2013

SOUTH AUSTRALIAN ELECTRICITY REPORT

Published by

AEMO
Australian Energy Market Operator
ABN 94 072 010 327

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Revision History

Number	Date	Notes
1	27 August 2013	First issue

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EXECUTIVE SUMMARY

Continued rooftop PV installations, energy efficiency savings from new building standards, and consumer response to recent rises in electricity prices have offset growth in energy consumption in South Australia for 2012–13. Expected growth over the 10-year outlook period (2013–14 to 2022–23) is lower than forecast in 2012.

The forecast reduction in demand, coupled with increases in available generation capacity results in there being adequate generation to meet demand.

Annual energy

In 2012–13, South Australia's annual energy consumption was 13,330 gigawatt hours (GWh), materially unchanged (down 0.3% or 42 GWh) compared to 2011–12, and 2.3% (299 GWh) higher than forecast in 2012.

Under a medium (most likely) economic growth scenario, consumption is forecast to decrease by 0.1% per year over the 10-year outlook period. This reflects a slower rate of long-term growth than the 0.7% per year forecast in the 2012 South Australian Electricity Report (SAER).

Primary differences between the 2012 and 2013 forecasts include the deferral of the Olympic Dam mine expansion project, higher rooftop PV forecasts, and additional efficiencies achieved through building regulations.

Maximum demand

For summer 2012–13, South Australia's maximum demand (MD) was 3,158 megawatts (MW). This is an increase of 179 MW from 2011–12, but is 266 MW lower than the record MD of 3,424 MW in 2010–11. It is also 113 MW below the 2012 10% probability of exceedence (POE)[1] forecast of 3,271 MW under the medium economic growth scenario.

Average growth in MD is forecast to be relatively flat (0.0% per annum), lower than the 0.8% average growth per annum forecast in the 2012 SAER.

Forecast drivers

Key drivers of the 2013 annual energy and MD forecasts over the 10-year outlook period are:

- Increased rooftop PV installations. South Australia has the highest penetration of domestic rooftop PV of all National Electricity Market (NEM) regions as a percentage of annual energy. Increased rooftop PV installations result in less electricity being required from the grid.
- Consumer response to recent electricity price rises.
- Increased energy efficiency measures (including increased energy efficiency from changes in building standards and regulations).

Differences between current annual energy and MD forecasts and those presented in the 2012 SAER include:

- Lower-than-expected demand in the large industrial sector (due to the deferral of the Olympic Dam mine expansion project).
- Increased rooftop PV installations and contribution to MD.

[1] POE for MD: the probability, as a percentage, that a MD demand forecast will be met or exceeded (for example due to weather conditions) in a particular period of time. A 10% POE MD projection is expected to be exceeded, on average, one year in 10.

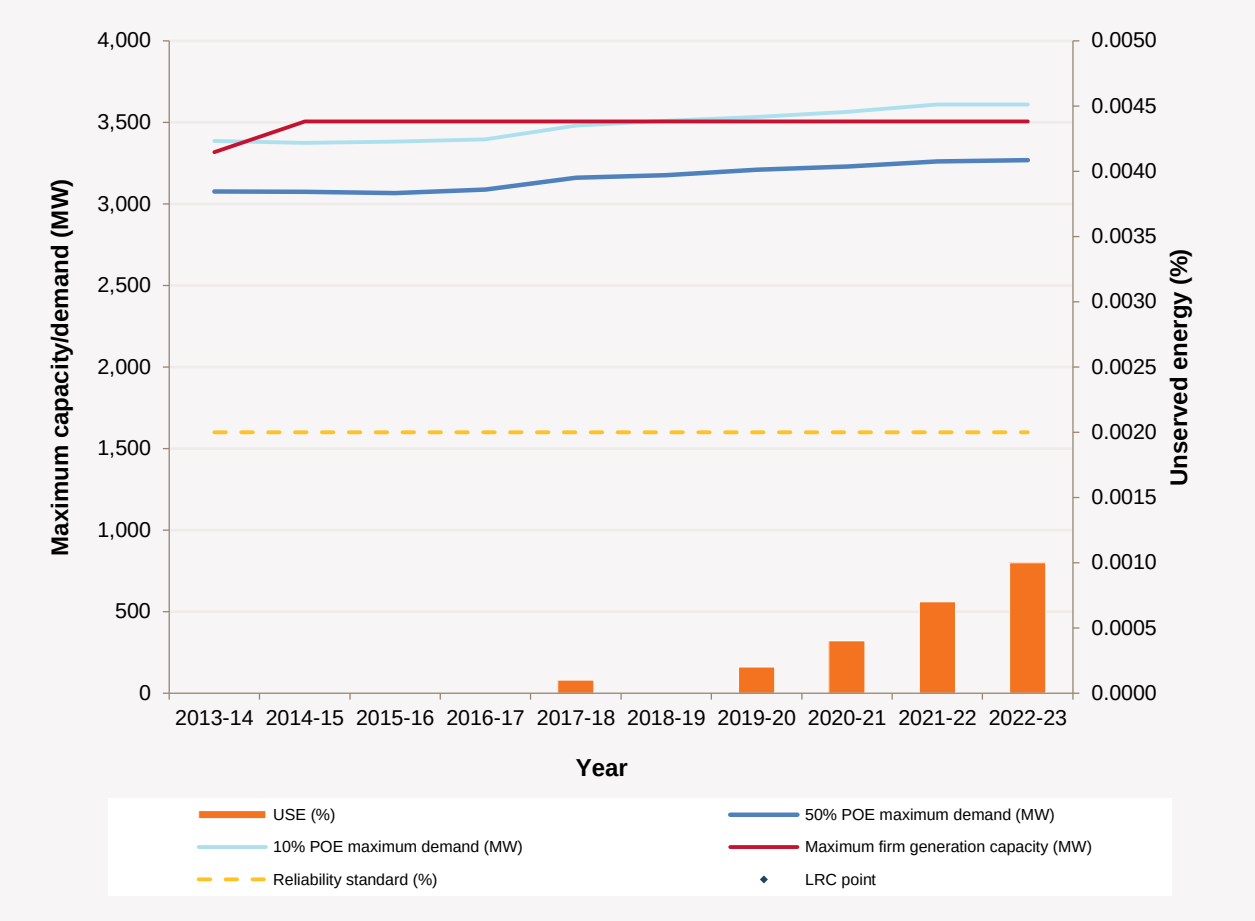
- Moderated state final demand growth projections leading to reduced annual energy forecasts, particularly in the short term.
- Increased impact of energy efficiency offsets as a result of the inclusion of building standards and regulations.

Supply adequacy

There is adequate electricity generation to meet demand, with no low reserve conditions (LRC) expected over the 10-year outlook period, taking into account the forecast reduction in energy consumption in South Australia. Figure 1[2] shows that levels of expected unserved energy (USE) are below the Australian Energy Market Commission's reliability standard of 0.002%.

The resulting deferred need for additional investment to ensure system reliability continues the trend evident in the 2012 SAER.

Figure 1 — South Australian supply adequacy (medium economic growth scenario)



[2] A guide to interpreting this chart is available in the Electricity Statement of Opportunities Methodology Report. Available: http://www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities. Viewed: 14 August 2013.

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Generation capacity developments

The key generation capacity development since the 2012 SAER is the Snowtown Stage 2 Wind Farm project (270 MW), committed in September 2012. This project will consist of two separately metered wind farms—Snowtown 2 North (144 MW) and Snowtown 2 South (126 MW).

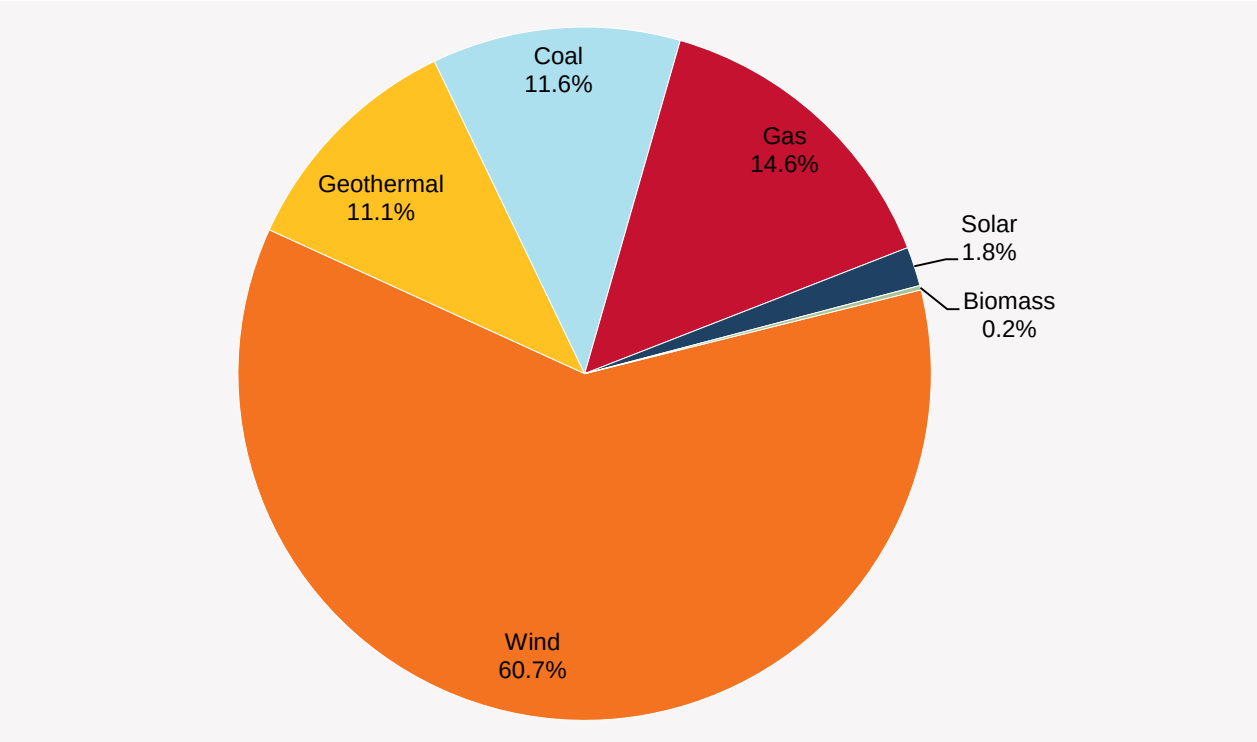
The proportion of South Australian installed wind generation considered to be firmly available to meet MD has been revised based on updated historical information, and has increased from 8.3% to 8.6% (summer) and from 7.5% to 7.9% (winter). South Australia is also able to rely on generation in Victoria to meet demand at times of reduced output from local wind resources.

Investment trends

As at 28 June 2013, 29 projects with over 4,900 MW of potential and committed new electricity generation capacity have been publicly announced in South Australia. Seventeen of the 29 projects are fuelled by wind, with capacity from these projects totalling 2,987 MW.

Most of these projects are in early development; only the Snowtown 2 Wind Farm project is committed.

Figure 2 — South Australian publicly announced and committed generation projects for the next 10 years (as at 28 June 2013).



About the SAER

The SAER is part of the suite of reports provided to the South Australian Government under the Australian Energy Market Operator's (AEMO) South Australian Advisory Function. The findings presented in the SAER are primarily based on other published AEMO sources released within the past 12 months, including AEMO's 2013 National Electricity Forecasting Report (NEFR) and 2013 Electricity Statement of Opportunities (ESOO) publications.

AEMO is currently investigating the potential network and operational impacts resulting from the projected increase in wind generation to 2020. The results of this study will be relevant to South Australia given its relatively high proportion of wind generation.

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DISCLAIMER D1

MEASURES AND ABBREVIATIONS M1

Units of Measure M1

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GLOSSARY G1

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CHAPTER 1 - BACKGROUND

1.2 AEMO's South Australian advisory functions

The 2013 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 (SAAF).

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 1-1 on the following page provides links to these publications.

The SAER is an annual publication, which was first released in 2012. The SAER and other SAAF publications replace the South Australian Supply and Demand Outlook (SASDO) that AEMO published in 2010 and 2011.

In addition to the publications listed in Table 1-1, in 2014–15 AEMO will also publish transmission connection point electricity forecasts for South Australia.

Table 1-1 — Links to AEMO 2013 publications relating to South Australian advisory functions

AEMO publications	Publication date	AEMO website address
Documents specific to South Australia		
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 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/Demand-Forecasts
Generation Information	June 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information
Maps	June 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/SA-Maps
Historical Market Information Report	July 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Historical-Market-Information
2013 SAER	August 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Electricity-Report
Review of ElectraNet Annual Planning Report	September 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions
Investment Trends Report	September 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Historical-Market-Information
Wind Study	October 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/Wind-Study-Report
Heywood Interconnector Upgrade Update	December 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions
Fuel Supply and Technology Report	December 2013	http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions
National documents		
Economic Outlook	June 2013	http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013
Forecast Accuracy Report	June 2013	http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013
National Electricity Market (NEM) Demand Review	June 2013	http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013
2013 National Electricity Forecasting Report (NEFR)	June 2013	http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013
Wind Integration Studies	June and September 2013	http://aemo.com.au/Electricity/Planning/Related-Information/2013-Wind-Integration-Studies
2013 NEFR Methodology Information Paper	July 2013	http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013
2013 Electricity Statement of Opportunities (ESOO)	August 2013	http://www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities
ESOO Methodology Document	August 2013	http://www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities
2013 National Transmission Network Development Plan (NTNDP)	December 2013	http://www.aemo.com.au/Electricity/Planning/National-Transmission-Network-Development-Plan

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1.3 SAER content and structure

The SAER comprises the following sections:

- **Actual and forecast annual energy and maximum demand (MD):** This section provides annual energy and MD forecasts for the 10-year outlook period (2013–14 to 2022–23) for three economic growth scenarios (see Section 1.3). It includes comparisons with recent actual annual energy and MD. It also summarises the impact of "behind-the-meter" rooftop photovoltaic (PV) generators.
- **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 also describes conditions that AEMO models for the supply-demand outlook.
- **Supply adequacy assessment:** This section compares forecast MD with forecast supply capacity and identifies when additional supply might be needed under different scenarios.

In addition to the SAER, in 2013 AEMO published the SAER data file, which provides access to the data underpinning the tables and figures presented in the SAER as well as additional comparative data.

1.4 2013 SAER scenario mapping

The 2013 SAER models three economic growth scenarios, consistent with the 2013 NEFR and ESOO. These scenarios are detailed in Table 1-2.

Table 1-2 — 2013 SAER scenario reference table

2013 Reference[3]	2012 AEMO scenario name[4]	Economic growth	Large industrial growth	Carbon emission target	Small non-scheduled generation	Rooftop PV & energy efficiency	Demand-side participation
High	Fast World Recovery	High	High	5%	High uptake	Moderate uptake	Moderate uptake
Medium	Planning	Medium	Medium	5%	Moderate uptake	Moderate uptake	Moderate uptake
Low	Slow Growth	Low	Low	5%	Slow uptake	Moderate uptake	Moderate uptake

[3] See the 2013 NEFR Table 1-1 for details of the correlation between the National electricity forecasting scenarios and the related component forecasts. Available: http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013. Viewed: 9 July 2013.
[4] See the 2012 Scenario Descriptions document for further information. Available: http://www.aemo.com.au/Electricity/Planning/Related-Information/2013-Planning-Assumptions. Viewed: 9 July 2013.

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CHAPTER 2 - ACTUAL AND FORECAST ANNUAL ENERGY AND MAXIMUM DEMAND

On 28 June 2013 the Australian Energy Market Operator (AEMO) published the National Electricity Forecast Report (NEFR)[5], which includes annual energy and maximum demand (MD) forecasts for each region of the National Electricity Market (NEM) including South Australia.[6]

This section of the South Australian Electricity Report (SAER) summarises key points from the NEFR regarding actual and forecast annual energy (measured in gigawatt hours (GWh)) and MD (measured in megawatts (MW)) in South Australia. It lists the main factors contributing to recent reductions in annual energy and MD and changes to forecasts. It also describes the impact of rooftop photovoltaic (PV) systems and compares the 2013 projections to those presented in the 2012 SAER.

Due to the SAER release being after the NEFR and the completion of the 2012–13 year, the SAER presents actual annual energy for the 2012–13 year; the NEFR presents an estimate of annual energy for the same period (six months of actuals and six months of forecasts).

2.1 Electricity forecasting

The SAER presents native sent-out demand forecasts, which include all large industrial consumption, residential and commercial consumption[7], and transmission loss forecasts. This is measured at the generator connection point, and excludes generator auxiliary loads.

- Large industrial load forecasts are based on information received from direct contact with each customer.
- Residential and commercial consumption forecasts are based on total energy (excluding large industrial loads) less forecasts of rooftop PV output and energy efficiency savings.

Please refer to the 2013 NEFR Forecasting Methodology document for more information.[8]

2.2 Annual energy

In 2012–13, South Australia's annual energy was 13,330 GWh, materially unchanged (0.3% (42 GWh) lower) compared to 2011–12 consumption (13,372 GWh).

Figure 2-1 illustrates the recent historical trend of declining annual energy in South Australia. Over the 2008–09 to 2012–13 period, annual energy reduced by 356 GWh – an average annual decline of 0.7%. This decline was driven by a fall in residential and commercial annual energy, resulting from:

- Increased rooftop PV output from negligible levels to 497 GWh in 2012–13. This was driven by short payback periods due to reducing rooftop PV system costs coupled with incentives from feed-in tariffs and rebates.
- Increases in electricity prices – largely driven by transmission and distribution network price increases.

These factors outweighed industrial annual energy increases from Olympic Dam and other sites over the 2008–09 to 2012–13 period.

[5] Available: http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013. Viewed: 23 July 2013.
[6] Available: http://www.aemo.com.au/Electricity/Planning/Forecasting/~/media/Files/Other/planning/NEFR/2013/NEFR_SA_2013_PDF.pdf.ashx. Viewed: 23 July 2013.
[7] Residential and commercial forecasts include light industrial loads.
[8] Available: http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013. Viewed: 14 August 2013.

Figure 2-1 also shows that under the medium economic growth scenario, South Australia's annual energy is forecast to decrease by 0.1% per year over the 10-year outlook period (2013–14 to 2022–23). This decline is strongly linked to:

- Low population and economic growth relative to other NEM regions.
- Increased rooftop PV installations and energy efficiency savings.

These drivers also result in reduced residential and commercial consumption per capita.

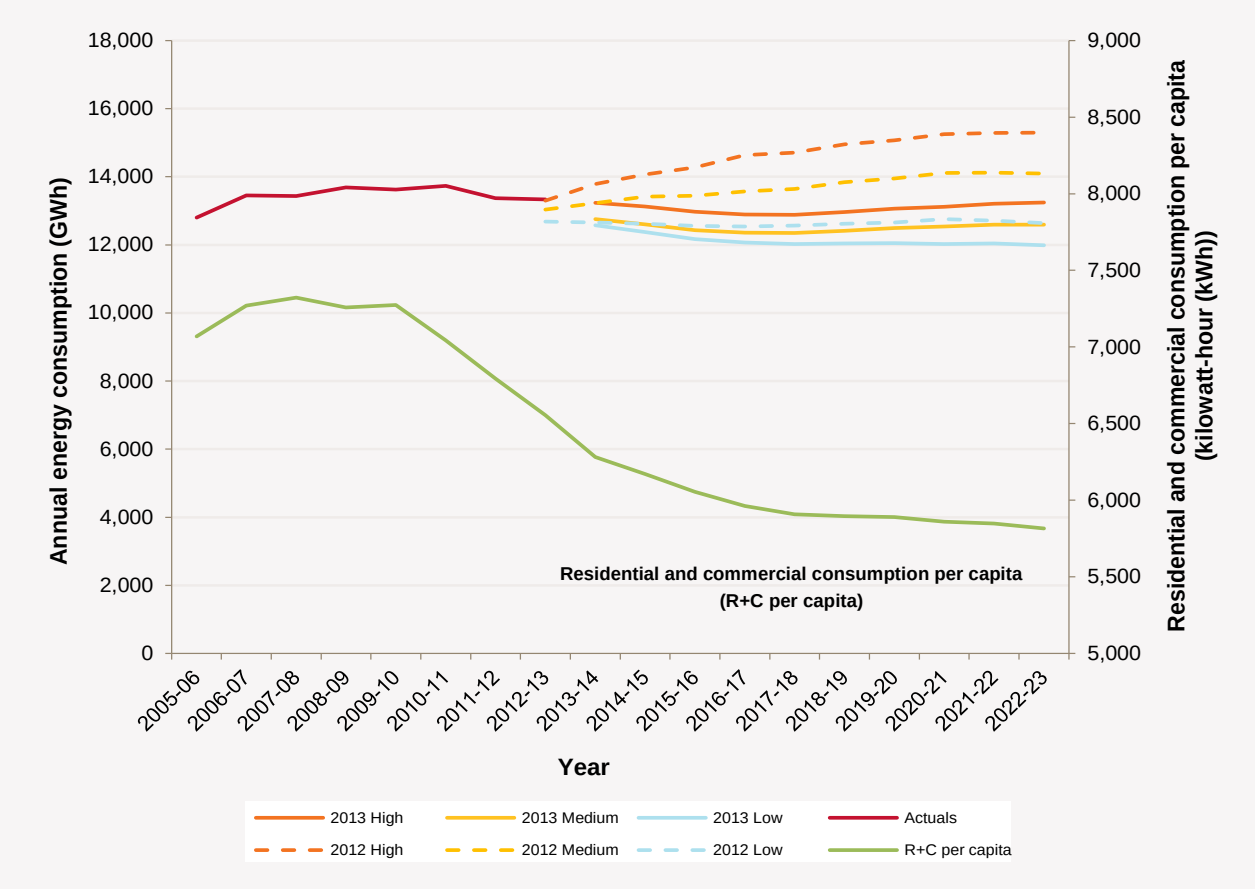
South Australia's declining annual energy trajectory to around 2017–18 is driven primarily by higher electricity prices throughout the first half of the outlook period and an overall population decrease from the 2012 forecast. After 2017–18, annual energy flattens and grows slightly due to more stable electricity price growth after 2019–20 and population growth.

Comparison with 2012 forecasts shows that:

- In 2012–13, South Australia's annual energy was 13,330 GWh; 2.3% (299 GWh) higher than the 2012 medium economic growth scenario forecast.
- Under the medium economic growth scenario, forecast annual energy for 2013–14 is expected to be 12,753 GWh, 3.6% lower than the 2012 forecast.
- Over the 10-year outlook period, average annual growth under the medium economic growth scenario is forecast to be -0.1%, lower than the 0.7% forecast in 2012.

Primary drivers of differences between the 2012 and 2013 forecasts are described in Sections 2.2.1 and 2.2.2.

Figure 2-1 — South Australian annual energy forecasts



Note: The 2012–13 residential and commercial per capita data point is an estimate (population data was not available at the time of publication).

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2.2.1 Large industrial sector

In 2012–13, South Australia's large industrial annual energy was 1,903 GWh, or 14% of total annual energy. This was 2.0% (36 GWh) higher than in 2011–12 (1,867 GWh).

Figure 2-2 shows that large industrial annual energy increased by 181 GWh (an average annual growth rate of 2.5%) from 2008–09 to 2012–13. This growth indicates that despite the global financial crisis, investor confidence remained strong in South Australia over this period.

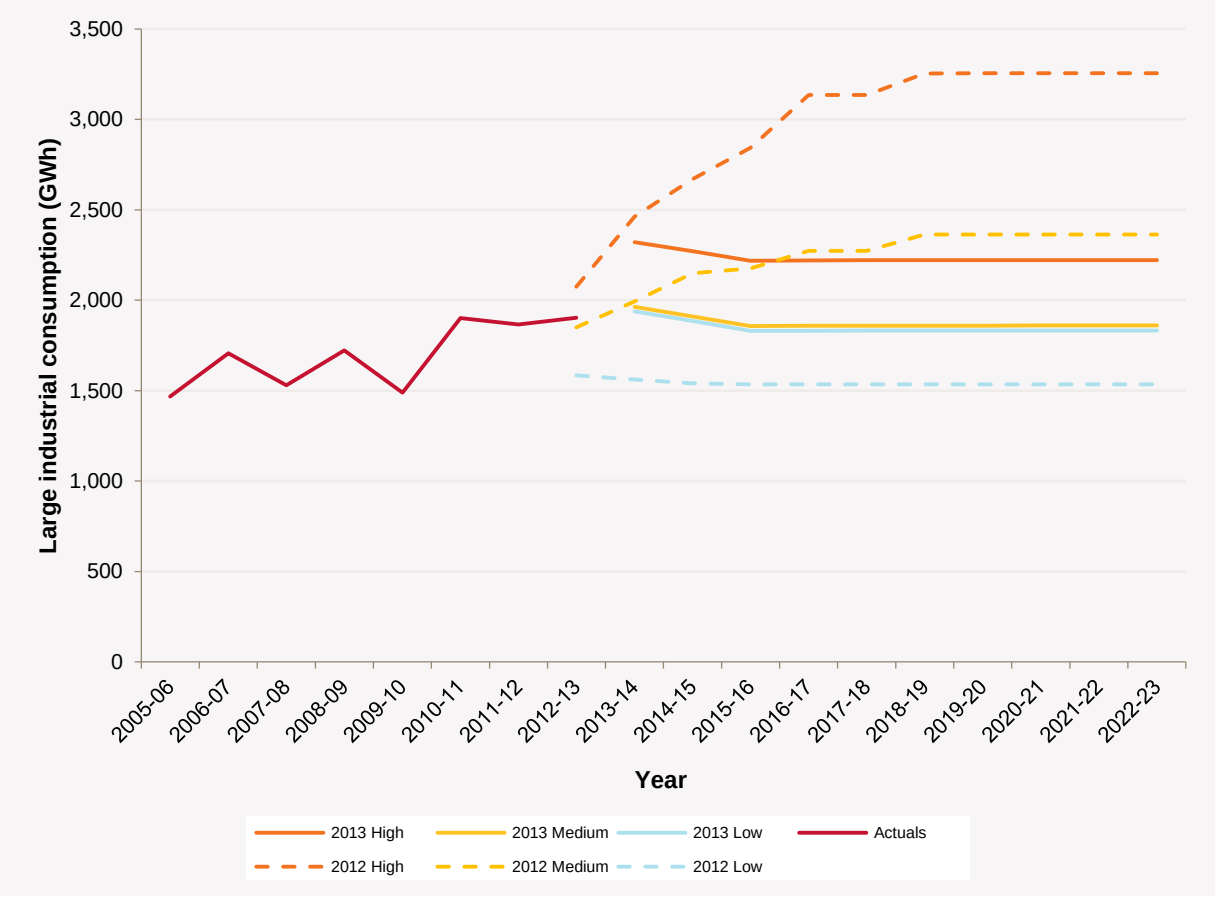
Figure 2-2 also shows that over the 10-year outlook period, large industrial annual energy is forecast to be relatively stable, decreasing slightly by 104 GWh as a result of:

- Deferral of the Olympic Dam mine expansion project.
- No new projects expected to come online.

According to the large industrial customers, economic conditions under a low economic growth scenario are not expected to affect the expected load. The result of this is consistent business-as-usual operations under both the medium and the low economic growth scenarios (see Figure 2-2).

Several large industrial projects on the Eyre Peninsula are currently undergoing feasibility studies; as these have not been confirmed, they are not included in AEMO's 2013 assumptions.

Figure 2-2 — South Australian large industrial annual energy forecasts



Comparison with large industrial sector forecasts in 2012 shows that:

- At 1,903 GWh, 2012–13 actual large industrial annual energy was 52 GWh (2.8%) above the 2012 medium economic growth scenario forecast of 1,851 GWh. The difference is primarily a result of higher-than-expected output from the Adelaide Desalination Plant at Port Stanvac during the testing phase.
- Over the 10-year outlook period, large industrial sector annual energy (under the medium economic growth scenario) is forecast to decline by 0.6% per annum, down from the 1.9% growth forecast in 2012. This is driven by the Olympic Dam mine expansion deferral and lower economic growth forecasts.

The 2013 large industrial loads forecasts were based on information received directly from customers. In 2012 they were based on economic modelling of the sector.[9]

2.2.2 Residential and commercial sector (including light industrial)

In 2012–13, South Australia's residential and commercial sector annual energy was 11,115 GWh, or 83% of total annual energy. This was 0.7% (80 GWh) lower than in 2011–12 (11,195 GWh).

Figure 2-3 shows that over the 2008–09 to 2012–13 period, residential and commercial annual energy decreased by 553 GWh, an average annual rate of -1.2%. This decline was driven by:

- Average annual residential electricity price increases of 10.1% over the 2008–09 to 2012–13 period. This was due to increased network costs and to a lesser extent the introduction of "green energy policies" (such as renewable energy targets and a price on carbon emissions).
- Increased rooftop PV output from negligible levels in 2008–09 to 497 GWh in 2012–13.

The resulting downward pressure on annual energy offset potential growth from population and state income increases (which grew at annual averages of 0.8% and 1.8% respectively over the period).

Figure 2-3 also shows that over the 10-year outlook period, residential and commercial annual energy is forecast to decline at an average annual rate of 0.1%, highlighting that annual energy is not expected to return to the record highs seen in 2009–10 over this period.

[9] Further information on the 2013 methodology is available here: http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013. Viewed: 14 August 2013.

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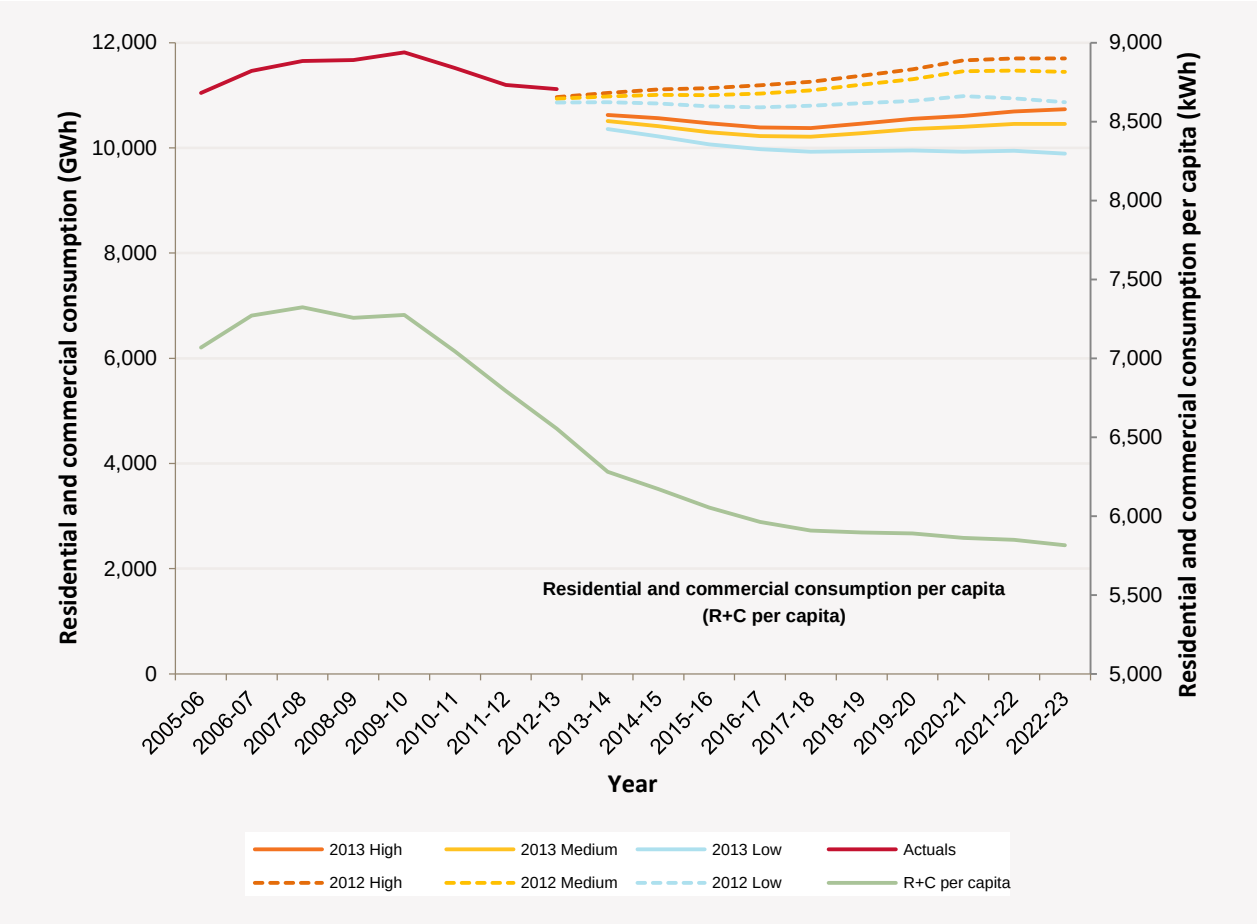
Figure 2-3 — South Australian residential and commercial annual energy forecasts



Note: The 2012–13 residential and commercial per capita data point is an estimate (population data not available at the time of publication).

Comparison with the 2012 residential and commercial annual energy forecasts shows that:

- At 11,115 GWh, 2012–13 actual residential and commercial annual energy was 181 GWh (1.7%) higher than the 2012 medium economic growth scenario forecast of 10,934 GWh.
- Over the 10-year outlook period, annual energy (under the medium economic growth scenario) is forecast to decline at an average annual rate of 0.1%, lower than the 0.5% growth forecast in 2012. The difference between the 2013 and 2012 forecasts is driven by:
    - Increased rooftop PV forecasts (additional 112 GWh by 2022–23) driven by continued energy price increases, and deceasing solar panel costs.
    - Increased energy efficiency impacts (additional 302 GWh by 2022–23) driven by including additional measures in the forecasts, such as efficiencies from new building standards and large cooling loads. Refer to the 2013 NEFR Forecasting Methodology document for more information about energy efficiency.[10]

[10] AEMO. Available at: http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013. Viewed August 2013.

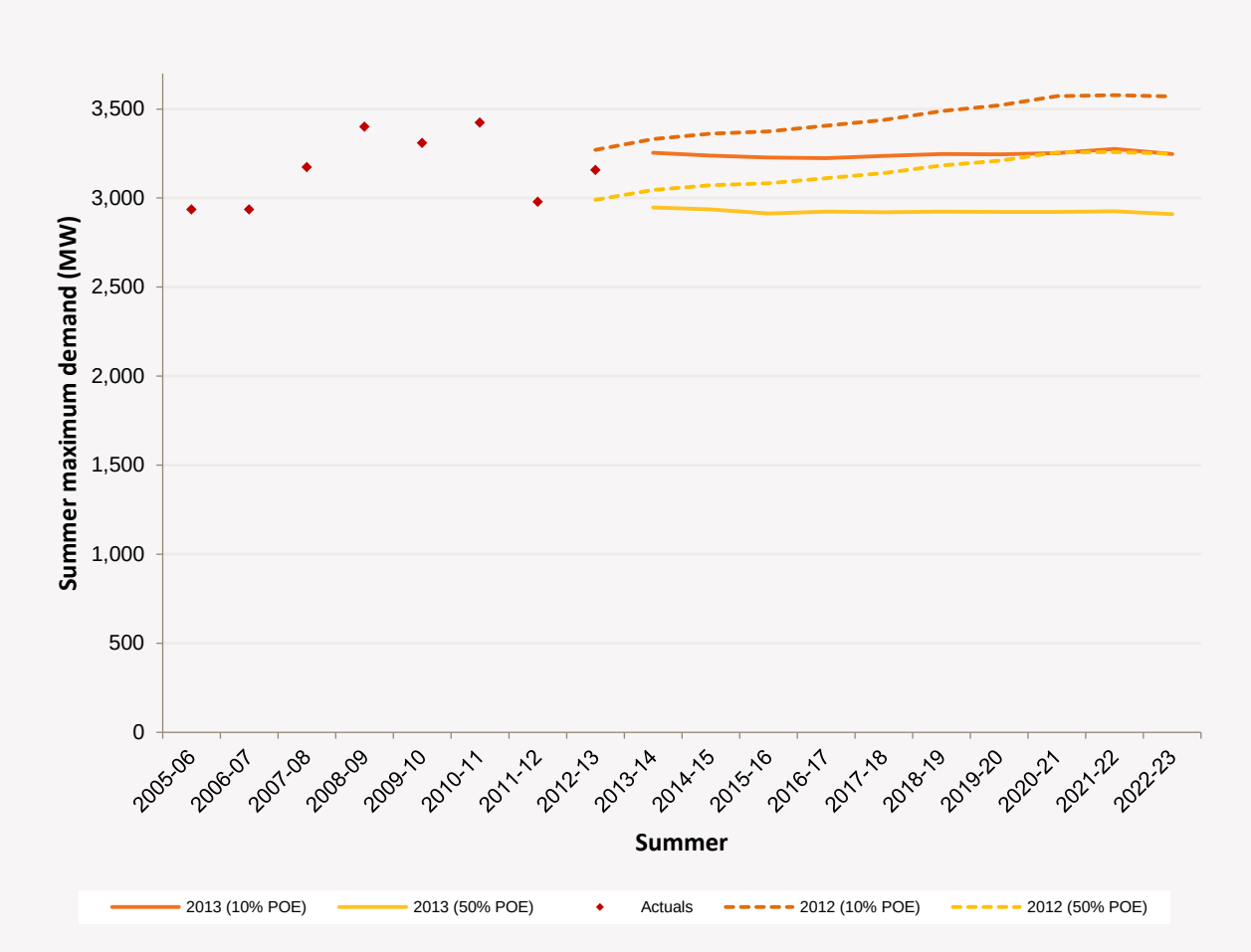
2.3 Maximum demand

South Australian MD occurs during periods of hot weather over summer. AEMO has observed that MD can be more than twice average demand in South Australia; in other NEM regions, MD might be only 50% higher than average demand.

Figure 2-4 shows that historically (2005–06 to 2012–13) MD in South Australia has ranged from approximately 2,900 MW to 3,400 MW. In summer 2012–13, it was 3,158 MW; an increase of 179 MW from 2011–12, but 266 MW lower than the record MD of 3,424 MW in 2010–11.

Forecast 10% and 50% probability of exceedence (POE) MD is expected to remain relatively flat over the 10-year outlook period.

Figure 2-4 — South Australian summer MD forecasts (medium economic growth scenario, 10% and 50% POE)



Comparison with the 2012 MD forecasts shows that:

- 2012–13 actual summer MD was 113 MW (3.5%) below the 2012 10% POE forecast.
- 2013 forecast 10% POE summer MD for 2013–14 is 78 MW lower than the 2012 forecast. This is due to the Olympic Dam mine expansion deferral, increased energy efficiency offsets, and increased rooftop PV installation offsets.
- Over the 10-year outlook period, in 10% POE summer MD is forecast to be relatively flat (0.0% per annum), down from average annual growth of 0.8% forecast in 2012. This is primarily due to:

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- Lower population growth projections in the 2013–14 forecast compared to 2012.
- Increased energy efficiency offsets.
- Decreased large industrial forecasts due to revised projections resulting from direct consultation with large industrial customers and the Olympic Dam mine expansion deferral.
- Higher rooftop PV forecasts (see Section 2.4 for further information on rooftop PV contribution to MD).

2.4 Impact of rooftop PV systems

Rooftop PV in South Australia has grown strongly since 2009, and rooftop PV penetration is higher compared with other NEM regions. This is primarily due to government incentives in the form of rebates and feed-in tariffs, the Small-scale Technology Certificate (STC) multiplier, falling system costs and rising electricity prices. These factors helped reduce payback periods, making rooftop PV an attractive option for households, particularly from 2010 to 2012.

Growth has slowed in recent years, partially due to reduced feed-in tariff rates. Moderate growth is expected to continue over the outlook period due to continued increases in energy prices and decreasing costs of imported solar panels which will allow payback periods to remain the same (5 to 7 years) despite a reduction in the feed-in tariff.

South Australia rooftop PV also has a relatively high average contribution factor for energy generation as a percentage of installed capacity. Based on historical analysis, AEMO estimates that at times of maximum summer demand, rooftop PV may contribute 40% of the total installed capacity, which, for example, compares to 33% in New South Wales and 34% in Queensland.

The forecasts for rooftop PV in South Australia are shown in Figure 2-5. Forecasts are shown for slow, moderate and rapid rooftop PV uptake scenarios. The graph also shows that within the 10-year outlook period, forecast installations are well below the estimated saturation levels (maximum rooftop PV capacity).

Figure 2-5 — Rooftop PV installed capacity forecasts for South Australia

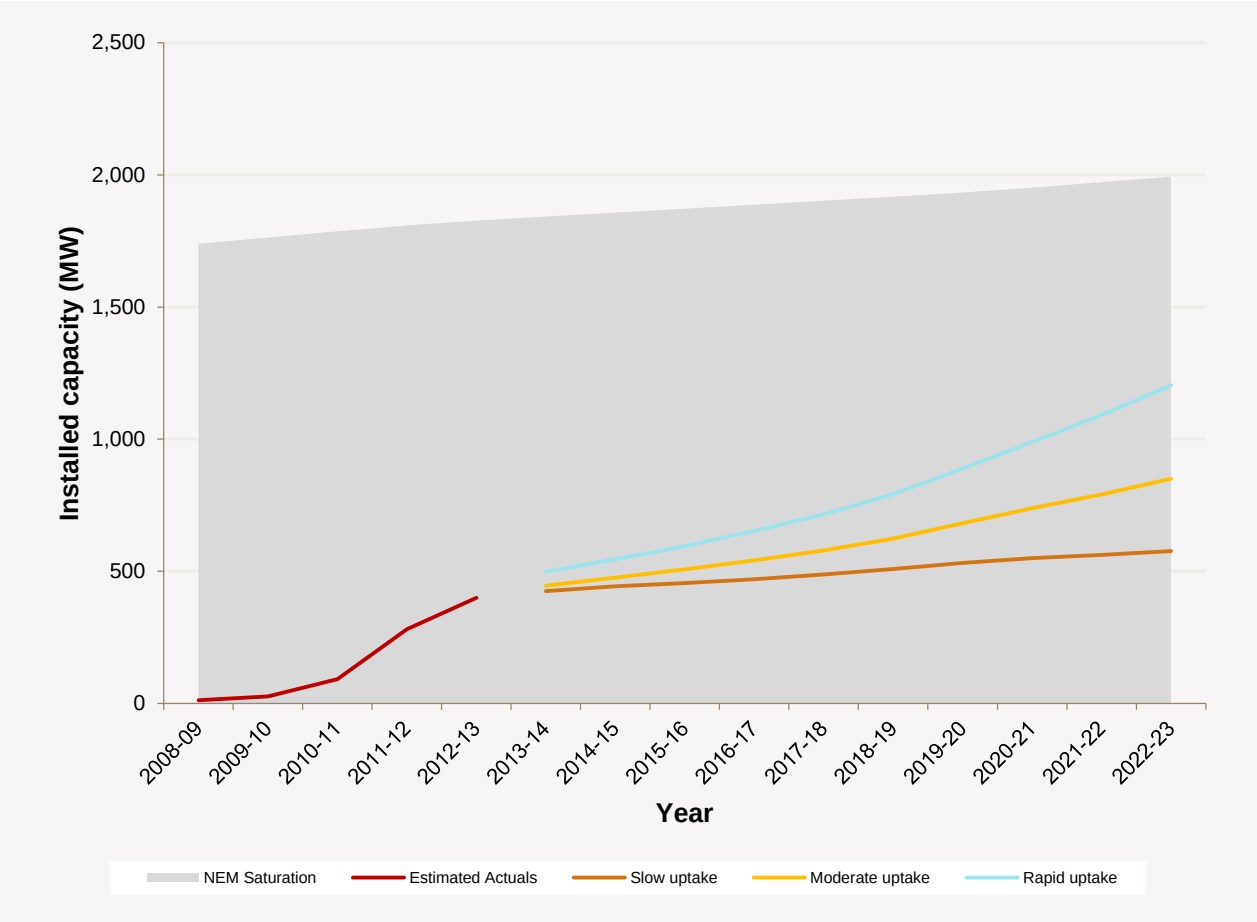

Figure 2-6 shows annual energy forecasts for rooftop PV. The medium, high, and low regional annual energy forecasts assume a moderate uptake of rooftop PV growth.

- Rooftop PV systems generated a total of 497 GWh in 2012–13, approximately 3.7% of South Australia's annual energy.
- Under the moderate uptake scenario, annual energy generated by rooftop PV is expected to reach 1,119 GWh by 2022–23, equivalent to 8.9% of South Australia's annual energy. This is an average annual growth of approximately 7.5% over the 10-year period.
- Current rooftop PV forecasts are higher than 2012 forecasts, driven by:
    - Higher-than-expected rooftop PV generation in 2012–13; 49 GWh or 10.9% above the 2012 forecasts. This is most likely driven by a rush to install rooftop PV prior to the scheduled feed-in tariff reduction after 30 September 2013 as well as continued increases in energy prices and decreasing imported solar panel costs.
    - A higher STC price of $30, compared with $25 in 2012, which means a higher rebate for new systems.

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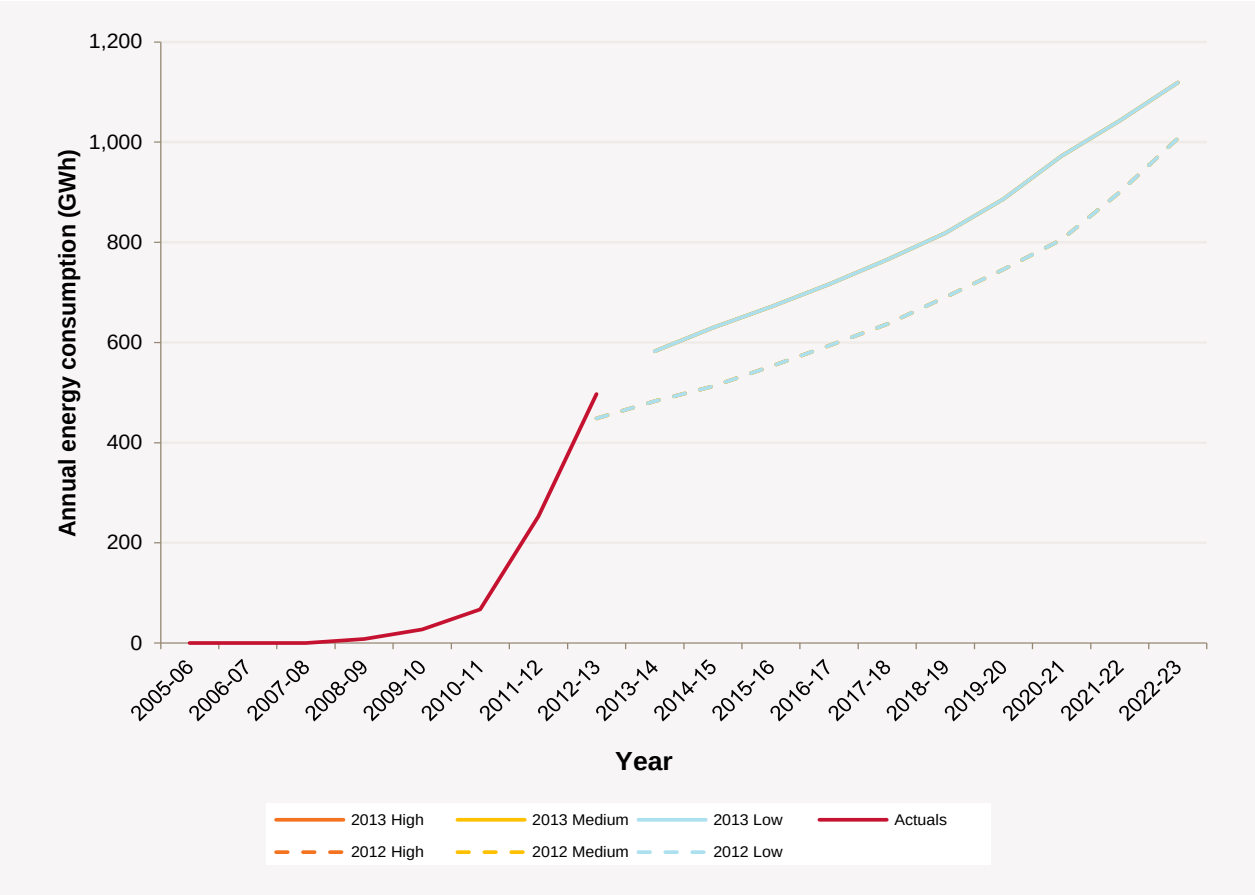
- Improved rooftop PV forecasting methodology used in 2013. Several improvements were made, particularly in developing the historical half-hourly regional rooftop PV profiles. Detailed information is available in the 2013 NEFR Forecasting Methodology Report.[11]

Figure 2-6 — Rooftop PV annual energy forecasts for South Australia



Note: High, medium and low scenarios follow the same trajectory as they are all based on the Moderate Uptake Scenario.

[11] Available at: http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013/NEFR-Supplementary-Information-2013. Viewed August 2013.

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CHAPTER 3 - EXISTING SUPPLY CAPACITY AND RECENT PERFORMANCE

This chapter 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.

Industry participants have provided generation information to the Australian Energy Market Operator (AEMO) via a web-based survey. Summary information relevant to South Australia is presented in this and other sections of the South Australian Electricity Report (SAER). For further detail, refer to the Generator Information page on AEMO's website.[12]

3.1 Existing generation

Table 3-1 compares South Australia's existing registered generation capacity to electricity generated by energy sources for scheduled, semi-scheduled and small embedded or on-site market non-scheduled generators.[13]

In South Australia, the largest share of registered capacity is gas-fired generation, at approximately 50% of total registered capacity. Gas-fired generation also dominates energy generation, at approximately 52% of 2012–13 generation.

Table 3-1 — Registered capacity and 2012–13 generation by energy source in South Australia

Energy source	South Australia registered generation capacity		Electricity generated in 2012–13 by energy source	
	Megawatts (MW)	Percentage of total	Gigawatt hours (GWh)	Percentage of total
Gas	2,672	50%	6,786	52%
Wind	1,203	23%	3,483	27%
Coal	770	14%	2,238	17%
Rooftop PV[a]	400	7%	497	4%
Diesel	270	5%	12	<1%
Landfill methane/ landfill gas	16	<1%	55	<1%
Hydro	3	<1%	6	<1%
Total	**5,334**	**100%**	**13,077**	**100%**

[a] Rooftop PV is not registered with AEMO, but has been included in this table due to its material contribution to generation in 2012–13. Rooftop PV capacity and generation as listed is consistent with that relied upon in the 2013 National Electricity Forecasting Report.

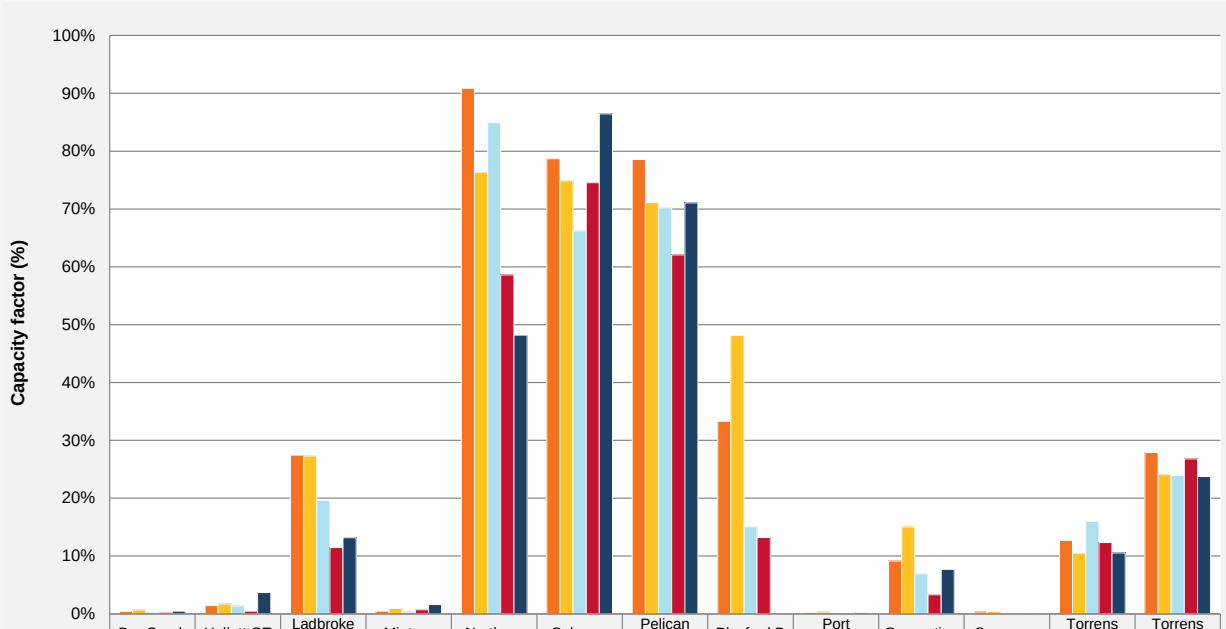
[12] Available: http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information. Viewed 19 July 2013.
[13] The 2012 SAER excluded small non-scheduled generation, reporting only those scheduled, semi-scheduled and non-scheduled generators recognised by AEMO's central dispatch system that have energy data stored within AEMO's Electricity Market Management System. For comparison with the 2012 SAER, a table excluding small non-scheduled generation has been included in the SAER data file available here: http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Electricity-Report.

Figure 3-1 shows the capacity factors for South Australian generation based on each power station's historical registered capacity.[14] Plants that respond to maximum 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.

Key trends observed in 2012–13 were:

- Higher capacity factors for most newer gas-fired scheduled generation plants, and lower capacity factors for base load coal and other gas-fired generators. Behavioural trends from coal-fired stations are discussed in further detail below, whilst the increase in capacity factors from some gas-fired stations was likely driven by increased generation from the the next lowest-cost source to meet demand no longer being met by coal-fired generation.
- Lower capacity factors for the Northern and Playford B power stations. This was driven by changes to how Alinta Energy operates these power stations. Alinta advised that Northern would operate as normal during the summer months, but would only be available following a three-week recall time during winter. Playford B was only available with a 90-day recall time. More details are available from AEMO's Generation Information page.[15]

Figure 3-1 — Financial year capacity factors for scheduled generators in South Australia



	Dry Creek	Hallett GT	Ladbroke Grove	Mintaro	Northern	Osborne	Pelican Point	Playford B	Port Lincoln GT	Quarantine	Snuggery	Torrens Island A	Torrens Island B
2008-09	0.4%	1.4%	27.4%	0.5%	90.9%	78.7%	78.6%	33.3%	0.3%	9.1%	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%	58.6%	74.6%	62.1%	13.2%	0.1%	3.3%	0.1%	12.3%	26.8%
2012-13	0.5%	3.7%	13.2%	1.6%	48.2%	86.5%	71.1%	0.0%	0.2%	7.7%	0.0%	10.5%	23.8%

[14] In previous reports, capacity factors were calculated based on the most recent year's registered capacity. The 2013 SAER (Figure 3-1) uses the recorded registered capacity for each relevant year (historic and current). For comparison with the 2012 SAER, results using the most recent year's registered capacity have been included in the SAER data file available at: http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Electricity-Report.

[15] For further information see the Generator Information page: http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information. Viewed 19 July 2013.

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3.2 Generation commissioned in 2012–13

No new generation was commissioned in South Australia during 2012–13.

3.3 Import and export via the Victoria – South Australia interconnectors

South Australia's generation and transmission networks are connected to the rest of the National Electricity Market (NEM) via the Heywood and Murraylink interconnectors. Electricity flows along these interconnectors either from South Australia to Victoria or Victoria to South Australia: It flows from South Australia to Victoria when South Australia is producing more electricity than it consumes; it generally flows from Victoria to South Australia during periods of high demand in South Australia.

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

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

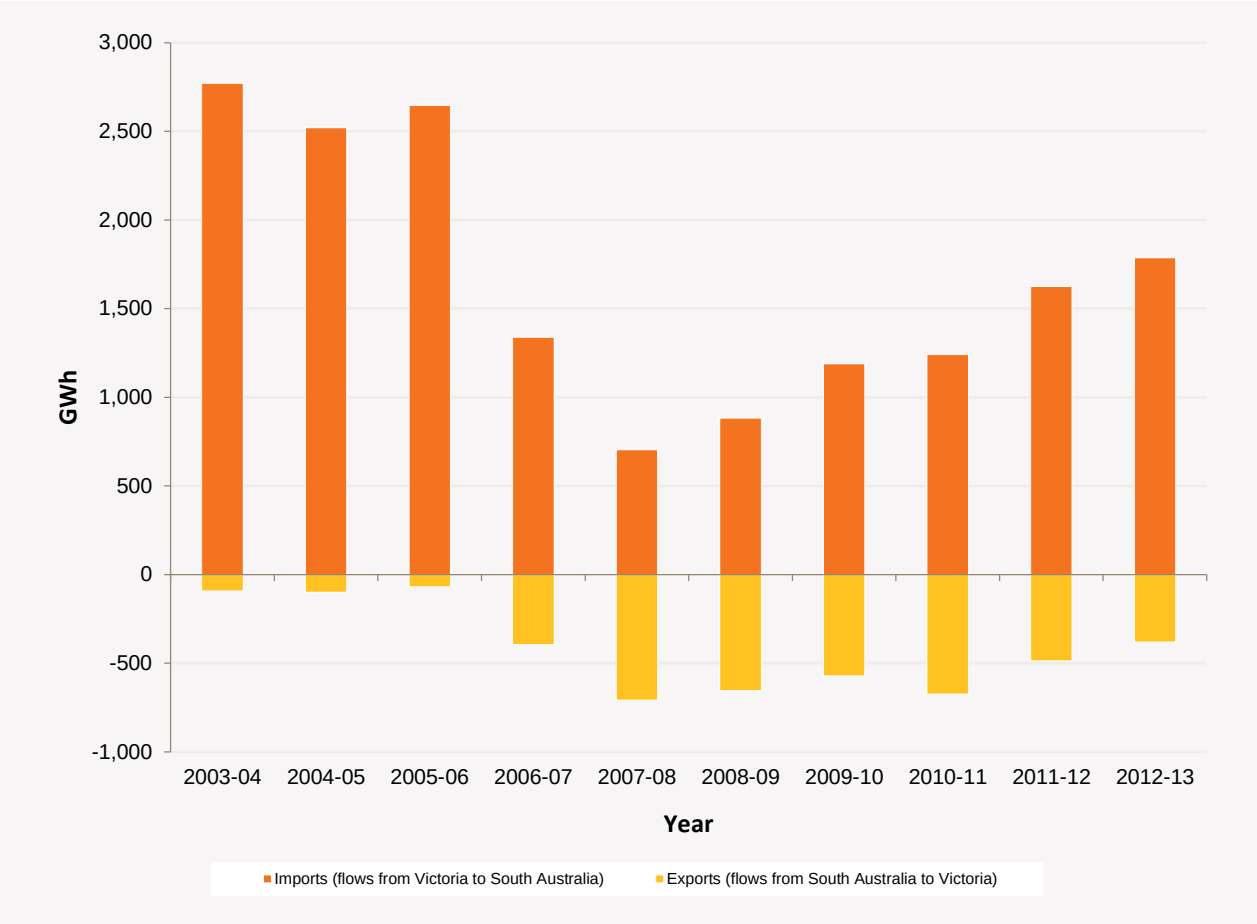
Figure 3-2 shows total interconnector electricity imports and exports since 2003–04. Imports into South Australia are plotted above the x-axis and exports are plotted below. Prior to 2006–07, South Australia electricity imports from Victoria dominated over exports. However from 2006–07, factors such as more expensive interstate supply, drought conditions, and increased wind generation in South Australia have led to reduced imports and increased exports.

In 2012–13, imports into South Australia exceeded exports by more than four times as much (1,786 GWh imported and 381 GWh exported). Total imports represented approximately 13% of electricity consumed in South Australia, while net imports (total imports less total exports) accounted for around 10%.

In 2012–13 combined interconnector total imports increased by 10% compared to 2011–12, total exports decreased by 22%, and net imports for the combined interconnectors increased by 24%.

[16] See Section 2.6 of AEMO's Victorian Annual Planning Report. Available: http://www.aemo.com.au/Electricity/Planning/Victorian-Annual-Planning-Report-2013. Viewed 19 July 2013.

Figure 3-2 — Victoria – South Australia electricity imports and exports via interconnectors



3.3.1 Potential for interconnector capability upgrade

In February 2013, ElectraNet and AEMO completed a Regulatory Investment Test for Transmission (RIT-T) to investigate the technical and economic viability of upgrading the Heywood interconnector transfer capability.[17]

ElectraNet has submitted a request to the Australian Energy Regulator (AER) for a determination as to whether the preferred option satisfies the RIT-T. If successful, the resulting augmentation is expected to increase the nominal transfer capacity from 460 to 650 MW, which will realise substantial market benefits across the NEM. Information on the progress of this request is available from the AER website.[18]

[17] Available: http://www.aemo.com.au/Electricity/Planning/Regulatory-Investment-Tests-for-Transmission-RITTs/Heywood-Interconnector-RIT-T. Viewed 18 July 2013.
[18] Available: http://www.aer.gov.au/node/19916. Viewed 18 July 2013.

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

This chapter describes South Australia's scheduled and semi-scheduled generation capacities, changes to generation that the Australian Energy Market Operator (AEMO) is considering in its planning, and other more speculative changes that might occur over the 10-year outlook period. These include potential new generation developments as well as other changes to generation capacity.

4.1 Scheduled and semi-scheduled generation capacities

Table 4-1 shows scheduled and semi-scheduled generation capacities and capacity for reliability for summer 2013–14 and winter 2014. These figures are based on information provided by industry participants.[19] A key observation is that available capacity tends to be greater in winter than in summer given the higher thermal generation efficiencies at cooler ambient temperatures.[20]

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

Table 4-1 — South Australian scheduled and semi-scheduled available and capacity for reliability

Energy source (scheduled and semi-scheduled only)	Nameplate capacity (MW)[a]	Summer 2013–14 available capacity (MW)	Summer 2013–14 capacity for reliability (MW)	Winter 2014 available capacity (MW)	Winter 2014 capacity for reliability (MW)
Coal	770	726	546	726	0
Diesel	137	110	110	137	137
Gas	2,716	2,523	2,523	2,684	2,684
Wind (excludes non-scheduled)	815	711	70	941[b]	74[b]
Total	**4,438**	**4,070**	**3,249**	**4,488**	**2,895**

[a] Note that a generator's installed nameplate capacity may be different to the registered capacity reported in Table 3-1. Nameplate capacity is as at 28 June 2013.

[b] These figures include Snowtown 2 Stage 2 South, which is expected to come online in winter 2014.

AEMO is currently completing a two-phase wind integration study. The objective of this study is to investigate the potential network and operational impacts resulting from the projected increase in National Electricity Market (NEM) connected wind generation to 2020. The results of this study will be relevant to South Australia given its relatively high proportion of wind generation (illustrated in Table 4-1).[21]

[19] Additional data for the entire 10-year outlook period is available at http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/SA-Generation-Information.

[20] These figures are based on the regional reference for South Australian temperatures of 43 °C for summer and 11 °C for winter.

[21] Further information is available at http://aemo.com.au/Electricity/Planning/Related-Information/2013-Wind-Integration-Studies

4.2 Committed and potential generation developments

Industry participants provided information to AEMO regarding 29 publicly announced electricity generation developments in South Australia. Of these, the only committed development is Snowtown Stage 2 Wind Farm (270 MW); the remaining projects are in the early stages of development.

Table 4-2 aggregates the publicly announced new developments by energy source, based on industry participant survey responses. Capacity of these projects totals 4,921 MW. Of the 29 projects, 25 are based on renewable energy sources, including 17 wind projects. Wind generation comprises 2,987 MW or 61% of the 29 projects' total capacity (see Figure 4-1). The largest publicly announced projects are the Ceres, Woakwine and Hornsdale proposals and the committed Snowtown Stage 2 project.

In September 2012, the Snowtown Stage 2 Wind Farm (270 MW) was committed for development. The project consists of two separately metered wind farms: Snowtown 2 North (144 MW) and Snowtown 2 South (126 MW), which will share a single transmission line owned by TrustPower. Snowtown Stage 2 represents an increase of generation capacity from winter 2014.

Table 4-2 — South Australian publicly announced and committed generation projects by energy source as at 28 June 2013

Energy source	Number of projects	Capacity (MW)
Biomass	1	10
Coal	1	570
Solar	2	90
Gas	3	720
Geothermal	5	544
Wind	17	2,987
Total	**29**	**4,921**

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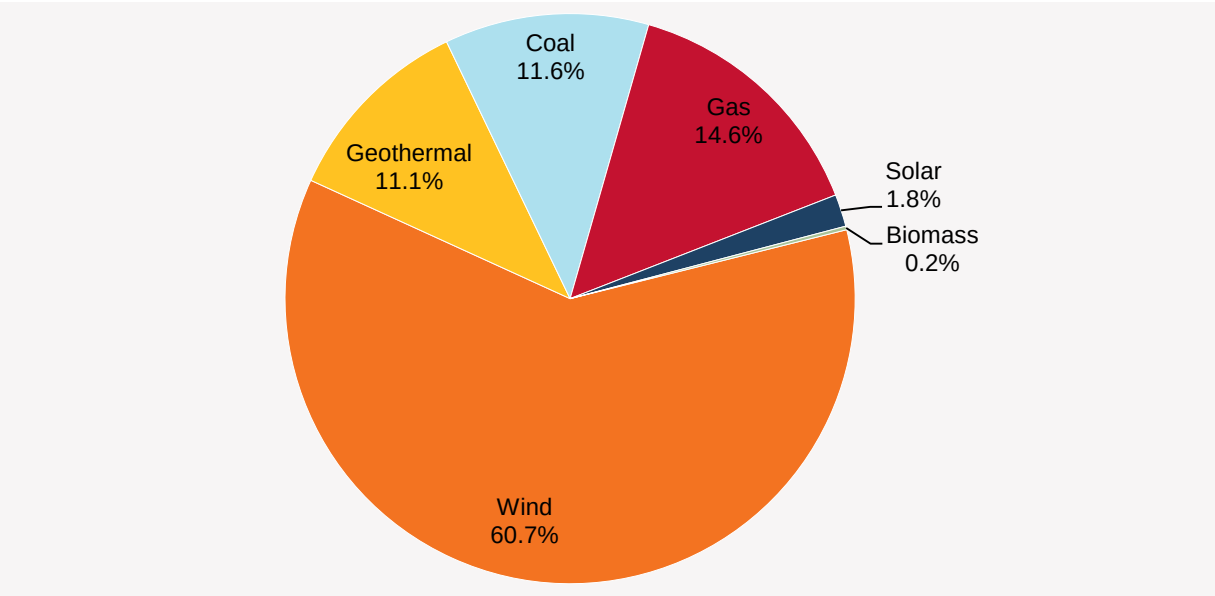
Figure 4-1 — South Australian publicly announced and committed generation projects as at 28 June 2013



4.3 Other changes to supply

4.3.1 Playford B brown coal-fired power station

The 2012 SAER advised changes to the availability of Northern and Playford B power stations. While Northern's availability remains as reported in 2012[22], Playford B has been revised downward from 200 MW to 180 MW (summer and winter) due to turbine 2 having been taken out of service. Playford B will only be available after a recall time of around 90 days.[23]

4.3.2 Minor revisions to capacity

A net increase of 30 MW has resulted from several minor revisions made to available summer capacity since the 2012 SAER due to plant maintenance or reassessment of plant capability.

Table 4-3 — Minor revisions to South Australian generation capacity since the 2012 SAER

Generator	Capacity change (MW)	Reason
Hallett 4 North Brown Hill Wind Farm	+17.3 (summer)	Revised rating of generation units.
Hallett Stage 1 Brown Hill Wind Farm	+12.4 (summer)	Revised rating of generation units.

4.3.3 Wind contribution to peak demand

AEMO has increased its estimate of the proportion of South Australian installed wind generation capacity considered to be firmly available to meet peak demand. The revised analysis, based on updated historical information, increased the peak demand wind contribution from 8.3% to 8.6% for summer and from 7.5% to 7.9% for winter. South Australia has the highest peak demand wind contribution of all NEM regions.

[22] See the 2012 SAER or Generation Information Page for South Australia. Available: http://www.aemo.com.au/Electricity/Planning/Related-Information/Generation-Information. Viewed 19 July 2013.
[23] Alinta has indicated that turbine 2 can be brought back into service if required.

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CHAPTER 5 - SUPPLY-DEMAND OUTLOOK

This chapter compares forecast supply capacity with a forecast maximum demand (MD) to identify Low Reserve Condition (LRC) points. LRC points indicate when additional investment in generation or demand-side response may be required to maintain electricity supply reliability within the National Electricity Market (NEM) Reliability Standard.[24]

The 2013 Electricity Statement of Opportunities (ESOO), from which the South Australian Electricity Report (SAER) results were derived, incorporates improved supply-demand modelling using simulated hourly dispatch. This results in more accurate forecast reserve deficits[25] and provides greater consistency with the Australian Energy Market Operator's (AEMO's) other planning reports.[26]

The modelling used a weighted 50% Probability of Exceedence (POE) and 10% POE MD against which to assess supply adequacy over the high, medium, and low economic growth scenarios outlined in Chapter 1.[27]

5.1 Supply adequacy

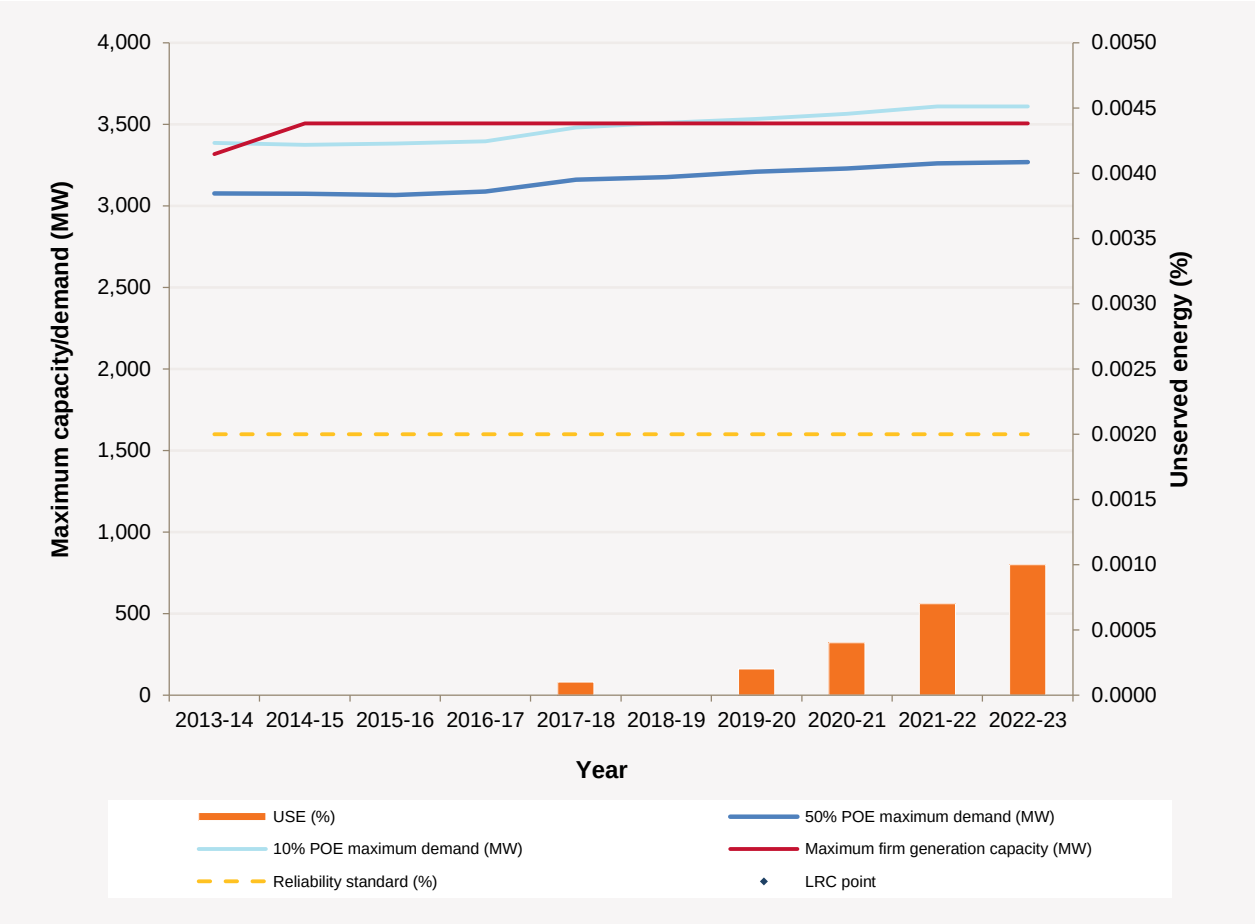
Forecast summer MD has been reduced since the 2012 SAER, and available capacity has increased (as outlined in chapters 2 and 4). This means there is currently adequate generation capacity to meet demand in South Australia across the 10-year outlook period (2013–14 to 2022–23) under the medium economic growth scenario.

Figure 5-1 shows that unserved energy (USE) in South Australia remains within the NEM Reliability Standard. No LRC is observed within the 10-year outlook period. This result defers any potential reserve deficit for at least three years compared to the 2012 estimate.

Due to the high penetration of wind generation, South Australia is sensitive to correlations between wind generation and demand. The visible quantity of USE in 2017–18 is associated with times of correlated high demand and low wind availability that do not occur in adjacent years; this is due to the way AEMO's model matches weekday, weekend and holiday demand periods with wind availability. Figure 5-1 shows that with high wind penetration, uncertainty in the wind resource can affect supply more than growth in demand does.

[24] Australian Energy Market Commission. Reliability Standards. 1 July 2012. Available: http://www.aemc.gov.au/panels-and-committees/reliability-panel/guidelines-and-standards.html. Viewed 3 July 2013.
[25] A reserve deficit is the amount of additional generation capacity required to defer an LRC point by one year.
[26] A description of the changes to supply-demand modelling for the assessment of LRC is included in the 2013 Planning Assumptions documentation. AEMO. 2013 Modelling Methodology and Assumptions. 12 June 2013. Available: http://www.aemo.com.au/Electricity/Planning/Related-Information/2013-Planning-Assumptions. Viewed 2 July 2013.
[27] See the ESOO Methodology document for more information on the modelling detail including weightings used. Available: http://www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities.

Figure 5-1 — South Australian supply adequacy (medium economic growth scenario)



South Australia relies heavily on wind generation, which has an historical summer contribution to peak demand of 8.6% of installed capacity; this is reflected in the maximum firm generation capacity line shown in Figure 5-1. Installed capacity is significantly higher than the firm capacity shown in Figure 5-1, and South Australia is able to rely on generation in Victoria to meet demand at times of reduced output from local wind resources.[28]

Table 5-1 shows the LRC points and reserve deficit forecast under the three economic growth scenarios modelled.

- Under the low and medium economic growth scenarios, adequate electricity generation capacity is forecast throughout the 10-year outlook period so there is no LRC point.
- Under the high economic growth scenario, an LRC point occurs in 2020–21. This is six years later than forecast in the 2012 ESOO, reflecting lower projected demand growth and a more detailed representation of the relationship between USE and the Reliability Standard afforded by improved modelling techniques. The supply adequacy chart for the high economic growth scenario is available from the ESOO data files.[29]

[28] For further information, refer to the files accompanying the ESOO that provide data on monthly energy by generation type (including wind). Available: http://www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities. Viewed: 14 August 2013.
[29] Available: http://www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities. Viewed: 14 August 2013.

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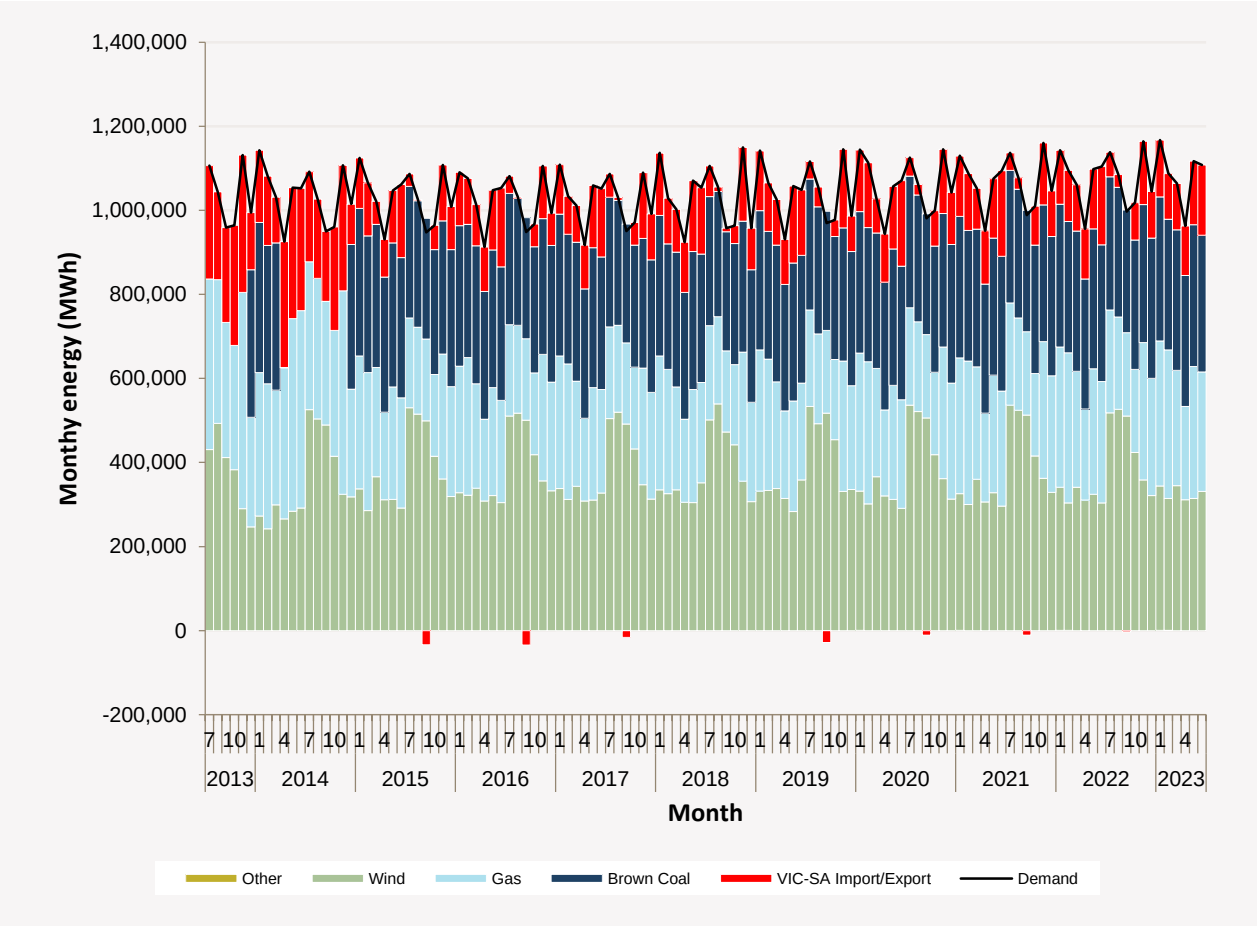
Table 5-1 — South Australian low reserve condition points

Low economic growth scenario		Medium economic growth scenario		High economic growth scenario	
LRC point	Reserve deficit (MW)	LRC point	Reserve deficit (MW)	LRC point	Reserve deficit (MW)
Beyond 2022–23	-	Beyond 2022–23	-	2020–21	36

5.2 Energy generation

Figure 5-2 shows the forecast energy generation by fuel source to meet demand on a monthly basis.[30] This figure highlights seasonal energy production differences, in particular the use of brown coal to meet summer demand, and increased wind generation in winter.

Figure 5-2 — South Australian energy supply by fuel source



[30] Figure 5-2 includes energy supply from "Other" fuel sources. Supply from "Other" fuel sources is minimal and not visible in the figure. Further detail is available in the SAER data file.

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Acknowledgements

AEMO acknowledges the support, co-operation and contribution of all participants in providing the data and information used in this publication.

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MEASURES AND ABBREVIATIONS

Units of Measure

Abbreviation	Unit of Measure
c	Cents
c/kWh	Cents per kilowatt-hour
GWh	Gigawatt-hour
kV	Kilovolt
kWh	Kilowatt-hour
MVA	Mega volt-amp
MW	Megawatts
MWh	Megawatt-hour
$	Australian dollars

Abbreviations

Abbreviation	Expanded Name
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CPI	Consumer price index
ESOO	Electricity Statement of Opportunities
LRC	Low reserve condition
MD	Maximum demand
NEFR	National Electricity Forecasting Report
NEM	National Electricity Market
POE	Probability of exceedence
PV	Photovoltaic
RIT-T	Regulatory Investment Test for Transmission
SAAF	South Australian Advisory Function
SAER	South Australian Electricity Report
SASDO	South Australian Supply and Demand Outlook
SRES	Small-scale Renewable Energy Scheme
STC	Small-scale Technology Certificates
USE	Unserved energy

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GLOSSARY

This document provides the glossary for the 2013 South Australian Electricity Report (SAER).

Term	Definition
10-year outlook period	The period from 2013–14 to 2022–23.
advanced proposal	A proposed generation project that meets at least three of the five criteria specified by the Australian Energy Market Operator (AEMO) for a committed project, and shows progress on two. See also 'proposed project' and 'publicly announced proposal'.
annualised average (growth rate)	The compound average growth rate, which is the year-over-year growth rate over a specified number of years.
annual energy	The amount of electrical energy consumed in a year.
as-generated	A measure of electricity demand or electrical energy at the terminals of a generating system. This measure includes electricity delivered to customers, transmission and distribution losses, and auxiliary load.
auxiliary load	The load from equipment used by a generating system for ongoing operation. Auxiliary loads are located on the generating system's side of the connection point, and include loads to operate generating system co-located coal mines.
available capacity	The total capacity available for dispatch by a scheduled generating unit, semi-scheduled generating unit or scheduled load (i.e. maximum plant availability).
capacity factor	The output of generating units or systems, averaged over time, expressed as a percentage of rated or maximum output.
committed project	A committed project is any new generation development or non-regulated transmission development that meets all five criteria specified by the AEMO for a committed project.
contribution factor	The rooftop photovoltaic (PV) power generation (in megawatts (MW)) as a percentage of the total rooftop PV (MW) installed capacity.
distribution losses	Electrical energy losses incurred in transporting electrical energy through a distribution system.
distribution network	A network that is not a transmission network.
distribution system	A distribution network, together with the connection assets associated with the distribution network (such as transformers), which is connected to another transmission or distribution system.
ElectraNet	The principal Transmission Network Service Provider and System Control Centre Operator in South Australia.
electricity demand	The electrical power requirement met by generating units.
energy efficiency	Potential annual energy or maximum demand that is mitigated by the introduction of energy efficiency measures.
feed-in tariff	A tariff paid to consumers for electrical energy they export to the network, such as rooftop PV output that exceeds the consumers' load.
generating unit	The plant that generates electricity and all the related equipment essential to its functioning as a single entity.
generation	The production of electrical power by converting another form of energy in a generating unit.

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Term	Definition
installed capacity	The generating capacity (in MW) of the following (for example): • A single generating unit. • A number of generating units of a particular type or in a particular area. • All of the generating units in a region. Rooftop PV installed capacity is the total amount of cumulative rooftop PV capacity installed at any given time.
interconnector	A transmission line or group of transmission lines that connects the transmission networks in adjacent regions.
large industrial load (annual energy or maximum demand)	There are a small number of large industrial loads—typically transmission-connected customers—that account for a large proportion of annual energy in each National Electricity Market (NEM) region. They generally maintain consistent levels of annual energy and maximum demand in the short term, and are weather insensitive. Significant changes in large industrial load occur when plants open, expand, close, or partially close.
load	A connection point or defined set of connection points at which electrical power is delivered to a person or to another network or the amount of electrical power delivered at a defined instant at a connection point, or aggregated over a defined set of connection points.
low reserve condition (LRC)	When AEMO considers that a region's reserve margin (calculated under 10% probability of exceedence scheduled and semi-scheduled maximum demand conditions) for the period being assessed is below the minimum reserve level (MRL).
maximum demand (MD)	The highest amount of electrical power delivered, or forecast to be delivered, over a defined 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.
moderate uptake scenario	A scenario under which the combination of drivers provide moderate incentives for new installations. This is the most likely scenario. Drivers include: • Medium retail and wholesale electricity prices and consumer price index (CPI). • Moderate system cost reductions. • Export prices follow a similar trend to historic values.
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 exchange of electricity operated by AEMO under the National Electricity Rules (NER).
National Renewable Energy Target scheme	The national Renewable Energy Target (RET) scheme, which commenced in January 2010, aims to meet a renewable energy target of 20% by 2020. Like its predecessor, the Mandatory Renewable Energy Target (MRET), the national RET scheme requires electricity retailers to source a proportion of their electricity from renewable sources developed after 1997. The national RET scheme is currently structured in two parts: • The Small-scale Renewable Energy Scheme (SRES) is a fixed price, unlimited-quantity scheme available only to small-scale technologies (such as solar water heating) and is being implemented via Small-scale Technology Certificates (STC). • The Large-scale Renewable Energy Target (LRET) is being implemented via Large-scale Generation Certificates (LGC), and targets 41,000 GWh of renewable energy by 2020.

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Term	Definition
native electrical energy	The electrical energy supplied by scheduled, semi-scheduled, and significant non-scheduled and small non-scheduled generating units.
non-scheduled generating unit	A generating unit that is not scheduled by AEMO as part of the central dispatch process, and which has been classified as such in accordance with Chapter 2 of the NER.
on-site generation	Generation, generally small-scale, that is co-located with a major load, such as combined heat and power systems at industrial plants.
operational demand	The electrical energy supplied by scheduled, semi-scheduled, and significant non-scheduled generating units, less the electrical energy supplied by small non-scheduled generation.
peak demand	Peak demand in the SAER and the Electricity Statement of Opportunities (ESOO) refers to the top 10% of demand periods (within 'winter' and 'summer' – see these entries for further information). In the SAER and ESOO suite, the term 'peak' is used when referring to the calculation of wind contribution to peak demand.
probability of exceedence (POE)	Refers to the probability that a forecast electricity demand figure will be exceeded. For example, a forecast 10% POE maximum demand will, on average, be exceeded only 1 year in every 10.
probability of exceedence (POE) maximum demand	The probability, as a percentage, that a MD level will be met or exceeded (for example, due to weather conditions) in a particular period of time. For example, for a 10% POE MD for any given season, there is a 10% probability that the corresponding 10% POE projected MD level will be met or exceeded. This means that 10% POE projected MD levels for a given season are expected to be met or exceeded, on average, one year in 10.
proposed project	All generation project proposals that have come to AEMO's attention and are not committed. Proposed projects are further classified as either advanced proposals or publicly announced proposals.
publicly announced proposal	A proposed generation project that has come to AEMO's attention but cannot be classified as an advanced proposal.
rapid uptake scenario	A scenario under which the combination of drivers strongly incentivise new installations. Drivers include: • High retail and wholesale electricity prices and CPI. • Rapid system cost reductions. • Export prices largely above average recent values.
region	An area determined by the Australian Energy Market Commission in accordance with Chapter 2A of the NER, being an area served by a particular part of the transmission network containing one or more major load centres or generation centres, or both.
registered capacity	A generating system's registered capacity is the nominal MW capacity registered with AEMO. Any person who owns, controls, or operates a generating system connected to a transmission or distribution network must register as a generator. Registered capacity may differ from nameplate capacity.
reliability	The probability that plant, equipment, a system, or a device, will perform adequately for the period of time intended, under the operating conditions encountered. Also the expression of a recognised degree of confidence in the certainty of an event or action occurring when expected.
reliability of supply	The likelihood of having sufficient capacity (generation or demand-side participation) to meet demand. See also 'electricity demand'.

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Term	Definition
reliability standard	The power system reliability benchmark set by the Reliability Panel. The maximum permissible unserved energy (USE)—which is the maximum allowable level of electricity at risk of not being supplied to consumers—due to insufficient generation, bulk transmission, or demand-side participation (DSP) capacity. The current Reliability Standard is 0.002% of the annual energy consumption for the associated region, or regions, per financial year. *Note that meeting this standard does not imply a guarantee of supply continuity to any customer. In fact it explicitly anticipates some shortfalls in severe conditions. Nor does it capture system security caused by disruptions (e.g., bushfires and storms), industrial action, or interruptions in the distribution network.* *Falling short of the standard does not imply that severe disruptions will occur. The standard simply represents a target that balances customer reliability and cost.*
Renewable Energy Target (RET)	See 'national Renewable Energy Target scheme'.
residential and commercial load (annual energy or maximum demand)	The annual energy or maximum demand relating to all consumers except large industrial load. Residential and commercial load is the load on the network, after savings from energy efficiency and rooftop PV output have been taken into account. Includes light industrial load.
retail electricity price	The price paid by consumers to retailers for supplying them with electricity.
rooftop photovoltaic (PV) systems	A system comprising one or more photovoltaic panels, installed on a residential or commercial building rooftop to convert sunlight into electricity.
saturation level	The estimated maximum rooftop PV capacity, reflecting the number of households, rooftop areas, and other siting factors.
scenario	A consistent set of assumptions used to develop forecasts of demand, transmission, and supply.
scheduled generating unit	A generator whose generating units are classified as scheduled in accordance with Chapter 2 of the NER.
semi-scheduled generating unit	A generating unit with the following qualities: • Intermittent output. • A total capacity of 30 MW or greater. May have its output limited to prevent the violation of network constraint equations.
semi-scheduled generator	A generator whose generating units are classified as semi-scheduled in accordance with Chapter 2 of the NER.
sent-out	A measure of demand or energy (in MW or megawatt hours (MWh), respectively) at the connection point between the generating system and the network. This measure includes consumer load and transmission and distribution losses.
significant non-scheduled generating unit	Refers to all of the following: Market non-scheduled (MNS) generating units. Non-market non-scheduled (NMNS) generating units and generating units exempted from registration (with an aggregate capacity greater than 1 MW), for which AEMO and the jurisdictional planning bodies have sufficient data to develop energy and maximum demand projections.
slow uptake scenario	A scenario under which the combination of drivers do not incentivise new installations. Drivers include: • Conservative retail and wholesale electricity prices and CPI. • Slow system cost reductions. • Feed-in prices largely below average historical values.

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Term	Definition
Small-scale Renewable Energy Scheme (SRES)	See 'national Renewable Energy Target scheme'.
small-scale technology certificate (STC)	See 'national Renewable Energy Target scheme'.
smart meter	An electricity meter that records electricity usage for discrete time intervals (such as for each 30-minute period) and automatically sends this data to the electricity supplier. Some smart meters have additional communications and load control functions.
state final demand (SFD)	A measure of the total value of goods and services sold in a state for consumption or retention as capital assets. It excludes sales for production inputs and exports.
summer	Unless otherwise specified, refers to the period 1 November–31 March.
supply-demand (adequacy) outlook	The future state of supply's ability to meet projected demand. The SAER's outlook is for 10 years.
transmission losses	Electrical energy losses incurred in transporting electrical energy through a transmission system.
transmission network	A network within any NEM participating jurisdiction operating at nominal voltages of 220 kilovolts (kV) and above plus: • (a) any part of a network operating at nominal voltages between 66 kV and 220 kV that operates in parallel to and provides support to the higher voltage transmission network, • (b) any part of a network operating at nominal voltages between 66 kV and 220 kV that is not referred to in paragraph (a) but is deemed by the Australian Energy Regulator (AER) to be part of the transmission network.
unserved energy (USE)	The amount of energy that cannot be supplied because there is insufficient generation capacity, demand-side participation, or network capability to meet demand. Under the Reliability Standard, each region's annual USE can be no more than 0.002% of its annual energy consumption. Compliance is assessed by comparing the 10-year moving average annual USE for each region with the Reliability Standard. See also 'Reliability Standard'.
wholesale electricity price	Wholesale trading in electricity is conducted as a spot market, and the wholesale price is the spot price. It is based on the price that generators receive for generating electricity and the price that retailers pay for electricity they purchase. The spot price is the price in a trading interval (a 30-minute period) for one MWh of electricity at a regional reference node.
winter	Unless otherwise specified, refers to the period 1 June–31 August.