

4 International context

Key points

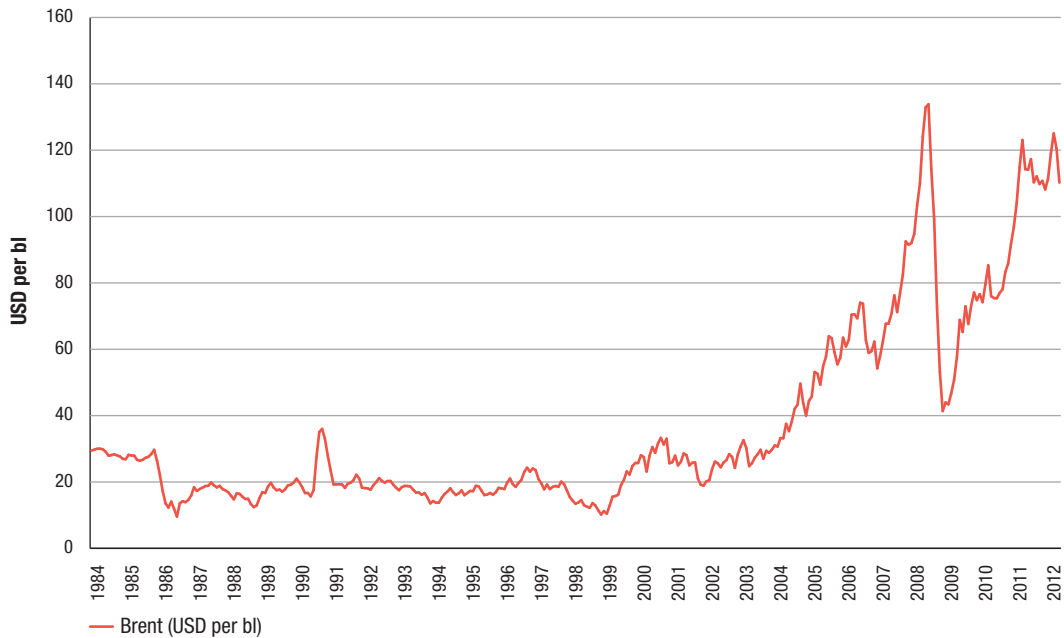
- International crude oil prices have a strong influence on both the level of, and movements in, Australian petrol prices.
- Crude oil prices have exhibited volatility in recent years but appear to have consolidated at historically high levels.
- Despite a weakened global economy, particularly among OECD nations, 2011–12 saw the highest average crude oil prices on record.
- Strong economic activity and demand for crude oil and its refined products in developing nations, particularly for transportation, has supported high crude oil prices.
- The future balance of global oil supplies is likely to be comprised of a greater proportion on unconventional supplies, with higher costs of production likely to keep upward pressure on prices.
- Crude prices are expected to remain high, and are expected to trend higher in the medium to longer term.

4.1 Introduction

Previous ACCC petrol monitoring reports have highlighted the significance of crude oil prices in shaping the retail price of petrol in Australia and, indeed, around the world. As the base product used in the production of petrol, the price of crude oil heavily influences international prices of refined petrol which in turn drives changes in the retail price of petrol for Australian consumers.

Crude oil prices have shown significant volatility in recent years and appear to have consolidated at relatively high levels compared to average prices evident in the last three decades (chart 4.1).

Chart 4.1 Monthly average price of Brent crude oil: June 1984 to June 2012



Source: ACCC calculations based on Platts data

In 2011–12 the price of crude oil continued to fluctuate at comparatively high levels although uncertainty surrounding global economic conditions led to prices weakening through the latter half of 2011–12.

This chapter explores crude oil pricing in greater detail and discusses key demand and supply factors affecting the international price of crude oil. The chapter also considers future crude oil prices and, consequently, the outlook for the price of petrol.

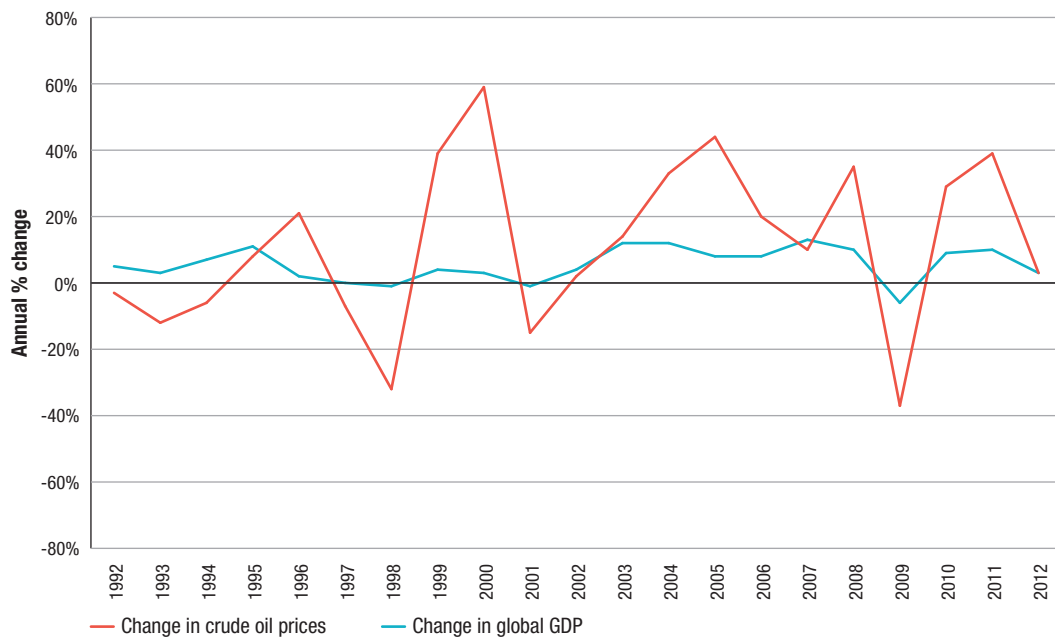
4.2 Crude oil prices

Crude oil is among the most traded commodities in the world and is the base product used to produce a range of fuels including petrol, diesel, aviation fuel and heating oil, as well as other goods such as lubricants and asphalt.

While the price of crude is influenced by a variety of factors, over time, large swings in the price of crude also reflect changes in perceptions of the state of the world economy. In the long term, economic growth is often accompanied by a greater demand for fuels. But in the short term, crude oil prices can be expected to exhibit significant volatility on the basis of market sentiment.

Chart 4.2 shows changes in the price of crude compared with changes in world annual gross domestic product (GDP) over the last 20 years.

Chart 4.2 Annual percentage change in Brent crude oil prices and global GDP: 1992 to 2012



Source: ACCC calculations based on Platts and IMF data. GDP data from IMF, at <http://www.imf.org/external/pubs/ft/weo/2011/01/weodata/WEOApr2011a.xls>

Notes: Data are in nominal terms.

It is evident in chart 4.2 that annual fluctuations in crude oil prices exceed fluctuations in world GDP. The data in chart 4.2 reinforces the premise that in any one year, changes in crude oil prices may not necessarily be closely linked with changes in rates of economic growth. While in the long-run world economic growth can be expected to be one of the main drivers of crude oil prices, in the short-run geopolitical and economic sentiment strongly influence prices.

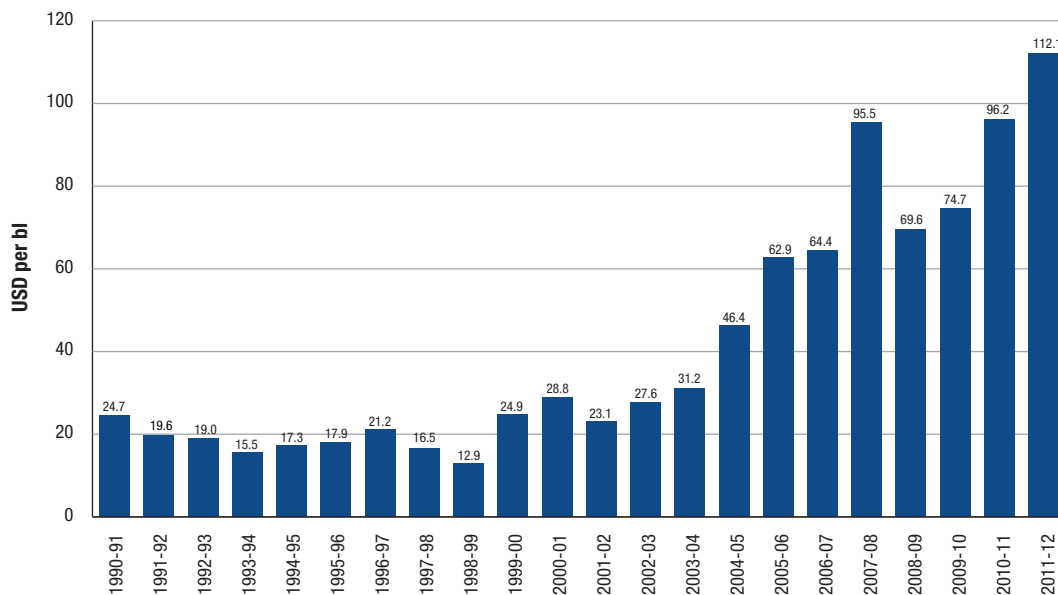
4.2.1 Volatility in recent crude oil prices

For most of 2011–12 crude oil prices remained very high, fluctuating between USD 100 and USD 120 per barrel. In March 2012 Brent prices peaked for the year at just over USD 125 per barrel, but towards the end of 2011–12 prices had somewhat eased in light of renewed uncertainty in many parts of the global economy.

Concerns about economic stability in the Eurozone and the United States as well as about future growth in China and India led to oil prices subsiding to around USD 90 per barrel in June 2012.

On average, however, high crude oil prices persisted throughout the 2011–12, resulting in the highest average annual price of crude oil in history. Chart 4.3 shows that the annual average price of Brent crude oil reached a high of USD 112.1 per barrel in 2011–12.

Chart 4.3 Average annual price of Brent crude: 1990–91 to 2011–12



Source: ACCC calculations based on Platts data

Increases in crude oil prices have been persistent throughout the past decade. Chart 4.3 illustrates that the average annual price of crude oil has increased in almost every year since 1998–99. The only exception was 2008–09 when the price of crude oil fell in response to the global financial crisis.

As noted, higher crude oil prices have also been accompanied by a heightened level of volatility in oil pricing. Prices were most volatile in the periods leading up to and then immediately after the global financial crisis, when crude prices increased and then fell dramatically, and then also in the subsequent rebound of the world economy through 2009 and 2010.

Over the longer-term, volatility measured in terms of the range between the highest and lowest price of oil has increased. During the 1990s Brent crude oil prices ranged within a relatively narrow band, the difference averaging about USD 10 per barrel each financial year. Over the past decade however, the range of crude prices has widened, averaging about USD 37 per barrel. In 2011–12, difference between the highest and lowest price was also around USD 37 per barrel.

4.2.2 Crude oil grades and pricing behaviour

Crude oils are differentiated on the basis of their chemical properties and consistency and are generally described in terms of their ‘sweetness’ and ‘heaviness’. Crudes with relatively low sulphur content are considered to be ‘sweet’, while ‘sour’ crudes contain a higher proportion of sulphur.⁴³ The consistency of different types of crude can range from a light fluid solution to a heavier waxy residue.⁴⁴

In general, crudes that are light and sweet are sold at a premium to sour and heavy crudes as they can be more efficiently and cheaply refined to produce larger volumes of higher value end-products such as petrol and diesel.

⁴³ Crudes with a sulphur content of less than 0.5 per cent are typically considered to be ‘sweet’.

⁴⁴ The American Petroleum Industry gravity index is used to measure the consistency of crudes, or the extent to which it floats on water.

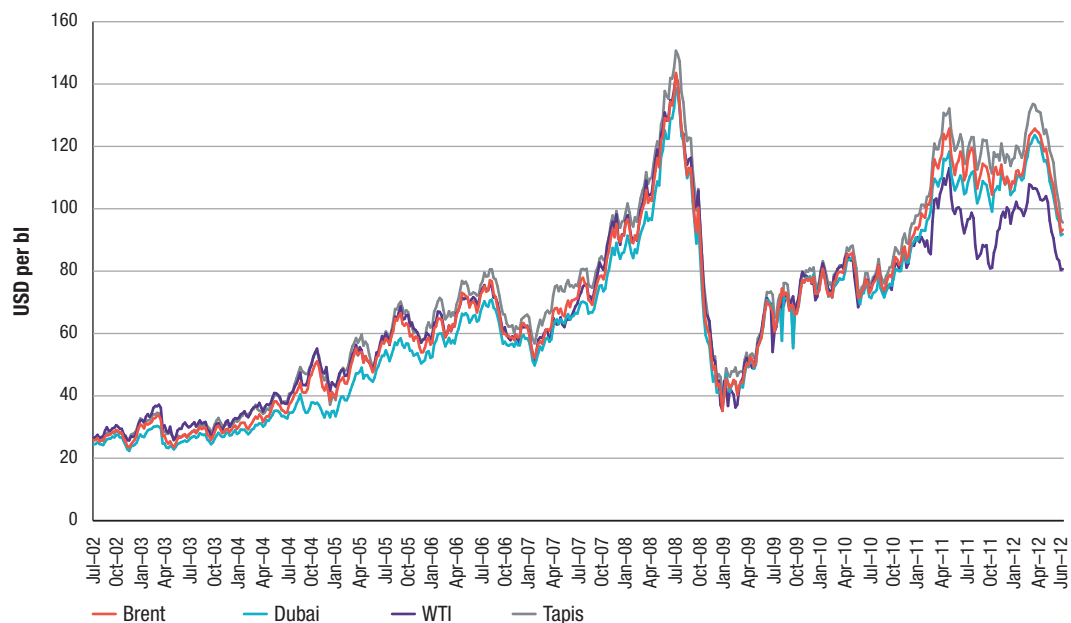
Among the most prominent grades of crude oil that also serve as key benchmarks for crude oil prices around the world are:

- Brent crude—a light sweet crude oil produced in the North Sea and now commonly used as a pricing marker across many regions of the world
- Dubai crude—a heavier, more sour crude oil produced in the United Arab Emirates. Its price is commonly used as a benchmark to calculate the price of exports of sour Middle East crudes to Asia⁴⁵
- West Texas Intermediate (WTI)—a light sweet crude oil from fields in Western Texas deliverable into Cushing, Oklahoma in the US. WTI is the major benchmark for US crude oil prices and is a deliverable grade for New York Mercantile Exchange crude oil futures contracts⁴⁶
- Tapis crude—a light sweet crude oil widely used as a marker in the South-East Asia region.

With the exception of the period since early 2011, the prices of all four crude oil grades have traditionally traded around a very similar level. Chart 4.4 illustrates price movements of the four prominent grades of crude oil over the 10 years to June 2012.

As expected, the lighter and sweeter crude oils (Tapis, WTI and Brent) have generally traded at a premium to the heavier Dubai grade. Being the lightest and sweetest of the four crudes, Tapis has by and large traded at the highest price. On the other hand, the price of Dubai crude has tended to be the lowest reflecting its relatively high sulphur content and heaviness.

Chart 4.4 Average weekly prices of WTI, Brent, Dubai and Tapis crudes: July 2002 to June 2012



Source: ACCC calculations based on Platts data

⁴⁵ Reuters, at http://glossary.reuters.com/index.php/Dubai_Crude

⁴⁶ Reuters, at <http://glossary.reuters.com/index.php/WTI>

More recently, however, the spread between the prices of the four crude markers has widened with prices of WTI becoming the lowest of the four. On average, in 2011–12 WTI traded at USD 94.8 per barrel, while Dubai, Brent and Tapis crudes traded at USD 109.0, USD 112.1 and USD 118.9 per barrel respectively.

The divergence of prices of WTI relative to other crude markers was noted in the 2011 ACCC petrol monitoring report. A culmination of several factors has led to a widening spread between the prices of WTI and other markers, including:

- a build-up of crude oil stocks at the major trading hub in land-locked Cushing, largely from strong US domestic production in conjunction with additional inflows of production from Canada
- a lack of adequate infrastructure to move supplies of crude from the Cushing hub to major refining centres.

In theory, the size of the spread between prices of WTI and other marker crudes is indicative of the high cost of moving crude oil from Cushing to the biggest US refining centres on the Gulf Coast.⁴⁷

In September and October 2011 the spread between WTI and Brent prices increased to well over USD 20 per barrel before narrowing to around USD 15 per barrel in May 2012 when the flow of the existing Seaway crude oil pipeline was reversed to allow oil to flow south from Cushing. However, rising US shale oil production, in conjunction with elevated Brent prices led to the spread widening to over USD 20 per barrel again in October 2012.⁴⁸

Further infrastructure capabilities are planned to help ease pressures at Cushing once they come online.⁴⁹ These include expansions of the Seaway crude oil pipeline starting in early 2013, as well as the construction of the Keystone XL pipeline connecting Cushing with the Texas refining sector, expected to be in-service by late 2013.⁵⁰

The US Energy Information Administration's (US EIA) baseline scenario predicts that with an increase in pipeline capacity between Cushing and the Gulf of Mexico, the price of WTI crude oil will converge with Brent prices, reaching parity by around 2016.⁵¹

4.3 Demand for crude oil

A key long term driver of demand for crude oil is economic growth.

World demand for energy, including crude oil, is expected to increase in the medium to long term as economic growth continues, particularly among emerging economies. According to forecasts by the International Energy Agency (IEA) non-OECD economies will account for 90 per cent of growth in global energy demand over the next 25 years.⁵²

4.3.1 Crude oil consumption

Global energy demand is met in a variety of ways. Traditionally, the largest source of energy has been crude oil. Chart 4.5 shows forecast world energy consumption to 2035 for the major sources of energy: liquid fuels (including crude oil), natural gas, coal, nuclear and renewables.

47 US Energy Information Administration (US EIA), *Short-Term Energy Outlook: Market Prices and Uncertainty Report July 2012*, 10 July 2012, p. 2.

48 Platts, *Oilgram News—Volume 90, Number 201*, 10 October 2012, p. 12.

49 Seaway Crude Pipeline Company, at <http://seawaypipeline.com/>

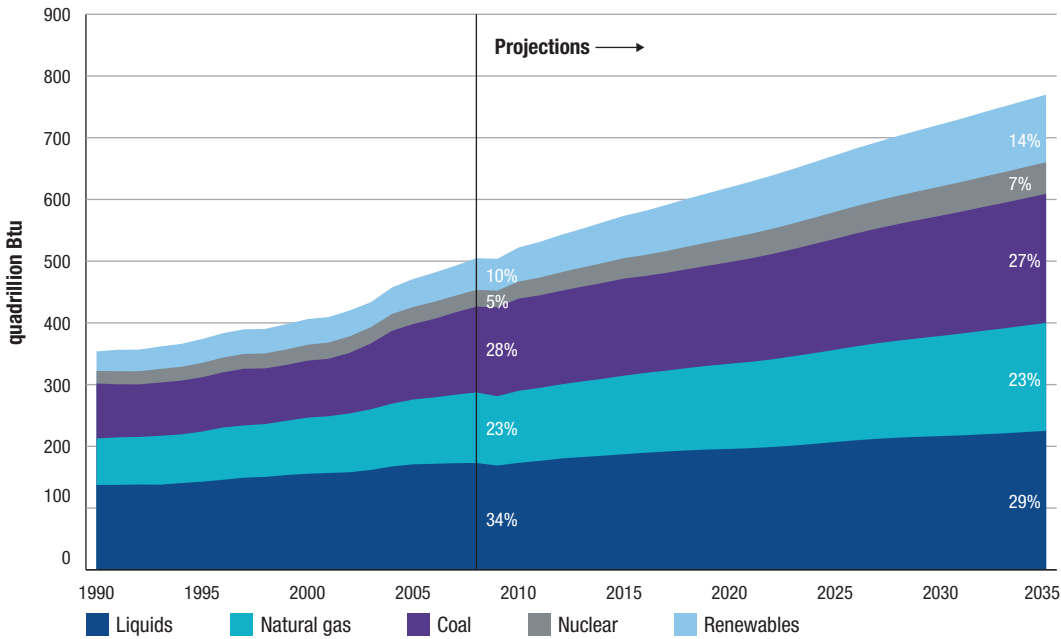
50 US EIA, *Country Analysis Brief: Canada*, September 2012, p. 10.

51 US EIA, *Annual Energy Outlook 2012*, pp. 23–4.

52 IEA, *World Energy Outlook 2011 Factsheet* © OECD/IEA, p. 1.

As at 2008, crude oil and other liquids fuelled around 34 per cent of the world's energy needs. According to projections by the US EIA demand for crude as an energy source will continue to grow in the future.

Chart 4.5 Annual world energy consumption, by fuel type: 1990 to 2035



Source: US Energy Information Administration (US EIA), *International Energy Outlook 2011*, at [http://www.eia.gov/forecasts/ieo/pdf/0484\(2011\).pdf](http://www.eia.gov/forecasts/ieo/pdf/0484(2011).pdf)

Notes: Liquids are made up of petroleum and other liquid fuels including petroleum-derived fuels and non-petroleum-derived liquid fuels, such as ethanol and biodiesel, coal-to-liquids, gas-to-liquids, petroleum coke, natural gas liquids, crude oil consumed as a fuel and liquid hydrogen (US Energy Information Administration, *International energy outlook 2011*, p. 25).

However, the reliance on crude oil is expected to diminish somewhat from current levels reflecting the expectation that crude prices will rise over the longer-term and encourage substitution to other energy sources. By 2035 crude and other liquid fuels are estimated to provide only 29 per cent of global energy demands.

In comparison, use of other sources of energy is expected to accelerate. Consumption of natural gas and coal is estimated to increase by about 50 per cent. Nuclear energy and renewables are projected to grow significantly with renewable sources receiving increased support and meeting around 14 per cent of world energy needs by 2035.

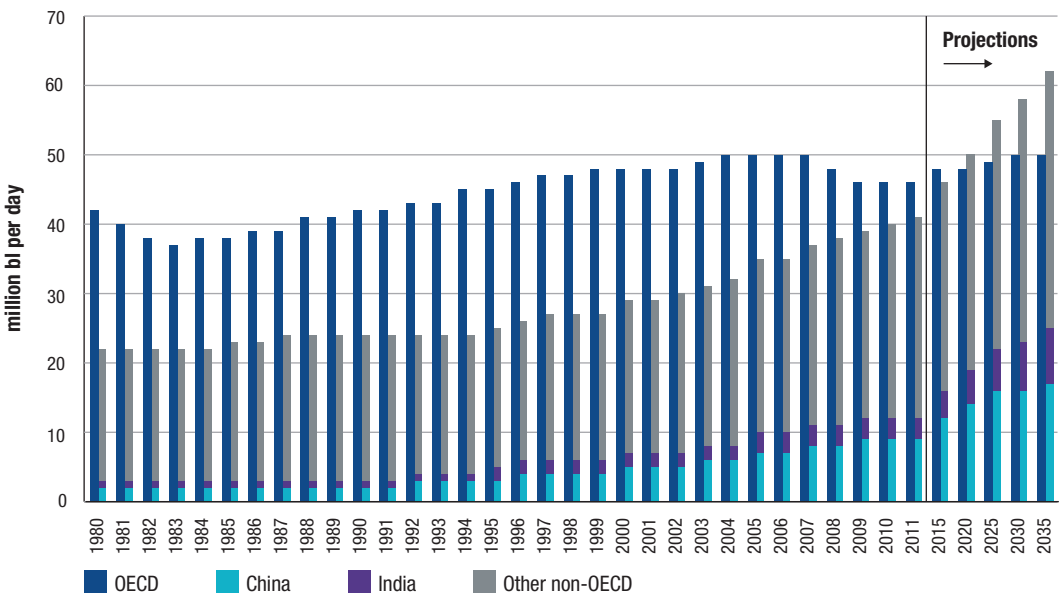
4.3.2 Oil demand growth

For some time now growth in oil consumption has been most prevalent in developing economies. Chart 4.6 shows projections of consumption of crude oil and other liquid fuels to 2035 in OECD and non-OECD countries. There is a clear contrast between rates of growth forecast for OECD and non-OECD regions.

Demand for crude in OECD countries has stalled, and is expected to show modest increases reflecting slow or declining population growth.⁵³ In 2035 consumption is projected to reach similar levels to those seen in the mid-2000s.

In contrast, demand in non-OECD countries is estimated to grow at much higher rates driven by oil consumption in China and India, and exceed OECD levels by 2020.

Chart 4.6 Consumption of crude oil and other liquid fuels in OECD and non-OECD countries (including China and India): 1980 to 2035



Source: US EIA, *International Energy Outlook 2011*, table A5, p. 162, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5&pid=5&aid=2&cid=CG6,CG5,CH,IN,&syid=1980&eyid=2011&unit=TBD>

Notes: Includes liquid fuels and other petroleum-derived fuels and non-petroleum derived liquid fuels, such as ethanol and biodiesel, coal-to-liquids, and gas-to-liquids, petroleum coke, natural gas liquids, crude oil consumed as fuel, and liquid hydrogen (US Energy Information Administration, *International energy outlook 2011*, p. 25).

It is widely expected that most of the net growth in oil consumption will occur within the transport sector of emerging economics as non-OECD car markets expand. The IEA predicts car sales in non-OECD countries to surpass those in the OECD by 2020, contributing to a doubling of the global passenger vehicle fleet by 2035.⁵⁴

Chart 4.7 illustrates projections of consumption of crude oil and other liquid fuels by sector to 2035 showing that the majority of growth is estimated to come from the transportation sector.

⁵³ US EIA, *International Energy Outlook 2011*, p. 28.

⁵⁴ IEA, *World Energy Outlook 2011 Factsheet* © OECD/IEA, p. 3.

Chart 4.7 Projections of crude oil and other liquid fuel consumption by sector: 2008 to 2035



Source: US EIA, *International Energy Outlook 2011*, figure 33

Despite the projected long term growth, uncertainty about world economic conditions has had a dampening effect on the short term prospects for developing economies. For example, the month of April 2012 saw a dramatic slowing of economic activity in non-OECD countries, primarily in China. The IEA reported a sharp deceleration in growth in developing markets including a downturn in the use of transport fuels.⁵⁵

Overall, on the demand side, the US EIA expects that consumption of crude oil and other liquids markets over the longer term will be largely driven by economic activity and momentum among developing nations, as demand in OECD countries responds to higher crude oil prices.⁵⁶

4.4 Supply of crude oil

The main factors that determine the long term supply of crude oil can be grouped into three categories:

- investment and production decisions by countries that are part of the Organisation of Petroleum Exporting Countries (OPEC)
- the economics of non-OPEC supply
- the viability of other (unconventional) sources of supply.⁵⁷

OPEC is an inter-governmental cartel consisting of 12 oil producing and exporting nations: Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates and Venezuela. OPEC's stated objective is 'to coordinate and unify the petroleum policies of its Member Countries and ensure the stabilization of oil markets in order to secure an efficient, economic and

⁵⁵ IEA, *Oil Market Report* © OECD/IEA, 13 June 2012, pp. 5–11.

⁵⁶ US EIA, *Annual Energy Outlook 2012*, p. 72.

⁵⁷ US EIA, *Annual Energy Outlook 2012*, p. 23.

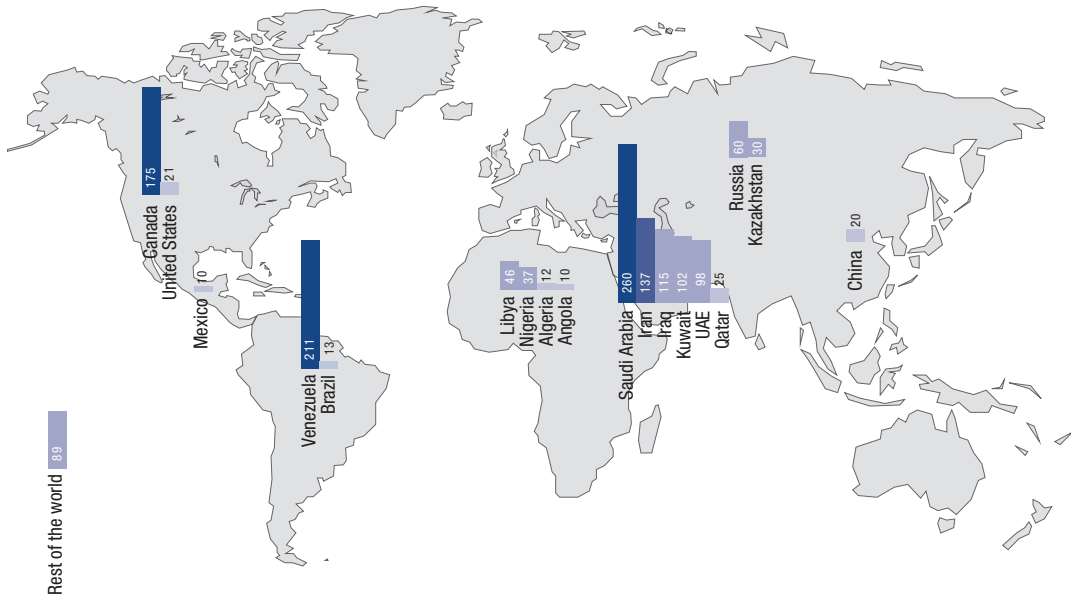
regular supply of petroleum to consumers, a steady income to producers and a fair return on capital for those investing in the petroleum industry'.⁵⁸

The following sections discuss the sources of crude oil supplies as well as production trends of both OPEC and non-OPEC nations.

4.4.1 Oil reserves

Figure 4.1 shows the major proven crude oil reserves around the world as at January 2011. Together, OPEC countries account for just over 70 per cent of proven supplies.

Figure 4.1 Major proven crude oil reserves, billions of barrels: January 2011



Source: US Energy Information Administration, *International Energy Outlook 2011*, table 5, p. 38; based on estimates by the *Oil and gas journal* provided to the US Securities and Exchange Commission

Notes: Proved reserves are defined by the US EIA as 'estimated quantities that geological and engineering data indicate can be recovered in future years from known reservoirs, assuming existing technology and current economic and operating conditions'.

Around 50 per cent of the world's proven crude oil reserves are located in the Middle East with Saudi Arabia holding the largest pool of reserves. The Americas also have sizeable reserves, largely by way of Venezuela and Canada with 14 and 12 per cent of the world total respectively. Venezuela's reserves now include its recent Orinoco extra-heavy oil developments marking a significant increase in local oil reserves.⁵⁹ Canadian tar sand deposits make up the majority of reserves in North America.

Recent developments in other "unproven" resources suggest the potential for sizeable growth of oil resources in some countries.⁶⁰

⁵⁸ OPEC Mission Statement, at http://www.opec.org/opec_web/en/about_us/23.htm

⁵⁹ US EIA, *International Energy Outlook 2011*, p. 38.

⁶⁰ Unproved resources are 'additional volumes estimated to be technically recoverable without consideration of economics or operating conditions, based on the application of current technology'. (US EIA, *Annual Energy Outlook 2012*, p. 56).

- In the US recent estimates indicate a sharp increase in recoverable volumes of shale oil.⁶¹ In its first official forecast of shale oil resources, the US EIA estimates US crude oil production to reach 6.7 million barrels per day (mbpd) in 2020 (the highest level since 1994) primarily as a result of continued development of shale oil resources.⁶² This is reportedly the largest new source of US supply since the offshore fields in the Gulf of Mexico, which themselves provide opportunities for further development in the short to medium-term.⁶³
- Brazil is also expected to show increases in oil supplies, largely following the discovery of significant pre-salt deposit fields in the Atlantic Ocean (located below the ocean surface underneath a layer of salt).⁶⁴

The extent to which these discoveries can be exploited is however uncertain, and for some fields, their viability is highly uncertain. These technically difficult, expensive and high risk projects would likely require a sustained high oil price (along with appropriate government support) to make them fully viable.

4.4.2 Major producers and exporters

In 2011 OPEC countries accounted for about 40 per cent of global crude oil production. Saudi Arabia was the largest producer with an output of 11.2 mbpd. Russia and the US were next, both producing over 10 mbpd. Chart 4.8 shows the top 30 crude oil producing countries in 2011. Australia ranks thirtieth with an output of 0.46 mbpd, down from 0.55 mbpd in the previous year.

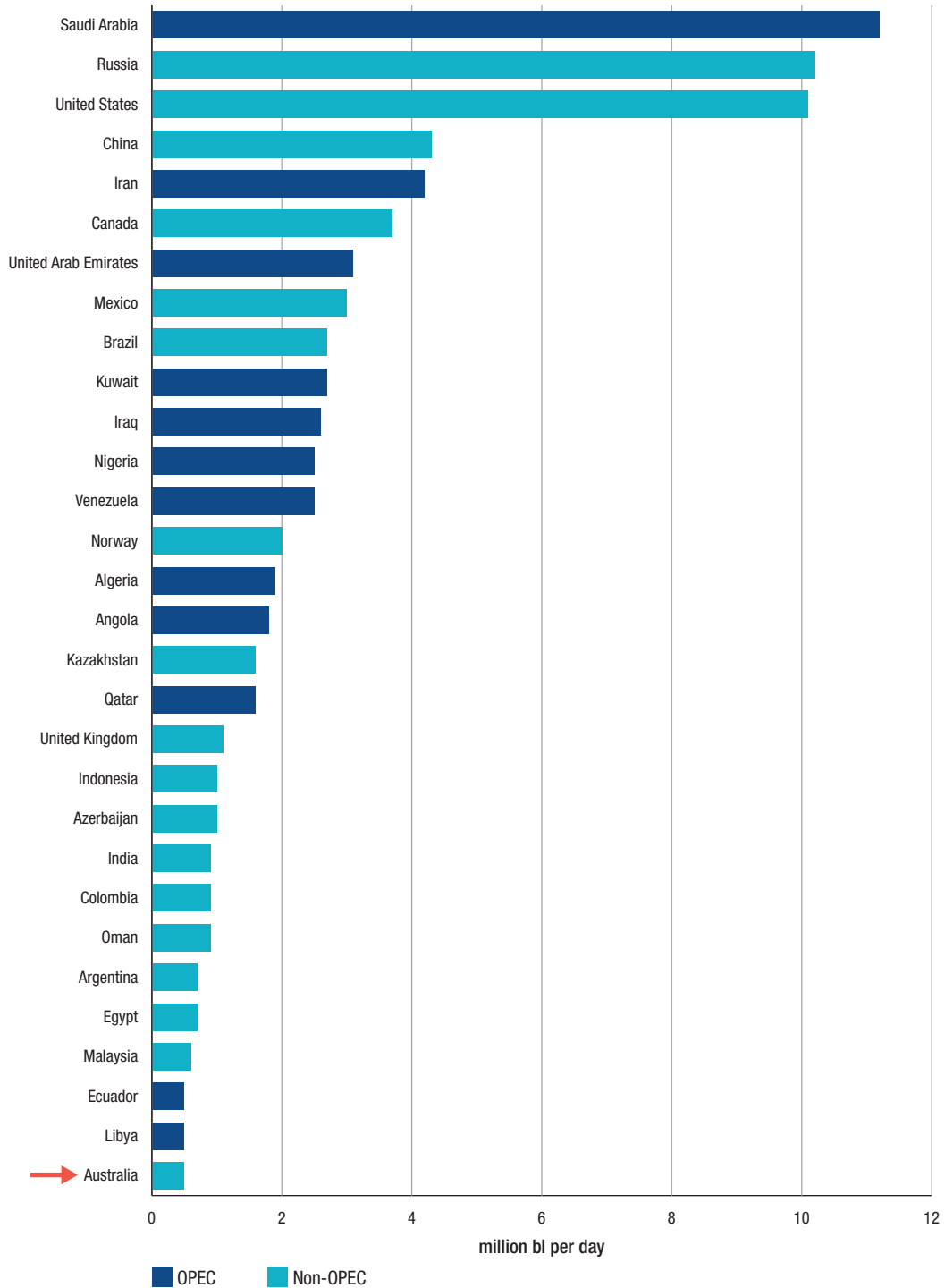
61 Also referred to as tight oil. Tight oil refers to liquid oil embedded in low-permeable sandstone, carbonate, and shale rock (US EIA, *Annual Energy Outlook 2012*, p. 95).

62 Reuters, at <http://www.reuters.com/article/2012/06/25/energy-data-eia-idUSL2E8HPCNO20120625>

63 US EIA, *International Energy Outlook 2011*, p. 33.

64 Ibid.

Chart 4.8 Top 30 crude oil producing countries: 2011



Source: US EIA, International Energy Statistics, at <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5&pid=53&aid=1&cid=regions,ww,r1,r2,r4,CG6,CG5,CG9,&syid=1990&eyid=2010&unit=TBD>

Notes: Oil production represents total oil supply, that is, production of crude oil (including lease condensate), natural gas plant liquids, other liquids and refinery processing gains.

On average, since 1980 OPEC countries have produced about 37 per cent of global oil supplies. OPEC's contribution to world supplies has moved over time, from 28 per cent of world production in 1985 to 42 per cent in 2008.

Forecasts on the contribution of OPEC production going forward are predominantly based on future crude oil price trends. The US EIA's reference case suggests that OPEC members will seek to maintain a constant market share of 40 to 42 per cent of world oil production.⁶⁵

In-line with the notion of OPEC being a swing producer, varying output to maximise revenues, if crude oil prices move higher than anticipated OPEC may tighten supply in order to maintain prices and revenues. Similarly, in the case of lower than expected crude oil prices, OPEC producers may attempt to increase supply to maximise revenues.⁶⁶

Many OPEC member countries also play a key role in the export of crude oil. Chart 4.9 shows that nine of the top 12 crude oil exporting countries in 2010 were members of OPEC. Saudi Arabia is the largest exporter of crude oil supplying 6.5 mbpd to the export market.

Export volumes originating from OPEC countries have undergone some change in recent years. Iran's export volumes have gradually declined and are set to reduce even further following US financial sanctions taking effect from the end of 2011, and the European Union banning Iranian oil imports from 1 July 2012.⁶⁷ The measures were aimed to halt the uranium enrichment activities occurring in Iran. In response, at least in the short term, other OPEC countries such as Saudi Arabia, Iraq and Libya as well as the United States, have increased output to offset Iran's declining supply.

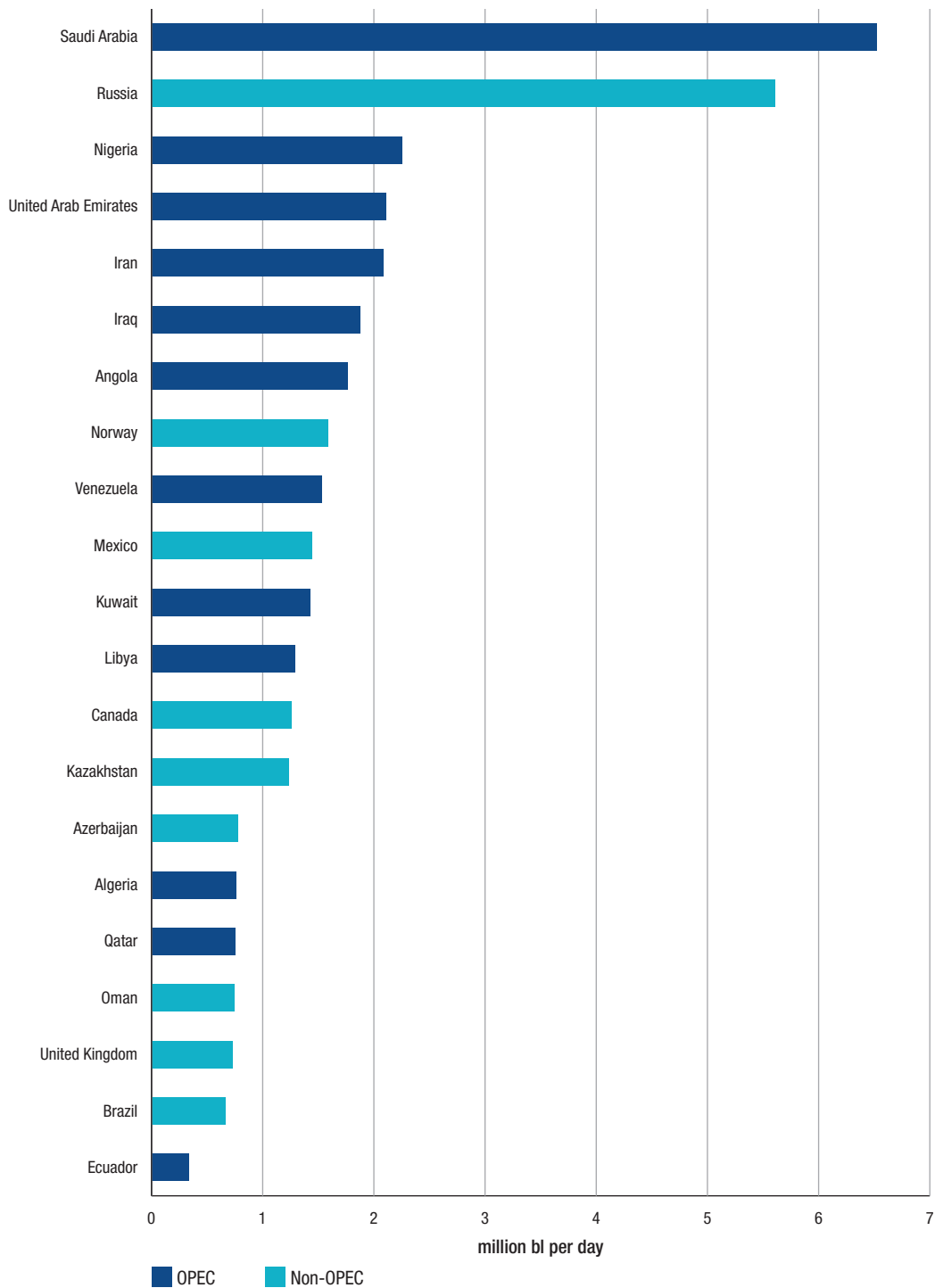
Non-OPEC countries also contributed substantial crude volumes to the export market in 2010, particularly Russia, exporting 5.6 mbpd. Norway, Mexico, Canada and Kazakhstan also contributed significant crude volumes.

⁶⁵ US EIA, *Annual Energy Outlook 2012*, p. 24.

⁶⁶ US EIA, *International Energy Outlook 2011*, p. 36.

⁶⁷ Platts, *Oilgram News Extra*, 29 June 2012.

Chart 4.9 Major crude oil exporters: 2010



Source: US EIA, International Energy Statistics, at <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5&pid=57&aid=4&cid=regions&syid=2009&eyid=2010&unit=TBPD>

4.4.3 Conventional and unconventional sources of supply

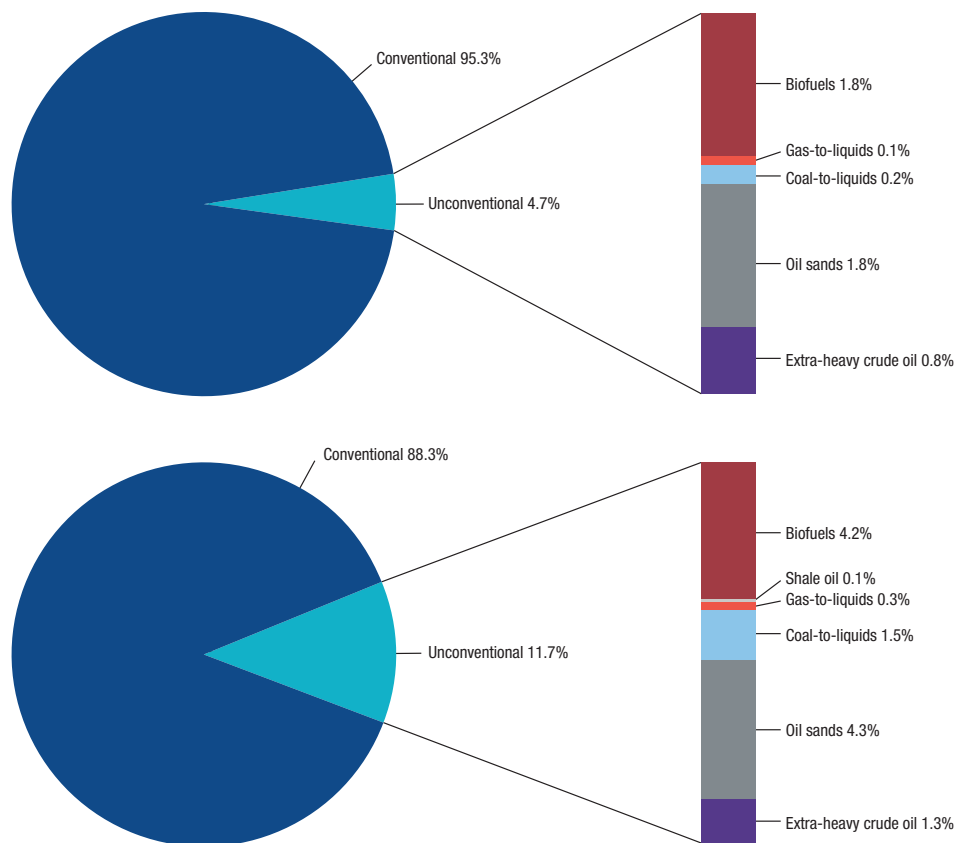
Unconventional supplies of oil refer to a wider variety of liquid sources including tar sands, extra-heavy oil, gas to liquids and other liquids. Conventional oil fields are typically easier and cheaper to recover than unconventional sources.⁶⁸

The mix of conventional and unconventional crude oil used to satisfy energy demand is likely to undergo lasting change as crude oil prices continue to rise over the longer-term and relatively expensive unconventional sources become viable to extract.

Although conventional liquids account for the bulk of global production, both currently and in the forecast medium-term, the contribution from unconventional liquids is projected to more than double.⁶⁹

Chart 4.10 shows the mix of conventional and unconventional sources of crude in 2008 as well as the US EIA's expected composition of world fuel liquids in 2035. Unconventional liquids are estimated to contribute 11.7 per cent of world liquid fuels production by 2035, up from 4.7 per cent in 2008.

Chart 4.10 Shares of world liquid fuels production, conventional and unconventional liquids: 2008 and 2035



Source: US EIA, *International Energy Outlook 2011*, figure 28

⁶⁸ IEA, at <http://www.iea.org/aboutus/faqs/oil/> © OECD/IEA

⁶⁹ US EIA, *International Energy Outlook 2011*, p. 36.

The outlook to 2035 suggests that oil sands and biofuels remain the most prevalent unconventional sources with extra-heavy crude oil and coal-to-liquids (CTL) also increasing in use.

The vast majority of the growth in unconventional liquid supply is likely to occur in non-OPEC regions:⁷⁰

- Canada's tar sands are expected to increase production by 3.3 mbpd and make up over 40 per cent of non-OPEC unconventional supplies.
- Supported by government mandates, the US is estimated to increase production of biofuels by 1.6 mbpd. Brazil is also projected to be a growth area for biofuels, increasing by 1.2 mbpd.
- China is expected to be the main producer of CTL supplies.

Venezuela's extra-heavy oil deposits are estimated to account for most of the unconventional production in OPEC countries.⁷¹

4.4.4 Future crude oil production

While projections can provide a well considered estimate about trends in crude resources going forward, the complete resource base of future oil supplies remains unclear. Estimates are likely to be continually reviewed as existing reserves are depleted, new fields are discovered and technological advancements allow greater recovery of liquids. As noted by the IEA, 'the size of ultimately recoverable resources of both conventional and unconventional oil is a major source of uncertainty for the long term outlook for world oil production'.⁷²

The move towards greater production of oil from unconventional sources however, rests on the progression of two important themes for future oil production:

- low-cost, conventional sources of supply becoming more scarce
- crude oil prices reaching levels where the development of unconventional sources of crude becomes viable.

The 2011 ACCC petrol monitoring report canvassed the concept of 'peak oil'—where the rate of global production of conventional oil declines and the world increasingly becomes dependent on harder-to-extract-and-refine unconventional supplies of oil.⁷³

There is concern that discoveries of new conventional oil fields are not keeping up with declining production of existing fields. It is probable that a number of nations have already experienced a high point of local crude production.

That said, some observers maintain that future increases in total supply will offset expected decreases in mature regions. In its 2011 World Oil Outlook, OPEC estimated that increases in conventional non-OPEC sources as well as steady increases in unconventional supply will more than compensate for expected conventional oil declines in regions such as North America and the North Sea.⁷⁴

Notwithstanding the uncertainties that lie ahead in terms of crude oil supply, the growth in unconventional sources of crude will mean higher production costs.

The production costs at which future oil supplies will be made available, although difficult to calculate exactly, are likely to be higher than those seen in the past.

⁷⁰ US EIA, *International Energy Outlook 2011*, p. 37.

⁷¹ US EIA, *International Energy Outlook 2011*, p. 36.

⁷² IEA, *World Energy Outlook 2010 - Executive Summary* © OECD/IEA, p. 6.

⁷³ ACCC, *Monitoring of the Australian Petroleum Industry—Summary 2011*, p. 18.

⁷⁴ OPEC, *World Oil Outlook 2011*, p. 10.

4.5 Refining capacity

The ability to refine crude oil to produce end-products is another crucial factor contributing to the supply and price of petrol.

Asia-Pacific has quickly become the most significant region in terms of refining capacity. According to the latest *BP Statistical Review of World Energy*, the region expanded capacity by around 33 per cent over the 10 years to 2011 to hold over 30 per cent of world refining capacity (table 4.1).

Within the Asia-Pacific region, Australia is a relatively small player in the global refining landscape with less than 1 per cent of global capacity.

While refining capacity in the Asia-Pacific region has grown, Australian refinery capacity has declined in recent years. Over the 10 years to 2011 capacity decreased by around 9 per cent. This trend, largely driven by competitive pressures from newer, more complex and lower-cost Asian refineries, seems established with the closure of two Australian refineries since 2003 and Caltex set to close its Kurnell refinery in 2014.

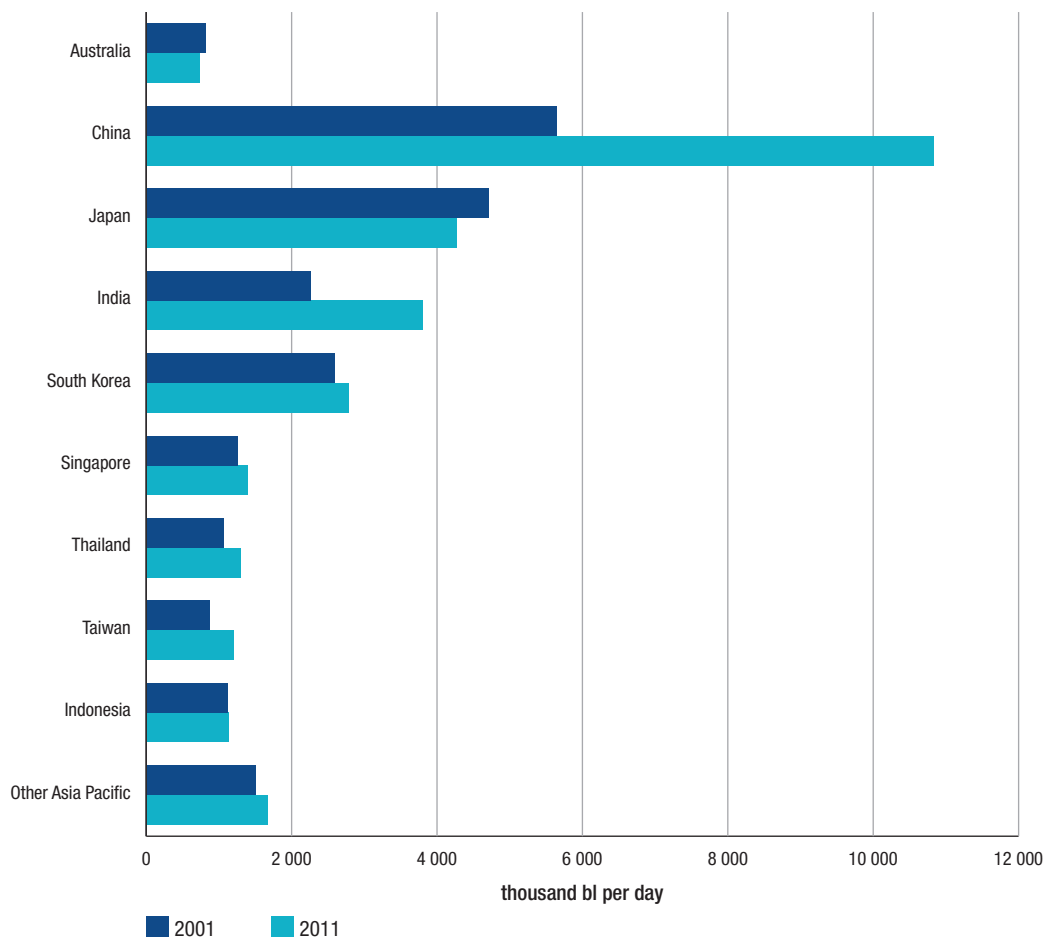
Table 4.1 World refining capacity, by region: 2001, 2005 and 2011

	2001	2005	2011	Change 2001 to 2011
	Thousand bl per day			%
Asia-Pacific	21 853	23 540	29 135	▲ 33
North America	20 183	20 698	21 382	▲ 6
South and Central America	6 246	6 405	6 590	▲ 6
Europe and Eurasia	25 162	24 877	24 570	▼ 2
Middle East	6 746	7 284	8 011	▲ 19
Africa	3 164	3 224	3 317	▲ 5
World	83 355	86 027	93 004	▲ 12

Source: BP, *BP Statistical Review of World Energy*, June 2012, p. 16, also at <http://www.bp.com/sectiongenericarticle800.do?categoryId=9037174&contentId=7068617>

The surge in refining capacity in the Asia-Pacific region in the last 10 years has been propelled by China and India, where capacity has increased by about 92 per cent and 68 per cent respectively. South Korea, Singapore, Taiwan and Thailand have also increased their refining capacity in the last 10 years, albeit by a much smaller degree. Chart 4.11 illustrates the change in refining capacity between 2001 and 2011 for a number of these countries, as well as for Australia.

Chart 4.11 Refining capacity in the Asia-Pacific region, by country: 2001 and 2011



Source: BP, *BP Statistical Review of World Energy*, June 2012, p. 16, also at <http://www.bp.com/sectiongenericarticle800.do?categoryId=9037174&contentId=7068617>

The more recent trend of integrated petrol companies withdrawing from refining operations is not limited to the Australian market. Refining capacity across the Europe and Eurasia region has also declined over the 10 years to 2011.

Evidence suggests that Europe will continue to face challenges in refining. For some time now the European region has been facing overcapacity, as local fuel demand has waned as a result of unstable economic conditions. Refiners have struggled to compete against more efficient operators including the increasing capacity coming online in Asia. The UK Government has recently reported that eight European refineries have closed since 2009 and that more closures are likely.⁷⁵

Chapter 15 discusses the changing refining environment in further detail, as well as implications for future crude oil and petroleum supply to Australian markets.

⁷⁵ Platts, *Oilgram News—Volume 90, Number 122*, 21 June 2012, p. 4.

4.6 Prospects for crude oil prices

The volatility seen in crude oil prices in the last few years suggests that predicting future crude oil prices is an extremely difficult task.

Table 4.2 presents various projections for crude oil prices in five year increments to 2035. The measure of oil prices is largely comparable across projections.⁷⁶

The spread of oil price projections also depicts the considerable level of uncertainty facing both the future supplies of crude oil and the level of global economic activity.

Table 4.2 Organisational projections of crude oil prices: 2015 to 2035

	2015	2020	2025	2030	2035
	2010 USD per bbl				
US Energy Information Administration	116.91	126.68	132.56	138.49	144.98
International Energy Agency	106.30	118.10	127.30	134.50	140.00
Strategic Energy and Economic Research, Inc.	94.20	101.57	107.13	111.26	121.94
Interindustry Forecasting Project at the University of Maryland (INFORUM)	91.78	105.84	113.35	117.83	116.76
Purvin & Gertz	98.75	103.77	106.47	107.37	107.37
Energy Ventures Analysis	82.24	84.75	89.07	94.78	102.11
IHS Global Insight	99.16	72.89	87.19	95.65	98.08

Source: US EIA, *Annual Energy Outlook 2012 with projections to 2035*, table 23, p. 105

Notes: The US EIA reports the price of low-sulphur, light crude oil, approximately the same as the WTI price widely cited in the trade press. The only series that do not report projections in WTI terms are the IEA, with prices expressed as the price of imported crude oil, and INFORUM, with prices expressed as the average US refiner acquisition cost of imported crude oil (US EIA, *Annual Energy Outlook 2012 with projections to 2035*, p. 105).

While there are a range of projections across the organisations represented in table 4.2, a common theme among almost all is that crude oil prices are forecast to continue to rise over the longer-term.

⁷⁶ US EIA, *Annual Energy Outlook 2012 with projections to 2035*, p. 105.

