AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

South Australian Generation Forecasts

April 2020

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 supply and demand.

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 based on information available to AEMO as at 27 March 2020, as modelled for the 2020 Gas Statement of Opportunities.

DISCLAIMER

AEMO has made every effort to ensure the quality of the information in this publication but cannot guarantee that information, forecasts and assumptions are accurate, complete or appropriate for individual circumstances. This publication does not include all the information that an investor, participant or potential participant in the National Electricity Market might require and does not amount to a recommendation of any investment.

Anyone proposing to use the information in this publication (including information and reports provided by third parties) should independently verify and check its accuracy, completeness and suitability for that purpose, and obtain independent and specific advice from appropriate experts.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this document:

- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and
- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.

1. Introduction

1.1 Purpose

The purpose of this publication is to provide forecasts of the possible future electricity generation mix in South Australia, over the next 10 years.

The projections consider the optimal National Electricity Market (NEM) development paths identified in AEMO's Draft 2020 *Draft Integrated System Plan* (ISP)[1], and are based on analysis conducted for AEMO's 2020 *Gas Statement of Opportunities* (GSOO)[2] for eastern and south-eastern Australia, which modelled future generation and interconnector flows in the NEM under a range of plausible scenarios.

1.2 Scenarios analysed

The data in this report is based on three core scenarios that vary the future pace of change in the energy industry – Central, Slow Change, and Step Change. More detail about the scenarios is provided in AEMO's 2019-20 *forecasting and planning scenarios, inputs and assumptions* report[3].

In summary:

- The **Central** scenario reflects the current transition of the energy industry under current policy settings and technology trajectories, where the transition from fossil fuels to renewable generation is generally led by market forces and supported by current Commonwealth and South Australian Government policies.
- The **Slow Change** scenario reflects a general slow-down of the energy transition. It is characterised by slower advancements in technology and reductions in technology costs, low population growth, and low political, commercial and consumer motivation to make the upfront investments required for significant emissions reduction.
- The **Step Change** scenario reflects strong action on climate change that leads to a step change reduction of greenhouse gas emissions. In this scenario, aggressive global decarbonisation leads to faster technological improvements, accelerated exit of existing generators, greater electrification of the transport sector with increased infrastructure developments, energy digitalisation, and consumer-led innovation.

[1] At https://www.aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2020-integrated-system-plan-isp.

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

[3] At https://www.aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2020-integrated-system-plan-isp.

2. Electricity forecasts

2.1 Introduction

A summary of forecast electricity generation, interconnection, and loads for South Australia from 2019-20 to 2028-29, across three scenarios, is shown in Table 1.

In Table 1, the following should be noted:

- S stands for Scheduled, SS for semi-scheduled, NS for non-scheduled generation.
- Rooftop PV includes behind-the-meter photovoltaic systems up to 100 kilowatts (kW).
- SNSG is small non-scheduled generation less than 30 megawatts (MW), comprising PV non-scheduled generation and other non-scheduled generation (a mix of renewable and non-renewable generation).
- Interconnector flows comprise all interconnectors in aggregate, including both existing interconnectors and interconnection that the 2020 Draft ISP development path assumes will be built between South Australia and other NEM regions (Project EnergyConnect between South Australia and New South Wales, assumed to be delivered in 2023-24).
- VPP stands for Virtual Power Plant, that is, orchestrated behind-the-meter battery storage systems.

2.2 Modelling assumptions

The following assumptions are consistent across the Central, Step Change and Slow Change scenarios.

Assumed operation of committed[4] generators:

- Lincoln Gap Wind Farm – Battery Energy Storage System (BESS), Barker Inlet Power Station, and Bungala Two Solar Farm assumed to start operation from Summer 2019-20.
- Lincoln Gap Wind Farm Stage 2 assumed to start operation from Summer 2020-21.
- Note that the Hornsdale Power Reserve upgrade was *not* modelled, because as it was not classified as committed under AEMO's commitment criteria at time of modelling.

Assumed retirement of generators:

- Torrens Island A Power Station retires progressively from 2020 to 2022.
- Osborne Power Station retires 2022-23.
- Snowtown 1 Wind Farm retires 2027-28 (as reported in the August 2019 Generation Information. Since this time, the expected closure year has been updated to 2033).

Assumed new interconnection:

- Project EnergyConnect (South Australia to New South Wales) assumed to start operation from July 2023 based on Draft 2020 ISP analysis.

[4] "Committed" criteria relate to site acquisition, major components, planning and approvals, financing, and construction. Definitions are under the Background Information in each published NEM Generation Information update, at https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information.

Table 1 Forecast annual energy supply mix for South Australia (gigawatt hours [GWh])

	Generation								Interconnector flow			Load
Financial year	Wind (SS, NS)	SNSG	Rooftop PV	Solar (SS)	Battery (S)	VPP	Gas and diesel (S)	Total	Imports to SA	Exports from SA	Net interchange (+ve import)	Battery (S) and VPP
Central scenario												
2019-20	6,119	218	1,603	707	32	19	6,317	15,015	1,059	1,211	-152	64
2020-21	6,098	220	1,744	957	45	44	4,618	13,726	2,081	772	1,309	110
2021-22	6,379	219	1,814	960	44	42	4,322	13,781	2,166	884	1,282	107
2022-23	6,376	220	1,857	960	45	37	4,234	13,729	2,306	823	1,483	102
2023-24	6,380	220	1,878	962	43	33	3,433	12,948	3,059	772	2,287	95
2024-25	6,358	219	1,885	961	41	42	2,427	11,934	4,039	667	3,372	103
2025-26	6,434	218	1,890	958	42	49	1,898	11,490	4,485	658	3,827	112
2026-27	6,489	218	1,897	958	42	57	1,570	11,231	4,797	669	4,128	121
2027-28	6,487	217	1,908	964	44	66	1,377	11,063	5,051	683	4,368	134
2028-29	6,147	219	1,917	961	45	73	1,265	10,626	5,516	631	4,885	143
Slow Change scenario												
2019-20	6,123	180	1,501	707	33	28	6,129	14,701	1,175	1,144	31	76
2020-21	6,110	178	1,525	957	46	65	4,328	13,209	2,333	685	1,648	135
2021-22	6,365	177	1,553	960	45	62	3,427	12,589	2,953	689	2,264	131
2022-23	6,407	178	1,579	960	44	52	3,411	12,629	3,075	715	2,360	118
2023-24	6,366	177	1,616	969	42	45	2,675	11,890	3,912	796	3,115	108
2024-25	6,418	175	1,655	956	44	37	1,588	10,873	5,012	809	4,203	101
2025-26	6,422	174	1,691	958	43	29	1,531	10,848	4,920	749	4,171	91
2026-27	6,507	173	1,727	958	42	24	1,514	10,944	4,795	742	4,053	84
2027-28	6,520	172	1,759	964	43	21	1,496	10,974	4,791	760	4,031	82
2028-29	6,167	173	1,781	961	45	18	1,559	10,704	4,959	643	4,316	82
Step Change scenario												
2019-20	6,122	222	1,687	707	29	45	6,436	15,248	994	1,263	-269	90
2020-21	6,068	246	2,070	960	42	104	4,642	14,131	1,944	840	1,103	173
2021-22	6,301	270	2,357	962	43	102	4,017	14,052	2,163	935	1,229	172
2022-23	6,242	298	2,496	961	44	117	3,417	13,575	2,630	760	1,870	190
2023-24	7,228	341	2,566	3,357	41	190	2,111	15,835	1,989	2,173	-184	268
2024-25	7,587	387	2,628	3,432	38	269	1,294	15,637	2,459	2,301	158	352
2025-26	8,916	433	2,685	3,762	38	285	1,885	18,004	1,426	3,538	-2,111	369
2026-27	8,766	479	2,708	4,018	38	300	1,547	17,857	1,636	3,551	-1,915	387
2027-28	8,715	524	2,733	4,021	38	299	906	17,237	2,044	3,294	-1,250	385
2028-29	8,519	571	2,773	4,005	38	313	1,514	17,733	1,717	3,380	-1,663	401

2.3 Key supply forecast analysis

Wind

Across all scenarios, wind generation is forecast to have a step increase in 2021-22 and step decrease in 2028-29, due to the commissioning and retirement, respectively, of committed and existing wind farms. In the Step Change scenario, new wind farms projected to be built[5], beyond those currently committed, are forecast to bring an additional 570 MW of capacity in 2023-24, increasing in total to 1,277 MW by 2027-28. The bulk of this is projected to be built in the Mid-North region and a small part in the South-East, which accounts for increased generation during this period.

SNSG

The amount of SNSG generation and its trending over the forecast period is mostly driven by PVNSG capacity, with the Step Change scenario showing the largest increase due to steady growth in PVNSG, and the Slow Change scenario having lower capacity than even the Central scenario.

Rooftop PV

Rooftop PV generation increases over the forecast period due to increased installed capacity, with the Step Change scenario having a higher average growth rate than the Central Scenario, particularly to 2022-23. The Slow Change scenario predicts lower overall capacity and hence lower generation than the Central Scenario.

Solar

The committed large-scale solar project, Bungala Two Solar Farm, was assumed to be commissioned from Summer 2019-20, leading to a forecast step increase in solar generation across all scenarios in 2020-21, with the solar farm's first full financial year of generation. In the Step Change scenario, new solar farms projected to be built are forecast to bring an additional 967 MW of capacity in 2023-24, increasing in total to 1,200 MW by 2026-27. This additional capacity is all forecast to be built in the Riverland region, driving increased solar generation during this period.

Battery

Across all scenarios, utility-scale battery generation has a small step increase in 2020-21, due to the commissioning of Lincoln Gap Wind Farm – BESS occurring from Summer 2019-20, meaning that a full financial year's generation was not modelled until 2020-21.

VPP

Changing generation levels from VPPs mirror the forecast VPP installed capacity that is modelled in each scenario, with market forces dictating actual usage. In the Step Change scenario, from 2023-24 onwards, the consumer-led growth of storage creates such an abundance of VPP that its market utilisation begins to lag installed capacity.

Gas and diesel

Across all scenarios, the forecast decrease in scheduled gas and diesel generation up to 2023-24 is driven by a combination of factors: the retirement of Torrens Island A and Osborne power stations, new variable renewable energy (VRE) being commissioned, and the relaxing of system strength requirements as synchronous condensers are constructed. The forecast decline after 2023-24 is attributed to increasing interconnector imports to South Australia, enabled by EnergyConnect commissioning assumed at the start of that year. With EnergyConnect in place, system strength requirements sourced from within South Australia are assumed to be further relaxed, leading to less South Australian gas generation.

[5] New generator builds in the modelling are not necessarily referring to any particular project that is being tracked by AEMO's Generation Information. Rather these additions relate to new generation being built to satisfy the modelling scenario's goals as mentioned in Section 1.2.

More generally, additional VRE across the NEM is forecast to displace gas generation across the forecast period. In the Slow change scenario, less VRE is projected to be built across all NEM regions, so gas generation is not projected to be displaced any further towards the end of the forecast period, and South Australian gas generation is forecast to level off.

In the Step Change scenario, increased renewable generation projected to be built across the NEM (including in South Australia) would again be expected to displace South Australian gas generation. However, increases in South Australian gas generation across the end of the forecast period can be attributed to the accelerated projected closures of coal generation elsewhere in the NEM during this period under Step Change scenario assumptions.

Interconnectors

In the Central and Slow Change scenarios, net interconnector flows into South Australia are mostly positive (net import), and generally increase across the forecast period. This is attributed to a minor forecast change in South Australian grid consumption (excluding SNSG and rooftop PV) over the period, coupled with the projected decline in South Australian gas and diesel generation, and retirement of wind generation in the last forecast year.

In the Step Change scenario, a forecast overall small decline in South Australian grid consumption and decreases in South Australian gas generation across the forecast period are combined with a large projected increase in South Australian VRE from the middle of the period. Thus, South Australia ends up as a net exporter on its interconnectors for the last few years of the forecast.