

Australia has access to abundant renewable energy sources that are used for heating, electricity generation and transportation. Renewable energy accounts for 5 per cent of Australia's primary energy consumption. Primary consumption and production of renewable energy include the quantity of fuel used in producing secondary forms of energy, such as electricity, and the associated losses in producing these secondary energy sources, as well as the fuels used directly by end users, such as the burning of fire wood.

Production

At present, renewable sources used to generate electricity include hydro, biomass, biogas, wind energy and solar energy. Renewable energy contributes around 7 per cent to Australian electricity generation, with 4.7 per cent sourced from hydroelectricity (renewable electricity data are available on page 22 of this report). Wind energy has grown strongly over recent years and is now 1.5 per cent of total electricity generation. Emerging renewable energy technologies that are yet to be commercially deployed include large-scale solar energy plants and geothermal generation technologies.

Australian production of renewable energy ^a

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
	PJ	PJ	PJ	PJ	PJ	PJ
Bagasse	101.1	108.3	109.1	110.8	111.9	110.1
Biogas and biofuels	10.1	8.7	9.4	10.2	17.6	23.8
Hydroelectricity	58.8	56.2	57.7	52.3	43.4	44.3
Solar hot water	2.6	2.6	2.4	6.0	6.5	8.2
Solar electricity	0.3	0.3	0.4	0.4	0.4	0.6
Wind	1.6	3.2	6.2	9.4	11.1	13.7
Wood and woodwaste	97.3	91.5	90.3	92.8	96	102.0
Total	271.7	270.8	275.5	281.9	286.9	302.7

^a Includes both electricity and heat.

Source: ABARES, Australian energy statistics.

Renewable energy

Australian production of renewable energy (including electricity generation, conversion losses and direct fuel use) is dominated by hydroelectricity, bagasse, wood and wood waste, which combined accounted for 85 per cent of renewable energy production in 2008–09. Wind energy, solar energy and biofuels (which include landfill and sewage gas) accounted for the remainder of Australia's renewable energy production. Most solar energy is used for residential water heating and accounts for 1.8 per cent of final energy consumption in the residential sector.

Renewable energy production increased at an average rate of 2 per cent a year in the five years from 2003–04 to 2008–09. In 2008–09, renewable energy production increased by 6 per cent. While still a small contributor, solar electricity experienced the strongest growth in 2008–09, increasing by 40 per cent. Solar hot water also increased strongly, with a 27 per cent increase from 6.5 petajoules in 2007–08 to 8.2 petajoules in 2008–09.

Capacity

The distribution of renewable energy production facilities in Australia reflects the climatic characteristics of different regions. Hydroelectricity capacity

Capacity of renewable electricity generation in Australia 2010

	biogas	bagasse	wood- waste	hydro	wind	solar	ocean and geothermal	other ^b	total
	MW	MW	MW	MW	MW	MW	MW	MW	MW
NSW ^a	74	43	42	4 293	179	5.1		3	4 639
Vic	83			769	458	1.2	0.2	34	1 344
Qld	19	377	15	667	12	0.5	0.1	4	1 095
SA	22		10	4	868	1.9			906
WA	28		6	32	203	0.9			270
Tas	4		0.0	2 284	144	0.2			2 432
NT	1				0.1	1.1			2
Other ^c						177			177
Aus	231	420	73	8 048	1 864	188	0.3	41	10 865

^a Includes the ACT. ^b Mixed biomass feedstocks, municipal waste and black liquor. ^c Solar PV installations at unspecified locations.

Sources: Geoscience Australia; Watt, M 2010, *National Survey Report of PV Power Applications in Australia 2009*.

in Australia is located mostly in New South Wales, Tasmania, Queensland and Victoria, while wind farms are most common in South Australia and Victoria. Almost all bagasse fuelled energy production facilities are located in Queensland where sugar production plants are located. In contrast, there is a more even distribution of biogas fuelled facilities across Australia, as these facilities are mostly based on gas generated from landfill and sewerage.

Potential

A range of policy measures have been introduced in Australia to support the uptake and development of renewable energy. These measures include the Australian Government's Renewable Energy Target (RET). The expanded RET began on 1 January 2010, committing the Australian Government to a target of 20 per cent of Australia's electricity supply coming from renewable energy sources by 2020. The RET scheme requires an additional 45 000 gigawatt hours a year of renewable energy to be produced by 2020. The target will be maintained at that level until 2030 when the RET scheme is scheduled to

Increase in renewable energy under MRET 1997–2009 ^a

	increase		baseline generation
	GWh	share %	GWh
Bagasse	669	4.3	497
Black liquor	104	0.7	154
Hydro	225	1.4	15 629
Landfill gas	739	4.7	264
Sewage gas	100	0.6	5
Solar electricity	1 738	11.1	0.01
Solar hot water	7 501	48.1	0
Wind	4 212	27.0	5
Wood waste	175	1.1	33
Other ^b	121	0.8	0.1
Total	15 584	100	16 588

^a Reported annual energy generation under the Mandatory Renewable Energy Target scheme, above baseline levels in 1997. ^b Includes municipal waste, food waste, agricultural waste and energy crops.

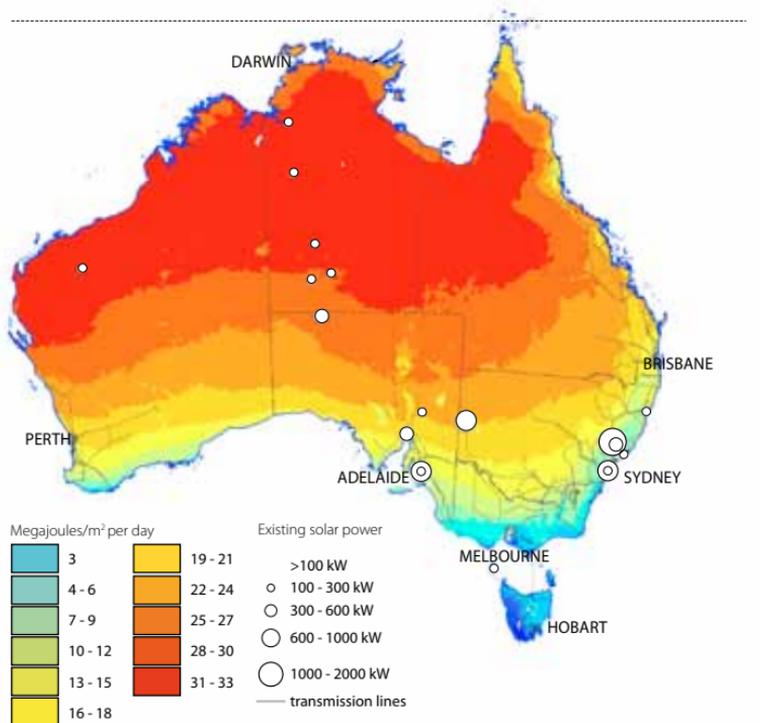
Source: Office of the Renewable Energy Regulator, *REC Registry*, www.rec-registry.gov.au.

Renewable energy

end. In June 2010, legislation was passed to separate the RET scheme into two parts from 1 January 2011—the Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET).

Before the RET scheme, the Mandatory Renewable Energy Target (MRET), which was in place until 31 December 2009, required an increase in electricity generation from renewable energy sources of 9500 gigawatt hours a year by 2010. The renewable energy sources that have experienced the greatest growth under the MRET are solar hot water, wind energy and solar electricity. In 2009, Australia's annual use of solar hot water was 7501 gigawatt hours higher than in 1997. Electricity generation from wind energy increased by 4212 gigawatt hours between 1997 and 2009.

Annual average solar radiation



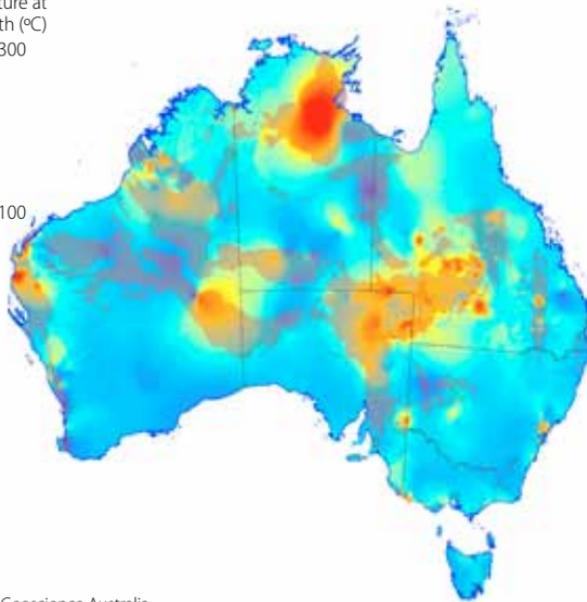
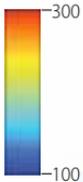
Source: Geoscience Australia.

Significant growth in renewable electricity generation capacity is planned for the next few years. As at the end of October 2010, there were 10 renewable electricity projects at an advanced planning stage, eight of which were wind projects and two of which were hydro projects. A further 99 renewable energy projects were at a less advanced stage of development, 79 of which were wind energy projects (ABARES–BRS 2010, Electricity generation major development projects - October 2010 listing).

There is growing interest in solar energy for electricity generation. There are several new solar plants being considered as part of the Australian Government's Solar Flagships Program, with successful applicants expected to be announced in mid-2011. Four ocean energy pilot projects have been completed in Australia, with several other proposed projects in the early

Australian geothermal energy potential

Temperature at
5km depth (°C)



Source: Geoscience Australia.

Renewable energy

stages of development. Geothermal energy, in the form of hot rock and hot sedimentary aquifer resources, is a renewable energy source that is currently relatively undeveloped. There is one geothermal electricity project in operation in Australia, at Birdsville in Queensland (see Appendix 1), and there are several proposed geothermal projects at early stages of development.

Renewable energy generators
operating plants

