

BP Statistical Review of World Energy

June 2012

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1 Introduction

- 1 Group chief executive's introduction
 - 2 2011 in review
-

6 Oil

- 6 Reserves
 - 8 Production and consumption
 - 15 Prices
 - 16 Refining
 - 18 Trade movements
-

20 Natural gas

- 20 Reserves
 - 22 Production and consumption
 - 27 Prices
 - 28 Trade movements
-

30 Coal

- 30 Reserves and prices
 - 32 Production and consumption
-

35 Nuclear energy

- 35 Consumption
-

36 Hydroelectricity

- 36 Consumption
-

38 Renewable energy

- 38 Other renewables consumption
 - 39 Biofuels production
-

40 Primary energy

- 40 Consumption
 - 41 Consumption by fuel
-

44 Appendices

- 44 Approximate conversion factors
- 44 Definitions
- 45 More information

Contents and navigation

Guide to navigation

BP Statistical Review of World Energy June 2012 uses the following icons and colour coding to help you navigate your way quickly and easily through the document. Icons and colours represent various energy types so you can see, at a glance, which section you are in.

Introduction

- 1 Group chief executive's introduction
- 2 2011 in review

Oil

- 6 Reserves
- 8 Production and consumption
- 15 Prices
- 16 Refining
- 18 Trade movements

Natural gas

- 20 Reserves
- 22 Production and consumption
- 27 Prices
- 28 Trade movements

Coal

- 30 Reserves and prices
- 32 Production and consumption

Nuclear energy

- 35 Consumption

Hydroelectricity

- 36 Consumption

Renewable energy

- 38 Other renewables consumption
- 39 Biofuels production

Primary energy

- 40 Consumption
- 41 Consumption by fuel

Appendices

- 44 Approximate conversion factors
- 44 Definitions
- 45 More information

About this review

For 61 years, the *BP Statistical Review of World Energy* has provided high-quality objective and globally consistent data on world energy markets. The review is one of the most widely respected and authoritative publications in the field of energy economics, used for reference by the media, academia, world governments and energy companies. A new edition is published every June.

Find out more online

BP Statistical Review of World Energy June 2012 is available online at bp.com/statisticalreview. The website contains all the tables and charts found in the latest printed edition, plus a number of extras, including:

- Historical data from 1965 for many sections.
- Additional data for natural gas, coal, hydroelectricity, nuclear energy, electricity and renewables.
- An energy charting tool, where you can view predetermined reports or chart specific data according to energy type, region and year.
- An oil, natural gas and LNG conversion calculator.
- PDF versions and PowerPoint slide packs of the charts, maps and graphs, plus an Excel workbook of the historical data.

About BP

BP is one of the world's largest oil and gas companies. We market our products in more than 70 countries. Our business segments are Exploration and Production, and Refining and Marketing. Through these business segments, we provide fuel for transportation, retail brands and energy for heat and light.



Appendices

For approximate conversion factors and definitions see [page 44](#)



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Disclaimer

The data series for proved oil and gas reserves in *BP Statistical Review of World Energy June 2012* does not necessarily meet the definitions, guidelines and practices used for determining proved reserves at company level, for instance, under UK accounting rules contained in the Statement of Recommended Practice, 'Accounting for Oil and Gas Exploration, Development, Production and Decommissioning Activities' (UK SORP) or as published by the US Securities and Exchange Commission, nor does it necessarily represent BP's view of proved reserves by country. Rather, the data series has been compiled using a combination of primary official sources and third-party data.

Group chief executive's introduction



Bob Dudley
Group Chief Executive
June 2012

Energy in 2011 – disruptions and continuity

Welcome to the 61st annual edition of the *BP Statistical Review of World Energy*. As is our longstanding custom, each June we take stock, and a step back from day-to-day activities to publish the annual data we have collected on the world's energy markets, to assess what has happened this last year and how last year's experience relates to longer-term trends. In a fast-changing world, I believe it is important to understand both the forces behind today's headlines as well as the underlying trends that are shaping the new energy landscape that our children and grandchildren will inherit. I find it essential and insightful to focus on the objective, rigorous data contained in this review.

2011 was an unusually eventful year in global energy. The tumultuous events of the 'Arab Spring' shook energy markets and underscored the importance of maintaining spare capacity and strategic stockpiles for dealing with supply disruptions. The earthquake and tsunami in Japan was a humanitarian disaster; and one with immediate implications – in Japan and around the world – for nuclear power and other fuels. Oil prices hit an all-time record high. Yet the revolution in shale gas production drove US natural gas prices lower, reaching record discounts to oil.

With all of these issues in play, global energy consumption grew by 2.5% in 2011, broadly in line with the historical average but well below the 5.1% seen in 2010. Once again emerging economies accounted for all of the net growth in energy consumption, with demand in the OECD falling for a third time in the last four years.

On the production side, the loss of oil supplies in Libya and elsewhere was eventually more than offset by large increases among Middle Eastern OPEC members, leading to record oil production in Saudi Arabia, the UAE, and Qatar. Meanwhile, the US recorded the largest non-OPEC production increase for a third consecutive year. In my mind, it is no coincidence that the innovations driving the renaissance in US oil and gas production are taking place in one of the most open and competitive upstream segments in the world. The example of North America highlights how competition and a level playing field foster innovation, ultimately leading to the production of previously inaccessible, new, 'unconventional' resources.

Crises and disruptions to one side, this year's data also confirm how a number of longer-term trends remained in place. The center of gravity for world energy consumption continues to shift from the OECD to emerging economies, especially in Asia. The world is not structurally short of hydrocarbon resources – as our data on proved reserves confirms year after year – but long lead times and various forms of access constraints in some regions continue to create challenges for the ability of supply to meet demand growth at reasonable prices.

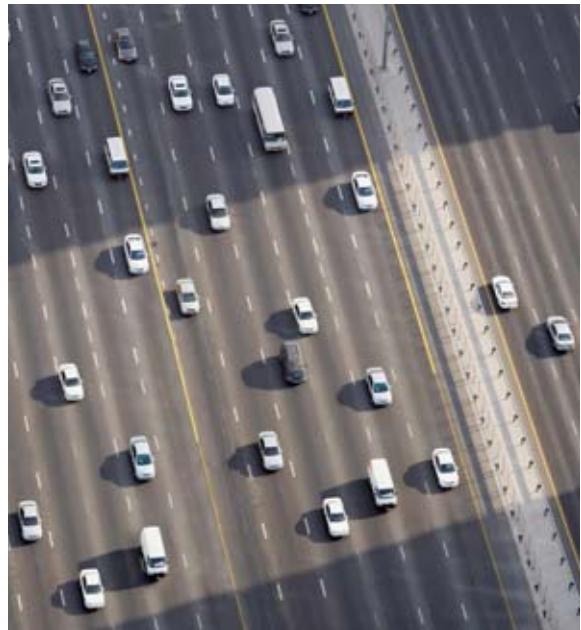
Fossil fuels still dominate energy consumption, with a market share of 87%. Renewable energy continues to gain but today accounts for only 2% of energy consumption globally. Meanwhile, the fossil fuel mix is changing as well. Oil, still the leading fuel, has lost market share for 12 consecutive years. Coal was once again the fastest growing fossil fuel, with predictable consequences for carbon emissions.

At this level, change comes only slowly to the global energy system. It is important for all of us – producers and consumers, along with our governments and everyone interested in energy – to address today's challenges without losing sight of slower-moving structural changes, including those we are seeking to bring about. It is a singular contribution of this review to keep us firmly rooted in objective data: a rigorous understanding of where we are – and where we have been – is necessary for us to build a safe and sustainable energy future together.

I would like to thank BP's economics team and all those around the world who have helped prepare this review – in particular those in governments in many countries who contribute their official data.

2011 in review

Global energy consumption growth in 2011 moderated along with the world economy.



Left Hong Kong at night, China.

Right A highway in Dubai, United Arab Emirates.

All of the net growth took place in emerging economies, with China alone accounting for 71% of global energy consumption growth. OECD consumption declined, led by a sharp decline in Japan – in volumetric terms, the world's largest decline. The data suggests that growth in global CO₂ emissions from energy use continued in 2011, but at a slower rate than in 2010.

Energy price developments were mixed. Oil prices for the year exceeded \$100 for the first time ever (in money-of-the-day terms) and inflation-adjusted prices were the second-highest on record, behind only 1864. Crude oil prices peaked in April following the loss of Libyan supplies. The differential between Brent and West Texas Intermediate (WTI) reached a record premium (in \$/bbl) due to infrastructure bottlenecks driven by rapidly-rising US and Canadian production. Natural gas prices in Europe and Asia – including spot markets and those indexed to oil – increased broadly in line with oil prices, although movements within the year varied widely. North American prices reached record discounts to both crude oil and to international gas markets due to continued robust regional production growth. Coal prices increased in all regions.

+2.5%

Growth in global primary energy consumption.

Energy developments

World primary energy consumption grew by 2.5% in 2011, roughly in line with the 10-year average. Consumption in OECD countries fell by 0.8%, the third decline in the past four years. Non-OECD consumption grew by 5.3%, in line with the 10-year average. Global consumption growth decelerated in 2011 for all fuels, as did total energy consumption for all regions. Oil remains the world's leading fuel, at 33.1% of global energy consumption, but oil continued to lose market share for the twelfth consecutive year and its current market share is the lowest in our data set, which begins in 1965.

33.1%

Oil's share of global energy consumption.

+1.1 million b/d

Growth of global oil production, despite outages in Libya and elsewhere.

Dated Brent averaged \$111.26 per barrel in 2011, an increase of 40% from the 2010 level. The loss of Libyan supplies early in the year, combined with smaller disruptions in a number of other countries, pushed prices sharply higher despite a large increase in production among other OPEC members following the Libyan outages and a release of strategic stocks from International Energy Agency member countries.

Global oil consumption grew by a below-average 0.6 million barrels per day (b/d), or 0.7%, to reach 88 million b/d. This was once again the weakest global growth rate among fossil fuels. OECD consumption declined by 1.2% (600,000 b/d), the fifth decrease in the past six years, reaching the lowest level since 1995. Outside the OECD, consumption grew by 1.2 million b/d, or 2.8%. Despite strong oil prices, oil consumption growth was below average in producing regions of the Middle East and Africa due to regional unrest. China again recorded the largest increment to global consumption growth (+505,000 b/d, +5.5%) although the growth rate was below the 10-year average. Middle distillates were again the fastest-growing refined product category by volume, for the seventh time in the past 10 years.

Annual global oil production increased by 1.1 million b/d, or 1.3%. Virtually all of the net growth was in OPEC, with large increases in Saudi Arabia (+1.2 million b/d), the UAE, Kuwait and Iraq more than offsetting a loss of Libyan supply (-1.2 million b/d). Output reached record levels in Saudi Arabia, the UAE and Qatar. Non-OPEC output was broadly flat, with increases in the US, Canada, Russia and Colombia offsetting continued declines in mature provinces such as the UK and Norway, as well as unexpected outages in a number of other countries. The US (+285,000 b/d) had the largest increase among non-OPEC producers for the third consecutive year. Driven by continued strong growth in onshore production of shale liquids, US output reached the highest level since 1998.

Global refinery crude runs increased by a below-average 375,000 b/d, or 0.5%. Non-OECD countries accounted for all the net increase, rising by 685,000 b/d. While OECD throughput declined by 310,000 b/d, US throughput increased (+110,000 b/d) and the US became a net exporter of refined products for the first time on record. Global refinery capacity utilization fell to 81.2% as global refining capacity increased by 1.4 million b/d (+1.5%), outpacing growth in throughputs for the fifth time in six years.

Global oil trade in 2011 grew by 2%, or 1.1 million b/d. At 54.6 million b/d, trade accounted for 62% of global consumption, up from 58% a decade ago. China accounted for roughly two-thirds of the growth in trade last year, with net imports (6 million b/d) rising by 13%. US net imports were 29% below their 2005 peak. Middle East countries accounted for 81% of the growth in exports last year. While crude oil accounted for 70% of global trade in 2011, refined products accounted for two-thirds of the growth in global trade last year.

Below Toledo refinery, Ohio, US.



Natural gas



Left Shah Deniz platform, Azerbaijan.

-9.9%

Decline in EU gas consumption,
the largest on record.

World natural gas consumption grew by 2.2%. Consumption growth was below average in all regions except North America, where low prices drove robust growth. Outside North America, the largest volumetric gains in consumption were in China (+21.5%), Saudi Arabia (+13.2%) and Japan (+11.6%). These increases were partly offset by the largest decline on record in EU gas consumption (-9.9%), driven by a weak economy, high gas prices, warm weather and continued growth in renewable power generation.

Global natural gas production grew by 3.1%. The US (+7.7%) recorded the largest volumetric increase despite lower gas prices, and remained the world's largest producer. Output also grew rapidly in Qatar (+25.8%), Russia (+3.1%) and Turkmenistan (+40.6%), more than offsetting declines in Libya (-75.6%) and the UK (-20.8%). As was the case for consumption, the EU recorded the largest decline in gas production on record (-11.4%), due to a combination of mature fields, maintenance, and weak regional consumption.

Following the general weakness of gas consumption growth, global natural gas trade increased by a relatively modest 4% in 2011. LNG shipments grew by 10.1%, with Qatar (+34.8%) accounting for virtually all (87.7%) of the increase. Among LNG importers, the largest volumetric growth was in Japan and the UK. LNG now accounts for 32.3% of global gas trade. Pipeline shipments grew by just 1.3%, with declines in imports by Germany, the UK, the US and Italy offsetting increases in China (from Turkmenistan), Ukraine (from Russia), and Turkey (from Russia and Iran).



Other fuels

2011 in review

+5.4%

Growth in coal consumption,
fastest among fossil fuels.

-4.3%

Decline in global nuclear output,
the largest on record.

2.1%

Share of renewables in global
energy consumption.



In detail

Additional information
is available at
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Coal consumption grew by 5.4% in 2011, the only fossil fuel to record above-average growth and the fastest-growing form of energy outside renewables. Coal now accounts for 30.3% of global energy consumption, the highest share since 1969. Consumption outside the OECD rose by an above-average 8.4%, led by Chinese consumption growth of 9.7%. OECD consumption declined by 1.1% with losses in the US and Japan offsetting growth in Europe. Global coal production grew by 6.1%, with non-OECD countries accounting for virtually all of the growth and China (+8.8%) accounting for 69% of global growth.

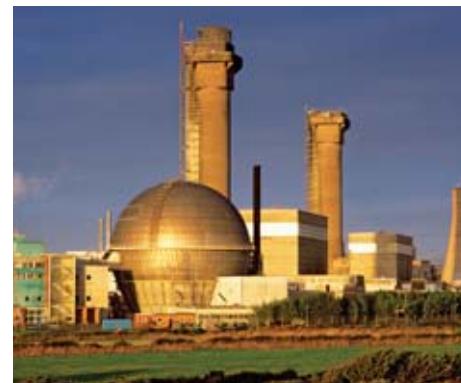
Global hydroelectric output grew by 1.6%, the weakest growth since 2003. Heavy rainfall drove strong growth in North America (+13.9%) – with the US recording the strongest increment on record – offsetting drought-related declines in Europe and China. Worldwide nuclear output fell by 4.3%, the largest decline on record, on the back of sharp declines in Japan (-44.3%) and Germany (-23.2%).

Renewable energy sources saw mixed results in 2011. Global biofuels production stagnated, rising by just 0.7% or 10,000 barrels per day oil equivalent (b/doe), the weakest annual growth since 2000. Growth in the US (+55,000 b/doe, or 10.9%) slowed as the share of ethanol in gasoline approached the ‘blendwall’, and Brazilian output had the largest decline in our data set (-50,000 b/doe, or -15.3%) due to a poor sugar harvest. In contrast, renewable energy used in power generation grew by an above-average 17.7%, driven by continued robust growth in wind energy (+25.8%), which accounted for more than half of renewable power generation for the first time. The US and China once again accounted for the largest increments in wind generation. Solar power generation grew even more rapidly (+86.3%), but from a smaller base. Renewable forms of energy accounted for 2.1% of global energy consumption, up from 0.7% in 2001.

Additional information – including historical time series for the fuels reported in this review; further detail on renewable forms of energy; and electricity generation – is available at bp.com/statisticalreview.

Acknowledgements

We would like to express our sincere gratitude to the many contacts worldwide who provide the publicly-available data for this publication, and to the researchers at the Heriot-Watt University Energy Academy who assist in the data compilation.



Above The Sellafield nuclear reprocessing plant, UK.

Left Tropical BioEnergia S.A. – the Brazilian biofuel company.

Proved reserves

	At end 1991 Thousand million barrels	At end 2001 Thousand million barrels	At end 2010 Thousand million barrels	At end 2011 Thousand million tonnes	At end 2011 Thousand million barrels	Share of total	R/P ratio
US	32.1	30.4	30.9	3.7	30.9	1.9%	10.8
Canada	40.1	180.9	175.2	28.2	175.2	10.6%	*
Mexico	50.9	18.8	11.7	1.6	11.4	0.7%	10.6
Total North America	123.2	230.1	217.8	33.5	217.5	13.2%	41.7
Argentina	1.7	2.9	2.5	0.3	2.5	0.2%	11.4
Brazil	4.8	8.5	14.2	2.2	15.1	0.9%	18.8
Colombia	1.9	1.8	1.9	0.3	2.0	0.1%	5.9
Ecuador	1.5	4.6	6.2	0.9	6.2	0.4%	33.2
Peru	0.8	1.0	1.2	0.2	1.2	0.1%	22.2
Trinidad & Tobago	0.6	1.0	0.8	0.1	0.8	0.1%	16.7
Venezuela	62.6	77.7	296.5	46.3	296.5	17.9%	*
Other S. & Cent. America	0.6	1.4	1.3	0.2	1.1	0.1%	22.1
Total S. & Cent. America	74.6	98.8	324.7	50.5	325.4	19.7%	*
Azerbaijan	n/a	1.2	7.0	1.0	7.0	0.4%	20.6
Denmark	0.6	1.3	0.9	0.1	0.8	♦	10.0
Italy	0.8	0.8	1.4	0.2	1.4	0.1%	34.3
Kazakhstan	n/a	5.4	30.0	3.9	30.0	1.8%	44.7
Norway	8.8	11.6	6.8	0.8	6.9	0.4%	9.2
Romania	1.5	1.2	0.6	0.1	0.6	♦	18.7
Russian Federation	n/a	73.0	86.6	12.1	88.2	5.3%	23.5
Turkmenistan	n/a	0.5	0.6	0.1	0.6	♦	7.6
United Kingdom	4.2	4.5	2.8	0.4	2.8	0.2%	7.0
Uzbekistan	n/a	0.6	0.6	0.1	0.6	♦	18.9
Other Europe & Eurasia	60.9	2.2	2.2	0.3	2.2	0.1%	15.2
Total Europe & Eurasia	76.8	102.4	139.5	19.0	141.1	8.5%	22.3
Iran	92.9	99.1	151.2	20.8	151.2	9.1%	95.8
Iraq	100.0	115.0	115.0	19.3	143.1	8.7%	*
Kuwait	96.5	96.5	101.5	14.0	101.5	6.1%	97.0
Oman	4.3	5.9	5.5	0.7	5.5	0.3%	16.9
Qatar	3.0	16.8	24.7	3.2	24.7	1.5%	39.3
Saudi Arabia	260.9	262.7	264.5	36.5	265.4	16.1%	65.2
Syria	3.0	2.3	2.5	0.3	2.5	0.2%	20.6
United Arab Emirates	98.1	97.8	97.8	13.0	97.8	5.9%	80.7
Yemen	2.0	2.4	2.7	0.3	2.7	0.2%	32.0
Other Middle East	0.1	0.1	0.3	0.1	0.7	♦	37.1
Total Middle East	660.8	698.7	765.6	108.2	795.0	48.1%	78.7
Algeria	9.2	11.3	12.2	1.5	12.2	0.7%	19.3
Angola	1.4	6.5	13.5	1.8	13.5	0.8%	21.2
Chad	—	0.9	1.5	0.2	1.5	0.1%	36.1
Republic of Congo (Brazzaville)	0.7	1.6	1.9	0.3	1.9	0.1%	18.0
Egypt	3.5	3.7	4.5	0.6	4.3	0.3%	16.0
Equatorial Guinea	0.3	1.1	1.7	0.2	1.7	0.1%	18.5
Gabon	0.9	2.4	3.7	0.5	3.7	0.2%	41.2
Libya	22.8	36.0	47.1	6.1	47.1	2.9%	*
Nigeria	20.0	31.5	37.2	5.0	37.2	2.3%	41.5
Sudan & South Sudan	0.3	0.7	6.7	0.9	6.7	0.4%	40.5
Tunisia	0.4	0.5	0.4	0.1	0.4	♦	15.0
Other Africa	0.8	0.6	2.3	0.3	2.2	0.1%	27.0
Total Africa	60.4	96.8	132.7	17.6	132.4	8.0%	41.2
Australia	3.2	5.0	3.8	0.4	3.9	0.2%	21.9
Brunei	1.1	1.2	1.1	0.1	1.1	0.1%	18.2
China	15.5	15.4	14.8	2.0	14.7	0.9%	9.9
India	6.1	5.5	5.8	0.8	5.7	0.3%	18.2
Indonesia	5.9	5.1	4.2	0.6	4.0	0.2%	11.8
Malaysia	3.7	4.5	5.9	0.8	5.9	0.4%	28.0
Thailand	0.2	0.6	0.4	0.1	0.4	♦	3.5
Vietnam	0.2	2.2	4.4	0.6	4.4	0.3%	36.7
Other Asia Pacific	0.9	1.1	1.2	0.1	1.1	0.1%	10.4
Total Asia Pacific	37.0	40.5	41.7	5.5	41.3	2.5%	14.0
Total World	1032.7	1267.4	1622.1	234.3	1652.6	100.0%	54.2
of which: OECD	142.7	254.8	235.0	35.7	234.7	14.2%	34.7
Non-OECD	890.1	1012.6	1387.1	198.6	1417.9	85.8%	59.7
OPEC	769.0	855.5	1167.3	168.4	1196.3	72.4%	91.5
Non-OPEC‡	204.7	330.4	329.4	48.7	329.4	19.9%	26.3
European Union#	8.3	8.8	6.8	0.9	6.7	0.4%	10.8
Former Soviet Union	59.0	81.4	125.4	17.2	126.9	7.7%	25.8
Canadian oil sands: Total	32.4	174.7	169.2	27.5	169.2		
of which: Under active development	3.2	11.5	25.9	4.2	25.9		
Venezuela: Orinoco Belt	—	—	220.0	35.3	220.0		

*More than 100 years.

♦Less than 0.05%.

†Excludes Former Soviet Union.

#Excludes Estonia, Latvia and Lithuania in 1991.

Notes: Proved reserves of oil – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

Reserves-to-production (R/P) ratio – If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate.

Source of data – The estimates in this table have been compiled using a combination of primary official sources, third-party data from the OPEC Secretariat, *World Oil*, *Oil & Gas Journal* and an independent estimate of Russian and Chinese reserves based on information in the public domain.

Canadian oil sands 'under active development' are an official estimate. Venezuelan Orinoco Belt reserves are based on the OPEC Secretariat and government announcements.

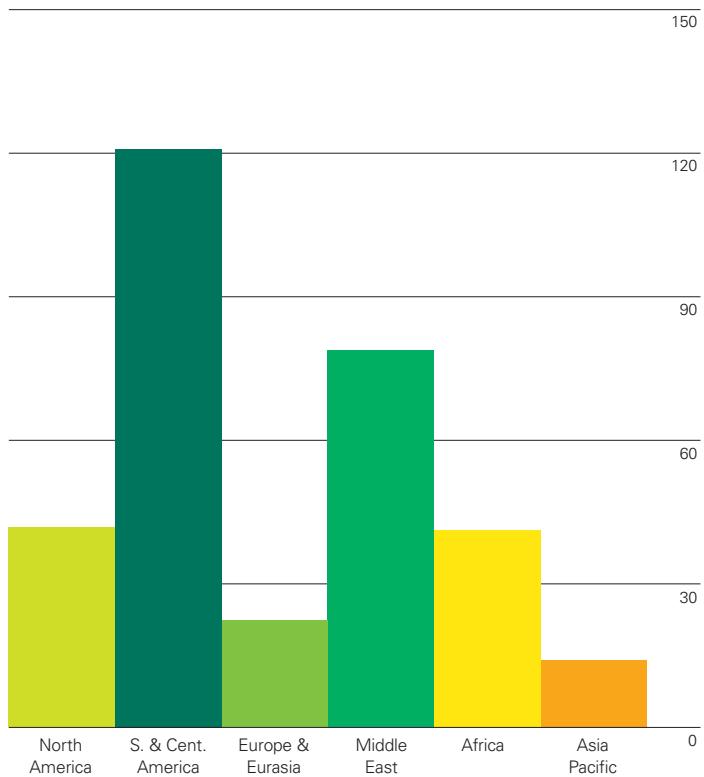
Reserves include gas condensate and natural gas liquids (NGLs) as well as crude oil.

Shares of total and R/P ratios are calculated using thousand million barrels figures.

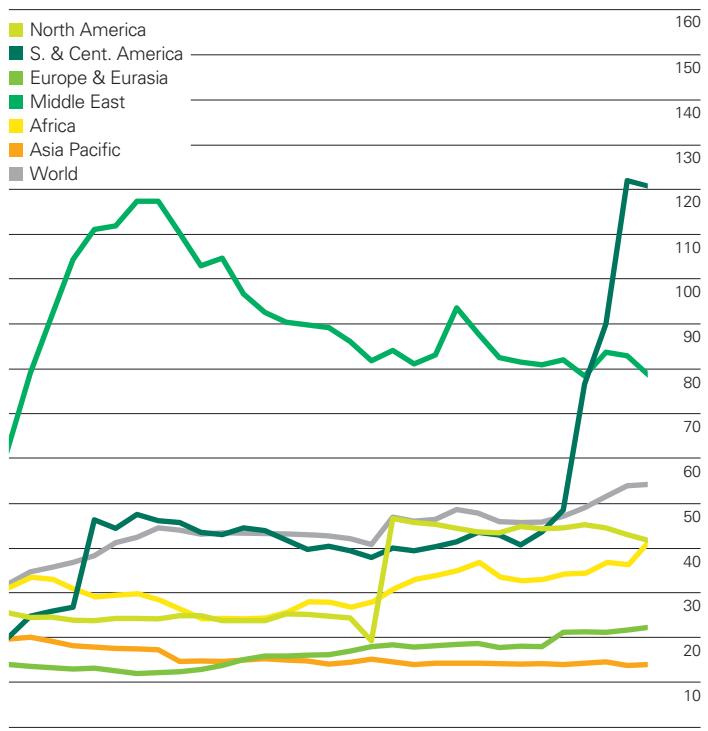
Reserves-to-production (R/P) ratios

Years

2011 by region



History

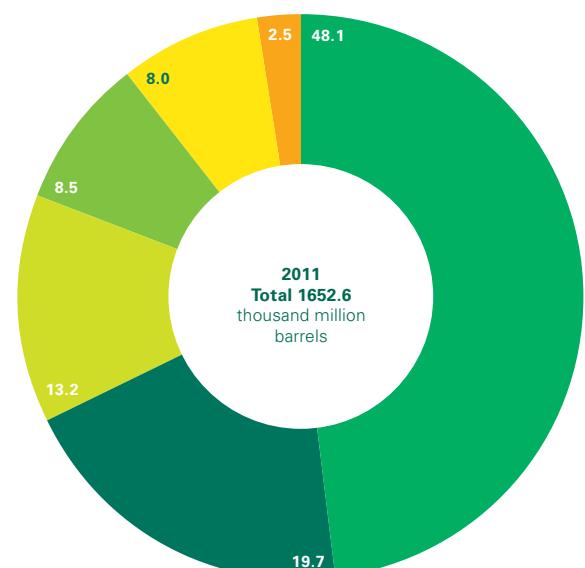
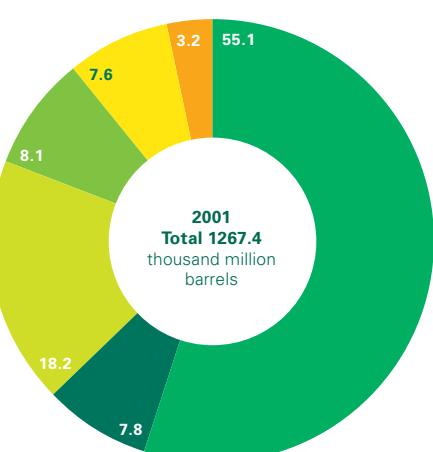
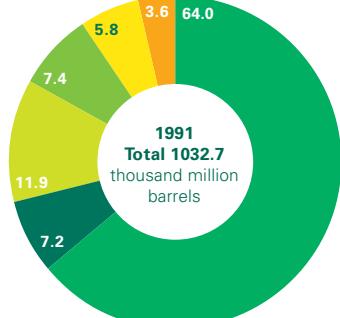


World proved oil reserves at the end of 2011 reached 1652.6 billion barrels, sufficient to meet 54.2 years of global production. The continuing increase in official Venezuelan reserves pushed the South & Central American R/P ratio above 100. The large increase in Middle Eastern production reduced the region's R/P ratio despite an increase in reserves; the region holds 48.1% of global proved reserves.

Distribution of proved reserves in 1991, 2001 and 2011

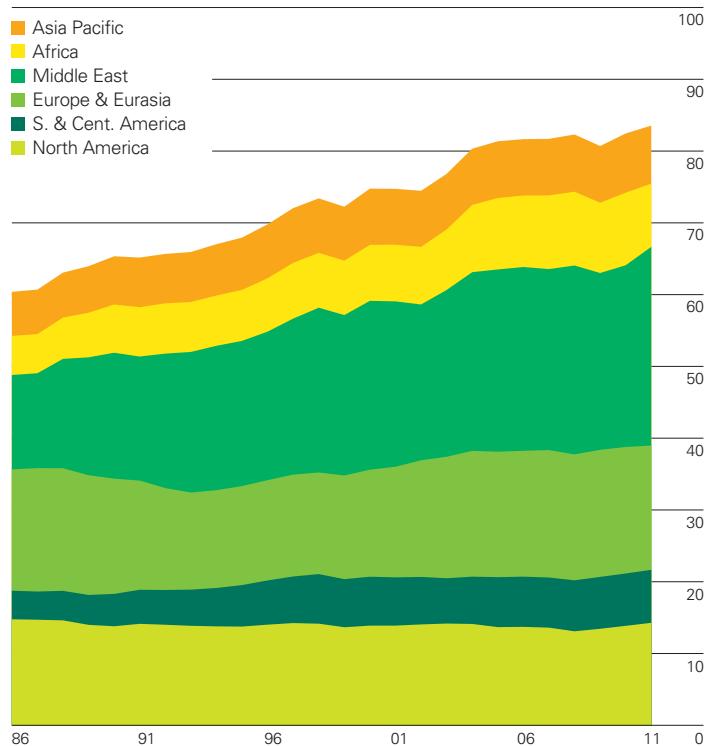
Percentage

- Middle East
- S. & Cent. America
- North America
- Europe & Eurasia
- Africa
- Asia Pacific



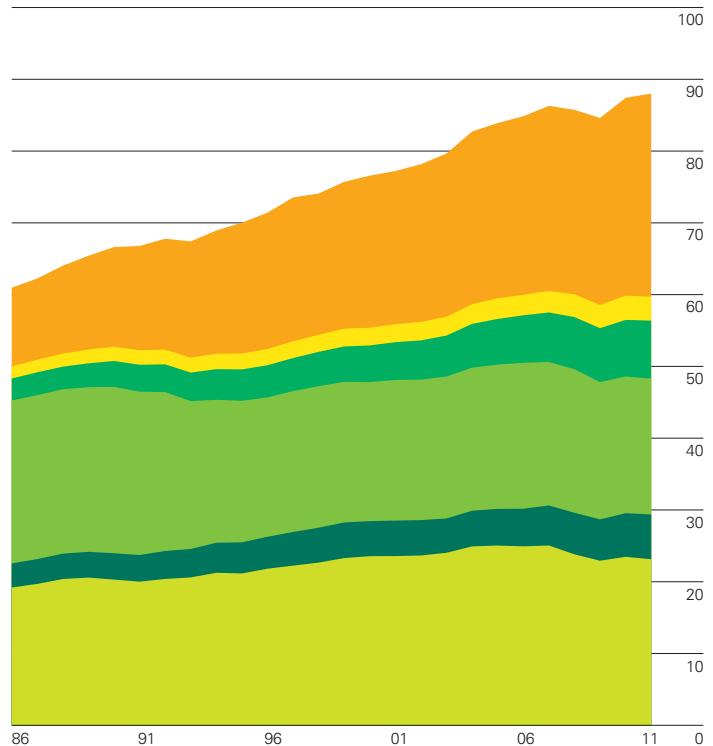
Production by region

Million barrels daily



Consumption by region

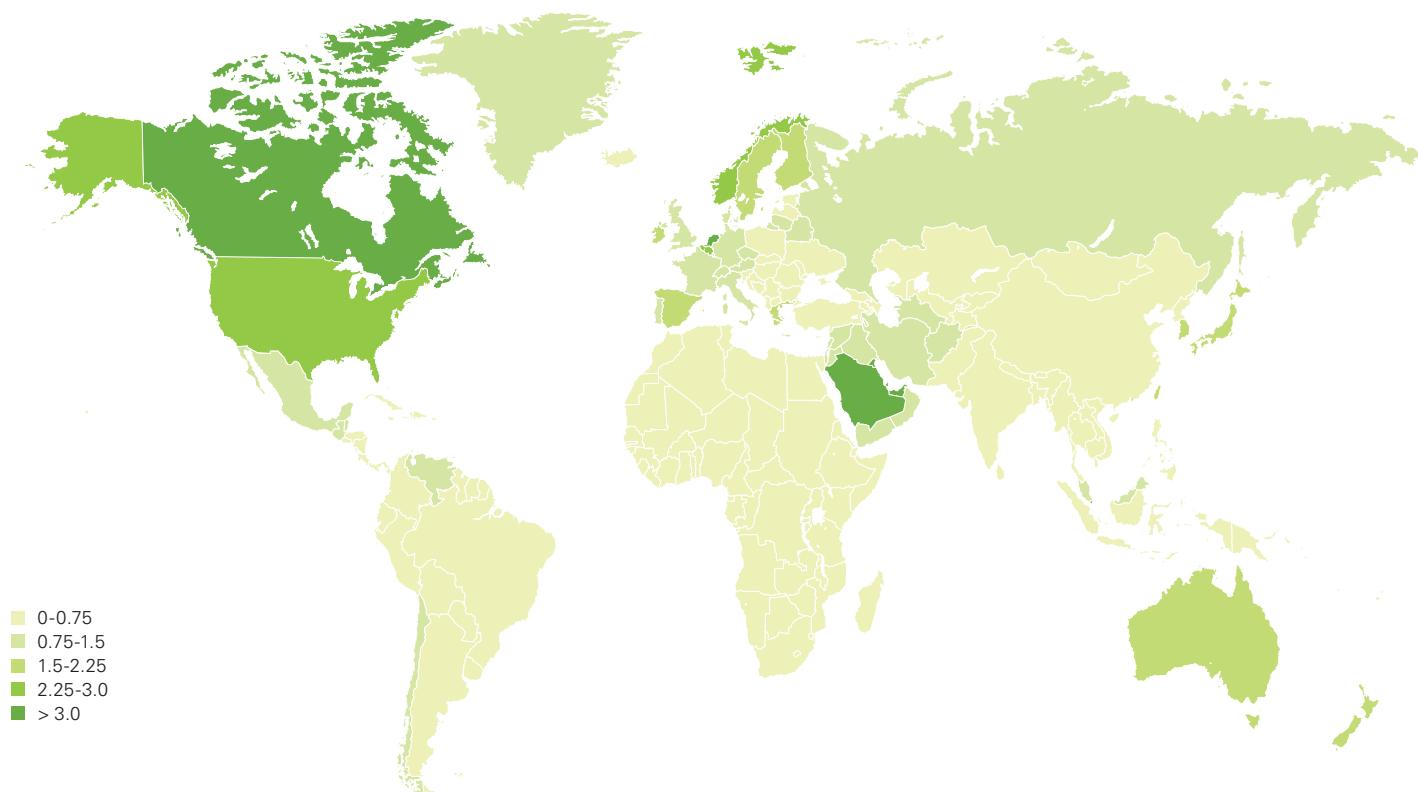
Million barrels daily



World oil production increased by 1.1 million b/d in 2011, with OPEC accounting for nearly all of the increase despite a 1.2 million b/d reduction in Libyan production. The US had the largest growth in non-OPEC supply for a third consecutive year. World oil consumption increased by roughly 600,000 b/d. All of the net growth came from emerging economies in Asia, South & Central America, and the Middle East, offsetting declines in Europe and North America.

Consumption per capita 2011

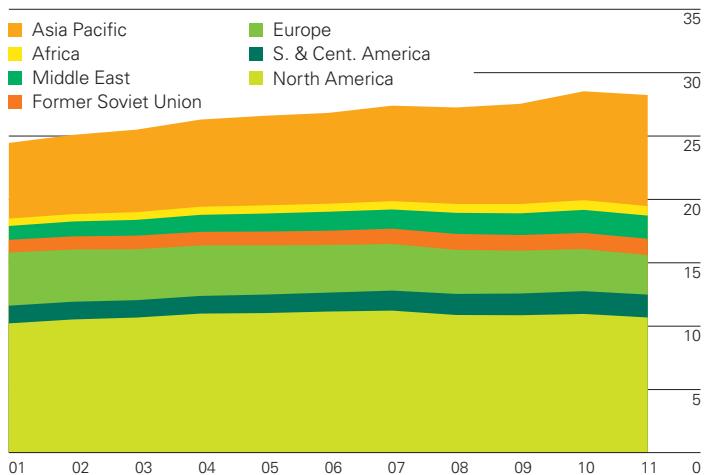
Tonnes



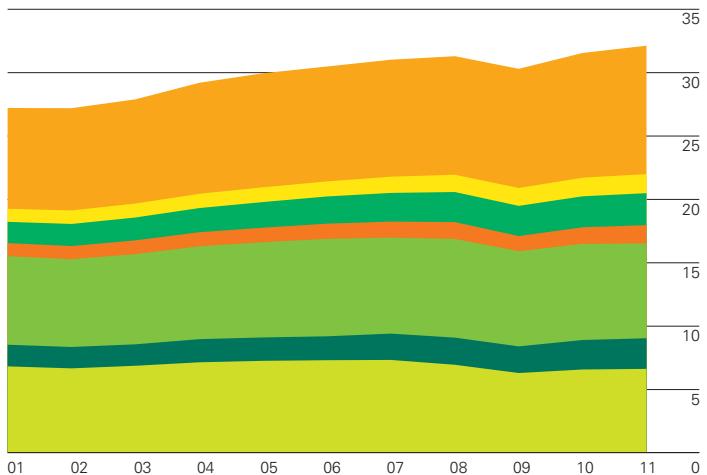
Product consumption by region

Million barrels daily

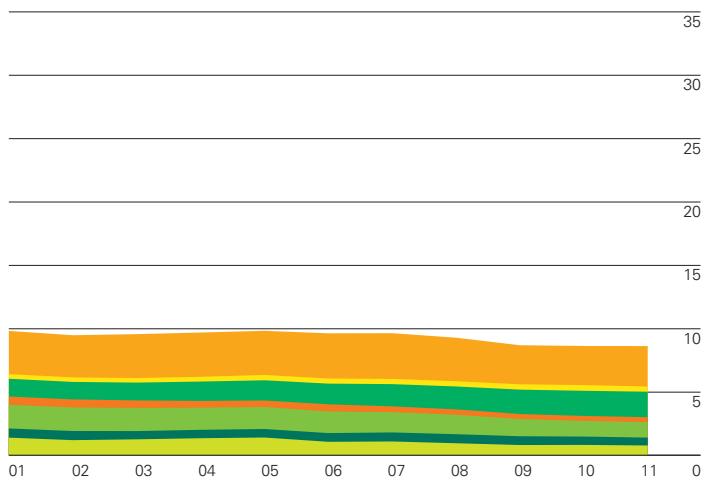
Light distillates



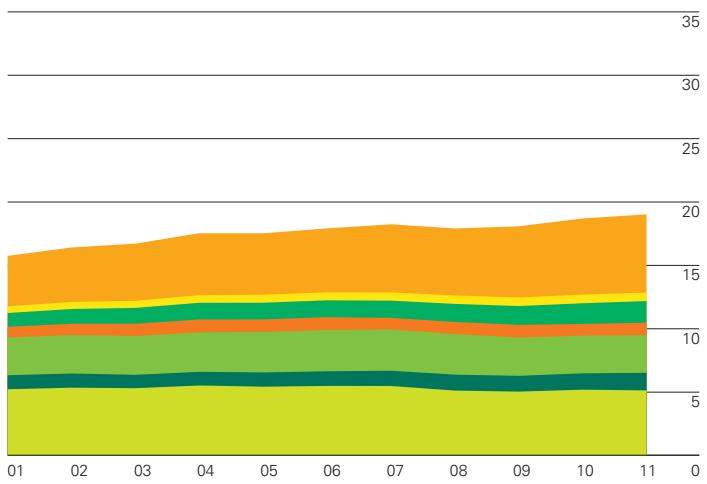
Middle distillates



Fuel oil

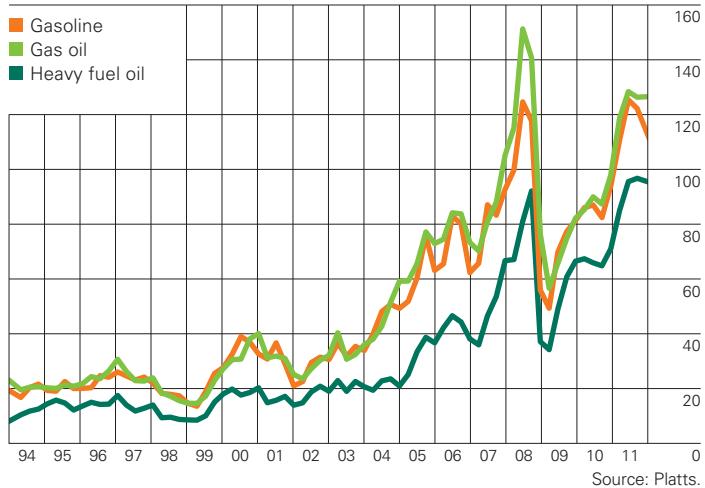


Others



Rotterdam product prices

US dollars per barrel



Source: Platts.

US Gulf Coast product prices

US dollars per barrel



Source: Platts.

Spot crude prices

US dollars per barrel	Dubai \$/bbl*	Brent \$/bbl†	Nigerian Forcados \$/bbl	West Texas Intermediate \$/bbl‡
1974	10.41	—	—	—
1975	10.70	—	—	—
1976	11.63	12.80	12.87	12.23
1977	12.38	13.92	14.21	14.22
1978	13.03	14.02	13.65	14.55
1979	29.75	31.61	29.25	25.08
1980	35.69	36.83	36.98	37.96
1981	34.32	35.93	36.18	36.08
1982	31.80	32.97	33.29	33.65
1983	28.78	29.55	29.54	30.30
1984	28.06	28.78	28.14	29.39
1985	27.53	27.56	27.75	27.98
1986	13.10	14.43	14.46	15.10
1987	16.95	18.44	18.39	19.18
1988	13.27	14.92	15.00	15.97
1989	15.62	18.23	18.30	19.68
1990	20.45	23.73	23.85	24.50
1991	16.63	20.00	20.11	21.54
1992	17.17	19.32	19.61	20.57
1993	14.93	16.97	17.41	18.45
1994	14.74	15.82	16.25	17.21
1995	16.10	17.02	17.26	18.42
1996	18.52	20.67	21.16	22.16
1997	18.23	19.09	19.33	20.61
1998	12.21	12.72	12.62	14.39
1999	17.25	17.97	18.00	19.31
2000	26.20	28.50	28.42	30.37
2001	22.81	24.44	24.23	25.93
2002	23.74	25.02	25.04	26.16
2003	26.78	28.83	28.66	31.07
2004	33.64	38.27	38.13	41.49
2005	49.35	54.52	55.69	56.59
2006	61.50	65.14	67.07	66.02
2007	68.19	72.39	74.48	72.20
2008	94.34	97.26	101.43	100.06
2009	61.39	61.67	63.35	61.92
2010	78.06	79.50	81.05	79.45
2011	106.18	111.26	113.65	95.04

*1974-1985 Arabian Light, 1986-2011 Dubai dated.

†1976-1983 Forties, 1984-2011 Brent dated.

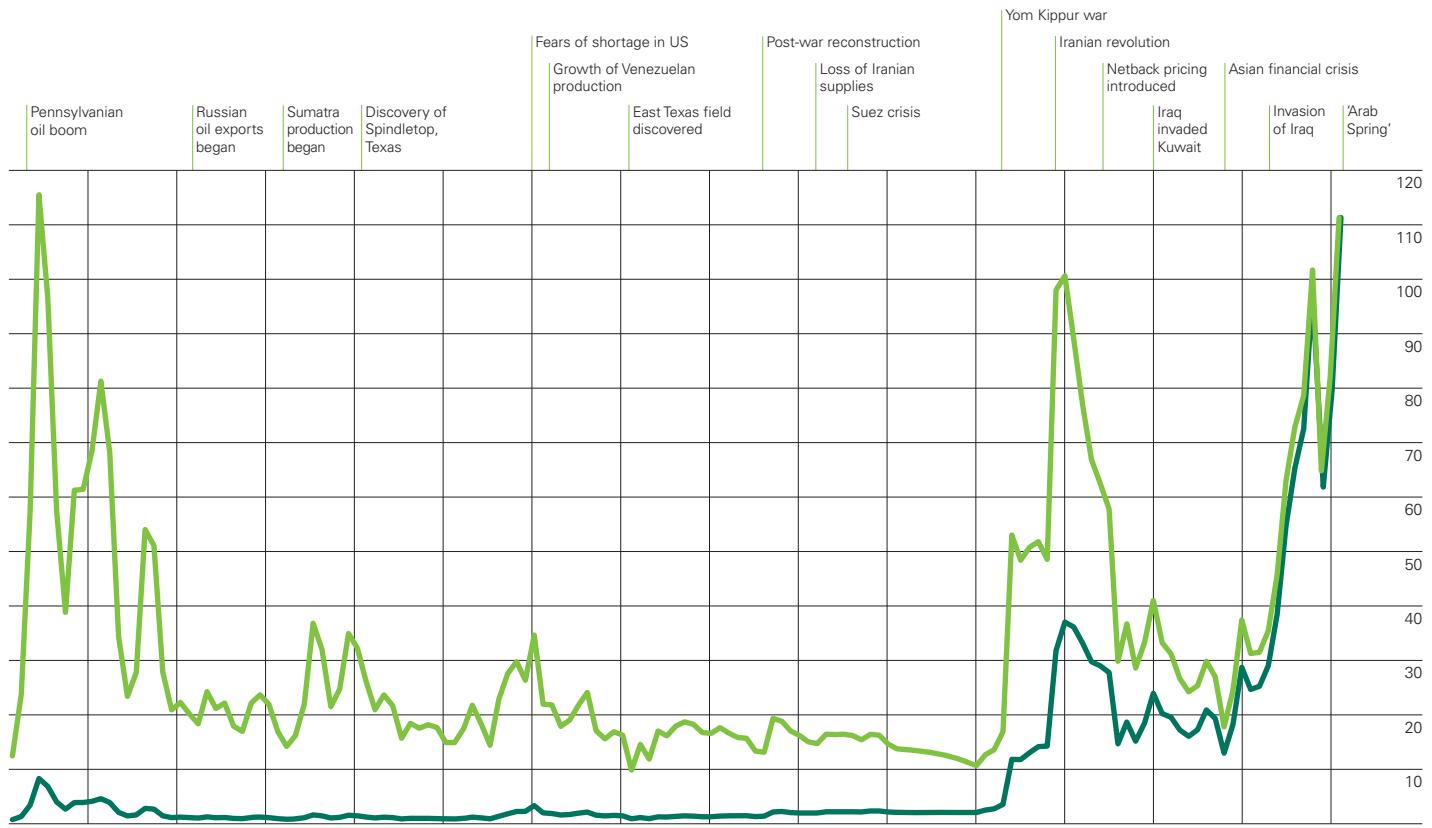
‡1976-1983 Posted WTI prices, 1984-2011 Spot WTI (Cushing) prices.

Source: Platts.

Crude oil prices 1861-2011

US dollars per barrel

World events



■ \$ 2011

■ \$ money of the day

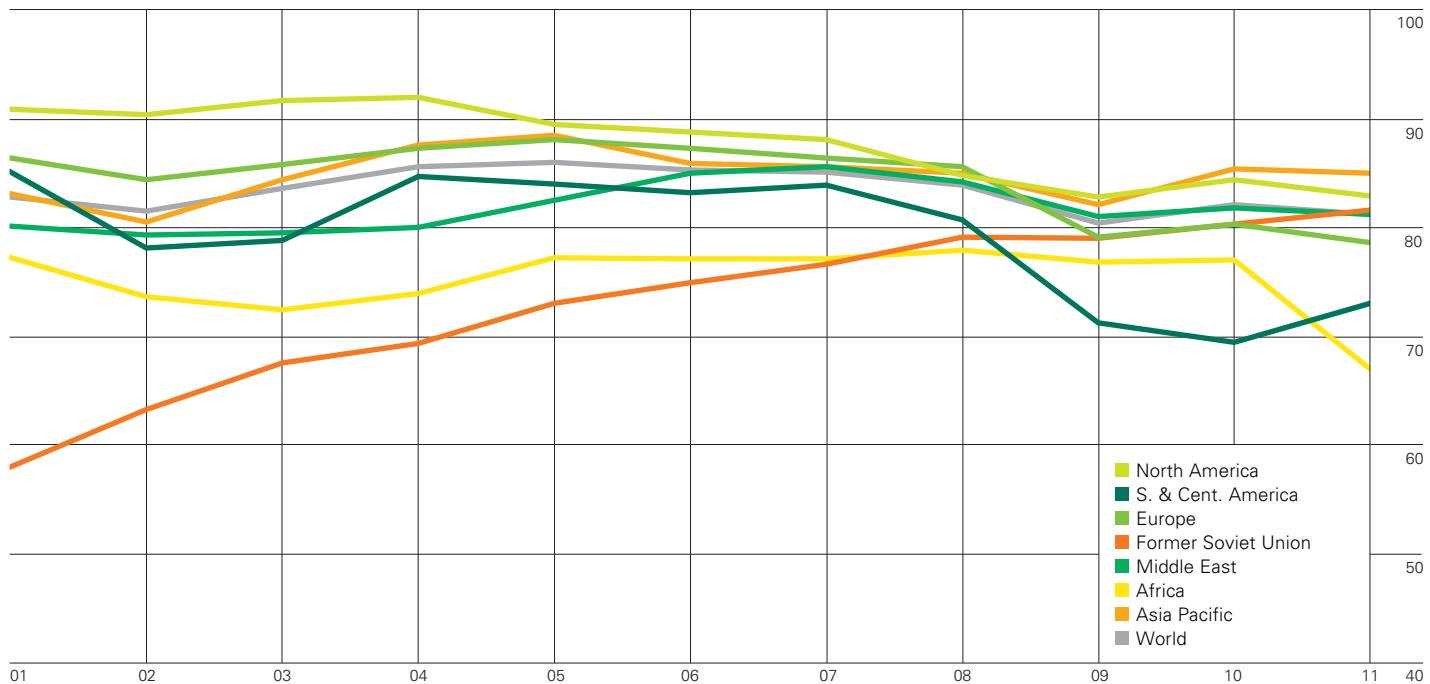
1861-1944 US average.

1945-1983 Arabian Light posted at Ras Tanura.

1984-2011 Brent dated.

Refinery utilization

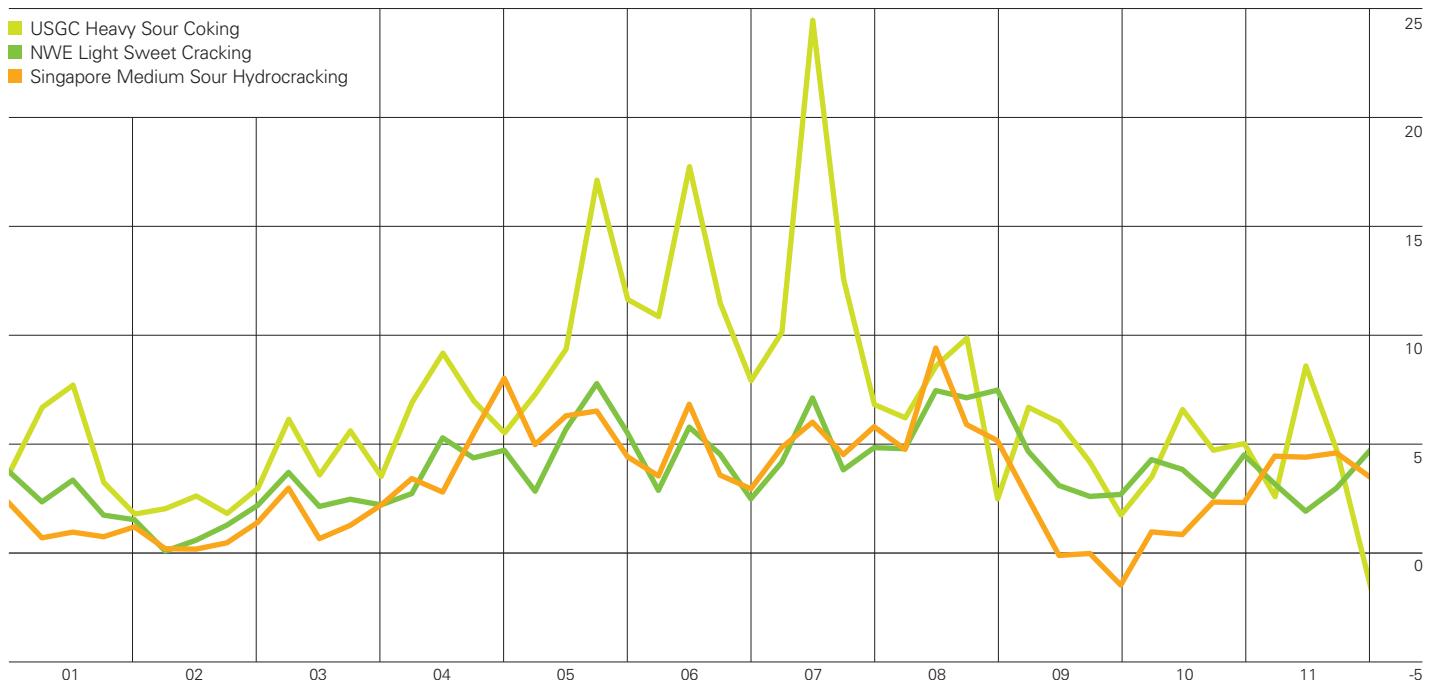
Percentage



Global crude runs grew by 0.4 million b/d in 2011, with all of the net increase accounted for by China. Refinery throughputs in the OECD fell by 0.3 million b/d and now lag those in the non-OECD by 1.7 million b/d. Last year's 1.4 million b/d increase in global refining capacity was more evenly spread but China's 0.5 million b/d addition was still the largest by a single country. Installed capacity in the non-OECD is now 2.2 million b/d above that of the OECD. Global average refinery utilization fell to 81.2%, the lowest since 2009.

Regional refining margins

US dollars per barrel



Note: The refining margins presented are benchmark margins for three major global refining centres: US Gulf Coast (USGC), North West Europe (NWE – Rotterdam) and Singapore. In each case they are based on a single crude oil appropriate for that region and have optimized product yields based on a generic refinery configuration (cracking, hydrocracking or coking), again appropriate for that region. The margins are on a semi-variable basis, i.e. the margin after all variable costs and fixed energy costs.

Trade movements

Thousand barrels daily	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change 2011 over 2010	2011 share of total
Imports													
US	11618	11357	12254	12898	13525	13612	13632	12872	11453	11689	11337	-3.0%	20.8%
Europe	11531	11895	11993	12538	13261	13461	13953	13751	12486	12094	12086	-0.1%	22.1%
Japan	5202	5070	5314	5203	5225	5201	5032	4925	4263	4567	4491	-1.7%	8.2%
Rest of World	16436	16291	17191	18651	19172	20287	22937	23078	24132	25160	26666	6.0%	48.9%
Total World	44787	44613	46752	49290	51182	52561	55554	54626	52333	53510	54580	2.0%	100.0%
Exports													
US	910	904	921	991	1129	1317	1439	1967	1947	2154	2573	19.4%	4.7%
Canada	1804	1959	2096	2148	2201	2330	2457	2498	2518	2599	2804	7.9%	5.1%
Mexico	1882	1966	2115	2070	2065	2102	1975	1609	1449	1539	1487	-3.4%	2.7%
S. & Cent. America	3143	2965	2942	3233	3528	3681	3570	3616	3748	3568	3763	5.5%	6.9%
Europe	1947	2234	2066	1993	2149	2173	2273	2023	2034	1888	2065	9.4%	3.8%
Former Soviet Union	4679	5370	6003	6440	7076	7155	8334	8184	7972	8544	8688	1.7%	15.9%
Middle East	19098	18062	18943	19630	19821	20204	19680	20128	18409	18883	19750	4.6%	36.2%
North Africa	2724	2620	2715	2917	3070	3225	3336	3260	2938	2871	1930	-32.8%	3.5%
West Africa	3182	3134	3612	4048	4358	4704	4830	4587	4364	4601	4655	1.2%	8.5%
Asia Pacific‡	3914	3848	3978	4189	4243	4312	6004	5392	5631	6226	6233	0.1%	11.4%
Rest of World	1506	1551	1361	1631	1542	1359	1656	1363	1323	637	631	-0.9%	1.2%
Total World	44789	44613	46752	49290	51182	52561	55554	54626	52333	53510	54580	2.0%	100.0%

†Excludes Japan. Excludes trade between other Asia Pacific countries and India prior to 2007.

Note: Annual changes and shares of total are calculated using thousand barrels daily figures.

Inter-area movements 2011

Million tonnes From	To													Total
	US	Canada	Mexico	S. & Cent. America	Europe	Africa	Austral- asia	China	India	Japan	Singapore	Other Asia Pacific	Rest of World	
US	–	8.2	27.1	41.1	23.7	3.4	0.5	4.1	0.7	4.0	6.8	0.5	3.1	123.1
Canada	133.8	–	0.1	0.3	2.4	–	†	1.2	–	0.6	†	0.2	†	138.5
Mexico	59.8	1.5	–	1.3	7.2	†	–	1.7	1.8	–	0.2	†	0.1	73.8
S. & Cent. America	111.2	1.2	0.8	–	17.4	0.1	†	27.1	15.7	0.7	10.3	0.9	0.1	185.5
Europe	29.5	8.6	2.9	3.6	–	28.4	0.3	0.7	0.5	0.6	11.1	2.2	10.7	99.3
Former Soviet Union	35.5	1.2	0.2	1.3	298.2	0.4	1.3	48.6	1.0	8.8	6.3	15.6	9.7	428.2
Middle East	95.5	5.3	0.8	6.0	126.0	26.0	8.4	137.8	110.7	175.1	61.1	226.6	0.1	979.4
North Africa	18.4	6.4	0.4	4.3	49.5	†	0.6	6.0	6.5	0.5	†	1.7	0.7	95.1
West Africa	68.3	6.2	0.1	11.1	57.6	†	3.4	42.2	29.5	1.2	0.1	11.8	–	231.5
East & Southern Africa	–	–	–	†	0.1	†	†	13.0	1.3	2.1	0.1	0.2	–	16.9
Australasia	0.5	–	–	0.6	†	†	–	7.9	0.7	2.5	1.8	8.3	–	22.2
China	0.2	†	–	5.7	0.7	1.2	0.1	–	1.0	0.6	3.2	17.3	1.3	31.3
India	2.3	†	–	3.5	7.6	4.8	0.1	0.2	–	2.6	12.3	7.8	0.6	41.8
Japan	0.4	0.1	0.1	0.1	0.4	†	2.3	2.1	†	–	5.3	3.0	†	13.9
Singapore	0.3	0.2	–	0.3	2.1	2.0	10.6	7.1	2.9	0.4	–	61.5	0.4	87.8
Other Asia Pacific	4.2	0.1	0.1	2.1	3.4	0.9	15.6	28.4	5.4	22.1	34.3	–	0.3	116.9
Total imports	559.8	39.3	32.7	81.2	596.4	67.4	43.4	328.1	177.9	221.8	152.7	357.6	27.2	2685.5

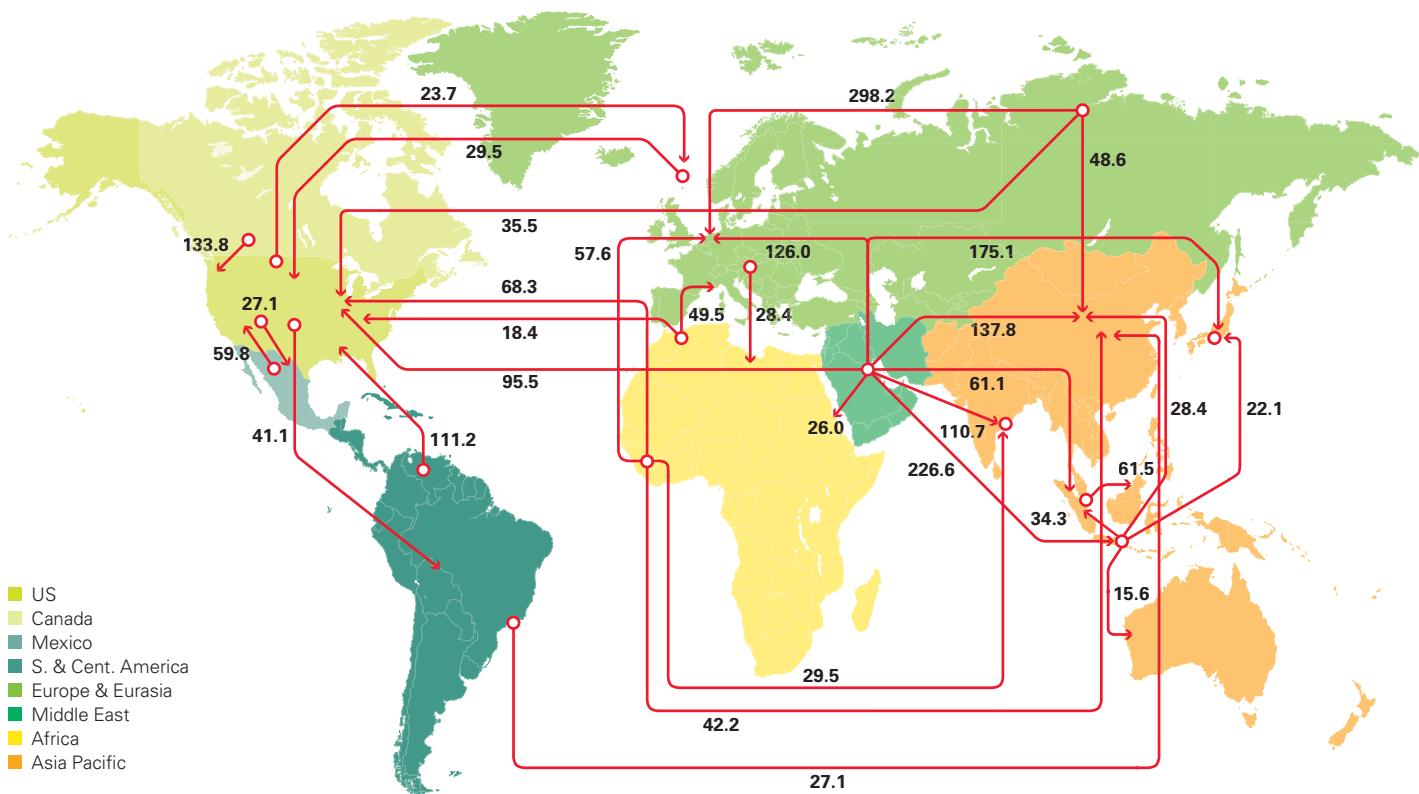
From	To													
From	US	Canada	Mexico	S. & Cent. America	Europe	Africa	Austral- asia	China	India	Japan	Singapore	Other Asia Pacific	Rest of World	
US	–	170	566	859	495	72	10	86	14	83	141	11	65	2573
Canada	2706	–	2	6	49	–	‡	24	–	12	‡	4	‡	2804
Mexico	1205	31	–	27	145	1	–	34	37	–	4	1	3	1487
S. & Cent. America	2252	24	17	–	354	2	‡	549	315	14	215	19	2	3763
Europe	613	176	62	74	–	594	6	14	11	13	233	45	224	2065
Former Soviet Union	729	25	5	27	6039	8	27	992	20	178	131	314	194	8688
Middle East	1919	107	17	121	2543	524	170	2774	2224	3534	1234	4582	2	19750
North Africa	378	129	8	90	1001	‡	12	121	131	10	1	34	15	1930
West Africa	1374	125	2	223	1159	‡	69	848	592	24	1	237	–	4655
East & Southern Africa	–	–	–	1	2	‡	‡	261	27	42	3	4	–	341
Australasia	9	–	–	13	‡	‡	–	161	14	52	36	169	–	453
China	4	1	–	119	16	25	2	–	21	13	66	360	26	653
India	48	1	–	73	159	101	3	5	–	55	257	162	12	875
Japan	9	3	2	1	8	1	48	44	1	–	111	62	1	291
Singapore	5	5	–	6	44	42	222	148	61	9	–	1285	9	1836
Other Asia Pacific	86	3	3	43	71	19	316	590	110	453	715	–	7	2416
Total imports	11337	799	684	1683	12086	1390	885	6651	3579	4491	3147	7290	560	54580

†Less than 0.05.

‡Less than 0.5.

Major trade movements 2011

Trade flows worldwide (million tonnes)



Imports and exports 2011

	Million tonnes				Thousand barrels daily			
	Crude imports	Product imports	Crude exports	Product exports	Crude imports	Product imports	Crude exports	Product exports
US	445.0	114.8	1.0	122.1	8937	2400	21	2552
Canada	26.6	12.7	111.7	26.8	533	265	2243	561
Mexico	—	32.7	67.5	6.2	—	684	1356	131
South & Cent. America	18.7	62.6	139.0	46.5	375	1308	2791	972
Europe	464.2	132.2	12.9	86.4	9322	2764	259	1806
Former Soviet Union	†	5.1	319.3	108.9	‡	107	6413	2276
Middle East	10.7	11.4	879.4	100.0	214	239	17660	2090
North Africa	21.0	20.6	72.3	22.9	423	430	1451	478
West Africa	†	11.8	224.1	7.4	‡	246	4501	154
East & Southern Africa	2.4	11.6	16.6	0.3	48	243	334	6
Australasia	26.8	16.6	14.2	8.0	538	346	285	168
China	252.9	75.2	1.5	29.8	5080	1571	30	623
India	169.7	8.2	0.1	41.8	3407	171	1.5	873
Japan	177.3	44.5	†	13.9	3560	930	0.6	290
Singapore	55.1	97.6	0.7	87.1	1107	2040	14	1822
Other Asia Pacific	224.4	133.2	34.3	82.6	4505	2785	690	1727
Total World	1894.7	790.7	1894.7	790.7	38050	16530	38050	16530

†Less than 0.05.

‡Less than 0.5.

Note: Bunkers are not included as exports. Intra-area movements (for example, between countries in Europe) are excluded.

Proved reserves

	At end 1991	At end 2001	At end 2010	At end 2011			
	Trillion cubic metres	Trillion cubic metres	Trillion cubic metres	Trillion cubic feet	Trillion cubic metres	Share of total	R/P ratio
US	4.7	5.2	8.2	299.8	8.5	4.1%	13.0
Canada	2.7	1.7	1.8	70.0	2.0	1.0%	12.4
Mexico	2.0	0.8	0.3	12.5	0.4	0.2%	6.7
Total North America	9.5	7.7	10.3	382.3	10.8	5.2%	12.5
Argentina	0.6	0.8	0.4	12.0	0.3	0.2%	8.8
Bolivia	0.1	0.8	0.3	9.9	0.3	0.1%	18.3
Brazil	0.1	0.2	0.4	16.0	0.5	0.2%	27.1
Colombia	0.1	0.1	0.2	5.8	0.2	0.1%	14.9
Peru	0.3	0.2	0.4	12.5	0.4	0.2%	31.1
Trinidad & Tobago	0.2	0.6	0.4	14.2	0.4	0.2%	9.9
Venezuela	3.6	4.2	5.5	195.2	5.5	2.7%	*
Other S. & Cent. America	0.2	0.1	0.1	2.2	0.1	♦	23.7
Total S. & Cent. America	5.3	7.0	7.5	267.7	7.6	3.6%	45.2
Azerbaijan	n/a	1.2	1.3	44.9	1.3	0.6%	85.8
Denmark	0.1	0.1	0.1	1.6	†	♦	6.5
Germany	0.2	0.2	0.1	2.2	0.1	♦	6.2
Italy	0.3	0.2	0.1	3.1	0.1	♦	11.4
Kazakhstan	n/a	1.8	1.9	66.4	1.9	0.9%	97.6
Netherlands	1.8	1.5	1.1	38.9	1.1	0.5%	17.2
Norway	1.3	2.2	2.0	73.1	2.1	1.0%	20.4
Poland	0.2	0.1	0.1	4.3	0.1	0.1%	28.3
Romania	0.5	0.3	0.6	3.8	0.1	0.1%	9.9
Russian Federation	n/a	42.4	44.4	1575.0	44.6	21.4%	73.5
Turkmenistan	n/a	2.6	13.4	858.8	24.3	11.7%	*
Ukraine	n/a	1.0	0.9	33.0	0.9	0.4%	51.3
United Kingdom	0.5	1.1	0.2	7.1	0.2	0.1%	4.5
Uzbekistan	n/a	1.7	1.6	56.6	1.6	0.8%	28.1
Other Europe & Eurasia	50.1	0.5	0.3	10.0	0.3	0.1%	29.4
Total Europe & Eurasia	54.9	56.8	68.0	2778.8	78.7	37.8%	75.9
Bahrain	0.2	0.1	0.2	12.3	0.3	0.2%	26.8
Iran	19.8	26.1	33.1	1168.6	33.1	15.9%	*
Iraq	3.1	3.1	3.2	126.7	3.6	1.7%	*
Kuwait	1.5	1.6	1.8	63.0	1.8	0.9%	*
Oman	0.1	0.9	0.9	33.5	0.9	0.5%	35.8
Qatar	6.4	25.8	25.0	884.5	25.0	12.0%	*
Saudi Arabia	5.2	6.5	8.0	287.8	8.2	3.9%	82.1
Syria	0.2	0.2	0.3	10.1	0.3	0.1%	34.3
United Arab Emirates	5.8	6.1	6.1	215.1	6.1	2.9%	*
Yemen	0.4	0.5	0.5	16.9	0.5	0.2%	50.7
Other Middle East	†	0.1	0.2	7.8	0.2	0.1%	49.3
Total Middle East	42.7	70.9	79.4	2826.3	80.0	38.4%	*
Algeria	3.6	4.5	4.5	159.1	4.5	2.2%	57.7
Egypt	0.4	1.6	2.2	77.3	2.2	1.1%	35.7
Libya	1.3	1.3	1.5	52.8	1.5	0.7%	*
Nigeria	3.4	4.6	5.1	180.5	5.1	2.5%	*
Other Africa	0.8	1.1	1.2	43.5	1.2	0.6%	63.4
Total Africa	9.5	13.1	14.5	513.2	14.5	7.0%	71.7
Australia	0.9	2.7	3.7	132.8	3.8	1.8%	83.6
Bangladesh	0.7	0.3	0.4	12.5	0.4	0.2%	17.8
Brunei	0.4	0.4	0.3	10.2	0.3	0.1%	22.5
China	1.0	1.4	2.9	107.7	3.1	1.5%	29.8
India	0.7	0.8	1.1	43.8	1.2	0.6%	26.9
Indonesia	1.8	2.6	3.0	104.7	3.0	1.4%	39.2
Malaysia	1.7	2.5	2.4	86.0	2.4	1.2%	39.4
Myanmar	0.3	0.3	0.2	7.8	0.2	0.1%	17.8
Pakistan	0.8	0.7	0.8	27.5	0.8	0.4%	19.9
Papua New Guinea	0.4	0.4	0.4	15.6	0.4	0.2%	*
Thailand	0.2	0.4	0.3	9.9	0.3	0.1%	7.6
Vietnam	†	0.2	0.6	21.8	0.6	0.3%	72.3
Other Asia Pacific	0.3	0.4	0.4	12.1	0.3	0.2%	18.9
Total Asia Pacific	9.3	13.1	16.5	592.5	16.8	8.0%	35.0
Total World	131.2	168.5	196.1	7360.9	208.4	100.0%	63.6
of which: OECD	15.2	16.1	18.1	660.2	18.7	9.0%	16.0
Non-OECD	116.1	152.5	178.0	6700.7	189.7	91.0%	90.0
European Union	3.8	3.6	2.3	64.4	1.8	0.9%	11.8
Former Soviet Union	49.8	50.9	63.5	2638.5	74.7	35.8%	96.3

*More than 100 years.

†Less than 0.05.

♦Less than 0.05%.

n/a not available.

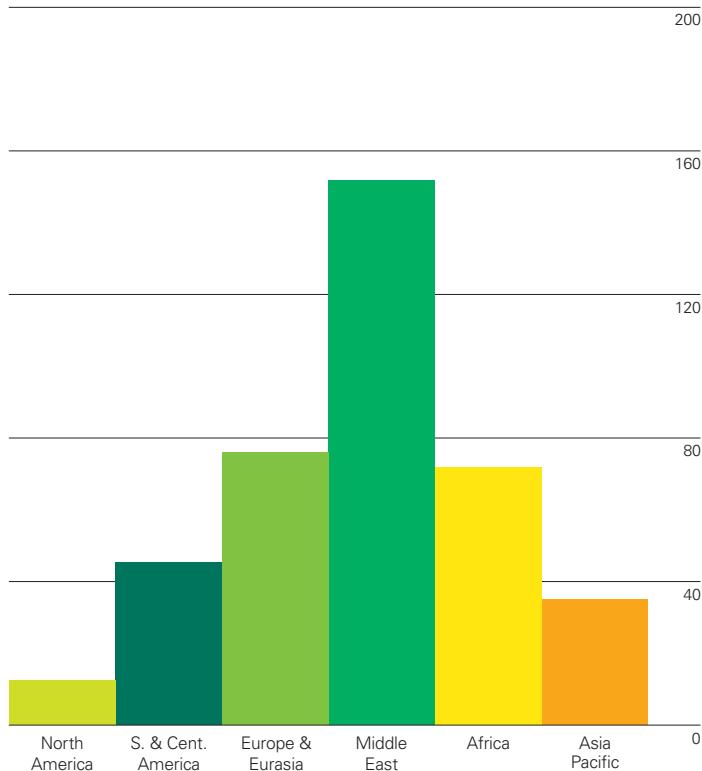
Notes: Proved reserves of natural gas – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.**Reserves-to-production (R/P) ratio** – If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate.

Source of data – The estimates in this table have been compiled using a combination of primary official sources and third-party data from Cedigaz and the OPEC Secretariat.

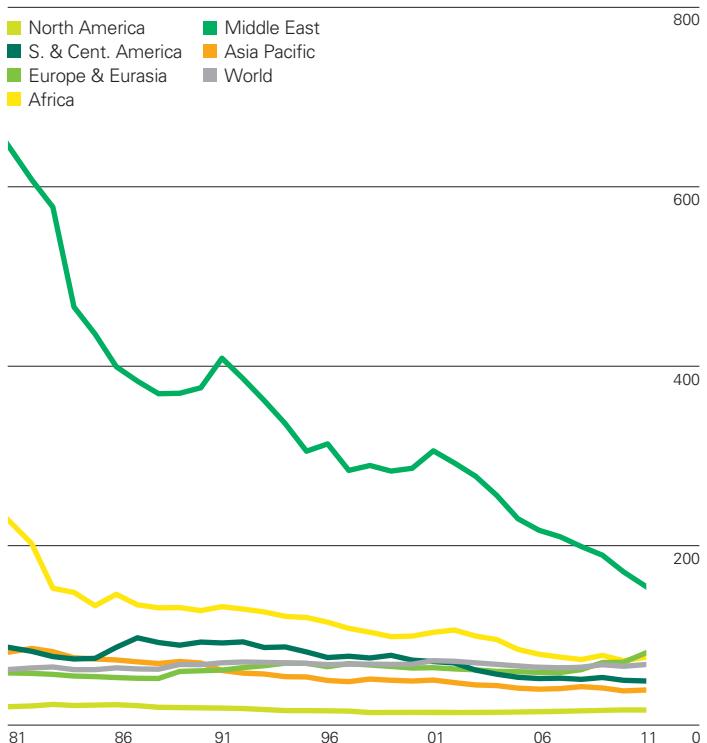
Reserves-to-production (R/P) ratios

Years

2011 by region



History

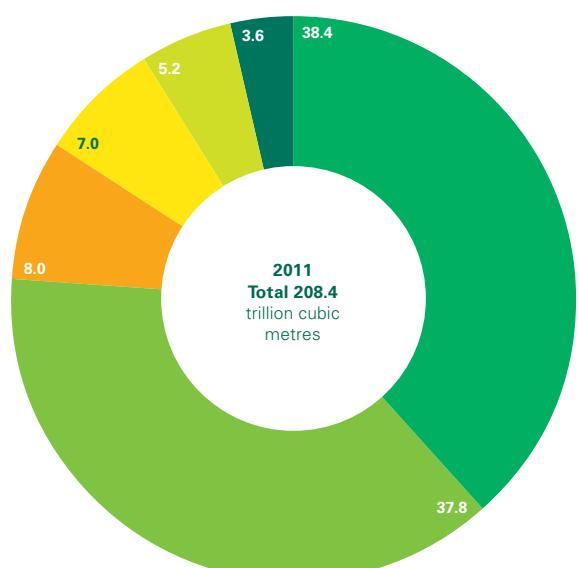
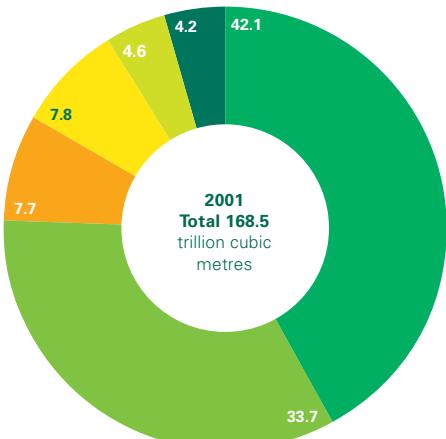
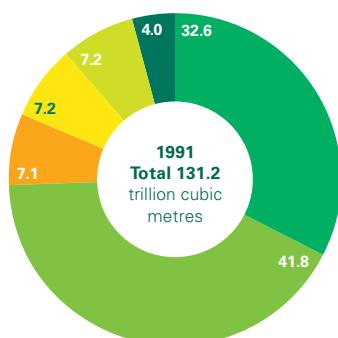


World proved natural gas reserves at end-2011 were sufficient to meet 63.6 years of production. A large increase in Turkmen reserves pushed the R/P ratio for Europe & Eurasia to 75.9 years. The Middle East still holds the largest reserves (38.4% of the world total, compared with 37.8% for Europe & Eurasia) and has an R/P ratio of over 150 years.

Distribution of proved reserves in 1991, 2001 and 2011

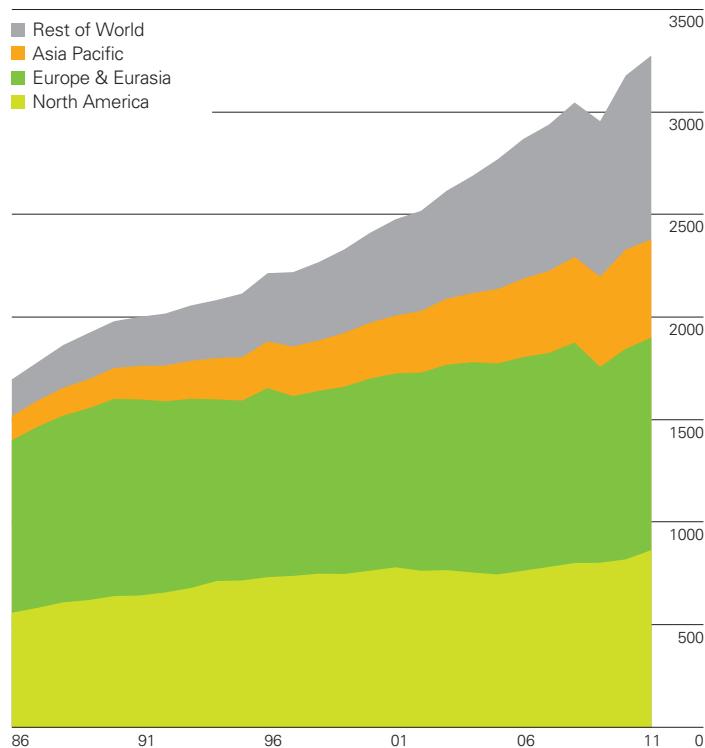
Percentage

- Middle East
- Europe & Eurasia
- Asia Pacific
- Africa
- North America
- S. & Cent. America



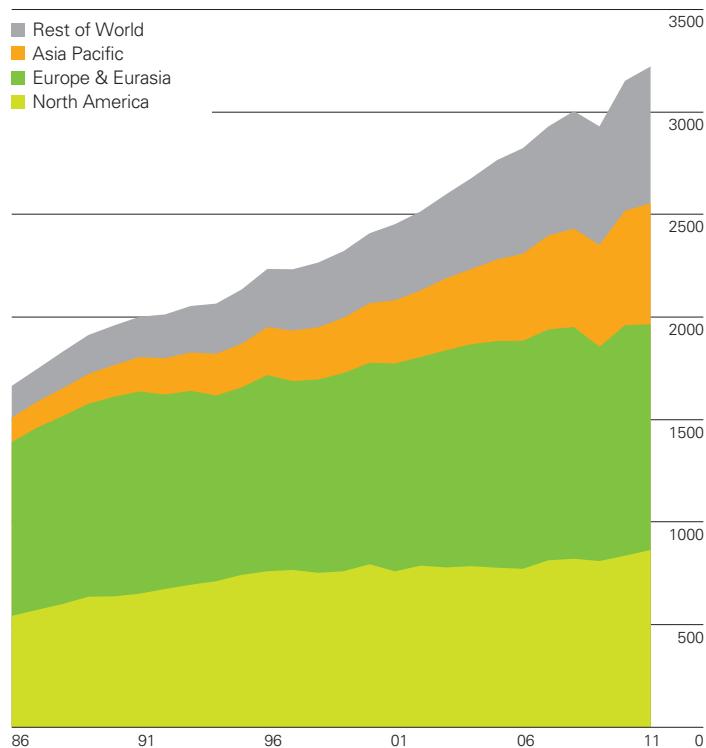
Production by region

Billion cubic metres



Consumption by region

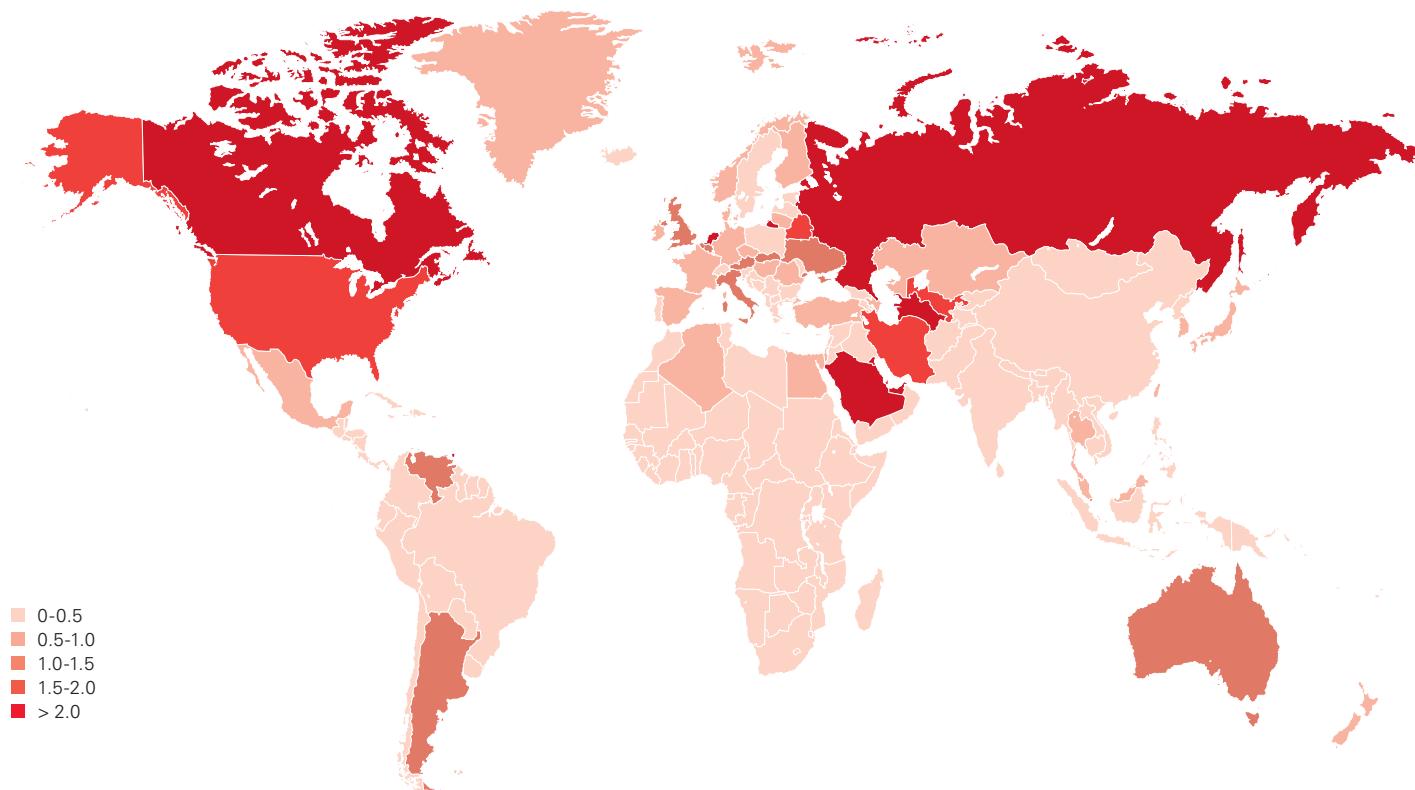
Billion cubic metres



World natural gas production increased by 3.1% in 2011. While the US saw the largest national increase, the Middle East recorded the largest regional increment to production. Production growth in Russia and Turkmenistan was partly offset by a large decline in European production. Natural gas consumption increased by 2.2%, with below-average growth in all regions but North America. The European Union experienced the sharpest decline in natural gas consumption (-9.9%) on record.

Consumption per capita 2011

Tonnes oil equivalent



Source: Includes data from Cedigaz.

Prices

\$/Mmbtu



Prices

US dollars per million Btu	LNG Japan cif	Natural gas				Crude oil OECD countries cif
		Average German Import Price*	UK (Heren NBP Index)†	US Henry Hub‡	Canada (Alberta)‡	
1984	5.10	4.00	—	—	—	5.00
1985	5.23	4.25	—	—	—	4.75
1986	4.10	3.93	—	—	—	2.57
1987	3.35	2.55	—	—	—	3.09
1988	3.34	2.22	—	—	—	2.56
1989	3.28	2.00	—	1.70	—	3.01
1990	3.64	2.78	—	1.64	1.05	3.82
1991	3.99	3.19	—	1.49	0.89	3.33
1992	3.62	2.69	—	1.77	0.98	3.19
1993	3.52	2.50	—	2.12	1.69	2.82
1994	3.18	2.35	—	1.92	1.45	2.70
1995	3.46	2.39	—	1.69	0.89	2.96
1996	3.66	2.46	1.87	2.76	1.12	3.54
1997	3.91	2.64	1.96	2.53	1.36	3.29
1998	3.05	2.32	1.86	2.08	1.42	2.16
1999	3.14	1.88	1.58	2.27	2.00	2.98
2000	4.72	2.89	2.71	4.23	3.75	4.83
2001	4.64	3.66	3.17	4.07	3.61	4.08
2002	4.27	3.23	2.37	3.33	2.57	4.17
2003	4.77	4.06	3.33	5.63	4.83	4.89
2004	5.18	4.32	4.46	5.85	5.03	6.27
2005	6.05	5.88	7.38	8.79	7.25	8.74
2006	7.14	7.85	7.87	6.76	5.83	10.66
2007	7.73	8.03	6.01	6.95	6.17	11.95
2008	12.55	11.56	10.79	8.85	7.99	16.76
2009	9.06	8.52	4.85	3.89	3.38	10.41
2010	10.91	8.01	6.56	4.39	3.69	13.47
2011	14.73	10.61	9.03	4.01	3.47	18.56

*Source: 1984-1990 German Federal Statistical Office, 1991-2011 German Federal Office of Economics and Export Control (BAFA).

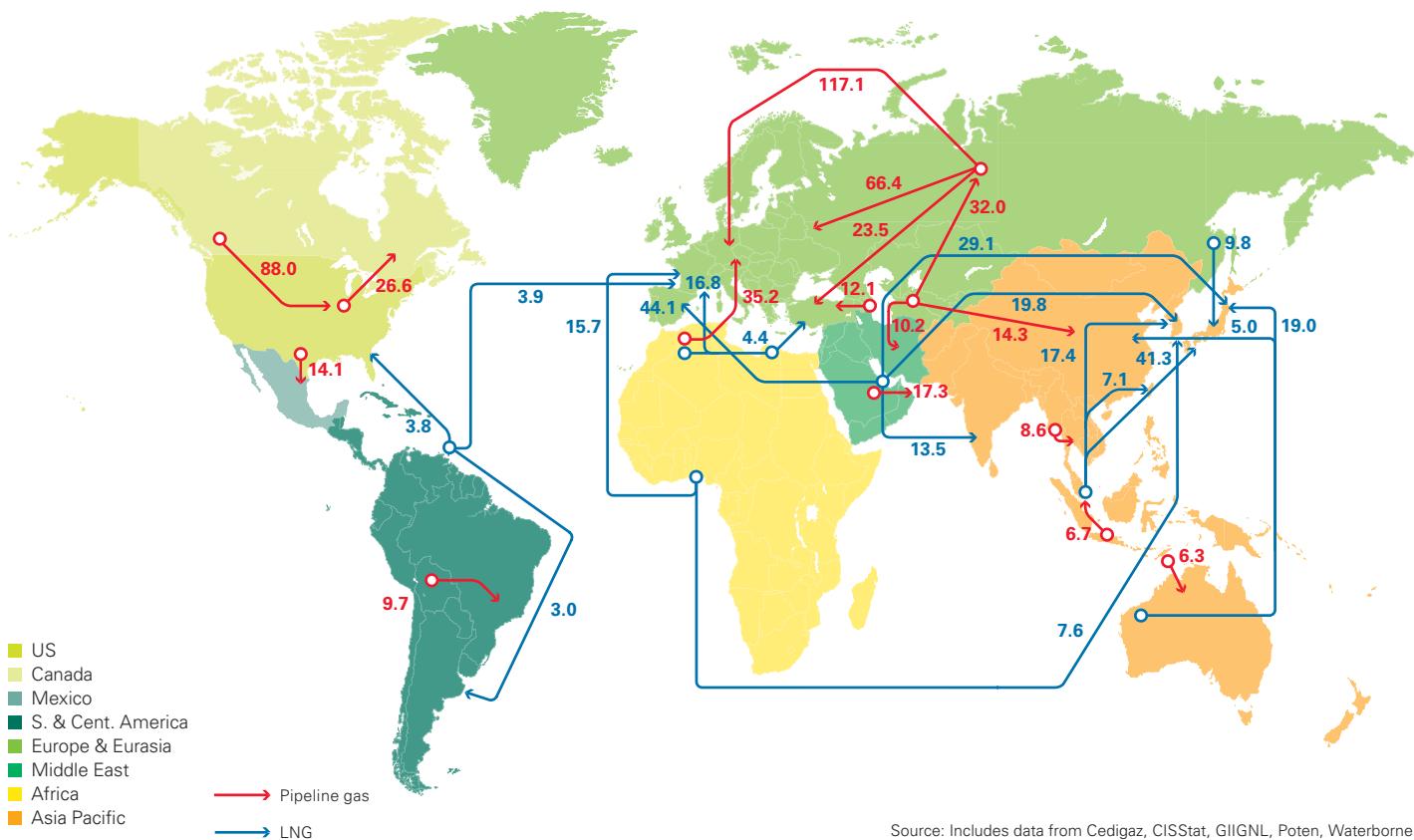
†Source: Heren Energy Ltd.

‡Source: Energy Intelligence Group, *Natural Gas Week*.

Note: cif = cost+insurance+freight (average prices).

Major trade movements 2011

Trade flows worldwide (billion cubic metres)



Gas trade in 2010 and 2011

Billion cubic metres	2010				2011			
	Pipeline imports	LNG imports	Pipeline exports	LNG exports	Pipeline imports	LNG imports	Pipeline exports	LNG exports
US	93.3	12.2	30.3	1.6	88.1	10.0	40.7	2.0
Canada	20.9	2.1	92.4	-	26.6	3.3	88.0	-
Mexico	9.4	5.7	0.9	-	14.1	4.0	0.1	-
Trinidad & Tobago	-	-	-	20.4	-	-	-	18.9
Other S. & Cent. America	14.3	9.2	14.3	1.8	15.6	10.9	15.6	5.1
France	34.6	14.2	1.5	-	32.3	14.6	2.2	-
Germany	91.7	-	14.9	-	84.0	-	11.7	-
Italy	65.8	9.1	0.1	-	60.8	8.7	0.1	-
Netherlands	16.8	-	53.3	-	13.6	0.8	50.4	-
Norway	-	-	96.3	4.71	-	-	92.8	4.0
Spain	8.9	27.9	0.5	-	12.5	24.2	0.5	0.7
Turkey	28.4	8.0	0.7	-	35.6	6.2	0.7	-
United Kingdom	35.0	18.7	15.7	-	28.1	25.3	16.3	-
Other Europe	98.9	10.6	11.3	0.6	101.8	10.9	6.2	0.6
Russian Federation	32.7	-	189.5	13.4	30.1	-	207.0	14.4
Ukraine	33.0	-	-	-	40.5	-	-	-
Other Former Soviet Union	32.2	-	51.5	-	30.4	-	62.5	-
Qatar	-	-	19.2	76.1	-	-	19.2	102.6
Other Middle East	31.5	2.9	8.4	25.3	31.6	4.6	9.1	27.8
Algeria	-	-	37.0	19.3	-	-	34.4	17.1
Other Africa	4.9	-	18.0	39.5	5.7	-	8.3	39.8
Japan	-	95.1	-	-	-	107.0	-	-
Indonesia	-	-	9.9	31.8	-	-	8.7	29.2
South Korea	-	44.4	-	-	-	49.3	-	-
Other Asia Pacific	33.4	40.4	19.9	66.1	43.2	51.0	20.3	68.6
Total World	685.5	300.6	685.5	300.6	694.6	330.8	694.6	330.8

Source: Includes data from Ceditaz, CISStat, GIGNL, Poten, Waterborne.

Proved reserves at end 2011

Million tonnes	Anthracite and bituminous	Sub- bituminous and lignite	Total	Share of total	R/P ratio
US	108501	128794	237295	27.6%	239
Canada	3474	3108	6582	0.8%	97
Mexico	860	351	1211	0.1%	77
Total North America	112835	132253	245088	28.5%	228
Brazil	–	4559	4559	0.5%	*
Colombia	6366	380	6746	0.8%	79
Venezuela	479	–	479	0.1%	55
Other S. & Cent. America	45	679	724	0.1%	*
Total S. & Cent. America	6890	5618	12508	1.5%	124
Bulgaria	2	2364	2366	0.3%	64
Czech Republic	192	908	1100	0.1%	19
Germany	99	40600	40699	4.7%	216
Greece	–	3020	3020	0.4%	53
Hungary	13	1647	1660	0.2%	174
Kazakhstan	21500	12100	33600	3.9%	290
Poland	4338	1371	5709	0.7%	41
Romania	10	281	291	♦	8
Russian Federation	49088	107922	157010	18.2%	471
Spain	200	330	530	0.1%	81
Turkey	529	1814	2343	0.3%	30
Ukraine	15351	18522	33873	3.9%	390
United Kingdom	228	–	228	♦	12
Other Europe & Eurasia	1440	20735	22175	2.6%	238
Total Europe & Eurasia	92990	211614	304604	35.4%	242
South Africa	30156	–	30156	3.5%	118
Zimbabwe	502	–	502	0.1%	202
Other Africa	860	174	1034	0.1%	*
Middle East	1203	–	1203	0.1%	*
Total Middle East & Africa	32721	174	32895	3.8%	126
Australia	37100	39300	76400	8.9%	184
China	62200	52300	114500	13.3%	33
India	56100	4500	60600	7.0%	103
Indonesia	1520	4009	5529	0.6%	17
Japan	340	10	350	♦	275
New Zealand	33	538	571	0.1%	115
North Korea	300	300	600	0.1%	19
Pakistan	–	2070	2070	0.2%	*
South Korea	–	126	126	♦	60
Thailand	–	1239	1239	0.1%	58
Vietnam	150	–	150	♦	3
Other Asia Pacific	1583	2125	3708	0.4%	88
Total Asia Pacific	159326	106517	265843	30.9%	53
Total World	404762	456176	860938	100.0%	112
of which: OECD	155926	222603	378529	44.0%	182
Non-OECD	248836	233573	482409	56.0%	86
European Union	5101	51047	56148	6.5%	97
Former Soviet Union	86725	141309	228034	26.5%	408

*More than 500 years.

♦Less than 0.05%.

Notes: Proved reserves of coal – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known deposits under existing economic and operating conditions.

Reserves-to-production (R/P) ratio – If the reserves remaining at the end of the year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate.

Source of reserves data: Survey of Energy Resources, World Energy Council.

Prices

US dollars per tonne	Northwest Europe marker pricet	US Central Appalachian coal spot price index‡	Japan coking coal import cif price	Japan steam coal import cif price
1991	42.80	29.01	60.45	50.30
1992	38.53	28.53	57.82	48.45
1993	33.68	29.85	55.26	45.71
1994	37.18	31.72	51.77	43.66
1995	44.50	27.01	54.47	47.58
1996	41.25	29.86	56.68	49.54
1997	38.92	29.76	55.51	45.53
1998	32.00	31.00	50.76	40.51
1999	28.79	31.29	42.83	35.74
2000	35.99	29.90	39.69	34.58
2001	39.03	50.15	41.33	37.96
2002	31.65	33.20	42.01	36.90
2003	43.60	38.52	41.57	34.74
2004	72.08	64.90	60.96	51.34
2005	60.54	70.12	89.33	62.91
2006	64.11	62.96	93.46	63.04
2007	88.79	51.16	88.24	69.86
2008	147.67	118.79	179.03	122.81
2009	70.66	68.08	167.82	110.11
2010	92.50	71.63	158.95	105.19
2011	121.54	87.38	229.12	136.21

†Source: McCloskey Coal Information Service. Prices for 1991-2000 are the average of the monthly marker, 2001-2011 the average of weekly prices.

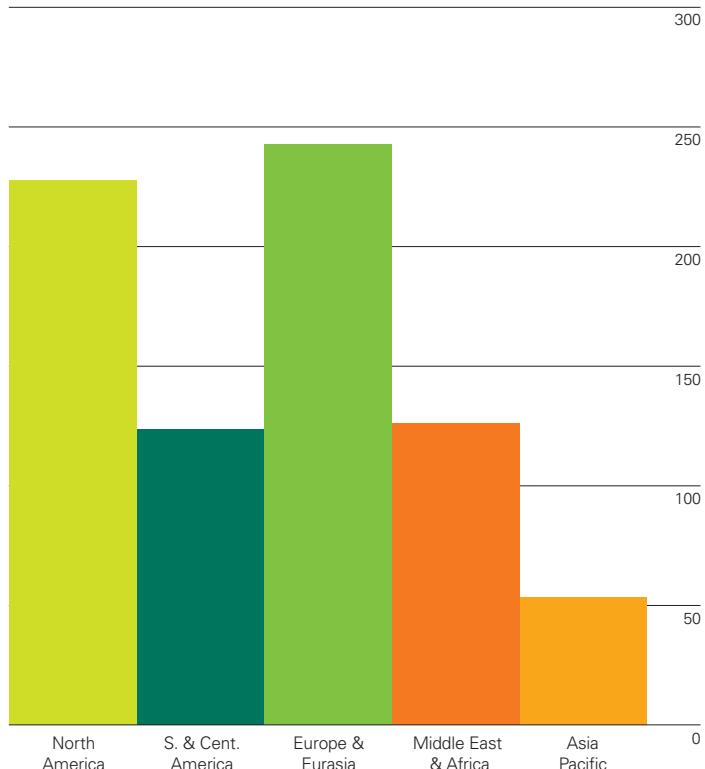
‡Source: Platts. Prices are for CAPP 12,500Btu, 1.2 SO₂ coal, fob. Prices for 1991-2000 are by coal price publication date, 2001-2011 by coal price assessment date.

Note: CAPP = Central Appalachian; cif = cost+insurance+freight (average prices); fob = free on board.

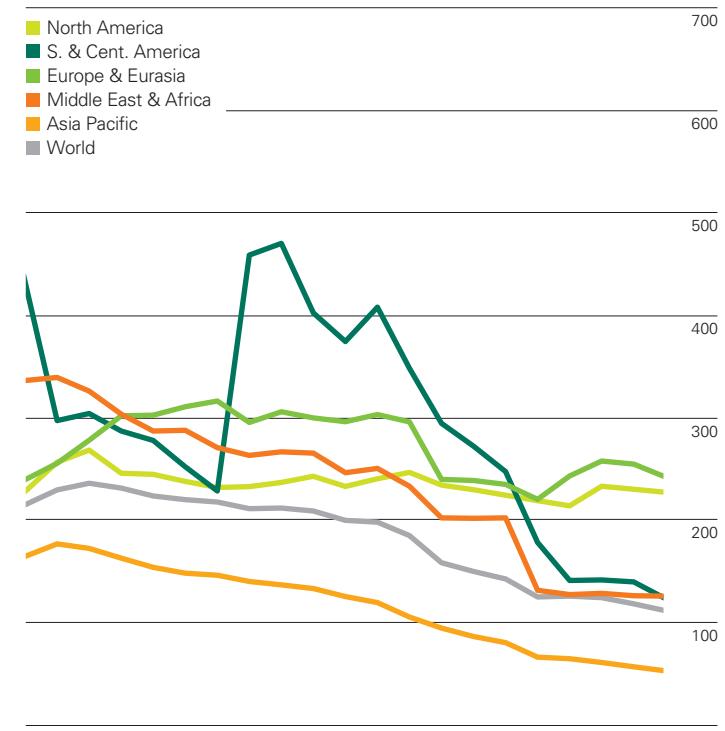
Reserves-to-production (R/P) ratios

Years

2011 by region



History

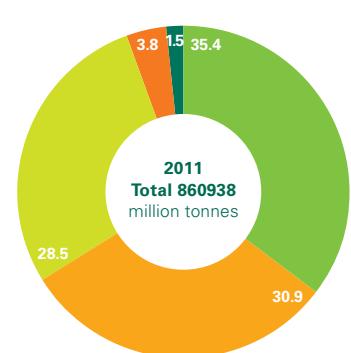
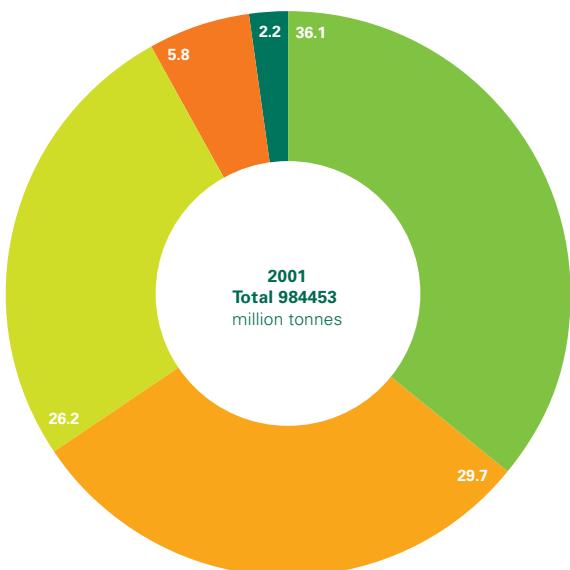
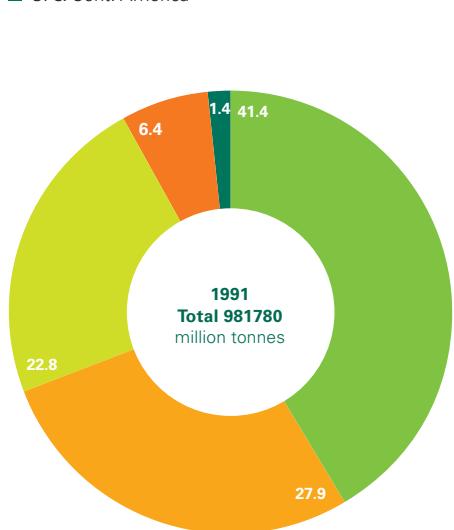


World proved reserves of coal in 2011 were sufficient to meet 112 years of global production, by far the largest R/P ratio for any fossil fuel. Europe & Eurasia holds the largest regional reserves and has the highest R/P ratio. The Asia Pacific region holds the second-largest reserves, while North America has the second-highest R/P ratio.

Distribution of proved reserves in 1991, 2001 and 2011

Percentage

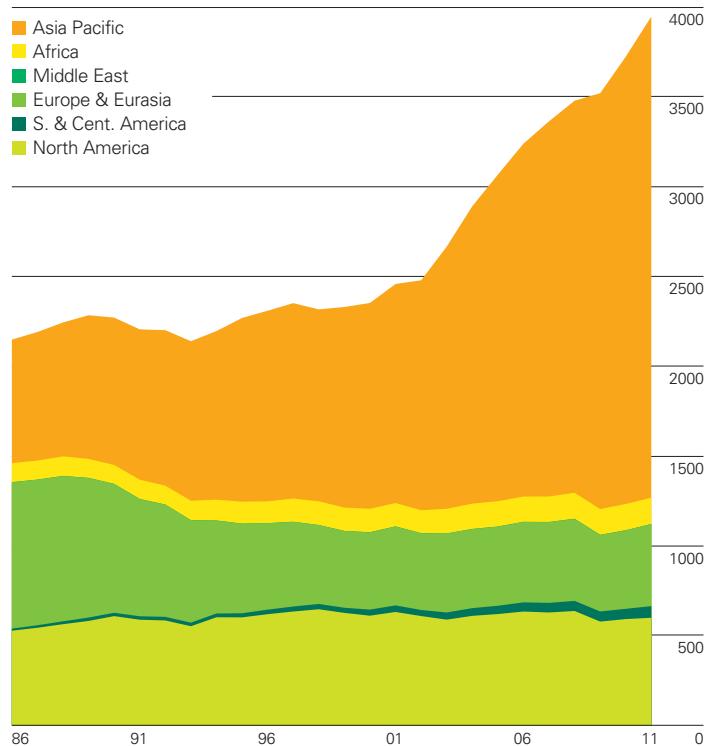
- Europe & Eurasia
- Asia Pacific
- North America
- Middle East & Africa
- S. & Cent. America



Source: Survey of Energy Resources, World Energy Council.

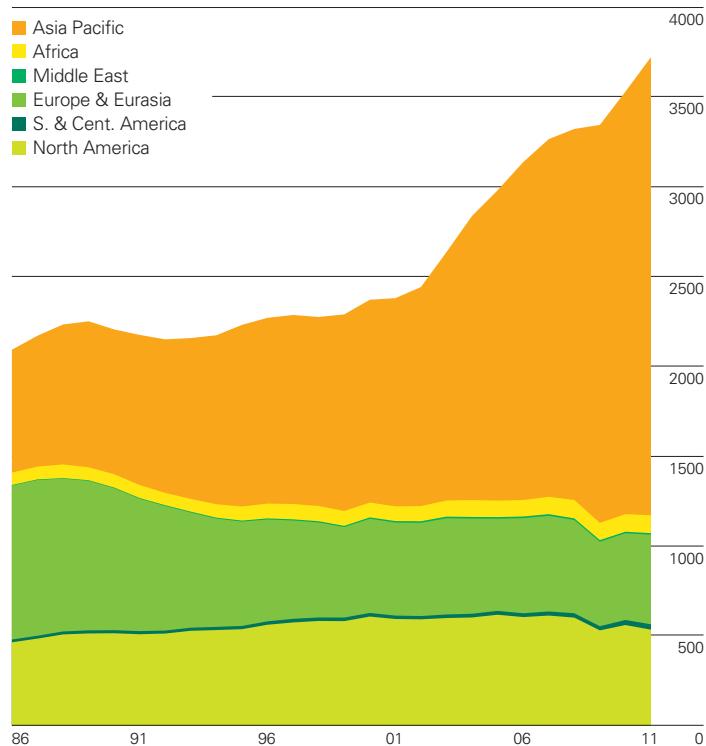
Production by region

Million tonnes oil equivalent



Consumption by region

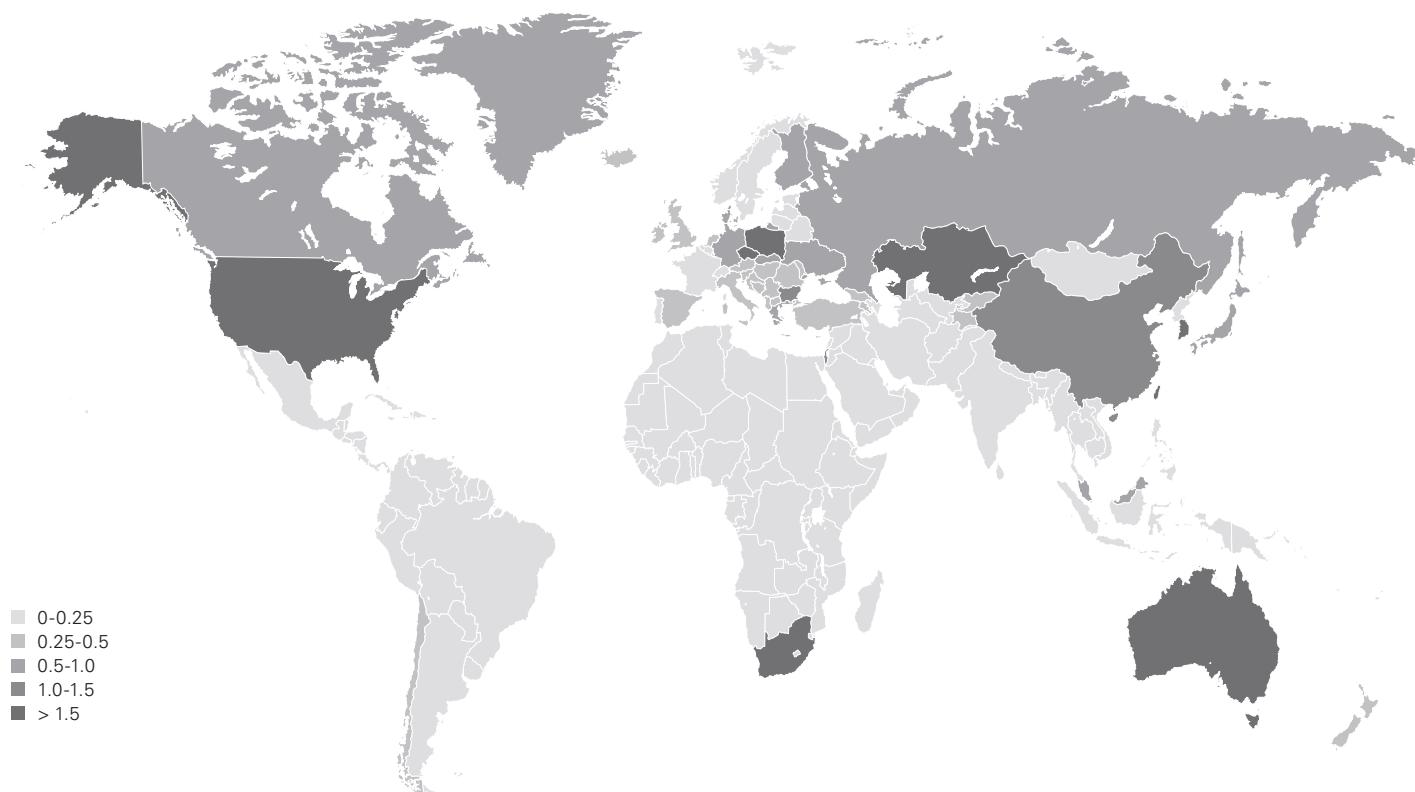
Million tonnes oil equivalent



Coal was again the fastest-growing fossil fuel. Global production grew by 6.1%. The Asia Pacific region accounted for 85% of global production growth, led by an 8.8% increase in China, the world's largest supplier. Global coal consumption increased by 5.4%, with the Asia Pacific region accounting for all of the net growth. Elsewhere, large declines in North American consumption were offset by growth in all other regions.

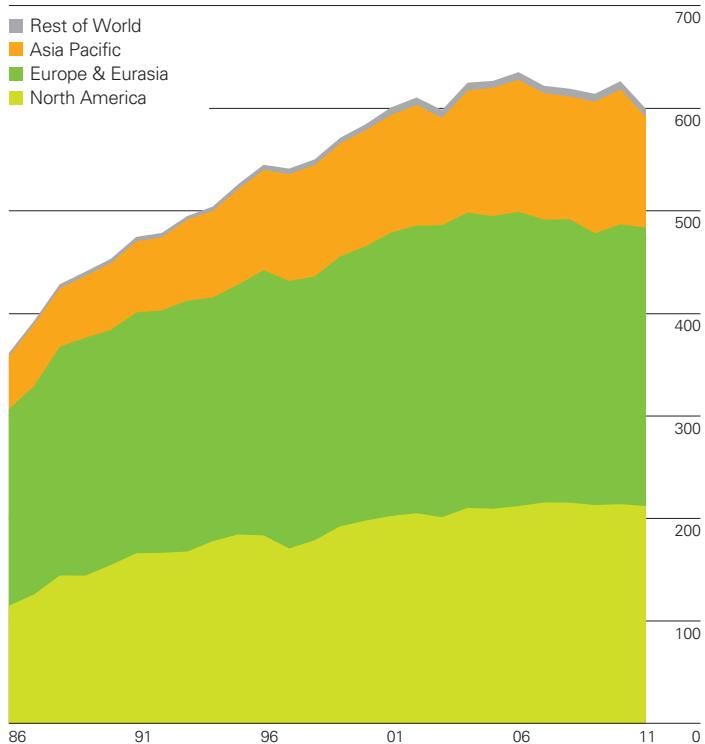
Consumption per capita 2011

Tonnes oil equivalent



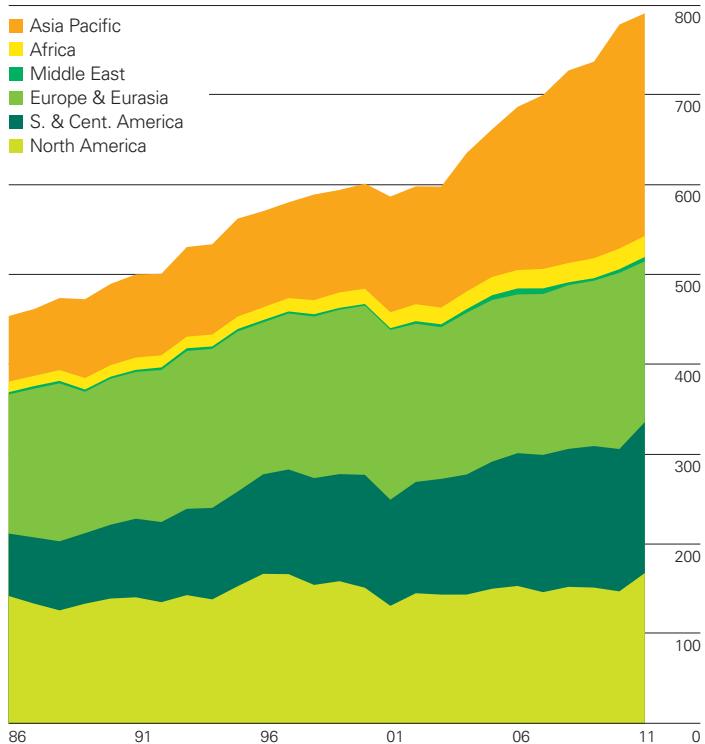
Nuclear energy consumption by region

Million tonnes oil equivalent



Hydroelectricity consumption by region

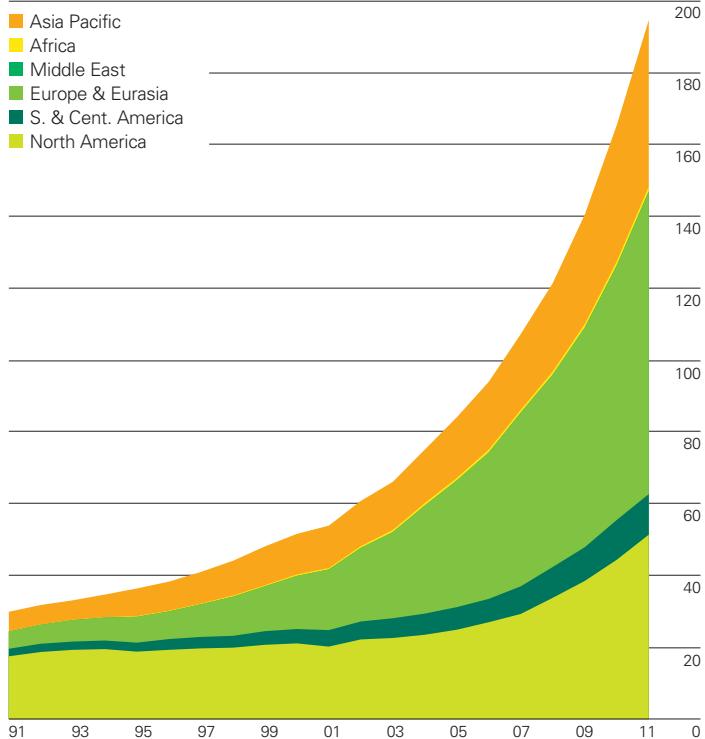
Million tonnes oil equivalent



World nuclear power generation declined by 4.3%, the largest decline on record. Japanese nuclear output fell by 44.3%, and German output fell by 23.2%. Global hydroelectric output grew by a below-average 1.6%. Strong growth in North America (+13.9%) was offset by drought-related declines in Europe & Eurasia and Asia Pacific.

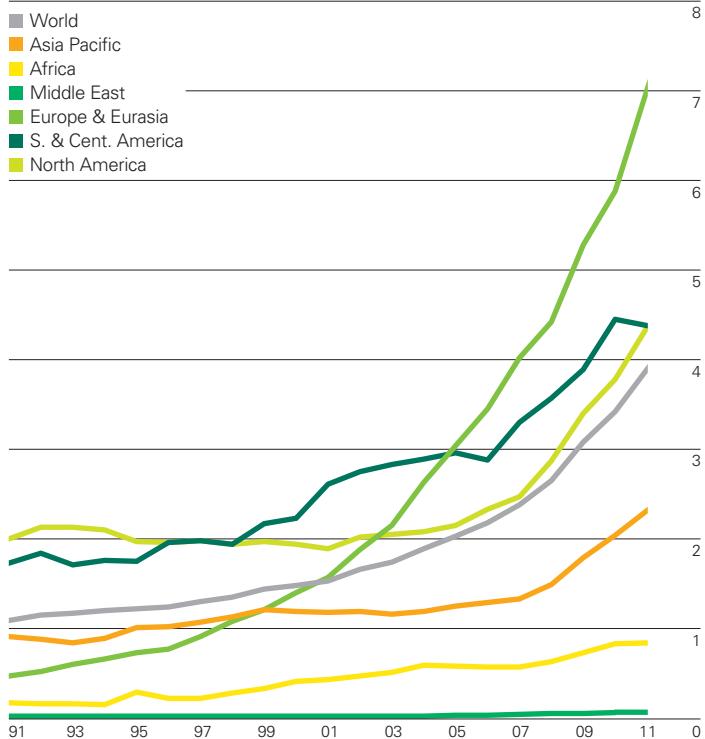
Other renewables consumption by region

Million tonnes oil equivalent



Other renewables share of power generation by region

Percentage



Renewable energy in power generation grew by an above-average 17.7%. Wind generation (+25.8%) accounted for more than half of renewable power generation for the first time. Renewables accounted for 3.9% of global power generation, with the highest share in Europe & Eurasia (7.1%).

Biofuels production

Thousand tonnes oil equivalent	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change 2011 over 2010	2011 share of total
US	3288	3987	5226	6357	7478	9746	13456	19096	21670	25467	28251	10.9%	48.0%
Canada	111	113	113	113	133	160	461	500	721	746	961	28.8%	1.6%
Total North America	3399	4100	5339	6470	7612	9906	13922	19600	22395	26226	29224	11.4%	49.6%
Argentina	9	9	9	9	9	29	228	632	1048	1656	2233	34.8%	3.8%
Brazil	5600	6149	7068	7135	7835	8729	11323	14132	13962	15575	13196	-15.3%	22.4%
Colombia	-	-	-	-	14	131	141	239	326	318	387	21.7%	0.7%
Other S. & Cent. America	29	123	151	148	235	515	610	785	606	314	314	-	0.5%
Total S. & Cent. America	5638	6280	7227	7291	8093	9405	12303	15788	15942	17863	16129	-9.7%	27.4%
Austria	18	22	26	48	70	105	220	263	354	375	434	16.0%	0.7%
Belgium	-	-	-	-	1	21	140	278	473	462	503	9.0%	0.9%
France	315	337	368	385	439	665	1121	2012	2312	2008	1720	-14.4%	2.9%
Germany	237	385	613	887	1525	2488	3181	2727	2728	2888	2839	-1.7%	4.8%
Italy	123	180	232	272	340	585	443	617	758	670	456	-31.9%	0.8%
Netherlands	-	-	-	6	3	22	80	77	241	385	470	22.1%	0.8%
Poland	-	-	28	6	109	144	96	279	393	421	386	-8.3%	0.7%
Portugal	-	-	-	-	1	70	153	145	202	275	246	-10.5%	0.4%
Spain	70	122	173	210	282	251	352	358	958	1267	777	-38.7%	1.3%
Finland	-	-	-	1	6	11	51	96	267	363	363	-	0.6%
Sweden	14	31	32	43	48	81	139	171	238	214	212	-1.1%	0.4%
United Kingdom	-	3	9	9	39	219	359	275	180	304	293	-3.7%	0.5%
Other Europe & Eurasia	113	126	138	164	293	389	485	898	1139	1178	1136	-3.6%	1.9%
Total Europe & Eurasia	889	1206	1619	2031	3157	5052	6820	8196	10243	10811	9837	-9.0%	16.7%
Total Middle East	-	-											
Total Africa	6	10	14	29	29	-	♦						
Australia	-	-	-	4	20	54	70	110	174	246	284	15.5%	0.5%
China	4	146	396	492	622	846	901	1094	1124	1124	1149	2.2%	2.0%
India	85	91	94	99	114	134	136	161	201	177	286	61.8%	0.5%
Malaysia	-	-	-	-	-	48	110	197	197	103	97	-6.0%	0.2%
South Korea	-	1	2	4	9	39	74	140	343	491	202	-58.8%	0.3%
Thailand	-	-	-	3	52	80	138	495	618	661	915	38.4%	1.6%
Other Asia Pacific	-	-	-	-	18	78	133	270	549	726	716	-1.3%	1.2%
Total Asia Pacific	89	238	491	603	834	1280	1563	2468	3207	3528	3649	3.4%	6.2%
Total World	10021	11830	14682	16401	19701	25648	34613	46063	51802	58457	58868	0.7%	100.0%
of which: OECD	4288	5307	6960	8499	10779	15015	20775	27818	32833	37465	39210	4.7%	66.6%
Non-OECD	5733	6523	7722	7902	8922	10633	13839	18244	18968	20992	19659	-6.4%	33.4%
European Union	889	1206	1619	2022	3133	5001	6743	8050	10059	10667	9693	-9.1%	16.5%
Former Soviet Union	-	-	-	11	22	28	50	129	210	179	197	10.1%	0.3%

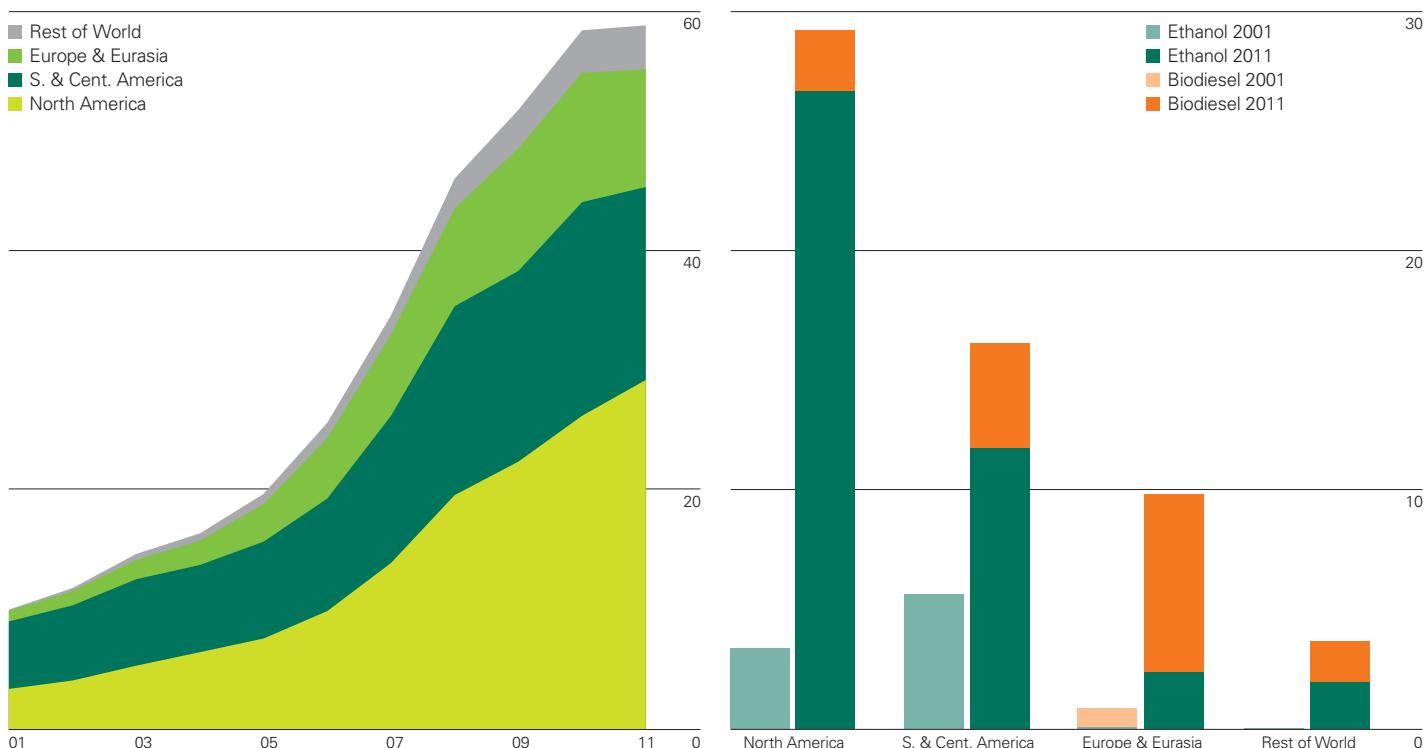
♦Less than 0.05%.

Note: Consumption of fuel ethanol and biodiesel is included in oil consumption.

Source: Includes data from F.O. Lichts; US Energy Information Administration.

World biofuels production

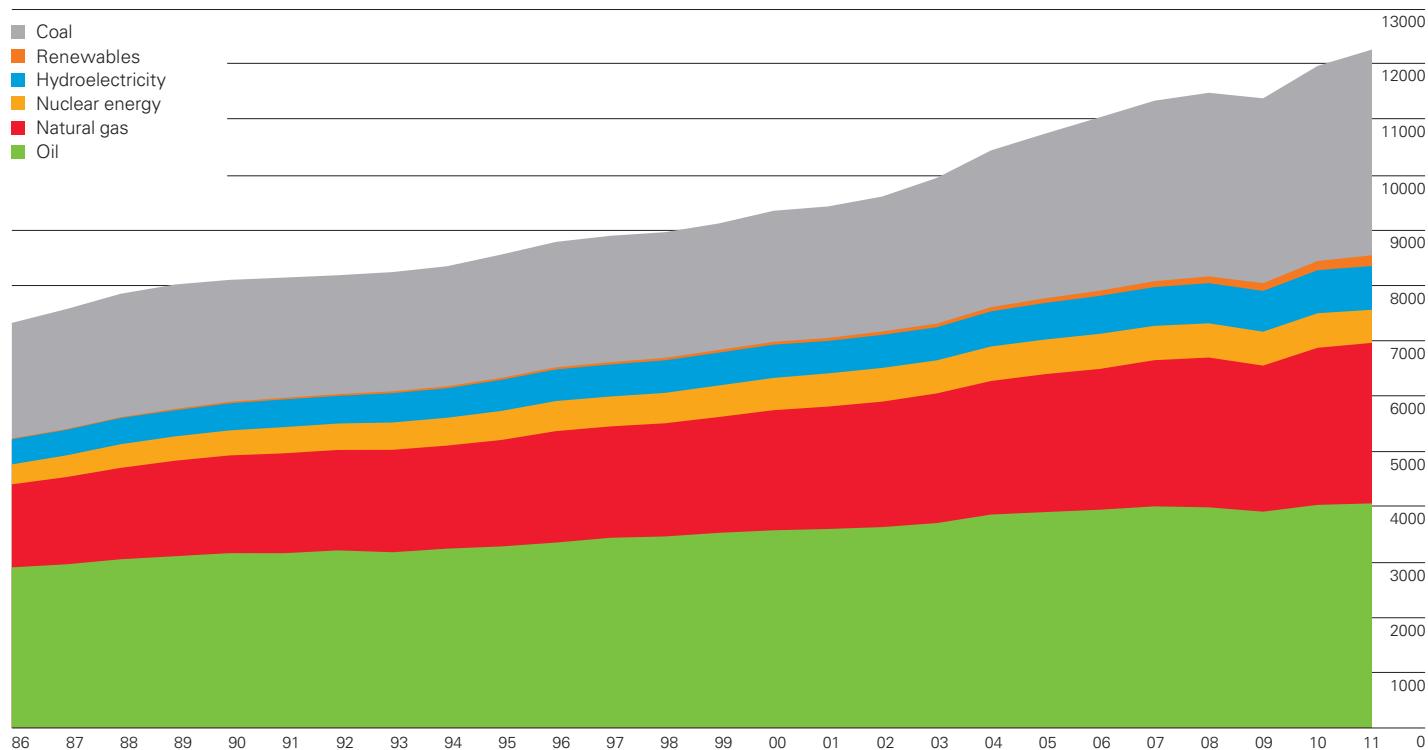
Million tonnes oil equivalent



World biofuels production grew by 0.7% in 2011, the smallest increase since 2000. Increased output in North America was offset by declines in South & Central America and Europe. Biodiesel accounts for just 27.5% of global biofuels output, but accounted for all of the growth in global biofuels output. Global ethanol output declined by 1.4%.

World consumption

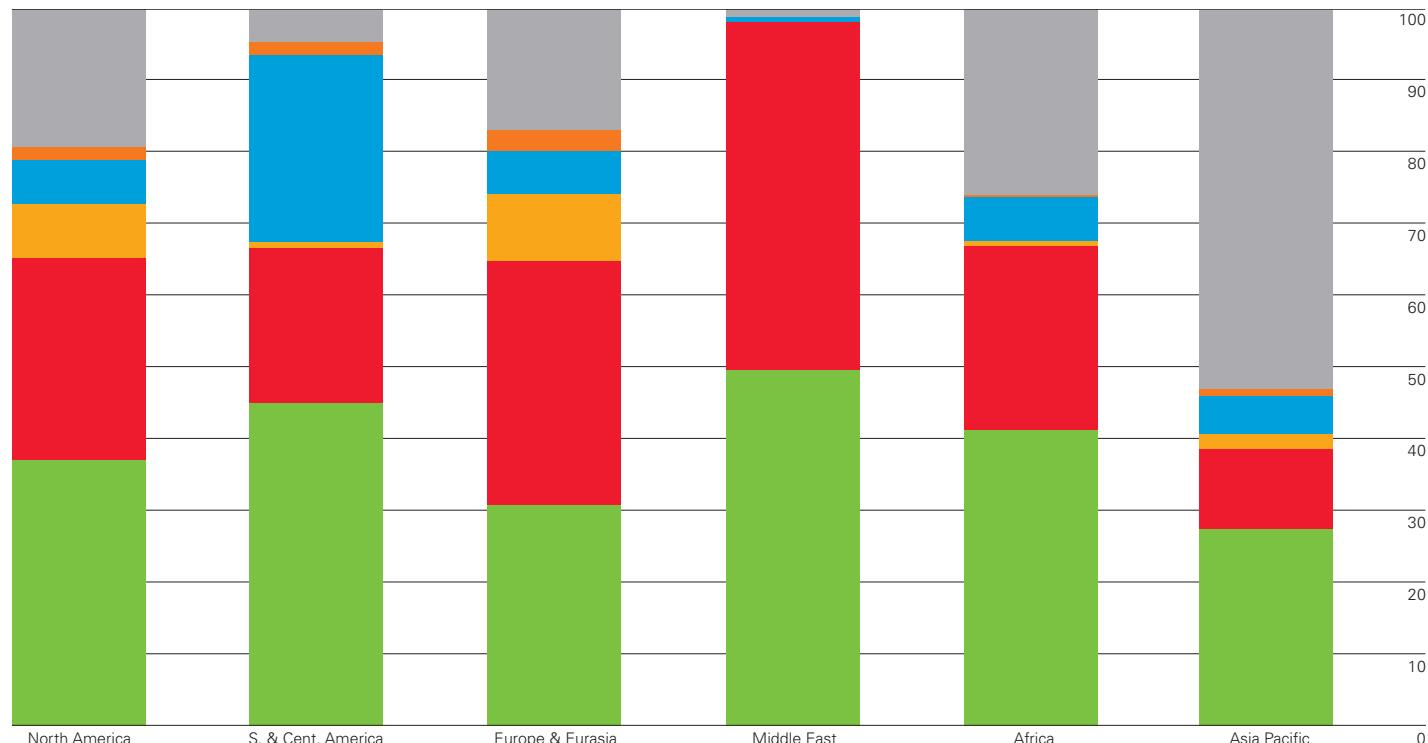
Million tonnes oil equivalent



World primary energy consumption grew by 2.5% in 2011, less than half the growth rate experienced in 2010 but close to the historical average. Growth decelerated for all regions and for all fuels. Oil remains the world's leading fuel, accounting for 33.1% of global energy consumption, but this figure is the lowest share on record. Coal's market share of 30.3% was the highest since 1969.

Regional consumption pattern 2011

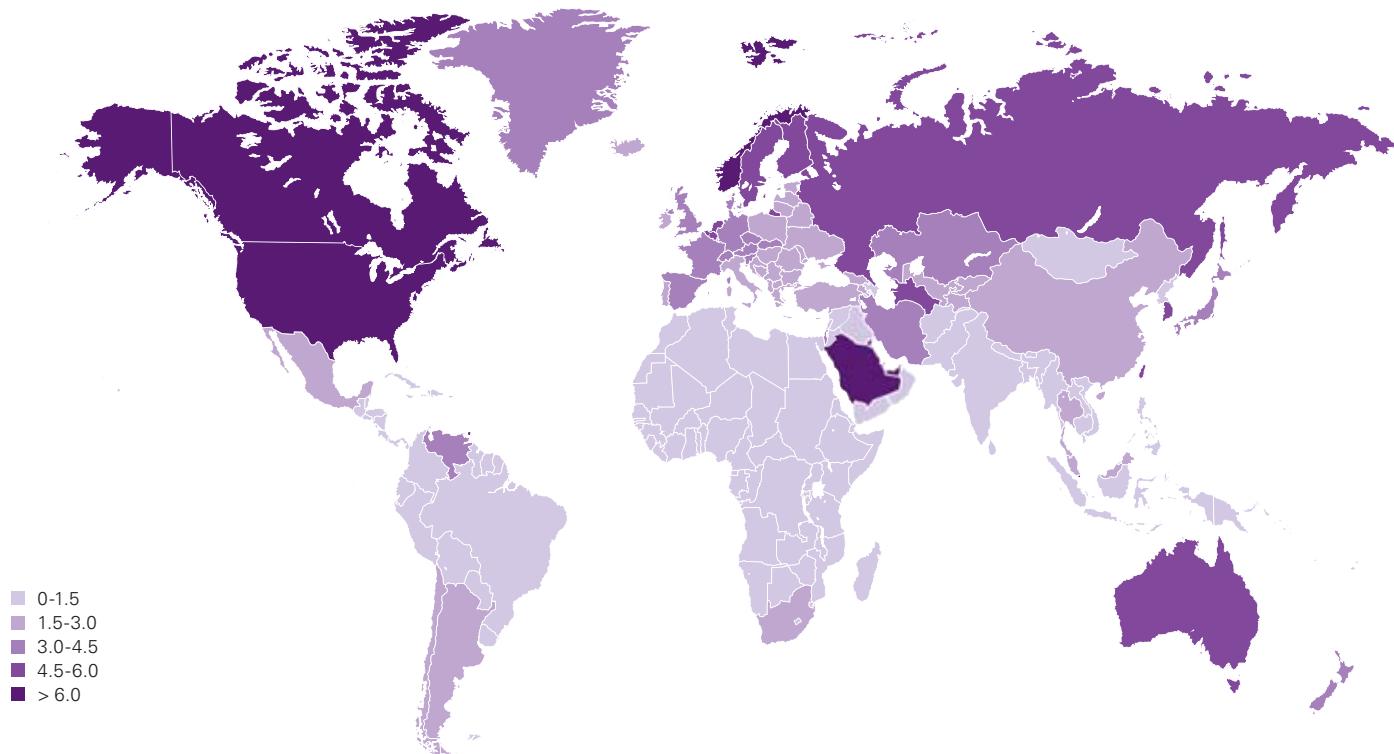
Percentage



The Asia Pacific region is the world's largest energy consumer, accounting for 39.1% of global energy consumption and 68.6% of global coal consumption; the region also leads in oil consumption and hydroelectric generation. Europe & Eurasia is the leading region for consumption of natural gas, nuclear power, and renewables. Coal is the dominant fuel in the Asia Pacific region; natural gas is dominant in Europe & Eurasia, and oil is dominant in all other regions.

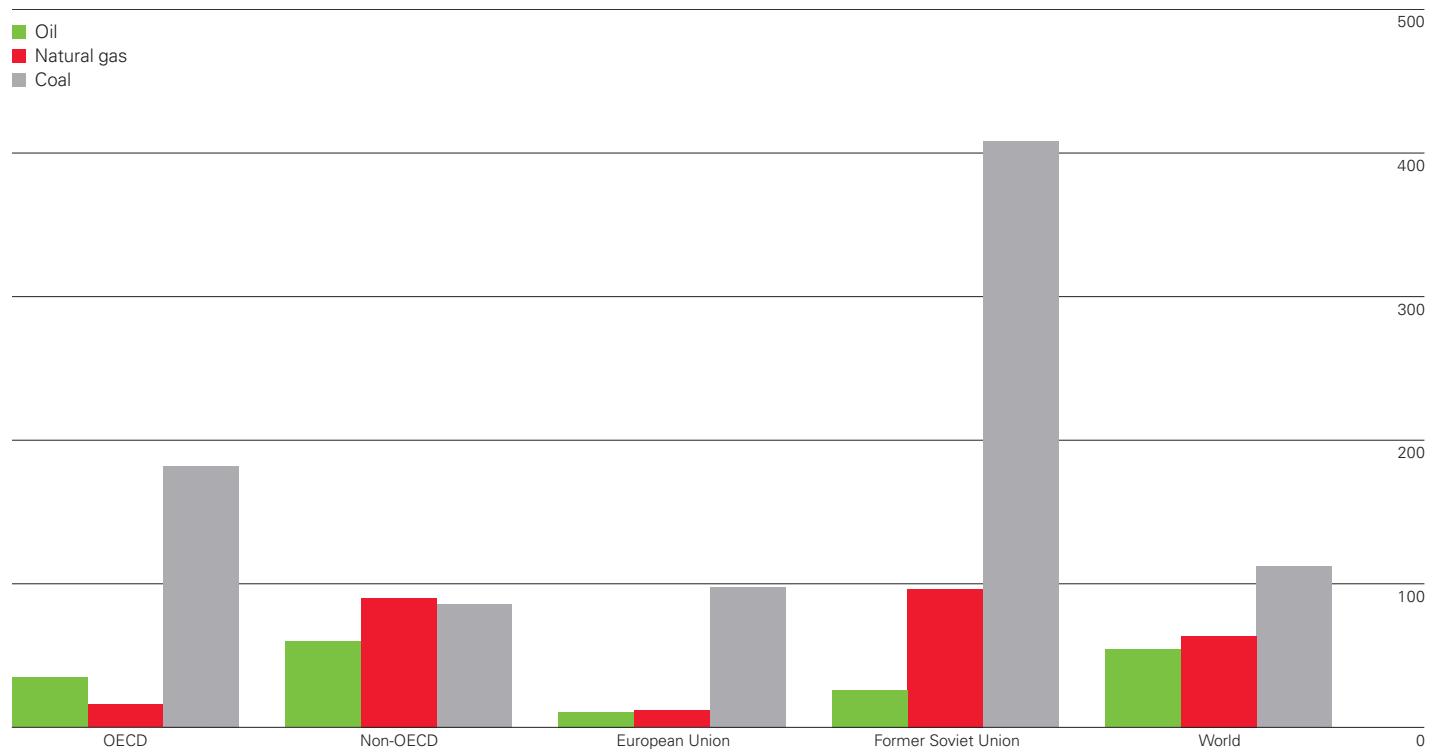
Consumption per capita 2011

Tonnes oil equivalent



Fossil fuel reserves-to-production (R/P) ratios at end 2011

Years



Coal remains the most abundant fossil fuel by global R/P ratio, although global oil and natural gas reserves have increased significantly over time. Non-OECD countries possess the majority of proved reserves for all fossil fuels, but OECD countries have a higher R/P ratio for coal.

Appendices

Approximate conversion factors

Crude oil*

From	To				
	tonnes (metric)	kilolitres	barrels	US gallons	tonnes per year
			Multiply by		
Tonnes (metric)	1	1.165	7.33	307.86	-
Kilolitres	0.8581	1	6.2898	264.17	-
Barrels	0.1364	0.159	1	42	-
US gallons	0.00325	0.0038	0.0238	1	-
Barrels per day	-	-	-	-	49.8

*Based on worldwide average gravity.

Products

	To convert			
	barrels to tonnes	tonnes to barrels	kilolitres to tonnes	tonnes to kilolitres
		Multiply by		
Liquefied petroleum gas (LPG)	0.086	11.6	0.542	1.844
Gasoline	0.118	8.5	0.740	1.351
Kerosene	0.128	7.8	0.806	1.240
Gas oil/diesel	0.133	7.5	0.839	1.192
Fuel oil	0.149	6.7	0.939	1.065

Natural gas (NG) and liquefied natural gas (LNG)

From	To					
	billion cubic metres NG	billion cubic feet NG	million tonnes oil equivalent	million tonnes LNG	trillion British thermal units	million barrels oil equivalent
		Multiply by				
1 billion cubic metres NG	1	35.3	0.90	0.74	35.7	6.60
1 billion cubic feet NG	0.028	1	0.025	0.021	1.01	0.19
1 million tonnes oil equivalent	1.11	39.2	1	0.82	39.7	7.33
1 million tonnes LNG	1.36	48.0	1.22	1	48.6	8.97
1 trillion British thermal units	0.028	0.99	0.025	0.021	1	0.18
1 million barrels oil equivalent	0.15	5.35	0.14	0.11	5.41	1

Definitions

Statistics published in this review are taken from government sources and published data. No use is made of confidential information obtained by BP in the course of its business.

Country and geographic groupings are made purely for statistical purposes and are not intended to imply any judgement about political or economic standings.

North America

US (excluding Puerto Rico), Canada, Mexico.

South & Central America

Caribbean (including Puerto Rico), Central and South America.

Europe

European members of the OECD plus Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Former Yugoslav Republic of Macedonia, Gibraltar, Malta, Romania, Serbia and Montenegro.

Former Soviet Union

Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

Europe & Eurasia

All countries listed above under the headings Europe and Former Soviet Union.

Middle East

Arabian Peninsula, Iran, Iraq, Israel, Jordan, Lebanon, Syria.

North Africa

Territories on the north coast of Africa from Egypt to western Sahara.

West Africa

Territories on the west coast of Africa from Mauritania to Angola, including Cape Verde, Chad.

East and Southern Africa

Territories on the east coast of Africa from Sudan to Republic of South Africa. Also Botswana, Madagascar, Malawi, Namibia, Uganda, Zambia, Zimbabwe.

Asia Pacific

Brunei, Cambodia, China, China Hong Kong SAR*, Indonesia, Japan, Laos, Macau, Malaysia, Mongolia, North Korea, Philippines, Singapore, South Asia (Afghanistan, Bangladesh, India, Myanmar, Nepal, Pakistan, Sri Lanka), South Korea, Taiwan, Thailand, Vietnam, Australia, New Zealand, Papua New Guinea, Oceania.

*Special Administrative Region.

Australasia

Australia, New Zealand.

OECD members

Europe: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK.

Other member countries: Australia, Canada, Chile, Israel, Japan, Mexico, New Zealand, South Korea, US.

OPEC members

Middle East: Iran, Iraq, Kuwait, Qatar, Saudi Arabia, United Arab Emirates.

North Africa: Algeria, Libya.

West Africa: Angola, Nigeria.

South America: Ecuador, Venezuela.

Units

1 metric tonne	= 2204.62lb = 1.1023 short tons
1 kilolitre	= 6.2898 barrels = 1 cubic metre
1 kilocalorie (kcal)	= 4.187kJ = 3.968Btu
1 kilojoule (kJ)	= 0.239kcal = 0.948Btu
1 British thermal unit (Btu)	= 0.252kcal = 1.055kJ
1 kilowatt-hour (kWh)	= 860kcal = 3600kJ = 3412Btu

Calorific equivalents

One tonne of oil equivalent equals approximately:

Heat units	10 million kilocalories 42 gigajoules 40 million British thermal units
Solid fuels	1.5 tonnes of hard coal 3 tonnes of lignite
Gaseous fuels	See Natural gas and liquefied natural gas table
Electricity	12 megawatt-hours
	One million tonnes of oil or oil equivalent produces about 4400 gigawatt-hours (= 4.4 terawatt-hours) of electricity in a modern power station.
	1 barrel of ethanol = 0.57 barrel of oil
	1 barrel of biodiesel = 0.88 barrel of oil

European Union members

Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, UK.

Non-OECD

All countries that are not members of the OECD.

Methodology

The primary energy values of nuclear and hydroelectric power generation, as well as electricity from renewable sources, have been derived by calculating the equivalent amount of fossil fuel required to generate the same volume of electricity in a thermal power station, assuming a conversion efficiency of 38% (the average for OECD thermal power generation).

Fuels used as inputs for conversion technologies (gas-to-liquids, coal-to-liquids and coal-to-gas) are counted as production for the source fuel and the outputs are counted as consumption for the converted fuel.

Percentages

Calculated before rounding of actuals. All annual changes and shares of totals are on a weight basis except on pages 6, 13, 16, 18 and 20.

Rounding differences

Because of rounding, some totals may not agree exactly with the sum of their component parts.

Tonnes

Metric equivalent of tons.

More information



The data in this publication is also available at bp.com/statisticalreview. In addition to viewing, data can be downloaded and charted using the charting tool.

Questions on data

BP regrets it is unable to deal with enquiries about the data in *BP Statistical Review of World Energy June 2012*.

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