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UK fuel market review

Refining

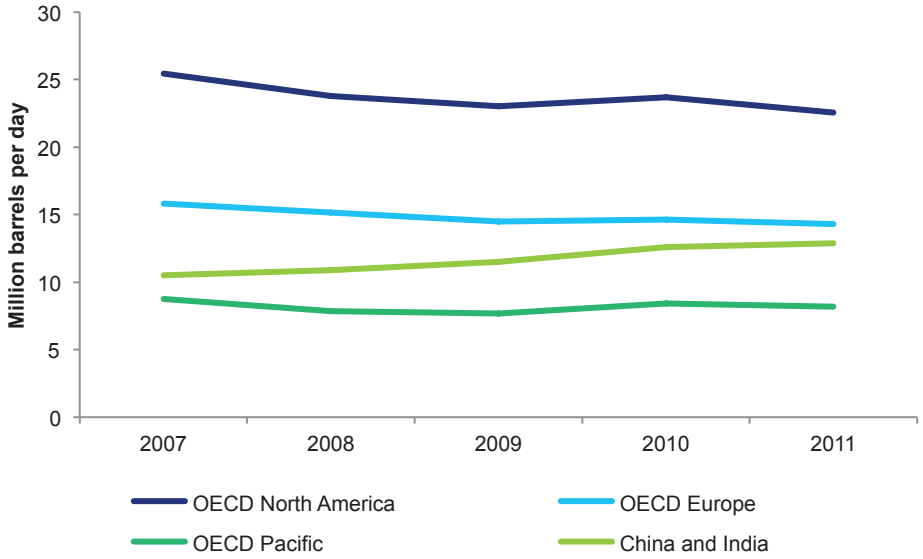
www.racfoundation.org/uk-fuel-market-review



- Understanding the latest structural changes in the global and European refining sectors is essential for an appreciation of the recent developments in UK refining.
- Demand for refined products has been gradually declining in the US and Europe; this is reflected in the flat or falling refinery capacity and utilisation rates in these regions.
- In contrast, demand for oil products has been growing in emerging countries, which is where the majority of growth in refinery capacity has occurred in the past five years.
- There is an increasing imbalance between demand and supply for refined products in the US and Europe.
- Growing environmental regulations in Europe and the US are also increasing the cost of refining.
- The UK refinery sector faces similar challenges: demand for oil-refined products is overall flat while the structure of demand is changing. The UK increasingly relies on trade flows to counter the impact of changes in the structure of demand.
- The UK had nine refineries nine years ago. Two refineries have closed and all but one have been sold or put up for sale in the past three years.

1. Recent developments in the global and European refining sector

Figure 1: Crude oil production by country in 2011 (000 barrels per day)



Note: Organisation for Economic Co-operation and Development (OECD) Pacific includes Australia, Japan and Korea

Source: Collected from the January issues of the Oil Market Review of the International Energy Agency (IEA)

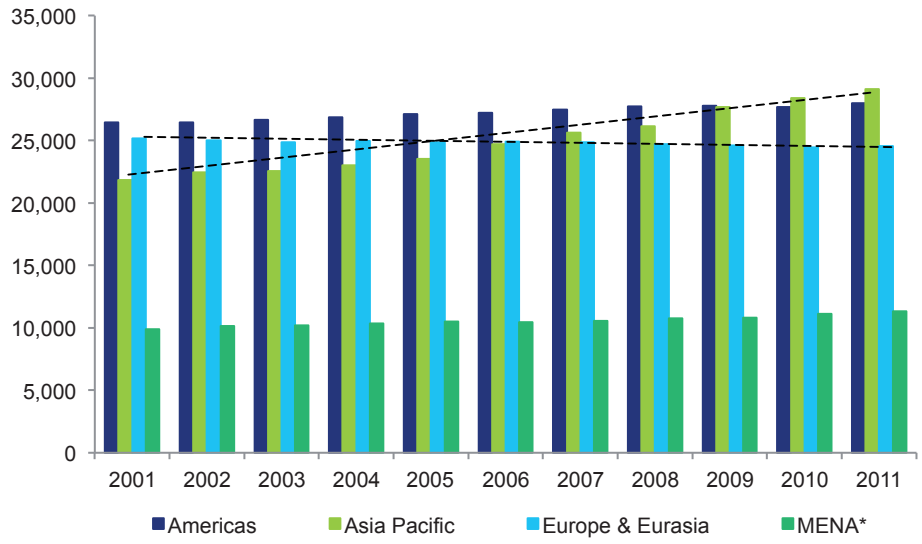
While demand in China and India has been increasing in the past five years, it has been falling in the more mature markets of North America, Europe and the Pacific. This is partly due to technological advances making the transport sector, the largest user of petroleum products, more fuel efficient. Equally important, the economic downturn has had a negative impact on demand and coincided with refinery expansion being carried out under investment plans agreed in previous years. This has led to oversupply in the US and European markets.

Many refiners in the US and Europe have responded to the adverse conditions by cutting back output, temporarily or permanently closing facilities, or delaying or cancelling capacity enhancements. In mainland Europe, the last couple of years have seen the closure of major refineries at Cremona, Reichstett, Harburg, Dunkirk and Wilhelmshaven.



Capacity expansion and higher utilisation rates in emerging countries

Figure 2: Global oil refinery capacity (000 barrels per day)



Source: *BP Statistical Review of World Energy 2012*

*MENA refers to Middle East and North Africa



Refining capacity in the Asia Pacific region has shown strong growth over the past ten years in response to increasing demand for petroleum products.

The majority of capacity growth has taken place in China to meet increased domestic demand. According to the IEA, future investment in refining capacity in China will be focused on supporting a similar strategy in the medium term.[1]

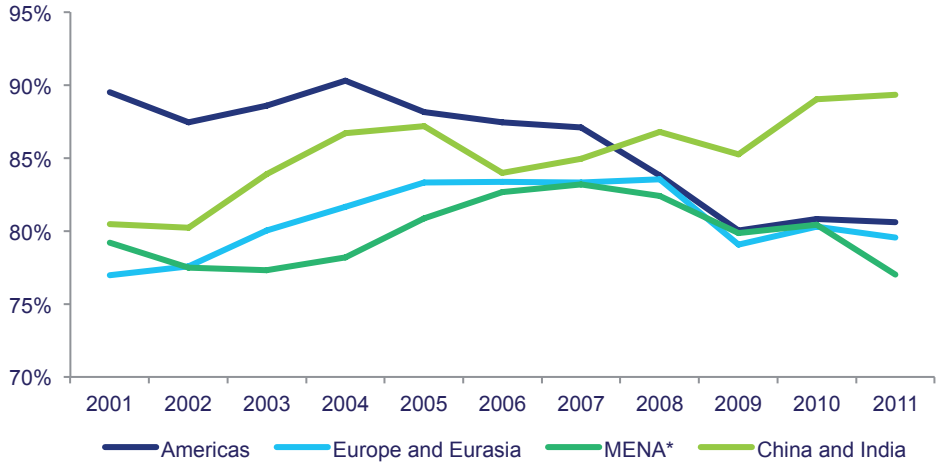
In contrast, Indian refining, which also expanded in the period, aims to establish the country as an exporter of oil products in the Asia–Pacific region. Thanks to its new and large Jamnagar plant, India has increased its exports of high-quality products to the US, Europe and Latin America since 2009. Given that the country's refining capacity will increase by at least one million barrels a day by 2016, it is likely that Indian exports will grow further.[2]

New refineries in the Asia Pacific region are typically larger and more efficient than many of those built in Europe and the US in the past decades. Older plants in general require more maintenance and are likely to be less energy efficient than modern facilities. This has an impact on a refinery's profitability.

[1] http://omrpublic.iea.org/omrarchive/mtogm_2011.pdf

[2] ibid.

Figure 3: Global refinery utilisation rates



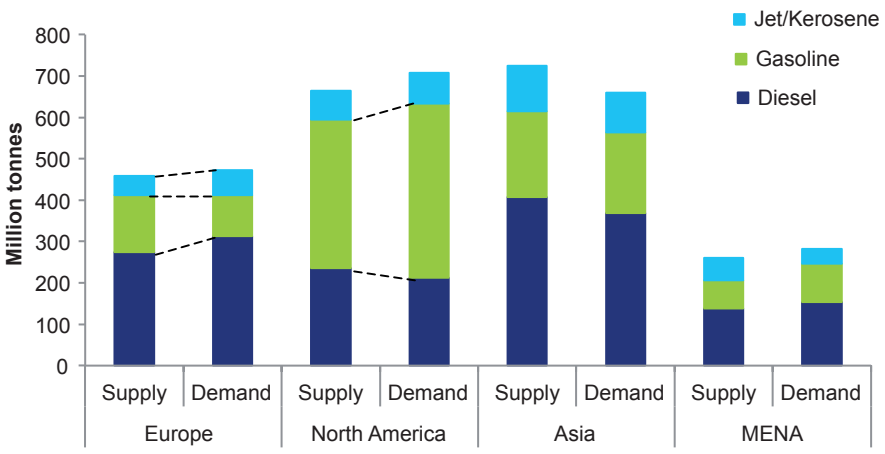
*MENA refers to Middle East and North Africa

Source: Deloitte analysis based on *BP Statistical Review of World Energy 2012 data*

The US has seen a decline in its refinery utilisation rates, a measure of profitability that was accelerated by the economic downturn. The economic crisis is also to blame for a decrease in the usage of European and MENA refineries. In contrast, not only are there significantly more refineries in China and India, they are also running at higher utilisation levels than those in the US, Europe or MENA countries.

Increasing imbalances between demand and supply for refined products in the US and Europe

Figure 4: Refined product supply and demand in 2011 (in million tonnes)



Source: *Developments in the international downstream oil markets and their drivers: implications for the UK refining sector* by Purvin & Gertz Inc.

Diesel is Europe's main transport fuel by volume and European demand exceeds diesel refining capacity. While the region also needs more jet fuel/kerosene than it produces, there is a marked surplus of gasoline. In contrast, the US, the largest gasoline market in the world, requires more gasoline than it can produce, while it produces more diesel than demand warrants.

These imbalances in European supply and demand are addressed through trade flows. For instance, Europe exports gasoline to the US and imports diesel and jet fuel/kerosene from the US. As mentioned above, Asia is establishing itself as an exporter of diesel and jet fuel/kerosene to Europe and gasoline to the US.

Growing environmental concerns further increase cost of refining

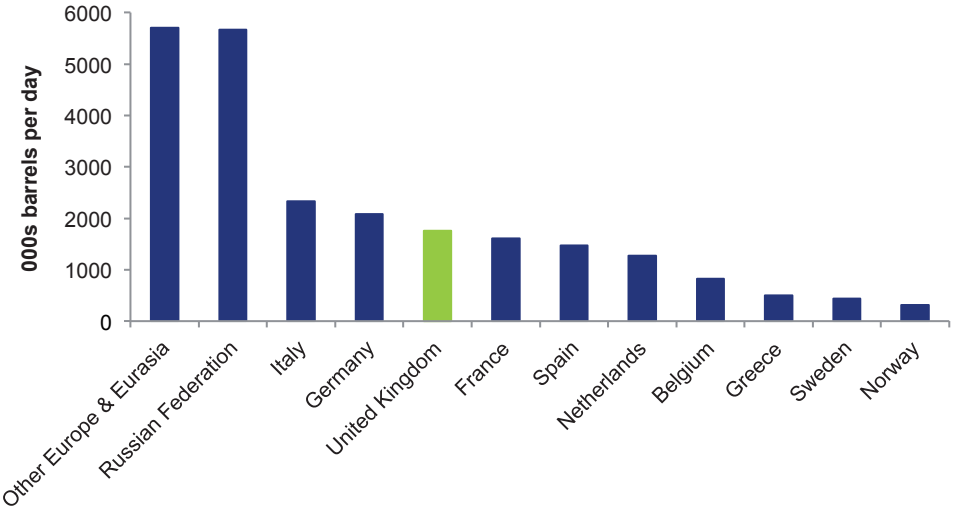
Tighter environmental controls associated with reducing carbon emissions and improving air quality, particularly in Europe, are adding to the costs of refining.

2. The UK market in an international setting

More than half of the crude oil extracted in the UK North Sea Continental Shelf is transported to UK refineries to be processed. As oil fields in the North Sea gradually deplete, an increasing proportion of crude is imported.

Demand for refined products is driven mainly by the transport sector which accounts for three quarters of petroleum products consumed in the UK.

Figure 5: European refinery capacities in 2011 (000 barrel/day)



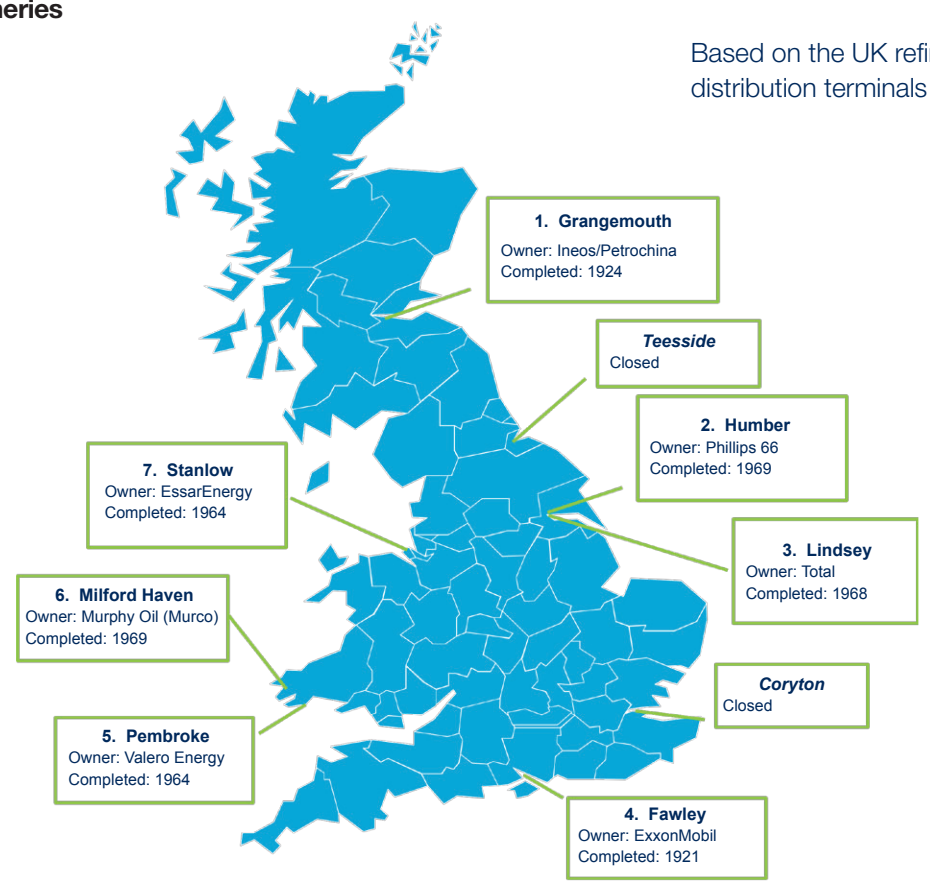
Source: *BP Statistical Review of World Energy 2012*

After the Russian Federation, Italy and Germany, the UK has the fourth largest refining capacity in Europe. Its refineries meet the country's refined product demand in petrol but not in diesel and jet fuel.

The UK currently has seven refineries. They are all located near port facilities to ease crude tanker access.

Figure 6: UK refineries

Based on the UK refining and product distribution terminals map by UKPIA[3]



1. Grangemouth refinery

Grangemouth is the second oldest refinery in the UK and owned by a joint venture formed by Ineos, the UK petrochemicals group, and Petrochina. Situated near the Firth of Forth in Scotland, the refinery supplies most of Scotland's 900 forecourts and many more customers in northern England and Northern Ireland. The refinery is supplied by the BP-owned Forties pipeline from the UK Continental Shelf in the North Sea and the Finnart terminal in Western Scotland.

Teesside refinery – closed

Petroplus, an independent Swiss company that became insolvent in early 2012, closed the Teesside refinery in 2009 after it failed to find a buyer. The plant has since been converted into a storage facility, import terminal and distribution centre.

2. Humber refinery

The Humber refinery is owned by Philips 66, a subsidiary of the US oil major ConocoPhillips. It is located in North Lincolnshire and processes mainly crude oil from the North Sea that arrives by tanker to the Tetney oil terminal before being transported via underground pipelines to the refinery.

The Humber refinery is one of the most sophisticated refineries in Europe. It has the ability to process graphite coke and anode coke from heavy oil residues left over after refining other petroleum products.

3. Lindsey refinery

The Total-owned Lindsey refinery is located in North Lincolnshire. Crude oil is imported to the nearby Port of Immingham and it reaches the refinery via pipelines.

[3] http://www.ukpia.com/Libraries/Download/UK_map_of_refineries_and_terminals_2012_1.sflb.ashx

Coryton – closed

The Coryton refinery was acquired by Petroplus in 2007. Conveniently located on the Thames estuary to transport crude and refined products by sea, train and road, the refinery supplied a great part of the south-east of England.

However, the plant's parent company went into administration in early 2012. A joint venture formed by Vopak, Greenenergy and Shell UK purchased the Coryton refinery. The joint venture plans to turn the facility into an import and distribution terminal called the Thames Oil Port. Operations are expected to start in 2013.

4. Fawley refinery

The Fawley refinery is owned by the US oil major ExxonMobil. It is the largest refinery in Britain. Located on the west shore of Southampton Water, it serves the southern regions of Britain through pipelines and some of its products are exported by sea.

5. Pembroke

Pembroke is owned by the US energy company, Valero. Situated on the Milford Haven estuary in southwest Wales, the majority of its products are distributed by sea, road and pipelines to Manchester and the Midlands.

6. Milford Haven

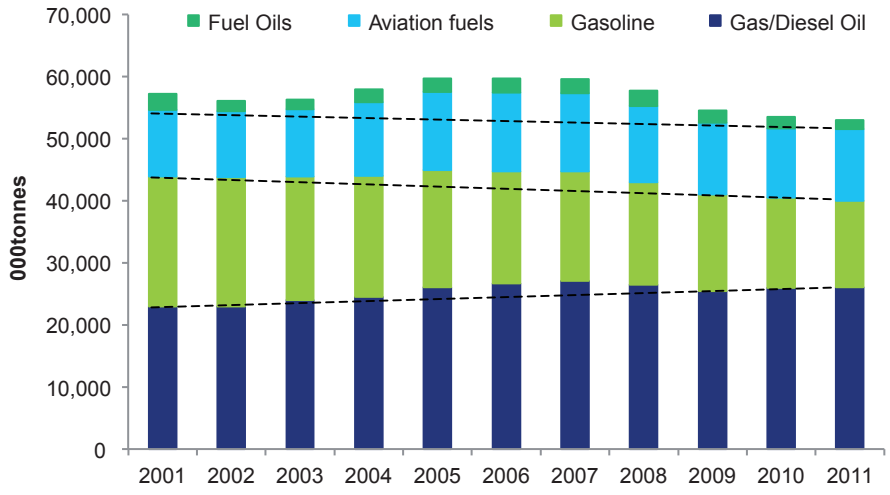
The Milford Haven refinery is owned by Murphy Oil Corporation and is situated on the Pembrokeshire coast.

7. Stanlow

Essar Energy bought the Stanlow refinery from Shell in 2011. It is the second largest refinery in the UK and provides around 17% of the country's total refining capacity. The plant is located by the Mersey estuary where crude oil arrives before being transported to the refinery via pipeline. The refined product is transported by pipelines and tankers on the Manchester Ship Canal.

Falling demand and changing demand patterns represent a challenge for refineries

Figure 7: UK demand for refined products (000 tonnes)



Source: Department of Energy and Climate Change (DECC), *Oil Statistics, Quarterly tables: Energy trends, Demand for key petroleum products*

The past ten years have seen the number of diesel cars increase on the roads while the number of petrol vehicles have decreased. With the increase in budget airline activity, demand for aviation fuel has also grown in the period.

Changes in demand patterns for refined petroleum products have coincided with lower demand in general.

UK refineries are configured to produce more gasoline and less diesel and aviation fuel than required. Changing the configuration of some of these refineries would require significant investment.

The UK relies on trade flows to counter the impact of the changing structure of demand

To make up for the shortfall in its diesel production, the UK relies on imports. The main sources of UK diesel imports are European countries (mostly the Netherlands, Sweden, the Russian Federation, Belgium) and the US.

The UK also imports aviation fuel from a number of countries. The majority of imported fuel comes from the Middle East (Kuwait and Qatar), Singapore, India and the Russian Federation.

Due to investment required to increase UK diesel refining capacity, imports of diesel fuel are likely to increase in the future.

As demand for petrol has declined over the past decade, the UK has been exporting the excess fuel, mainly to the US. Some European countries, such as Ireland and the Netherlands, also purchase gasoline from the UK. The UK exports some diesel, mainly to Europe and some African countries. This is because of commercial considerations and the grade of the diesel exported.



While the US is a stable market for UK gasoline, technological advancements and increased ethanol use may in future restrict its potential to absorb excess UK production.

Refinery sales

UK refineries are facing challenging times with tightening margins due to high crude oil prices and a marked decline in fuel demand.

Ten years ago, the UK had nine refineries. Since then, two plants, Teesside and more recently Coryton, have closed and soon will be converted into import terminals with storage facilities. Both refineries were owned by Petroplus, the Swiss independent refiner.

Of the remaining seven refineries, only one, the Fawley refinery, has not been on the market in the past three years. Chevron sold the Pembroke refinery to Valero, the US energy company, in 2011. In the same year, Shell sold its Stanlow refinery to Essar. The Humber and the Milford Haven refineries have also been put on the market. Total, the French oil major, put the Lindsey refinery up for sale in 2010. While it attracted some interest, none of the deals materialised and the owner announced in early 2012 that it would hold onto the plant until market conditions improve.

Ineos also sold a 50% stake in the Grangemouth plant to PetroChina, a subsidiary of the state-owned China National Petroleum Corporation (CNPC) in 2011.

This factsheet was last updated January 2013.

The Royal Automobile Club Foundation for Motoring is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

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