Challenges for European Refining:
The dash for diesel...
... and biofuels

Dr Panos E. Cavoulacos

President, EUROPIA

The 2nd South East Europe Energy Dialogue
Thessaloniki, 21 May 2008

EUROPIA represents the interests of the downstream oil industry in Europe

- BP
- Cepsa
- Chevron
- ConocoPhilips
- Eni
- ExxonMobil
- Hellenic Petroleum
- MOL

- Neste Oil
- OMV
- Galp Energia
- PKN Orlen
- RepsolYPF
- Saras
- Shell
- Statoil
- Total

Its 17 members cover 80% of the EU-27 refining capacity

Challenges for European Refining

- Demand/trade trends to 2020
  - Strong growth of diesel and decline of gasoline in Europe
  - Trade flows continue to grow – diesel into Europe, gasoline to USA
- Significant refining investment underway
  - $30 billion globally since 1995 (P&G)
  - New "balanced" refining capacity in Middle East, India and China
  - Emphasis on upgrading – hydrocrackers in EU, cokers in USA
  - European supply security requires us to invest for the future
- New Middle East & India capacity could exceed demand in 2012
  - Competing with Europe for gasoline exports to USA
  - More jet fuel and diesel into Europe
- Refining ownership starting to shift in Europe
  - Emergence of independent, Russian major and petchem players
- Despite European Refining's ongoing efficiency gains, CO_2 emissions will likely increase
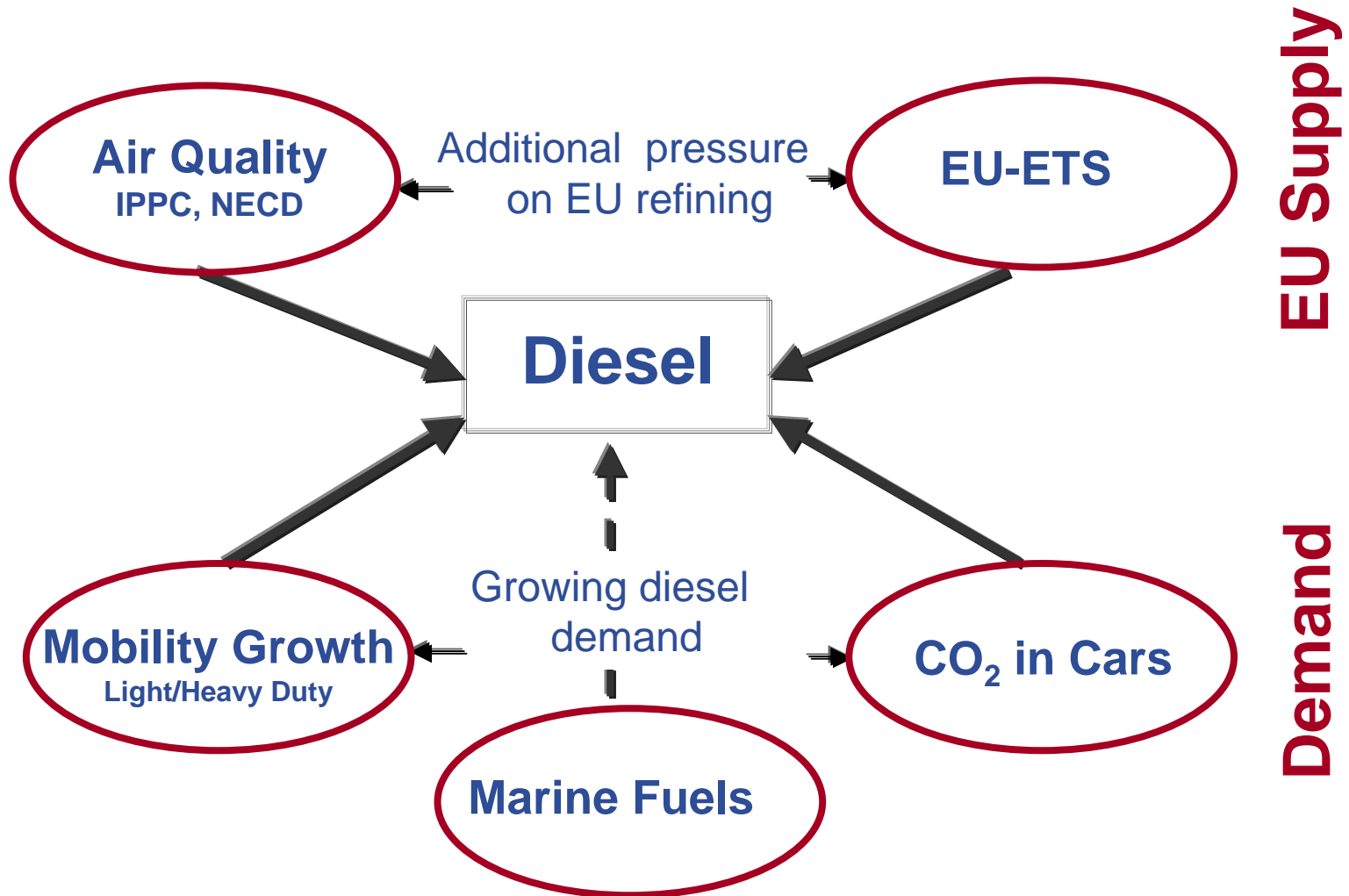- EU policies impact heavily our industry and our profitability

Cleaner fuels help engine technologies to improve air quality, but their production emits more CO_2


Emissions, % of 1995 level

CO_2 emissions

Legend:
- CO
- NOx
- PM-diesel
- VOC
- Benzene
- SO2
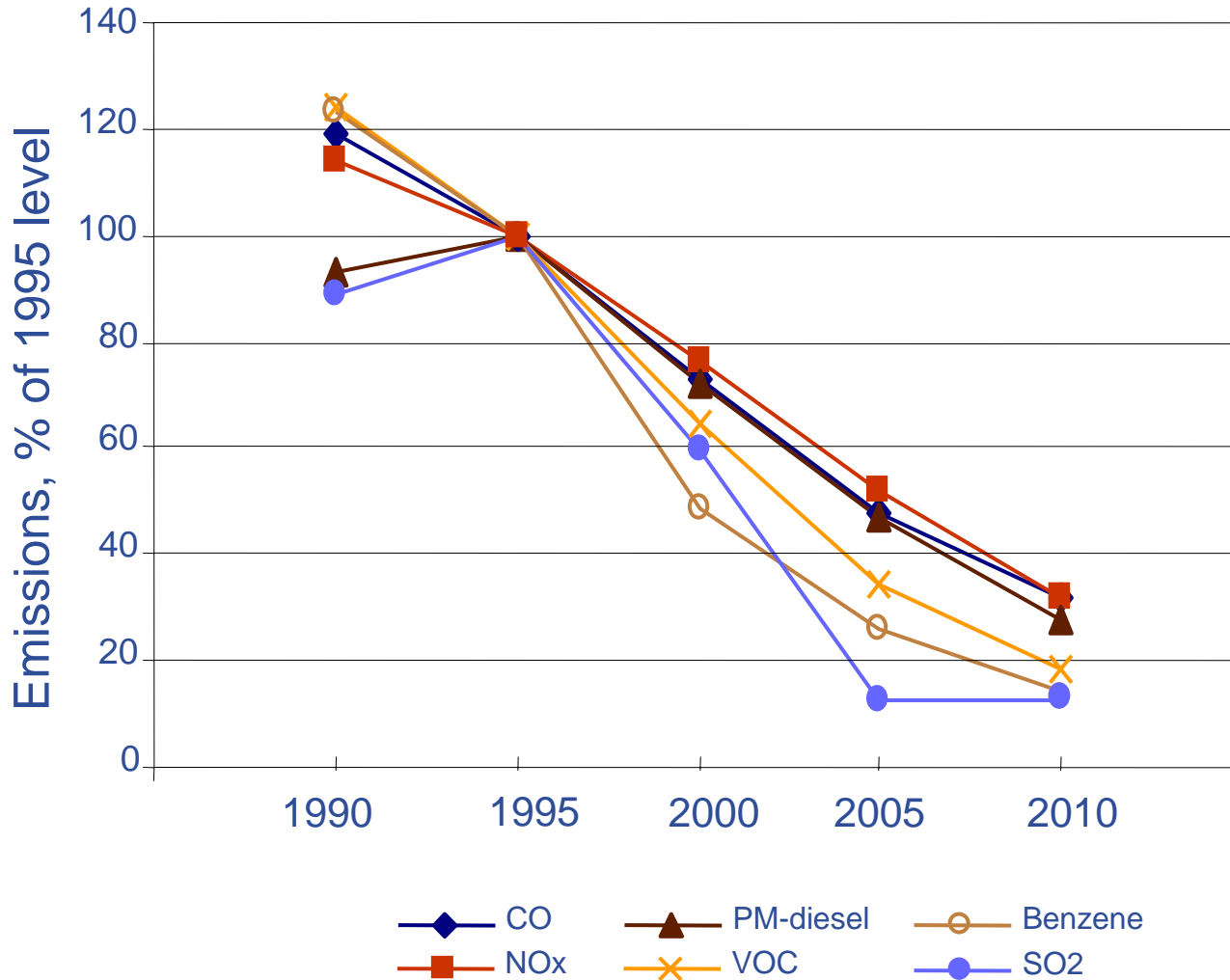
The dash for diesel...

European legislation adds significant pressures on diesel fuel, both from the demand and supply side

europia
european
petroleum
industry
association

EU Supply

Demand

Air Quality
IPPC, NECD

Additional pressure on EU refining

EU-ETS

Diesel

Mobility Growth
Light/Heavy Duty

Growing diesel demand

CO_2 **in Cars**

Marine Fuels

Current EU legislation and taxation schemes will continue to generate growth in diesel demand

● 389

Diesel Demand

Million tonnes per year

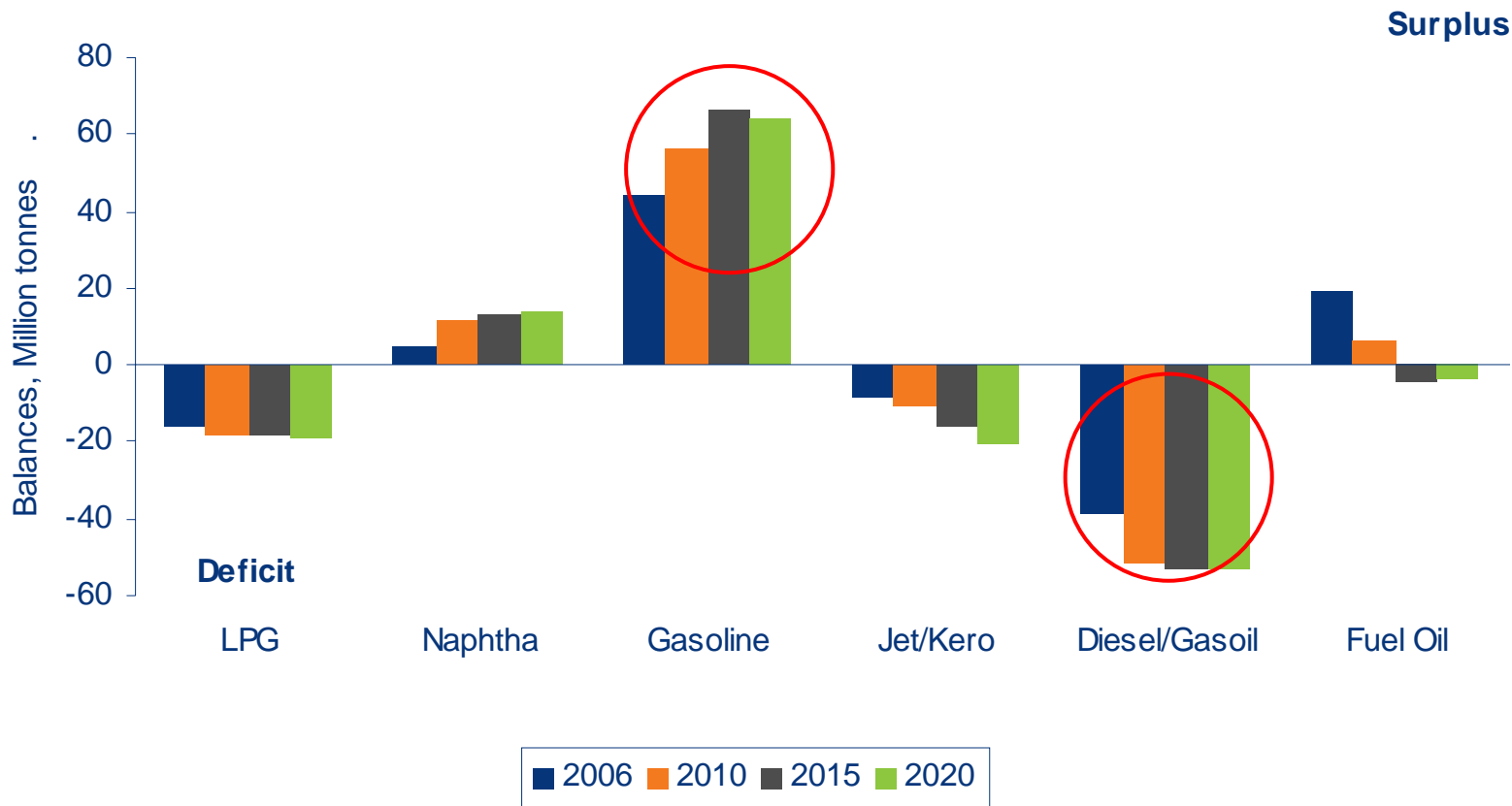**Diesel**

Gasoline

80

2020
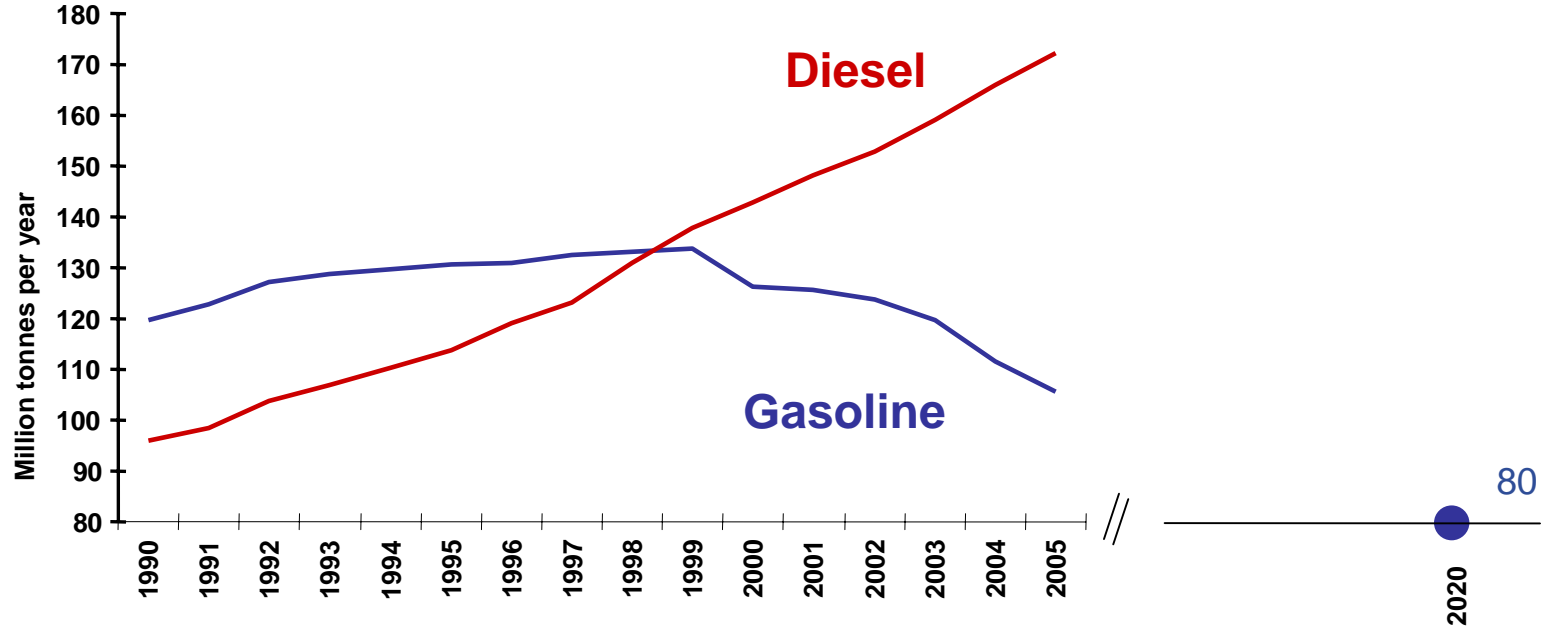
Source: Eurostat

Source: Purvin &Gertz

Additionally, ~60 million tonnes per year of diesel would be needed in the EU (300-350 million tonnes globally), if the marine sector switched to diesel fuel.

The EU supply/demand imbalance for both diesel and gasoline will continue to grow
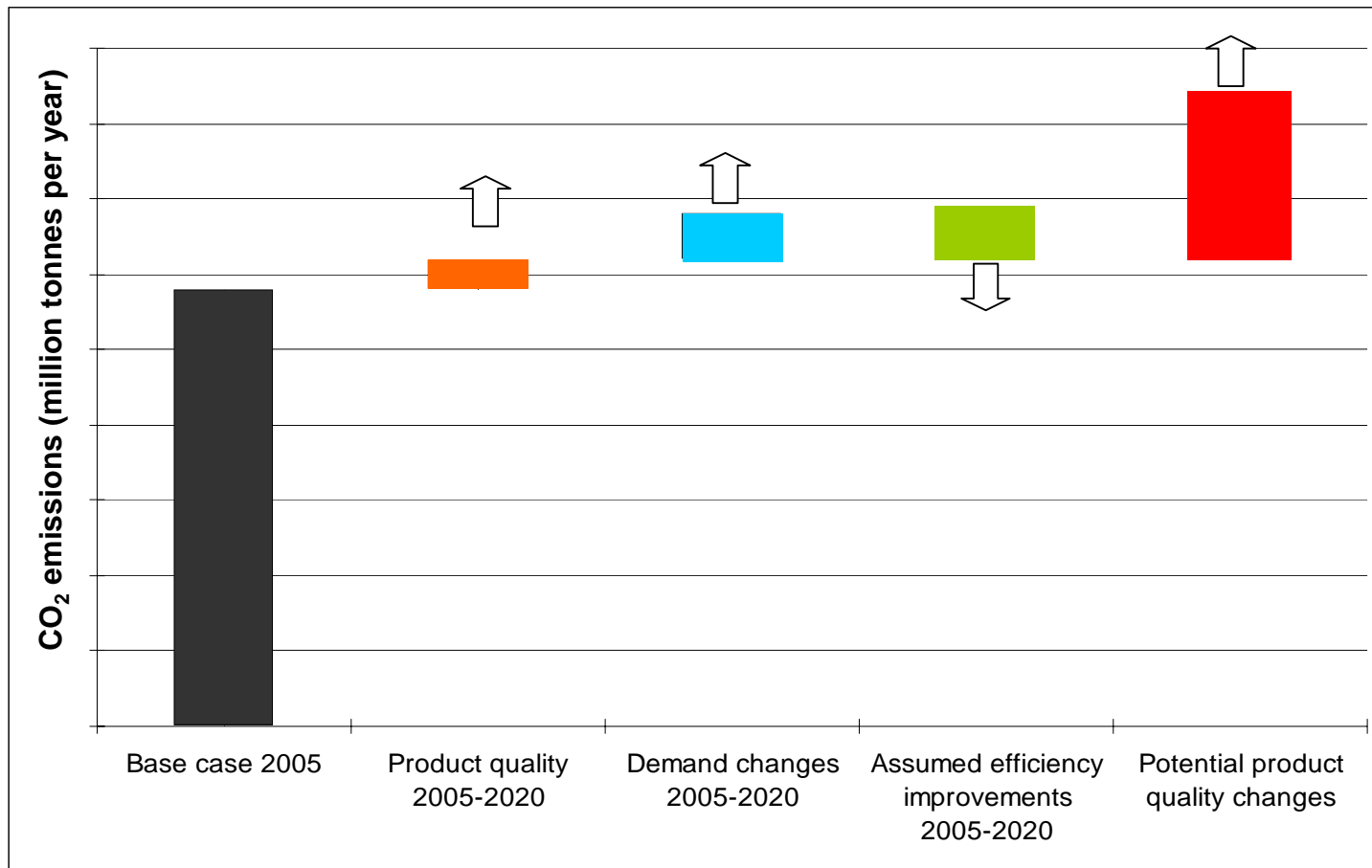
Diesel Supply/Demand

Source: Wood Mackenzie, 2006 (whole Europe)

EU refinery CO_2 emissions will grow due to specification and diesel demand changes…

EU Diesel Supply

Source: CONCAWE

.. which cannot be offset by future energy efficiency improvements.

# Proposed EU legislation would add cost to the EU refining sector, potentially leading to more imports

EU Diesel Supply

EU-ETS:

- Imposing a cost of CO_2 on EU refineries would give a comparative advantage to non-EU refiners.

- At above 20 €/t CO_2, many non-EU producing locations would have a "CIF EU" cost advantage.

Air Quality

- The proposed IPPC Directive *(Integrated Pollution Prevention and Control*) would mean a significant increase in cost burden to the EU Industrial Sectors, including refining. This cost element does not apply for non-EU suppliers of fuels.

EU Diesel Supply
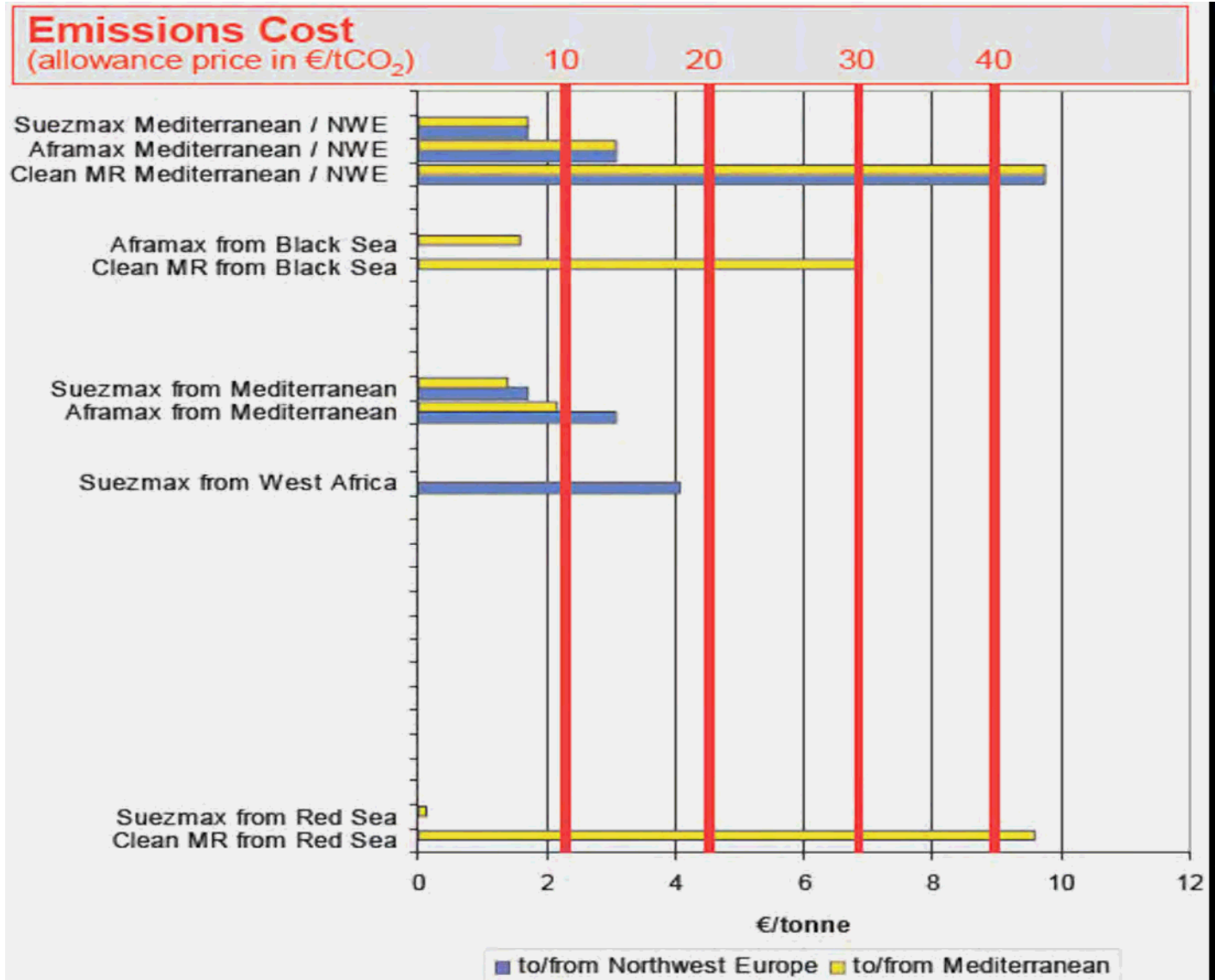
Optimal Air Quality Policy (Thematic Strategy for Air Pollution)
vs
Prescriptive (proposed IPPC Directive)
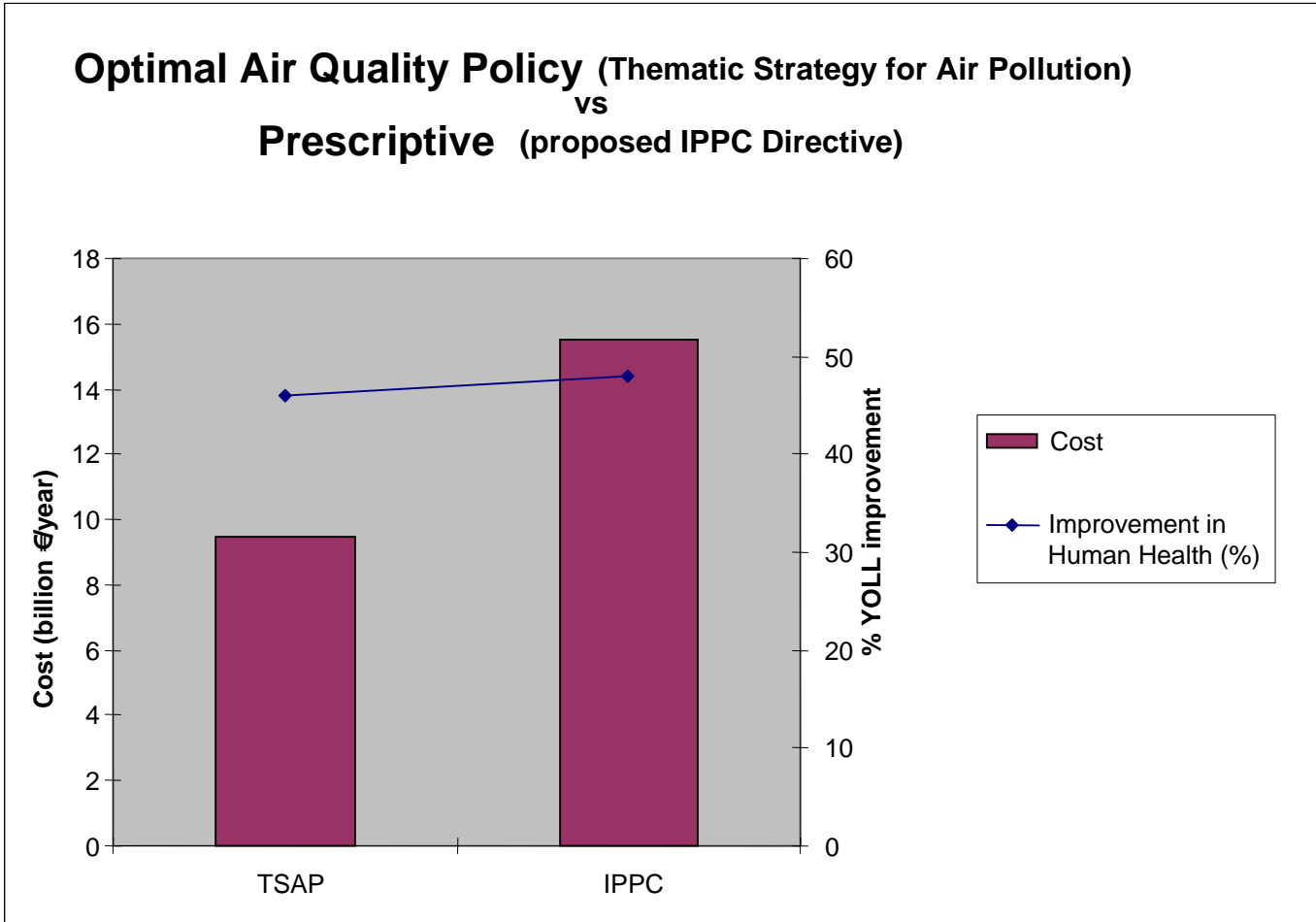
Recent price signals reflect the changing dynamics of diesel supply/demand relative to gasoline

EU Diesel Supply

German product prices without taxes (€cent/liter)

US product prices at pump ($/gallon)
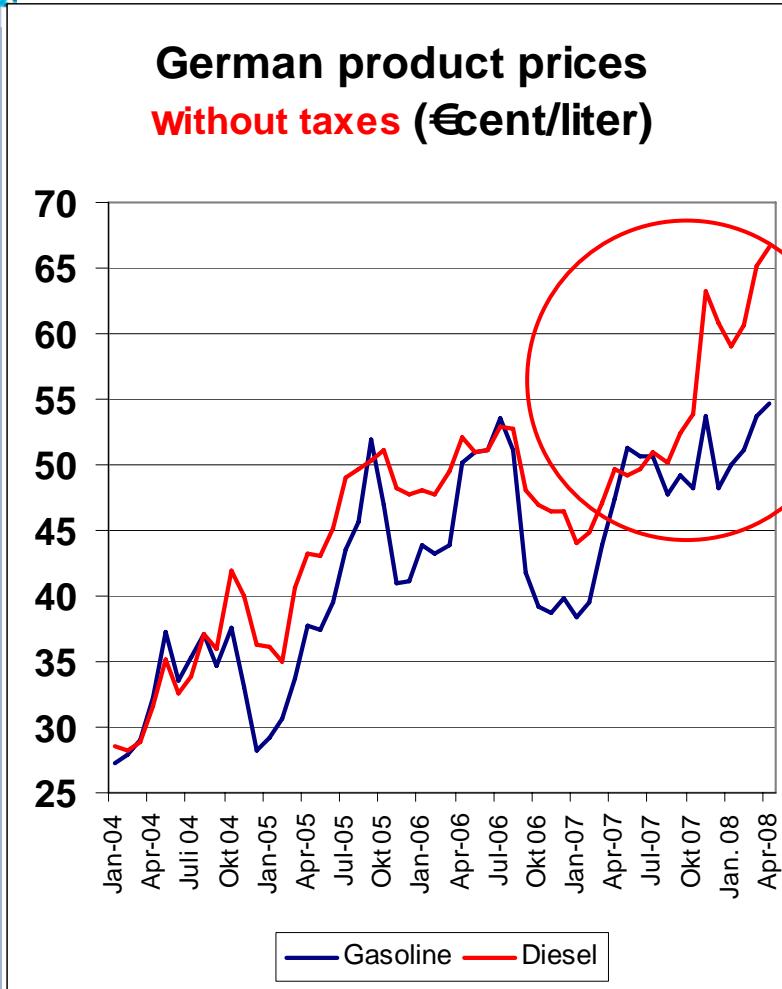
Source: MWV (Mineralölwirtschaftsverband)
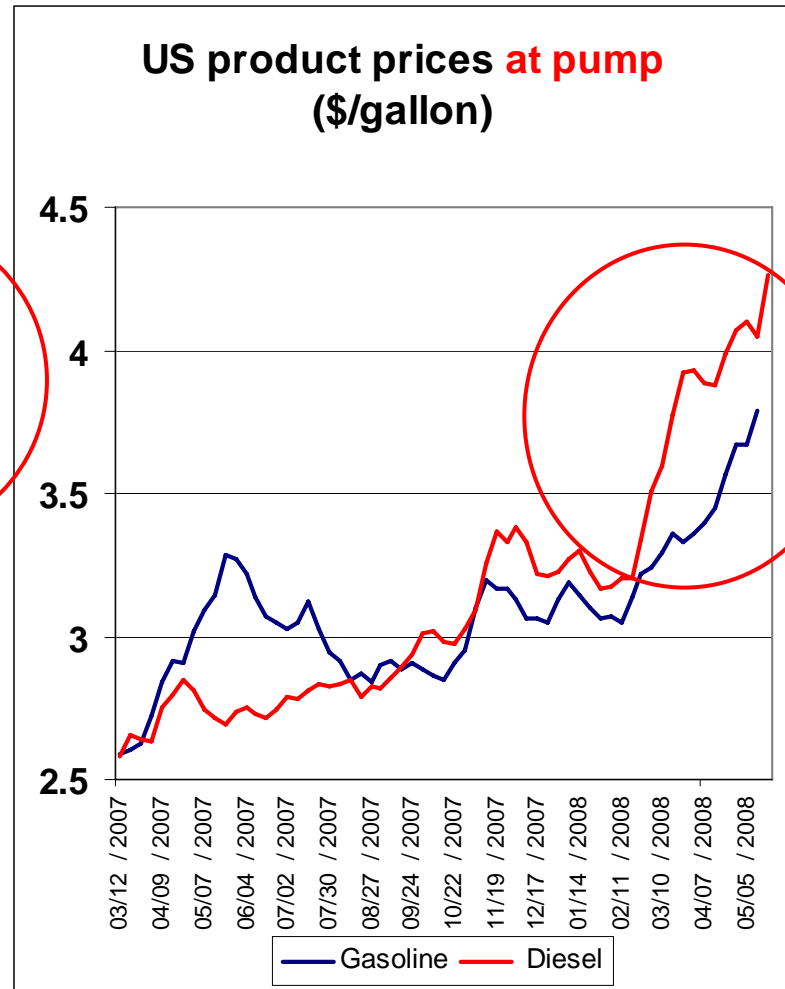
Source: EIA (Energy Information Administration)

Continuing growth in EU diesel demand would grow the diesel CO_2 footprint and require more imports

Should the observed historic growth of diesel demand in Europe continue, diesel supply / demand dynamics would result in:
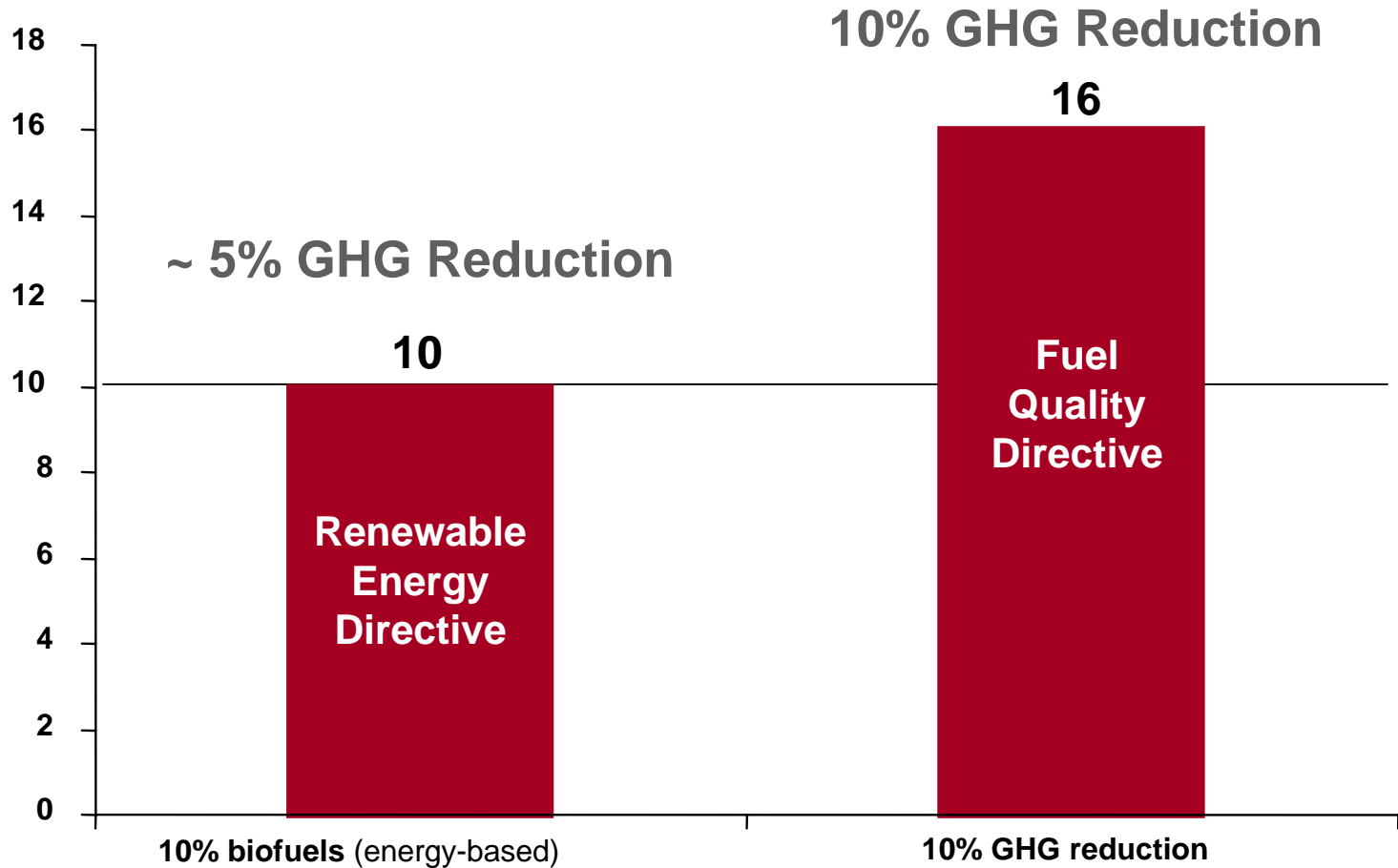
- Higher CO_2 emissions from refinery operations and logistics

- A net increase of total CO_2 emissions for diesel compared to gasoline-fuelled vehicles, as refinery CO_2 penalty exceeds vehicle benefits

- Probably a substantially higher share of diesel imports to the EU

- Upward pressure on diesel supply cost and prices relative to gasoline

The dash for biofuels...

Currently proposed EU Directives introduce conflicting biofuels targets

% energy from biofuels

10% GHG Reduction

~ 5% GHG Reduction

Chart axis values: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18

10 — Renewable Energy Directive

16 — Fuel Quality Directive

10% biofuels (energy-based)   **10% GHG reduction**

Source: CONCAWE

The 10% Biofuels target cannot be achieved by the envisaged E10 and B7 specifications
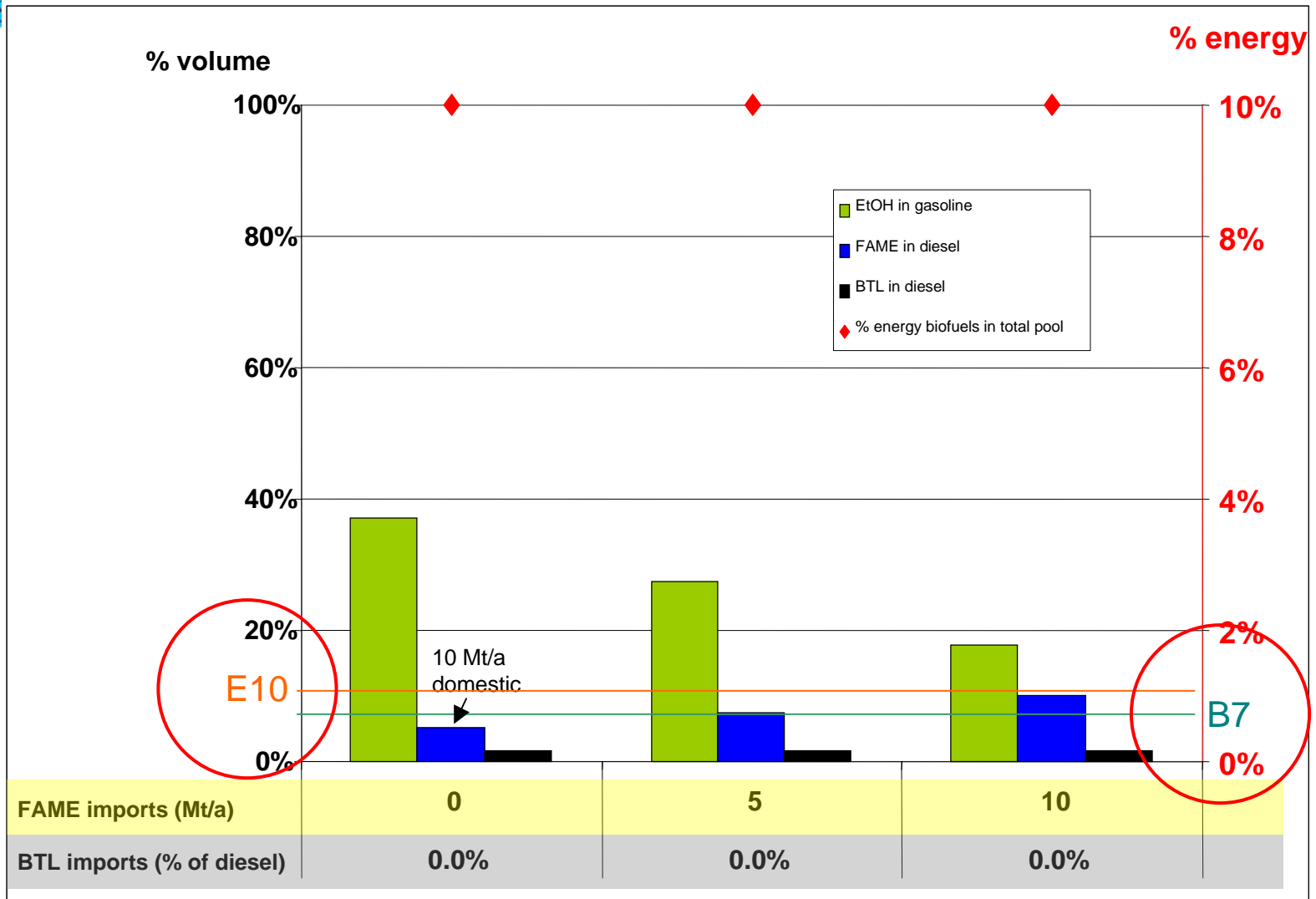
B7 = 7% FAME in diesel
E10 = 10% Ethanol in gasoline

Source: CONCAWE

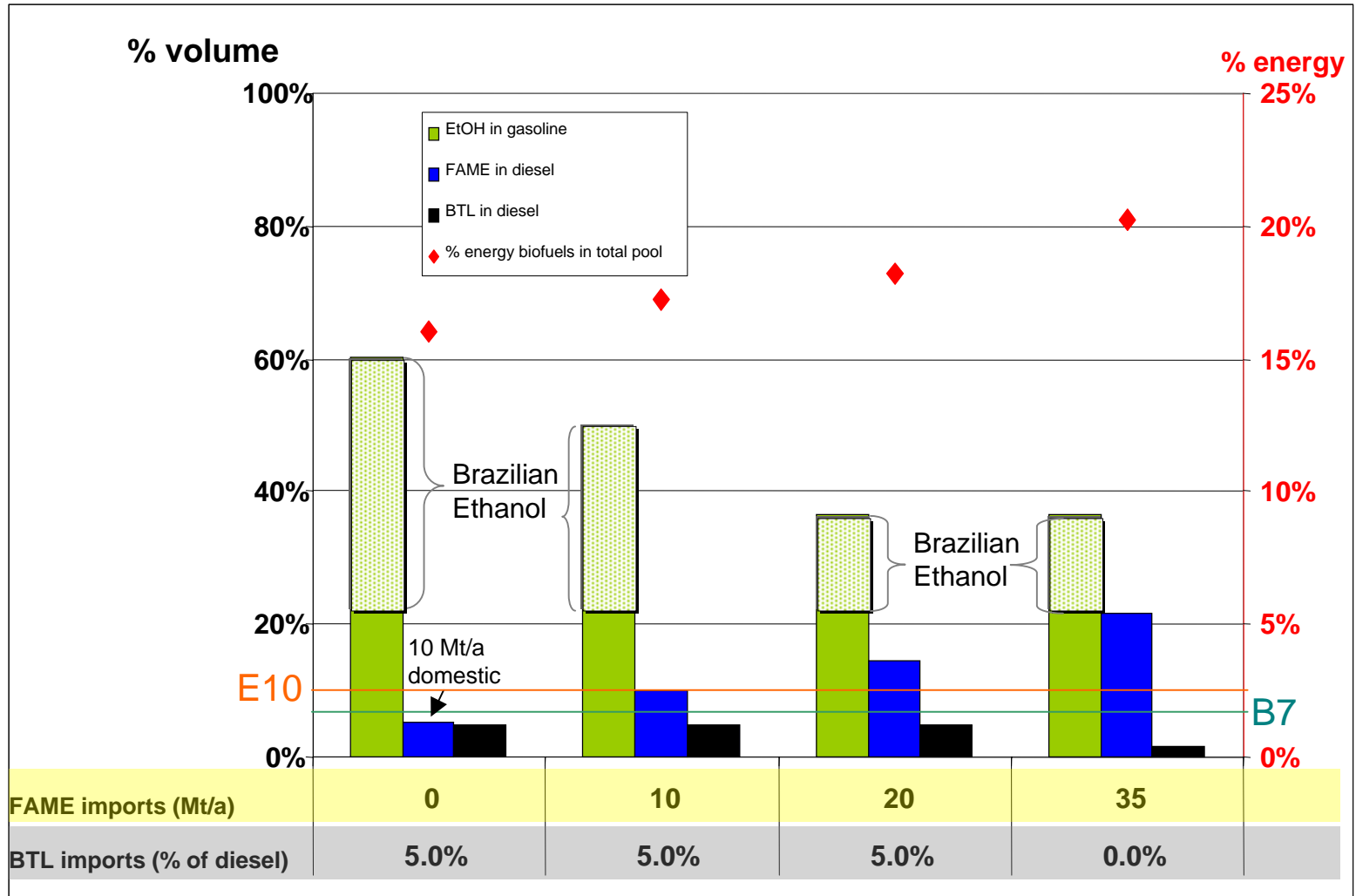# Depending on availability of imports, the 10% GHG of Article 7a may require more than 20% biofuels

% volume

% energy

Legend:
- EtOH in gasoline (green)
- FAME in diesel (blue)
- BTL in diesel (black)
- % energy biofuels in total pool (red diamond)

Brazilian Ethanol

10 Mt/a domestic

E10

B7

FAME imports (Mt/a)	0	10	20	35
BTL imports (% of diesel)	5.0%	5.0%	5.0%	0.0%

B7 = 7% FAME in diesel
E10 = 10% Ethanol in gasoline

Source: CONCAWE

The path towards 10% biofuels is paved with several stumbling blocks that need to be removed

- The existing fleet of light duty vehicles poses upper limits to shares of available bio-components in fuels (~B7 in diesel and ~E10 in gasoline), which is insufficient to meet the 10% target.

- Advanced biofuels (oxygen-poor or -free) could help, but they will probably not be available in sufficient quantities before 2020.

- The attractiveness of investment in production of advanced or second generation biofuels remains unclear today.

- Proposed sustainability criteria for biofuels and minimum thresholds for CO_2 savings, coupled with competition for biomass from other sectors, will put additional pressure on biofuels volumes accessible for road transport.

- The emerging proliferation of additional fuel grades threatens the smooth, reliable and secure supply of road transport fuels and, at the same time, may lead to consumer confusion.

Conclusions

Well-designed EU energy and environmental policies can help us face these challenges

Policy priorities must remain balanced

- Globally competitive level playing field so European Refining can invest

- Minimise Carbon-leakage and meet environmental objectives

- Maintain security of supply to Europe

Sustainability Kyoto/Bali

EU Energy Policy

Competitiveness

Security of Supply
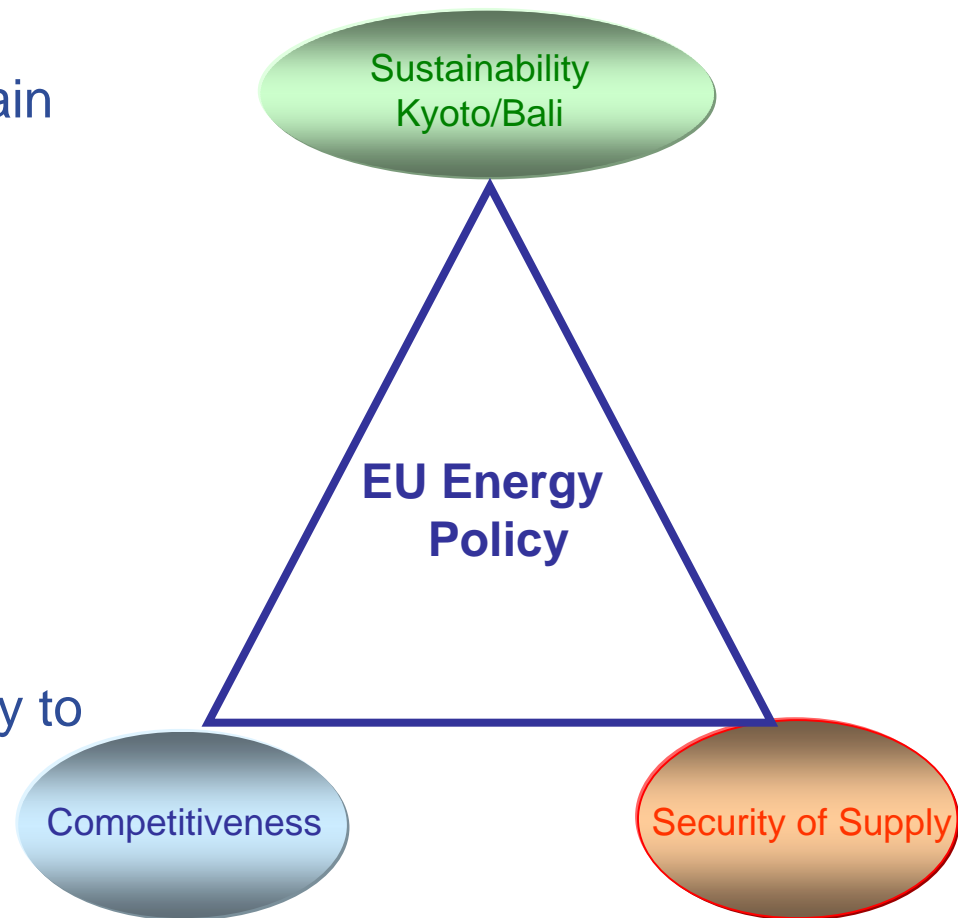
Predictable policies that do not introduce unequal cost burdens are essential for investment decisions in European Refining

The European oil industry will continue supporting economic growth and energy security in Europe …

- Low cost, efficient supplier of energy

- Ensuring security of supply

- Developing products which are clean and safe to use, and encouraging responsible and efficient use of these products

- Continuously working towards reducing the footprint of our operations

- A partner for society in addressing the sustainability challenges

… in an environmentally-responsible way