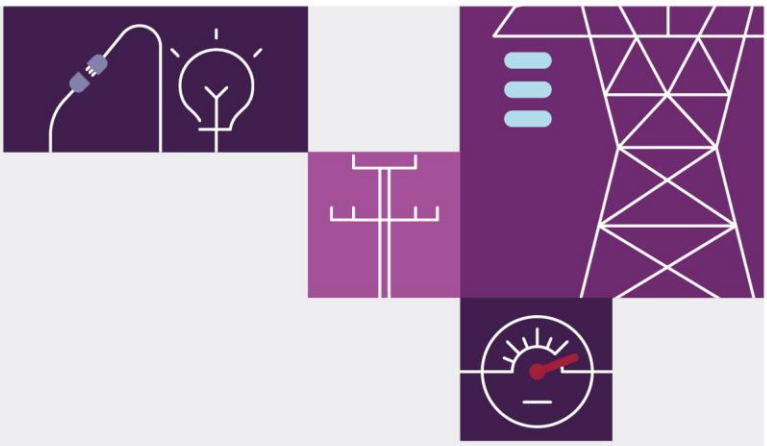
South Australian Generation Forecasts

May 2022

South Australian Advisory Functions



Important notice

Purpose

The purpose of this publication is to provide information to the South Australian Minister for Energy and Mining about South Australia's electricity generation forecasts.

AEMO publishes this South Australian Generation Forecasts report in accordance with its additional advisory functions under section 50B of the National Electricity Law. This publication is generally based on information available to AEMO as at 10 December 2021, as modelled for the 2022 Gas Statement of Opportunities (published on 29 March 2022).

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1 Electricity generation forecasts

The *South Australian Generation Forecasts* report provides forecasts of the potential future electricity generation mix in South Australia over the next 10 years.

1.1 Overview

The electricity generation and storage projections are based on analysis conducted for AEMO's 2022 *Gas Statement of Opportunities* (GSOO)[1] for eastern and south-eastern Australia, which modelled future generation and interconnector flows in the National Electricity Market (NEM) under a range of plausible scenarios.

Key forecast trends

The key generation and storage forecast trends highlighted by the projections are:

- The amount of forecast generation beyond 2022-23 will be influenced by the announced retirement of existing assets, the development of currently proposed generation, storage and transmission projects, and the potential for increased demand (in scenarios with high economic growth, high electrification and/or hydrogen industry growth).
- Both wind generation and large-scale solar generation are forecast to increase in the near term due to commissioning of new projects. The forecast degree of growth beyond this point varies between scenarios depending on future demand growth.
- The annual volume of gas and diesel generation is forecast to decrease relative to history. This is driven by a combination of factors: the retirement of Torrens Island A and Osborne power stations, the commissioning of new variable renewable energy (VRE) generation, the commissioning of Project EnergyConnect (PEC) in 2025-26, and the relaxation of system strength requirements with the delivery of the synchronous condensers.
- Forecast growth in battery technologies, including both large-scale battery generation and Virtual Power Plants (VPPs), demonstrates the growing value in generation technologies that can complement the natural variability of renewable generation, by providing rapid start capabilities and increased operational flexibility.
- Rooftop photovoltaics (PV) and PV non-scheduled generation (PVNSG) are forecast to continue increasing over the next decade.

[1] At https://aemo.com.au/en/energy-systems/gas/gas-forecasting-and-planning/gas-statement-of-opportunities-gsoo.

1.2 Scenarios analysed

This report is based on scenarios and sensitivities described in AEMO's 2021 *Inputs, Assumptions and Scenarios Report* (IASR)[2]. More detail is available in the 2021 IASR; Table 1 summarises the high-level narratives. The scenarios are selected to provide some perspective on the range of outcomes possible under different future scenarios.

Table 1 Descriptions of AEMO's 2021-22 forecasting and planning scenarios and sensitivity

Scenario/sensitivity	Description
Step Change	A future with rapid consumer-led transformation of the energy sector and a coordinated economy-wide approach that efficiently and effectively tackles the challenge of rapidly lowering emissions. This requires a step change in global policy commitments to achieve the minimum objectives of the Paris Agreement, supported by rapidly falling costs of energy production, including consumer devices. Increased digitalisation enhances the role consumers can play in managing their energy use, along with advancements in energy efficient technologies and buildings. EV adoption is strong, with early decline in manufacturing of internal-combustion vehicles. By 2050, most consumers rely on electricity to heat their homes and businesses. Carbon sequestration in the land use sector helps offset hard-to-abate emissions.
Hydrogen Superpower	Strong global action towards emissions reduction, with significant technological breakthroughs and social change to support low and zero emissions technologies. Emerging industries such as hydrogen production present unique opportunities for domestic developments in manufacturing and transport, and renewable energy exports via hydrogen become a significant part of Australia's economy. New household connections tend to rely on electricity for heating and cooking, but those households with existing gas connections progressively switch to using hydrogen – first through blending, and ultimately through appliance upgrades to use 100% hydrogen.
Strong Electrification	A high emissions-reduction future, aligned with the decarbonisation objectives of the Hydrogen Superpower scenario, only in this future, hydrogen uptake is limited and energy efficiency is also more muted. This leaves the majority of the emissions reductions to be achieved through electrification, testing the outer bounds of the existing system. No export hydrogen or associated green steel manufacturing facilities are therefore included in this sensitivity.

1.3 Electricity forecasts

A summary of forecast electricity generation, interconnection, and loads for South Australia from 2021-22 to 2030-31, across three scenarios, is shown in 0.

For this analysis, all modelling assumptions are described in the 2022 GSOO. Key assumptions include:

- New generator developments, and closures, are as in AEMO's 2021 *Inputs and Assumptions Workbook*[3].
- Transmission developments, including the commissioning of Project EnergyConnect and system security constraints, are as in the 2022 *Draft Integrated System Plan* (ISP)[4].

[2] At https://aemo.com.au/-/media/files/major-publications/isp/2021/2021-inputs-assumptions-and-scenarios-report.pdf?la=en.

[3] At https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios.

[4] At: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp.

In Table 2:

- S stands for Scheduled, SS for semi-scheduled, NS for non-scheduled generation.
- Rooftop PV means behind-the-meter PV systems up to 100 kilowatts (kW).
- PVNSG means distributed PV systems greater than 100 kW, up to 30 megawatts (MW).
- ONSG (other non-scheduled generation) is small non-scheduled generation less than 30 MW (a mix of renewable and non-renewable generation). Peaking generation is excluded from the Other Non-Scheduled Generation (ONSG) in this year's forecast as outlined in AEMO's Electricity Demand Forecasting Methodology. Peaking generation is now considered as a form of demand side participation (DSP).
- VPP stands for Virtual Power Plant, that is, orchestrated behind-the-meter battery storage systems.

Table 2 Forecast annual energy supply mix for South Australia (gigawatt hours [GWh])

Financial year	Generation									Interconnector flow			Load
	Wind (SS, NS)	Solar (SS)	Battery (S)	ONSG	PVNSG	Rooftop PV	VPP	Gas and diesel (S)	Total	Imports to SA	Net interchange (+ve import)	Exports from SA	Battery (S) and VPP
Step Change scenario													
2020-21 Actuals	5,739	673	85	69	248	1,925	5 †	5,235	13,978	1,147	123	1,023	110 †
2021-22	6,023	805	44	59	406	2,275	40	4,411	14,062	2,144	1,269	876	100
2022-23	6,164	792	53	59	487	2,605	68	4,488	14,717	1,999	893	1,107	144
2023-24	6,881	1,066	54	60	568	2,906	96	3,975	15,604	1,824	322	1,502	178
2024-25	7,119	1,019	58	60	662	3,161	133	2,719	14,931	2,628	1,334	1,293	226
2025-26	9,199	1,114	59	60	760	3,380	160	2,200	16,933	2,592	-351	2,944	258
2026-27	9,532	1,076	66	61	860	3,585	184	2,452	17,816	2,416	-853	3,268	295
2027-28	9,492	1,063	60	61	967	3,775	214	1,685	17,317	3,086	-31	3,118	323
2028-29	11,222	1,042	58	61	1,071	3,951	238	1,555	19,199	2,587	-1,585	4,172	350
2029-30	11,403	990	62	56	1,177	4,117	285	2,129	20,218	2,433	-2,332	4,765	409
2030-31	11,498	937	59	56	1,283	4,292	345	2,130	20,600	2,802	-2,255	5,057	477
Hydrogen Superpower scenario													

Financial year	Generation									Interconnector flow			Load
	Wind (SS, NS)	Solar (SS)	Battery (S)	ONSG	PVNSG	Rooftop PV	VPP	Gas and diesel (S)	Total	Imports to SA	Net interchange (+ve import)	Exports from SA	Battery (S) and VPP
2020-21 Actuals	5,739	673	85	69	248	1,925	5 †	5,235	13,978	1,147	123	1,023	110 †
2021-22	6,086	824	45	59	415	2,331	45	4,452	14,256	2,598	1,866	732	106
2022-23	6,242	804	55	59	515	2,743	80	4,210	14,708	2,710	1,785	926	159
2023-24	6,985	1,059	48	60	633	3,103	118	3,249	15,254	3,033	1,973	1,060	196
2024-25	10,283	982	44	60	779	3,424	167	1,708	17,448	2,285	430	1,855	249
2025-26	13,491	984	70	60	929	3,703	200	994	20,430	2,393	-2,099	4,492	319
2026-27	15,356	2,210	95	61	1,079	3,966	230	1,142	24,139	2,629	-1,530	4,159	384
2027-28	15,342	3,097	200	61	1,233	4,228	262	1,207	25,630	2,778	-2,281	5,058	549
2028-29	23,823	5,674	197	61	1,377	4,484	290	986	36,892	3,286	-1,997	5,283	579
2029-30	23,577	6,164	190	56	1,525	4,726	358	860	37,456	3,231	-2,003	5,234	651
2030-31	28,602	8,623	213	56	1,669	4,967	431	933	45,494	2,456	-2,926	5,382	764
Strong Electrification sensitivity													
2020-21 Actuals	5,739	673	85	69	248	1,925	5 †	5,235	13,978	1,147	123	1,023	110 †
2021-22	6,086	825	46	59	368	2,448	44	5,218	15,093	2,143	1,307	837	106
2022-23	6,237	802	60	60	474	3,048	70	5,417	16,168	2,054	949	1,105	154
2023-24	6,918	996	58	61	569	3,601	104	4,149	16,456	2,398	993	1,405	191
2024-25	10,238	898	54	62	625	4,028	149	1,982	18,035	1,942	-361	2,303	239
2025-26	12,868	962	69	63	672	4,351	168	1,146	20,299	2,458	-2,200	4,658	280
2026-27	14,105	969	93	64	724	4,597	190	1,683	22,426	2,168	-3,268	5,435	335
2027-28	14,107	1,279	100	66	762	4,781	214	1,757	23,065	2,528	-3,267	5,795	371

Financial year	Generation									Interconnector flow			Load
	Wind (SS, NS)	Solar (SS)	Battery (S)	ONSG	PVNSG	Rooftop PV	VPP	Gas and diesel (S)	Total	Imports to SA	Net interchange (+ve import)	Exports from SA	Battery (S) and VPP
2028-29	14,316	1,305	94	66	795	4,918	237	1,911	23,642	2,549	-3,390	5,939	392
2029-30	13,962	1,248	93	61	847	5,009	280	1,851	23,351	2,656	-2,652	5,308	441
2030-31	16,220	1,738	104	62	898	5,083	322	2,239	26,666	1,325	-5,153	6,478	504

† The 2020-21 actual VPP generation and load are estimated using forecast value of central scenario from AEMO's 2021 South Australian Generation Forecasts.