



# Energy update 2008

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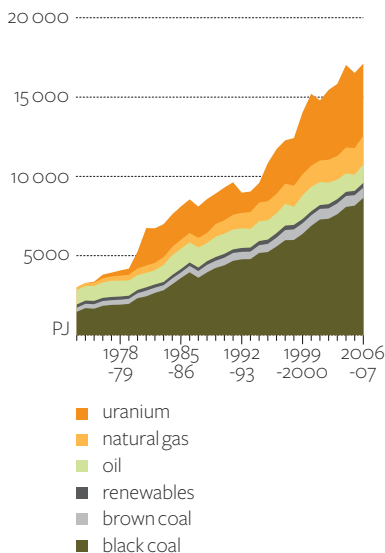
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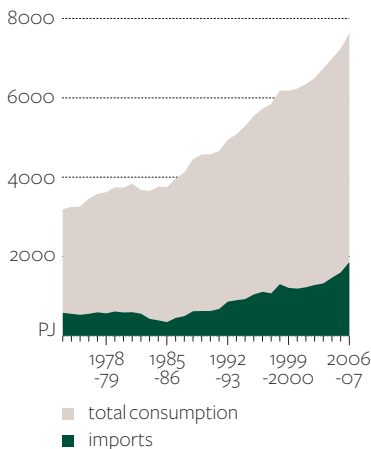
## Australian energy production, consumption and trade, 1973-74 to 2006-07

**a** Australian energy production



- Australia's energy production, in energy content terms, rose strongly in 2006-07 to more than 17 000 petajoules, largely as a result of a 5.6 per cent increase in hard coal production.
- Australia's energy exports rose by 2.2 per cent in 2006-07 to 12 975 petajoules. This reflected strong growth in coal, LNG and oil product exports, partially offset by a fall in uranium oxide exports.
- Coal continues to dominate energy exports, accounting for more than half of total energy exports in 2006-07. Uranium oxide exports, at 4470 petajoules, decreased as a share of total energy exports from 37.7 per cent to 34.3 per cent in 2006-07 but remained Australia's second largest energy export.
- Australia's energy consumption increased by an estimated 2.3 per cent in 2006-07, to 5770 petajoules.
- The total contribution from renewable sources increased by 10 per cent in 2006-07, largely reflecting strong growth in wind energy. Renewables maintained their share of the fuel mix at around 5 per cent, despite declining availability of hydroelectricity.

**b** Australian energy consumption



## Production and trade

In 2006-07, Australia produced around 17 000 petajoules of primary energy, or three times more than was consumed domestically. Energy production grew by 3.2 per cent during this period, compared with growth in energy consumption of 2.3 per cent.

Coal maintained a 51 per cent share of total primary energy production and made the strongest contribution to the overall increase. Coal production rose by 480 petajoules to 9300 petajoules. While production of crude oil and condensate grew by 15 per cent in 2006-07, this was the first recorded increase for this sector since 2000-01 and was the result of increased investment in the sector following higher commodity prices. Renewable energy grew by 10 per cent in 2006-07 to almost 300 petajoules while the 7 per cent increase in natural gas reflected longer run annual average growth. The energy contained in uranium oxide production fell for the second consecutive year, by 3.8 per cent to 4509 petajoules (figures a and b, table 1, see the 'methodology' section later).

# 1 Australian energy production, by fuel

	average annual growth 2001-02 to 2006-07 %	growth 2006-07 %	2006-07 PJ	contribution to growth 2006-07 ppts
Black coal	3.5	5.6	8 650	2.8
Brown coal	-0.8	-3.1	642	-0.1
Renewables	3.0	10.3	298	0.2
Crude oil and condensate	-4.2	14.9	1 177	1.0
Natural gas	5.2	7.2	1 793	0.8
Uranium	4.2	-3.8	4 509	-1.0
<b>Total</b>	<b>3.0</b>	<b>3.2</b>	<b>17 069</b>	<b>3.7</b>

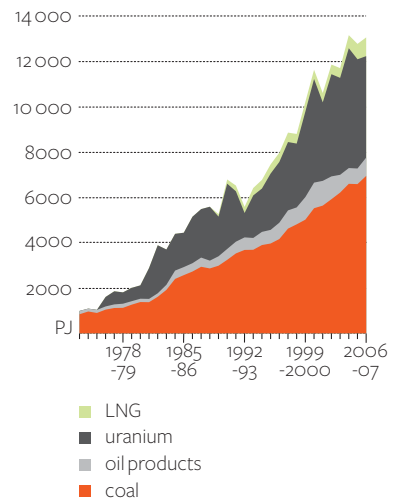
Australia is a significant exporter of energy commodities and in 2006-07 energy exports grew by 2.2 per cent to 13 055 petajoules. Coal exports represented 53 per cent of total exports of energy by commodity in 2006-07 and contributed the most to total energy export growth, rising by 360 petajoules to 6940 petajoules (244 million tonnes).

The strongest growth in energy exports in 2006-07 was in LNG (21.6 per cent) and oil (17.7 per cent). The energy value of uranium exports declined by around 7 per cent in 2006-07, to 4474 petajoules, but still represented 34 per cent of Australia's total energy exports (figure c).

Australia is a net importer of liquid hydrocarbons, which include crude oil, LPG and petroleum products. In 2006-07, Australia exported around 810 petajoules of liquid fuels (excluding LNG but including international bunkers) and imported around 1860 petajoules. Exports of liquid fuels rose for the first time since 2000-01, corresponding with a rise in domestic crude oil and condensate production. However, for the sixth consecutive year, the change in exports of liquid hydrocarbons was exceeded by the change in imports, resulting in a 16 per cent rise in net imports.

Total electricity production in Australia is estimated to have risen by 3.5 per cent in 2006-07. However, production of hydroelectricity fell almost 10 per cent in 2006-07, with dam inflows continuing to fall. During the 14 years since 1992-93, when hydroelectricity production peaked, output has fallen almost 15 per cent with the water flow available to hydropower generators restricted by continued dry conditions, particularly in New South Wales, Victoria and Tasmania. Despite the decline in hydroelectricity generation, production of electricity from renewable sources rose by an estimated 6.4 per cent in 2006-07.

**C** Australian energy exports



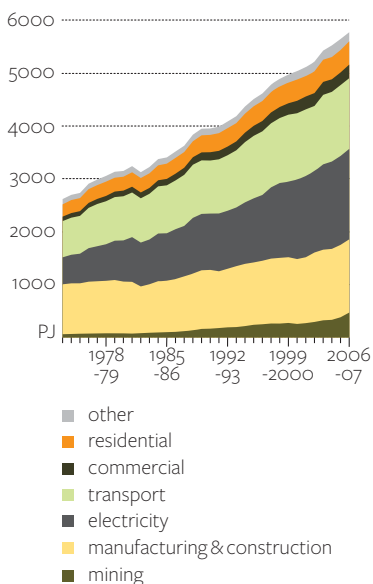
## Consumption

Australia's primary energy consumption (total domestic availability) is estimated to have risen by 2.3 per cent, to 5770 petajoules in 2006-07. The major energy using sectors of electricity generation, transport and manufacturing together accounted for more than 75 per cent of Australia's energy consumption. Next in terms of energy consumption were the mining, residential and commercial and services sectors (figure d, table 2, box 1).

## 2 Australian energy consumption, by industry

	average annual growth 2001-02 to 2006-07 %	growth 2006-07 %	2006-07 PJ	contribution to growth 2006-07 ppts
Mining	11.8	23.6	469	1.9
Manufacturing and construction	2.1	-0.7	1385	-0.2
Electricity	2.2	1.7	1710	0.5
Transport	1.2	-0.2	1337	-0.1
Commercial	1.1	3.0	257	0.1
Residential	2.5	3.9	440	0.3
Other	0.5	0.0	172	0.0
<b>Total</b>	<b>2.4</b>	<b>2.3</b>	<b>5770</b>	<b>2.6</b>

**d** Australian energy consumption, by industry



### box 1 Total energy consumption

Total energy consumption, as depicted in figure d, is a net concept. In order to avoid double counting, the energy used to produce energy products (consumed in other sectors) does not count toward the estimate of total energy consumed in the sector where the products are produced. For example, in the electricity generation sector, total energy consumption comprises fuel inputs of all types less the amount of electricity produced; where one petajoule (PJ) of energy approximates to 278 gigawatt hours (GWh).

In net energy terms, electricity generation accounts for approximately 31 per cent of total energy consumed. The transport and manufacturing sectors account for 35 and 33 per cent, respectively. However, in terms of primary energy consumption, the electricity generation sector accounts for around 28 per cent of total energy consumed, while electricity represents 21 per cent of final energy consumed.

The largest contribution to the growth in primary energy consumption in 2006-07 was from the mining sector, which grew by 23.6 per cent, the fastest growth in this sector since 1989-90. Total energy use in transport was largely unchanged in 2006-07 with steadily rising fuel prices, although energy consumption in the aviation transport industry continued to increase strongly. Residential energy use rose by almost 4 per cent in 2006-07, the most rapid rate since 2002-03. Total energy consumption in the manufacturing sector declined by almost 1 per cent in 2006-07, following a moderate increase in 2005-06.

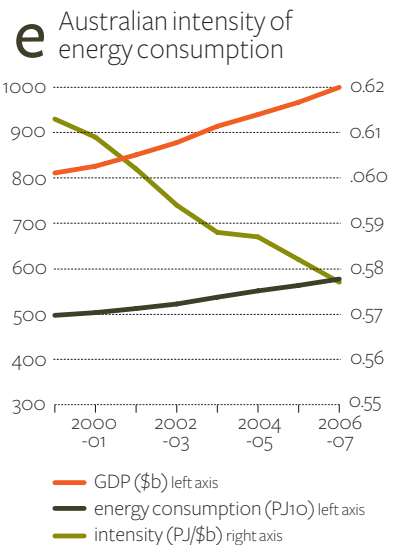
Since the early 1990s, growth in energy consumption in Australia has generally remained below the rate of growth in GDP. This indicates a longer term decline in 'energy intensity' of the Australian economy that can be attributed to two main factors: greater efficiency being achieved through technological improvement and fuel switching; and rapid growth in less energy intensive sectors such as 'commercial and services' relative to the more moderate growth of the energy intensive manufacturing sector (figure e).

Reflecting strong economic and population growth and the expansion of energy intensive industries, energy consumption in Western Australia grew by 13 per cent and contributed most to Australia's energy consumption growth in 2006-07. New South Wales, the Northern Territory and Tasmania also contributed positively to overall energy consumption growth, expanding by 2 per cent, 17 per cent and 5 per cent, respectively. Increasing energy consumption in some jurisdictions was largely a result of the expansion in Australia's mining sector in 2006-07. A general increase in energy use in Queensland was negated by a decline in net energy use in the petroleum refining sector.

Reductions in energy consumption occurred in Victoria and South Australia in 2006-07 where service industries played an increasing role. The largest decline in energy consumption occurred in South Australia, with a reduction of 2 per cent (table 3).

The fuel mix in Australia's domestic energy use was largely unchanged between 2005-06 and 2006-07. Black and brown coal accounted for the greatest share of the fuel mix, at 40 per cent, followed by oil (34 per cent), natural gas (20 per cent) and renewables (5 per cent). Increased use of natural gas contributed most strongly to the rise in energy consumption in 2006-07 (table 4).

Despite the decline in the production of hydroelectricity, renewable energy maintained its share of the fuel mix in 2006-07 with a rise in biogas, bioliquids, solar and wind energy (table 5). However, these important new energy sources only accounted for around 1 per cent of Australian energy consumption.



### 3 Australian energy consumption, by state

	average annual growth 2001-02 to 2006-07 %	growth 2006-07 %	2006-07 PJ	shares 2006-07 ppts
New South Wales	1.1	1.7	1 529	26.5
Victoria	1.2	-0.9	1 463	25.4
Queensland	4.2	0.0	1 309	22.7
South Australia	-0.7	-2.0	317	5.5
Western Australia	4.7	13.5	916	15.9
Tasmania	5.1	4.9	126	2.2
Northern Territory	8.0	16.7	109	1.9
<b>Australia</b>	<b>2.4</b>	<b>2.3</b>	<b>5 770</b>	<b>100.0</b>

### 4 Australian energy consumption, by fuel

	average annual growth 2001-02 to 2006-07 %	growth 2006-07 %	2006-07 PJ	contribution to growth 2006-07 ppts
Coal	1.8	-0.4	2 324	-0.2
Oil	2.5	-0.1	1 990	0.0
Natural gas	3.5	10.8	1 158	2.2
Renewables	3.0	10.3	298	0.5
<b>Total</b>	<b>2.4</b>	<b>2.3</b>	<b>5 770</b>	<b>2.5</b>

### 5 Australian renewable energy consumption, by fuel

	growth 2006-07 %	2006-07 PJ
Biogas/liquids	4.1	13
Hydro	-9.9	52
Solar/wind	230.2	28
Biomass	6.9	205
<b>Total</b>	<b>10.3</b>	<b>298</b>

## Methodology and coverage

The general methodology used in ABARE's *Australian Energy Statistics* (AES) is the process of balancing energy consumption with production and trade, where much of the production and trade data are sourced independently. This check for internal consistency is an important component of Australian Energy Statistics and ensures that ABARE's estimates of energy consumption at an aggregate level are as accurate as possible.

The construction of ABARE's historical statistics is based primarily on the voluntary *Fuel and Electricity Survey* (FES), conducted in the second half of each year. The FES is a partial census of energy users in Australia.

In energy terms, the FES provides consumption and derived production statistics for slightly more than half the national total. A further 25 per cent comes from other state and federal agencies and industry associations. The remainder is estimated using the energy balance process and a variety of economic indicators, based on the assumption that statistics for energy production and trade are reliable.

This year's *Energy Update* adds the year 2006-07 to the historical energy statistics, much of which extend back to the early 1970s. Some changes to the historical series occurred when ABARE's fuel and electricity survey was benchmarked to a one-off statistical collection in 2001-02 by the Australian Bureau of Statistics (ABS). The results of the ABS benchmarking study are located at [www.abs.gov.au/ausstats/](http://www.abs.gov.au/ausstats/) (ABS cat. no. 4649.0.55.001). Breaks in some series occurred as a result.

ABARE's energy database provides detailed energy consumption and production statistics by state and by fuel at an industry specific level. The most extensive coverage of industries is provided in the energy intensive manufacturing sectors and for Australian totals. In some cases, particularly at the state level, specific industry detail is confidential.

The coverage of industries in ABARE's energy database is included in the following table. The industry categorisation for the 2006-07 AES remains unchanged from the categorisation used during the past 15 years. The AES industry classifications are a modified form of the ANZSIC classifications introduced in 1993, containing additional classes in some industries and assuming aggregated energy usage in others. Apart from these distinctions already in place, a change to the new ANZSIC classifications, introduced in 2006, would have compromised confidential data in the current tables and introduced breaks in many of the time-series.