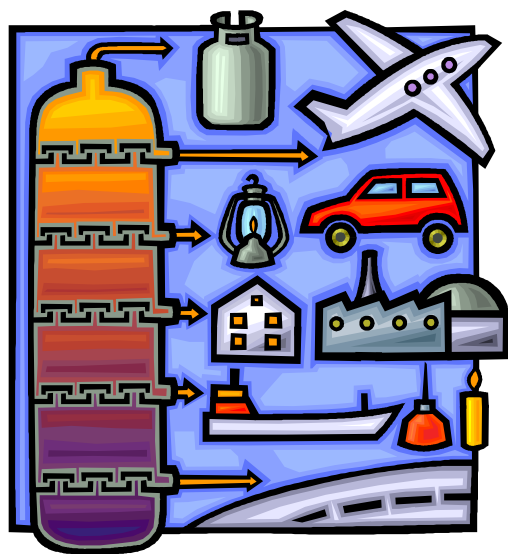




Session Four: Refining and Fuels

Nick Edwards
Phillips 66



10th CONCAWE Symposium
25-26th February 2013

- ▶ **Introduction: Refining and Fuels**
 - ▶ **Chair: Nick Edwards, Phillips 66**

- ▶ **Refining: EU Refining Study 2020**
 - ▶ **Speaker 11: Heinz-Dieter Sinnen, RMG representative**

- ▶ **Fuels & Emissions: European Fuel Quality performance over 50 years**
 - ▶ **Speaker 12: Dave Rickeard, Consultant**

- ▶ **Fuels & Emissions: Looking Ahead-Future Challenges for European Vehicles and Fuels**
 - ▶ **Speaker 13: Neville Jackson, Ricardo**

- ▶ **Session Questions, Answers, and Discussion**

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▶ Last 20 years have seen dramatic changes

- ▶ “Golden age” followed by tough conditions and consolidation
- ▶ No of EU15 refineries reduced from 130 to 82
- ▶ Switch from gasoline to diesel and structural imbalance of road fuels
- ▶ Ultra low sulfur fuels and mandates for Biofuels
- ▶ Industry has invested heavily to meet the challenge of changing fuels quality and demand

▶ Refining Study 2020, with perspectives to 2030

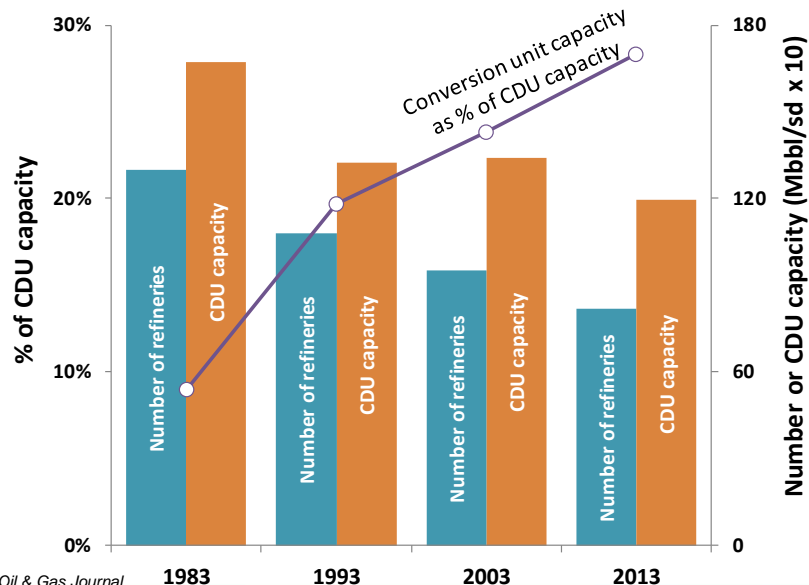
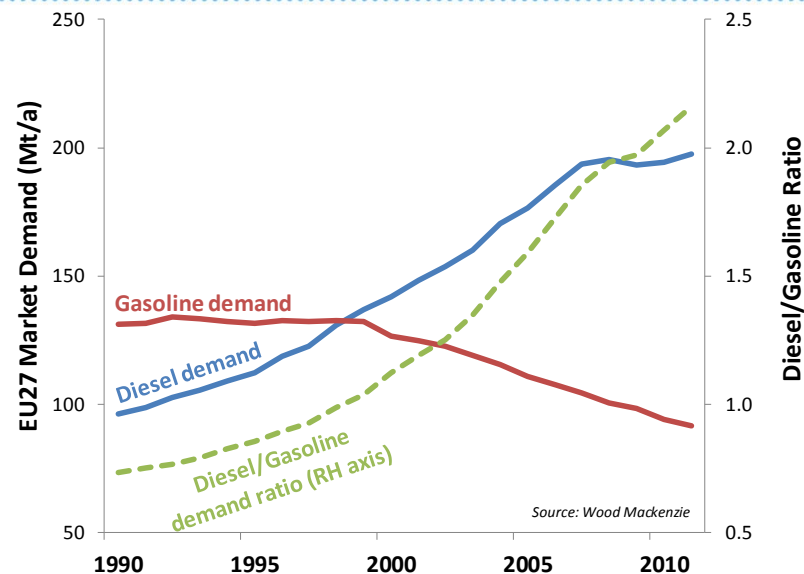
- ▶ Next 2 decades appear just as challenging
- ▶ EU product demand pattern expected to change dramatically
- ▶ Major capital expenditure required to meet demand and quality
- ▶ Sector utilization will be further challenged
 - ▶ Under-utilization of new-build units?
 - ▶ Further consolidation?

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- ▶ **Dramatic shift in road fuels demand 2011 vs. 1990**
 - ▶ **Diesel: 100% demand increase**
 - ▶ **Gasoline: 32% demand destruction**
 - ▶ **Diesel / Gasoline demand ratio increased from 0.7 to 2.2**

- ▶ **Reduced capacity with increasing complexity**
 - ▶ **EU15 Refinery count reduced from 130 to 82 (including speciality bitumen/lubes refineries)**
 - ▶ **Significant upgrading investment**
 - ▶ **Cat Cracking in 80's**
 - ▶ **Hydrocrackers in 90's and 2000's**



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Fuels & Emissions: European Fuel Quality performance over 50 years

- ▶ European air quality objectives: reduce vehicle exhaust emissions
 - ▶ Engine performance
 - ▶ After-treatment technology
 - ▶ Fuel qualities
- ▶ Complex relationships between engine combustion and fuel composition
- ▶ Specifications should provide 'fit for purpose' fuels
- ▶ CONCAWE's approach: sound technical work as a basis for decisions

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Fuels & Emissions: Looking Ahead - Future Challenges for European Vehicles and Fuels

- ▶ Future requirements for clean, sustainable and low carbon vehicles
- ▶ No single solution!
- ▶ Potential future roadmap – combination of:
 - ▶ Advanced combustion engines
 - ▶ Electrification
 - ▶ Low carbon fuels

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