Issues Facing Oil Industry

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### UK Petroleum Industry Association

**UKPIA**
- Trade Association for the UK oil refining industry & its marketing activities
- Cover new legislation on: conventional fuels, biofuels, air quality, climate change, safety, other environmental, etc
- Emergency planning

### Nine Members
- BP
- Chevron
- ConocoPhillips
- ExxonMobil
- Ineos
- Murco
- Petroplus
- Shell
- Total
Oil Reserves
**Oil is not running out (yet)**

- Estimate ~3 trillion barrels ultimately recoverable oil
- Used ~1 trillion barrels oil
- Proven reserves 1.2 trillion barrels (41.6 years)
- Balance is in unproven reserves / yet to find
- Extend with
  - unconventional oil
  - gas to liquids processes
  - effect of price/technology

Sources - BP and ExxonMobil
60% of proven reserves in Middle East
OPEC has 75% of proven reserves

Location of proven reserves

- OPEC: 76%
- Former Soviet Union: 10%
- Non-OPEC: 14%

End 2007

BP Statistical Review
Oil Supply

- Oil will continue to provide transport fuels for decades to come
- Era of easy oil is over - new resources are harder to reach and tougher to produce
- Their development requires both large investment and capability (technology, skills and know-how)
Demand

Oil remains major energy source
IEA “Oil still the major energy source in 2030”

World Total Energy

- Oil: 1.6
- Gas: 1.7
- Coal: 1.7
- Other: 1.6

Source ExxonMobil

EU Total Energy

- Oil: 0.8
- Gas: 0.5
- Coal: 0.5
- Other: 0.8

Source ExxonMobil
Transport fuels dominate use of oil

UK transport fuel sales around 70% of oil products

Other uses chemicals, heating, bitumen, lubes, etc also important

Source: DECC
Product mix is changing

In EU more diesel sold than petrol

UK Petrol and Diesel Sales

Source: DECC
UK Petrol & Diesel Sales Trend

Since 2000 petrol sales ↓ 0.55 mte/a & diesel ↑ 0.80 mte/a
EU Petrol & Diesel Trends

Diesel sales expected to be three times petrol in 2020

Source: Eurostat & Concawe
UK Production / Inland Demand 2007

Production 76,141 Mte/a

Demand 73,176 Mte/a
2007 UK Gas Oil & Diesel

Demand ↑ from extra diesel & 2015 North Sea GO switch
UK imports GO / diesel increasing

UK is now net importer of gas oil / diesel
EU-27’s 116 refineries produce too much Petrol and Fuel oil but too little Jet and Diesel/Gas oil

IEA data for 2005

Source: IEA, 2005
But the US is moving towards gasoline balance........

US gasoline demand-US production

Source Wood Mackenzie

2007 US Energy Bill requires 36 bn gall/year ethanol by 2022 & fuel economy in new cars and small trucks to 35 mpg by 2020
Political Pressure

- Improve air quality
- Lower duty rates
- Reduce greenhouse gas emissions
Improving air quality

• Lead removed from petrol
  – In EU sales of leaded petrol stopped in 1999
  – Other countries following the same path
  – Enabled catalytic converter

• Sulphur reduced in petrol and diesel
  – In EU sulphur levels dropped in stages
  – Other counties following same path
  – Enables exhaust after-treatment
Exhaust emissions from road transport falling

Fall will continue NOx & PM$_{10}$ now lower than 1970

Source DEFRA UNECE basis
Lower duty use to drive change

• ULSD and ULSP
• LPG and Natural Gas
• Biodiesel and Bioethanol
Sales of gaseous fuels static

Fuel deliveries in Mte/a

2003 LPG NG duty differential announced

2006 LPG NG duty differential introduced

Source: HMRC

Fuel deliveries in Mte/a


Source HMRC
Sales of biofuels rising

2007 ~50 billion litres petrol+diesel

Source HMRC
Petrol and diesel dominate road

- 2008 Jan-Aug
- Diesel 54.3%
- Biofuels 2.1%
- LPG & NG 0.4%

Mass basis

Source HMRC
Reducing Greenhouse Gas Emissions

Biofuels
Hydrogen
Renewable Electricity
CO₂ from lorries and vans rising

CO₂ from cars and buses static

Source DEFRA
EU push for biofuels

- Fuel Quality Directive
  10% GHG saving

- Renewable Energy Directive
  10% biofuels by energy

Common sustainability criteria and GHG saving calculation (default + typical)

Most Member States regard FQD GHG reduction target as too ambitious so focus on RED
Electricity

- Cars powered by electricity generated from renewables (wind etc) or nuclear offer lower emissions of carbon dioxide

- Policy needs to decide whether our limited nuclear and renewable generated power should be used to replace fossil fuels used in power generation or road transport
Hydrogen

• Many groups, including motor manufacturers, see the ultimate target as
  – fuel celled vehicles
  – powered by hydrogen generated from renewable energy eg wind

• Some say this is 30 years away, others say less
Why the wait for hydrogen

• Cost of fuel cells too high

• Reliability needs to be improved further

• Hydrogen storage has to be improved

• Hydrogen distribution and refuelling infrastructure to be developed

• Safe handle procedures to be established and proven.

• Customer acceptance.
MARKAL Modelling for EWP

- No one fuel dominates in 2050
- Petrol and diesel still have role
- Major alternative fuels FT diesel and hydrogen still being developed

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<th>Fuel</th>
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<tr>
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</table>
Challenges

• Changing sources of crude oil

• Changing product demand

• Demand for cleaner fuels

• Reducing emissions of greenhouse gases
Thank you for your attention

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