of cost of shipping
  - –Modal shift?
- Price increases for all distillate products
  - –Automotive diesel
  - –Jet
  - –Home heating oil
- European dependence on oil imports would increase
- Gas prices and gas imports would increase

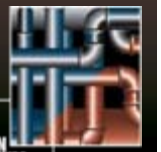
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



# Conclusions

- Large scale changes in marine fuels
  - Would create perturbation and uncertainties in the marine fuels market.
  - Change in refinery configuration can only be gradual and would take some 20 – 30 years.
  - Marine fuel demand pattern must therefore also change gradually over similar time-frame – an abrupt switch-over not feasible
  - Process needs careful planning and management
    - Rapid forcing can lead to sharp market disturbances and distortions
  - The impact will be felt in all energy markets

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



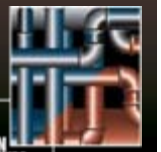
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

# Summary

- The guiding principles of the current Annex VI are still valid:
  - Justified environmental need
  - Cost-effectiveness
  - Technology-neutral
  - Holistic view on impacts
- Abandoning these guiding principles can lead to wrong prioritization and large adverse socio/economic effects:

  World-wide measures
  - Are most likely not environmentally justified
  - Can have large adverse socio/economic and environmental impacts
  - Will take a long time to deliver

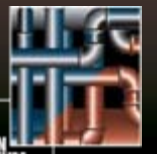
EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



# Conclusions

- The current Annex VI already has provisions to address local air quality problems.
- Annex VI should only be revised if there is a clear need.
- During such revision, the guiding principles of the current Annex VI should be used.

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION



EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

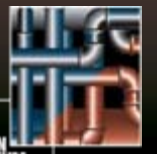
# A Way Forward ?

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

1. Identify air quality problems, caused by ships, that cannot be addressed by Annex VI as is, using Appendix III methodology
   - Specified areas
   - Quantitative contribution of SOx emissions from ships and their adverse effect (taking into account wind patterns etc.)

2. Identify the measures needed to address these problems.

3. Propose revisions of Annex VI to allow these measures, applying the high level principles of the existing Annex VI.
   - relative costs of reducing sulphur depositions from ships when compared with land-based controls.
   - analysis of socio/economic impacts.
   - implementation considerations.



EUROPEAN PETROLEUM INDUSTRY ASSOCIATION

EUROPEAN PETROLEUM INDUSTRY ASSOCIATION