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SOUTH AUSTRALIAN ELECTRICITY REPORT

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Revision History

Number	Date	Notes
1	9 August 2012	First issue

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EXECUTIVE SUMMARY

Annual Energy

South Australia's annual energy decreased in 2011-12 by approximately five per cent – or 700 GWh – compared with 2010-11 and is about 10 per cent – or 1,500 GWh – lower than forecast in the 2011 Electricity Statement of Opportunities (ESOO) and South Australian Supply and Demand Outlook (SASDO) reports. This represents a significant drop compared to last year's forecasts.

Annual energy is now forecast to grow by only 0.9 per cent per year over the 10-year outlook period, which is less than the 1.5 per cent per year growth rate forecast in the 2011 ESOO.

Maximum Demand

For summer 2012-13, the forecast 10 per cent probability of exceedence (POE)[1] maximum demand has been reduced by 359 MW compared with the 2011 forecast and is now expected to grow by 1.0 per cent per year, down from the 1.7 per cent per year that was forecast in the 2011 ESOO.

The reduced maximum demand forecasts contribute to a small reserve deficit of less than one per cent in generation capacity in summer 2019-20 under a medium economic growth scenario. This reserve deficit occurs five years later than was forecast in the 2011 ESOO (see Table 1).

Table 1 — Forecast of South Australian low reserve condition (LRC)

Summer	Low economic growth scenario	Medium economic growth scenario	High economic growth scenario
	Reserve deficit (MW / % of forecast firm capacity, approximate)		
2014-15	-	-	-
2015-16	-	-	3 / <1%
2016-17	-	-	60 / 2%
2017-18	-	-	86 / 3%
2018-19	-	-	135 / 4%
2019-20	-	24 / < 1%	165 / 5%
2020-21	-	72 / 2%	216 / 6%
2021-22	-	76 / 2%	226 / 7%

[1] Probability of exceedence (POE) for maximum demand: the probability, as percentage, that a maximum demand level will be met or exceeded (for example due to weather conditions) in a particular period of time.

Drivers of energy and demand reductions:

The main factors influencing these energy and demand reductions include:

- Lower than expected demand in the large industrial and manufacturing sectors.
- Increased rooftop photovoltaic (PV) installations – as shown in the 2012 National Electricity Forecasting Report, South Australia has the highest penetration of rooftop PV of all the National Electricity Market states, meaning less electricity is being supplied from the grid.
- Consumer response to rising electricity costs and energy efficiency measures.
- Moderation in gross state product (GSP) growth projections leading to reduced annual energy forecasts, especially in the short term.

Generation capacity developments:

Alinta Energy has advised that:

- From 20 April 2012, Playford B Power Station will only be available after a recall time of 70 days.
- Northern Power Station will be operational during summer but only available over the next two winter periods after a recall time of three weeks.
- From October 2014, Northern Power Station will return to normal operation.

The 53 MW Hallett (The Bluff) wind farm was commissioned in December 2011.

AEMO has increased its determination of the proportion of installed wind generation capacity that can be considered to be firmly available to meet maximum demand from 5.0 per cent to 8.3 per cent for summer and from 3.5 per cent to 7.5 per cent for winter. The increase is due to more wind farms operating in the state, providing greater geographical diversity, and also improvements to AEMO’s wind data analysis methodology.

Investment trends

Over 4,000 MW of potential new electricity generation capacity in South Australia has been publicly announced, based on coal, gas, geothermal and wind energy sources. However these projects are largely in the early development stages and none have progressed to ‘advanced’ or ‘committed’ status or are under construction.

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1. BACKGROUND

AEMO’s South Australian advisory functions

This 2012 South Australian Electricity Report (SAER) is an independent report prepared by the Australian Energy Market Operator (AEMO) as part of its South Australian advisory functions.

AEMO provides these advisory functions for the South Australian declared power system as set out in the National Electricity Law (Section 50B) and as agreed between AEMO and the Government of South Australia.

The SAER is a high-level executive briefing report. It summarises South Australia’s electricity supply and demand situation and references AEMO publications that provide more detailed information. Table 2 provides links to these publications.

In addition to the publications listed in Table 2, in 2013 AEMO will publish additional information relating to South Australia, addressing the following topics:

- Review of ElectraNet Annual Planning Report.
- South Australian fuel supplies (biennial report).
- Electricity generation technology review.

The SAER and these other publications replace the South Australian Supply and Demand Outlook (SASDO) that AEMO published in 2010 and 2011.

Table 2 — Links to AEMO 2012 publications relating to South Australian advisory functions

AEMO publication	Publication date	AEMO website address
South Australia specific documents		
Archive of previous SASDO reports	Prior to 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Archive-of-previous-SASDO-reports
Demand Forecasts	June 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Demand-Forecasts
Generation Information	June 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information
Electricity Market Economic Trends	September 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Electricity-Market-Economic-Trends
Heywood RIT-T Update	June 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Heywood-RITT-Update
Historical Market Information	July 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Historical-Market-Information
Maps	June 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Maps
2011–12 National Electricity Market Demand Review 2012	June 2012	http://www.aemo.com.au/en/Electricity/Forecasting/~/media/Files/Other/forecasting/201112_NEM_demand_review_report%20pdf.ashx
Peak Demand Study	November 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Peak-Demand-Study
Planning Requirements	May 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Planning-Requirements-Report
Review of ElectraNet Revenue Cap	June 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/ElectraNet-Revenue-Cap-Review
South Australian Electricity Report (SAER)	August 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Electricity-Report
Wind Study	October 2012	http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Wind-Study-Report
National documents		
Economic Outlook Information Paper	May 2012	http://www.aemo.com.au/en/Electricity/~/media/Files/Other/forecasting/Economic_Outlook_Information_%20Paper.ashx
Rooftop PV Information Paper	May 2012	http://www.aemo.com.au/en/Electricity/~/media/Files/Other/forecasting/Rooftop_PV_Information_Paper_20_June_2012.ashx
2012 National Electricity Forecasting Report	June 2012	http://www.aemo.com.au/en/Electricity/Forecasting/2012-National-Electricity-Forecasting-Report
2012 Electricity Statement of Opportunities (ESOO)	August 2012	http://www.aemo.com.au/en/Electricity/Planning/Electricity-Statement-of-Opportunities
2012 National Transmission Network Development Plan (NTNDP)	December 2012	http://www.aemo.com.au/Electricity/Planning/National-Transmission-Network-Development-Plan

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SAER content and structure

The South Australian Electricity Report contains the following sections:

- **Actual and forecast annual energy and maximum demand:** This section provides annual energy and maximum demand forecasts for the 10-year outlook period for three economic growth scenarios, including comparisons with recent actual annual energy and maximum demand. It also summarises the impact of 'behind-the-meter' rooftop photovoltaic (PV) generators on grid-supplied demand.
- **Existing supply capacity and recent performance:** This section describes existing supply capacity, including generation located within South Australia and the power transfer capability of the interconnectors that connect South Australia to the national grid via Victoria. Information is provided on the use and performance of these facilities in recent years.
- **Scheduled and semi-scheduled generation capacities and changes to supply:** Information in this section is based on data provided by industry participants. This section describes some potential impacts on South Australia's electricity supply from government policy and economic conditions that AEMO models for the supply-demand outlook.
- **Supply-demand outlook:** This section compares forecast maximum demand with forecast supply capacity and identifies when additional supply might be needed under different scenarios.

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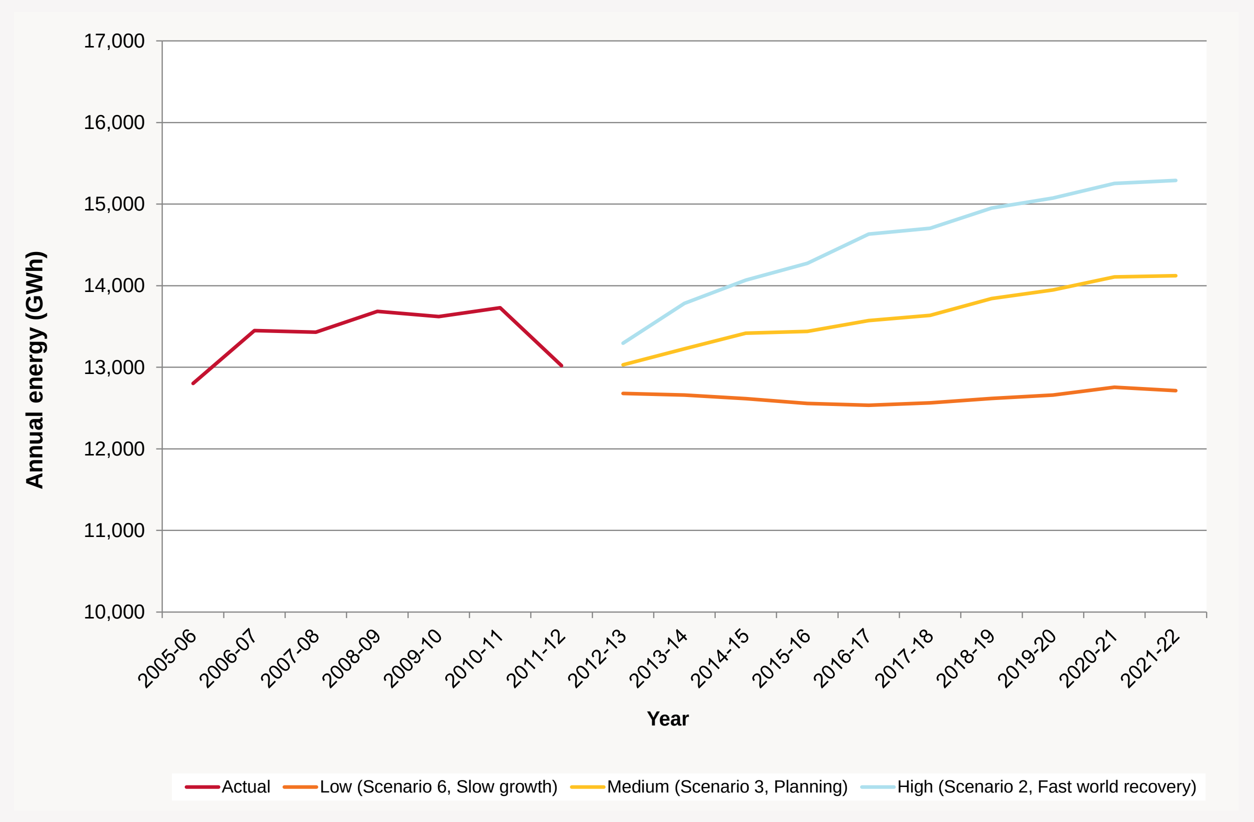
2. ACTUAL AND FORECAST ANNUAL ENERGY AND MAXIMUM DEMAND

On 30 June 2012, AEMO published the National Electricity Forecast Report (NEFR),[2] which includes annual energy and maximum demand forecasts for each region of the National Electricity Market (NEM) including South Australia.[3] This section of the SAER summarises key points from the NEFR regarding actual and forecast annual energy (measured in gigawatt-hours (GWh)) and maximum demand (measured in megawatts (MW)) in South Australia. It lists the main factors contributing to recent reductions in annual energy and maximum demand and changes to forecasts, and also describes the impact of rooftop photovoltaic (PV) systems.

Annual energy

Figure 1 shows that over the period 2006–07 to 2010–11, annual energy in South Australia exhibited only mild growth and averaged approximately 13,600 GWh over the five-year period. In 2011–12 annual energy declined to 13,020 GWh, 709 GWh (5.2%) lower than 2010–11.

Figure 1 — Annual energy forecasts



[2] http://www.aemo.com.au/en/Electricity/Forecasting.
[3] http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Demand-Forecasts.

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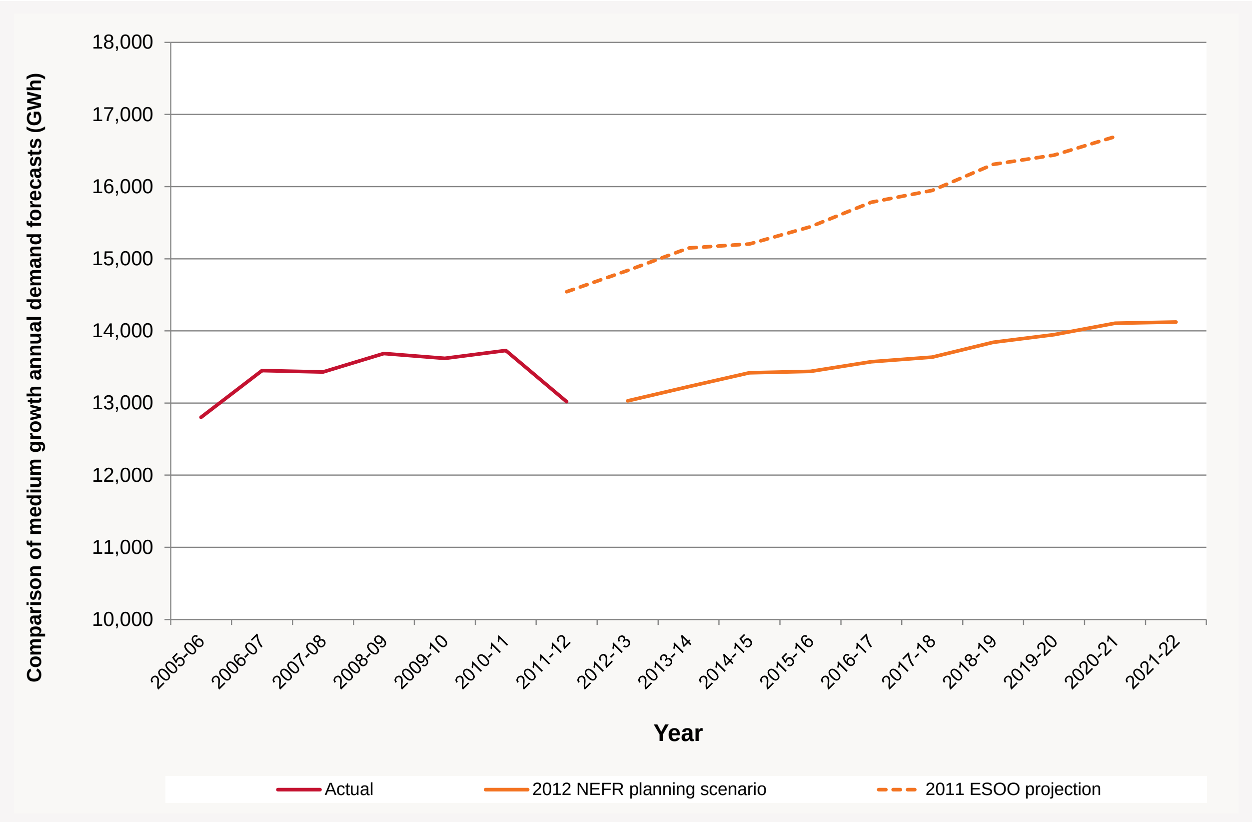
Figure 1 also shows that under the medium scenario (Scenario 3, Planning), annual energy for 2012–13 is forecast to grow by 0.1% compared with 2011-12. Over the 10-year outlook period, annual energy is forecast to grow by an average of 0.9% per year (Scenario 3, Planning), increasing to approximately 14,100 GWh in 2021–22.

Figure 2 shows that:

- South Australia's annual energy in 2011-12 was approximately 10%, or 1,500 GWh, lower than the forecasts presented in last year's 2011 Electricity Statement of Opportunities (ESOO) and 2011 SASDO.
- For the 10-year outlook period, the 2012 NEFR forecasts are significantly lower than the forecasts presented in the 2011 ESOO (0.9% per year compared with 1.5% per year).

Figure 2 — Comparison of the 2012 NEFR and 2011 ESOO annual energy forecasts



The main factors contributing to the recent reduction in annual energy and changes to the forecast are presented in the following sections for the large industrial and mass market sectors.

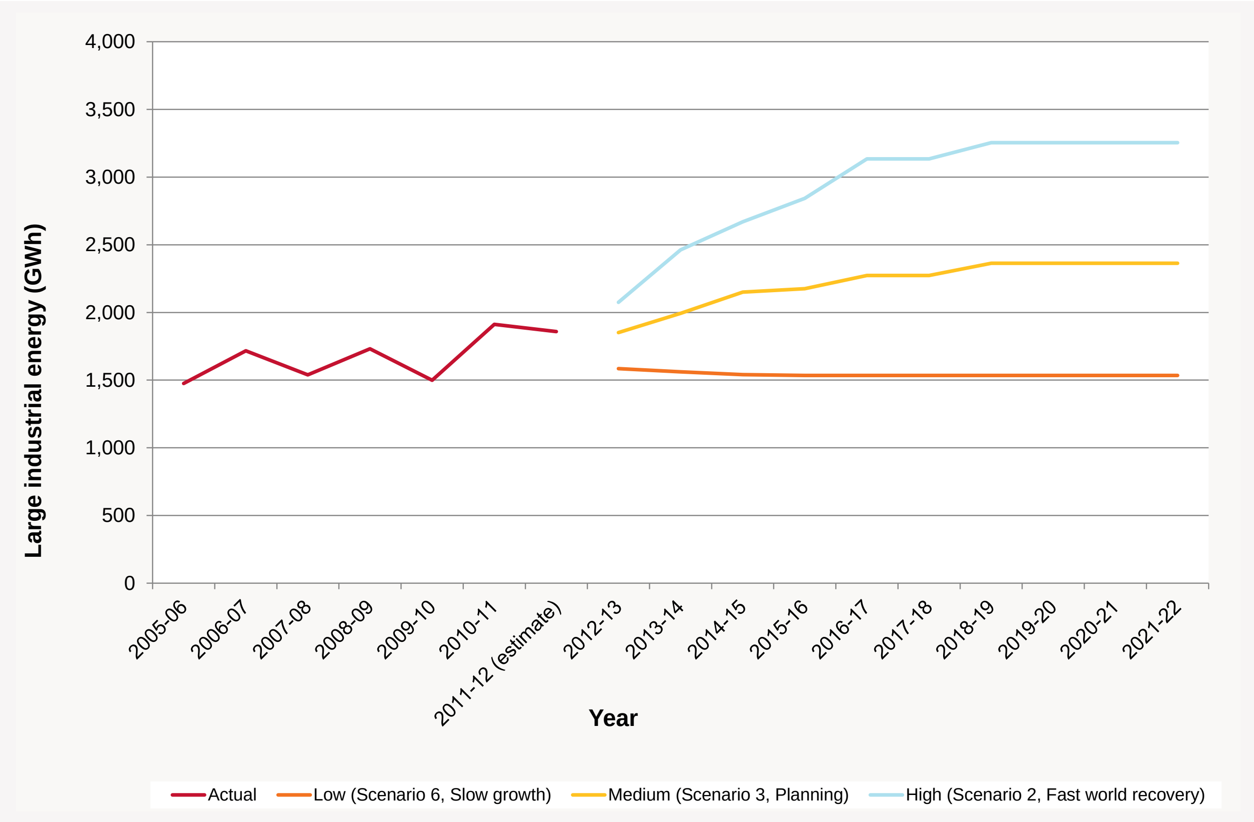
Large industrial sector

At present, South Australia's large industrial demand makes up approximately 15% of the region's annual energy.

Figure 3 presents annual energy for the large industrial sector since 2005–06 and forecasts to 2021–22 under three scenarios. Annual energy for this sector in 2011–12 is expected to be similar to that seen in the previous year and approximately 15% greater than levels seen four or five years earlier.

Over the 10-year outlook period, large industrial annual energy is forecast to increase by an annual average rate of 2.8% under the medium scenario (Scenario 3, Planning) and by 5.2% under the high scenario (Scenario 2, Fast world recovery).

Figure 3 — Large industrial annual energy forecasts



The forecasts consider the following eight industrial facilities:

- Alinta Energy Leigh Creek coal-field.
- AMCOR Roseworthy (glass manufacturing).
- BHP Billiton (Olympic Dam mine).
- DSC Woomera (a defence satellite communication system).
- Kimberly Clark (manufacturing industry).
- One Steel Middleback (iron ore mining).
- SA Water (including the seawater desalination pumping stations).
- SANTOS Stony Point (the Stony Point Liquids Project pipeline).

Olympic Dam is the largest present industrial consumer and largest component of future growth. Olympic Dam's owner, BHP Billiton, has announced that it will make a decision by the end of 2012 about expanding the mine.

Other proposals for large industrial projects and further mining exploration activity were not included in the forecasts due to a lack of sufficiently consistent information.

Mass market sector

For AEMO's forecasting purposes, the mass market sector includes all users except the large industrial sector. Mass market sector forecasts have been calculated by modelling residual energy (representing all energy except large industrial sector usage), and then subtracting forecasts for rooftop PV output and energy efficiency savings.

Figure 4 presents mass market sector annual energy since 2005–06 and forecasts to 2021–22 under three scenarios. It shows that mass market annual energy has declined by approximately 7% since the record high levels seen in 2009–10. Even under the high scenario (Scenario 2, Fast world recovery) annual mass market annual energy does not return to the record high level seen in 2009–10 for at least 10 years.

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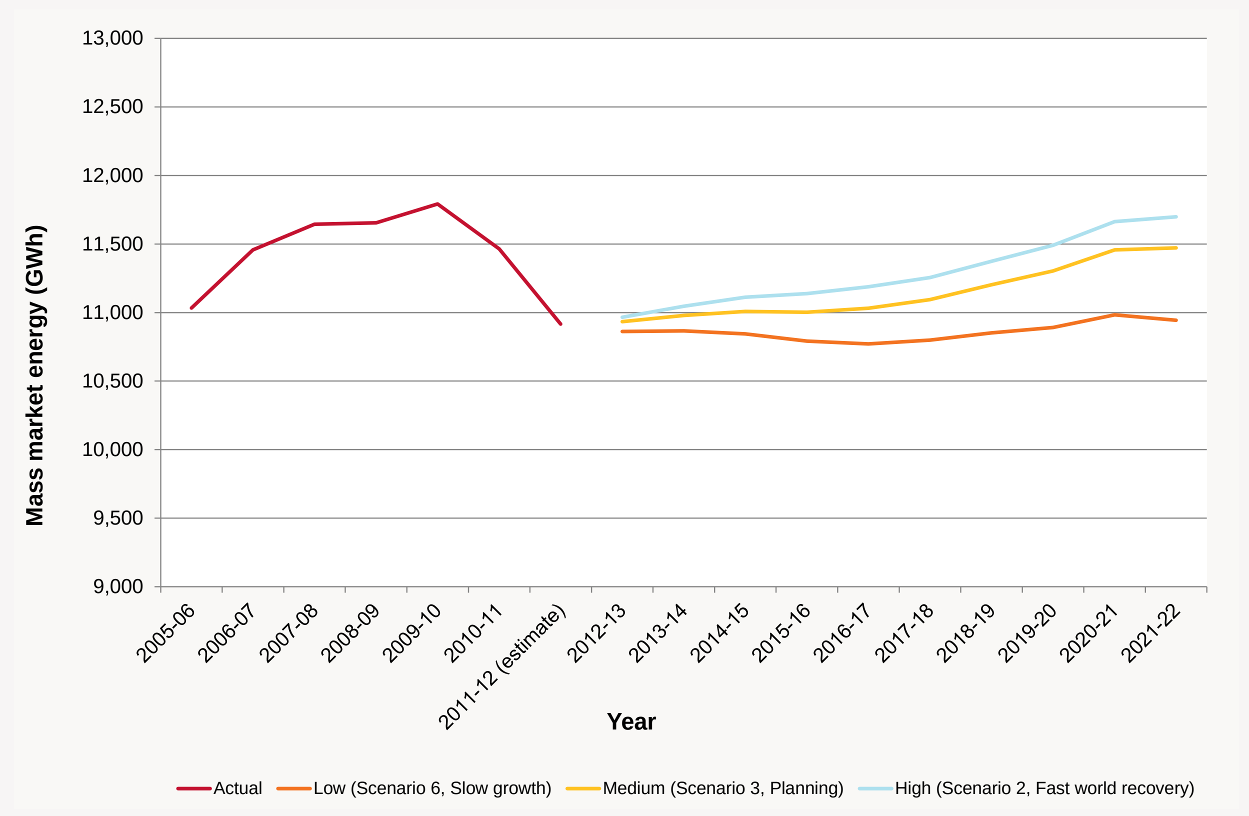
Figure 4 — Mass market annual energy forecasts



Maximum demand

Maximum demand in South Australia occurs during periods of hot summer weather and depends greatly on the particular weather conditions of each individual summer. It can be more than twice as large as average demand, whereas in some other NEM regions, maximum demand might be only 50% larger than average demand.

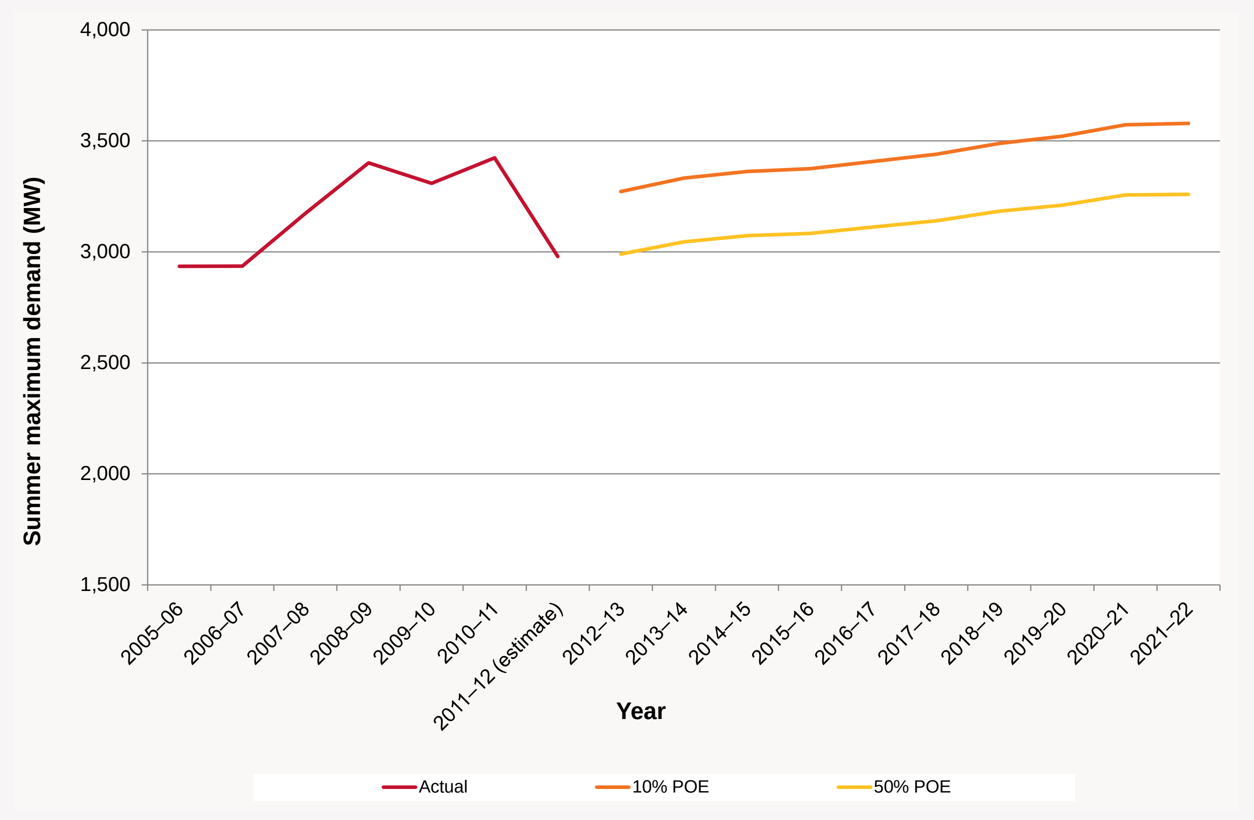
Figure 5 shows that over the period from summer 2005–06 to summer 2011–12, actual maximum demand in South Australia ranged from approximately 2,900 MW to approximately 3,400 MW.

Summer 2011–12 did not feature the heat waves of the previous three years and summer maximum demand was 445 MW less than the previous summer. The half-hourly average maximum demand for summer 2011–12 was 2,979 MW during the half-hour of 4:30 to 5:00 PM ACDT on Monday 23 January 2012. In comparison, the highest half-hourly maximum demand recorded to date, 3,424 MW, occurred on 31 January 2011.[4]

Figure 5 also shows summer maximum demand forecasts (10% and 50% POE) for the next ten years, under the medium scenario (Scenario 3, Planning). The maximum demand forecast for summer 2012–13 is 3,271 MW, a reduction of 359 MW (approximately 10%) from the 2011 forecast. The forecast annual growth in maximum demand (10% POE) over the 10-year outlook period is 1.0% per year, or approximately 34 MW per year, which is less than the 1.7% per year forecast given in the 2011 ESOO.

[4] http://www.aemo.com.au/en/Electricity/Forecasting/~/media/Files/Other/forecasting/201112_NEM_demand_review_report%20pdf.ashx.

Figure 5 — Summer maximum demand forecasts (Medium – Scenario 3, Planning)



Main factors contributing to recent demand reduction and changes to forecasts

The forecasts for annual energy and maximum demand have decreased since the forecasts presented in the 2011 ESOO for the following main reasons:

- Slower than expected forecast increase in large industrial electricity demand, including developments in the mining sector and desalination plant.
- Significant penetration of rooftop photovoltaics (PV)[5], which is further explained in the following section.
- Reduced demand in the manufacturing sector in response to the high Australian dollar.
- Moderation in gross state product (GSP) growth projections[6] leading to reduced annual energy forecasts, especially in the short term.
- Commercial and residential consumer response to rising electricity costs, including energy efficiency measures. In 2012–13, electricity prices are expected to continue to increase, and then, on average, are expected to be moderate from 2013–14 until the end of the 10-year outlook period.[7]

[5] http://www.aemo.com.au/en/Electricity/~/media/Files/Other/forecasting/Rooftop_PV_Information_Paper_20_June_2012.ashx.
[6] http://www.aemo.com.au/en/Electricity/~/media/Files/Other/forecasting/Economic_Outlook_Information_%20Paper.ashx.
[7] http://www.aemo.com.au/en/Electricity/Forecasting/~/media/Files/Other/forecasting/201112_NEM_demand_review_report%20pdf.ashx.

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Impact of rooftop photovoltaic systems

AEMO has quantified the impact of rooftop 'behind-the-meter'[8] PV electricity generation on the electricity market.[9]

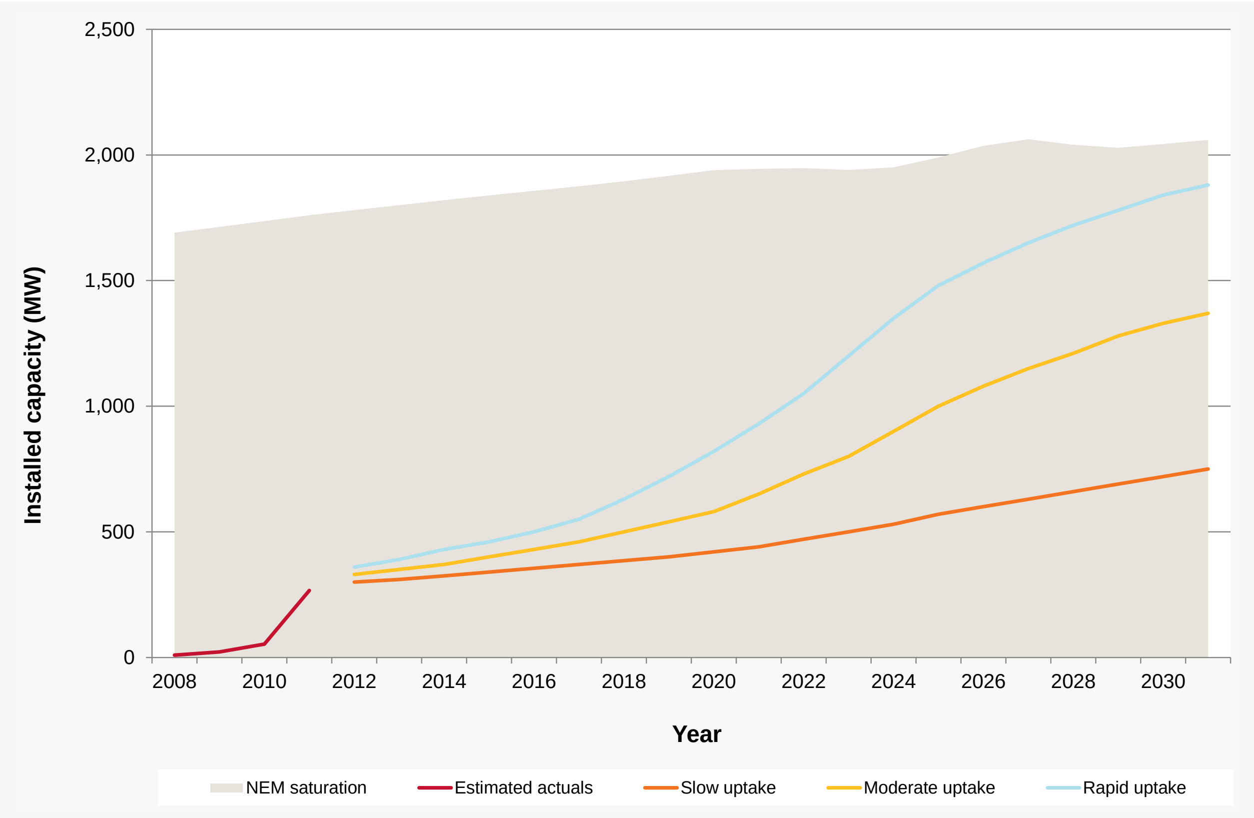
Among the NEM regions, South Australia has the highest penetration of rooftop PV. Approximately one out of five South Australian homes had rooftop PV at the end of February 2012, with a total capacity of 267 MW.[10] Figure 6 provides capacity forecasts for a 20-year outlook period.

In 2011–12, rooftop PV systems are estimated to have generated 306 GWh in South Australia, which is equivalent to 2.4% of South Australia's annual energy.[11]

AEMO estimates that 38% of rooftop PV capacity installed in South Australia can be considered to be producing at times of summer maximum demand.

By 2021–22, rooftop PV-generated electricity is forecast to increase to 900 GWh (under AEMO's moderate uptake scenario). Over the 10-year outlook period, the average annual growth rate of rooftop PV energy is forecast to be approximately 8%.

Figure 6 — Rooftop PV installed capacity forecasts for South Australia



[8] 'Behind-the-meter' rooftop PV generation is not included in NEM power generation totals. Instead it is treated as a 'negative demand'.
[9] http://www.aemo.com.au/en/Electricity/~/media/Files/Other/forecasting/Rooftop_PV_Information_Paper_20_June_2012.ashx.
[10] 114,057 systems installed, of 2.34 KW average size.
[11] http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/~/media/Files/Other/forecasting/NEFR_ch6_SA_forecasts%20pdf.ashx.

3. EXISTING SUPPLY CAPACITY AND RECENT PERFORMANCE

This section describes South Australia's existing supply capacity and the power transfer capability between South Australia and Victoria via the Heywood and Murraylink interconnectors. It also describes the recent performance of these electricity supply facilities.

In early 2012, industry participants provided generation information to an AEMO survey via a web-based online system. Aspects of this information are presented in this and other sections of the SAER, and on the AEMO website.[12,13]

Existing generation

Table 3 aggregates South Australia's existing installed nameplate[14] generation capacity by energy source.[15] The largest share of installed generation capacity is gas-powered generation, at approximately 55%.

Wind generation includes non-scheduled generators, as these make up a large proportion of the electricity generated by wind.

Table 3 also lists the amount of electricity generated in 2011–12 for each energy source. Gas was the largest energy source for electricity generation in 2011–12.

Table 3 — Nameplate generation capacity and electricity generated in 2011–12 by energy source

Energy source	South Australia nameplate installed generation capacity (MW and % of total)[a]	Electricity generated in 2011-12 by energy source (GWh and % of total)
Gas	2,730 / 55%	6,348 / 50%
Wind	1,203 / 24%	3,349 / 26%
Coal	770 / 15%	3,007 / 24%
Diesel	270 / 5%	1 / < 1%
Hydro	3 / < 1%	0 / < 1%
Total	4,975 / 100%	12,706 / 100%

a. http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information

[12] http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information.
[13] http://www.aemo.com.au/en/Electricity/NEM-Data/Generation-Information.
[14] See Glossary for definition of nameplate capacity.
[15] Includes scheduled,semi-scheduled, and non-scheduled generation. See Glossary for definition of these terms.

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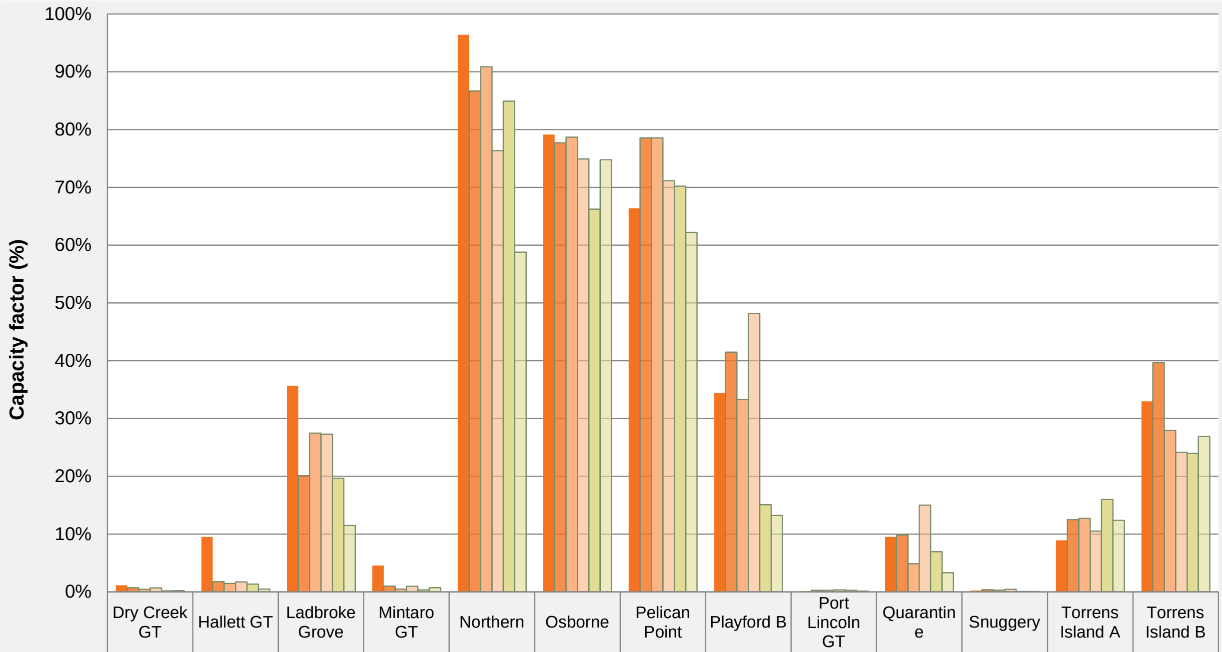
Figure 7 shows the capacity factors for South Australian generation based on each power station's historical registered capacity. Plants that respond to peak demand generally have very low capacity factors as they operate for short periods and are idle most of the year. Plants providing base load power have higher capacity factors, and tend to produce power continuously unless shut down for maintenance. Changes for 2011-12 include the following:

- Lower capacity factors for most scheduled generators reflecting lower demand in the region.
- The capacity factors for Northern and Playford B power stations are much lower than in previous years. Alinta has announced significant changes to Northern and Playford B power station operations.

Figure 7 — Financial year capacity factors for scheduled generators



	Dry Creek GT	Hallett GT	Ladbroke Grove	Mintaro GT	Northern	Osborne	Pelican Point	Playford B	Port Lincoln GT	Quarantine	Snuggery	Torrens Island A	Torrens Island B
2006-07	1.1%	9.5%	35.7%	4.5%	96.4%	79.1%	66.4%	34.4%	0.1%	9.5%	0.2%	8.9%	33.0%
2007-08	0.7%	1.8%	20.1%	1.0%	86.7%	77.7%	78.6%	41.5%	0.2%	9.9%	0.4%	12.5%	39.6%
2008-09	0.4%	1.4%	27.4%	0.5%	90.9%	78.7%	78.6%	33.3%	0.3%	4.9%	0.3%	12.7%	27.9%
2009-10	0.7%	1.7%	27.3%	1.0%	76.4%	74.9%	71.2%	48.2%	0.3%	15.0%	0.4%	10.5%	24.2%
2010-11	0.2%	1.4%	19.6%	0.3%	84.9%	66.2%	70.2%	15.1%	0.3%	6.9%	0.1%	16.0%	24.0%
2011-12	0.2%	0.5%	11.5%	0.7%	58.8%	74.8%	62.2%	13.2%	0.1%	3.3%	0.1%	12.4%	26.9%

Generation commissioned in 2011–12

The 53 MW Hallett 5 (The Bluff) wind farm was commissioned in December 2011 and is included in the totals for capacity and electricity generated shown in Table 3. No other new generation facilities were commissioned in South Australia in 2011-12.

Import and export via the Victoria - South Australia interconnectors

South Australia's generation and transmission networks are connected to the rest of the NEM via the Heywood and Murraylink interconnectors. Electricity may flow along these interconnectors either from South Australia to Victoria or from Victoria to South Australia. Electricity flows from South Australia when that state is producing more electricity than it consumes. Electricity may flow from Victoria to South Australia in particular during periods of high demand in South Australia.

The Heywood interconnector connects South Australia to south-west Victoria. The Heywood 500/275 kV transformers are rated at 370 MVA (continuous) and 525 MVA (short term). These transformers set the limit for the interconnector at 460 MW although other factors can limit the interconnector flow to less than 460 MW.[16]

The Murraylink interconnector connects South Australia to north-west Victoria via the Riverland. It has a nominal rating of 220 MW but the actual limit depends on the direction of flow and local conditions.

Figure 8 shows total interconnector electricity imports and exports since 1999–2000. Energy imported into South Australia from Victoria is plotted above the x-axis and exports are plotted below the x-axis. Historically, South Australia imported electricity from Victoria. However from 2006–07, factors such as more expensive interstate supply, drought conditions, and an increase in wind generation in South Australia led to reduced imports and increased exports.

In 2011–12, electricity imports exceeded the amount exported by more than a factor of three. Total imports represented also approximately 12% of the electricity consumed in South Australia, while net imports accounted for around 8%.

[16] http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Heywood-RITT-Update.

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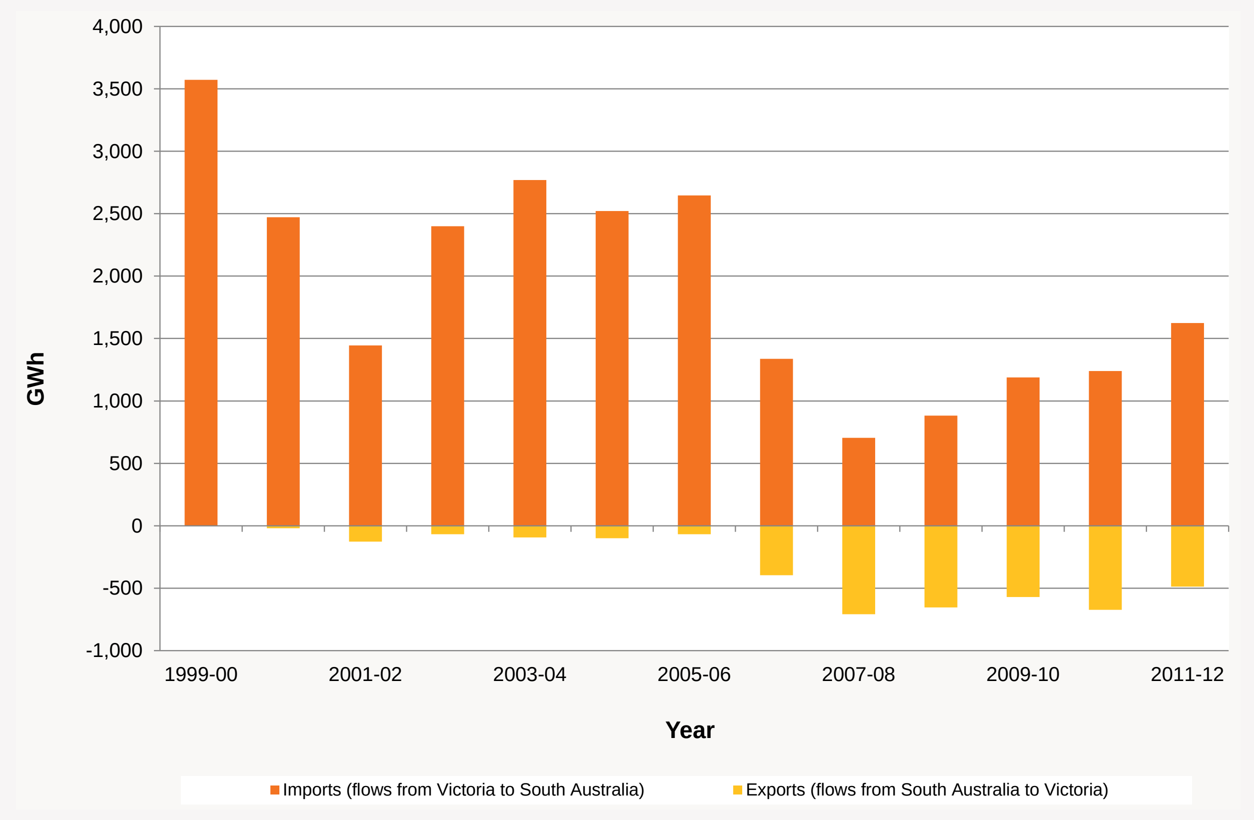
Figure 8 — Victoria - South Australia electricity imports and exports via interconnector



Potential for interconnector capability upgrade

In 2011, ElectraNet and AEMO began a formal Regulatory Investment Test for Transmission (RIT-T) to investigate the technical and economic viability of upgrading the Heywood interconnector.[17]

Increasing the power transfer capability of the Victoria - South Australia interconnectors might have the following benefits:

- Provide additional supply to South Australia during times of maximum demand, which generally occur during summer heat waves.
- Alleviate transmission network congestion and reduce high market-price events.
- Facilitate more efficient generation dispatch in Victoria and South Australia.

The current step of the RIT-T process being conducted jointly by ElectraNet and AEMO is development of the Project Assessment Draft Report (PADR). Publication is planned for August 2012. The PADR will present a range of options and provide an analysis of the market benefits of the options (including non-network options) that might increase interconnector capability from as little as approximately 200 MW up to as much as 2,000 MW.

[17] http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/Heywood-RITT-Update.

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4. SCHEDULED AND SEMI-SCHEDULED GENERATION CAPACITIES AND CHANGES TO SUPPLY

This section describes South Australia's scheduled and semi-scheduled generation capacities, changes to generation that AEMO considers in its planning, and also other more speculative changes that might occur over the 10-year outlook period, including the following:

- Potential new generation developments.
- Other changes to generation capacity.

Scheduled and semi-scheduled generation capacities for 2012–13

Table 4 shows scheduled and semi-scheduled generation capacities[18] for summer 2012–13 and winter 2013. These figures are based on information provided to AEMO by industry participants.[19]

Available capacity tends to be greater in winter than in summer because higher thermal generation efficiencies are possible at cooler ambient temperatures.[20]

Capacity for reliability is used in AEMO's supply-demand modelling, the results of which are presented in Section 5.

Table 4 — South Australian scheduled and semi-scheduled available and capacity for reliability

Energy source (scheduled and semi-scheduled only)	Nameplate capacity (MW)	Summer 2012–13 available capacity (MW)	Summer 2012–13 capacity for reliability (MW)	Winter 2013 available capacity (MW)	Winter 2013 capacity for reliability (MW)
Coal	770	746	546	746	0
Diesel	137	108	108	139	139
Gas	2,716	2,521	2,521	2,683	2,683
Wind (excludes non-scheduled)	815	666	68	815	61
Total	**4,438**	**4,041**	**3,243**	**4,383**	**2,744**

18 See Glossary for definitions of capacities.
19 Additional data for the entire 10-year outlook period is available at http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information.
20 These figures are based on the regional reference for South Australian temperatures: 43 °C for summer and 11 °C for winter.

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Potential new generation developments

Industry participants provided information to AEMO regarding 24 potential electricity generation developments for South Australia. All of these are at the 'publicly announced' stage.[21] AEMO has not been advised of any developments in South Australia with 'committed' status or that are under construction. Table 5 aggregates these potential new developments by energy source.

The total announced capacity of all projects (4,000 to 4,400 MW) is of a similar order of magnitude to South Australia's present installed capacity (approximately 5,000 MW, as described in Section 3). Of the 24 potential new developments, 20 are based on renewable geothermal or wind energy sources.

Table 5 — Potential new developments by energy source

Energy source	Number of publicly announced projects	Capacity of all potential new developments (MW)
Coal	1	570
Gas (open cycle gas turbine)	3	695
Geothermal	2	> 525[a]
Wind	18	2,215 to > 2,607
Total	**24**	**4,005 to > 4,397**

a. Stated capacities total 525 MW. Some projects do not have stated capacities. As a result, the total capacity including these projects exceeds 525 MW.

Investment in new generation in South Australia has slowed over the past couple of years. Reasons, positive and negative, that might influence the pace at which projects advance to 'committed' status and the construction stage include the following:

- Lower electricity demand forecasts, such as presented in Section 2.
- Ease or difficulty of gaining planning approvals.
- Wholesale electricity price projections.
- Economic factors.
- Availability and cost of finance.
- Large-scale generation certificate prices (Renewable Energy Target).
- Carbon price forecasts.

[21] http://www.aemo.com.au/en/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information.

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Other changes to supply

This section describes other changes to supply since the 2011 ESOO and 2011 SASDO were prepared.

Playford B and Northern coal-fired power stations

Playford B and Northern are South Australia's two brown coal-fired power stations, located near Port Augusta.

Alinta Energy has advised that, until further advised, the 240 MW (nameplate capacity) Playford B Power Station will only be available after a recall time of 70 days.

Alinta Energy has advised that the 530 MW (nameplate capacity) Northern Power Station will be fully operational in the summer but only available over the next two winter periods after a recall time of three weeks. From October 2014 Northern Power Station will return to normal operation all year.

Lake Bonney 2 and 3 wind farms

Infigen Energy has reviewed operations at the Lake Bonney 2 and 3 wind farms. This has resulted in the available summer capacity of these wind farms increasing from zero to 146 MW and 36 MW respectively.

Wind contribution to maximum demand

AEMO has revised the fraction of installed wind generation capacity that can be considered firmly available to meet maximum demand. The figure has been raised from 5.0% to 8.3% for the summer period and from 3.5% to 7.5% for winter. The increase is due to more wind farms operating in the state, providing greater geographical diversity, and also improvements to AEMO's wind data analysis methodology, including:

- An improved level of accuracy of the analysis, achieved by shifting the basis of the calculations from 30 minute periods to five minute dispatch intervals.
- Use of wind generation and demand data over only the last three to four years, rather than since first installation, to account for the current levels of diversity (in some regions) and potential changes in operating conditions over the past few years.
- Excluded wind farm output during construction and commissioning.
- Creation of a consistent basis for analysis that reflects the dispatched outputs of plants including the impacts of all constraints.

Contract for closure

For modelling purposes, AEMO has not assumed that any high greenhouse gas-emitting generation closes due to the Australian Government's Clean Energy Future 'contract for closure' negotiations that are underway with industry participants. Generation in South Australia is being considered in this process. An announcement was expected on 30 June 2012 but has been delayed by some months.

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5. SUPPLY-DEMAND OUTLOOK

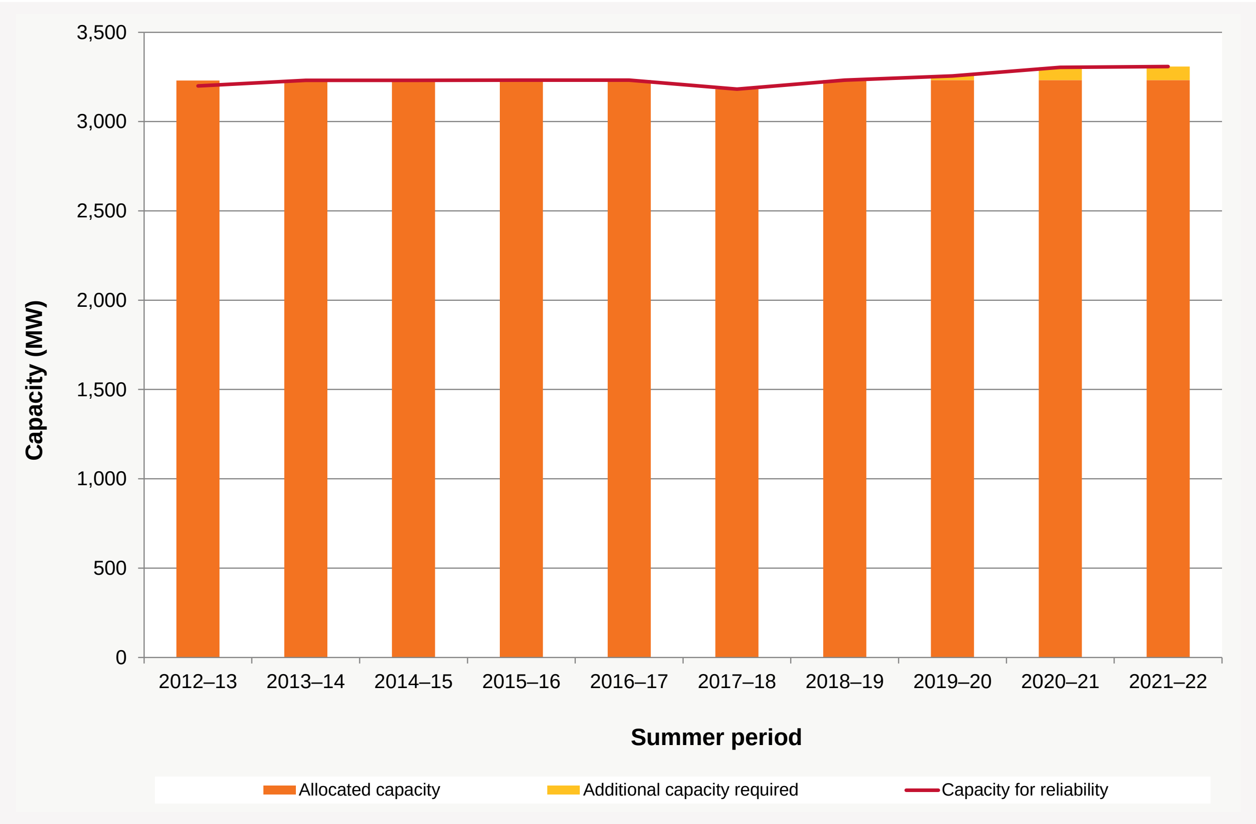
This section of the SAER compares forecast supply capacity with forecast maximum demand plus a minimum reserve level, and identifies when additional electricity supply might be needed under different scenarios. This is known as the Low Reserve Condition (LRC) point.[22] The capacity of generation required to meet the LRC point is known as the capacity for reliability. When there is adequate capacity for reliability, there are sufficient supplies to the region to meet the Reliability Standard.

Summer supply-demand outlook

Since the 2011 ESOO, the forecast for summer maximum demand has been reduced, as has the modelled available generation capacity from the Northern and Playford B power stations.

Figure 9 shows that under the medium scenario South Australia reaches its LRC point in 2019–20, requiring at least 24 MW of new generation or demand-side investment to delay this reserve shortfall until the following year. This LRC point is five years later than the 2011 ESOO estimate. This change is mainly due to a reduction in the maximum demand forecast since 2011.

Figure 9 — South Australian summer supply-demand outlook, medium scenario



[22] See the 2012 Electricity Statement of Opportunities for details about the supply-demand calculation. http://www.aemo.com.au/en/Electricity/Planning/Electricity-Statement-of-Opportunities.

Table 6 shows the LRC points and reserve deficit forecasts under three scenarios.

Under the low economic growth scenario, adequate electricity generation capacity is forecast throughout the 10-year outlook period.

Under the high scenario, the LRC point appears in summer 2015–16; however the reserve deficit is less than one per cent of capacity for reliability at that time. This difference grows to approximately 7% of forecast capacity for reliability by summer 2021–22.

Table 6 — South Australian low reserve condition (LRC) forecast

Summer	Low economic growth scenario	Medium economic growth scenario	High economic growth scenario
	Reserve deficit (MW / % of forecast capacity for reliability, approximate)		
2014-15	-	-	-
2015-16	-	-	3 / <1%
2016-17	-	-	60 / 2%
2017-18	-	-	86 / 3%
2018-19	-	-	135 / 4%
2019-20	-	24 / < 1%	165 / 5%
2020-21	-	72 / 2%	216 / 6%
2021-22	-	76 / 2%	226 / 7%

Winter supply-demand outlook

Under all scenarios, winter maximum demand can be met by the forecast capacity of existing generation.

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MEASURES AND ABBREVIATIONS

Units of measure

Abbreviation	Unit of measure
GW	Gigawatts
GWh	Gigawatt hours
KW	Kilowatts
MW	Megawatts
MWh	Megawatt hours

Abbreviations

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
CO2-e	Carbon dioxide equivalent
ESOO	Electricity Statement of Opportunities
LRC	Low reserve condition
NEFR	National Electricity Forecast Report
NEM	National Electricity Market
POE	Probability of Exceedence
PV	Photovoltaic solar energy generation systems
RIT-T	Regulatory Investment Test for Transmission
SAER	South Australian Electricity Report
SASDO	South Australian Supply and Demand Outlook

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GLOSSARY

Term	Definition
Annual electrical energy	The amount of electrical energy consumed in a year. Sometimes shortened to “annual energy”.
Annual energy	The amount of electrical energy consumed in a year. A shortened form of “annual electrical energy”.
Capacity factor	The output of generating units or systems, averaged over time, expressed as a percentage of rated or maximum output.
Capacity for reliability	The allocated installed capacity required to meet a region’s minimum reserve level (MRL). When met, sufficient supplies are available to the region to meet the Reliability Standard. Capacity for reliability = 10% probability of exceedence (POE) scheduled and semi-scheduled maximum demand + minimum reserve level – committed demand-side participation.
ElectraNet	The principal Transmission Network Service Provider and System Control Centre Operator in South Australia. See http://www.electranet.com.au/corporate/role-and-function
Interconnector	A transmission line or group of transmission lines that connects the transmission networks in adjacent regions.
Low Reserve Condition (LRC)	A date by when AEMO modelling suggests that a region’s electricity supply reserve margin, calculated under 10% probability of exceedence (POE) conditions, is below the minimum reserve level.
Maximum demand	The highest amount of electrical power delivered, or forecast to be delivered. Also known as “peak” demand. This may be defined over a certain time period (day, week, month, season or year), either at a connection point, or simultaneously at a defined set of connection points.
Minimum Reserve Level (MRL)	The reserve margin (calculated under 10% probability of exceedence (POE) scheduled maximum demand conditions) required in a region to meet the Reliability Standard.[23] This is used in calculating the Low Reserve Condition (LRC).
Nameplate capacity	The maximum continuous output or consumption in MW of an item of equipment as specified by the manufacturer, or as subsequently modified.
National Electricity Market (NEM)	The wholesale market for electricity supply in the Australian Capital Territory and the States of Queensland, New South Wales, Victoria, Tasmania and South Australia.
Non-scheduled generation	Refers to generating systems with an aggregate nameplate capacity of less than 30 MW. Generating systems greater than 30 MW may be classified as non-scheduled if AEMO is satisfied that: • the primary purpose of the generating unit is for local use and the aggregate sent-out generation rarely exceeds 30 MW, or • the physical and technical attributes are such that it is not practicable for the generating unit to participate in central dispatch. A generating unit that has a nameplate rating of more than 5 MW but less than 30 MW may seek a registration exemption from AEMO if it exports less than 20 GWh into the grid in a year or extenuating circumstances apply.
Probability of Exceedence (POE)	The probability that a forecast electricity maximum demand figure will be exceeded. For example, a forecast 10% POE maximum demand figure will, on average, be exceeded only during one year in a 10-year period.

[23] See the Electricity Statement of Opportunities. http://www.aemo.com.au/en/Electricity/Planning/Electricity-Statement-of-Opportunities

Term	Definition
Scheduled generation	Refers to any generating system with an aggregate nameplate capacity of 30 MW or more, unless it is classified as semi-scheduled, or the Australian Energy Market Operator (AEMO) is permitted to classify it as non-scheduled.
Semi-scheduled generator	Refers to any generating system with intermittent output (such as wind or run-of-river hydro) with an aggregate nameplate capacity of 30 MW or more. A semi-scheduled classification gives AEMO the power to limit generation output that may exceed network capabilities, but reduces the participating generator's requirement to provide dispatch information.
Transmission Network Service Provider (TNSP)	A person (usually an organisation) who engages in the activity of owning, controlling or operating a transmission system.

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